# PUBLIC REVIEW DRAFT - CEQA INITIAL STUDY

# MITIGATED NEGATIVE DECLARATION

## CRAWFORD CANYON PARK AND CRAWFORD CANYON ROAD SIDEWALK EXTENSION PROJECT
## IP 21-093

***Prepared for:***

**County of Orange**

**OC Parks, Planning & Design Division**
**13042 Old Myford Road**
**Irvine, CA 92602**

**OC Public Works, Infrastructure Programs**
**601 N. Ross Street**
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**June 2021**

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# Chapter 1: Introduction

The purpose of this Initial Study is to evaluate the potentially significant environmental impacts associated with implementing the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project. The Initial Study is organized into the following chapters:

- Chapter 1: Introduction
- Chapter 2: Environmental Determination
- Chapter 3: Project Description
- Chapter 4: Environmental Evaluation
- Chapter 5: Mitigation Monitoring and Reporting Program
- Chapter 6: References

## 1.1 Project Title

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

## 1.2 Lead Agency Name | Address

County of Orange

OC Parks, Planning & Design Division
13042 Old Myford Road
Irvine, CA 92602

OC Public Works, Infrastructure Programs
601 N. Ross Street
Santa Ana, CA 92703

## 1.3 Lead Agency Contact Person | Telephone Number | Email

OC Parks, Planning & Design Division
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Email: natalia.gaerlan@ocparks.com

OC Public Works, Infrastructure Programs
Adam Ramos, P.E., Civil Engineer
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Email: Adam.Ramos@ocpw.ocgov.com

## 1.4 Project Location

Regionally, the proposed Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project (Project) is situated in North Tustin, an unincorporated community in the County of Orange (County); refer to **Figure 1,** *Regional Map*. Locally, the proposed Park (Crawford Canyon Park or Park) is located at the northwest corner of Newport Avenue and Crawford Canyon Road (Park Site) and the proposed Sidewalk Extension with associated roadway improvements (Sidewalk Extension) is located along Crawford Canyon Road and Newport Avenue (Sidewalk Extension Site); refer to **Figure 2**, *Local Vicinity Map*. For the topography of the Park and Sidewalk Extension Sites and the local vicinity, refer to **Figure 3**, *Topographic Map*.

SOURCE: ESRI

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

**Figure 1**
Regional Map

ESA

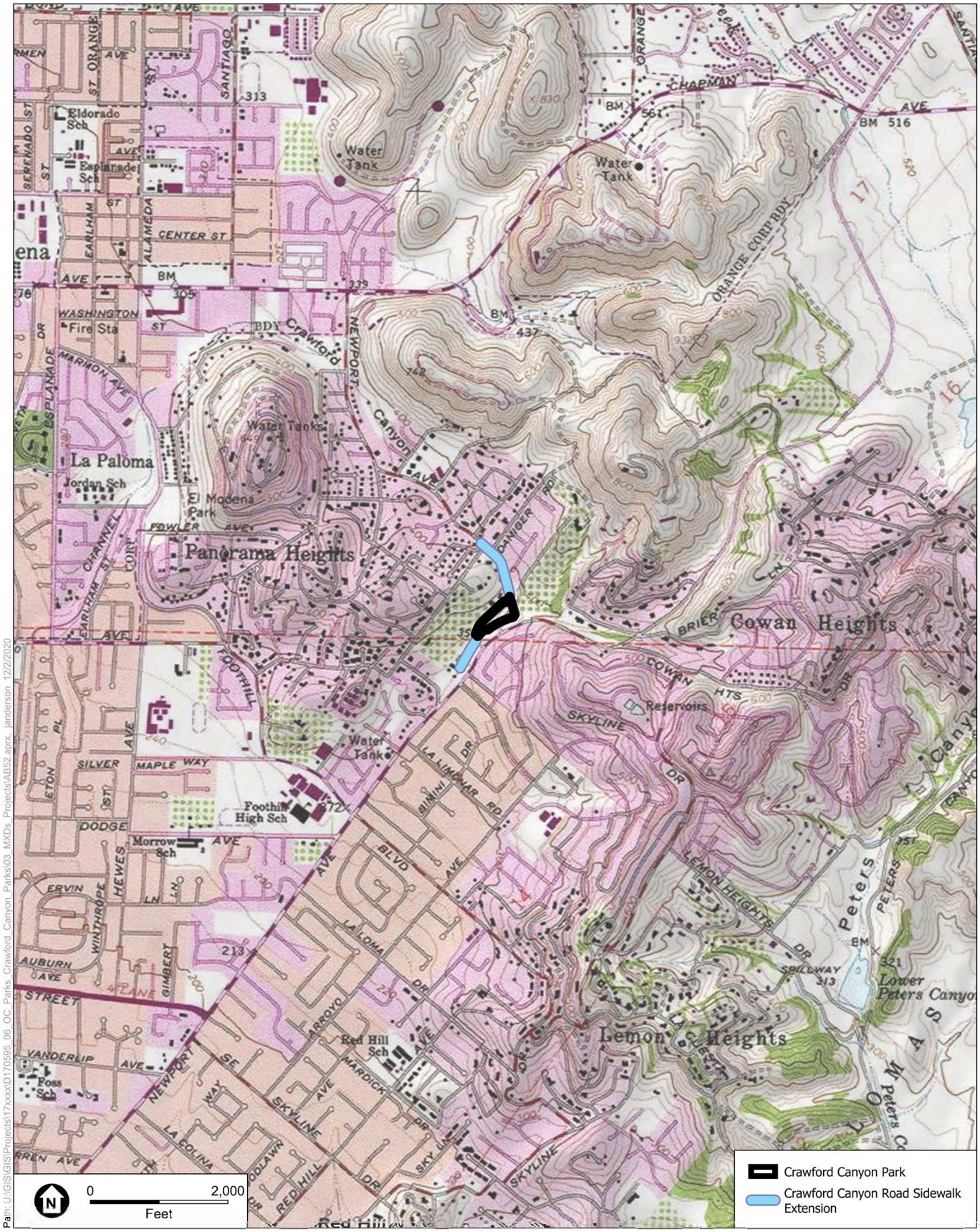
Path: U:\GIS\GIS\Projects\17xxxx\D170595_06_OC_Parks_Crawford_Canyon_Parks\03_MXDs_Projects\Initial_Study_MND.aprx, janderson, 3/25/2021

SOURCE: Mapbox, 2020.

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

**Figure 2**
Local Vicinity Map

ESA




SOURCE: USGS Topographic Series (Orange, CA).

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

**Figure 3**
Topographic Map

ESA

## 1.5 Project Sponsor's Name | Address

County of Orange

OC Parks, Planning & Design Division
13042 Old Myford Road
Irvine, CA 92602

OC Public Works, Infrastructure Programs
601 N. Ross Street
Santa Ana, CA 92703

## 1.6 General Plan | Specific Plan Designation(s)

County of Orange General Plan Land Use Designation: Suburban Residential (1B)

## 1.7 Zoning District(s)

County of Orange Zoning Designation: Agricultural Residential (AR) 20,000

## 1.8 Description of Project

The County is proposing to develop the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project. The proposed Crawford Canyon Park is a 2.5-acre neighborhood park located at the northwest corner of Newport Avenue and Crawford Canyon Road situated in North Tustin, an unincorporated community in the County. Recreational amenities and features of Crawford Canyon Park are anticipated to include a quarter-mile walkway, pathways, foot bridges, two playgrounds/natural play areas for children, exercise stations, picnic tables, benches, a drinking fountain, a bioswale and bioretention basin, landscape berms aligned with trees and natural rolling lawn areas. Crawford Canyon Park would not include barbeques or restroom facilities. A paved surface parking lot with 11 vehicular parking spaces for the Park would be provided onsite with vehicular access from Newport Avenue for both northbound and southbound travel. A deceleration lane would be constructed for southbound travel on Newport Avenue that would allow a right turn into the parking lot of Crawford Canyon Park. The striped center median would be modified to allow a left turn into Crawford Canyon Park. The proposed improvements of the Sidewalk Extension include approximately 630 feet of sidewalk construction along the north side of Newport Avenue beginning across from Hyde Park Drive proceeding easterly and approximately 815 feet of sidewalk construction along the west side of Crawford Canyon Road from the northeasterly end of the Park Site to Country Haven Lane; refer below to Figures 7a and 7b. Additional associated proposed improvements include decomposed granite walkways, pavement reconstruction, driveways, curb ramps, curb/gutter, retaining walls/slough walls, drainage inlet modifications and features, utility relocations and adjustments, traffic pole replacement, pedestrian push button relocation and adjustments to pull boxes at the intersection of Crawford Canyon Road and Newport Avenue. The areas adjacent to the decomposed granite walkways along Crawford Canyon Road will be self-retaining areas.

## 1.9 Surrounding Land Uses and Setting

The areas immediately to the north, east, south, and west of both the Park and Sidewalk Extension Sites consist of existing single-family residences; refer to Figure 2.

## 1.10 Other public agencies whose approval is required

**Table 1-1**, *Public Agency Approvals*, below provides a list of required and anticipated public agency approvals that are associated with the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project.

**Table 1-1: Public Agency Approvals**

| Body | Action |
|---|---|
| County of Orange Public Works | The following permits are required: temporary construction easements, grading, demolition, landscape, plumbing, and electrical. |
| OC Parks Commission | Recommendation for approval of the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project Initial Study/Mitigated Negative Declaration (IS/MND). |
| Board of Supervisors | Approval and adoption of the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project IS/MND. |

Source: ESA, 2021.

## 1.11 California Native American consultation

**Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?** OC Planning mailed the Assembly Bill 52 (AB 52) initial consultation notification letters on December 28, 2020 to the following California Native American tribes: Gabrieleno Band of Mission Indians – Kizh Nation, Juaneno Band of Mission Indians, San Gabriel Band of Mission Indians, and Soboba Band of Luiseno Indians. Tribal consultation is still ongoing. Consultation with the Gabrieleno Band of Mission Indians – Kizh Nation and the County took place on March, 12, 2021; refer to Section 4.22, *Tribal Cultural Resources* for further discussion.

# Chapter 2: Environmental Determination

Based on the analysis conducted in this Initial Study, the County of Orange, OC Parks and OC Public Works, as the Lead Agency, has made the following determination:

**Table 2-1: Environmental Determination**

| | |
|---|---|
| I find that the proposed project COULD NOT have a significant effect on the environment, and a **NEGATIVE DECLARATION** will be prepared. | ☐ |
| I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made or agreed to by the project proponent. A **MITIGATED NEGATIVE DECLARATION** will be prepared. | ☒ |
| I find that the proposed project MAY have a significant effect on the environment, and an **ENVIRONMENTAL IMPACT REPORT** is required. | ☐ |
| I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An **ENVIRONMENTAL IMPACT REPORT** is required, but it must analyze only the effects that remain to be addressed. | ☐ |
| I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier **EIR** or **NEGATIVE DECLARATION** pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier **EIR** or **NEGATIVE DECLARATION**, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required. | ☐ |
| I find that the proposed project has previously been analyzed as part of an earlier CEQA document (which either mitigated the project or adopted impacts pursuant to findings) adopted/certified pursuant to the State CEQA Guidelines and the County's adopted Local CEQA Guidelines. The proposed project is a component of the whole action analyzed in the previously adopted/certified CEQA document. | ☐ |
| I find that the proposed project has previously been analyzed as part of an earlier CEQA document (which either mitigated the project or adopted impacts pursuant to findings) adopted/certified pursuant to State and County CEQA Guidelines. Minor additions and/or clarifications are needed to make the previous documentation adequate to cover the project which are documented in this addendum to the earlier CEQA document (CEQA §15164). | ☐ |
| I find that the proposed project Has previously been analyzed as part of an earlier CEQA document (which either mitigated the project or adopted impacts pursuant to findings) adopted/certified pursuant to State and County CEQA Guidelines. However, there is important new information and/or substantial changes have occurred requiring the preparation of an additional CEQA document (ND or EIR) pursuant to CEQA Guidelines Sections 15162 through 15163. | ☐ |

Cindy Salazar
Signature

6/17/2021
Date

Cindy Salazar
Printed Name

# Chapter 3: Project Description

## 3.1 Introduction

The County is proposing to develop the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project. The proposed Crawford Canyon Park is a 2.5-acre neighborhood park located at the northwest corner of Newport Avenue and Crawford Canyon Road. Recreational amenities and features of Crawford Canyon Park are anticipated to include a quarter-mile walkway, pathways, foot bridges, two playgrounds/natural play areas for children, exercise stations, picnic tables, benches, a drinking fountain, a bioswale and bioretention basin, landscape berms aligned with trees and natural rolling lawn areas. Crawford Canyon Park would not include barbeques or restroom facilities. A paved surface parking lot with 11 vehicular parking spaces would be provided onsite with vehicular access from Newport Avenue. The proposed improvements of the Sidewalk Extension include approximately 630 feet of sidewalk construction along the north side of Newport Avenue beginning across from Hyde Park Drive proceeding easterly and approximately 815 feet of sidewalk construction along the west side of Crawford Canyon Road from the northeasterly end of the Park Site to Country Haven Lane. Additional associated proposed improvements include decomposed granite walkways, pavement reconstruction, driveways, curb ramps, curb/gutter, retaining walls/slough walls, drainage inlet modifications and features, utility relocations and adjustments, traffic pole replacement, pedestrian push button relocation and adjustments to pull boxes at the intersection of Crawford Canyon Road and Newport Avenue.

Project Objectives:

- Accessibility. Provide safe pedestrian access for residents of North Tustin area including Panorama Elementary School. Provide linkage to surrounding walkways, bikeways and trails.
- Recreation. Serve the recreational needs of the community.
- Safe and Sustainable Design. Provide safe and healthy environment; Maintain law enforcement surveillance views into the Park Site; Eco-friendly materials and low maintenance.
- Improve Aesthetics. Beautify the Park and Sidewalk Extension Sites with the proposed Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project.

## 3.2 Environmental Setting and Surrounding Land Uses

The surrounding land uses to the Crawford Canyon Park and Sidewalk Extension are described in **Table 3-1**, *Surrounding Land Uses*.

**Table 3-1: Surrounding Land Uses**

| Direction | Land Use(s) |
|---|---|
| North | Single-family residences, Panorama Elementary School |
| East | Crawford Canyon Road, Single-family residences |
| West | Single-family residences |
| South | Newport Avenue, Single-family residences |

Source: ESA, 2021.

Site Regional Environmental Setting
The Park and Sidewalk Extension Sites are located in North Tustin, an urban unincorporated community in the County; refer to Figure 1. North Tustin is located outside the city limits of Tustin and is the largest census-designated place (i.e., population) within the unincorporated community in the County.

Site Vicinity Environmental Setting
The areas immediately to the north, east, south, and west of the Park and Sidewalk Extension Sites consist of existing single-family residences; refer to Figure 2. An existing drainage culvert and associated cement drainage ditch is located immediately to the southwest of the Park Site. These drainage facilities will not be modified by construction of the Park.

Site Environmental Setting
The Park Site is currently vacant with scattered vegetation. An additional cement drainage ditch exists along Newport Avenue. An existing 60-foot easement designated to the County for public utilities and regional and local trails is located along the northern portion of the Park Site. Underground infrastructure and utilities located within the easement area include a storm drain pipe, sewer, water, gas, and electric lines. Overhead power lines currently exist within the easement area. An approximate 5-foot high retaining wall along a portion of the northern site perimeter currently separates the Park Site from adjacent residences. Chain link fencing exists along the Site perimeter. The Sidewalk Extension Site currently consists of roadway shoulder and a dirt drainage area along Crawford Canyon Road and an asphalt and dirt shoulder along Newport Avenue.

## 3.3 Site Improvement Characteristics

Project Components
The County is proposing to develop the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project. Recreational amenities and features of Crawford Canyon Park are anticipated to include a quarter-mile walkway, pathways, foot bridges, two playgrounds/natural play areas for children, exercise stations, picnic tables, benches, a drinking fountain, a bioswale and bioretention basin, landscape berms aligned with trees and natural rolling lawn areas; refer to **Figure 4,** *Crawford Canyon Park Conceptual Site Plan*.

The proposed 8-foot wide concrete quarter-mile walkway traverses the central area of the Park Site and near the exterior portions along Newport Avenue and Crawford Canyon Road. The proposed 5-foot wide decomposed granite pathways connect to the interior walkways along the natural rolling lawn areas. The wooden foot bridges cross the proposed dry creek/bed areas comprised of pebbles, stones, and boulders which meander throughout the interior of the Park Site. These dry creek/bed areas are an artificial runoff management feature and not a natural creek. The proposed Crawford Canyon Park includes a bioswale and bioretention basin comprised of riparian plants with natural stone cobbles and boulders located in the western portion of the Park Site adjacent to the proposed parking lot. Since the concrete ditch along Newport Avenue east of the proposed parking lot entry will be removed, stormwater will be diverted to the proposed dry creek/bed areas and bioswale. The centrally located playgrounds/natural play areas for children would include play equipment atop poured-in-place resilient play surfacing rubber materials and sand. The two playgrounds/natural play areas would be designated by recommended age groups; children aged 2 through 5 and children aged 5 through 12. The playground equipment would include a wizard's hideaway playhouse, a log and rope course, rock climber, log pyramid climber, a surfacing half-dome hand holds, log steppers, log benches, a double swing with bird's nest swing, an embankment slide, and a spring rider; refer to **Figure 5,** *Crawford Canyon Park Playground Equipment* and **Figure 6,**

*Crawford Canyon Park Site Furnishings*. The proposed exercise stations located throughout the Park Site would be situated atop decomposed granite. Exercise equipment would include push-offs, leg-flexes, body-pulls, and body-tucks. The Crawford Canyon Park does not include barbeques or restroom facilities.

The proposed improvements of the Sidewalk Extension include approximately 630 feet of sidewalk construction along the north side of Newport Avenue beginning across from Hyde Park Drive proceeding easterly and approximately 815 feet of sidewalk construction along the west side of Crawford Canyon Road from the northeasterly end of the Park Site to Country Haven Lane; refer to **Figure 7a,** *Crawford Canyon Road Sidewalk Extension Conceptual Plan* and **Figure 7b,** *Crawford Canyon Road Sidewalk Extension Conceptual Plan*. Additional associated proposed improvements include decomposed granite walkways, pavement reconstruction, driveways, curb ramps, curb/gutter, retaining walls/slough walls, drainage inlet modifications and features, utility relocations and adjustments, traffic pole replacement, pedestrian push button relocation and adjustments to pull boxes at the intersection of Crawford Canyon Road and Newport Avenue. The proposed improvements are to be constructed within the existing road right-of-way with no acquisitions anticipated. However, temporary construction easements will be required.

Parking/Access

The Crawford Canyon Park would include a paved surface parking lot comprised of nine standard vehicular spaces, two handicap accessible vehicular spaces and equipped with bicycle racks to be provided onsite with vehicular access from Newport Avenue. The vehicular access is located in the southwestern portion of the Park Site. The Crawford Canyon Park would include a vehicular deceleration lane on Newport Avenue prior to entering the proposed parking lot. A 15-wide maintenance access drive comprised of turf block with grasses would be located along the northern boundary of the Park Site and accessible from the parking lot. A fence up to six feet in height would be installed along the northeastern perimeter of the Park Site to discourage pedestrians from trespassing through private property. Pedestrian access would be provided within the parking lot and from sidewalks along Newport Avenue and Crawford Canyon Road.

Operations

Hours of operation for the Crawford Canyon Park would include 7:00 A.M. to 6:00 P.M. from November 1 through February 28 and 7:00 A.M. to 9:00 P.M. from March 1 through October 31. County sponsored activities or events would not be hosted at the Crawford Canyon Park. Public group reservations for the recreational amenities at the Park Site would not be allowed.

Security Features/Lighting

A proposed vehicular gate would be located at the parking lot entrance. The proposed parking lot would be locked every evening and opened every morning. The Park would not be enclosed with fencing or walls. The Park would provide security lighting located along walkways and pathways and within the two playgrounds/natural play areas for children and the parking lot. The proposed down-shield lighting would be timer controlled and remain on through the evening and automatically shut off during the day.

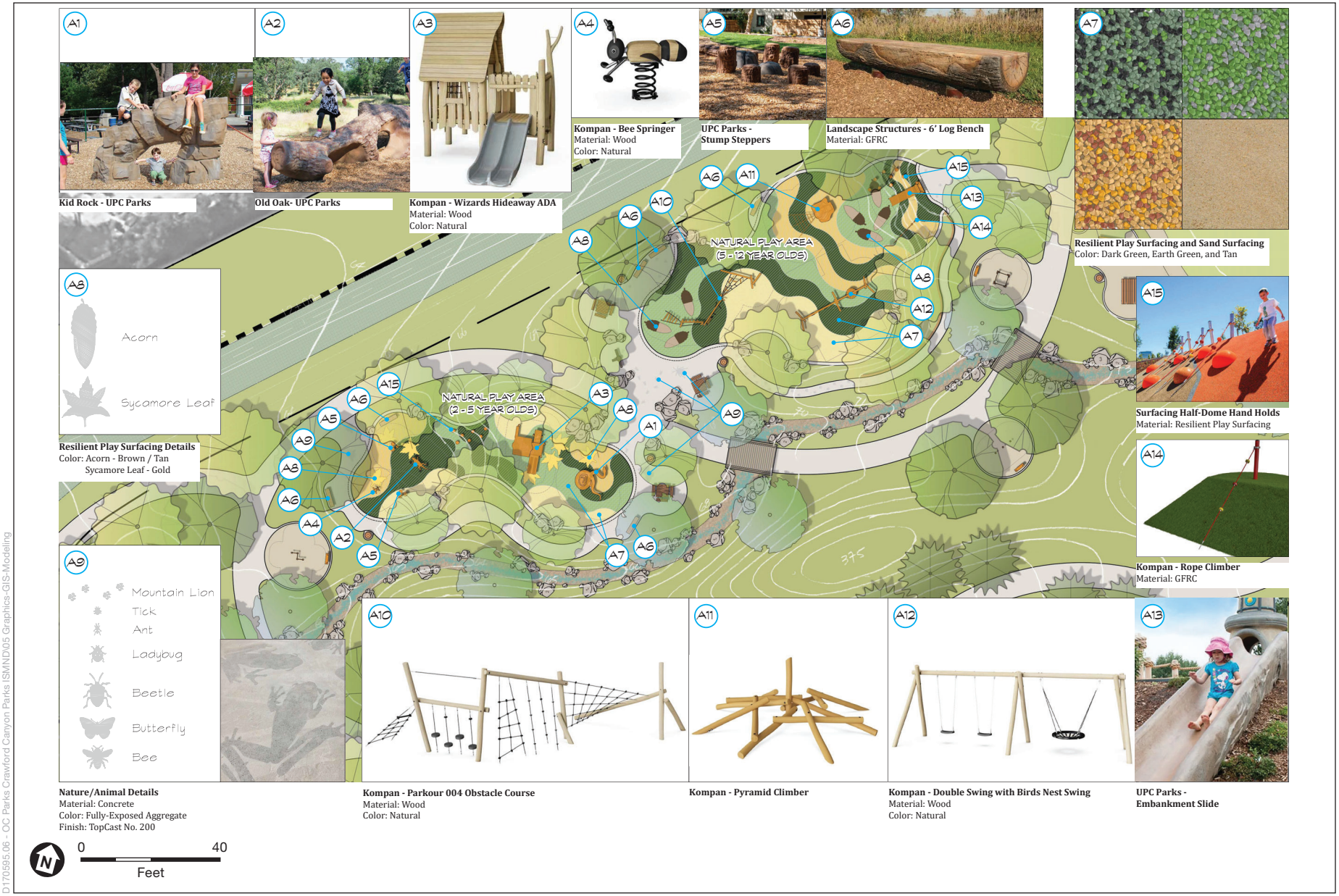
D170595.06 - OC Parks Crawford Canyon Parks ISMND\05 Graphics-GIS-Modeling

SOURCE: OC Parks, 2020

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

**Figure 4**
Crawford Canyon Park Conceptual Site Plan

ESA



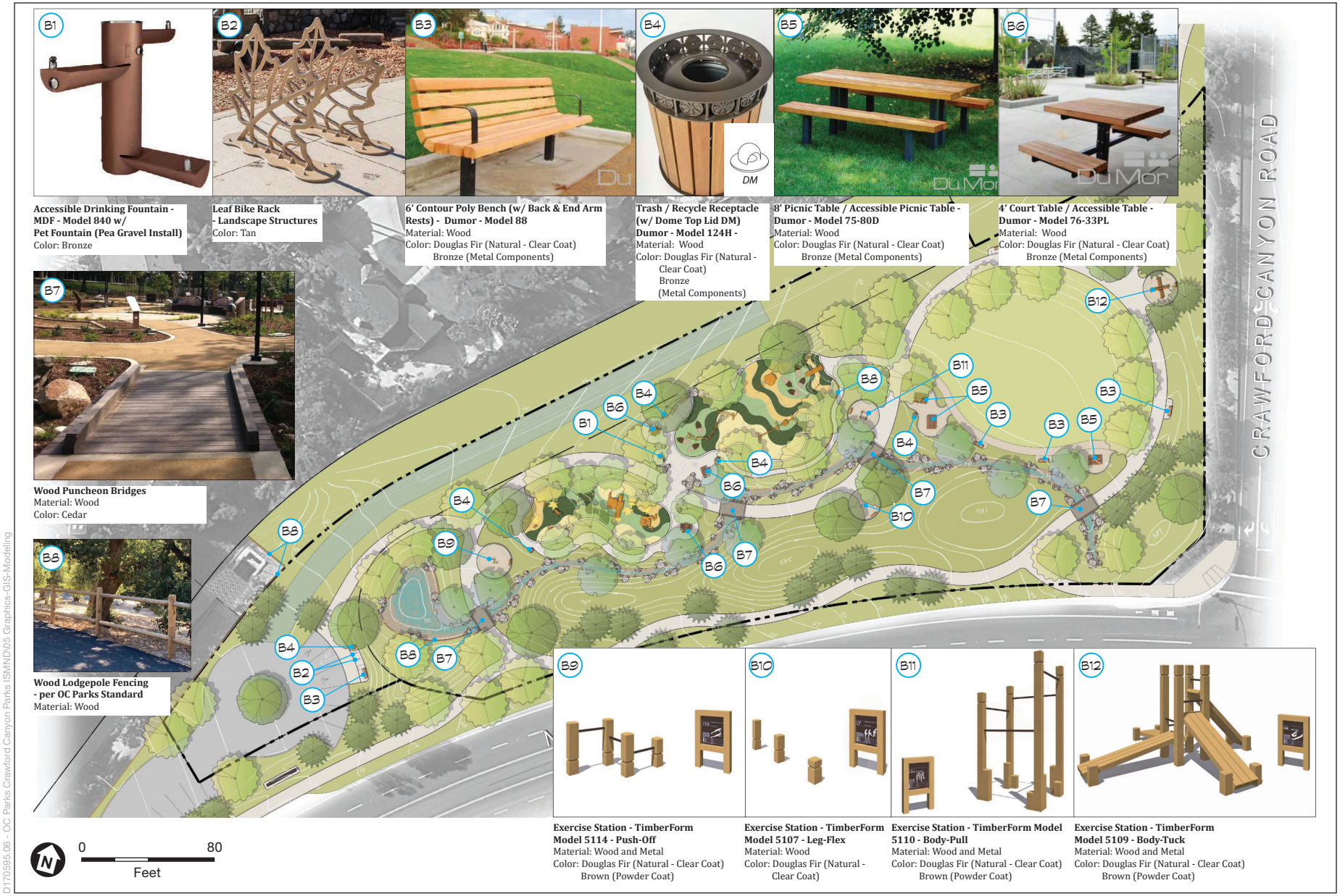

D170595.06 - OC Parks Crawford Canyon Parks ISMND\05 Graphics-GIS-Modeling

SOURCE: RJM Design Group, 2020

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

**Figure 5**
Crawford Canyon Park Playground Equipment

ESA



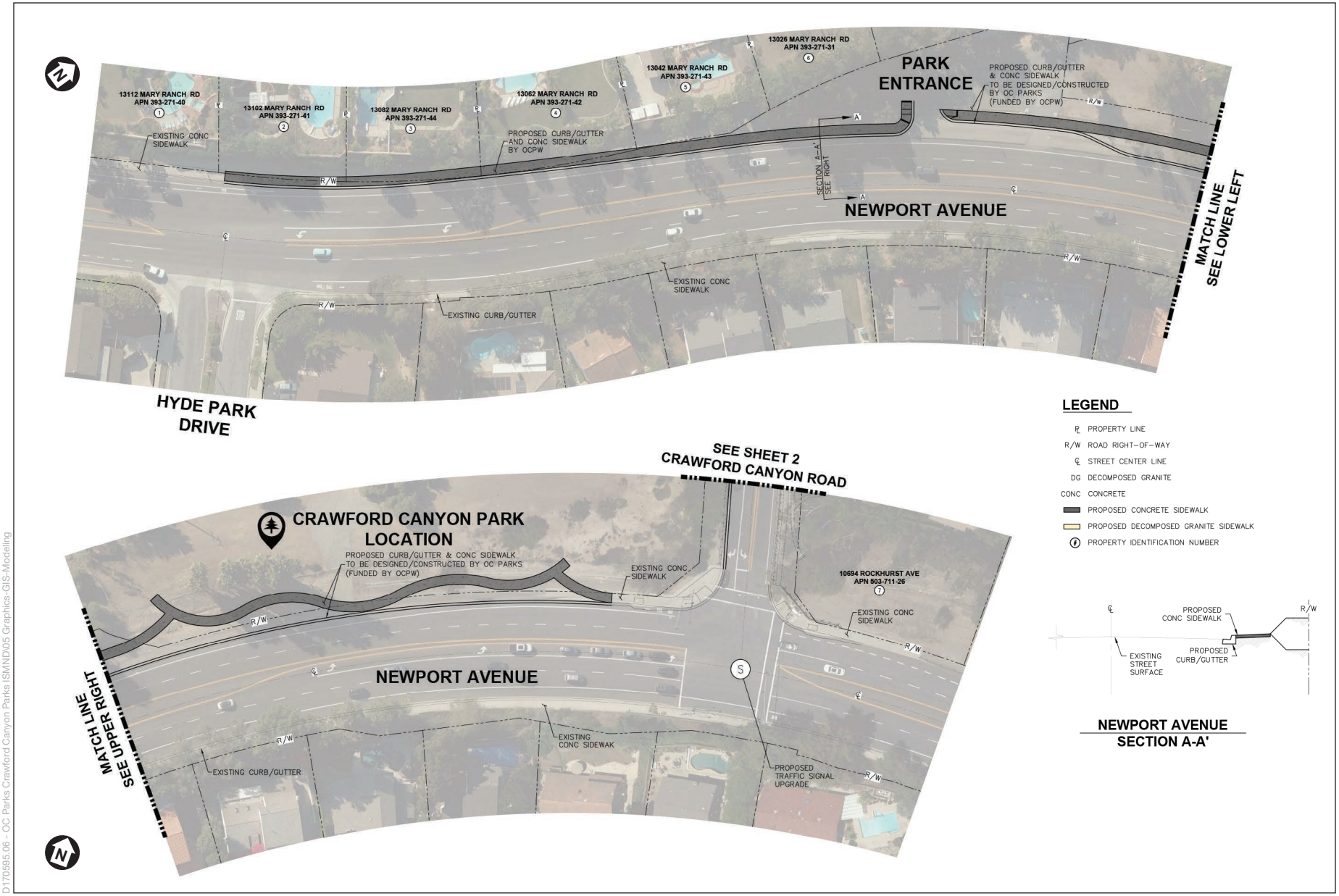

D170595.06 - OC Parks Crawford Canyon Parks ISMND\05 Graphics-GIS-Modeling

SOURCE: RJM Design Group, 2020

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

**Figure 6**
Crawford Canyon Park Site Furnishings

ESA



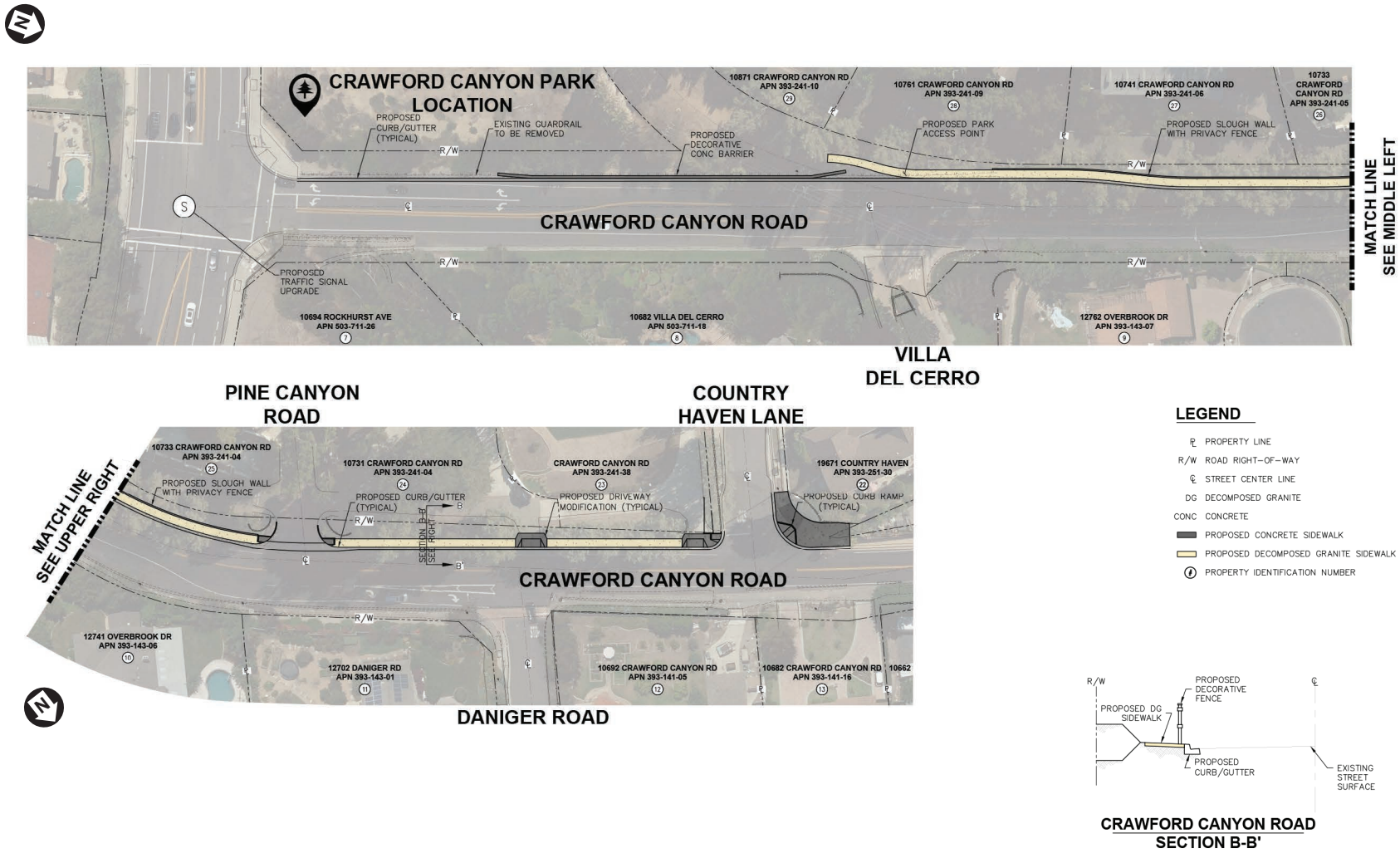

D170595.06 - OC Parks Crawford Canyon Parks ISMND\05 Graphics-GIS-Modeling

SOURCE: County of Orange, 2020

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

**Figure 7a**
Crawford Canyon Road Sidewalk Extension Conceptual Plan

ESA




D170595.06 - OC Parks Crawford Canyon Parks ISMND\05 Graphics-GIS-Modeling

SOURCE: County of Orange, 2020

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

**Figure 7b**
Crawford Canyon Road Sidewalk Extension Conceptual Plan

ESA

Maintenance
The anticipated maintenance of Crawford Canyon Park would include weekly landscaping, trash haul up to twice a week, and daily inspection of all-around Park integrity. Trash receptacles would be located throughout the Park Site.

Landscaping
The Crawford Canyon Park would remove all 49 existing trees and all 27 existing palms onsite; refer to Section 4.8, *Biological Resources*, for potential impacts to trees within the Park Site. The Park would include landscape berms aligned with trees and natural rolling lawn areas; refer to **Figure 8**, *Crawford Canyon Park Conceptual Landscape Plan*. Various size replacement trees would be planted on-site and include native coast live oaks (*Quercus agrifolia*), native sycamores (*Platanus racemosa*), non-native madrones (*Arbutus 'Marina'*), non-native allepo pines (*pinus halepensis*), and non-native California peppers (*Schinus molle*). The Park would provide native and/or drought tolerant landscaping or other low water landscaping to the greatest extent feasible. Foot bridges would cross the dry creek/bed areas comprised of pebbles, stones, and boulders which meander throughout the interior of the Park Site. A bioswale and bioretention basin comprised of riparian plants with natural stone cobbles and boulders is proposed in the western portion of the Park Site adjacent to the proposed parking lot. Development of the Sidewalk Extension could result in removal of one or two existing ornamental or non-native trees along Crawford Canyon Road in the County right-of-way; refer to Section 4.8, *Biological Resources,* for potential impacts to trees within the Sidewalk Extension Site.

Signage
Proposed signage would include a wooden entry monument sign up to 5 feet in height located at the parking lot entrance of the Park Site. Metal way-finding signage with Park regulations up to 6 feet in height would be located throughout the Park Site.

Walls and Fencing
A black, wrought-iron fence up to 6 feet in height would be installed along the northeastern perimeter of the Park Site to discourage pedestrians from trespassing through private property. The Park would not be enclosed with fencing or walls. The Sidewalk Extension would include splitface concrete block retaining walls ranging from 2 feet to 4 feet in height with wrought iron fencing up to 6 feet in height.

D170595.06 - OC Parks Crawford Canyon Parks ISMND\05 Graphics-GIS-Modeling

SOURCE: RJM Design Group, 2020

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

**Figure 8**
Crawford Canyon Park Conceptual Landscape Plan

ESA

## 3.4 Building Characteristics

The Crawford Canyon Park and Sidewalk Extension would not include the development of habitable structures, buildings, or restroom facilities. The Park is designed with a nature theme.

## 3.5 Infrastructure Characteristics

Stormwater

The Crawford Canyon Park is proposing a bioswale and bioretention basin located in the western portion of the Park Site adjacent to the parking lot. Since the concrete ditch along Newport Avenue east of the proposed parking lot entry will be removed, stormwater will be diverted to the proposed dry creek/bed areas and bioswale. Construction of the Park would also include storm drain outfall maintenance, removing the accumulated soil piles to improve site drainage and sediment/erosion control on the Site, and accumulated soil and debris piles on the Park Site. Construction of the Sidewalk Extension would include the removal of the concrete v-ditch along Crawford Canyon Road for the installation of the curb and gutter and the decomposed granite pathway. The Sidewalk Extension includes the construction of a storm drain and catch basin inlet along Crawford Canyon Road.

Utilities/Utility relocation(s)

The Crawford Canyon Park is proposing domestic water for landscape irrigation. The Park would not include restroom facilities or sewer lines. Electricity is needed for the proposed security lighting within the Park. No existing utilities within the Park Site would require relocation. Utilities requiring relocation for construction of the Sidewalk Extension would include an advance Southern California Gas Company meter, traffic signal poles and pedestrian push button.

Site Drainage/Best Management Practices

The parking lot surface flows to an inlet and then into the proposed underground storm drain pipe. Low flows go to a filterra proprietary best management practice (BMP) water quality treatment device then into the proposed underground storm drain pipe. Storm flows bypass the filterra and go directly into the catch basin inlet then into the proposed underground storm drain pipe for the Park. The majority of the Park Site will be treated by the proposed bioretention basin. The remainder of the Park Site employs the use of onsite low impact development (LID) BMPs to address project runoff. These LID BMPs include (1) minimizing impervious area through the incorporation of landscaping and trees, (2) maximizing natural infiltration capacity with the use of pervious drainage swales, (3) preserve existing drainage patterns and time of concentration, (4) disconnect impervious areas by providing landscaping, (5) protect existing vegetation and sensitive areas, and (6) revegetate disturbed areas with the use of xeriscape landscaping.

## 3.6 Construction Activities

Construction Staging and Lay-Down Area(s)

The construction staging and lay-down area for the Park will be located within the project boundaries of the Park Site. Construction staging and lay-down area for the Sidewalk Extension will be located offsite, potentially within a vacant lot located approximately one-mile south of the Sidewalk Extension Site on Newport Avenue. The final construction staging and lay-down area for the Sidewalk Extension will be determined by the Project contractor. Construction workers will park within the staging and lay-down area.

Temporary roadway or travel lane closures

During construction of the Park, lane closures would occur along Newport Avenue for delivery of construction materials and during installation of the deceleration lane. One of the two southbound travel lanes along Newport Avenue is expected to be closed during construction of the Sidewalk Extension. The travel lane for southbound travel along Newport Avenue is expected

to be closed during construction of the Sidewalk Extension. Along Crawford Canyon Road, travel lanes are expected to be shifted to maintain two-directional travel.

Equipment Roster

A summary of the construction phases, approximate duration of each construction phase (working days assuming Mondays through Fridays), estimated construction workers, and estimated construction equipment for the Crawford Canyon Park and the Sidewalk Extension are shown below:

Crawford Canyon Park

- Clearing and Grubbing (Approximately 20 days consisting of 18 construction workers): Bulldozer, excavator, loader, dump truck, water truck, and sweeper.
- Grading/Excavation (Approximately 60 days consisting of 20 construction workers): Excavator, bulldozer, scraper, water truck, dump truck, and sweeper.
- Paving and Construction (Approximately 80 days consisting of 30 construction workers): Scraper, dump truck, sweeper, asphalt paver, compactor/roller, water truck, excavator, concrete truck, and bulldozer.
- Landscaping (Approximately 90 days consisting of 28 construction workers): Skid steer and backhoe.

Sidewalk Extension

- Site Preparation (Approximately 6 days consisting of 8 construction workers): Grader, tractor, loader, and backhoe.
- Demolition (Approximately 16 days consisting of 10 construction workers): Excavator, concrete/industrial saw, tractor, loader, and backhoe.
- Utility Relocation (Approximately 11 days consisting of 6 construction workers): Utility trucks.
- Storm Drain Construction (Approximately 33 days consisting of 12 construction workers): Excavator, tractor, loader, backhoe, welder, cement and mortar mixer.
- Sidewalk Construction (Newport Avenue) (Approximately 16 days consisting of 8 construction workers): Cementer and mortar mixer, compactor, and concrete/industrial saw.
- Sidewalk Construction (Crawford Canyon Road) (Approximately 16 days consisting of 8 construction workers): Cementer and mortar mixer, compactor, and concrete/industrial saw.
- Traffic Signal Modification (Approximately 11 days consisting of 10 construction workers): Crane, utility truck, and backhoe.
- Paving (Approximately 16 days consisting of 8 construction workers): Cement and mortar mixer, paver, paving equipment, roller, tractor, loader, and backhoe.

Soil Balance

The Crawford Canyon Park is proposing approximately 2,900 cubic yards of cut and 12,900 cubic yards of fill, resulting in approximately 10,000 cubic yards of soil import. The Sidewalk Extension is anticipated to export up to approximately 272 cubic yards of native soil and import up to approximately 265 cubic yards for structure backfill. If the native soil can be used for wall backfill, then the Sidewalk Extension Site would be balanced.

## 3.7 Project Features

Recreational amenities and features of Crawford Canyon Park are anticipated to include a quarter-mile walkway, pathways, foot bridges, two playgrounds/natural play areas for children, exercise

stations, picnic tables, benches, a drinking fountain, a bioswale and bioretention basin, landscape berms aligned with trees and natural rolling lawn areas; refer to Figures 4 through 6 and Figure 8.

### 3.8 Offsite Improvements

The Crawford Canyon Park would include a deceleration lane on Newport Avenue prior to entering the proposed parking lot.

### 3.9 Project Schedule and Phases

The County is proposing to begin construction in fall of 2021 with Crawford Canyon Park opening in summer of 2022. The Crawford Canyon Park would take approximately one year to construct. Construction of the Park would include approximately 250 working days with no overlap of construction phases which includes approximately 20 days for clearing and grubbing; approximately 60 days for grading/excavation; approximately 80 days for paving and construction; and approximately 90 days for landscaping; refer to Table 4.7-1, *Estimated Construction Schedule*.

The County is proposing to begin construction of the Sidewalk Extension in summer of 2022 with completion in fall of 2022. Construction of the Sidewalk Extension would include approximately 120 working days with some overlap of construction phases which includes approximately 7 days for site preparation; 21 days for demolition; approximately 15 days for utility relocations; approximately 45 days for storm drain construction; approximately 21 days for sidewalk construction along Newport Avenue and approximately 21 days for sidewalk construction along Crawford Canyon Road; approximately 15 days for traffic signal modification; and approximately 21 days for paving; refer to Table 4.7-1.

### 3.10 Change in Land Use Controls

The Crawford Canyon Park Site is designated as Suburban Residential (1B) on the County's General Plan Land Use Element Map (2015). A park is allowed in this land use designation. The Park Site is zoned Agricultural Residential (AR) 20,000 on the County's Zoning Map (2016), which allows outdoor recreational uses. The Crawford Canyon Park and Sidewalk Extension does not include a general plan amendment or zone change.

# Chapter 4: Environmental Evaluation

## 4.1 Analysis Methodology

Analysis of potentially significant impacts of each of the environmental factors identified in **Table 4-1**, *Environmental Factors Potentially Affected*, below is based on the project site environmental setting, project description, and the sample questions/thresholds of significance. Potentially significant impacts that are reduced below the level of significance by sample questions/thresholds of significance will detail how the potentially significant impact is reduced. Potentially significant impacts that are unable to be reduced below the level of significance will detail the various mitigation options applied and why none would reduce the impact to less than significant.

The analysis will consider the whole of the actions and include the following:

- Onsite impacts
- Offsite impacts
- Short-term construction impacts
- Long-term operational impacts
- Direct impacts
- Indirect impacts
- Cumulative impacts

## 4.2 Environmental Factors Evaluated

This document incorporates the Environmental Checklist Form from Appendix G of the CEQA Guidelines as referenced in Section 3.3 of the Orange County 2020 Local CEQA Procedures Manual. Table 4-1 below lists the environmental factors that are evaluated in Sections 4.5 through 4.25 of this document.

**Table 4-1: Environmental Factors Evaluated**

| | |
|---|---|
| ☐ Aesthetics (4.5) | ☐ Mineral Resources (4.16) |
| ☐ Agriculture & Forestry Resources (4.6) | ☐ Noise (4.17) |
| ☐ Air Quality (4.7) | ☐ Population & Housing (4.18) |
| ☐ Biological Resources (4.8) | ☐ Public Services (4.19) |
| ☐ Cultural Resources (4.9) | ☐ Recreation (4.20) |
| ☐ Energy (4.10) | ☐ Transportation (4.21) |
| ☐ Geology and Soils (4.11) | ☐ Tribal Cultural Resources (4.22) |
| ☐ Greenhouse Gas Emissions (4.12) | ☐ Utilities & Service Systems (4.23) |
| ☐ Hazards & Hazardous Materials (4.13) | ☐ Wildfire (4.24) |
| ☐ Hydrology & Water Quality (4.14) | ☐ Mandatory Findings (4.25) |
| ☐ Land Use & Planning (4.15) | |

## 4.3 Thresholds of Significance

Thresholds of significance are identifiable quantitative, qualitative or performance level standards of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by a Lead Agency and compliance with which means the effect will normally be determined to be less than significant (Guidelines §15064.7(a)).

The County relies upon the specific questions relating to the topical environmental factors listed in Appendix G of the State CEQA Guidelines to assist in the determination of a potentially significant impact. The County may, depending on the circumstances of a particular project, use specific thresholds of significance on a case-by-case basis as provided by CEQA Guidelines Section 15064.7(b). In addition, the County of Orange Board of Supervisors adopted County VMT guidelines and thresholds set by the County of Orange *Final Guidelines for Evaluating Vehicle Miles Traveled Under CEQA* (County of Orange, 2020) at its November 17, 2020 meeting.

## 4.4 Environmental Baseline

To adequately determine the significance of a potential environmental impact, the environmental baseline must be established. Guidelines Section 15125(a) states in pertinent part that the existing environmental setting will normally constitute the baseline physical conditions that will assist the County in a determining if an impact is significant.

Therefore, the environmental baseline for this Project constitutes the existing physical conditions as they exist at the time that the environmental process commenced.

| **4.5 Aesthetics**<br><br>*Except as provided in Public Resources Code Section 21099, would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Have a substantial adverse effect on a scenic vista? | ☐ | ☐ | ☒ | ☐ |
| b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway? | ☐ | ☐ | ☒ | ☐ |
| c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality? | ☐ | ☐ | ☒ | ☐ |
| d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area? | ☐ | ☐ | ☒ | ☐ |

**Question 4.5a) Have a substantial adverse effect on a scenic vista?**

**Response to Question 4.5a)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. Scenic vistas consist of expansive, panoramic views of important, unique, or highly valued visual features that are seen from public viewing areas. This definition combines visual quality with information about view exposure to describe the level of interest or concern that viewers may have for the quality of a particular view or visual setting. A scenic vista can be impacted in two ways: a development project can have visual impacts by either directly diminishing the scenic quality of the vista or by blocking the view corridors or "vista" of the scenic resource. Important factors in determining whether a proposed project would block scenic vistas include the project's proposed height, mass, and location relative to surrounding land uses and travel corridors.

The Park and Sidewalk Extension Sites are not designated as scenic vistas in Chapter VI, Resources Element, of the County's General Plan (County of Orange, 2013). According to the Scenic Highway Plan, Newport Avenue to the south and east of the Park and Sidewalk Extension Sites is considered a viewscape corridor (County of Orange, 2013). The Park Site is currently vacant with scattered vegetation, a drainage culvert and associated drainage ditches, overhead power lines, an existing County easement designated for public utilities and regional and local trails, and chain link fencing along the Site perimeter. The Sidewalk Extension Site is comprised of the existing road right-of-ways of Newport Avenue and Crawford Canyon Road. The Park and Sidewalk Extension Sites are located in a highly urbanized area of North Tustin. The areas immediately to the north, east, south, and west of the Sites comprise of existing single-family residences.

Construction of the Project would require temporary ground disturbance within the Park and Sidewalk Extension Sites. Construction fencing will include screening materials to block the view within the construction site. Post construction, the Park Site would be developed with a 2.5-acre neighborhood park consisting a variety of recreational amenities and features. The Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements. The Park and Sidewalk Extension would not include above-ground structures that would block or impede views of the viewscape corridor along Newport Avenue or within the vicinity of the Park and Sidewalk Extension Sites. The Project would be compatible and enhance the existing visual character of the Project vicinity. As such, the Project would not result in a substantial adverse effect on a scenic vista or change views of the viewscape corridor along Newport Avenue. Impacts would be less than significant and no mitigation measures are required.

**Question 4.5b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?**

**Response to Question 4.5b)**

<u>Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension</u>: **Less than Significant Impact**. The Park and Sidewalk Extension Sites are located in a highly urbanized area of North Tustin. The areas immediately to the north, east, south, and west of the Sites comprise of existing single-family residences. According to the Scenic Highway Plan Map, of the County's General Plan, Newport Avenue to the south and east of the Park and Sidewalk Extension Sites is considered a viewscape corridor (County of Orange, 2013). The Park and Sidewalk Extension would not include above-ground structures that would block or impede views or scenic resources within the vicinity of the Park and Sidewalk Extension Sites, including the viewscape corridor along Newport Avenue. The nearest designated scenic highway is the State Route 55 (Santa Ana)/East Anaheim and State Route 55 (near Santa Ana Canyon)/Route 15 (near Corona), located approximately 5.25 miles northwest of the Park and Sidewalk Extension Sites (Caltrans, 2021). The Park and Sidewalk Extension Sites do not contain rock outcroppings. As discussed below in Response 4.9a, based on a recent historical resources survey, no improvements on the Park and Sidewalk Extension Sites are eligible for the National Register, California Register, or Local designation. Therefore, no damage to historical resources would occur with implementation of the Project. The Sidewalk Extension Site is developed and consists of a paved sidewalk, concrete lined v-ditch drainages and vegetation that is either ornamental or non-native. The Crawford Canyon Park would remove all 49 existing trees and all 27 existing palms onsite. The Park would include the planting of more than 76 various size replacement trees as well as shrubs and groundcover within the Park Site; refer to Figure 8. Development of the Sidewalk Extension could

result in removal of one or two ornamental or non-native trees along Crawford Canyon Road in the County right-of-way. Overall, based on the above, the Project would not substantially damage scenic resources located within the vicinity of a scenic highway or the viewscape corridor along Newport Avenue. As such, a less than significant impact would occur and no mitigation measures are required.

**Question 4.5c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?**

**Response to Question 4.5c)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. The Park and Sidewalk Extension Sites are located in a highly urbanized area of North Tustin. The areas immediately to the north, east, south, and west of the Sites comprise of existing single-family residences. The Park Site is currently vacant with scattered vegetation, a drainage culvert and associated drainage ditches, overhead power lines, an existing County easement designated for public utilities and regional and local trails, and chain link fencing along the Site perimeter. The Sidewalk Extension Site is comprised of the existing road right-of-ways of Newport Avenue and Crawford Canyon Road.

Construction activities associated with the Project would require the use of construction equipment and storage of materials on-site, thus introducing contrasting features into the visual landscape that affect the visual quality of the Park and Sidewalk Extension Sites and the immediate vicinity. Contrasting features would include demolition materials, excavated areas, stockpiled soils, and other materials generated and stored on-site during construction. However, adverse effects to visual character associated with Project construction would be temporary. Post construction, the Park Site would be developed with a 2.5-acre neighborhood park consisting a variety of recreational amenities and features. The Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements. The Park and Sidewalk Extension would not include above-ground structures that would block or impede views in the vicinity of the Park and Sidewalk Extension Sites. The Project would be compatible and enhance the existing visual character of the Project vicinity.

The Park and Sidewalk Extension Sites are located in an urbanized area. Implementation of the Crawford Canyon Park and Sidewalk Extension Project is consistent with the existing zoning designation of the Sites. The Park Site is zoned Agricultural Residential (AR) 20,000 on the County's Zoning Map (2016). Per Table 7-9-31.2, Land Use Regulations – Single-Family Residential Districts, of the County's Zoning Code, the AR zoning designation permits parks and recreational facilities (non-commercial).

Overall, construction and operation of the Project would not conflict with the applicable zoning or other regulations governing scenic quality. A less than significant impact would occur in this regard and no mitigation measures are required.

**Question 4.5d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?**

**Response to Question 4.5d)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. The Park and Sidewalk Extension Sites are located in a highly urbanized area of North Tustin. The areas immediately to the north, east, south, and west of the Sites comprise of existing single-family residences. The Project vicinity exhibits considerable ambient nighttime illumination levels due to the densely developed nature of the area and adjacent properties. Artificial light sources from the surrounding properties include interior and exterior lighting for security and incidental landscape lighting. Automobile headlights, streetlights, and stoplights for visibility and safety purposes along Newport Avenue and Crawford Canyon Road contribute to overall ambient lighting levels as well.

Security lighting used during the construction of Crawford Canyon Park and the Sidewalk Extension, if necessary, could introduce new sources of light to the Sites and the immediate vicinity. If security lighting is needed, it would be shielded and directed away from surrounding light-sensitive land uses. Further, construction of Crawford Canyon Park and the Sidewalk Extension would not occur during evening hours. Temporary impacts associated with light during construction activities would be less than significant and no mitigation measures are required.

Post construction, the Park Site would be developed with a 2.5-acre neighborhood park consisting a variety of recreational amenities and features. The Park would provide security lighting located along walkways and pathways and within the two playgrounds/natural play areas for children and the parking lot. Hours of operation for the Crawford Canyon Park would include 7:00 A.M. to 6:00 P.M. from November 1 through February 28 and 7:00 A.M. to 9:00 P.M. from March 1 through October 31. The proposed down-shield lighting would be timer controlled and remain on through the evening and automatically shut off during the day. The Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements which would not involve the installation of permanent new outdoor lighting. Although implementation of Crawford Canyon Park would introduce new sources of lighting to the Park Site that are typical of recreational and urban uses, all outdoor lighting would be shielded and oriented downward to reduce light spillage onto adjacent properties. The final lighting plan for the Project would be subject to review and approval by the County as part of the site plan review process. Further, all proposed outdoor lighting would be subject to review by the County. Compliance with these regulations would ensure that operational impacts regarding lighting of Crawford Canyon Park would be less than significant and no mitigation measures are required.

Glare within the Project Site and the surrounding area occurs from sunlight reflected from reflective materials utilized in existing residences along Newport Avenue and Crawford Canyon Road and from vehicle windows and surfaces. Glare-sensitive receptors include motorists on the roadways surrounding the Project Site. As glare is a temporary phenomenon that changes with the movement of the sun, receptors other than motorists are generally less sensitive to glare impacts than to light impacts. Impacts related to glare would be minimal because the Crawford Canyon Park and the Sidewalk Extension would not include the construction of above-ground buildings or structures with highly reflective materials (e.g., windows or glass with mirror-like tints). As such, a less than significant impact would occur in this regard and no mitigation measures are required.

| **4.6 Agriculture and Forestry Resources**<br><br>*In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? | ☐ | ☐ | ☐ | ☒ |
| b) Conflict with existing zoning for agricultural use, or a Williamson Act contract? | ☐ | ☐ | ☐ | ☒ |

| | | | | |
|---|---|---|---|---|
| c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code 12220 (g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51004)g))? | ☐ | ☐ | ☐ | ☒ |
| d) Result in the loss of forest land or conversion of forest land to non-forest use? | ☐ | ☐ | ☐ | ☒ |
| e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or forest land to non-forest use? | ☐ | ☐ | ☐ | ☒ |

**Question 4.6a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?**

**Response to Question 4.6a)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. The Park and Sidewalk Extension Sites are located in North Tustin, an urbanized unincorporated community in the County. Accordingly, there is no area in North Tustin that is designated Prime Farmland, Unique Farmland or Farmland of Statewide Importance. The Park and Sidewalk Extension Sites are located in a highly urbanized area of North Tustin. The areas immediately to the north, east, south, and west of the Sites comprise of existing single-family residences. The Park Site is currently vacant with scattered vegetation, a drainage culvert and associated drainage ditches, overhead power lines, an existing County easement designated for public utilities and regional and local trails, and chain link fencing along the Site perimeter. The Sidewalk Extension Site is comprised of the existing road right-of-ways of Newport Avenue and Crawford Canyon Road. No agricultural uses or related operations are present within the Park or Sidewalk Extension Sites or in the surrounding urbanized area. Pursuant to the maps of the Farmland Mapping and Monitoring Program, the Park and Sidewalk Extension Sites are designated as Urban and Built-Up Land (CDC, 2020). According to Figure VI-1, Prime Farmland in Orange County, of the County's General Plan, the Park and Sidewalk Extension Sites are not designated as prime farmland (County of Orange, 2013). Therefore, the Sites are not located on designated Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Since the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would not convert farmland to non-agricultural uses, no impact would occur in this regard.

**Question 4.6b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?**

**Response to Question 4.6b)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. The Park and Sidewalk Extension Sites are designated as Suburban Residential (1B) on the County's General Plan Land Use Element Map (2015) and zoned Agricultural Residential (AR) 20,000 on the County's Zoning Map (2016). The Park Site is currently vacant with scattered vegetation, a drainage culvert and associated drainage ditches, overhead power lines, an existing County easement designated for public utilities and regional and local trails, and chain link fencing along the Site perimeter. The Sidewalk Extension Site is comprised of the existing road right-of-ways of Newport Avenue and Crawford Canyon Road. No agricultural zoning is present in North Tustin, and no nearby lands are enrolled under the Williamson Act. According to Figure VI-2, Orange County Agricultural Preserves, of the County's General Plan, the Park and the Sidewalk Extension Sites are not enrolled under the Williamson Act (County of Orange, 2013). As such, the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would not conflict with existing zoning for agricultural uses or a Williamson Act contract and no impact would occur in this regard.

**Question 4.6c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code 12220 (g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51004)g))?**

**Response to Question 4.6c)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. North Tustin is urbanized. The Park and Sidewalk Extension Sites are zoned Agricultural Residential (AR) 20,000. The Park Site is currently vacant with scattered vegetation, a drainage culvert and associated drainage ditches, overhead power lines, an existing County easement designated for public utilities and regional and local trails, and chain link fencing along the Site perimeter. The Sidewalk Extension Site is comprised of the existing road right-of-ways of Newport Avenue and Crawford Canyon Road. No forest land or land zoned for timberland production is present within North Tustin. As such, the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would not conflict with existing zoning for forest land or timberland and no impact would occur in this regard.

**Question 4.6d) Result in the loss of forest land or conversion of forest land to non-forest use?**

**Response to Question 4.6d)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. North Tustin is urbanized. The Park Site is currently vacant with scattered vegetation, a drainage culvert and associated drainage ditches, overhead power lines, an existing County easement designated for public utilities and regional and local trails, and chain link fencing along the Site perimeter. The Sidewalk Extension Site is comprised of the existing road right-of-ways of Newport Avenue

and Crawford Canyon Road. No forest land exists in North Tustin. As such, the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would not result in the loss of forest land or conversion of forest land to non-forest use and no impact would occur in this regard.

**Question 4.6e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or forest land to non-forest use?**

**Response to Question 4.6e)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. North Tustin is urbanized. There are no agricultural or forest uses or related operations in North Tustin or ear the Park or the Sidewalk Extension Sites, which are located within a highly urbanized area. Therefore, the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would not involve the conversion of farmland or forest land to other uses, either directly or indirectly. No impacts to agricultural or forest land or uses would occur in this regard.

| **4.7 Air Quality**<br>*Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Conflict with or obstruct implementation of the applicable air quality plan? | ☐ | ☐ | ☒ | ☐ |
| b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard? | ☐ | ☐ | ☒ | ☐ |
| c) Expose sensitive receptors to substantial pollutant concentrations? | ☐ | ☐ | ☒ | ☐ |
| d) Result in other emissions (such as those leading to odors affecting a substantial number of people? | ☐ | ☐ | ☒ | ☐ |

The following analysis is based on the *Air Quality and Greenhouse Gas Modeling* (ESA, 2020a), located in Appendix A, of this Draft IS/MND.

**Question 4.7a) Conflict with or obstruct implementation of the applicable air quality plan?**

**Response to Question 4.7a)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. The Park and Sidewalk Extension Sites are located within the South Coast Air Basin (Basin). Air quality planning for the Basin is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The Crawford Canyon Park and Sidewalk Extension would be subject to the SCAQMD's Air Quality Management Plan (AQMP), which contains a comprehensive list of pollution control strategies directed at reducing emissions and achieving ambient air quality standards. These strategies are developed, in part, based on regional population, housing, and employment projections prepared by the Southern California Association of Governments (SCAG).

The 2016 AQMP was prepared to accommodate growth, reduce the high levels of pollutants within the areas under the jurisdiction of SCAQMD, return clean air to the region, and minimize the impact on the economy (SCAQMD, 2016). Projects that are consistent with the assumptions used in the AQMP do not interfere with attainment because the growth is included in the projections utilized in the formulation of the AQMP. Thus, projects, uses, and activities that are consistent with the applicable growth projections and control strategies used in the development of the AQMP would not jeopardize attainment of the air quality levels identified in the AQMP, even if it would individually exceed the SCAQMD's numeric indicators.

Construction

Construction activities associated with the Project have the potential to generate temporary criteria pollutant emissions through the use of heavy-duty construction equipment and through vehicle trips generated from worker trips, vendor and haul trucks traveling to and from the Park and Sidewalk Extension Sites. In addition, fugitive dust emissions would result from construction activity. Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of construction activity and equipment, and prevailing weather conditions. The assessment of construction air quality impacts considers each of these potential sources.

Under this criterion, the SCAQMD recommends that lead agencies demonstrate that a project would not directly obstruct implementation of an applicable air quality plan and that a project be consistent with the assumptions (typically land-use related) upon which the air quality plan is based. The Project would result in an increase in short-term employment compared to existing conditions. The construction of Crawford Canyon Park would generate up to 30 jobs during the paving and construction phase and the Sidewalk Extension would generate up to 24 jobs during the storm drain construction phase. Being relatively small in number and temporary in nature, construction jobs under the Project would not conflict with the long-term employment projections upon which the AQMP is based.

As described in the sections below, the Project would have less than significant construction emissions of criteria pollutants. Therefore, the Project would be consistent with the AQMP. Additionally, the Project would comply with California Air Resources Board (CARB) requirements to minimize short-term emissions from on-road and off-road diesel equipment. The Project would also comply with SCAQMD regulations for controlling fugitive dust pursuant to SCAQMD Rule 403, for example, apply water spray/mists or similar suppressant (e.g., SoilSeal) at least 3 times per day on active areas of disturbance and unpaved roads, and limit truck speed to 15 miles per hour or less on unpaved roads to minimize dust on unpaved roads at the construction site.

Compliance with these requirements is consistent with and meets or exceeds the AQMP requirements for control strategies intended to reduce emissions from construction equipment and activities. Because the Crawford Canyon Park and Sidewalk Extension would not conflict with the control strategies intended to reduce emissions from construction equipment, the Project would not conflict with or obstruct implementation of the AQMP, and impacts would be less than significant and no mitigation measures are required.

Operation

The Park Site is currently vacant with scattered vegetation, a drainage culvert and associated drainage ditches, overhead power lines, an existing County easement designated for public

utilities and regional and local trails, and chain link fencing along the Site perimeter. The Crawford Canyon Park is anticipated to generate 85 weekday trips, 57 Saturday trips, and 49 Sunday trips. The Sidewalk Extension would not generate any operational vehicle trips. As discussed in Section 16, Transportation and Traffic, this Project would not have a significant impact on transportation or traffic. As a park and circulation use, the Project is not anticipated to result in increases in employment. Overall, the Crawford Canyon Park and Sidewalk Extension would not conflict with the growth projections identified in the AQMP and would not conflict with or obstruct implementation of the AQMP's or the County's strategies and polices intended to reduce criteria pollutant emissions. Therefore, impacts would be less than significant and no mitigation measures are required.

The Park and Sidewalk Extension Sites are located within the SCAB, which is characterized by relatively poor air quality (SCAQMD, 2016). State and federal air quality standards are often exceeded in many parts of the Basin. The Project would contribute to local and regional air pollutant emissions during construction (short-term or temporary) and Project occupancy (long-term). However, based on the following analysis, construction and operation of the Crawford Canyon Park and Sidewalk Extension would result in less than significant impacts relative to the daily significance thresholds for criteria air pollutant emissions established by the SCAQMD for construction and operational phases and no mitigation measures are required.

Construction Impacts

Based on criteria set forth in the SCAQMD CEQA Air Quality Handbook (SCAQMD, 1993), a project would have the potential to violate an air quality standard or contribute substantially to an existing violation and result in a significant impact with regard to construction emissions if regional emissions from both direct and indirect sources would exceed any of the following SCAQMD prescribed threshold levels: (1) 75 pounds a day for volatile organic compounds (VOCs), (2) 100 pounds per day for (NOX, (3) 550 pounds per day for carbon monoxide (CO), (4) 150 pounds per day for sulfur oxides (SOX), (5) 150 pounds per day for respirable particulate matter (PM10), and (6) 55 pounds per day for fine particulate matter (PM2.5).

Daily regional emissions during construction are forecasted by assuming a conservative estimate of construction activities (i.e., assuming all construction occurs at the earliest feasible date) and applying the mobile source and fugitive dust emissions factors. The emissions have been estimated using the CalEEMod software (version 2016.3.2), an emissions inventory software program recommended by the SCAQMD, and the CARB on-road vehicle EMFAC2017 model. CalEEMod is based on outputs from OFFROAD and EMFAC, which are emissions estimation models developed by CARB and used to calculate emissions from construction activities, including on- and off-road vehicles. On-road emissions have been calculating outside of CalEEMod using the most recent version of EMFAC (2017). The input values used in this analysis were adjusted to be project-specific based on equipment types and the construction schedule. These values were then applied to the construction phasing assumptions used in the criteria pollutant analysis to generate criteria pollutant emissions values for each construction activity. This emissions analysis for all construction activities includes compliance with mandatory SCAQMD Rule 403 measures regarding the control of fugitive dust.

Construction of Crawford Canyon Park is estimated to last approximately 12 months, tentatively scheduled to begin September 2021 and conclude August 2022. The Sidewalk Extension is estimated to last approximately four months, tentatively scheduled to begin June 2022 and conclude September 2022. Construction duration by phase is provided in **Table 4.7-1**, *Estimated*

*Construction Schedule*. The duration of construction activity and associated equipment represents a reasonable approximation of the expected construction fleet as required per CEQA guidelines. Site specific construction fleet may vary due to specific Project needs at the time of construction. The duration of construction activity and associated construction equipment was estimated based on consultation with the County.

**Table 4.7-1: Estimated Construction Schedule**

| Activity | Start Date | End Date | Duration (Work Days) |
|---|---|---|---|
| **Crawford Canyon Park** | | | |
| Clearing and Grubbing | 9/1/2021 | 9/28/2021 | 20 |
| Grading/Excavation | 9/29/2021 | 12/20/2021 | 60 |
| Paving and Construction | 12/21/2021 | 4/9/2022 | 80 |
| Landscaping | 4/10/2022 | 8/15/2022 | 90 |
| **Sidewalk Extension** | | | |
| Site Preparation | 6/1/2022 | 6/8/2022 | 6 |
| Demolition | 6/9/2022 | 6/29/2022 | 16 |
| Utility Relocation | 6/30/2022 | 7/14/2022 | 11 |
| Storm Drain Construction | 6/30/2022 | 8/15/2022 | 33 |
| Sidewalk Construction (Newport) | 6/30/2022 | 7/21/2022 | 16 |
| Sidewalk Construction (Crawford) | 8/15/2022 | 9/5/2022 | 16 |
| Traffic Signal Modification | 7/21/2022 | 8/4/2022 | 11 |
| Paving | 9/6/2022 | 9/27/2022 | 16 |

Source: ESA 2020.

Note: Construction schedule assumes work occurring Mondays through Fridays.

The maximum daily regional emissions from these activities are estimated by construction phase and compared to the SCAQMD significance thresholds. Emissions have been combined for phases that are anticipated to overlap representing a worst-case scenario. As shown in **Table 4.7-2**, *Maximum Regional Construction Emissions – Without Mitigation (Pounds Per Day)*, emissions resulting from construction of the Project would not exceed any criteria pollutant thresholds established by the SCAQMD. Therefore, impacts would be considered less than significant and no mitigation measures are required.

**Table 4.7-2: Maximum Regional Construction Emissions – Without Mitigation (pounds per day) [a]**

| Source | VOC | $NO_X$ | CO | $SO_2$ | PM10 [b] | PM2.5 [b] |
|---|---|---|---|---|---|---|
| **Crawford Canyon Park** | | | | | | |
| Clearing and Grubbing | 2.89 | 27.41 | 19.02 | 0.05 | 3.92 | 2.53 |
| Grading | 3.82 | 40.54 | 25.93 | 0.07 | 4.50 | 2.92 |
| Paving and Construction | 4.71 | 46.35 | 32.87 | 0.08 | 2.37 | 1.96 |
| Landscaping | 0.25 | 2.73 | 4.49 | 0.01 | 0.45 | 0.20 |
| **Sidewalk Extension** | | | | | | |
| Site Preparation | 0.71 | 8.22 | 6.10 | 0.01 | 0.71 | 0.37 |
| Demolition | 1.24 | 10.94 | 15.42 | 0.03 | 0.82 | 0.60 |
| Utility Relocation | 1.07 | 8.09 | 7.10 | 0.03 | 0.43 | 0.31 |
| Storm Drain Construction | 1.10 | 8.14 | 10.95 | 0.02 | 0.69 | 0.42 |
| Sidewalk Construction (Newport) | 0.53 | 4.54 | 5.48 | 0.01 | 0.45 | 0.26 |
| Sidewalk Construction (Crawford) | 0.57 | 4.79 | 5.69 | 0.01 | 0.46 | 0.27 |
| Traffic Signal Modification | 1.13 | 10.90 | 8.82 | 0.03 | 0.73 | 0.47 |
| Paving | 0.78 | 7.64 | 10.30 | 0.02 | 0.57 | 0.41 |
| **Overlapping Phases** | | | | | | |
| Park Landscaping + Sidewalk Extension Site Prep + Sidewalk Extension Demo | 2.20 | 21.90 | 26.02 | 0.05 | 1.98 | 1.17 |
| Sidewalk Extension Utility Relocation + Sidewalk Extension Storm Drain Construction | 2.17 | 16.23 | 18.05 | 0.05 | 1.12 | 0.73 |
| Sidewalk Extension Utility Relocation + Sidewalk Extension Storm Drain Construction + Sidewalk Construction (Newport) | 2.70 | 20.77 | 23.54 | 0.06 | 1.57 | 0.98 |
| Sidewalk Construction (Newport) + Sidewalk Extension Storm Drain Construction + Sidewalk Extension Traffic Signal Mod | 2.76 | 23.58 | 25.26 | 0.06 | 1.87 | 1.14 |
| Sidewalk Construction (Newport) + Sidewalk Extension Traffic Signal Mod | 1.66 | 15.44 | 14.31 | 0.04 | 1.18 | 0.72 |
| **Maximum Daily Emissions** | 5 | 46 | 33 | <1 | 5 | 3 |
| **SCAQMD Regional Significance Thresholds [c]** | 75 | 100 | 550 | 150 | 150 | 55 |
| **Exceeds Threshold?** | No | No | No | No | No | No |

[a] Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Appendix A, of this Draft IS/MND.

[b] Emissions include fugitive dust control measures consistent with SCAQMD Rule 403.

Source: ESA, 2020.

Operational Impacts

Based on criteria set forth in the SCAQMD CEQA Air Quality Handbook, a project would have the potential to violate an air quality standard or contribute substantially to an existing violation and result in a significant impact with regard to operational emissions if regional emissions from both direct and indirect sources would exceed any of the following SCAQMD prescribed threshold levels: (1) 55 pounds a day for VOCs, (2) 55 pounds per day for NOX, (3) 550 pounds per day for CO, (4) 150 pounds per day for SOX, (5) 150 pounds per day for PM10, and (6) 55 pounds per day PM2.5 (SCAQMD, 2019).

Operation of Crawford Canyon Park has the potential to generate criteria pollutant emissions through vehicle trips traveling to and from the Park Site. In addition, emissions would result electrical generation necessary to provide park lighting and area sources onsite such as landscaping equipment. Operational impacts were assessed for the Project buildout year. The Sidewalk Extension would not generate an increase in operational emissions.

Operational emissions for Crawford Canyon Park were estimated using CalEEMod for a City Park. Mobile source emissions are based on the vehicle emission factors from EMFAC2017 and the default trip length values for the Park land uses in CalEEMod, which are Basin-wide average trip distance values. To estimate the total vehicle miles traveled (VMT) for existing trips, daily trip totals provided in the Transportation Analysis Memorandum (Appendix J, of this Draft IS/MND) were used in combination with CalEEMod default trip distances.

Other sources of emissions from Park operation uses include equipment used to maintain landscaping, such as lawnmowers and trimmers. The CalEEMod tool uses landscaping equipment GHG emission factors from the CARB OFFROAD2011 model and the *CARB Technical Memo: Change in Population and Activity Factors for Lawn and Garden Equipment* (CARB, 2003). The CalEEMod software estimates that landscaping equipment operate for 250 days per year in the Air Basin. Emissions of VOCs from the use of consumer products and architectural coatings are based on SCAQMD-specific emission factors for land uses in the Air Basin.

Operational-source emissions are summarized in **Table 4.7-3***, Maximum Unmitigated Regional Operational Emissions (Pounds Per Day)*. As shown, operational-source emissions of Crawford Canyon Park are below the applicable SCAQMD regional thresholds of significance. Therefore, impacts would be considered less than significant and no mitigation measures are required.

**Table 4.7-3: Maximum Unmitigated Regional Operational Emissions (pounds per day)[a]**

| Source | VOC | $NO_X$ | CO | $SO_2$ | PM10 | PM2.5 |
|---|---|---|---|---|---|---|
| Area | 0.01 | 0.00 | <1 | 0.00 | 0.00 | 0.00 |
| Energy | <1 | <1 | <1 | <1 | <1 | <1 |
| Mobile | 0.35 | 0.02 | 469.86 | 2.03 | 1.30 | 1.82 |
| **Total Project Operational Emissions** | **0.35** | **0.02** | **469.86** | **2.03** | **1.30** | **1.82** |
| SCAQMD Significance Thresholds | 55 | 55 | 550 | 150 | 150 | 55 |
| Exceeds Threshold? | No | No | No | No | No | No |

[a] Totals may not add up exactly due to rounding in the modeling calculations Detailed emissions calculations are provided in Appendix A, of this Draft IS/MND.

Source: ESA, 2020

**Question 4.7b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?**

**Response to Question 4.7b)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. The Project would result in the emission of criteria pollutants both during construction and operation for which the Project area is in non-attainment. A significant impact may occur if a project would add a cumulatively considerable contribution of a federal or state non-attainment pollutant. The Air Basin is currently in non-attainment for ozone, PM10, and PM2.5.

The SCAQMD's approach for assessing cumulative impacts related to operations is based on attainment of ambient air quality standards in accordance with the requirements of the Federal and State Clean Air Acts. As discussed earlier, the SCAQMD has developed a comprehensive plan, the 2016 AQMP, which addresses the region's cumulative air quality condition.

A significant impact may occur if a project were to add a cumulatively considerable contribution of a federal or state non-attainment pollutant. The Basin is currently in non-attainment for ozone (federal and state standards), PM10 (state standards only) and PM2.5 (federal and state standards); therefore, related projects could cause ambient concentrations to exceed an air quality standard or contribute to an existing or projected air quality exceedance. Cumulative impacts to air quality are evaluated under two sets of thresholds for CEQA and SCAQMD.

In particular, CEQA Guidelines Section 15064(h)(3) provides guidance in determining the significance of cumulative impacts. Specifically, Section 15064(h)(3) states in part that:

> *"A lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program which provides specific*

*requirements that will avoid or substantially lessen the cumulative problem (e.g., water quality control plan, air quality plan, integrated waste management plan) within the geographic area in which the project is located. Such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency…"*

For purposes of the cumulative air quality analysis with respect to CEQA Guidelines Section 15064(h)(3), the Project's incremental contribution to cumulative air quality impacts is determined based on compliance with the SCAQMD adopted 2016 AQMP. As noted previously under discussion 4.7a), the Project would be consistent with the 2016 AQMP and would not have a cumulatively considerable air quality impact. Although the Project's employment would increase temporarily during construction, this growth would be well within the employment projections for the County.

As the Project is not part of an ongoing regulatory program, the SCAQMD also recommends that Project-specific air quality impacts be used to determine the potential cumulative impacts to regional air quality. As noted previously under discussion 4.7a), peak daily emissions of construction and operation-related pollutants would not exceed SCAQMD regional significance thresholds. By applying SCAQMD's cumulative air quality impact methodology, even though implementation of the Project would result in an addition of criteria pollutants, in conjunction with related projects in the region, cumulatively significant impacts would not occur. In addition, as noted in discussion 4.7c), below, construction of the Project is not expected to result in a cumulatively considerable net increase of any criteria pollutant for which the SCAQMD has established a localized impact threshold. Therefore, the emissions of non-attainment pollutants and precursors generated by the Crawford Canyon Park and Sidewalk Extension would be less than significant and would not result in a cumulatively considerable air quality impact. No mitigation measures are required.

With respect to health impacts, the Project construction health risks would be less than significant and related projects would also be required to implement similarly stringent measures, as necessary under CEQA, to mitigate impacts to less than significant. Compliance with applicable SCAQMD rules would verify Project operational health risks would be less than significant and related projects would also be required to comply with applicable rules as well as implement mitigation measures, as necessary under CEQA, to mitigate impacts to less than significant. As a result, the Project would not result in cumulatively considerable health impacts and no mitigation measures are required.

Compliance with applicable rules would ensure that the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project and related projects would not result in cumulatively considerable odor impacts.

**Question 4.7c) Expose sensitive receptors to substantial pollutant concentrations?**

**Response to Question 4.7c)**

<u>Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension:</u> **Less than Significant Impact**. Certain population groups are especially sensitive to air pollution and should be given special consideration when evaluating potential air quality impacts. These population groups include children, the elderly, persons with pre-existing respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise. As defined in the SCAQMD CEQA Air Quality

Handbook, a sensitive receptor to air quality is defined as any of the following land use categories: (1) long-term health care facilities; (2) rehabilitation centers; (3) convalescent centers; (4) retirement homes; (5) residences; (6) schools; (7) parks and playgrounds; (8) child care centers; and (9) athletic fields. Sensitive receptors within a quarter-mile radius of the Park boundary and the Sidewalk Extension boundary include adjacent residential land uses in all directions of the Sites.

The localized air quality analysis was conducted using the methodology described in the SCAQMD *Localized Significance Threshold Methodology* (June 2003, revised July 2008),[1] which relies on on-site mass emission rate screening tables and project-specific dispersion modeling typically for sites greater than five acres, as appropriate (SCAQMD, 2008). The localized significance thresholds are applicable to NOX, CO, PM10, and PM2.5. For NOX and CO, the thresholds are based on the ambient air quality standards. For PM10 and PM2.5, the thresholds are based on requirements in SCAQMD Rule 403 (Fugitive Dust) for construction and Rule 1303 (New Source Review Requirements) for operations. The SCAQMD has established screening criteria that can be used to determine the maximum allowable daily emissions that would satisfy the localized significance thresholds and therefore not cause or contribute to an exceedance of the applicable ambient air quality standards without project-specific dispersion modeling. The screening criteria depend on: (1) the area in which the project is located, (2) the size of the project area, and (3) the distance between the project area and the nearest sensitive receptor.

SCAQMD's Methodology clearly states that "off-site mobile emissions from the project should not be included in the emissions compared to LSTs." Therefore, for purposes of the LST analysis, only emissions included in the CalEEMod "on-site" emissions outputs were considered. The nearest existing sensitive receptors to the Park and Sidewalk Extension Sites are single-family residential uses in all directions and the Panorama Elementary School. The localized significance threshold (LST) used for the localized significance impact analysis were based on a two-acre site in the Saddleback Valley Source-Receptor Area with sensitive receptors located adjacent to the Park and Sidewalk Extension Sites (i.e., 25 meters).

Construction Emissions

**Table 4.7-4**, *Maximum Localized Construction Emissions – Without Mitigation (Pounds Per Day),* identifies the localized impacts at the nearest receptor location in the vicinity of the Project area without mitigation. The localized emissions during construction activity would not exceed SCAQMD's localized significance thresholds. Therefore, impacts would be less than significant and no mitigation measures are required.

[1] South Coast Air Quality Management District, Localized Significance Thresholds, (2003, revised 2008), http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds. Accessed October 2020.

**Table 4.7-4: Maximum Localized Construction Emissions – without Mitigation (pounds per day)[a]**

| Source | $NO_X$ | CO | PM10 [b] | PM2.5 [b] |
|---|---|---|---|---|
| **Crawford Canyon Park** | | | | |
| Clearing and Grubbing | 27.37 | 18.45 | 3.71 | 2.47 |
| Grading | 36.41 | 23.47 | 3.96 | 2.76 |
| Paving and Construction | 46.19 | 31.86 | 2.03 | 1.86 |
| Landscaping | 2.60 | 3.63 | 0.12 | 0.11 |
| **Sidewalk Extension** | | | | |
| Site Preparation | 8.19 | 5.64 | 0.53 | 0.32 |
| Demolition | 10.32 | 14.52 | 0.54 | 0.52 |
| Utility Relocation | 8.07 | 6.75 | 0.29 | 0.27 |
| Storm Drain Construction | 7.12 | 9.52 | 0.33 | 0.32 |
| Sidewalk Construction (Newport) | 3.54 | 4.28 | 0.18 | 0.18 |
| Sidewalk Construction (Crawford) | 3.79 | 4.49 | 0.19 | 0.19 |
| Traffic Signal Modification | 9.89 | 7.51 | 0.41 | 0.38 |
| Paving | 7.61 | 9.84 | 0.39 | 0.36 |
| **Overlapping Phases** | | | | |
| Park Landscaping + Sidewalk Extension Site Prep + Sidewalk Extension Demo | 21.11 | 23.78 | 1.20 | 0.96 |
| Sidewalk Extension Utility Relocation + Sidewalk Extension Storm Drain Construction | 15.19 | 16.27 | 0.63 | 0.59 |
| Sidewalk Extension Utility Relocation + Sidewalk Extension Storm Drain Construction + Sidewalk Construction (Newport) | 18.73 | 20.55 | 0.81 | 0.77 |
| Sidewalk Construction (Newport) + Sidewalk Extension Storm Drain Construction + Sidewalk Extension Traffic Signal Mod | 20.55 | 21.31 | 0.92 | 0.88 |
| Sidewalk Construction (Newport) + Sidewalk Extension Traffic Signal Mod | 13.43 | 11.79 | 0.59 | 0.56 |
| **Maximum Daily Emissions** | **46.19** | **31.86** | **3.96** | **2.76** |
| **SCAQMD Localized Significance Thresholds [c]** | **131** | **993** | **6** | **4** |
| **Exceeds Threshold?** | No | No | No | No |

[a] Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Appendix A, of this Draft IS/MND.

[b] Emissions include fugitive dust control measures consistent with SCAQMD Rule 403.

[c] Localized Significance Thresholds (LST) were for a 2-acre project site with a 25-meter receptor distance.

Source: ESA, 2020

Operational Emissions

According to SCAQMD LST methodology, LSTs would apply to the operational phase of a proposed project if the project includes stationary sources or attracts mobile sources that may queue and idle at the site (e.g., warehouse or transfer facilities). With regard to on-site sources of emissions, the Crawford Canyon Park would not generate emissions resulting from sources such as natural combustion (on-site natural gas consumption for heating, such as natural gas combustion in broilers and water heaters). The Sidewalk Extension would not result in an increase in operational emissions. Therefore, as shown in **Table 4.7-5**, *Maximum Localized Operational Emissions (Pounds Per Day)*, below, impacts would be less than significant and no mitigation measures are required.

**Table 4.7-5: Maximum Localized Operational Emissions (pounds per day)[a]**

| Source | $NO_X$ | CO | PM10 | PM2.5 |
|---|---|---|---|---|
| Area | 0.00 | <1 | 0.00 | 0.00 |
| Energy | <1 | <1 | <1 | <1 |
| **Total Localized Project Operational Emissions** | **<1** | **<1** | **<1** | **<1** |
| SCAQMD Thresholds of Significance [b] | 46.2 | 31.9 | 2 | 1 |
| Exceeds Thresholds? | No | No | No | No |

a Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Appendix A, of this Draft IS/MND.
b Emissions include fugitive dust control measures consistent with SCAQMD Rule 403.
c Localized Significance Thresholds (LST) were for a 2-acre project site with a 25-meter receptor distance.

Source: ESA, 2020

Carbon Monoxide Hotspot

A carbon monoxide (CO) hotspot is an area of localized CO pollution that is caused by severe vehicle congestion on major roadways, typically near intersections. Projects may worsen air quality if they increase the percentage of vehicles in cold start modes by two percent or more; significantly increase traffic volumes (by five percent or more) over existing volumes; or worsen traffic flow, defined for signalized intersections as increasing average delay at intersections operating at Level of Service (LOS) E or F or causing an intersection that would operate at LOS D or better without the proposed project, to operate at LOS E or F.

CO decreased dramatically in the Basin with the introduction of the automobile catalytic converter in 1975. No exceedances of CO have been recorded at monitoring stations in the Basin in recent years and the Basin is currently designated as a CO attainment area for both the CAAQS and NAAQS. As discussed below, it is not expected that CO levels at Project-impacted intersections would rise to such a degree as to cause an exceedance of these standards.

*Construction*

On-road traffic from the construction of Crawford Canyon Park would include a daily maximum of 30 worker vehicles during the paving and construction phase and 16 haul trucks during the grading phase. Daily maximum construction vehicles associated with the construction of the Sidewalk Extension would consist of up to 52 worker vehicles during the overlap of storm drain construction and sidewalk construction and up to 3 haul trucks during demolition. While construction-related traffic on the local roadways would occur during construction, the net increase of construction worker vehicle trips to the existing daily traffic volumes on local roadways would be relatively small and would not result in CO hotspots. Additionally, construction-related vehicle trips would only occur in the short-term and would cease once construction activities have been completed.

*Operation*

Caltrans CO Protocol requires detailed analysis for intersections with LOS E or F (Caltrans, 1997). The SCAQMD recommends performing a CO hotspot analysis if a project triggers either of the two criteria: 1) increases the volume to capacity ratio by two percent or more for intersections rated at LOS D or worse, or 2) declines an intersection's LOS from C to D. Based on trip generation rates for a "public park", the Crawford Canyon Park is anticipated to generate 85 weekday trips, 57 Saturday trips, and 49 Sunday trips. During the peak hour, the Crawford Canyon Park would generate a maximum of 13 trips Sunday evenings. The Sidewalk Extension would not generate operational trips. Based on this level of trip generation, the Project does not warrant a CO hotspot analysis per the Caltrans and SCAQMD criteria.

<u>Toxic Air Contaminants</u>

Concentrations of toxic air contaminants (TACs), or in federal parlance, hazardous air pollutants (HAPs), are also used as indicators of ambient air quality conditions. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

Sensitive receptors are located adjacent to the Park and Sidewalk Extension Sites. SCAQMD recommends that construction health risk assessments be conducted for substantial sources of diesel particulate matter (DPM) emissions (e.g., earth-moving construction activities) in proximity to sensitive receptors and has provided guidance for analyzing mobile source diesel emissions. However, localized DPM emissions (strongly correlated with PM2.5 emissions) are less than significant. Although the localized analysis does not directly measure health risk impacts, it does provide data that can be used to evaluate the potential to cause health risk impacts. The very low level of PM2.5 emissions coupled with the short-term duration of construction activity resulted in an overall low level of DPM concentrations in the Project area. Furthermore, compliance with the CARB ATCM anti-idling measure, which limits idling to no more than five minutes at any location for diesel-fueled commercial vehicles, further minimized DPM emissions in the Project area. Sensitive receptors would be exposed to emissions below thresholds, and construction TAC impacts are less than significant and no mitigation measures are required.

SCAQMD recommends that operational health risk assessments be conducted for substantial sources of DPM emissions (e.g., truck stops and warehouse distribution facilities) in proximity to

sensitive receptors and has provided guidance for analyzing mobile source diesel emissions. The Project is not anticipated to generate a substantial number of daily truck trips. Therefore, based on the limited activity of TAC sources TAC concentrations at off-site sensitive receptors, the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would not warrant the need for a health risk assessment associated with on-site operational activities, and potential TAC impacts are expected to be less than significant.

**Question 4.7d) Result in other emissions (such as those leading to odors) affecting a substantial number of people?**

**Response to Question 4.7d)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant**. Potential activities that may emit odors during construction activities include the use of architectural coatings and solvents and the combustion of diesel fuel in on- and off-road equipment. SCAQMD Rule 1113 would limit the amount of VOCs in architectural coatings and solvents. In addition, the Project would comply with the applicable provisions of the CARB Air Toxics Control Measure regarding idling limitations for diesel trucks. Further, construction odor emissions would be temporary, short-term, and intermittent in nature and would cease upon completion of construction. Through adherence with mandatory compliance with SCAQMD Rules, no construction activities or materials are expected to create objectionable odors affecting a substantial number of people. Therefore, construction of the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would result in less than significant impacts and no mitigation measures are required.

According to the SCAQMD CEQA Air Quality Handbook, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The Project does not include any uses identified by SCAQMD as being associated with substantial odors. As a result, the Project is not expected to discharge contaminants into the air in quantities that would cause a nuisance, injury, or annoyance to the public or property pursuant to SCAQMD Rule 402. Therefore, the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would not create adverse odors affecting a substantial number of people and impacts would be less than significant and no mitigation measures are required.

| **4.8 Biological Resources**<br>*Would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? | ☐ | ☐ | ☒ | ☐ |
| b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? | ☐ | ☐ | ☐ | ☒ |
| c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? | ☐ | ☐ | ☐ | ☒ |
| d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | ☐ | ☒ | ☐ | ☐ |

| | | | | |
|---|---|---|---|---|
| e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? | ☐ | ☐ | ☐ | ☒ |
| f) Conflict with provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? | ☐ | ☐ | ☐ | ☒ |

The following analysis is based in part, on the *Biological Constraints Survey Memorandum for the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project* (Biological Constraints Survey Memorandum) (ESA, 2020b), located in Appendix B, of this Draft IS/MND.

**Question 4.8a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?**

**Response to Question 4.8a)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact.** The Park and Sidewalk Extension Project Sites are located in a residential community in North Tustin. The Park Site consists of a vacant lot comprised of bare ground (e.g. dirt/gravel) and scattered patches of native and non-native vegetation such as lemonade berry (*Rhus integrifolia*), laurel sumac (*Malosma laurina*), Peruvian pepper tree (*Schinus molle*) and Mexican fan palm (*Washingtonia robusta*). The existing patches of native vegetation in the Park Site are small and isolated, therefore, they are unlikely to provide suitable habitat to species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife (CDFW) or U.S. Fish and Wildlife Service (USFWS). However, the Mexican fan palms could provide habitat for roosting bat species. Otherwise, the small and isolated native vegetation provides suitable habitat to non-special-status avian species. The Sidewalk Extension Site is developed and consists of a paved sidewalk, concrete lined v-ditch drainages and vegetation that is either ornamental or non-native. Representative vegetation of the Sidewalk Extension Site includes eucalyptus (*Eucalyptus* sp.), tree tobacco (*Nicotiana glauca*), carrotwood (*Cupaniopsis anacardioides*), Chinese elm (*Ulmus parvifolia*), weeping fig (*Ficus benjamina*), variegated pittosporum (*Pittosporum tobira* 'Variegata') and salt cedar (*Tamarix ramosissima*). No special-status plant or wildlife species were observed during surveys, and no suitable habitat exists in either the Park or the Sidewalk Extension Sites. No special-status species are expected to occur on the Project Site. Consequently, Project impacts related to construction or operation would be less than significant for species identified as candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by CDFW and USFWS during Project construction or operations and no mitigation measures are required.

**Question 4.8b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?**

**Response to Question 4.8b)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact.** The Park and Sidewalk Extension Sites do not support riparian habitat or sensitive natural communities. Although the Park Site supports native species such as lemonade berry, laurel sumac, California buckwheat (*Eriogonum fasciculatum*), and California brittlebush (*Encelia californica*), the small and patchy plant assemblage does not constitute a sensitive natural plant community, nor does it serve as a functional native vegetation community. The Park Site also does not support riparian vegetation communities, even though mulefat (*Baccharis salicifolia*), a facultative wetland species, is present but does not constitute riparian habitat, as the isolated occurrence of the species by itself does not constitute riparian habitat. Similarly, the Sidewalk Extension Site is vegetated exclusively by ornamental and non-native trees such as eucalyptus, Peruvian pepper tree, castor bean (*Ricinus communis*), tree tobacco (*Nicotiana glauca*), carrotwood, Chinese elm, variegated pittosporum, and weeping fig. Neither the vegetation present on the Park or Sidewalk Extension Sites constitute a sensitive natural community or a riparian habitat. Therefore, no impacts to riparian habitat or sensitive natural communities identified in local or regional plans, policies, and regulations or by CDFW or USFWS are expected as a consequence of construction or operational activities.

**Question 4.8c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?**

**Response to Question 4.8c)**

Crawford Canyon Park: **No Impact**. The Park Site is situated along a sloped area and evidence of downhill water flow is present onsite in the form of shallow surface erosion channels. In addition, two shallow depressions are present within the Park Site, surrounded by Mexican fan palms, where water can pool after a rain event. These features, however, do not constitute a jurisdictional feature regulated by the U.S. Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), or the CDFW. No state or federally protected wetlands were observed on the Park Site. Therefore, the Project would not impact state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.).

Crawford Canyon Road Sidewalk Extension: **No Impact**. The Sidewalk Extension Site consists of a manufactured drainage with northern and western branches, both of which are situated along sloped areas. Both the north and west portion of the Sidewalk Extension Site have concrete lined v-ditches that lead to box culverts. While these features may have been part of a jurisdictional feature (the National Wetlands Inventory designates a jurisdictional feature upstream of the Sidewalk Extension Site), and subject to regulation by the USACE, RWQCB, no new or additional development is anticipated, and temporary impacts caused by sidewalk construction would not disrupt any hydrologic connections. Therefore, the Project would not impact state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.).

**Question 4.8d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?**

**Response to Question 4.8d)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant with Mitigation Incorporated**. The Park and Sidewalk Extension Sites do not have suitable conditions to support a wildlife nursery and are not located within or near an established wildlife corridor. However, vegetation onsite may provide suitable roosting sites for bats (Park Site only), and nesting sites for birds (both Park and Sidewalk Extension Sites). Migratory nongame native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918 (50 C.F.R. Section 10.13). Sections 3503, 3503.5, and 3513 of the California Fish and Game Code prohibit take of native birds and their active nests including raptors and other migratory nongame birds (as listed under the Federal MBTA). Additionally, common bats are protected under CDFG Code Section 4150. Activities that could result in a potentially significant impact during breeding season include construction disturbance to avian nesting substrate or bat maternity colony that may cause nest or roost abandonment or direct mortality by habitat removal, noise levels at the nest exceeding 65 dBA, or activities within 100-feet of the nest or roost. With pre-construction nesting birds and bat surveys, monitoring during construction during the breeding season in areas containing active nesting sites, and with implementation of specific restrictions to establish appropriate set-backs to curtail construction near any active bird or bat nest sites, impacts would be less than significant with mitigation incorporated as described in Mitigation Measure BIO-1.

**Mitigation Measure:**

**Mitigation Measure BIO-1**: Proposed Project activities that may disturb native and non-native vegetation, or structures where birds or bats may potentially nest, shall occur outside of the avian breeding and maternity bat roosting seasons which extend from February 1 to September 1 (and may begin as early as January 1 for some raptors) in order to avoid potential impacts to nesting birds or their eggs or breeding bats.

If construction activities cannot avoid the avian breeding and maternity bat roosting season, a qualified biologist shall conduct nesting bird and maternity bat roosting surveys not more than 3 days prior to the initiation of Project activities. If a protected native nesting bird or maternity bat roost is found, the County shall delay all Project activities within 100 feet of occupied nesting or roosting habitat (within 300 feet for suitable raptor nesting habitat) until the nest or roost is vacated and juveniles have fledged and there is no evidence of a second attempt at nesting/maternal roosting. Flagging, stakes, or construction fencing shall be used to demarcate the inside boundary of the buffer of 100 feet (or 300 feet) between the Project activities and the nest/roost. A smaller buffer area around an active nest may be recommended by the qualified monitoring biologist based on tolerance behavior of the nesting bird. Project personnel, including all contractors working on site, shall be instructed on the sensitivity of the area. The qualified biologist shall provide the County with the results of the recommended protective measures described above to document compliance with applicable State and Federal laws pertaining to the protection of native birds and special-status bats.

**Question 4.8e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?**

**Response to Question 4.8e)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact.** The Crawford Canyon Park would remove all 49 existing trees and all 27 existing palms onsite. The Park would include the planting of more than 76 various size replacement trees as well as shrubs and groundcover within the Park Site; refer to Figure 8. The Park and Sidewalk Extension Sites do not conflict with any local policies or ordinances protecting biological resources as the General Plan Resources Element defers to the County of Orange (Central/Coastal) Natural Community Conservation Plan (NCCP)/Habitat Conservation Plan (HCP). Please refer to refer to discussion 4.8f), below, for protection of wildlife habitats, and the County Zoning Code contains no ordinances specific for the protection of biological resources.

**Question 4.8f) Conflict with provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?**

**Response to Question 4.8f)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. The Park and Sidewalk Extension Sites are located within the County of Orange (Central/Coastal) NCCP/HCP and the Orange County Transportation Authority (OCTA) NCCP/HCP. The Park and Sidewalk Extension Sites are located approximately 1.2 miles south of the El Modena Open Space and 1.2 miles southwest of the Peter Canyon Regional Park, both part of the County of Orange Central NCCP Habitat Reserve System. The OCTA NCCP/HCP only covers discrete areas that include thirteen freeway improvement projects. The Park and Sidewalk Extension Sites are not associated with these improvement projects and are therefore not covered by the OCTA NCCP/HCP. In addition, while the Park and Sidewalk Extension Sites are located in the area covered by the County of Orange NCCP/HCP, they are not located in a designated reserve area, and the NCCP mapping identifies the Project site as developed. Therefore, the Project activities would have no impacts in regard to conflicts with provisions of local NCCP/HCPs.

| **4.9 Cultural Resources**<br>*Would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5? | ☐ | ☒ | ☐ | ☐ |
| b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5? | ☐ | ☒ | ☐ | ☐ |
| c) Disturb any human remains, including those interred outside of dedicated cemeteries? | ☐ | ☒ | ☐ | ☐ |

The following analysis is based in part, on the *Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project, North Tustin, California, Cultural Resources Assessment Report* (Cultural Resources Assessment) (ESA, 2021), located in Appendix C, of this Draft IS/MND.

**Question 4.9a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?**

**Response to Question 4.9a)**

Crawford Canyon Park: **Less than Significant Impact with Mitigation Incorporated**. The Cultural Resources Assessment was conducted for the Crawford Canyon Park in January 2021 (ESA, 2021). The Assessment included a California Historical Resources Information System – South Central Coastal Information Center (SCCIC) records search conducted on June 9, 2020; Native American Heritage Commission (NAHC) Sacred Lands File (SLF) search conducted on April 13, 2020; a pedestrian survey conducted on April 20, 2020; and a subsurface archaeological sensitivity assessment based on a review of historic maps, aerial photographs, geotechnical investigations, and proposed excavation parameters.

The SCCIC records search results indicate that approximately 20 percent of the 0.50-mile records search radius has been included in previous cultural resources surveys; however, the Park Site has not been previously surveyed. The SCCIC records search results also indicate that one cultural resource (CA-ORA-1537; prehistoric archaeological site) has been recorded within the 0.50-mile radius. No cultural resources have been recorded within the Park Site.

The NAHC SLF search returned negative results.

No cultural resources were encountered within the Park Site during the pedestrian survey. Ground surface visibility ranged from approximately 0 to 25 percent across the Park Site due to the presence of leaf litter, vegetation, road base, gravels, and other stockpiled materials which obstructed the ground surface.

The subsurface archaeological sensitivity assessment indicates that although the Park Site contains sedimentary deposits dating to the late Pleistocene and Holocene (11,700 years ago to present), the period for which there is widely accepted evidence for human habitation of Southern California, the nearest body of water (which could have provided fresh water to prehistoric inhabitants) is located a far distance from the Park Site (approximately 0.75 miles away). Additionally, no Native American villages are located in close proximity or in the surrounding vicinity to the Park Site (the nearest village is located approximately six miles away). Moreover, the results of the archival research (through the SCCIC and the NAHC) and the pedestrian survey yielded negative results. Lastly, it appears that a portion of the Park Site (eastern side) was previously disturbed in the past to increase the elevation for the purpose of constructing an asphalt road that once traversed the eastern section. Based on these factors, the Park Site appears to contain a low potential for yielding buried prehistoric archaeological resources.

Per review of the 1960 historic aerial photograph, two small structures once existed in the easternmost portion of the Park Site; however, these structures were later removed by at least 1963 (per the aerial photograph of that year). The pedestrian survey identified remnants of an access road, which existed along the eastern portion of the Park Site (per review of the 1964 historic topographic map). The remnants measured approximately 24-foot-long by 2-foot-wide and were in a dilapidated condition. Given the negative results of the pedestrian survey and the previous disturbances along the eastern portion of the Park Site (fill soils placed to elevate and construct the paved road), the subsurface archaeological assessment indicates that the Park Site appears to contain a low potential for yielding buried historic-period archaeological resources.

Nevertheless, since the construction of Crawford Canyon Park includes ground disturbance up to 6 feet in depth, it is possible that unknown subsurface archaeological resources could be encountered. Impacts to archaeological resources that qualify as historical resources as defined in §15064.5 of the State CEQA Guidelines could result in a significant effect on the environment. With implementation of Mitigation Measure CUL-1, which provides procedures to follow in the event of the discovery of archaeological resources, impacts would be less than significant.

<u>Crawford Canyon Road Sidewalk Extension</u>: **Less than Significant Impact with Mitigation Incorporated**. The Cultural Resources Assessment was conducted for the Sidewalk Extension in January 2021 (ESA, 2021). The Assessment included an SCCIC records search conducted on June 9, 2020; NAHC SLF search conducted on April 13, 2020; a pedestrian survey conducted on November 11, 2020; and a subsurface archaeological sensitivity assessment based on a review of historic maps, aerial photographs, geotechnical investigations, and proposed excavation parameters.

The SCCIC records search results indicate that approximately 20 percent of the 0.50-mile records search radius has been included in previous cultural resources surveys; however, the Sidewalk Extension Site has not been previously surveyed. The SCCIC records search results also indicate that one cultural resource (CA-ORA-1537; prehistoric archaeological site) has been recorded within the 0.50-mile radius. No cultural resources have been recorded within the Sidewalk Extension Site.

The NAHC SLF search returned negative results.

No cultural resources were encountered within the Sidewalk Extension Site during the pedestrian survey. Ground surface visibility ranged from approximately 0 to 25 percent due to leaf litter, gravels, and a concrete sidewalk.

The subsurface archaeological sensitivity assessment indicates that although the Sidewalk Extension Site contains sedimentary deposits dating to the late Pleistocene and Holocene (11,700 years ago to present), the period for which there is widely accepted evidence for human habitation of Southern California, the nearest body of water is located a far and approximately 0.75 miles away. Additionally, no Native American villages are located in close proximity or in the surrounding vicinity to the Sidewalk Extension Site (the nearest village is located approximately six miles away). Moreover, the results of the archival research (through the SCCIC) and the pedestrian survey yielded negative results. Based on these factors, the Sidewalk Extension Site appears to contain a low potential for yielding buried prehistoric archaeological resources.

The review of historic topographic maps and aerial photographs did not show evidence that historic-period structures once existed within the Sidewalk Extension Site and the pedestrian survey yielded negative results. As a result, it appears that there is a low potential for finding buried historic-period archaeological resources.

Nevertheless, since the Sidewalk Extension includes ground disturbance up to 3 feet in depth, it is possible that unknown subsurface archaeological resources could be encountered. Impacts to archaeological resources that qualify as historical resources as defined in §15064.5 could result in a significant effect on the environment. With implementation of Mitigation Measure CUL-1, which provides procedures to follow in the event of the discovery of archaeological resources, impacts would be less than significant.

**Mitigation Measure:**

> **Mitigation Measure CUL-1**: In the event that historic (e.g., bottles, foundations, refuse dumps/privies, railroads, etc.) or prehistoric (e.g., hearths, burials, stone tools, shell and faunal bone remains, etc.) archaeological resources are unearthed, ground-disturbing activities shall be halted or diverted away from within 50 feet of the find and a Qualified Archaeologist (defined as meeting the Secretary of the Interior's Professional Qualification Standards for archaeology) shall be notified. An appropriate buffer area shall be established by the Qualified Archaeologist around the find where construction activities shall not be allowed to continue. Work shall be allowed to continue outside of the buffer area. All archaeological resources unearthed by project construction activities shall be evaluated by the Qualified Archaeologist. The County shall consult with appropriate Native American representatives in determining treatment for prehistoric or Native American resources to ensure cultural values ascribed to the resource, beyond those that are scientifically important, are considered. If a resource is determined by the Qualified Archaeologist to constitute a "historical resource" pursuant to CEQA Guidelines Section 15064.5(a) or a "unique archaeological resource" pursuant to Public Resources Code Section 21083.2(g), the Qualified Archaeologist shall coordinate with the Applicant and the County to develop a formal treatment plan that would serve to reduce impacts to the resources. The treatment plan established for the resources shall be in accordance with CEQA Guidelines Section 15064.5(f) for historical resources and Public Resources Code Sections 21083.2(b) for unique archaeological resources. If preservation in place is not

feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. The treatment plan shall include measures regarding the curation of the recovered resources that may include curation at an accredited public, non-profit institution with a research interest in the materials, such as the Natural History Museums of Los Angeles County, if such an institution agrees to accept the material. If no accredited institution accepts the materials, they may be donated to a local school or historical society in the area for educational purposes. The Qualified Archaeologist shall determine the need for archaeological construction monitoring in the vicinity of the find thereafter.

The Qualified Archaeologist shall prepare a final report and appropriate California Department of Parks and Recreation Site Forms at the conclusion of treatment and/or the any follow-up archaeological construction monitoring. The report shall include a description of resources unearthed, if any, treatment of the resources, results of the artifact processing, analysis, and research, and evaluation of the resources with respect to the California Register of Historical Resources. The report and the Site Forms shall be submitted by the Applicant to the County, the South Central Coastal Information Center, and representatives of other appropriate or concerned agencies to signify the satisfactory completion of the project and required mitigation measures.

**Question 4.9b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?**

**Response to Question 4.9b)**

Crawford Canyon Park: **Less than Significant Impact with Mitigation Incorporated**. As noted under discussion 4.9a), the SCCIC records search, SLF search, and pedestrian survey did not identify archaeological resources within the Park Site. Additionally, the subsurface archaeological sensitivity assessment indicated that the Park Site appears to contain a low potential for yielding buried prehistoric archaeological resources.

Nevertheless, since the Crawford Canyon Park includes ground disturbance up to 6 feet in depth, it is possible that unknown subsurface archaeological resources could be encountered. Impacts to archaeological resources could result in a significant effect on the environment. With implementation of Mitigation Measure CUL-1, which provides procedures to follow in the event of the discovery of archaeological resources, impacts would be less than significant.

Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact with Mitigation Incorporated.** As noted under discussion 4.9a), the SCCIC records search, SLF search, and pedestrian survey did not identify archaeological resources within the Sidewalk Extension Site. Additionally, the subsurface archaeological sensitivity assessment indicated that the Sidewalk Extension Site appears to contain a low potential for yielding buried prehistoric archaeological resources.

Nevertheless, since the Sidewalk Extension includes ground disturbance up to 3 feet in depth, it is possible that unknown subsurface archaeological resources could be encountered. Impacts to archaeological resources could result in a significant effect on the environment. With implementation of Mitigation Measure CUL-1, which provides procedures to follow in the event of the discovery of archaeological resources, impacts would be less than significant.

**Mitigation Measure:**

Implementation of Mitigation Measure CUL-1.

**Question 4.9c) Disturb any human remains, including those interred outside of dedicated cemeteries?**

**Response to Question 4.9c)**

Crawford Canyon Park: **Less than Significant Impact with Mitigation Incorporated**. The results from the SCCIC records search, SLF search, and pedestrian survey did not identify human remains within the Park Site. Should ground disturbance encounter human remains, disturbance of those remains could result in a significant effect on the environment. With implementation of Mitigation Measure CUL-2, which requires following state laws in the event of a discovery, impacts to human remains would be less than significant.

Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact with Mitigation Incorporated.** The results from the SCCIC records search, SLF search, and pedestrian survey did not identify human remains within the Sidewalk Extension Site. Should ground disturbance encounter human remains, disturbance of those remains could result in a significant effect on the environment. With implementation of Mitigation Measure CUL-2, which requires following state laws in the event of a discovery, impacts to human remains would be less than significant.

**Mitigation Measure:**

**Mitigation Measure CUL-2:** If human remains are encountered unexpectedly during implementation of the project, State Health and Safety Code Section 7050.5 requires that no further excavation or disturbance shall occur to the human remains and any nearby area (within 100 feet) reasonably suspected to overlie adjacent remains until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the Native American Heritage Commission (NAHC). The NAHC shall then identify the person(s) thought to be the Most Likely Descendent (MLD). The MLD may, with the permission of the land owner, or his or her authorized representative, inspect the site of the discovery of the Native American remains and may recommend to the owner or the person responsible for the excavation work means for treating or disposing, with appropriate dignity, the human remains and any associated grave goods. The MLD shall complete their inspection and make their recommendation within 48 hours of being granted access by the land owner to inspect the discovery. The recommendation may include the scientific removal and nondestructive analysis of human remains and items associated with Native American burials. Upon the discovery of the Native American remains, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the landowner has discussed and conferred, as prescribed in this mitigation measure, with the MLD regarding their recommendations, if applicable, taking into account the possibility of multiple human remains. The landowner shall discuss and confer with the descendants all reasonable options regarding the descendants' preferences for treatment.

If the NAHC is unable to identify a MLD, or the MLD identified fails to make a recommendation, or the landowner rejects the recommendation of the MLD and the mediation provided for in Subdivision (k) of Section 5097.94, if invoked, fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall inter the human remains and items associated with Native American human remains with appropriate dignity on the facility property in a location not subject to further and future subsurface disturbance.

| **4.10 Energy**<br><br>*Would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation? | ☐ | ☐ | ☒ | ☐ |
| b) Conflict or obstruct a state or local plan for renewable energy or energy efficiency? | ☐ | ☐ | ☒ | ☐ |

The following analysis is based on the *Energy Modeling* (ESA, 2020c), located in Appendix D, of this Draft IS/MND.

**Question 4.10a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?**

**Response to Question 4.10a)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. The Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would consume energy during construction activities primarily from on- and off-road vehicle fuel consumption in the form of diesel, gasoline, and electricity from water conveyance for dust control. Project operation would consume energy from vehicular traffic and energy use. The analysis below includes the Project's energy requirements and energy use efficiencies by energy type for each stage of the Project (construction and operations).

Construction

The estimated fuel usage for off-road equipment is based on the number and type of equipment that would be used during construction activities, hour usage estimates, the total duration of construction activities, and hourly equipment fuel consumption factors from the CARB OFFROAD model, which was used in the Project's air quality analysis. On-road vehicles would include trucks to haul material to and from the Park and Sidewalk Extension Sites, vendor trucks to deliver supplies necessary for Project construction, and fuel used for employee commute trips. Construction activities typically do not involve the consumption of natural gas. **Table 4.10-1**, *Summary of Energy Consumption During Project Construction,* summarizes the Project's total fuel and electricity consumption from construction activities.

**Table 4.10-1: Summary of Energy Consumption During Project Construction**

| Fuel Type | Quantity |
|---|---|
| **Gasoline** | **gallons** |
| On-Road Construction Trips | 5,832 |
| Off-Road Construction Equipment | 0 |
| **Total Gasoline** | **5,832** |
| **Diesel** | **Gallons** |
| On-Road Construction Trips | 4,229 |
| Off-Road Construction Equipment | 56,309 |
| **Total Diesel** | **60,538** |

Source: ESA, 2020

The energy use summary provided above in Table 4.10-1 represents the amount of energy that could potentially be consumed during Project construction based on a conservative set of assumptions, provided in Appendix D, of this Draft IS/MND. As shown, on- and off-road vehicles would consume an estimated 5,832 gallons of gasoline and approximately 60,538 gallons of diesel fuel. For comparison purposes, the fuel usage during Project construction would represent approximately 0.009 percent of the 2018 annual on-road gasoline-related energy consumption and 0.004 percent of the 2018 annual diesel fuel-related energy consumption in Orange County. Detailed calculations are shown in Appendix D, of this Draft IS/MND.

The Project's construction contractors would comply with applicable CARB regulations governing the accelerated retrofitting, repowering, or replacement of heavy duty diesel on- and off-road equipment. CARB adopted an Airborne Toxic Control Measure to limit heavy-duty diesel motor vehicle idling time in order to reduce public exposure to diesel particulate matter and other toxic air contaminants. CARB approved the Truck and Bus regulation to reduce NOX, PM10, and PM2.5 emissions from existing diesel vehicles operating in California. In addition to limiting exhaust from idling trucks, CARB recently promulgated emission standards for off-road diesel construction equipment of greater than 25 horsepower to reduce emissions by requiring the installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission-controlled models.

While intended to reduce construction criteria pollutant emissions, compliance with the above listed anti-idling and emissions regulations would also result in efficient use of construction-related energy and the minimization or elimination of wasteful and unnecessary consumption of energy. According to the CARB staff report that was prepared at the time the anti-idling ATCM was being proposed for adoption in late 2004/early 2005, the regulation was estimated to reduce non-essential idling and associated emissions of diesel particulate matter and NOX emissions by 64 and 78 percent respectively in analysis year 2009.

These reductions in emissions are directly attributable to overall reduced idling times and fuel combustion as a result of compliance with the regulation. Heavy-duty engines continue to become more efficient and reduction amounts may lessen in the future due to this. Although the energy

savings cannot be accurately quantified, the Project would still reduce consumption of diesel fuel under the anti-idling measure. Construction electricity use would be temporary, sporadic, and would cease upon completion of the Project. Electricity for water conveyance would only be used when necessary to prevent fugitive dust and would decrease after completion of excavation and paving phases when the site is paved and has less dust to control. Thus, construction of the Crawford Canyon Park and Sidewalk Extension would use energy necessary to build the Project, but would not result in the wasteful, inefficient, and unnecessary use of energy and impacts would be less than significant and no mitigation measures are required.

Operation

The Sidewalk Extension would not result in an increase in operational energy demand. During operation of the Park Site, energy would be consumed for multiple purposes, including, but not limited to park lighting. Energy would also be consumed during Park operations related to water usage, solid waste disposal, and vehicle trips. The Park would not increase the demand for natural gas resources. The Park would result in a projected consumption of electricity totaling approximately 38,115 kWh per year and represent 0.0002 percent of Southern California Edison's (SCE's) total sales in 2018. Detailed calculations are shown in Appendix D, of this Draft IS/MND. The Park would comply with the applicable provisions of Title 24 and the CALGreen Code in effect at the time of building permit issuance. As such, the Park would minimize energy demand. Therefore, with the incorporation of these features, operation of Crawford Canyon Park would not result in the wasteful, inefficient, and unnecessary consumption of electricity. A less than significant impact would occur and no mitigation measures are required.

**Question 4.10b) Conflict or obstruct a state or local plan for renewable energy or energy efficiency?**

**Response to Question 4.10b)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. Construction of the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would result in a temporary increase in demand for electricity, gasoline, and diesel. The Project's energy consumption primarily would result from on- and off-road fuel use from construction related vehicles and electricity from water conveyance for dust control. Natural gas would not be used during Project construction. These activities make up small percentages of total energy supplies and would cease after the 1-year construction period. Thus, construction would not cause a permanent increase in demand and impacts would be less than significant and no mitigation measures are required.

Park operation will increase the demand for electricity resources. While the Park would generate an increase in electricity demand, the demand would be extremely minimal with respect to SCE supplies and it is not anticipated that additional power generation facilities would be required to serve the Park, or that the demand would exceed capacity of energy providers. Impacts would be less than significant and no mitigation measures are required.

Mobile source emissions result from park users and maintenance, use of on-site vehicles, trucks carrying waste to the Park from collection routes, trucks, and truck deliveries and pickups. Mobile source emissions are based on the number of inbound and outbound truck trips to and from the Park. Mobile emissions from these sources were estimated using emission factors from CARB's Motor Vehicle Emissions Inventory EMFAC model. The most recent version is EMFAC 2017,

which "represents [California Air Resources Board's] current understanding of motor vehicle travel activities and their associated emission levels." The Park would increase the demand for fuel resources. The Park's estimated operational gasoline and diesel fuel use is projected to generate an annual demand for gasoline totaling approximately 7,604 gallons per year and generate annual demand for diesel totaling approximately 1,358 gallons. The Park's fuel consumption accounts for a small percentage of the entire Orange County; with gasoline accounting for approximately 0.01 percent, and 0.0001 percent for diesel. Detailed calculations are shown in Appendix D, of this Draft IS/MND.

Demand for electricity, diesel, or gasoline would not result in an increase that exceeds available supply or distribution infrastructure capabilities; thus impacts would be less than significant and no mitigation measures are required.

| **4.11 Geology and Soils**<br><br>*Would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:<br>i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. | ☐ | ☐ | ☒ | ☐ |
| ii) Strong seismic ground shaking? | ☐ | ☐ | ☒ | ☐ |
| iii) Seismic-related ground failure, including liquefaction? | ☐ | ☐ | ☒ | ☐ |
| iv) Landslides? | ☐ | ☐ | ☒ | ☐ |
| b) Result in substantial soil erosion or the loss of topsoil? | ☐ | ☐ | ☒ | ☐ |
| c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction or collapse? | ☐ | ☐ | ☒ | ☐ |

| | | | | |
|---|---|---|---|---|
| d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property? | ☐ | ☐ | ☒ | ☐ |
| e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal system where sewers are not available for the disposal of waste water? | ☐ | ☐ | ☐ | ☒ |
| f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? | ☐ | ☒ | ☐ | ☐ |

The following analysis is based on the *Geotechnical Investigation Report, Crawford Canyon Park, Northwest Corner of Newport Avenue and Crawford Canyon Road, Orange, California* (Geotechnical Report) (GMU, 2020), located in Appendix E, of this Draft IS/MND.

**Question 4.11a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:**

**ai) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.**

**Response to Question a-*i*)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. Fault rupture is the displacement that occurs along the surface of a fault during an earthquake. Based on criteria established by the California Geological Survey (CGS), faults may be categorized as active, potentially active, or inactive. Active faults are those which show evidence of surface displacement within the last 11,000 years (Holocene-age). Potentially active faults are those that show evidence of most recent surface displacement within the last 1.6 million years (Quaternary-age). Faults showing no evidence of surface displacement within the last 1.6 million years are considered inactive. In addition, there are buried thrust faults, which are low angle reverse faults with no surface exposure. Due to their buried nature, the existence of buried thrust faults is usually not known until they produce an earthquake.

The CGS has established earthquake fault zones known as Alquist-Priolo Earthquake Fault Zones around the surface traces of active faults to assist cities and counties in planning, zoning, and building regulation functions. These zones, which extend from 200 to 500 feet on each side of a known active fault, identify areas where potential surface rupture along an active fault could prove hazardous and identify where special studies are required to characterize hazards to habitable structures.

The Park and Sidewalk Extension Sites are located in the seismically active Southern California region and could be subject to moderate to strong ground shaking in the event of an earthquake on one of the many active Southern California faults. According to Figure IX-11, Fault Map, of the County's General Plan Safety Element (County of Orange, 2013), two potentially hazardous active fault zones run along the coastal and inland edges of the County (County of Orange, 2013). The Newport-Inglewood Fault Zone angles from offshore near Dana Point, inland through the City of Newport Beach, and on to the cities of Long Beach and Torrance. Paralleling this fault zone across the northeasterly edge of the County is the Whittier Fault Zone, a westward continuation of the lengthier Elsinore Fault which trends along the northeast side of the Santa Ana Mountains into Mexico. Additionally, the Elysian Park Blind Thrust Fault and Compton Blind Thrust Fault extend into and underneath northwestern and southwestern County of Orange. According to the Geotechnical Report, the nearest known active faults are the San Joaquin Hills Fault and the Elsinore Fault, which are located approximately 6.3 and 7.9 miles, respectively, from the Park and Sidewalk Extension Sites. Accordingly, no currently known active or potentially active surface faults traverse the Park and Sidewalk Extension Site, and the Sites are not located within a designated Alquist-Priolo Earthquake Fault Zone (GMU, 2020). As such, the potential for surface rupture due to faulting occurring on the Park and Sidewalk Extension Sites during the design life of the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project is considered low. Thus, a less than significant impact would occur in this regard and no mitigation measures are required.

### a-ii) Strong seismic ground shaking?

**Response to Question a-*ii*)**

<u>Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension</u>: **Less than Significant Impact**. Seismicity is the geographic and historical distribution of earthquakes, including their frequency, intensity, and distribution. The level of ground shaking at a given location depends on many factors, including the size and type of earthquake, distance from the earthquake, and subsurface geologic conditions. The type of construction also affects how particular structures and improvements perform during ground shaking. A common measure of ground motion is the peak ground acceleration (PGA). It is not a measure of total energy of an earthquake, such as the Richter and moment magnitude scales, but rather of how hard the ground shakes in given geographic area. PGA is expressed as the percentage of the acceleration due to gravity (g), which is approximately 980 centimeters per second squared.

Several active or potentially active faults are located in the Southern California region. As discussed under Response 4.11 a.i, the nearest known active faults are the San Joaquin Hills Fault and the Elsinore Fault, which are located approximately 6.3 and 7.9 miles, respectively, from the Park and Sidewalk Extension Sites. The San Joaquin Hills Fault and the Elsinore Fault are capable of generating a maximum earthquake magnitude (Mw) of 7.1 and 7.9, respectively. Given the proximity of these faults and numerous other active and potentially active faults located in Southern California, the Park and Sidewalk Extension Sites are subject to earthquake ground

motions in the future (GMU, 2020). The $PGA_M$ (maximum considered earthquake-geometric mean) of 0.64g was calculated for the Park Site in conformance with the 2019 CBC. The $PGA_M$ is primarily dominated by earthquakes with a mean magnitude of 6.6 at a mean distance of 10 miles from the Park Site using the USGS 2014 Interactive Deaggregation Website (GMU, 2020).

The Park and Sidewalk Extension do not propose habitable structures or buildings that would be susceptible to substantial risks associated with an earthquake. The Park Site would be developed with a 2.5-acre neighborhood park consisting a variety of recreational amenities and features. The Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements. The County requires that all new construction meet or exceed the County's Building Code and the latest standards of the 2019 CBC. Further, the Geotechnical Report provides preliminary site-specific design recommendations and parameters regarding clearing and grubbing, grading and earthwork, temporary excavations, surface drainage, bridge and pole foundations, retaining walls, structural concrete and pavement design. Given the low-intensity nature of proposed development, absence of proposed habitable structures and buildings, and compliance with applicable building and safety codes, impacts related to strong seismic ground shaking would be less than significant and no mitigation measures are required.

### a-iii) Seismic-related ground failure, including liquefaction?

**Response to Question a-*iii*)**

<u>Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension</u>: **Less than Significant Impact**. Liquefaction is a phenomenon in which saturated silty to cohesionless soils below the groundwater table are subject to a temporary loss of strength due to the buildup of excess pore pressure during cyclic loading conditions such as those induced by an earthquake. Liquefaction effects include loss of bearing strength, amplified ground oscillations, lateral spreading, and flow failures. Liquefaction typically occurs in areas where groundwater is less than 50 feet from the surface, and where the soils are composed of poorly consolidated, fine to medium-grained sand. In addition to the necessary soil conditions, the ground acceleration and duration of the earthquake must also be of a sufficient level to initiate liquefaction.

Portions of the County are known for liquefaction. According to Figures IX-12, Newport-Inglewood Fault and Figure IX-13, San Andreas Fault, of the County's General Plan Safety Element, the potential for liquefaction within the North Tustin, including the Park and Sidewalk Extension Sites, are considered low (County of Orange, 2013). According to the Geotechnical Report, groundwater was not observed at the Park Site during the exploration to a maximum depth of 26.5 feet below the existing grade. Groundwater conditions may vary across the Park Site due to stratigraphic and hydrologic conditions and may change over time as a consequence of seasonal and meteorological fluctuations or activities by humans at the Park Site or nearby sites. However, groundwater is unlikely to impact the Project (GMU, 2020).

Further, as part of the proposed construction activities, on-site soils would be excavated and processed to remove organic materials, and then recompacted for use as engineered fill for the Park and Sidewalk Extension. The recompacted soil would meet applicable density and shear strength requirements for engineered fill materials consistent with American Society for Testing Materials (ASTM) Test Methdol D 1557 and ASTM Test Method D 3080, and would not be subject to liquefaction effects (GMU, 2020). Furthermore, the Park and Sidewalk Extension would not include habitable structures or buildings. While the Park and Sidewalk Extension would be required to comply with applicable seismic-related regulatory requirements of the County's

Building Code, and the latest standards of the 2019 CBC, implementation of the preliminary site-specific design recommendations and parameters of the Geotechnical Report would further ensure that seismic-related ground failure impacts, including liquefaction, would be less than significant and no mitigation measures are required.

**a-iv) Landslides?**

**Response to Question a-*iv*)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. The residential areas located immediately to the north of the Park Site are located at elevations up to approximately 10 feet above the Site. An approximate 5-foot high retaining wall along a portion of the northern site perimeter currently separates the Park Site from the residences. The Park and Sidewalk Extensions Sites, which are relatively flat, are located in a highly urbanized area. The probability of a seismically induced landslide affecting the Park and Sidewalk Extensions Sites are considered to be low, due to the lack of significant slopes on the Sites and surrounding areas. Further, no landslides or related features underlie or are adjacent to the Sites (GMU, 2020). A less than significant impact would occur in this regard and no mitigation measures are required.

**Question 4.11b) Result in substantial soil erosion or the loss of topsoil?**

**Response to Question 4.11b)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. Soil erosion refers to the process by which soil or earth material is loosened or dissolved and removed from its original location. Erosion can occur by varying processes and may occur in a project area where bare soil is exposed to wind or moving water (both rainfall and surface runoff). The processes of erosion are generally a function of material type, terrain steepness, rainfall or irrigation levels, surface drainage conditions, and general land uses. Topsoil is used to cover surface areas for the establishment and maintenance of vegetation due to its high concentrations of organic matter and microorganisms.

Project construction would result in ground surface disruption during excavation and grading that would create the potential for erosion to occur. Wind erosion would be minimized through soil stabilization measures required by the SCAQMD Rule 403 (Fugitive Dust) such as daily watering. Potential for water erosion would be reduced by implementation of standard erosion control measures imposed during site preparation and grading activities. As discussed in more detail under Section 4.14a, *Hydrology and Water Quality*, the Park and Sidewalk Extension would be subject to all existing regulations associated with the protection of water quality. Construction activities would be carried out in accordance with applicable County standard erosion control practices required pursuant to the 2019 CBC and the requirements of the National Pollutant Discharge Elimination System (NPDES) Construction General Permit No. 2009-2009-DWQ NPDES No. CAS000002 and SAR MS4 Order No. RI-2009-0030, as amended by Order No. R8-2010-0062 NPDES No. CAS 618030 issued by the Santa Ana Regional Water Quality Control Board (SARWQCB), as applicable (SARWQCB, 2017). Consistent with these requirements, a Stormwater Pollution Prevention Plan (SWPPP) would be prepared that incorporates BMPs to control water erosion during the construction of the Park and Sidewalk Extension. Thus, construction and operational impacts due to erosion or the loss of topsoil would be less than

significant with compliance with the applicable regulatory requirements listed above. No mitigation measures are required.

**Question 4.11c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction or collapse?**

**Response to Question 4.11c)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. According to the Geotechnical Report, the Park Site is underlain by alluvium deposits (Qal) that are typically comprised of sands and clays. Artificial fill (Qaf) soils were encountered in a majority of the excavations at the Park Site. The fills were encountered to a maximum depth of five feet below the existing grade and generally consist of yellow and dark brown, damp to moist, firm to stiff, sandy clays. The alluvium (Qal) underlay the artificial fill to the maximum depth of the exploratory drill holes (11.5 feet for Drill Hole [DH]-1, DH-4, DH-5 and DH-8; 21.5 feet for DH-2 and DH-3; 3 feet for DH-6; 5 feet for DH-7; 25.5 feet for DH-9); refer to Appendix A of the Geotechnical Report (GMU, 2020). The alluvium consists of brown to dark gray brown to yellow brown, damp to moist, medium dense to very dense, sands and firm to stiff clays (GMU, 2020).

Impacts related to liquefaction and landslides are discussed under Responses 4.11 (a.iii and a.iv). Lateral spreading is the downslope movement of surface sediment due to liquefaction in a subsurface layer. The downslope movement is due to the combination of gravity and earthquake shaking. Such movement can occur on slope gradients of as little as one degree. Lateral spreading typically damages pipelines, utilities, bridges, and structures. Lateral spreading of the ground surface during a seismic activity usually occurs along the weak shear zones within a liquefiable soil layer and has been observed to generally take place toward a free face (i.e. retaining wall, slope, or channel) and to a lesser extent on ground surfaces with a very gentle slope. As stated in Response 4.11 (a.iii), the potential for liquefaction within North Tustin, including the Park and Sidewalk Extensions Sites are considered low. Further, due to the absence of any channel, significant slope, or river within or near the Park and Sidewalk Extensions Sites, the potential for lateral spreading occurring on or off the Sites is considered to be negligible. No large-scale extraction of groundwater, gas, oil, or geothermal energy is occurring or planned at the Park and Sidewalk Extension Sites. Thus, there appears to be little or no potential for ground subsidence due to withdrawal of fluids or gases at the Park and Sidewalk Extension Sites.

While Project construction and design would be required to comply with the 2019 CBC, implementation of the preliminary site-specific design recommendations and parameters of the Geotechnical Report regarding clearing and grubbing, grading and earthwork, temporary excavations, surface drainage, bridge and pole foundations, retaining walls, structural concrete and pavement design would ensure that ground and soil stability hazards would be less than significant and no mitigation measures are required.

**Question 4.11d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?**

**Response to Question 4.11d)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. Soils with shrink-swell or expansive properties typically occur in fine-grained sediments and cause damage through volume changes as a result of a wetting and drying process. Structural damage may occur over a long period of time, usually the result of inadequate soil and foundation engineering or the placement of structures directly on expansive soils. According to the Geotechnical Report, the soils encountered near the ground surface at the Park Site exhibit low to medium expansion potential. If expansive soils were to be found at the Park and Sidewalk Extension Sites, site-specific design criteria (i.e., foundation design parameters, retaining walls) and remedial grading techniques (i.e., primarily removal, moisture conditions and recompaction of unsuitable soils) would be identified and implemented per the County, the 2019 CBC building requirements, and the Geotechnical Report recommendations to minimize the potential for risks due to expansive soils. As such, a less than significant impact would occur in this regard and no mitigation measures are required.

**Question 4.11e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal system where sewers are not available for the disposal of waste water?**

**Response to Question 4.11e)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. The Park and Sidewalk Extension do not propose habitable structures or restroom facilities. Therefore, the Park and Sidewalk Extension would not require the use of septic tanks or alternative waste water disposal systems. No impact would occur.

**Question 4.11f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?**

**Response to Question 4.11f)**

Crawford Canyon Park: **Less than Significant Impact with Mitigation Incorporated.** The Cultural Resources Assessment was conducted for the Crawford Canyon Park in January 2021 (ESA, 2020). The Assessment included a paleontological resources database search by the Natural History Museum of Los Angeles County (LACM) conducted on April 27, 2020, geologic map review, and a review of the Geotechnical Investigation Report for the Park Site.

No paleontological resources were identified within the Park Site. However, the geologic map review, the Geotechnical Investigation Report, and the LACM records search revealed that the Park Site has exposures of alluvial fan deposits (Qyf), which are assigned a low-to-high paleontological potential increasing with depth. Given that Park excavations would only reach 6 feet in depth and fossils from nearby older Quaternary alluvium sediments were recovered from 8 to 25 feet below ground surface, the Park Site does not appear to have the potential to disturb or destroy buried paleontological resources. Nevertheless, since construction of the Crawford Canyon Park includes ground disturbance, there remains the possibility that paleontological

resources could be encountered. Directly or indirectly destroying a unique paleontological resource could result in a significant effect on the environment. With implementation of Mitigation Measure PALEO-1, which provides procedures to follow in the event of a discovery, impacts would be less than significant.

Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact with Mitigation Incorporated**. The Cultural Resources Assessment was conducted for the Sidewalk Extension in January 2021 (ESA, 2021). The Assessment included a paleontological resources database search by the Natural History Museum of Los Angeles County (LACM) conducted on April 27, 2020 and geologic map review.

No paleontological resources were identified within the Sidewalk Extension Site. However, the geologic map review and the LACM records search revealed that the Sidewalk Extension Site has exposures of alluvial fan deposits (Qyf) and the middle Miocene Topanga Formation (Tt). The alluvial fan deposits are assigned a low-to-high paleontological potential increasing with depth. The LACM also mentions that in elevated areas immediately east and southeast of the Sidewalk Extension Site, there are exposures of the Sespe/Vaqueros Formation, undifferentiated (Tvs); however, the LACM has stated that these localities are likely to have originated from the Topanga Formation (Tt). The Sespe/Vaqueros Formation and the Topanga Formation are assigned a high potential. Since excavations would not exceed 3 feet in depth and the known fossil localities[2] in the vicinity have been discovered from as deep as 8 to 25 feet below ground surface, the Sidewalk Extension Site does not appear to have the potential to disturb or destroy buried paleontological resources.

Nevertheless, since construction of the Sidewalk Extension includes ground disturbance, there remains the possibility that paleontological resources could be encountered. Directly or indirectly destroying a unique paleontological resource could result in a significant effect on the environment. With implementation of Mitigation Measure PALEO-1, which provides procedures to follow in the event of a discovery, impacts would be less than significant.

**Mitigation Measure:**

> **Mitigation Measure PALEO-1:** If a potential fossil is found, a Qualified Paleontologist (Paleontologist) that meets the professional criteria established by the Society of Vertebrate Paleontology (SVP, 2010) shall be notified. The Paleontologist shall have the authority to temporarily divert or redirect grading and excavation activities in the area of the exposed fossil to facilitate evaluation of the discovery. An appropriate 50-foot buffer area shall be established around the find where construction activities shall not be allowed to continue. Work shall be allowed to continue outside of the buffer area. The Paleontologist shall assess the discovery and make recommendations as to the appropriate treatment. At the Paleontologist's discretion, and to reduce any construction delay, the grading and excavation contractor shall assist in removing rock/sediment samples for initial processing and evaluation. If the fossil is determined to be significant, the Paleontologist shall implement a paleontological salvage program to remove the resource from its location, following the guidelines of the SVP (2010). Any fossils encountered and recovered shall be prepared to the point of identification and catalogued before they are submitted to their final repository. Any fossils collected shall be curated at a public, non-

[2] Additional fossil localities have been found from the Sespe/Vaqueros Formation (which per the LACM, these likely originated from the Topanga Formation); however, the depths from which they were recovered are unknown.

profit institution with a research interest in the material and with retrievable storage, such as the County of Orange's Paleontology and Archaeology (COPA) collections at the Dr. John D. Cooper Archaeological and Paleontological Center, or Natural History Museums of Los Angeles County, if such an institution agrees to accept the fossils. If no institution accepts the fossil collection, they shall be donated to a local school in the area for educational purposes. Accompanying notes, reports, maps, and photographs shall also be filed at the repository and/or school.

| **4.12 Greenhouse Gas Emissions**<br><br>*Would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant effect on the environment? | ☐ | ☐ | ☒ | ☐ |
| b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases? | ☐ | ☐ | ☒ | ☐ |

The following analysis is based on the *Air Quality and Greenhouse Gas Modeling* (ESA, 2020a), located in Appendix A, of this Draft IS/MND.

**Question 4.12a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant effect on the environment?**

**Response to Question 4.12a)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. Gases that trap heat in the atmosphere are called greenhouse gases (GHGs). The major concern with GHGs is that increases in their concentrations are causing global climate change. Global climate change is a change in the average weather on Earth that can be measured by wind patterns, storms, precipitation, and temperature. Although there is disagreement as to the rate of global climate change and the extent of the impacts attributable to human activities, most in the scientific community agree that there is a direct link between increased emissions of GHGs and long term global temperature increases.

The State of California defines GHGs as carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulfur hexafluoride (SF6), perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs). Because different GHGs have different global warming potentials (GWPs) and CO2 is the most common reference gas for climate change, GHG emissions are often quantified and reported as

CO2 equivalents (CO2e). For example, CH4 has a GWP of 25 (over a 100-year period); therefore, 1 metric ton (MT) of CH4 is equivalent to 25 MT of CO2 equivalents (MTCO2e). The State uses the GWP ratios available from the United Nations Intergovernmental Panel on Climate Change (IPCC) and published in the *Fourth Assessment Report* (AR4). By applying the GWP ratios, project-related CO2e emissions can be tabulated in metric tons (MT) per year. Large emission sources are reported in million metric tons (MMT) of CO2e.

Some of the potential effects of global warming in California may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more forest fires, and more drought years.[3] Globally, climate change has the potential to impact numerous environmental resources through potential, though uncertain, impacts related to future air temperatures and precipitation patterns. The projected effects of global warming on weather and climate are likely to vary regionally, but are expected to include the following direct effects:[4]

- Higher maximum temperatures and more hot days over nearly all land areas;
- Higher minimum temperatures, fewer cold days and frost days over nearly all land areas;
- Reduced diurnal temperature range over most land areas;
- Increase of heat index over land areas; and
- More intense precipitation events.

Also, there are many secondary effects that are projected to result from global warming, including global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity. While the possible outcomes and the feedback mechanisms involved are not fully understood and much research remains to be done, the potential for substantial environmental, social, and economic consequences over the long term may be great.

California generated 429.4 MMTCO2e in 2016, the most recent year data are available. Combustion of fossil fuel in the transportation sector was the single largest source of California's GHG emissions in 2016, accounting for approximately 39 percent of total GHG emissions in the state. This sector was followed by the industrial sector (21 percent) and the electric power sector (including both in-state and out-of-state sources) (16 percent).

Impacts of GHGs are borne globally, as opposed to localized air quality effects of criteria air pollutants and toxic air contaminants. The quantity of GHGs that it takes to ultimately result in climate change is not precisely known; however, it is clear that the quantity is enormous, and no single project would measurably contribute to a noticeable incremental change in the global average temperature, or to global, local, or micro climates. From the standpoint of CEQA, GHG impacts to global climate change are inherently cumulative.

The County of Orange has not adopted a threshold of significance for GHG emissions that would be applicable to the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project. Although SCAQMD has not formally adopted a significance threshold for GHG emissions generated by a project for which SCAQMD is not the lead agency, or a uniform methodology for analyzing impacts related to GHG emissions on global climate change, in the absence of any industry-wide accepted standards, the SCAQMD's significance threshold of 3,000 MTCO2e per

[3] California Air Resources Board (CARB), 2008. Climate Change Scoping Plan. December 2008. Available: https://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. Accessed October 2020.
[4] Intergovernmental Panel on Climate Change (IPCC), 2001. Climate Change 2001: Working Group I: The Scientific Basis. Available: https://www.ipcc.ch/report/ar3/wg1/. Accessed December 2020.

year for development projects is the most relevant air district-adopted GHG significance threshold and is used as a benchmark for this Project. It should be noted that the SCAQMD's significance threshold of 3,000 MTCO2e per year is intended for long-term operational GHG emissions. The SCAQMD has developed guidance for the determination of the significance of GHG construction emissions that recommends that total emissions from construction be amortized over an assumed project lifetime of 30 years and added to operational emissions and then compared to the threshold.

The justification for the threshold is provided in SCAQMD's *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans* ("SCAQMD Interim GHG Threshold"). The SCAQMD Interim GHG Threshold identifies a screening threshold to determine whether additional analysis is required. As stated by the SCAQMD:

> *the…screening level for stationary sources is based on an emission capture rate of 90 percent for all new or modified projects…the policy objective of [SCAQMD's] recommended interim GHG significance threshold proposal is to achieve an emission capture rate of 90 percent of all new or modified stationary source projects. A GHG significance threshold based on a 90 percent emission capture rate may be more appropriate to address the long-term adverse impacts associated with global climate change because most projects will be required to implement GHG reduction measures. Further, a 90 percent emission capture rate sets the emission threshold low enough to capture a substantial fraction of future stationary source projects that will be constructed to accommodate future statewide population and economic growth, while setting the emission threshold high enough to exclude small projects that will in aggregate contribute a relatively small fraction of the cumulative statewide GHG emissions. This assertion is based on the fact that [SCAQMD] staff estimates that these GHG emissions would account for slightly less than one percent of future 2050 statewide GHG emissions target (85 [MMTCO2e per year]). In addition, these small projects may be subject to future applicable GHG control regulations that would further reduce their overall future contribution to the statewide GHG inventory. Finally, these small sources are already subject to [Best Available Control Technology (BACT)] for criteria pollutants and are more likely to be single-permit facilities, so they are more likely to have few opportunities readily available to reduce GHG emissions from other parts of their facility.*

Thus, based on guidance from the SCAQMD, if a project would emit GHGs less than 3,000 MTCO2e per year, the project would not be considered a substantial GHG emitter and GHG emission impact would be less than significant, requiring no additional analysis and no mitigation.

CEQA Guidelines 15064.4 (b)(1) states that a lead agency may use a model or methodology to quantify GHGs associated with a project. In September 2016, the SCAQMD in conjunction with California Air Pollution Control Officers Association (CAPCOA) released the latest version of the CalEEMod (Version 2016.3.2). The purpose of this model is to estimate construction-source and operational-source emissions from direct and indirect sources. Accordingly, the latest version of CalEEMod has been used for this Project to estimate the Project's emission impacts.

<u>Construction Emissions</u>

Construction activities associated with the Park and Sidewalk Extension would result in emissions of CO2 and to a lesser extent methane (CH4) and nitrous oxide (N2O). Construction-period GHG emissions were quantified based on the same construction schedule, activities, and equipment list

as noted below in **Table 4.17-2**, *Construction Equipment,* in Section 4.17, *Noise*. To amortize the emissions over the life of the Park and Sidewalk Extension, the SCAQMD recommends calculating the total GHG emissions attributable to construction activities, dividing it by a 30-year project life, and then adding that number to a project's annual operational-phase GHG emissions. As such, construction emissions were amortized over a 30-year period and included in the Project's annual operational-phase GHG emissions.

Operational Emissions

*GHG Emissions*

Operational activities associated with the Park and Sidewalk Extension would result in emissions of CO2 and to a lesser extent CH4 and N2O. Operational sources of GHG emissions would include mobiles sources from vehicles traveling to and from the Park Site, and indirect GHG emissions from export of electricity.

During operations, a maximum of 85 weekday vehicle trips, 57 Saturday vehicle trips, and 49 vehicle trips is expected from the Park. The Sidewalk Extension would not generate an increase in operational emissions. GHG emissions from mobile sources were calculated based on the trips per day, GHG emission factors for transportation fuels, and trip distances in CalEEMod.

Emissions of GHGs also resulted from electricity demand to power the on-site lighting. Electricity-related GHG emissions are based on the maximum electricity demand for Park lighting, and CO2 intensity factors for Southern California Edison.

Emissions Summary

The Project's annual GHG emissions are shown in **Table 4.12-1**, *Annual Project Greenhouse Gas Emissions*. As shown, the Project's total GHG emissions would be below the SCAQMD's proposed screening level of 3,000 MTCO2e per year. The Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would result in a less than significant impact with respect to GHG emissions and no mitigation measures are required.

**Table 4.12-1: Annual Project Greenhouse Gas Emissions**

| Emissions Sources | $CO_2e$ (Metric Tons per Year) [a] |
|---|---|
| Area | <1 |
| Electricity | 12 |
| Natural Gas | 0 |
| Mobile | 82 |
| Waste | <1 |
| Water | 11 |
| Construction[b] | 23 |
| **Project Total** | **128** |
| SCAQMD GHG Significance Threshold | 3,000 |
| **Exceeds Threshold?** | **No** |

[a] Totals may not add up exactly due to rounding in the modeling calculations.
[b] Construction emissions are amortized over 30 years.
Source: ESA 2020

**Question 4.12b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?**

**Response to Question 4.12b)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. The Project's highest GHG contributors are from mobile sources. This is a highly regulated source by the State of California with measures implemented in the Scoping Plan to reduce GHG emissions. With respect to relevant statewide GHG reduction strategies, in January 2007, the California Governor enacted Executive Order S-01-07, which mandates the following: (1) establish a statewide goal to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020; and (2) adopt a Low Carbon Fuel Standard (LCFS) for transportation fuels in California. CARB identified the LCFS as one of the nine discrete early actions in the Climate Change Scoping Plan. The LCFS regulations were approved by CARB in 2009 and established a reduction in the carbon intensity of transportation fuels by 10 percent by 2020 with implementation beginning on January 1, 2011. In September 2015, CARB approved the re-adoption of the LCFS, which became effective on January 1, 2016, to address procedural deficiencies in the way the original regulation was adopted. In the proposed 2017 Climate Change Scoping Plan Update, CARB's preferred recommendation includes increasing the stringency of the LCFS by reducing the carbon intensity of transportation fuels by 18 percent by 2030, up from the current target of 10 percent by 2020.[5]

[5] CARB, 2017. The 2017 Climate Change Scoping Plan Update – The Proposed Strategy For Achieving California's 2030 Greenhouse Gas Target. January 2017. Available: https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf. Accessed October 2020.

Overall, the Project would not conflict with an applicable plan, policy, or regulation to reduce GHG emissions because it would comply with all construction-related transportation fuel regulations and it would not generate or promote operational mobile emissions. As such, impacts would be considered less than significant and no mitigation measures are required.

| **4.13 Hazards and Hazardous Materials**<br><br>*Would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? | ☐ | ☐ | ☒ | ☐ |
| b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment? | ☐ | ☐ | ☒ | ☐ |
| c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? | ☐ | ☐ | ☒ | ☐ |
| d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? | ☐ | ☐ | ☒ | ☐ |

| | | | | |
|---|---|---|---|---|
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area? | ☐ | ☐ | ☐ | ☒ |
| f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? | ☐ | ☐ | ☒ | ☐ |
| g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires? | ☐ | ☐ | ☐ | ☒ |

The following analysis is based on the *Hazardous Materials Assessment for the North Tustin Park Parcel, Northwest Corner of Newport Avenue and Crawford Canyon Road, Unincorporated Orange County; ROWE I.D. No. 2011-41* (Environmental Resources, 2011), located in Appendix F, of this Draft IS/MND.

**Question 4.13a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?**

**Response to Question 4.13a)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. A hazardous material is defined as any material that due to its quantity, concentration, physical or chemical characteristics, poses a significant present or potential hazard to human health or to the environment if released. Hazardous materials include, but are not limited to, inorganic and organic chemicals, solvents, mercury, lead, asbestos, paints, cleansers, or pesticides.

Hazardous materials that may be used during construction of the Park and Sidewalk Extension include, but are not limited to, fuels (gasoline and diesel), hydraulic fluids, oils and lubricants, grease, solvents, cleaning fluids, paints and paint thinners, adhesives, surface coatings and possibly herbicides and pesticides. Generally, these materials would be used in concentrations that would not pose significant threats during the transport, handling, use, storage, and disposal of such materials. Furthermore, potentially hazardous materials would be contained, stored, and used in accordance with manufacturers' instructions and handled in compliance with applicable

standards and regulations, including California Occupational Safety and Health Administration (OSHA) requirements, and Title 8 and 22 of the California Code of Regulations. Further, material safety data sheets for all applicable materials present at the Project Site would be made readily available to onsite construction personnel. Accordingly, risks associated with hazards to the public or environment posed by the transport, use or disposal of hazardous materials during construction are considered less than significant due to compliance with applicable and required standards and regulations.

Post construction, the Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements. No operational activities are associated with the Sidewalk Extension. The Park Site would be developed with a 2.5-acre neighborhood park consisting a variety of recreational amenities and features. Operational activities associated with the Park would include maintenance for landscaping. Maintenance activities related to landscaping include the use of fertilizers and the use of light equipment (such as lawn mowers and edgers). These types of activities use small amounts of hazardous materials such as gasoline, oils and lubricants, and solvents. These hazardous materials are regulated by stringent federal and state laws mandating the proper transport, handling, use, storage, and disposal of hazardous materials in accordance with product labeling. These laws include, but not limited to, the Clean Air Act (CAA), the Superfund Amendments and Reauthorization Act (SARA), the Emergency Planning and Community Right-to-Know Act (EPCRA), the Hazardous Materials Transportation Act (HMTA), the Occupational and Safety Health Act (OSHA), the Resource Conservation and Recovery Act (RCRA), the Unified Hazardous Waste and Hazardous Materials Management Regulatory Program, and the Accidental Release Prevention Law. The use and storage of these substances is not considered to present a health risk when used in accordance with manufacturer specifications and with compliance to applicable regulations. Thus, potential impacts from the routine transport, use or disposal of hazardous materials resulting from Project operations would be less than significant and no mitigation measures are required.

**Question 4.13b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?**

**Response to Question 4.13b)**

<u>Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension</u>: **Less than Significant Impact**. It is not anticipated that Project construction could create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Construction of the Park and Sidewalk Extension could involve the use of some hazardous and flammable substances. Construction vehicles onsite may require routine or emergency maintenance that could result in the release of oil, diesel fuel, transmission fluid, or other materials. However, the materials would be in small quantities and stored in a manner that would pose a less than significant hazard to the public. In the unlikely event of a spill, these petroleum products are relatively easy to clean up, treat, or biodegrade. Operational activities associated with the Park and Sidewalk Extension, such as maintenance for landscaping, would not involve the use of acutely hazardous materials or waste, and the limited use of any hazardous materials would be transported, handled, used, stored, and disposed of in accordance with manufactures' instructions. Due to the limited use of small quantities, the Project would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous

materials in to the environment. A less than significant impact would occur in this regard and no mitigation measures are required.

**Question 4.13c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?**

**Response to Question 4.13c)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. The nearest school, Panorama Elementary School at 10512 S. Crawford Canyon Road, Santa Ana, is located approximately 0.40 miles northwest of the Park Site. Construction of the Park and Sidewalk Extension would involve the temporary use of hazardous substances in the form of fuels (gasoline and diesel), hydraulic fluids, oils and lubricants, grease, solvents, cleaning fluids, paints and paint thinners, adhesives, surface coatings and possibly herbicides and pesticides. Operational activities associated with the Park would include maintenance for landscaping which would involve the use of fertilizers and the use of light equipment (such as lawn mowers and edgers). Materials and substances required for construction of the Park and Sidewalk Extension would be located within the project boundaries of the Park Site. All materials would be transported, handled, used, stored, and disposed of in accordance with applicable laws and regulations and manufacturers' instructions. Further, the Project would be required to comply with the stringent federal and state laws and regulations discussed above under Response 4.13a that would avoid or minimize the potential releases of hazards materials during construction and operation. A less than significant impact would occur in this regard and no mitigation measures are required.

**Question 4.13d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?**

**Response to Question 4.13d)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. Government Code Section 65962.5, amended in 1992, requires CalEPA to develop and update annually the Cortese List, which is a list of hazardous waste sites and other contaminated sites. While Government Code Section 65962.5 makes reference to the preparation of a list, many changes have occurred related to web-based information access since 1992 and information regarding the Cortese List is now compiled on the websites of the Department of Toxic Substances Control (DTSC), the State Water Board, and CalEPA. The DTSC maintains the EnviroStor database, which includes sites on the Cortese List and also identifies potentially hazardous sites where cleanup actions (such as a removal action) or extensive investigations are planned or have occurred. The database provides a listing of Federal Superfund sites (National Priorities List); State Response sites; Voluntary Cleanup sites; and School Cleanup sites. Based on a review of the EnviroStor database, the Park and Sidewalk Extension Sites are not identified on any of the above lists (Department of Toxic Substances Control 2020), or CalEPA's list of sites with active Cease and Desist Orders or Cleanup and Abatement Orders or list of contaminated solid waste disposal sites (CalEPA, 2020), or the State Water Board's Geotracker Database, which provides a list of leaking underground storage tank sites that are included on the Cortese List (SWRCB, 2020). According to the previous hazardous materials assessment prepared for the Park Site, no RECs

associated with the Park Site or adjoining sites were identified. The regulatory database identified one mapped listing around the Park Site and nine orphan sites. However, further investigation determined that the target and orphan listings have a low potential for impacting the Park Site (Environmental Resources, 2011). As such, a less than significant impact would occur in this regard and no mitigation measures are required.

**Question 4.13e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?**

**Response to Question 4.13e)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. The Park and Sidewalk Extension Sites are not within an airport land use plan and are not within two miles of a public airport or public use airport. The nearest airport is the John Wayne Airport, Newport Beach, located approximately 7.5 miles southwest of the Park and Sidewalk Extensions Sites. Therefore, the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would not result in an airport-related safety hazard for people residing or working in the Project area. No impact would occur in this regard.

**Question 4.13f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?**

**Response to Question 4.13f)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. The Park and Sidewalk Extension Sites are located in a highly urbanized area of North Tustin. The areas immediately to the north, east, south, and west of the Park and Sidewalk Extension Sites comprise of existing single-family residences. While it is expected that the majority of construction activities for the Project would be confined on-site, short-term construction activities may temporarily affect access on portions of adjacent streets during certain periods of the day. Construction activities for the Park will involve temporary lane closures along Newport Avenue for delivery of construction materials and during installation of the deceleration lane. One of the two southbound travel lanes along Newport Avenue is expected to be closed during construction of the Sidewalk Extension. Along Crawford Canyon Road, travel lanes are expected to be shifted to maintain two-directional travel. Construction-related traffic could result in increased travel time due to flagging or traffic to accommodate trucks entering and exiting the Park and Sidewalk Extension Sites during construction. However, the impacts of such construction activity would be temporary and on an intermittent basis. Further, a Construction Management Plan for the Park and Sidewalk Extension would be prepared in order to minimize disruptions to through traffic flow, maintain emergency vehicle access to the Park and Sidewalk Extension Sites and neighboring land uses, and schedule worker and construction equipment delivery to avoid peak traffic hours. As a component of the Construction Management Plan, the times of day and locations of all temporary lane closures would be coordinated so that they do not occur during peak periods of traffic congestion, to the extent feasible. Truck routes for material and equipment deliveries, as well as for soil export and disposal, would require approval by the OC Public Works prior to construction activities. The Construction Management Plan would be

prepared for review and approval prior to commencement of any construction activity. These practices, as well as techniques typically employed by emergency vehicles to clear or circumvent traffic (i.e., lights and sirens), are expected to limit the potential for significant delays in emergency response times during Project construction. As such, construction is not expected to result in inadequate emergency access.

The County is proposing to develop a 2.5-acre neighborhood park consisting of a variety of recreational amenities and features. Park operations would generate traffic to the Park Site and would include a vehicular deceleration lane on Newport Avenue prior to entering the proposed paved surface parking lot with 11 vehicular parking spaces. The proposed improvements of the Sidewalk Extension include approximately 630 feet of sidewalk construction along the north side of Newport Avenue beginning across from Hyde Park Drive proceeding easterly and approximately 815 feet of sidewalk construction along the west side of Crawford Canyon Road from the northeasterly end of the Park Site to Country Haven Lane. Additional associated proposed improvements include, but are not limited to pavement reconstruction, driveways, curb ramps, curb/gutter, and a traffic signal system upgrade at the intersection of Crawford Canyon Road and Newport Avenue. Emergency access to the Park Site and surrounding area would continue to be provided similar to existing conditions. Emergency vehicles and fire access to the Park Site would be provided at-grade from Newport Avenue. Subject to review and approval of Site access and circulation plans by the OCFA, the Project would not impair implementation or physically interfere with adopted emergency response or emergency evacuation plans. Since the Project would not cause significant impediments along any designated emergency evacuation routes, and the proposed use would not impair implementation of the County's emergency response plan, the Project would have a less than significant impact with respect to these issues and no mitigation measures are required.

**Question 4.13.g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?**

**Response to Question 4.13g)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. The Park and Sidewalk Extension Sites are located in North Tustin, an urbanized in unincorporated community in the County. The areas immediately to the north, east, south, and west of the Park and Sidewalk Extension Sites comprise of existing single-family residences. No wildlands are present in the North Tustin or the Project area. Therefore, the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would not expose people or structures to a significant risk involving wildland fires. No impact would occur in this regard.

| **4.14 Hydrology and Water Quality**<br><br>*Would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality? | ☐ | ☐ | ☒ | ☐ |
| b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin? | ☐ | ☐ | ☒ | ☐ |
| c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner, which would: | ☐ | ☐ | ☒ | ☐ |
| i) result in substantial erosion or siltation on- or offsite? | ☐ | ☐ | ☒ | ☐ |
| ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite? | ☐ | ☐ | ☒ | ☐ |

| | | | | |
|---|---|---|---|---|
| iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial sources of polluted runoff? | ☐ | ☐ | ☒ | ☐ |
| d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation? | ☐ | ☐ | ☒ | ☐ |
| e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan? | ☐ | ☐ | ☒ | ☐ |

The following analysis is based in part, on the *Hydrology Analysis for Crawford Canyon Park, S. Crawford Canyon Road & Newport Blvd* (Hydrology Study) (Hunsaker, November 16, 2020), located in Appendix G, of this Draft IS/MND; the *Water Quality Management Plan Crawford Canyon Park* (Water Quality Management Plan) (Hunsaker, November 17, 2020), located in Appendix H, of this Draft IS/MND; and the *Geotechnical Investigation Report, Crawford Canyon Park, Northwest Corner of Newport Avenue and Crawford Canyon Road, Orange, California* (Geotechnical Report) (GMU, 2020), located in Appendix E, of this Draft IS/MND.

**Question 4.14a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?**

**Response to Question 4.14a)**

<u>Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension</u>: **Less than Significant Impact**.

Project construction activities include demolition, clearing and grubbing, site preparation, grading/excavation, utility relocation, paving and construction, and landscaping which could lead to ground disturbance and polluted runoff. Since the Project is anticipated to disturb greater than one acre of land, Project construction activities would be carried out in accordance with applicable County standard erosion control practices required pursuant to the 2019 CBC and the requirements of the Construction General Permit No. 2009-2009-DWQ NPDES No. CAS000002 and SAR MS4 Order No. RI-2009-0030, as amended by Order No. R8-2010-0062 NPDES No. CAS 618030 issued by the SARWQCB, as applicable. Consistent with these requirements, a SWPPP would be prepared that incorporates BMPs to control wind and water erosion during the Project's construction period. Pursuant to the Construction General Permit, prior to terminating permit coverage at the end of the construction phase, the Park and Sidewalk Extension Sites must

be stabilized and not pose any additional sediment discharge risk than it did prior to the commencement of construction activity.

The Park Site is located within the San Diego Creek Watershed. Established total maximum daily loads (TMDL's) for the Park's receiving waters are as follows: Peters Canyon Channel (no TMDL's established); San Diego Creek Reach 1 (nutrients, pesticides, sedimentation/siltation, metals); Upper Newport Bay (indicator bacteria, nutrients, pesticides, sedimentation/siltation, metals); and Lower Newport Bay (indicator bacteria, nutrients, pesticides, metals, siltation). Per the watershed infiltration and hydromodification management (WIHMP) for San Diego Creek, the Crawford Canyon Park is subject to hydromodification impacts as it is tributary to natural reaches of downstream San Diego Creek (Hunsaker, November 17, 2020).

As discussed above, the Park Site is located within the jurisdiction of the SARWQCB and is subject to the requirements of the North Orange County Water Quality Management Plan (WQMP) Technical Guidance Document (TGD), in which hydrology conditions of concern (HCOC's) are considered to exist if the volume for the 2-year runoff event for post-development condition exceeds pre-development condition by more than five percent or the time of concentration is less than the pre-development condition by greater than five percent. The Crawford Canyon Park will increase the amount of existing impervious area located within the Park Site by a negligible amount of 0.5 acres (pre-project conditions 0.37 acres; post-project conditions 0.87 acres); thereby potentially increasing the developed condition runoff volume and rate. As such, the Crawford Canyon Park is subject to the hydromodification requirements prescribed in the TGD for North Orange County (Hunsaker, November 17, 2020). A summary of the analysis is provided in **Table 4.14-1**, *HCOC Analysis Summary (2-Year Event)*. Based on the Park's hydrology analysis for the 2-year storm, the time of concentration (Tc) to reach peak runoff for the developed condition is reduced by greater than 5 percent. Therefore, the Crawford Canyon Park must implement hydromodification control BMPs to address HCOC impacts (Hunsaker, November 17, 2020).

**Table 4.14-1: HCOC Analysis Summary (2-Year Event)**

| Total Drainage Area[1] | Existing Condition | | | Proposed Condition | | | Delta Acres | Delta $Q_2$ (cfs) | Delta Tc (min) |
|---|---|---|---|---|---|---|---|---|---|
| | Acres | $Q_2$ (cfs) | Tc (min) | Acres | $Q_2$ (cfs) | TC (min) | | | |
| **Overall (onsite plus offsite)** | 37.1 | 35.8 | 12.46 | 37.1 | 35.7 | 10.82 | 0.0 | -0.1 | -1.64 |

[1] Consists of onsite runoff and any offsite run-on areas to selected point of compliance.

Notes: $Q_2$ = 2-year event; cfs = cubic feet per second; Tc = time of concentration; min = minimum.

Source: Hunsaker, November 17, 2020 (Appendix H, of this Draft IS/MND).

The Crawford Canyon Park will incorporate site design BMPs, hydrologic source control (HSC) BMPs, infiltration BMPs, biotreatment BMPs, and hydromodification control BMPs to address HCOC impacts. The site design BMPs that have been incorporated into the Park include the following: minimize impervious area, maximize natural infiltration capacity; preserve existing drainage patterns and time of concentration; disconnect impervious areas; protect existing vegetation and sensitive areas, and revegetate disturbed areas and xeriscape landscaping.

Hydrologic source controls can be considered to be an integration of site design practices and LID BMPs. The goal of HSC's is to reduce runoff volume for a given drainage area without reducing the site's true impervious area. Where feasible, runoff from the Park's impervious areas and walkways will be directed to adjacent landscaping areas for filtration, evapotranspiration and incidental infiltration of runoff and volume reduction, prior to discharging to the storm drain system. The Park includes the use of infiltration BMPs to address pollutants from project-related runoff. Infiltration BMPs are LID BMPs that capture, store, and infiltrate storm water runoff. These BMPs are engineered to store a specified volume of water and have no design surface discharge (i.e., underdrain or outlet structure) until this volume is exceeded. Examples of infiltration BMPs include infiltration trenches, bioretention without underdrains, drywells, permeable pavement, and underground infiltration galleries. The Park proposes the use of a proprietary biotreatment BMP (i.e., filterra biofiltration or approved equivalent) to address runoff from the proposed parking lot area. Biotreatment BMPs are a class of structural LID BMPs that treat suspended solids and dissolved pollutants in storm water using mechanisms characteristics of biologically active systems. These BMPs are considered treat and release facilities and include treatment mechanisms that employ soil microbes and plants. Additional benefits of these BMPs may include aesthetic enjoyment, recreational use, wildlife habitat and reduction in storm water volume. The Project will incorporate hydromodification control BMPs. The Project's main storm drain line will be upsized and/or detention within the bioretention basin will be utilized to detain the difference in runoff for the 2-year storm event as shown in Table 4.14-1. The Project's main storm drain line in the proposed parking lot area will be upsized to detain the difference in runoff for the 2-year storm event (Hunsaker, November 17, 2020)

Overall, compliance with applicable County standard erosion control practices required pursuant to the 2019 CBC and the requirements of the Construction General Permit No. 2009-2009-DWQ NPDES No. CAS000002 and SAR MS4 Order No. RI-2009-0030, as amended by Order No. R8-2010-0062 NPDES No. CAS 618030 issued by the SARWQCB, and incorporation of the BMPs, the Project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality. A less than significant impact would occur in this regard and no mitigation measures are required.

**Question 4.14b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?**

**Response to Question 4.14b)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. The Project would not decrease groundwater supplies or interfere substantially with groundwater recharge as groundwater extraction is not proposed for the Park or Sidewalk Extension. The Park and Sidewalk Extension Sites would be watered during dry and windy conditions during construction to prevent dust and debris from migrating offsite. The demand for construction watering would be minor and temporary. According to the Geotechnical Report, the groundwater was not observed during the exploration to a maximum depth of 26.5 feet below the existing grade of the Park Site. Groundwater conditions may vary across the Park Site due to stratigraphic and hydrologic conditions and may change over time as a consequence of seasonal and meteorological fluctuations or activities by humans at the Park Site or nearby sites. However, groundwater is unlikely to impact the Project (GMU, 2020). Therefore, the Project would result in less than significant impact to groundwater supplies and no mitigation measures are required.

**Question 4.14c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner, which would:**

**c-i) result in substantial erosion or siltation on- or offsite?**

**c-ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?**

**c-iii): create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial sources of polluted runoff?**

**Response to Question c-i - c-iii)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. Refer above to Response 4.14a.

The Project would include the construction and operation of a 2.5-acre neighborhood park consisting of walkways, trails, foot bridges, two nature play areas for children, exercise stations, picnic tables, benches, landscape berms and natural rolling lawn areas. The Park would not include habitable structures or buildings. A paved surface parking lot with 11 vehicular parking spaces would be provided onsite with vehicular access from Newport Avenue. The Park Site is currently vacant with scattered vegetation, a drainage culvert and associated drainage ditches, overhead power lines, an existing County easement designated for public utilities and regional and local trails, and chain link fencing along the Site perimeter. Construction of the Park would not alter the course of a stream or river.

The proposed improvements of the Sidewalk Extension include approximately 630 feet of sidewalk construction along the north side of Newport Avenue beginning across from Hyde Park Drive proceeding easterly and approximately 815 feet of sidewalk construction along the west side of Crawford Canyon Road from the northeasterly end of the Park Site to Country Haven Lane. Additional associated proposed improvements include decomposed granite walkways, pavement reconstruction, driveways, curb ramps, curb/gutter, retaining walls/slough walls, drainage inlet modifications and features, utility relocations and adjustments, traffic pole replacement, pedestrian push button relocation and adjustments to pull boxes at the intersection of Crawford Canyon Road and Newport Avenue. The Sidewalk Extension Site is comprised of the existing road right-of-ways of Newport Avenue and Crawford Canyon Road. Construction of the Sidewalk Extension would not alter the course of a stream or river because no stream or rivers are located on this portion of the Sidewalk Extension Site.

Earth-moving activities would occur during construction of the Park and Sidewalk Extension that would slightly alter the topography of the Sites. SWPPP erosion control measures would be implemented to reduce surface run-off impacts during construction. Implementation of the Park and Sidewalk Extension would add impervious surfaces that could affect current drainage patterns.

According to the Hydrology Study, there are existing storm drain systems within the Park Site which convey the offsite runoffs from the existing residential uses to the north and east. There is an existing 30-inch storm drain and 36-inch storm drain at the northeast corner of the Park Site for the off-site

flows. There is an existing 48-inch pipe after the confluence of the existing 30-inch and 36-inch RCP pipes. The 48-inch storm drain discharges into an existing energy dissipater and ultimately into the existing trapezoidal earthen/concrete channel. The existing trapezoidal channel joins an existing 42-inch RCP at the southwest corner of the Park Site and ultimately discharges offsite into an existing 60-inch RCP along Newport Avenue. A majority of the runoff within the Park Site, including the west side of Crawford Canyon Road sheet flows from east to west into a depressed area downstream where flows are collected and conveyed into the on-site trapezoidal channel. Existing concrete v-ditches are located along the southern site boundary along Newport Avenue to collect and convey the flows within the Park Site and are discharged into the existing trapezoidal channel downstream via a concrete down drain (Hunsaker, November 16, 2020).

An inlet is proposed within the Park Site for the concrete down drain at the northeastern corner of the Site and will be proposed to join the existing 30-inch reinforced concrete pipe (RCP) below grade. The majority of the on-site runoff will be collected and conveyed by a meandering dry creek swale which traverses the Park Site from east to west. A bioretenion basin is proposed at the end of the swale for water quality treatments. The storm runoffs from the bioretention basin discharge to the existing trapezoidal channel. An inlet and filterra unit are proposed at the entrance of the proposed parking lot. The storm drain system is proposed to join the existing trapezoidal channel which discharges into by an existing 42-inch RCP and ultimately into an existing 60-inch RCP along Newport Avenue (Hunsaker, November 16, 2020).

According to the Hydrology Study, there is only one drainage area within the studied reach for both the existing condition and proposed condition. There are no available hydrology studies for the existing 30-inch and 36-inch pipes located at the northeastern corner of the Park Site. The Hydrology Study was extended to include the off-site drainage areas. As indicated in **Table 4.14-2**, *Crawford Canyon Park Overall Hydrology Summary*, the overall peak runoffs are similar to the existing condition after the Park improvements. The overall tributary areas remain the same and the proposed condition flow rate are all less than the existing levels. Overall, it is concluded that development of Crawford Canyon Park would result in no adverse impacts to the existing drainage systems (Hunsaker, November 16, 2020).

**Table 4.14-2: Crawford Canyon Park Overall Hydrology Summary**

| Drainage Area | Existing Condition | | | | Proposed Condition | | | | Delta (Proposed-Existing) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Area | 2-year | 25-year | 100-year | Area | 2-year | 25-year | 100-year | Area | 2-year | 25-year | 100-year |
| | (acre) | (cfs) | (cfs) | (cfs) | (acre) | (cfs) | (cfs) | (cfs) | (acre) | (cfs) | (cfs) | (cfs) |
| **Overall** | 37.1 | 35.8 | 86.4 | 113.2 | 37.1 | 35.7 | 86.0 | 112.9 | 0.0 | -0.1 | -0.4 | -0.3 |

Source: Hunsaker, November 16, 2020 (Appendix G, of this Draft IS/MND).

Along Crawford Canyon Road, surface water sheet flows off the road towards an earthen swale adjacent to the roadway which drains to a concrete v-ditch that connects to a storm drain inlet. The proposed improvements of the Sidewalk Extension include the installation of a curb and gutter along the Crawford Canyon Road with drainage inlet modifications and features connecting to a new storm drain which will drain into the existing storm drain system. Improvements along Newport Avenue will not alter any drainage patterns.

Overall, a less than significant impact is expected to occur in these regards and no mitigation measures are required.

**Question 4.14d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?**

**Response to Question 4.14d)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. According to the Geotechnical Report, the majority of the Sites are located within an Area of Minimal Flood Hazard (Zone X). However, the southwestern portion of the Park Site is located within an area of 0.2 percent annual chance for a flood, one percent annual chance for a flood with average depths of less than one foot or within drainage areas less than one square mile, and protected by levees from one percent chance for a flood. The potential for the Sites to be adversely impacted by significant flooding is considered low (GMU, 2020). The Sites are not located on any State of California Tsunami Inundation Map for Emergency Planning (California Department of Conservation, 2021). The potential for the Sites to be adversely impacted by a tsunami are considered to be negligible as the Sites are located approximately 14 miles inland from the Pacific Ocean and at an elevation exceeding the maximum height of potential tsunami inundation (GMU, 2020). The potential for the Sites to be adversely impacted by seiches are considered to be negligible due to the lack of any significant enclosed bodies of water located in the vicinity of the Project Site (GMU, 2020). As such, the Project would not risk release of pollutants within a flood hazard zone, or from inundation of tsunami or seiche and there would be less than a significant impact and no mitigation measures are required.

**Question 4.14e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?**

**Response to Question 4.14e)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. As discussed above, the Park and Sidewalk Extension would not decrease groundwater supplies or interfere substantially with groundwater recharge. The Park and Sidewalk Extension Sites would be watered during dry and windy conditions during construction to prevent dust and debris from migrating offsite. The demand for construction watering would be minor and temporary. According to the Geotechnical Report, the groundwater was not observed during the exploration to a maximum depth of 26.5 feet below the existing grade of the Park Site. Groundwater conditions may vary across the Park Site due to stratigraphic and hydrologic conditions and may change over time as a consequence of seasonal and meteorological fluctuations or activities by humans at the Park Site or nearby sites. However, groundwater is unlikely to impact the Project (GMU, 2020). The Park and Sidewalk Extension would be subject to all existing regulations associated with the protection of water quality. Construction activities would be carried out in accordance with applicable County standard erosion control practices required pursuant to the 2019 CBC and the requirements of the Construction General Permit No. 2009-2009-DWQ NPDES No. CAS000002 and SAR MS4 Order No. RI-2009-0030, as amended by Order No. R8-2010-0062 NPDES No. CAS 618030 issued by the SARWQCB, as applicable. Consistent with these requirements, a SWPPP would be prepared that incorporates BMPs to control water erosion during the construction of the Park and Sidewalk Extension. Therefore, a less than significant impact would occur in this regard and no mitigation measures are required.

| **4.15 Land Use and Planning**<br><br>*Would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Physically divide an established community? | ☐ | ☐ | ☒ | ☐ |
| b) Cause a significant environmental impact due to a conflict with any applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect? | ☐ | ☐ | ☒ | ☐ |

**Question 4.15a) Physically divide an established community?**

**Response to Question 4.15a)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. The Park and Sidewalk Extension Site are located in North Tustin, an urbanized in unincorporated community in the County. The Park and Sidewalk Extension Site are located in a highly urbanized area of North Tustin. The areas immediately to the north, east, south, and west of the Park and Sidewalk Extension Site comprise of existing single-family residences.

The Project would include the construction and operation of a 2.5-acre neighborhood park consisting of walkways, trails, foot bridges, two nature play areas for children, exercise stations, picnic tables, benches, landscape berms and natural rolling lawn areas. The Park would not include habitable structures or buildings. A paved surface parking lot with 11 vehicular parking spaces would be provided onsite with vehicular access from Newport Avenue. The development of the Park would provide recreational uses for the existing neighborhood and community. In 2011, the Orange County Board of Supervisors authorized the OC Public Works Director to pursue acquisition and development of a community park or other recreational opportunities within North Tustin to benefit the residents of North Tustin (OC Board of Supervisors, 2011).

The proposed improvements of the Sidewalk Extension include approximately 630 feet of sidewalk construction along the north side of Newport Avenue beginning across from Hyde Park Drive proceeding easterly and approximately 815 feet of sidewalk construction along the west side of Crawford Canyon Road from the northeasterly end of the Park Site to Country Haven Lane. Additional associated proposed improvements include decomposed granite walkways, pavement reconstruction, driveways, curb ramps, curb/gutter, retaining walls/slough walls, drainage inlet modifications and features, utility relocations and adjustments, traffic pole replacement, pedestrian push button relocation and adjustments to pull boxes at the intersection of Crawford Canyon Road and Newport Avenue.

Overall, given development of the Park would provide needed recreational uses for the existing neighborhood and community and the sidewalk improvements and associated proposed improvements would benefit residents of the Project area, the Project would be an integral part of the community and would not physically divide the existing established community. A less than significant impact would occur in this regard and no mitigation measures are required.

**Question 4.15b) Cause a significant environmental impact due to a conflict with any applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?**

**Response to Question 4.15b)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. The County's General Plan designation for the Park Site is Suburban Residential (1B). These areas are characterized by a wide range of housing types, from estates on large lots to attached dwelling units (i.e., townhomes, condominiums, and clustered arrangements). No change to the Park Site's existing general plan designation is proposed or a necessary component of the Project. The Park Site's existing zoning designation is Agricultural Residential (AR) 20,000. Per Table 7-9-31.2, Land Use Regulations – Single-Family Residential Districts, of the County's Zoning Code, the AR zoning designation permits parks and recreational facilities (non-commercial). No change to the Park Site's existing zoning designation is proposed or a necessary component of the Project. Therefore, implementation of the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would not conflict with an applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. As such, a less than significant impact would occur in this regard and no mitigation measures are required.

| **4.16 Mineral Resources**<br><br>*Would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? | ☐ | ☐ | ☐ | ☒ |
| b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan? | ☐ | ☐ | ☐ | ☒ |

**Question 4.16a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?**

**Response to Question 4.16a)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. Minerals are defined as any naturally occurring chemical elements or compounds formed from inorganic processes and organic substances. The California Surface Mining and Reclamation Act of 1975 (SMARA) requires that all cities address significant mineral resources, classified by the State Geologist and designated by the State Mining and Geology Board, in their General Plans.

North Tustin is presently urbanized and covered with impervious surfaces. Valuable mineral resources are not known to exist within the North Tustin, the Project vicinity, or the Park or Sidewalk Extension Site. The Park Site is currently vacant with scattered vegetation, a drainage culvert and associated drainage ditches, overhead power lines, an existing County easement designated for public utilities and regional and local trails, and chain link fencing along the Site perimeter. The Sidewalk Extension Site is comprised of the existing road right-of-ways of Newport Avenue and Crawford Canyon Road. As such, the potential of uncovering mineral resources during Project construction is considered low. According to Figure VI-3, Orange County Mineral Resources, of the County's General Plan, the Park and Sidewalk Extension Sites are not a mineral resource area (County of Orange, 2013). Therefore, the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would not result in the loss of availability of a known mineral resource delineated on a local general plan, specific plan, or other land use plan as there are no known mineral resources. No impact would occur in this regard.

**Question 4.16b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?**

**Response to Question 4.16)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. North Tustin is presently urbanized and covered with impervious surfaces. Valuable mineral resources are not known to exist within North Tustin, the Project vicinity, or the Park or Sidewalk Extension Sites. There are no mineral resource recovery sites located within North Tustin. There is no opportunity to impact any mineral recovery sites. According to Figure VI-3, Orange County Mineral Resources, of the County's General Plan, the Park and Sidewalk Extension Sites are not a mineral resource area. The County's General Plan designation for the Park Site is Suburban Residential (1B). These areas are characterized by a wide range of housing types, from estates on large lots to attached dwelling units (i.e., townhomes, condominiums, and clustered arrangements). The Park and Sidewalk Extension Site are not zoned for mineral extraction. The Park Site is zoned Agricultural Residential (AR) 20,000 on the County's Zoning Map (2016). Per Table 7-9-31.2, Land Use Regulations – Single-Family Residential Districts, of the County's Zoning Code, the AR zoning designation permits parks and recreational facilities (non-commercial). The Park and Sidewalk Extension Sites are located in a highly urbanized area in North Tustin. The Park Site is currently vacant with scattered vegetation, a drainage culvert and associated drainage ditches, overhead power lines, an existing County easement designated for public utilities and regional and local trails, and chain link fencing along the Site perimeter. The Sidewalk Extension Site is comprised of the existing road right-of-ways of Newport Avenue and Crawford Canyon Road. The Project would not result in the loss of availability of a known mineral resource delineated on a local general plan, specific plan, or other land use plan as there are no known mineral resource recovery sites on or near the Park or Sidewalk Extension Sites. No impact would occur in this regard.

| **4.17 Noise**<br><br>*Would the project result in:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? | ☐ | ☐ | ☒ | ☐ |
| b) Generation of excessive groundborne vibration or groundborne noise levels? | ☐ | ☐ | ☒ | ☐ |
| c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | ☐ | ☐ | ☒ | ☐ |

The following analysis is based on the *Noise Modeling Calculations*. (ESA, 2020d) located in Appendix I, of this Draft IS/MND.

Thresholds of Significance

A project will normally have a significant effect on the environment related to noise if it will substantially increase the ambient noise levels for adjoining areas or conflict with adopted environmental plans and goals of the community in which it is located. The applicable noise standards governing the Park and Sidewalk Extensions Sites are the criteria in the County's Noise Element of the General Plan (County of Orange, 2013) and its Noise Control Ordinance (County of Orange, 1973).

Noise Element of the General Plan

The Noise Element of the County's General Plan has developed noise standards for mobile noise sources. These standards address the impacts of noise from adjacent roadways and airports, including John Wayne Airport (JWA). The County specifies outdoor and indoor noise limits for residential uses,

places of worship, educational facilities, hospitals, hotels/motels, and commercial and other land uses. The noise standard for exterior living areas is 65 A-weighted decibels (dBA) community noise equivalent level (CNEL). The County prohibits new residential land uses within the 65 dBA CNEL contour from any noise sources, including highways and airports. Nonresidential noise-sensitive land uses such as hospitals, rest homes, convalescent hospitals, places of worship, and schools will not be permitted within the 65 dBA CNEL area from any source unless appropriate mitigation measures are included such that the standards contained in the Noise Element and in appropriate State and federal codes are met. The indoor noise standard is 45 dBA CNEL, which is consistent with the standard in the California Noise Insulation Standard. The County also enforces building sound transmission and indoor fresh air ventilation requirements specified in Chapter 35 of the Uniform Building Code.

Outdoor living area is a term used by the County to define spaces that are associated with residential land uses typically used for passive recreational activities or other noise-sensitive uses. Such spaces include backyards, balconies, patio areas, barbecue areas, jacuzzi areas, etc., associated with residential uses; outdoor patient recovery or resting areas, etc., associated with hospitals, convalescent hospitals, or rest homes; outdoor areas associated with places of worship that have a significant role in services or other noise-sensitive activities; and outdoor school facilities routinely used for educational purposes that may be adversely impacted by noise. Outdoor areas usually not included in this definition are: front yard areas, driveways, greenbelts, maintenance areas at hospitals that are not used for patient activities; outdoor areas associated with places of worship and principally used for short-term social gatherings; and, outdoor areas associated with school facilities that are not typically associated with educational uses prone to adverse noise impacts (for example, school play yard areas). The County does not specify outdoor noise standard for non-outdoor living areas.

Noise Control Ordinance

The County's Standard Conditions of Approval require that all construction vehicles or equipment, fixed or mobile, operated within 1,000 feet of a dwelling shall be equipped with properly operating and maintained mufflers. All operations shall comply with Orange County Codified Ordinance Division 6 (Noise Control). Stockpiling and/or vehicle staging areas shall be located as far as practicable from dwellings. As specified in the Orange County Codified Ordinance Division 6 (Noise Control), construction activities are generally restricted to between 7:00 A.M. and 8:00 P.M. from Monday through Saturday. No construction activity is permitted on Sundays and federal holidays. Construction noise during the allowed construction time periods are exempted from the noise level provisions in the Noise Control Ordinance.

It is stated in the County's Noise Control Ordinance that exterior noise levels at residential properties within Noise Zone 1 shall not exceed the basic noise standard of 55 dBA between the hours of 7:00 A.M. and 10:00 P.M. and shall not exceed 50 dBA between the hours of 10:00 P.M. and 7:00 A.M., plus the following limits:

- Basic noise level for a cumulative period of not more than 30 minutes in any 1 hour ($L_{50}$); or
- Basic noise level plus 5 dBA for a cumulative period of not more than 15 minutes in any 1 hour ($L_{25}$); or
- Basic noise level plus 10 dBA for a cumulative period of not more than 5 minutes in any 1 hour ($L_8$); or
- Basic noise level plus 15 dBA for a cumulative period of not more than 1 minutes in any 1 hour ($L_2$); or

- Basic noise level plus 20 dBA for any period of time ($L_{max}$).

The basic interior noise standard for residential uses are set as 45 dBA between 10:00 P.M. and 7:00 A.M. and 55 dBA between 7:00 A.M. and 10:00 P.M., plus the following limits:

- Basic noise level for a cumulative period of not more than 5 minutes in any 1 hour ($L_8$); or
- Basic noise level plus 5 dBA for a cumulative period of not more than 1 minutes in any 1 hour ($L_2$); or
- Basic noise level plus 10 dBA for any period of time ($L_{max}$).

In the event that the ambient noise level exceeds any of the above noise limits, the cumulative period applicable to that category shall be increased to reflect that ambient noise level. It shall be unlawful for any person at any location within the unincorporated area of the County to create any noise or to allow the creation of any noise that causes the noise level to exceed the residential noise standards stated above. Each of the noise limits above shall be reduced 5 dBA for noise consisting of impact noise, simple tone noise, speech, music, or any combination thereof.

Surrounding Land Uses

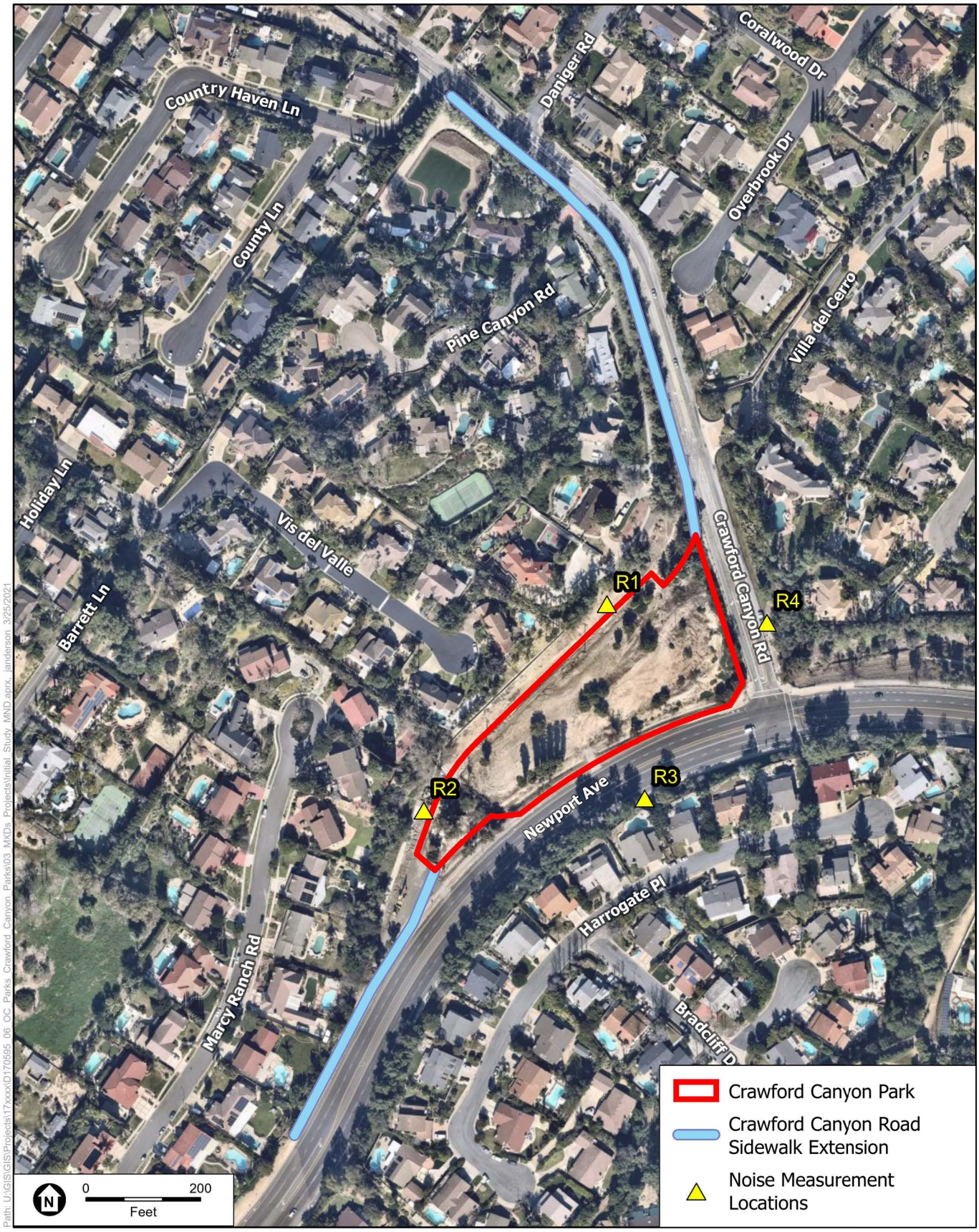
The Park and Sidewalk Extension Sites are located in a highly urbanized area of North Tustin. The areas immediately to the north, east, south, and west of the Sites comprised of existing single-family residences.

Ambient Noise and Vibration Levels

Primary noise sources observed in the vicinity of the Park and Sidewalk Extension Sites represent typical noise levels expected in a suburban, mostly residential, environment. The predominant existing noise source is vehicle traffic noise from the roadways surrounding Park and Sidewalk Extensions Sites, Newport Avenue and Crawford Canyon Road. Secondary noise sources include general residential-related activities, such as landscaping and refuse service activities, playground activities at Panorama Elementary School, and intermittent aircraft flyovers.

To establish baseline noise conditions representing the nearby noise sensitive land uses in the vicinity of the Park and Sidewalk Extension Sites, existing ambient noise levels measurements were conducted at four locations (refer to **Figure 9**, *Noise Measurement Locations*), labeled as R1 through R4 as described as follows:

- R1 - on the northeastern boundary of the Park Site, approximately 80 feet from residential uses north of the Park Site;
- R2 - on the northwestern boundary of the Park Site, approximately 70 feet from residential uses north of the Park Site;
- R3 – on the south side of Newport Avenue south of the Park Site, approximately 100 feet south of the Park boundary;
- R4 – on the east side of Crawford Canyon Road east of the Park Site, approximately 75 feet east of the Park boundary.




SOURCE: Mapbox, 2020.

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

**Figure 9**
Noise Measurement Locations

ESA

Short-term (15-minute) noise measurements were conducted at locations R1 through R4. Measured noise levels at the Park Site and adjacent to the Park Site represent typical noise levels expected in a suburban, mostly residential, environment. The short-term noise measurements were conducted between 8:49 A.M. and 10:02 A.M. on Thursday, September 10, 2020, to characterize the existing noise environment in the vicinity of the Park Site. **Table 4.17-1**, *Summary of Short-Term Ambient Noise Measurements*, lists the measured ambient noise levels.

The ambient noise measurements were conducted using Larson Davis's model 820 Precision Integrated Sound Level Meter (SLM), which is a Type 1 standard instrument, as defined in the American National Standard Institute S1.4. The SLM was within its annual factory calibration, field calibrated prior to conducting measurements, and operated according to the applicable manufacturer specification. The microphone of the SLM was placed at a height of five feet above the local grade, representing an average height of the human ear.

**Table 4.17-1: Summary of Short-Term Ambient Noise Measurements**

| Measurement Locations Date (Time of Day) | Noise Level (dBA $L_{eq}$) [a] |
|---|---|
| **R1** 9/10/20 (8:49 AM - 9:04 AM) | 52.2 |
| **R2** 9/10/20 (9:07 AM - 9:22 AM) | 55.6 |
| **R3** 9/10/20 (9:24 AM - 9:39 AM) | 68.0 |
| **R4** 9/10/20 (9:47 AM - 10:02 AM) | 61.9 |

[a] Detailed measured noise data is included in Appendix I, of this Draft IS/MND.

Source: ESA, 2020.

Ambient vibration levels are typically not measured in areas, such as the Park Site, where background vibration velocity levels would be limited to heavy truck traffic on surrounding roadways. Vibratory motion is commonly described by identifying the peak particle velocity (PPV). Typically, rubber-tired vehicles traveling at a distance of 50 feet typically generate groundborne vibration velocity levels of approximately 63 vibration decibels (VdB) which equates to approximately 0.006 inches per second PPV). This level of vibration is well below the threshold level of human annoyance of 72 VdB (0.015 PPV) (Federal Transit Administration, 2006). Observed noise and activity levels at and surrounding the Park Site did not identify uncharacteristically high sources of vibration (e.g., impact construction activity, adjacent freeways).

**Question 4.17a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?**

**Response to Question 4.17a)**

Crawford Canyon Park**: Less than Significant Impact**.

Construction Noise

The Project would include the construction of a 2.5-acre neighborhood park consisting of walkways, trails, foot bridges, two nature play areas for children, exercise stations, picnic tables, benches, landscape berms and natural rolling lawn areas. A paved surface parking lot with 11 vehicular parking spaces would be provided onsite. A list of the construction equipment that would be used during each phase of construction is provided in **Table 4.17-2**, *Construction Equipment*. Table 4.17-2 also provides the construction phases assuming a one-year construction schedule is 250 working days. The noise from construction equipment would generate both steady-state and episodic noise that could be heard within and adjacent to the Park Site. Construction noise levels fluctuate throughout a given workday as construction equipment move from one location to another within a project site. When construction equipment would be in use further away from a sensitive receptor location, construction noise levels would be lower than the calculated values provided herein, which assumes construction equipment would be in use nearest to a sensitive receptor location. Exposure to fluctuating construction noise levels that would at times be lower than the noise levels shown in the analysis below would not rise to the level (greater than 120 dBA) that would result in hearing loss or adverse health impacts.

Individual pieces of construction equipment that would be used for construction of the Park would produce maximum noise levels of 76 dBA to 84 dBA at a reference distance of 50 feet from the noise source, as shown in **Table 4.17-3**, *Construction Equipment Noise Reference Levels and Usage Factors*. The construction equipment noise levels at 50 feet distance (Referenced Maximum Noise Levels) are based on the FHWA RCNM User's Guide[6], which is a technical report containing actual measured noise data for construction equipment.

[6] FHWA, Roadway Construction Noise Model, 2006.

**Table 4.17-2: Construction Equipment**

| Construction Phase | Equipment | Duration |
|---|---|---|
| Clearing and Grubbing | Excavator<br>Sweeper<br>Loader<br>Bulldozer<br>Dump Truck<br>Water Truck | 20 days |
| Grading/Excavation | Excavator<br>Dump Truck<br>Scraper<br>Bulldozer<br>Water Truck<br>Sweeper | 60 days |
| Paving and Construction | Scraper<br>Dump Truck<br>Sweeper<br>Asphalt Paver<br>Compactor/Roller<br>Water Truck<br>Excavator<br>Concrete Truck<br>Bulldozer | 80 days |
| Landscaping | Skid Steer<br>Backhoe | 90 days |

Source: Hunsaker & Associates Irvine Inc., September 28, 2020.

**Table 4.17-3: Construction Equipment Noise Reference Levels and Usage Factors**

| Type of Equipment | Acoustical Usage Factor[a] (%) | Reference Maximum Noise Levels at 50 Feet,[a,b] $L_{max}$ (dBA) |
|---|---|---|
| Air Compressor | 40 | 78 |
| ***Backhoe*** | ***40*** | ***78*** |
| Cement and Mortar Mixer | 50 | 80 |
| ***Compactor (ground)*** | ***20*** | ***83*** |
| ***Concrete Mixer Truck*** | ***40*** | ***79*** |
| Concrete Saw | 20 | 90 |
| Crane | 16 | 81 |
| ***Dozer*** | ***40*** | ***82*** |
| Drill Rig | 20 | 84 |
| ***Excavator*** | ***40*** | ***81*** |
| Forklift | 20 | 75 |
| Generator | 50 | 81 |
| Grader | 40 | 85 |
| ***Dump/Haul Truck*** | ***40*** | ***76*** |
| Jackhammer | 20 | 89 |
| ***Front End Loader*** | ***40*** | ***79*** |
| Pump | 50 | 81 |
| ***Roller*** | ***20*** | ***80*** |
| ***Water Truck*** | ***40*** | ***76*** |
| ***Scraper*** | ***40*** | ***84*** |
| Tractor | 40 | 80 |
| ***Asphalt Paver*** | ***50*** | ***77*** |
| ***Vacuum Street Sweeper*** | ***10*** | ***82*** |
| Welders | 40 | 74 |

[a] The usage factor is the percentage of time during a construction noise operation that a piece of construction is operating at full power.

[b] Construction equipment noise levels are based on the FHWA RCNM.

Source: FHWA, Roadway Construction Noise Model User's Guide, 2006, Table 1.

These maximum noise levels would occur when equipment is operating under full power conditions (i.e., the equipment engine at maximum speed). However, equipment used on construction sites often operates under less than full power conditions or part power. To more accurately characterize construction-period noise levels, the average (hourly Leq) noise level associated with each construction phase is calculated based on the quantity, type, and usage factors for each type of equipment that would be used during each construction phase[7]. These noise levels are typically associated with multiple pieces of equipment operating simultaneously. **Table 4.17-4**, *Construction Noise in Different Phases*, lists the potential construction noise levels at 50 feet from the active construction source(s), factoring in the number and type of construction equipment that would be in operation during the same period of time, and their individual utilization factors. A sample calculation is included in the footnote of the table that shows how the sound energy is combined into a logarithmic scale and summed up in the time period (Leq) during which the equipment operates.

Table 4.17-4 shows that during each construction phase, depending on the number of pieces of construction equipment and individual utilization factor, the noise level at a distance of 50 feet from an active construction area on the Park Site ranges from 77 to 85 dBA Leq. This scenario assumed that the equipment listed during each construction phase would be operating during the same period of time (with individual utilization factor included) and is located in close range that can be viewed as a point source from a distance of 50 feet. In reality, it is not practical to have all these pieces of equipment operating in a small area at the same time. It is assumed this way to obtain the worst case possible noise exposure for receivers in the vicinity of the Park. If the equipment is spread out over the entire Park Site, even though some pieces of equipment may be closer to an adjacent receiver, other pieces of equipment would be located at a longer distance from the same receiver, and the overall combined noise level would not be greater than the one estimated using the worst case scenario.

[7] Pursuant to the FHWA *Roadway Construction Noise Model User's Guide*, 2005, the usage factor is the percentage of time during a construction noise operation that a piece of construction is operating at full power.

**Table 4.17-4: Construction Noise in Different Phases**

| Construction Phase | Equipment (noise level, Lmax, at 50 feet) (UF)[a] | Noise Level at 50 feet from Active Construction Area, dBA Leq |
|---|---|---|
| Clearing and Grubbing | Excavator (81 dBA) (40)<br>Sweeper (82 dBA) (10)<br>Loader (79 dBA) (40)<br>Bulldozer (82 dBA) (40)<br>Dump Truck (76 dBA) (40)<br>Water Truck (76 dBA) (40) | 83[b] |
| Grading/Excavation | Excavator (81 dBA) (40)<br>Dump Truck (76 dBA) (40)<br>Scraper (84 dBA) (40)<br>Bulldozer (82 dBA) (40)<br>Water Truck (76 dBA) (40)<br>Sweeper (82 dBA) (10) | 84 |
| Paving and Construction | Scraper (84 dBA) (40)<br>Dump Truck (76 dBA) (40)<br>Sweeper (82 dBA) (10)<br>Asphalt Paver (77 dBA) (50)<br>Compactor/Roller (83 dBA) (20)<br>Water Truck (76 dBA) (40)<br>Excavator (81 dBA) (40)<br>Concrete Truck (79 dBA) (40)<br>Bulldozer (82 dBA) (40) | 85 |
| Landscaping | Skid Steer (78 dBA) (40)<br>Backhoe (78 dBA) (40) | 77 |

[a] UF: Utilization factor.

[b] Leq = 10 Log $[(10^{8.1} + 10^{7.9} + 10^{8.2} + 10^{7.6} + 10^{7.6}) \times 0.4 + 10^{8.2} \times 0.1]$ = 10 Log [193223409] = 10 x 8.286 = 83 dBA

Source: Hunsaker & Associates Irvine Inc. & ESA, 2020.

Construction Noise Impact

There are residential uses surrounding the Park Site to the west, east, north, and south. These residences would be potentially exposed to relatively high noise levels during Project construction. Residences to the north and west of the Park Site are the nearest off-site sensitive receivers that would be affected by construction noise. Some of these off-site residences are as close as 50 feet from the Park Site, and may be exposed to construction noise levels reaching 85

dBA Leq for a period of time during paving and construction phase. For residences to the east across Crawford Canyon Road and residences to the south across Newport Avenue, they are both approximately 90 feet from the Park Site construction boundary, and will receive 5 dBA in noise attenuation compared to the noise level measured at 50 feet. Therefore, when construction occurs near the eastern or southern boundary of the Park Site, these off-site residences would be exposed to construction noise levels reaching 80 dBA Leq during the noisiest construction phase.

As specified in the Orange County Codified Ordinance Division 6 (Noise Control), construction activities are generally restricted to between 7:00 A.M. and 8:00 P.M. from Monday through Saturday. No construction activity is permitted on Sundays and federal holidays. Construction noise during the allowed construction time periods are exempted from the noise level provisions in the Noise Control Ordinance. The Park Site will comply with the permitted construction hours as identified in the Orange County Codified Ordinance Division 6. Because construction of the Park will be temporary and short term, no significant noise impacts would occur. The following Best Management Practice Measures would help reduce construction noise impacts of Crawford Canyon Park.

Best Management Practice Measures:

BMP-N.1 Noise sources associated with construction, repairs, remodeling, or the grading of any real property, shall be conducted from 7:00 A.M. to 8:00 P.M. on Monday through Saturday. Construction is prohibited at any time on Sunday or a Federal holiday.

BMP-N.2 Equipment will use available noise suppression devices and properly maintained mufflers. Construction noise will be reduced by using quiet or "new technology", equipment, particularly the quieting of exhaust noises by use of improved mufflers where feasible. All internal combustion engines used at the Project site will be equipped with the type of muffler recommended by the vehicle manufacturer. In addition, all equipment will be maintained in good mechanical condition so as to minimize noise created by faulty or poorly maintained engine, drive-train and other components.

BMP-N.3 During all site preparation, grading and construction, contractors shall minimize the staging of construction equipment and unnecessary idling of equipment in the vicinity of noise sensitive land uses.

BMP-N.4 The equipment staging area will be situated so as to provide the greatest distance separation between construction-related noise sources and noise-sensitive receptors nearest the Park Site during all construction.

Operational Noise

Recreational amenities and features of Crawford Canyon Park are anticipated to include walkways, trails, footbridges, two nature play areas for children, exercise stations, picnic tables, benches, landscape berms and natural rolling lawn areas. A paved surface parking lot with 11 vehicular parking spaces would be provided onsite with vehicular access from Newport Avenue. Most of these amenities (walkways, trails, foot bridges, exercise stations, picnic tables, benches, landscape berms and natural rolling lawn areas) would not generate any substantial noise. The proposed two nature play areas for children may generate relatively high noise levels compared

to the other amenities. However, they are designed for small children (2 to 5 years old and 5 to 12 years old) in relative small centralized areas. Ambient noise from traffic on Newport Avenue and Crawford Canyon Road would be comparable to and provide masking effect to the play area noise.

Existing roadway CNEL noise levels were calculated using the Federal Highway Administration's (FHWA's) Highway Traffic Noise Model (FHWA TNM)[8] and traffic volumes at the study intersections reported in the Transportation Analysis Memorandum (Appendix J, of this Draft IS/MND). The TNM model calculates the average noise level at specific locations based on traffic volumes, average speeds, and site environmental conditions. The noise levels along these roadway segments are presented in **Table 4.17-5,** *Existing Vehicular Traffic Noise Levels*.

**Table 4.17-5: Existing Vehicular Traffic Noise Levels**

| Roadway Segment | Traffic Noise Level 100 feet from Roadway Centerline, dBA CNEL | | Increase in Noise Levels dBA |
|---|---|---|---|
| | Existing | Existing plus Project | |
| 1. Crawford Canyon Road | 67.8 | 68.2 | 0.4 |
| 2. Newport Avenue | 73.5 | 73.8 | 0.3 |

Source: ESA, 2020.

Table 4.17-5 shows that Park Site-related traffic noise level increases would be 0.4 dBA or less, which is not perceptible to the human ear in an outdoor environment. Therefore, no long term traffic noise impacts would occur from the implementation of the Park. Long term operational noise impacts associated with the Crawford Canyon Park would be less than significant and no mitigation measures are required.

Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**.

Construction Noise

A summary of the construction phases and estimated pieces of equipment for the Sidewalk Extension is shown below in **Table 4.17-6**, *Construction Equipment*. Table 4.17-6 also lists the number of equipment and employees in each construction phase. **Table 4.17-7**, *Construction Noise in Different Phases,* shows that during each construction phase, depending on the number of pieces of construction equipment and individual utilization factor, the noise level at a distance of 50 feet from an active construction area on the Sidewalk Extension Site ranges from 72 to 84 dBA Leq. This scenario assumed that the equipment listed during each construction phase would be operating during the same period of time (with individual utilization factor included) and is located in close range that can be viewed as a point source from a distance of 50 feet. In reality, it is not practical to have all these piece of equipment operating in a small area at the same time. It is assumed this way to obtain the worst case possible noise exposure for receivers in the project vicinity. If the equipment is spread out over the entire Sidewalk Extension Site, even though some

[8] The traffic noise model which was developed based on calculation methodologies provided in the Caltrans TeNS document and traffic data provided in the Transportation Analysis Memorandum provided in Appendix J, of this Draft IS/MND. This methodology, considered an industry standard, allows for the definition of roadway configurations, barrier information (if any), and receiver locations.

pieces of equipment may be closer to an adjacent receiver, other pieces of equipment would be located at a longer distance from the same receiver, and the overall combined noise level would not be greater than the one estimated using the worst case scenario.

**Table 4.17-6: Construction Equipment**

| Construction Phase | Equipment | Number of Equipment/Employee |
|---|---|---|
| Site preparation | Graders<br>tractors/loaders/backhoes | 3/8 |
| Demolition | Excavator<br>concrete/industrial saws<br>tractors/loaders/backhoes | 5/10 |
| Utility Relocation | Utility trucks | 2/6 |
| Storm Drain Construction | Excavator<br>tractors/loaders/backhoes<br>welders<br>cement and mortar mixers | 5/12 |
| Sidewalk Construction | Cement and mortar mixers<br>compactor<br>concrete/industrial saws | 4/8 |
| Traffic Signal Modification | Crane<br>utility truck<br>backhoe | 3/10 |
| Paving | Cement and mortar mixers<br>pavers<br>paving equipment<br>rollers<br>tractors/loaders/backhoes | 5/8 |

Source: Orange County Public Works, November 2020; ESA, November 2020.

**Table 4.17-7: Construction Noise in Different Phases**

| Construction Phase | Equipment (noise level, Lmax, at 50 feet) (UF)[a] | Noise Level at 50 feet from Active Construction Area, dBA Leq |
|---|---|---|
| Site preparation | Graders (85 dBA) (40)<br>tractors/loaders/backhoes (79 dBA) (40) | 82 |
| Demolition | Excavator (81 dBA) (40)<br>concrete/industrial saws (90 dBA) (20)<br>tractors/loaders/backhoes (79 dBA) (40) | 84 [b] |
| Utility Relocation | Utility trucks (76 dBA) (40) | 72 |
| Storm Drain Construction | Excavator (81 dBA) (40)<br>tractors/loaders/backhoes (79 dBA) (40)<br>welders (74 dBA) (40)<br>cement and mortar mixers (80 dBA) (20) | 81 |
| Sidewalk Construction | Cement and mortar mixers (80 dBA) (20)<br>Compactor (83 dBA) (20)<br>concrete/industrial saws (90 dBA) (40) | 84 |
| Traffic Signal Modification | Crane (81 dBA) (16)<br>utility truck (76 dBA) (40)<br>backhoe (81 dBA) (40) | 79 |
| Paving | Cement and mortar mixers (80 dBA) (20)<br>pavers (80 dBA) (20)<br>paving equipment (77 dBA) (50)<br>rollers (75 dBA) (40)<br>tractors/loaders/backhoes (81 dBA) (40) | 81 |

[a] UF: Utilization factor.

[b] Leq = 10 Log [($10^{8.1}$ + $10^{7.9}$) x 0.4 + $10^{9.0}$ x 0.2] = 10 Log [282130146] = 10 x 8.45 = 84 dBA

Source: Orange County Public Works and ESA, November 2020.

Construction Noise Impact

There are residential uses surrounding the Sidewalk Extension Site to the east and south. These residences would be potentially exposed to relatively high noise levels during the construction of the Sidewalk Extension. Residences to the east of the Sidewalk Extension Site are the nearest off-site sensitive receivers that would be affected by construction noise. Some of these off-site residences are as close as 50 feet from the boundary of the Sidewalk Extension Site, and may be exposed to construction noise levels reaching 84 dBA Leq for a period of time during demolition

and sidewalk construction phases. For residences to the south across Newport Avenue, they are approximately 90 feet from the Sidewalk Extension Site construction boundary, and will receive 5 dBA in noise attenuation compared to the noise level measured at 50 feet. Therefore, when construction occurs near the southern boundary of the Sidewalk Extension Site, these off-site residences would be exposed to construction noise levels reaching 79 dBA Leq during the noisiest (demolition and sidewalk construction) construction phases.

As specified in the Orange County Codified Ordinance Division 6 (Noise Control), construction activities are generally restricted to between 7:00 A.M. and 8:00 P.M. from Monday through Saturday. No construction activity is permitted on Sundays and federal holidays. Construction noise during the allowed construction time periods are exempted from the noise level provisions in the Noise Control Ordinance. The Sidewalk Extension will comply with the permitted construction hours as identified in the Orange County Codified Ordinance Division 6. Because construction of the Sidewalk Extension will be temporary and short term, no significant noise impacts would occur. The following Best Management Practice Measures would help reduce the potential construction noise impacts of the Sidewalk Extension.

Best Management Practice Measures:

BMP-N.1 Noise sources associated with construction, repairs, remodeling, or the grading of any real property, shall be conducted from 7:00 A.M. to 8:00 P.M. on Monday through Saturday. Construction is prohibited at any time on Sunday or a Federal holiday.

BMP-N.2 Equipment will use available noise suppression devices and properly maintained mufflers. Construction noise will be reduced by using quiet or "new technology", equipment, particularly the quieting of exhaust noises by use of improved mufflers where feasible. All internal combustion engines used at the Project site will be equipped with the type of muffler recommended by the vehicle manufacturer. In addition, all equipment will be maintained in good mechanical condition so as to minimize noise created by faulty or poorly maintained engine, drive-train and other components.

BMP-N.3 During all site preparation, grading and construction, contractors shall minimize the staging of construction equipment and unnecessary idling of equipment in the vicinity of noise sensitive land uses.

BMP-N.4 The equipment staging area will be situated so as to provide the greatest distance separation between construction-related noise sources and noise-sensitive receptors nearest the Sidewalk Extension Site during all construction.

Once the construction is complete, the Sidewalk Extension would not result in any noticeable noise changes. Operational noise impacts would be less than significant and no mitigation measures are required.

**Question 4.17b) Generation of excessive groundborne vibration or groundborne noise levels?**

**Response to Question 4.17b)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. Vibration impacts due to construction activities would occur when a large machine would be operated near fragile structures or vibration sensitive uses within a building. The amounts of construction and demolition required for the Park is not anticipated to generate excessive groundborne vibrations or noise levels. Construction of the Park is not anticipated to include pile driving activities. Table 4.17-8 presents vibration source levels for equipment required for the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension. Residential structures are located approximately 50 feet from the Park and Sidewalk Extension Sites. Construction activities would produce vibration velocities of up to approximately 0.074 inches per second (in/sec) peak particle velocity (PPV) at those off-site residential structures when construction equipment operates within approximately 50 feet. This value would not exceed the 0.2 in/sec PPV significance threshold for potential building damage, therefore, ground borne vibration would result in less than significant impacts and no mitigation measures are required. Also, refer to discussion 4.17a), above.

**Table 4.17-8: Vibration Source Levels for Construction Equipment**

| Equipment | Approximate PPV (in/sec) at 50 feet |
|---|---|
| Roller | 0.074 |
| Large Bulldozer/ Drill Rig | 0.031 |
| Loaded Trucks | 0.027 |
| Small Bulldozer | 0.001 |

Source: Federal Transit Administration, 2018.

The primary source of transient vibration would include passenger vehicle circulation along the local roadway network, which is consistent with existing conditions and uses in the vicinity of the Park and Sidewalk Extension Sites. Ground-borne vibration generated by such activity would not generate vibration velocities that would exceed the FTA's structural damage threshold (0.2 PPV) for non-engineered timber and masonry buildings (Federal Transit Administration, 2006). As such, vibration impacts associated with Project operation would be below the significance threshold and impacts would be less than significant and no mitigation measures are required.

**Question 4.17c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?**

**Response to Question 4.17c)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. The Park and Sidewalk Extension Sites are not within an airport land use plan and are not within two miles of a public airport or public use airport. The nearest airport is the John Wayne Airport, Newport Beach, located approximately 7.5 miles southeast of the Park and Sidewalk Extension Sites. The Park and Sidewalk Extension Sites are not located within the 65 dBA CNEL impact zone of the John Wayne Airport. However, the Park and Sidewalk Extension Sites are near the approach flight path of the John Wayne Airport as the jets turn from eastbound to southwest-bound and is exposed to intermittent aircraft overflight noise. The range of aircraft overflight noise levels would not exceed any noise standards and would be much lower than the levels considered hazardous for human health. Therefore, this impact is less than significant and no mitigation measures are required.

| **4.18 Population and Housing**<br><br>*Would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)? | ☐ | ☐ | ☐ | ☒ |
| b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ☒ |

**Question 4.18a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?**

**Response to Question 4.18a)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. The Project does not propose new housing or businesses. The Project would include the construction and operation of a 2.5-acre neighborhood park consisting of walkways, trails, foot bridges, two nature play areas for children, exercise stations, picnic tables, benches, landscape berms and natural rolling lawn areas. A paved surface parking lot with 11 vehicular parking spaces would be provided onsite with vehicular access from Newport Avenue. The Sidewalk Extension would include the construction of sidewalk extensions and associated improvements. The construction of the Park and Sidewalk Extension would temporarily increase construction employees. However, due to the relatively short duration of construction (i.e., 12 months for the Park and 4 months for the Sidewalk Extension), Project construction activities would not induce employees to move to the Project vicinity and would not induce population growth or the need for housing. In addition, operation of the Park and Sidewalk Extension would not increase employment and therefore, no inducement of population or housing would occur. The provision of new domestic water lines for landscape irrigation, stormwater infrastructure, and electricity for security lighting would only serve the Park Site and would not induce further on- or off-site population growth. Given the limited intensity of the proposed development, growth would not result from the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project. The Project would result in no impact related to growth inducement.

**Question 4.18b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?**

**Response to Question 4.18b)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. The Park Site is currently vacant with scattered vegetation, a drainage culvert and associated drainage ditches, overhead power lines, an existing County easement designated for public utilities and regional and local trails, and chain link fencing along the Site perimeter. The Sidewalk Extension Site is comprised of the existing road rights of way of Newport Avenue and Crawford Canyon Road. No dwelling units exist on the Park or Sidewalk Extension Sites. Thus, the Park and Sidewalk Extension would not result in the displacement of existing people or demolition of existing housing units. The Park Site would be developed with a 2.5-acre neighborhood park consisting a variety of recreational amenities and features. The Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements. Since no existing housing would be displaced, there would be no need for the construction of replacement housing elsewhere. No impact would occur in this regard.

| **4.19 Public Services**<br><br>*Would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: | | | | |
| a-i) Fire protection | ☐ | ☐ | ☒ | ☐ |
| a-ii) Police protection | ☐ | ☐ | ☒ | ☐ |
| a-iii) Schools | ☐ | ☐ | ☐ | ☒ |
| a-iv) Parks | ☐ | ☐ | ☐ | ☒ |
| a-v) Other public facilities | ☐ | ☐ | ☐ | ☒ |

**Question 4.19a)** **Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for:**

**a-i) Fire protection?**

**Response to Question a-i)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. Fire protection and emergency medical services for North Tustin and the Park and Sidewalk Extension Sites are provided by the Orange County Fire Authority (OCFA). The OCFA provides traditional fire and life safety services to over 1,984,758 residents in 24 cities in the County and all unincorporated areas of the County. OCFA is comprised of seven divisions and eleven battalions which include 79 fire stations located throughout the County (OCFA, 2020). OCFA has three fire stations located within approximately 2 miles of the Park and Sidewalk Extension Sites: Fire Station No. 8, located at 10631 Skyline Drive, Santa Ana 92705, approximately 0.57 miles east of the Park and Sidewalk Extension Sites; Fire Station No. 43, located 11490 Pioneer Way, Tustin,92782, located approximately 1.97 miles southeast of the Park and Sidewalk Extension Sites; and Fire Station No. 21, located at 1241 Irvine Boulevard, Tustin, 92780, approximately 2.04 miles south of the Park and Sidewalk Extension Sites (OCFA, 2020).

Construction

The Park Site would be developed with a 2.5-acre neighborhood park consisting a variety of recreational amenities and features. The Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements. Construction activities associated with the

Park and Sidewalk Extension may temporarily increase the demand for fire protection and emergency medical services, and may cause the occasional exposure of combustible materials, such as wood, plastics, sawdust, coverings and coatings, to heat sources including machinery and equipment sparking, exposed electrical lines, welding activities, and chemical reactions in combustible materials and coatings. However, in compliance with the requirements of Cal-OSHA, all construction managers and personnel would be trained in fire prevention and emergency response. Further, fire suppression equipment specific to construction would be maintained on the Park and Sidewalk Extension Sites. As applicable, construction activities would be required to comply with the 2019 CBC, the 2019 California Fire Code (CFC), and the Title 3, Public Morals, Safety and Welfare, Division 3, Fire Protection and Explosives, of the County's Fire Code (County's Fire Code).

Construction activities for the Park would involve temporary lane closures along Newport Avenue for delivery of construction materials and during installation of the deceleration lane. One of the two southbound travel lanes along Newport Avenue is expected to be closed during construction of the Sidewalk Extension. Along Crawford Road, travel lanes are expected to be shifted to maintain two-directional travel. As such, construction activities could increase response times for emergency vehicles to local business and/or residences within the vicinity of the Park and Sidewalk Extension Sites, due to travel time delays to through traffic. However, the impacts of such construction activity would be temporary and on an intermittent basis. Further, a Construction Management Plan for the Park and Sidewalk Extension would be prepared in order to minimize disruptions to through traffic flow, maintain emergency vehicle access to the Park and Sidewalk Extensions Sites and neighboring land uses, and schedule working and construction equipment delivery to avoid peak traffic hours. As a component of the Construction Management Plan, the times of day and locations of all temporary lane closures would be coordinated so that they do not occur during peak periods of traffic congestion, to the extent feasible. Such events would be coordinated with neighboring construction projects, as necessary. Truck routes for material and equipment deliveries, as well as for soil export and disposal, would require approval by OC Public Works prior to construction activities. These practices, as well as techniques typically employed by emergency vehicles to clear or circumvent traffic (i.e., lights and sirens), are expected to limit the potential for significant delays in emergency response times during construction of the Park and Sidewalk Extension. Therefore, impacts regarding emergency response times and emergency access during construction would be less than significant and no mitigation measures are required.

Overall, with compliance to the applicable requirements of the 2019 CBC, the 2019 CFC, and County's Fire Code, and due to the temporary nature of the necessary construction activities, construction impacts on fire protection and emergency medical services would be less than significant and no mitigation measures are required.

<u>Operation</u>

Operational activities associated with the Crawford Canyon Park could increase the demand for fire protection and emergency medical services as a vacant lot is being developed with park and recreation uses which would draw daytime visitors. As mentioned above, OCFA has three fire stations located within approximately 2 miles of the Park and Sidewalk Extension Sites. Due to the close proximity of the three fire stations, including the nearest station located 0.57 miles from the Park and Sidewalk Extension Sites, service calls are anticipated to be responded to within the OCFA's desired response times of 5 to 7 minutes for engines to arrive on the scene after a 9-1-1 call has been placed (OCFA, 2020). Emergency vehicles and fire access for the Park Site would be

provided at-grade access from Newport Avenue and from at-grade access from both Newport Avenue and Crawford Canyon for the Sidewalk Extension Site. The Park and Sidewalk Extension would be designed, constructed and maintained in accordance with OCFA's development and construction requirements to minimize the risks associated with fires. The Park and Sidewalk Extension would be subject to compliance with fire protection design standards, as applicable, per the 2019 CBC, the 2019 CFC, and the County's Fire Code, to ensure adequate fire protection. Further, the Park and Sidewalk Extension would not result in an increase of above-ground habitable structures, buildings, employees or population. Accordingly, the OCFA's response times would not be substantially changed such that response time objectives are compromised in any significant manner. Further, new or expanded fire stations to be constructed or the need to hire additional staffing to the fire protection facilities servicing the Site as a result of Project implementation are not required. A less than significant impact would occur in this regard and no mitigation measures are required.

**a-ii) Police protection?**

**Response to Question a-ii)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. Sheriff protection services for North Tustin and the Park and Sidewalk Extension Sites are provided by the Orange County Sheriff-Coroner Department (OCSCD). OCSCD is a multi-faceted law enforcement agency served by approximately 3,800 sworn personnel and professional staff members and over 800 reserve personnel. OCSCD consists of five organization commands comprised of 21 separate divisions and provides land and sea based patrol, and investigative services to contract and task force partners at the city and county level and to the unincorporated areas of the County. (OCSCD, 2020). The Park and Sidewalk Extension Sites are patrolled by the North Operations Division, which is based at the Sheriff's Headquarters located at 550 N. Flower Street, Santa Ana, 92703, approximately six miles east of the Park and Sidewalk Extension Sites.

Construction

During construction, equipment and building materials could be temporarily stored on-site and on the temporary, offsite lay-down area, which could result in theft, graffiti, and vandalism. The construction sites would be fenced along the perimeter, with the height and fence materials subject to review and approval by OC Public Works. Further, as discussed above, a Construction Management Plan for the Park and Sidewalk Extension would be prepared in order to minimize disruptions to through traffic flow, maintain emergency vehicle access to the Park and Sidewalk Extension Sites and neighboring land uses, and schedule worker and construction equipment delivery to avoid peak traffic hours. Given the visibility of the Park and Sidewalk Extension Sites from adjacent roadways and surrounding properties, existing sheriff presence in North Tustin, maintained emergency access, and construction fencing, the Park and Sidewalk Extension are not expected to increase demand on existing sheriff services. As such, the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would have a less than significant temporary impact on sheriff protection during the construction phases and no mitigation measures are required.

Operation

Operational activities associated with Crawford Canyon Park could increase the demand for police protection services. The Project would include the development of a 2.5-acre neighborhood park

consisting of walkways, trails, foot bridges, two nature play areas for children, exercise stations, picnic tables, benches, landscape berms and natural rolling lawn areas. A paved surface parking lot with 11 vehicular parking spaces would be provided onsite with vehicular access from Newport Avenue. Hours of operation for the Crawford Canyon Park would include 7:00 AM to 6:00 PM November 1 through February 28 and 7:00 AM to 9:00 PM March 1 through October 31. County sponsored activities or events would not be hosted at Crawford Canyon Park. Public group reservations for the recreational amenities at the Park Site would not be allowed. The Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements and is not anticipated to provide operational activities that would increase the demand for police protection services.

Features of the Crawford Canyon Park include a proposed vehicular gate to be located at the parking lot entrance. The proposed parking lot would be locked every evening and opened every morning. The Park would not be enclosed with fencing or walls. Crawford Canyon Park would provide security lighting located along walkways and trails and within the play areas and parking lot.

Similar to all building applications within the County, the OCSCD would be provided the opportunity to review and comment upon development plans in order to facilitate opportunities for improved emergency access and response; ensure the consideration of design strategies that facilitate public safety and police surveillance; and other specific design recommendations to enhance public safety and reduce potential demands upon police protection services. Further, the Park and Sidewalk Extension would not result in new homes or business or an increase in employees or population. Accordingly, the OCSCD's response times would not be substantially changed such that response time objectives are compromised in any significant manner. Further, new or expanded police facilities to be constructed or the need to hire additional staffing to the police protection facilities servicing the Park and Sidewalk Extension Sites as a result of Project implementation are not anticipated. Therefore, a less than significant impact would occur in this regard and no mitigation measures are required.

**a-iii) Schools?**

**Response to Question a-iii)**

<u>Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension</u>: **No Impact.** The Park Site would be developed with a 2.5-acre neighborhood park consisting a variety of recreational amenities and features. The Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements. As the Project would not include housing or generate new residents, employees, or school-aged children, no impacts would occur in this regard.

**a-iv) Parks?**

**Response to Question a-iv)**

<u>Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension</u>: **No Impact**. The Park and Sidewalk Extension would not result in a population increase that would necessitate additional parks, recreational facilities, or alteration of existing facilities, and Project operation would not adversely affect the use or condition of existing facilities. The Project involves the construction and operation of a 2.5-acre neighborhood park consisting of walkways, trails, foot bridges, two nature play areas for children, exercise stations, picnic tables, benches, landscape

berms and natural rolling lawn areas. The Project would provide increased recreational opportunities for the community. The Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements. As the Park and Sidewalk Extension would not include housing or generate new residents or employees, no impacts would occur in this regard.

**a-v) Other public facilities?**

**Response to Question a-v)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. The Park Site would be developed with a 2.5-acre neighborhood park consisting a variety of recreational amenities and features. The Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements. As the Project would not include housing or generate new residents or employees, the Project would have no impact on other public facilities such as libraries or roads.

| **4.20 Recreation**<br><br>*Would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | ☐ | ☐ | ☐ | ☒ |
| b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? | ☐ | ☐ | ☒ | ☐ |

**Question 4.20a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?**

**Response to Question 4.20a)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. The Project involves the construction and operation of a 2.5-acre neighborhood park consisting of walkways, trails, foot bridges, two nature play areas for children, exercise stations, picnic tables, benches, landscape berms and natural rolling lawn areas. The Project would provide increased recreational opportunities for the community. The Project would draw residents to the new park and therefore would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. The Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements. No impacts would occur in this regard.

**Question 4.20b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?**

**Response to Question 4.20b)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. The Project would provide new recreational opportunities in the area, and the construction and operation of the proposed neighborhood park would not result in

adverse physical impacts to the environment. The Project is not a component of a separate project. The proposed construction impacts have been considered throughout the discussion of environmental impacts in this document. Therefore, with implementation of the mitigation measures as described herein, recreation-related impacts would be less than significant and no mitigation measures are required.

| **4.21 Transportation**<br><br>*Would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities? | ☐ | ☐ | ☒ | ☐ |
| b) Would the project conflict or be inconsistent with CEQA section 15064.3, subdivision (b)? | ☐ | ☐ | ☒ | ☐ |
| c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? | ☐ | ☐ | ☒ | ☐ |
| d) Result in inadequate emergency access? | ☐ | ☐ | ☒ | ☐ |

The following analysis is based on the *Crawford Canyon Park, Transportation Analysis Memorandum* (Traffic Memorandum) (Translutions, 2020), located in Appendix J, of this Draft IS/MND.

**Question 4.21a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?**

**Response to Impact Question 4.21a)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**.

**Transportation Safety (Project Trip Generation/Levels of Service)**

The County of Orange Chapter IV. Transportation Element, includes a goal (Goal 3) to provide a circulation plan that facilitates the safe, convenient and efficient movement of people and goods throughout unincorporated areas of the County. Following is a discussion of transportation safety.

Project Trip Generation

The trip generation rate for Crawford Canyon Park is based on rates for Land Use 411 - "Public Park" from the Institute of Transportation Engineers (ITE) *Trip Generation (10th Edition)*, as this project is a public park owned and operated by the County. The parks surveyed vary widely as to location, type, and number of facilities, including boating or swimming facilities, beaches, hiking trails, ball fields, soccer fields, campsites, and picnic facilities. The sites surveyed varied from 4 acres to 1,154 acres. Since the trip generation rate varies substantially based on size, the rates used in this evaluation are based on the data for a 4-acre park. **Table 4.21-1**, *Project Trip Generation*, shows the trip generation for the Crawford Canyon Park.

**Table 4.21-1: Project Trip Generation**

| | | | Peak Hour | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | | PM Peak Hour | | | |
| **Land Use** | | **Units** | **In** | **Out** | **Total** | **In** | **Out** | **Total** | **Daily** |
| **Weekday** | 2.5 | Acre | 2.655 | 1.845 | 4.500 | 1.925 | 1.575 | 3.500 | 34.000 |
| Inbound/Outbound Splits | | | 59% | 41% | 100% | 55% | 45% | 100% | 50%/50% |
| **Weekday Trip Generation** | | | **7** | **4** | **11** | **5** | **4** | **9** | **85** |
| **Saturday[2]** | 2.5 | Acre | | | | 2.475 | 2.025 | 4.500 | 22.750 |
| Inbound/Outbound Splits | | | | | | 55% | 45% | 100% | 50%/50% |
| **Saturday Trip Generation** | | | | | | **6** | **5** | **11** | **57** |
| **Sunday[2]** | 2.5 | Acre | | | | 1.950 | 3.050 | 5.000 | 19.500 |
| Inbound/Outbound Splits | | | | | | 39% | 61% | 100% | 50%/50% |
| **Sunday Trip Generation** | | | | | | **5** | **8** | **13** | **49** |

Notes:

[1] Rates based on 4-acre park for Land Use 411 - "Public Park" from Institute of Transportation Engineers (ITE) Trip Generation (10th Ed.).

[2] Peak hour rates for generator

Source: Translutions, 2020

As seen in Table 4.21-1, the Crawford Canyon Park is forecast to generate approximately 85 daily trips on weekdays, 57 trips on Saturdays, and 49 trips on Sundays. During the weekday peak hours of adjacent street traffic, the Crawford Canyon Park is forecast to generate approximately 11 trips during the A.M. peak hour and 9 trips during the P.M. peak hour. On weekends, the Park is forecast to generate 11 peak hour trips on Saturday and 13 peak hour trips on Sunday.

Access Analysis

While the trips generated by the Crawford Canyon Park are less than the threshold requiring a traffic study based on County requirements, an evaluation of Project access was conducted to evaluate traffic operations. Due to the proximity of the intersection of Crawford Canyon Road and

Newport Avenue to the proposed driveway, the analysis also includes the intersection of Crawford Canyon Road and Newport Avenue. This analysis was conducted for weekday peak hours only since traffic on adjacent streets are typically highest on weekday peak hours.

Project Trips. Forecast project trips were calculated at the study intersections. The trip distribution for the Crawford Canyon Park was forecast based on the location of the Park in relation to residential uses in the area. The trip generation was applied to the trip distribution to obtain project trip assignment.

Traffic Volumes. Due to the current pandemic, new traffic counts could not be obtained at the intersections as current traffic counts would be atypical because schools are closed, and many residents are working from home. Therefore, traffic counts at the intersection of Crawford Canyon Road and Newport Avenue from 2014 were obtained from OCTA. A growth rate of 2 percent per annum was applied to these counts to obtain 2020 traffic volumes.

Traffic Operations and Delay. The evaluation of the Project entry was conducted based on traffic delay. Delay ranges are generally expressed LOS. There is a strong correlation between delay and safety. Research has shown that accidents increase as LOS worsens, especially at unsignalized intersections. For example, a driver is likely to take unnecessary risks to make a turn after waiting beyond a certain amount of time to make that turn. The Highway Capacity Manual (HCM) accounts for this psychological factor and uses different delay metrics for stop controlled and signalized intersections. Therefore, this analysis was based on HCM methodologies using Synchro software. The County of Orange uses LOS D as the threshold for acceptable operations.

**Table 4.21-2**, *Existing Levels of Service*, shows the levels of service at the analysis intersections. As seen on Table 4.21-2, both intersections operate at acceptable levels of service. At the Project driveway, there are minimal delays in making turns in and out of the Project driveway. Further, the Project is unlikely to significantly increase traffic delays at other intersections.

### Congestion Management Program

The congestion management program (CMP) is a State-mandated program enacted by the State legislature to address the impacts that urban congestion has on local communities and the region as a whole. The OCTA is the local agency responsible for implementing the requirements of the CMP. New projects located in the County must comply with the requirements set forth in the OCTA's CMP. The nearest OCTA CMP intersection to the Park and Sidewalk Extension Sites is Jamboree Road/Irvine Boulevard, located approximately 3.3 miles to the southeast (OCTA, 2019). As such, implementation of the Project would not conflict with OCTA's CMP.

### Bus Routes

The nearest OC bus transit route runs along Newport Avenue to Foothill Boulevard, approximately 0.55 miles south of the Park and Sidewalk Extension Sites (OC Bus, 2021). As such, implementation of the Project would not conflict with OCTA's bus routes.

### Bicycle Facilities

An existing Class II bikeway facility along Newport Avenue and a proposed Class II bikeway facility along Crawford Canyon Road are located adjacent to the Park and Sidewalk Extension Sites. Class II bikeway facilities consist of on-streets striped and signed bicycle lanes (County of

Orange, 2013). Implementation of the Project would not conflict with existing or proposed County bicycle facilities.

Overall, given the limited intensity of the proposed development, implementation of the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would not conflict with transportation safety, the CMP, OCTA's bus routes, or the County bicycle facilities. As such, a less than significant impact would occur in this regard and no mitigation measures are required.

**Table 4.21-2: Existing Levels of Service**

| | | Intersection | LOS Std. | Control | Without Project | | | | With Project | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | |
| | | | | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| 1 | . | Project Driveway/Newport Avenue | D | TWSC | Future Intersection | | | | 13.1 | B | 11.4 | B |
| 2 | . | Crawford Canyon Road/ Newport Avenue | D | Signal | 28.3 | C | 27.3 | C | 28.4 | C | 27.4 | C |

Notes:

* Exceeds LOS Standard

TWSC = Two-Way Stop Control; For TWSC intersections, reported delay is for worst-case movement.

LOS = Level of Service

Source: Translutions, 2020

**Question 4.21b) Would the project conflict or be inconsistent with CEQA section 15064.3, subdivision (b)?**

**Response to Impact Question 4.21b)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. Senate Bill 743 (SB743) which was codified in Public Resources Code section 21099, was signed by the Governor in 2013 and directed the Governor's Office of Planning and Research (OPR) to identify alternative metrics for evaluating transportation impacts under CEQA. Pursuant to Section 21099, the criteria for determining the significance of transportation impacts must "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." Recently adopted changes to the CEQA Guidelines in response to Section 21099 include a new section (15064.3) that specifies that Vehicle Miles Traveled (VMT) is the most appropriate measure of transportation impacts. A separate Technical Advisory issued by OPR provides additional technical details on calculating VMT and assessing transportation impacts for various types of projects.

The County of Orange Board of Supervisors adopted County VMT guidelines at its November 17, 2020 meeting. The Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project is exempt from a VMT analysis per Orange County's Guidelines for Evaluating Vehicle Miles Traveled Under CEQA. Section 3.1 identifies Land Development Projects with certain attributes may be presumed to create a less than significant on transportation and circulation. The Project qualifies as a Small Project attribute because it generates fewer than 500 average daily trips. The Project also qualifies as a Public Facility attribute because it is a government facility that supports community health, safety, or welfare. Therefore, based on the thresholds set by the County of Orange *Final Guidelines for Evaluating Vehicle Miles Traveled Under CEQA* (County of Orange, 2020) less than significant impacts would occur in this regard and no mitigation measures are required.

**Question 4.21c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?**

**Response to Impact Question 4.21c)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. A Construction Management Plan for the Park and Sidewalk Extension would be prepared in order to minimize disruptions to through traffic flow, maintain emergency vehicle access to the Park and Sidewalk Extension Sites and neighboring land uses, and schedule worker and construction equipment delivery to avoid peak traffic hours. As a component of the Construction Management Plan, the times of day and locations of all temporary lane closures would be coordinated so that they do not occur during peak periods of traffic congestion, to the extent feasible. Truck routes for material and equipment deliveries, as well as for soil export and disposal, would require approval by the OC Public Works prior to construction activities.

The Park Site would be developed with a 2.5-acre neighborhood park consisting a variety of recreational amenities and features. The Crawford Canyon Park would include a vehicular deceleration lane designed to County standards, including standards for sight distance, on Newport Avenue prior to entering the proposed parking lot. The proposed improvements of the

Sidewalk Extension include approximately 630 feet of sidewalk construction along the north side of Newport Avenue beginning across from Hyde Park Drive proceeding easterly and approximately 815 feet of sidewalk construction along the west side of Crawford Canyon Road from the northeasterly end of the Park Site to Country Haven Lane. Additional associated proposed improvements include decomposed granite walkways, pavement reconstruction, driveways, curb ramps, curb/gutter, retaining walls/slough walls, drainage inlet modifications and features, utility relocations and adjustments, traffic pole replacement, pedestrian push button relocation and adjustments to pull boxes at the intersection of Crawford Canyon Road and Newport Avenue. There are no existing hazardous design features such as sharp curves or dangerous intersections on-site or within the vicinity of the Park and Sidewalk Extension Sites. The Project would not alter existing street patterns in the vicinity. A less than significant impact would occur in this regard and no mitigation measures are required.

**Question to 4.21d) Result in inadequate emergency access?**

**Response to Impact Question 4.21d)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. The Park and Sidewalk Extension Sites are located in a highly urbanized area of North Tustin that is well served by the surrounding roadway network. While construction activities for the Project would be confined on-site, the construction staging and lay-down area for the Park will be located within the project boundaries of the Park Site. Construction staging and lay-down area for the Sidewalk Extension will be located offsite, potentially within a vacant lot located approximately one-mile south of the Sidewalk Extension Site on Newport Avenue. The final construction staging and lay-down area for the Sidewalk Extension will be determined by the Project contractor. Construction workers will park within the staging and lay-down area. However, through-access for drivers, including emergency personnel, along all roads would still be provided. In these instances, the Project would implement traffic control measures (e.g., construction flagmen, signage, etc.) to maintain flow and access. Further, in accordance with OC Public Works, the Park and Sidewalk Extension would develop a Construction Management Plan which includes designation of haul routes, to ensure that adequate emergency access is maintained during construction. Therefore, construction is not expected to result in inadequate emergency access. A less than significant construction impact would occur and no mitigation measures are required.

Post construction, the Park Site would be developed with a 2.5-acre neighborhood park consisting a variety of recreational amenities and features. The proposed parking lot would provide emergency access to the Park Site for emergency personnel. As discussed under Response 4.21a, Crawford Canyon Park is anticipated to generate approximately 85 daily trips on weekdays, 57 trips on Saturday, and 49 trips on Sundays. During the weekday peak hours of adjacent street traffic, the project is forecast to generate approximately 11 trips during the A.M. peak hour and 9 trips during the P.M. peak hour. On weekends, the Park is forecast to generate 11 peak hour trips on Saturday and 13 peak hour trips on Sunday. The Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements. As such, Project operation would not generate substantial traffic in the Project vicinity. Therefore, operation of the Project would result in a less than significant impact and no mitigation measures are required.

| **4.22 Tribal Cultural Resources**<br><br>*Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k). | ☐ | ☐ | ☐ | ☒ |
| b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe. | ☐ | ☐ | ☐ | ☒ |

The following analysis is based on the County's consultation with California Native American tribes pursuant to AB 52 to identify tribal cultural resources in or near the Park and Sidewalk Extension Sites, located in Appendix K, of this Draft IS/MND.

**Question 4.22a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k).**

**Question 4.22b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.**

**Response to Question 4.22a-b)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. The SCCIC records search, pedestrian survey (ESA, 2021) and NAHC SLF search did not identify potential tribal cultural resources in the Park Site or Sidewalk Extension Site. The County conducted consultation with California Native American tribes pursuant to AB 52 to identify tribal cultural resources in or near the Park and Sidewalk Extension Sites. On December 28, 2020, the County sent notification letters via certified mail with return receipted requested to the designated representatives of four California Native American tribes, including the Gabrieleno Band of Mission Indians – Kizh Nation, Juaneno Band of Mission Indians, San Gabriel Band of Mission Indians, and Soboba Band of Luiseno Indians. The letters provide a brief description of the Park and Sidewalk Extension and their locations, with maps, the lead agency's contact information, and a notification that the tribe has 30 days to request consultation[9] pursuant to Public Resources Code section 21080.3.1.

On January 21, 2021, the County received a letter via email from Mr. Andrew Salas, Chairman of the Gabrieleno Band of Mission Indians - Kizh Nation that requested formal AB 52 consultation with the County for the Project. The County consulted with the Kizh Nation on February 25, 2021 via conference call. During the call, the County provided an overview of the Project and the Kizh Nation provided their knowledge of the Project Site vicinity, including information about the natural environment and general history of the area, and known villages and trade routes/trails in the area. The Kizh Nation indicated that there could be archaeological resources and human remains related to prehistoric travel along trade routes, such as burials of those who may have died while on the trail, and that these resources could be found in artificial fill soils. They also suggested that the Project Site is located within and around the sacred village of Pasbengna. After the conference call, the Kizh Nation submitted an email to the County on March 2, 2021 that included similar information that they provided in the call, including maps and other documentation, and a request to understand the origin of the soil stockpiles and other onsite soils located at the Project Site. The maps and documentation do not provide information that indicates a known tribal cultural resource is located within the Project Site.

As a follow-up to the Tribe's request for additional information on the existing fill materials, additional research was conducted to determine the previous land use of the project site and immediate vicinity and determine the nature of the onsite soil materials. to the extent practicable

[9] However, the letter also indicated that this deadline may be affected by various Executive Orders issued by the Governor.

and provided a follow-up letter to the Kihz Nation on May 6, 2021. An extensive evaluation of historic maps and aerial photos to determine the historic land use of the project site and immediate vicinity was conducted. Historic topographic maps and aerial photographs were examined to provide historical information about the previous land uses of the Park Site and Sidewalk Extension Site. Available topographic maps include the 1896 and 1901 Anaheim 15-minute quadrangles, the 1964 Orange 7.5-minute quadrangles (Topo View, 2020). Historic aerial photographs were available for the years 1927, 1931, 1939, 1952, 1960, 1977 (Frame Finder, 2020), 1980, 1994, 2002, 2003, 2004, 2005, 2009, 2010, 2012, 2014, 2016 (Historicaerials.com, 2020), and 2020 (Bing Maps, 2020). The Park Site has undergone disturbance from prior land uses including orchards, access roads, homesteading activities, and ornamental trees.

While the Kizh Nation did not identify any known tribal cultural resources (as defined in PRC Section 21074) within the Project Site during consultation with the County, they have indicated that the Project Site has a high potential to encounter tribal cultural resources during construction given the Project Site's location near sacred villages (including the village of *Pasbengna*), water courses, major traditional trade routes, and its location within a cultural landscape. As a result, the Kizh Nation recommended Native American monitoring during construction of the Project. However, they suggested that their concerns for proposed construction monitoring would be reduced if the County could show that the soil stockpiles and other onsite soils had been removed and replaced with clean or engineered fill soils that were imported. As mentioned earlier, the origin of the soil stockpiles and other onsite soils at the Project Site is currently unknown.

The Project Site has undergone disturbance from prior land uses including orchards, access roads, homesteading activities, and ornamental trees. Results of ESA's pedestrian survey in 2020 revealed that a large majority of the ground surface at the Park Site was obstructed by large soil stockpiles of unknown origin. In particular, it is unknown whether these soils originated at the Park Site or another location. Given the past land use activities that have likely displaced resources, the negative results of the pedestrian survey and record searches, and since the proposed excavations are anticipated to be shallow (up to 6 feet in depth), the potential to encounter buried tribal cultural resources during construction is considered low.

The AB 52 Native American notification letters and Mr. Salas' initial response letter are provided in the Native American Tribal Correspondence references materials to this IS/MND. To date, no other responses from the Native American community have been received as part of the AB 52 tribal consultation effort. As a result of the County's consultation efforts, no known tribal cultural resources have been identified within the Project Site or vicinity and therefore no impact to known tribal cultural resources would occur.

Although the project area is not in an area of previously identified archaeological sensitivity, the possibility exists that undiscovered cultural resources may be encountered during ground-disturbing activities associated with the proposed project. Implementation of **Standard Condition SC-TCR-1** would provide consulting Native American groups the opportunity to examine inadvertently discovered prehistoric cultural resources and consult on the identification, evaluation, and protection of TCRs if they are discovered during construction.

**SC-TCR-1: Unanticipated Discovery of Archaeological Resources.** If unanticipated archaeological resources or deposits are discovered during ground disturbing activities, OCPW will implement the following measures. All work will halt within a 50-foot radius of the discovery. OCPW will have a qualified professional archaeologist with knowledge of Native American resources to assess the significance of the find. If the resources are Native American in origin, the

County shall coordinate with the Tribe regarding evaluation, treatment, curation, and preservation of these resources. The archaeologist will have the authority to modify the no-work radius as appropriate, using professional judgment in consultation with OCPW. Work will not continue within the no-work radius until the archaeologist conducts sufficient research and evidence and data collection to establish that the resource is either: (1) not cultural in origin; or (2) not potentially eligible for listing on the CRHR. If a potentially eligible resource is encountered, then the archaeologist and OCPW, as lead agency, in consultation with the Tribe, will arrange for either: (1) avoidance of the resource, if possible; or (2) test excavations to evaluate eligibility, and if eligible, an attempt to resolve adverse effects to determine appropriate mitigation. The assessment of eligibility will be formally documented in writing as verification that the provisions in CEQA for managing unanticipated discoveries and PRC Section 5024 have been met.

| **4.23 Utilities and Service Systems**<br><br>*Would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects? | ☐ | ☐ | ☒ | ☐ |
| b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years? | ☐ | ☐ | ☒ | ☐ |
| c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? | ☐ | ☐ | ☒ | ☐ |
| d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals? | ☐ | ☐ | ☒ | ☐ |
| e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste? | ☐ | ☐ | ☒ | ☐ |

**Question 4.23a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?**

**Response to Question 4.23a)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**.

Construction

Water service is provided to North Tustin and the Park and Sidewalk Extension Sites by the East Orange County Water District (EOCWD) (OCWD, 2020; OC LAFCO, 2020). During construction activities, there would be a temporary, intermittent demand for water for such activities as soil watering for site preparation, fugitive dust control, concrete preparation, painting, cleanup, and other short-term activities. Construction-related water usage is not expected to have an adverse impact on available water supplies or the existing water distribution system, and impacts would be less than significant and no mitigation measures are required.

Wastewater service is provided to the Park and Sidewalk Extension Sites by the Orange County Sanitation District (OCSD) (OCSD, 2020). During construction, a negligible amount of wastewater would be generated by construction workers. Portable toilets would be provided on the Project Site by a private company and the waste disposed off-site to two treatment facilities jointly owned by OCSD in Fountain Valley. Therefore, construction impacts to the local wastewater conveyance and treatment would be less than significant and no mitigation measures are required.

Operation

Water use during the operation of the Project would be used for landscaping throughout Crawford Canyon Park. Water use will not occur during operation of the Sidewalk Extension. The Park would provide drought tolerant landscaping or other low water landscaping to the greatest extent feasible. The Park and Sidewalk Extension do not propose habitable structures or restroom facilities. As such, Project operations would not generate wastewater. Therefore, the Project would result in a less than significant impact on water and wastewater services and facilities and no mitigation measures are required.

Existing development within North Tustin is currently serviced by a stormwater drainage system designed to accept area runoff. The Park Site is currently zoned for development within a highly urbanized area of North Tustin. The areas immediately to the north, east, south, and west of the Park and Sidewalk Extension Sites comprise of existing single-family residences. An existing drainage culvert and associated cement drainage ditch is located within the southwestern portion of the Park Site. An additional cement drainage ditch exists along Newport Avenue. As such, the drainage system of North Tustin has been designed with sufficient capacity to accommodate development on the Park and Sidewalk Extension Sites that would include the Site's impervious surfaces in its capacity. The Park Site would include the construction and operation of a 2.5-acre neighborhood park consisting of walkways, trails, foot bridges, two nature play areas for children, exercise stations, picnic tables, benches, landscape berms and natural rolling lawn areas. The Park

Site's limited impervious surfaces would include a paved surface parking lot with 11 vehicular parking spaces. In addition, the Park is proposing a bioretention basin located in the western portion of the Site adjacent to the proposed parking lot. The Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements. There is an existing drainage system and Project implementation would improve the system and not induce the need for additional capacity. The stormwater system will be improved with the removal of the concrete ditch along Newport Avenue, and stormwater will be diverted to a bioswale leading to a bioretention basin. A less than significant impact would occur in this regard and no mitigation measures are required.

The anticipated electricity needed for the proposed security lighting located along walkways and trails and within the play areas and parking lot of the Park Site is negligible in the context of overall daily use of electricity within North Tustin as discussed in Section 4.10(a). Construction and operation of the Park and Sidewalk Extension would not require the use of natural gas or telecommunication facilities.

Overall, due to the negligible demand for water and wastewater services and facilities, stormwater drainage, electric power, natural gas, and telecommunication facilities, the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would not require or result in the construction of new facilities or expansion of existing facilities. Therefore, water and wastewater infrastructure, stormwater drainage, electric power, natural gas, and telecommunication facility impacts associated with construction and operation of the Park and Sidewalk Extension would be less than significant and no mitigation measures are required.

**Question 4.23b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?**

**Response to Question 4.23b)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. As discussed above, North Tustin and the Park and Sidewalk Extension Sites are located within the water service area of the EOCWD. The EOCWD encompasses an area of approximately 10,000 acres and is a member of the Municipal Water District of Orange County (MWDOC) which is a member of the Metropolitan Water District (MWD) and therefore entitled to receive Colorado River and Northern California imported water through the distribution facilities of the Metropolitan system (EOCWD, 2020; OC LAFCO, 2020).

Construction and operation of the Park and Sidewalk Extension would result in the demand for water supplies. Water used during construction activities would be used for soil watering for site preparation, fugitive dust control, concrete preparation, painting, cleanup, and other short-term activities. Water use during the operation of the Park would be used for landscaping throughout Crawford Canyon Park. Water use will not occur during operation of the Sidewalk Extension.

The Park would provide drought tolerant landscaping or other low water landscaping to the greatest extent feasible. The Park and Sidewalk Extension do not propose habitable structures or restroom facilities. Due to the negligible amount of water anticipated to be used by the Park and Sidewalk Extension, the existing water entitlements and water resources of North Tustin would be sufficient to serve the Project. A less than significant impact would occur in this regard and no mitigation measures are required.

**Question 4.23c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?**

**Response to Question 4.23c)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. As discussed above, North Tustin and the Park and Sidewalk Extension Sites are located within the wastewater service area of Orange County Sanitation District (OCSD). OCSD is responsible for safely collecting, treating and disposing the wastewater generated by approximately 2.6 million residents within a 479-square mile area of central and northwest County of Orange (OCSD, 2020).

During construction of the Park and Sidewalk Extension, a negligible amount of wastewater would be generated by construction workers. Portable toilets would be provided by a private company and the waste disposed off-site to two treatment facilities jointly owned by OCSD in Fountain Valley. The Park and Sidewalk Extension do not propose habitable structures or restroom facilities. As such, operations of the Park and Sidewalk Extension would not generate wastewater. Therefore, the Project would result in a less than significant impact on wastewater services and facilities and no mitigation measures are required.

**Question 4.23d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?**

**Response to Question 4.23d)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. Trash, recyclables, and green waste within the North Tustin are collected by Waste Management of Orange County. The County of Orange provides three active landfills: Olinda Alpha Landfill, Brea, CA; Frank R. Bowerman Landfill, Irvine, CA; and Prima Deshecha Landfill, San Juan Capistrano. Solid waste generated from the Project Site is anticipated to disposed of at the Frank R. Bowerman Landfill. The Frank R. Bowerman Landfill, a Class III municipal solid waste landfill, is one of the largest landfills in California and the ninth largest landfill in the United States. This landfill is permitted for 11,500 tons per day (TPD) maximum with an 8,500 TPD annual average. The Frank R. Bowerman Landfill has capacity to serve the County of Orange through year 2053 (OC Waste, 2020).

Construction of the Park and Sidewalk Extension would result in generation of solid waste such as scarp, lumber, concrete, packing materials, and plastics which could require disposal of construction associated debris. Construction related solid waste is anticipated to be nominal. Further, it is anticipated that a large amount of the construction debris would be recycled. Disposal and recycling of the construction debris would be required to comply with all federal, State, and local regulations. Operation of the Park is anticipated to generate a negligible amount of solid waste. The Park will have seven 31-gallon trash receptacles emptied weekly. Maintenance of the landscaped areas throughout the Crawford Canyon Park is anticipated to generate a small amount of trash and debris, including green waste. Operation of the Sidewalk Extension would not generate solid waste. Construction and operational waste is anticipated to be disposed of at

the Frank R. Bowerman Landfill. Due to the small amount of solid waste generated by the Park and Sidewalk Extension, it is anticipated the Frank R. Bowerman Landfill could accommodate the Project's solid waste generation. As such, a less than significant impact would occur in this regard and no mitigation measures are required.

**Question 4.23e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?**

**Response to Question 4.23e)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact**. All local governments, including the County, are required under Assembly Bill 939 (AB 939), the Integrated Waste Management Act of 1989, to develop source reduction, reuse, recycling, and composting programs to reduce tonnage of solid waste going to landfills. The waste generated by the Park and Sidewalk Extension would be incorporated into the waste stream of the County, and diversion rates would not be substantially altered. The Project does not include any component that would conflict with state laws governing construction or operational solid waste diversion and would comply pursuant to local implementation requirements. As such, a less than significant impact would occur in this regard and no mitigation measures are required.

| **4.24 Wildfire**<br><br>*If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Substantially impair an adopted emergency response plan or emergency evacuation plan? | ☐ | ☐ | ☐ | ☒ |
| b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire? | ☐ | ☐ | ☐ | ☒ |
| c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment? | ☐ | ☐ | ☐ | ☒ |
| d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes? | ☐ | ☐ | ☐ | ☒ |

**Question 4.24a) Substantially impair an adopted emergency response plan or emergency evacuation plan?**

**Response to Question 4.24a**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. The Park and Sidewalk Extension Sites are not located within or near an area designated as a state responsibility area nor is it classified as a very high fire hazard severity zone (VHFHSZ) or located near a VHFHSZ (Cal Fire, 2011). The Park and Sidewalk Extension Sites are mapped as Non-VHFHSZ per the California Department of Forestry and Fire Protection (Cal Fire) Fire Hazard Severity Zone Maps prepared under the Fire and Resource Assessment Program (FRAP) (County of Orange, 2013). Further, according to Figure IX-1, Fire Hazard Severity Zones, of the County's General Plan Safety Element, the Park and Sidewalk Extension Sites are not located in a fire hazard severity zone (County of Orange, 2013). As such, the Park and Sidewalk Extension would not substantially impair an adopted emergency response plan or emergency evacuation plan. No impact would occur in this regard.

**Question 4.24b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?**

**Response to Question 4.24b**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. The Park and Sidewalk Extension Sites are not located within or near an area designated as a state responsibility area nor is it classified as a VHFHSZ or located near a VHFHSZ (Cal Fire, 2011). The Park and Sidewalk Extension Sites are mapped as Non-VHFHSZ per the California Department of Forestry and Fire Protection (Cal Fire) Fire Hazard Severity Zone Maps prepared under the FRAP (County of Orange, 2013). Further, according to Figure IX-1, Fire Hazard Severity Zones, of the County's General Plan Safety Element, the Park and Sidewalk Extension Sites are not located in a fire hazard severity zone (County of Orange, 2013). As such, due to slope, no impact would occur in this regard.

**Question 4.24c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?**

**Response to Question 4.24c**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. The Park and Sidewalk Extension Sites are not located within or near an area designated as a state responsibility area nor is it classified as a very high fire hazard severity zone (VHFHSZ) or located near a VHFHSZ (Cal Fire, 2011). The Park and Sidewalk Extension Sites are mapped as Non-VHFHSZ per the California Department of Forestry and Fire Protection (Cal Fire) Fire Hazard Severity Zone Maps prepared under the Fire and Resource Assessment Program (FRAP) (County of Orange, 2013). Further, according to Figure IX-1, Fire Hazard Severity Zones, of the County's General Plan Safety Element, the Park and Sidewalk Extension Sites are not located in a fire

hazard severity zone (County of Orange, 2013). As such, the Park and Sidewalk Extension would not require the installation or maintenance of associated infrastructure that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment. No impact would occur in this regard.

**Question 4.24d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?**

**Response to Question 4.24d**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **No Impact**. The Park and Sidewalk Extension Sites are not located within or near an area designated as a state responsibility area nor is it classified as a very high fire hazard severity zone (VHFHSZ) or located near a VHFHSZ (Cal Fire, 2011). The Park and Sidewalk Extension Sites are mapped as Non-VHFHSZ per the California Department of Forestry and Fire Protection (Cal Fire) Fire Hazard Severity Zone Maps prepared under the Fire and Resource Assessment Program (FRAP) (County of Orange, 2013). Further, according to Figure IX-1, Fire Hazard Severity Zones, of the County's General Plan Safety Element, the Park and Sidewalk Extension Sites are not located in a fire hazard severity zone (County of Orange, 2013). As such, the Park and Sidewalk Extension would not expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. No impact would occur in this regard.

| **4.25 Mandatory Findings of Significance**<br><br>*Would the project:* | **Potentially Significant Impact** | **Less than Significant With Mitigation Incorporated** | **Less than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? | ☐ | ☒ | ☐ | ☐ |
| b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)? | ☐ | ☒ | ☐ | ☐ |
| c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? | ☐ | ☒ | ☐ | ☐ |

**Question 4.25a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?**

**Response to Question 4.25a)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant with Mitigation Incorporated**. Based on the discussion under Section 4.8, *Biological Resources*, the onsite Mexican fan palms could provide habitat for roosting bats species (Park Site only), and active nesting sites for birds (both Park and Sidewalk Extension Sites). Migratory nongame native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918 (50 C.F.R. Section 10.13). Sections 3503, 3503.5, and 3513 of the California Fish and Game Code prohibit take of native birds and their active nests including raptors and other migratory nongame birds (as listed under the Federal MBTA). Additionally, common bats are protected under CDFG Code Section 4150. Disturbance to potential nesting substrate or bat maternity colony could result in a potentially significant impact. With pre-construction nesting bird surveys, bat surveys and monitoring prior to and during construction during the breeding season in areas containing potential nesting sites and with implementation of specific restrictions to establish appropriate set-backs to curtail construction near any active bird or bat nest sites, as described in Mitigation Measure BIO-1, impacts would be less than significant

Based on the discussion under Section 4.9, *Cultural Resources*, since the construction of Crawford Canyon Park and Sidewalk Extension includes ground disturbance up to 6 feet in depth and 3 feet in depth, respectively, it is possible that unknown subsurface archaeological resources could be encountered. Impacts to archaeological resources that qualify as historical resources as defined in §15064.5 could result in a significant effect on the environment. With implementation of Mitigation Measure CUL-1, which provides procedures to follow in the event of the discovery of archaeological resources, impacts would be less than significant. The results from the SCCIC records search, SLF search, and pedestrian survey did not identify human remains within the Park or Sidewalk Extension Site. Should ground disturbance encounter human remains, disturbance of those remains could result in a significant effect on the environment. With implementation of Mitigation Measure CUL-2, which requires following state laws in the event of a discovery, impacts to human remains would be less than significant.

No paleontological resources were identified within the Park or Sidewalk Extension Site as discussed in Section 4.11, *Geology and Soils*. However, the geologic map review, the Geotechnical Investigation Report, and the LACM records search revealed that the Park Site has exposures of alluvial fan deposits (Qyf), which are assigned a low-to-high paleontological potential increasing with depth. The geologic map review and the LACM records search revealed that the Sidewalk Extension Site has exposures of alluvial fan deposits (Qyf) and the middle Miocene Topanga Formation (Tt). The alluvial fan deposits are assigned a low-to-high paleontological potential increasing with depth. The LACM also mentions that in elevated areas immediately east and southeast of the Sidewalk Extension Site, there are exposures of the Sespe/Vaqueros Formation, undifferentiated (Tvs); however, the LACM has stated that these localities are likely to have

originated from the Topanga Formation (Tt). The Sespe/Vaqueros Formation and the Topanga Formation are assigned a high potential. Given that Park excavations would only reach 6 feet in depth and fossils from nearby older Quaternary alluvium sediments were recovered from 8 to 25 feet below ground surface, the Park Site does not appear to have the potential to disturb or destroy buried paleontological resources. Since excavations would not exceed 3 feet in depth and the known fossil localities[10] in the vicinity have been discovered from as deep as 8 to 25 feet below ground surface, the Sidewalk Extension Site does not appear to have the potential to disturb or destroy buried paleontological resources. Nevertheless, since construction of the Park and Sidewalk Extension includes ground disturbance, there remains the possibility that paleontological resources could be encountered. Directly or indirectly destroying a unique paleontological resource could result in a significant effect on the environment. With implementation of Mitigation Measure PALEO-1, which provides procedures to follow in the event of a discovery, impacts would be less than significant. As such, the Park and Sidewalk Extension would not have the potential to degrade the quality of the environment, substantially reduce the habitat of fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory, and impacts in this regard would be less than significant with mitigation incorporated, as necessary.

**Mitigation Measures:**

Implementation of Mitigation Measures BIO-1, CUL-1 and CUL-2, and PALEO-1.

**Question 4.26b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?**

**Response to Question 4.26b)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact with Mitigation Incorporated.** A cumulative impact could occur if the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project would result in an incrementally considerable contribution to a significant cumulative impact in consideration of past, present and reasonably foreseeable future projects for each resource area. Because the Project impacts are generally construction related, the cumulative study area is generally confined to the immediate vicinity or within a mile radius. **Table 4.26-1**, *Related Projects*, provides a summary of related projects in the vicinity of the Park and Sidewalk Extension Sites, which are used in the cumulative impact analysis.

[10] Additional fossil localities have been found from the Sespe/Vaqueros Formation (which per the LACM, these likely originated from the Topanga Formation); however, the depths from which they were recovered are unknown.

**Table 4.26-1: Related Projects**

| Project | Location | Description |
|---|---|---|
| **County of Orange** | | |
| Annual County Road Preservation: Asphalt Overlay of Newport Avenue | Newport Avenue from Hyde Park Drive to 400 feet south of Kings Bridge Road | Grind and overlay with GlasPave25. Project completed April 2020. |
| Crawford Canyon Road Sidewalk Extension (Phase II)[1] | Crawford Canyon Road from Newport Avenue to Stroller Lane | Sidewalk improvements with drainage inlet modifications and features. Construction anticipated Fall 2023. |
| East Orange County Water District: Sewer Main Installation | Crawford Canyon Road from Brae Glen to Stroller Lane | Replace 600 feet of sewer main. Construction anticipated Summer 2022. |
| New single family dwelling with improvements in County right-of-way | 10713 Crawford Canyon Road | New single family dwelling. Driveway improvements extend into County right-of-way. County Grading Permit #GRD20-0056 and encroachment permit #20-0354. Construction anticipated for Spring 2021. |
| Cowan Ranch Residential Project | S. Newport Ave & Kings Briar Road | 16-Lot, SFD subdivision |

Source: OC Public Works, OC Planning, February 2021.

Note:

[1] The Crawford Canyon Road Sidewalk Extension (Phase II) is a separate project and unrelated to the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project.

Aesthetics

Development of the Park and Sidewalk Extension in conjunction with the related projects would result in an incremental intensification of land uses in a highly urbanized are of North Tustin. Similar to the Park and Sidewalk Extension Sites, the related projects are not located within scenic vistas or within the vicinity of a state-designated scenic highway. The related project sites do not contain rock outcroppings or historical resources. Similar to the Park and Sidewalk Extension, the related projects would be compatible with the existing visual character of the surrounding area. Cumulative light and glare effects would be consistent with the existing urban environment, which is characterized by high ambient light levels. Therefore, no cumulative impacts on aesthetics would occur.

Agriculture and Forestry Resources

As with the Park and Sidewalk Extension, related projects are located within developed, urbanized areas generally zoned for residential uses and do not support farming, agricultural, or forest-related operations. Development of the Park and Sidewalk Extension in combination with the related

projects would not result in the conversion of State-designated agricultural land from agricultural use to a non-agricultural use, nor result in the loss of forest land or conversion of forest land to non-forest use. Therefore, no cumulative impacts on agricultural or forest resources would occur.

Air Quality

There are related projects in the area of the Park and Sidewalk Sites that have not yet been built or are currently under construction. As such, any quantitative analysis to ascertain daily construction emissions that assumes multiple, concurrent construction projects would be speculative. The SCAQMD recommends that Project-specific construction air quality impacts be used to determine the potential cumulative impacts to regional air quality.

With regard to Project operations, the SCAQMD's approach for assessing cumulative impacts related to operations or long-term implementation is based on attainment of ambient air quality standards in accordance with the requirements of the federal and State Clean Air Acts. As discussed earlier, the SCAQMD has developed a comprehensive plan, the AQMP, which addresses the region's cumulative air quality condition

For purposes of the cumulative air quality analysis with respect to CEQA Guidelines Section 15064(h)(3), the Project's incremental contribution to cumulative air quality impacts is determined based on compliance with the SCAQMD adopted 2016 AQMP. The Park and Sidewalk Extension would not conflict with or obstruct implementation of AQMP and would be consistent with the growth projections in the AQMP. Nonetheless, SCAQMD no longer recommends relying solely upon consistency with the AQMP as an appropriate methodology for assessing cumulative air quality impacts. The SCAQMD recommends that project-specific air quality impacts be used to determine the potential cumulative impacts to regional air quality. As shown in Tables 4.7-2 through 4.7-5, emissions calculated for construction and operations of the Park and Sidewalk Extension are less than the applicable SCAQMD significance thresholds, which are designed to assist the region in attaining the applicable State and national ambient air quality standard. These standards apply to both primary (criteria and precursor) and secondary pollutants (ozone). The emissions associated with the Park and Sidewalk Extension would not be cumulatively considerable as the emissions would fall below the SCAQMD significance thresholds. In addition, the Park and Sidewalk Extension would be consistent with the AQMP, which is intended to bring the Basin into attainment for all criteria pollutants. Therefore, cumulative impacts on air quality would be less than significant and no mitigation measures are required.

Biological Resources

With regard to cumulative biological impacts, the Park and Sidewalk Extension Sites are located in a highly urbanized area. The related projects would mostly occur on previously disturbed, urbanized land. The Park and Sidewalk Extension Sites do not contain sensitive biological resources or habitat, including wetlands, and is not part of a wildlife corridor, and therefore, could not contribute to a cumulative effect in these regards. With pre-construction nesting bird surveys, bat surveys and monitoring prior to and during construction during the breeding season in areas containing potential nesting sites and with implementation of specific restrictions to establish appropriate set-backs to curtail construction near any active bird or bat nest sites, as described in Mitigation Measure BIO-1, impacts would be less than significant. Related projects would also be required to implement mitigation for impacts to bats and nesting birds. Therefore, cumulative impacts to biological resources would be less than significant.

Cultural Resources

Impacts related to cultural resources are site-specific and as such, are assessed on a site-by-site basis. As discussed previously, Mitigation Measure CUL-1 would ensure the Park and Sidewalk Extension do not cause a substantial adverse change in the significance of an archaeological resource. With implementation of Mitigation Measure CUL-2, which requires following state laws in the event of a discovery, impacts to human remains would be less than significant.

It is anticipated that comparable implementation of similar mitigation measures, such as archaeological, and/or compliance with existing regulations would be incorporated into the approval of each related project. Further, the historic setting in the area around the Park and Sidewalk Extension Sites are already eroded by contemporary development. Based on the above, the Park and Sidewalk Extension would not contribute to cumulatively considerable cultural resources impacts.

Energy

Similar to the Park and Sidewalk Extension, related projects would consume energy during construction activities primarily from on- and off-road vehicle fuel consumption in the form of diesel, gasoline, and electricity from water conveyance for dust control. Operation of related projects, similar to the Project, would consume energy from vehicular traffic and energy use. The construction contractors of the related projects would comply with applicable CARB regulations governing the accelerated retrofitting, repowering, or replacement of heavy duty diesel on- and off-road equipment. Similar to the Project, related projects would use energy necessary to build the development but would not result in the wasteful, inefficient, and unnecessary use of energy. Related projects would be required to comply with the applicable provisions of Title 24 and the CALGreen Code in effect at the time of building permit issuance. Based on the above, the Park and Sidewalk Extension would not contribute to cumulative considerable energy impacts.

Geology and Soils

Geological and geotechnical impacts are defined by site-specific conditions for the Park and Sidewalk Extensions Sites and related projects and are, therefore, typically confined to contiguous properties or to a localized area in which concurrent construction projects in close proximity could be subject to the same fault rupture system or other geologic hazard, or exacerbate erosion impacts. The Park and Sidewalk Extension Sites are not underlain by an active earthquake fault and, thus, would not contribute to cumulative seismic rupture impacts. Although seismic shaking would occur on the Park and Sidewalk Extension Sites as well as related project sites, applicable regulatory requirements require consideration of seismic loads in structural design for all related projects. As such, cumulative impacts associated with ground shaking would be less than significant. According to Figures IX-12, Newport-Inglewood Fault and Figure IX-13, San Andreas Fault, of the County's General Plan, the potential for liquefaction within the North Tustin, including the Park and Sidewalk Extension Sites, are considered low (County of Orange, 2013). However, the Geotechnical Assessment concluded that liquefaction should not pose a significant hazard to the Park and Sidewalk Extension Sites. The probability of a seismically induced landslide affecting the Park and Sidewalk Extensions Sites are considered to be low, due to the lack of significant slopes on the Sites and surrounding areas. Further, no landslides or related features underlie or are adjacent to the Sites (GMU, 2020). As such, the Park and Sidewalk Extension would not cumulatively contribute to liquefaction or landslide impacts. While the loss of topsoil among the Park and Sidewalk Extension and related projects during construction could

result in cumulative erosion impacts, the Project and related projects would be required to implement applicable local, regional and State regulations for grading and excavations during construction, including SWPPP requirements. Because the Park and Sidewalk Extension would be required to comply with approved geotechnical recommendations, the Project's contribution to potential cumulative impacts from lateral spreading, subsidence, liquefaction, or collapse would also be less than significant. In addition, the Park and Sidewalk Extension Sites and related project sites are located in a highly urbanized area and would connect to existing wastewater infrastructure. Thus, the Park and Sidewalk Extension and related projects would not need to use septic tanks or alternative waste disposal systems and, as such, cumulative impacts relative to waste disposal capacity would be negligible. No paleontological resources were identified within the Park or Sidewalk Extension Site. With implementation of Mitigation Measure PALEO-1, which provides procedures to follow in the event of a discovery, impacts would be less than significant. It is anticipated that comparable paleontological construction monitoring and/or compliance with existing regulations would be incorporated into the approval of each related project. Because the Park and Sidewalk Extension would not contribute considerably to geology and soils impacts, the Project's cumulative geology and soil impacts would be less than significant and no mitigation measures are required.

Greenhouse Gas Emissions

Greenhouse gas emission impacts are cumulative. As such, the impact discussion included in Section 4.12, *Greenhouse Gas Emissions*, address the Project's potential to result in a cumulatively considerable GHG impact. As discussed therein, impacts would be less than significant and no mitigation measures are required.

Hazards and Hazardous Materials

Many of the related projects would use, handle, store, and/or transport hazardous materials or require demolition containing such materials. As with the Park and Sidewalk Extension, related projects would be required to use and store all potentially hazardous materials in accordance with the manufacturers' instructions and handle materials in accordance with Federal, State, and local health and safety standards and regulations. Compliance with existing standards and regulations would ensure that the related projects would not result in significant impacts to the public or the environment through the routine transport, storage, use, disposal, or handling of hazardous materials. Some of the related projects may be on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. However, each related project would be required to comply with existing Federal, State, and local regulations related to hazardous materials sites, including cleanup sites, and hazardous materials generators. Cumulative impacts would therefore be less than significant in this regard and no mitigation measures are required.

Some of the related projects may also include the use of hazardous materials and, as with the Park and Sidewalk Extension, be located within one-quarter mile of a school. However, related projects would be subject to environmental review to evaluate potential impacts from hazardous materials releases within one-quarter mile of a school. The Park and Sidewalk Extension would not have a considerable contribution related to the use or release of hazardous materials. With the implementation of existing regulations, cumulative impacts with respect to impacts on schools would be less than significant and no mitigation measures are required.

Hydrology and Water Quality

The related projects would potentially increase the volume of stormwater runoff and contribute to pollutant loading in stormwater runoff within the local vicinity of the Park and Sidewalk Extension Sites. However, as with the Park and Sidewalk Extension, the related projects are located within the highly urbanized areas, which are largely characterized by existing buildings and paved surfaces with limited landscaped areas. Accordingly, the potential to generate a notable amount of new impermeable surfaces is limited. Related projects would be required to capture and treat runoff flow during storm events similar to the Park and Sidewalk Extension. Further, the related projects would be subject to NPDES permit requirements for both construction and operation. Each project greater than one-acre in size would be required to develop a SWPPP and would be evaluated individually to determine appropriate BMPs and treatment measures to avoid or minimize impacts to water quality. In addition, OC Public Works reviews all construction projects on a case-by-case basis to ensure that sufficient local and regional drainage capacity is available. Thus, compliance with applicable regulatory requirements would avoid significant impacts on drainage/flooding conditions and the quality of water reaching the public drainage system. Cumulative impacts to hydrology and water quality would be less than significant and no mitigation measures are required.

Land Use and Planning

As with the Park and Sidewalk Extension, related projects would be located within highly urbanized areas. Overall, given the types of uses in the Project area, the need for additional recreational facilities in the Project vicinity, the need for sidewalk extensions and associated roadway improvements, and the infill character of the Project, the Project would not physically divide an established community. Similar to the Park and Sidewalk Extension, the related projects would provide roadway and infrastructure improvements or residential uses and would not physically divide an established community. Because it is anticipated that development of the related projects would be consistent with the objectives of the County's General Plan and other plans that support intensification and improvements and residential uses, cumulative land use impacts would be less than significant and no mitigation measures are required.

Mineral Resources

North Tustin is presently urbanized and covered with impervious surfaces. Valuable mineral resources are not known to exist within the North Tustin, the Project vicinity, or the Park or Sidewalk Extension Site. According to Figure VI-3, Orange County Mineral Resources, of the County's General Plan, the Park and Sidewalk Extension Sites and related project sites are not a mineral resource area (County of Orange, 2013). Because the Park and Sidewalk Extension would have no incremental contribution to the potential cumulative impact on mineral resources, the Project would have no cumulative impact on such resources.

Noise

The geographic context for the analysis of cumulative noise impacts depends on the impact being analyzed. Noise is by definition a localized phenomenon, and sound reduces significantly in magnitude as the distance from the source increases. As such, only projects expected to occur in the immediate area of the Park and Sidewalk Extension likely would contribute to cumulative noise impacts.

Because the timing of the construction activities for all related projects cannot be defined and are beyond the control of the County, quantitative analysis that assumes multiple, concurrent construction projects would be speculative. The cumulative noise levels would be intermittent, temporary and would cease at the end of the respective construction periods. It is not likely that maximum construction noise impacts from the related projects would occur simultaneously, as sound levels vary from day to day depending on the construction activity performed that day and its location on the development site. Due to distance attenuation and intervening structures, construction noise from one site would not result in a noticeable increase in noise at sensitive receptors near the Park and Sidewalk Extension Sites, which would preclude a cumulative noise impact. Furthermore, related projects would be required to comply with County noise standards and implement mitigation measures for identified significant impacts, as required under CEQA, similar to the Park and Sidewalk Extension. As such, cumulative impacts associated with construction noise would be less than significant and no mitigation measures are required.

Cumulative noise impacts would occur primarily as a result of increased traffic on local roadways due to the Park and Sidewalk Extension and other related projects in the Project vicinity. Therefore, cumulative traffic-generated noise impacts have been assessed in the analysis above based on the contribution of the Park and to the future cumulative base traffic volumes in the Project vicinity. Table 4.17-5 shows that Park Site-related traffic noise level increases would be 0.4 dBA or less, which is not perceptible to the human ear in an outdoor environment. As such, with respect to roadway noise, there is no potential for the Park to result in a cumulatively considerable contribution when considered together with the related project.

Most of the recreational amenities and features of Crawford Canyon Park would not generate any substantial noise. The proposed two nature play areas for children may generate relatively high noise levels compared to the other amenities. However, they are designed for small children (2 to 5 years old and 5 to 12 years old) in relative small centralized areas that would not generate high play noise. Ambient noise from traffic on Newport Avenue and Crawford Canyon Road would be comparable to and provide masking effect to the play area noise. Once the construction is complete, the Sidewalk Extension would not result in any noticeable noise changes. As the Park and Sidewalk Extension's composite stationary-source and operational impacts would be less than significant, composite stationary-source and operational noise impacts attributable to the proposed single residential dwelling unit related project would also be less than significant and no mitigation measures are required.

Vibration

Due to the rapid attenuation characteristics of ground-borne vibration and distance of the related projects to the Park and Sidewalk Extension Sites, there is no potential for the Project to result in a cumulatively considerable contribution, when considered together with the related projects, to result in cumulatively significant construction-related or operational impacts. No mitigation measures are required.

Population and Housing

The Project would not involve new housing or businesses. The Park Site would be developed with a 2.5-acre neighborhood park consisting a variety of recreational amenities and features. The Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements. The increase in area population and employment resulting from the proposed single residential dwelling unit related project would have a less than significant cumulative

impact as this negligible increase is anticipated to be within SCAG and County's growth forecasts. Related projects in combination with the Park and Sidewalk Extension would not result in the cumulative loss or reduction of housing. Therefore, cumulative impacts with respect to population and housing are considered to be less than significant and no mitigation measures are required.

Public Services

Fire Protection

The related projects would cumulatively generate, in conjunction with the Park and Sidewalk Extension, the need for additional fire protection and emergency medical services. Although there would be cumulative demand on fire protection services, cumulative impacts on fire protection and medical services would be reduced through regulatory compliance and site specific design and safety requirements, similar to the Park and Sidewalk Extension. All related projects would be subject to review by the OCFA for compliance with Fire Code and Building Code regulations related to emergency response, emergency access, fire flow, and fire safety. Further, project-by-project traffic mitigation, multiple fire station response, and other requirements imposed by the OCFA are expected to help support adequate response times. As such, the Park and Sidewalk Extension would not result in a cumulatively considerable contribution to cumulative impacts associated with the construction of new fire facilities. No mitigation measures are required.

Police Protection

The related projects would cumulatively generate, in conjunction with the Park and Sidewalk Extension, the need for additional police protection services. It is expected that the related projects would be subject to review by the OCSCD on a project-by-project basis to ensure that sufficient security measures are implemented to reduce potential impacts to police protection services. As such, the Park and Sidewalk Extension would not result in a cumulatively considerable contribution to cumulative impacts associated with the construction of new police facilities. No mitigation measures are required.

Schools

The Park Site would be developed with a 2.5-acre neighborhood park consisting a variety of recreational amenities and features. The Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements. The Project would not include housing or generate new residents, employees, or school-aged children. The proposed single residential dwelling unit related project would generate school-aged children. Pursuant to California Government Code Section 65995, the payment of developer fees under the provisions of SB 50 address the impacts of new development on school facilities serving that development. Compliance with the provisions of Section 65995 is deemed to provide full and complete mitigation of school facilities impacts. The related projects would be required to pay these fees as applicable. Therefore, the full payment of all applicable school fees would reduce potential cumulative impacts to schools to less than significant levels and no mitigation measures are required.

Parks

The Park and Sidewalk Extension would not result in a population increase that would necessitate additional parks or recreational facilities, and Project operation would not adversely affect the use

or condition of existing facilities. The Project would provide increased recreational opportunities for the community. The proposed single residential dwelling unit related project would generate negligible need for park services and facilities. As such, related projects are not anticipated to result in substantial physical deterioration or accelerated deterioration of recreational and parks facilities. Cumulative impacts to parks would be less than significant and no mitigation measures are required.

Other Public Facilities

The Park Site would be developed with a 2.5-acre neighborhood park consisting a variety of recreational amenities and features. The Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements. As the Project would not include housing or generate new residents or employees, the Project would have no impact on other public facilities such as libraries. The proposed single residential dwelling unit related project would generate negligible use of library services or roads. The related project would pay applicable development fees. The full payment of all applicable development fees would reduce potential cumulative impacts to libraries and to less than significant levels and no mitigation measures are required.

Recreation

Less than significant impact and no mitigation measures are required. Refer to discussion under Park, above.

Transportation

Cumulative impacts on traffic associated with construction (e.g., an intermittent reduction in street and intersection operating capacity) are typically considered short-term adverse, but not significant impacts.

The Park and Sidewalk Extension would result in a less than significant traffic impact during construction with the implementation of a Construction Management Plan that would incorporate notification and safety procedures and controls. Each related project would be required to comply with County requirements regarding haul routes and would implement project characteristics such as traffic controls and safety procedures as part of a Construction Management Plan, to reduce potential traffic impacts during construction. No mitigation measures are required.

Post construction, the Park Site would be developed with a 2.5-acre neighborhood park consisting a variety of recreational amenities and features. The Sidewalk Extension Site would be developed with sidewalk extensions and associated improvements. As discussed under Response 4.21a in Table 4.12-1, Crawford Canyon Park is anticipated to generate approximately 85 daily trips on weekdays, 57 trips on Saturday, and 49 trips on Sundays. During the weekday peak hours of adjacent street traffic, the project is forecast to generate approximately 11 trips during the A.M. peak hour and 9 trips during the P.M. peak hour. On weekends, the Park is forecast to generate 11 peak hour trips on Saturday and 13 peak hour trips on Sunday. As such, Project operation would not generate substantial traffic in the Project vicinity. Therefore, operation of the Project would result in a less than significant impact and no mitigation measures are required. As seen on Table 4.21-2, both intersections operate at acceptable levels of service. At the Project driveway, there are minimal delays in making turns in and out of the Project driveway. Further, the Project is unlikely to significantly increase traffic delays at other intersections.

The Park and Sidewalk Extension Site are exempt from a VMT analysis based on the thresholds set by the County of Orange *Final Guidelines for Evaluating Vehicle Miles Traveled Under CEQA* (County of Orange, 2020) based on the size of the Project and the fact that the Crawford Canyon Park is a public facility. No impact would occur in this regard.

There are no existing hazardous design features such as sharp curves or dangerous intersections on-site or within the vicinity of the Park and Sidewalk Extension Sites. The Project would not alter existing street patterns in the vicinity. The Park and Sidewalk Extension Sites are located in a highly urbanized area of North Tustin. The areas immediately to the north, east, south, and west of the Sites comprise of existing single-family residences. The Project uses would be compatible with the surrounding uses and Project vicinity. A less than significant impact would occur in this regard and no mitigation measures are required.

Overall, the Park and Sidewalk Extension Site would not contribute to a significant cumulative impact with regard to these issues.

Tribal Cultural Resources

The AB 52 Native American notification letters and Mr. Salas' initial response letter are provided in the Native American Tribal Correspondence references materials to this IS/MND. To date, no other responses from the Native American community have been received as part of the AB 52 tribal consultation effort. As a result of the County's consultation efforts, no known tribal cultural resources have been identified within the Project Site or vicinity and therefore no impact to known tribal cultural resources would occur. As such, no impacts to tribal cultural resources from cumulative development would occur and thus, the Project would not contribute to a cumulatively tribal cultural resources impact.

Utilities and Service Systems

Water Supply

Development of the Park and Sidewalk Extension Sites in conjunction with the related projects would cumulatively increase negligible water demand on the existing water infrastructure system. However, each related project would be subject to review by the EOCWD to assure that the existing public utility facilities would be adequate to meet the domestic and fire water demands of each related project. Therefore, cumulative impacts on the water infrastructure system would be less than significant and no mitigation measures are required.

Wastewater

Development of the Park and Sidewalk Extension Sites in conjunction with the related projects would cumulative increase generation of wastewater. However, each related project would be subject to review by the OCSD to assure that existing facilities would be adequate to treat the demands of each related project. Therefore, cumulative impacts on the wastewater infrastructure system would be less than significant and no mitigation measures are required.

Solid Waste

Construction and operation of the Park and Sidewalk Extension would result in negligible generation of solid waste. Construction and operational waste is anticipated to be disposed of at the Frank R. Bowerman Landfill. Due to the negligible solid waste generated by the Park, Sidewalk Extension, and related projects, it is anticipated the Frank R. Bowerman Landfill could accommodate the Project. As such, impacts to the solid waste system from cumulative development would be less than significant and no mitigation measures are required and thus, the Project would not contribute to a cumulatively solid waste impact.

Wildfire

The Park and Sidewalk Extension Sites and related projects are not located within or near an area designated as a state responsibility area nor are the sites classified as a VHFHSZ. The Park and Sidewalk Extension Sites and related project sites are mapped as Non-VHFHSZ per the Cal Fire Hazard Severity Zone Maps prepared under the FRAP. Further, according to Figure IX-1, Fire Hazard Severity Zones, of the County's General Plan, the Park and Sidewalk Extension Sites and related project sites are not located in a fire hazard severity zone. As such, impacts to wildfire from cumulative development would be less than significant and no mitigation measures are required and thus, the Project would not contribute to a cumulatively wildfire impact.

**Mitigation Measures:**

Implementation of Mitigation Measures BIO-1, CUL-1 and CUL-2, and PALEO-1

**Question 4.25c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly.**

**Response to Question 4.25c)**

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension: **Less than Significant Impact with Mitigation Incorporated.** Based on the analysis of the Project's impacts in Responses 4.5 through 4.24, there is no indication that the Project could result in substantial adverse effects on human beings. While there would be a variety of effects related to biological resources, cultural resources, and paleontological resources, these impacts would be less than significant with mitigation incorporated, as necessary. The analysis herein concludes that direct and indirect environmental effects will, at most, require mitigation to reduce potentially significant impacts to less than significant levels. Generally, environmental effects will result in less than significant impacts. Based on the analysis in this Draft IS/MND, the County finds that direct and indirect impacts to human beings will be less than significant with mitigation incorporated, as necessary.

**Mitigation Measures:**

Implementation of Mitigation Measures BIO-1, CUL-1 and CUL-2, and PALEO-1.

# Chapter 5: Mitigation Monitoring Reporting Program

The following is a Mitigation Monitoring and Reporting Program (MMRP) for the County of Orange for the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project, which has been prepared pursuant to Section 15097 of the CEQA Guidelines and Section 21081.6 of the Public Resources Code. This MMRP lists all applicable mitigation measures from the IS/MND. The appropriate timing of implementation and responsible party are identified to ensure proper enforcement of the mitigation measures from the IS/MND to reduce Project impacts to less than significant levels. Mitigation measures are presented in the same order as they occur in the IS/MND.

The columns in the **Table 5-1**, *Mitigation Monitoring Reporting Program,* provide the following information:

- **Mitigation Measure(s):** The action(s) that will be taken to reduce the impact to less than significant.
- **Implementation Action**: The action(s) listed out, according to the identified mitigation measure, that would be implemented by the responsible agency.
- **Responsible Implementation Agency**: The agency or private entity responsible for ensuring implementation of the mitigation measure. For the Project, the County of Orange, as the CEQA Lead Agency, remains responsible for ensuring that implementation of the mitigation measures occur in accordance with the MMRP (CEQA Guidelines, Section 15097(a)).
- **Timing of Verification**: The general timing for implementing each mitigation measure.
- **Verification Date**: The date in which the mitigation measure has been completed.

The MMRP will kept on file at the following addresses:

OC Parks, Planning & Design Division
13042 Old Myford Road
Irvine, CA 92602

OC Public Works, Infrastructure Programs
601 N. Ross Street
Santa Ana, CA 92703

**Table 5-1: Mitigation Monitoring and Reporting Program**

| Mitigation Measure | Implementation Action | Responsible Implementation Agency/Party | Timing of Verification | Verification Date |
|---|---|---|---|---|
| **Biological Resources** | | | | |
| **Mitigation Measure BIO-1**: Proposed Project activities that may disturb native and non-native vegetation, or structures where birds or bats may potentially nest, shall occur outside of the avian breeding and maternity bat roosting seasons which extend from February 1 to September 1 (and may begin as early as January 1 for some raptors) in order to avoid potential impacts to nesting birds or their eggs or breeding bats.<br><br>If construction activities cannot avoid the avian breeding and maternity bat roosting season, a qualified biologist shall conduct nesting bird and maternity bat roosting surveys not more than 3 days prior to the initiation of Project activities. If a protected native nesting bird or maternity bat roost is found, the County shall delay all Project activities within 100 feet of occupied nesting or roosting habitat (within 300 feet for suitable raptor nesting habitat) until the nest or roost is vacated and juveniles have fledged and there is no evidence of a second attempt at nesting/maternal roosting. Flagging, stakes, or construction fencing shall be used to demarcate the inside boundary of the buffer of 100 feet (or 300 feet) between the Project activities and the nest/roost. A smaller buffer area around an active nest may be recommended by the qualified monitoring biologist based on tolerance behavior of the nesting bird. Project personnel, including all contractors working on site, shall be instructed on the sensitivity of the area. The qualified biologist shall provide the County with the results of the recommended protective measures described | If a protected native nesting bird or maternity bat roost is found during the survey, the County shall delay all Project activities within 100 feet of occupied nesting or roosting habitat (within 300 feet for suitable raptor nesting habitat) until the nest or roost is vacated and juveniles have fledged and there is no evidence of a second attempt at nesting/maternal roosting. | County of Orange<br><br>Qualified Biologist<br><br>Project Contractor | Prior to and during grading and/or construction | |

| Mitigation Measure | Implementation Action | Responsible Implementation Agency/Party | Timing of Verification | Verification Date |
|---|---|---|---|---|
| above to document compliance with applicable State and Federal laws pertaining to the protection of native birds and special-status bats. | | | | |
| **Cultural Resources** | | | | |
| **Mitigation Measure CUL-1**: In the event that historic (e.g., bottles, foundations, refuse dumps/privies, railroads, etc.) or prehistoric (e.g., hearths, burials, stone tools, shell and faunal bone remains, etc.) archaeological resources are unearthed, ground-disturbing activities shall be halted or diverted away from within 50 feet of the find and a Qualified Archaeologist (defined as meeting the Secretary of the Interior's Professional Qualification Standards for archaeology) shall be notified. An appropriate buffer area shall be established by the Qualified Archaeologist around the find where construction activities shall not be allowed to continue. Work shall be allowed to continue outside of the buffer area. All archaeological resources unearthed by project construction activities shall be evaluated by the Qualified Archaeologist. The County shall consult with appropriate Native American representatives in determining treatment for prehistoric or Native American resources to ensure cultural values ascribed to the resource, beyond those that are scientifically important, are considered. If a resource is determined by the Qualified Archaeologist to constitute a "historical resource" pursuant to CEQA Guidelines Section 15064.5(a) or a "unique archaeological resource" pursuant to Public Resources Code Section 21083.2(g), the Qualified Archaeologist shall coordinate with the Applicant and the County to develop a formal treatment plan that would serve to reduce impacts to the resources. The treatment plan established for the resources | If historic archaeological resources are unearthed, ground-disturbing activities shall be halted or diverted away from within 50 feet of the find and a Qualified Archaeologist shall be notified. | County of Orange<br>Qualified Archaeologist<br>Project Contractor | Prior to and during grading and/or construction | |

| Mitigation Measure | Implementation Action | Responsible Implementation Agency/Party | Timing of Verification | Verification Date |
|---|---|---|---|---|
| shall be in accordance with CEQA Guidelines Section 15064.5(f) for historical resources and Public Resources Code Sections 21083.2(b) for unique archaeological resources. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. The treatment plan shall include measures regarding the curation of the recovered resources that may include curation at an accredited public, non-profit institution with a research interest in the materials, such as the Natural History Museums of Los Angeles County, if such an institution agrees to accept the material. If no accredited institution accepts the materials, they may be donated to a local school or historical society in the area for educational purposes. The Qualified Archaeologist shall determine the need for archaeological construction monitoring in the vicinity of the find thereafter.<br><br>The Qualified Archaeologist shall prepare a final report and appropriate California Department of Parks and Recreation Site Forms at the conclusion of treatment and/or the any follow-up archaeological construction monitoring. The report shall include a description of resources unearthed, if any, treatment of the resources, results of the artifact processing, analysis, and research, and evaluation of the resources with respect to the California Register of Historical Resources. The report and the Site Forms shall be submitted by the Applicant to the County, the South Central Coastal Information Center, and representatives of other appropriate or concerned agencies to signify the satisfactory completion of the project and required mitigation measures. | | | | |

| Mitigation Measure | Implementation Action | Responsible Implementation Agency/Party | Timing of Verification | Verification Date |
|---|---|---|---|---|
| **Mitigation Measure CUL-2:** If human remains are encountered unexpectedly during implementation of the project, State Health and Safety Code Section 7050.5 requires that no further excavation or disturbance shall occur to the human remains and any nearby area (within 100 feet) reasonably suspected to overlie adjacent remains until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the Native American Heritage Commission (NAHC). The NAHC shall then identify the person(s) thought to be the Most Likely Descendent (MLD). The MLD may, with the permission of the land owner, or his or her authorized representative, inspect the site of the discovery of the Native American remains and may recommend to the owner or the person responsible for the excavation work means for treating or disposing, with appropriate dignity, the human remains and any associated grave goods. The MLD shall complete their inspection and make their recommendation within 48 hours of being granted access by the land owner to inspect the discovery. The recommendation may include the scientific removal and nondestructive analysis of human remains and items associated with Native American burials. Upon the discovery of the Native American remains, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the landowner has discussed and conferred, as prescribed in this mitigation measure, with the MLD regarding their | If human remains are encountered unexpectedly during implementation of the project, State Health and Safety Code Section 7050.5 requires that no further excavation or disturbance shall occur to the human remains and any nearby area reasonably suspected to overlie adjacent remains until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. | County of Orange<br>Qualified Archaeologist<br>Project Contractor | Prior to and during grading and/or construction | |

| Mitigation Measure | Implementation Action | Responsible Implementation Agency/Party | Timing of Verification | Verification Date |
|---|---|---|---|---|
| recommendations, if applicable, taking into account the possibility of multiple human remains. The landowner shall discuss and confer with the descendants all reasonable options regarding the descendants' preferences for treatment.<br><br>If the NAHC is unable to identify a MLD, or the MLD identified fails to make a recommendation, or the landowner rejects the recommendation of the MLD and the mediation provided for in Subdivision (k) of Section 5097.94, if invoked, fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall inter the human remains and items associated with Native American human remains with appropriate dignity on the facility property in a location not subject to further and future subsurface disturbance. | | | | |
| **Geology and Soils** | | | | |
| **Mitigation Measure PALEO-1:** If a potential fossil is found, a Qualified Paleontologist (Paleontologist) that meets the professional criteria established by the Society of Vertebrate Paleontology (SVP, 2010) shall be notified. The Paleontologist shall have the authority to temporarily divert or redirect grading and excavation activities in the area of the exposed fossil to facilitate evaluation of the discovery. An appropriate 50-foot buffer area shall be established around the find where construction activities shall not be allowed to continue. Work shall be allowed to continue outside of the buffer area. The Paleontologist shall assess the discovery and make recommendations as to the appropriate treatment. At the Paleontologist's discretion, and to reduce any construction delay, the grading and excavation contractor shall assist in removing rock/sediment samples for initial processing and evaluation. If the | If a potential fossil is found, a Qualified Paleontologist (Paleontologist) that meets the professional criteria established by the Society of Vertebrate Paleontology (SVP, 2010) shall be notified. | County of Orange<br><br>Qualified Archaeologist<br><br>Project Contractor | Prior to and during grading and/or construction | |

| Mitigation Measure | Implementation Action | Responsible Implementation Agency/Party | Timing of Verification | Verification Date |
|---|---|---|---|---|
| fossil is determined to be significant, the Paleontologist shall implement a paleontological salvage program to remove the resource from its location, following the guidelines of the SVP (2010). Any fossils encountered and recovered shall be prepared to the point of identification and catalogued before they are submitted to their final repository. Any fossils collected shall be curated at a public, non-profit institution with a research interest in the material and with retrievable storage, such as the County of Orange's Paleontology and Archaeology (COPA) collections at the Dr. John D. Cooper Archaeological and Paleontological Center, or Natural History Museums of Los Angeles County, if such an institution agrees to accept the fossils. If no institution accepts the fossil collection, they shall be donated to a local school in the area for educational purposes. Accompanying notes, reports, maps, and photographs shall also be filed at the repository and/or school. | | | | |
| **Tribal Cultural Resources** | | | | |
| **Standard Conditions TCR-1:** Unanticipated Discovery of Archaeological Resources. If unanticipated archaeological resources or deposits are discovered during ground disturbing activities, OCPW will implement the following measures. All work will halt within a 50-foot radius of the discovery. OCPW will have a qualified professional archaeologist with knowledge of Native American resources to assess the significance of the find. If the resources are Native American in origin, the County shall coordinate with the Tribe regarding evaluation, treatment, curation, and preservation of these resources. The archaeologist will have the authority to modify the no-work radius as appropriate, using professional judgment in consultation with OCPW. | If unanticipated archaeological resources or deposits are discovered during ground disturbing activities. | OC Parks Department – Qualified Archaeologist | During construction | |

| Mitigation Measure | Implementation Action | Responsible Implementation Agency/Party | Timing of Verification | Verification Date |
|---|---|---|---|---|
| Work will not continue within the no-work radius until the archaeologist conducts sufficient research and evidence and data collection to establish that the resource is either: (1) not cultural in origin; or (2) not potentially eligible for listing on the CRHR. If a potentially eligible resource is encountered, then the archaeologist and OCPW, as lead agency, in consultation with the Tribe, will arrange for either: (1) avoidance of the resource, if possible; or (2) test excavations to evaluate eligibility, and if eligible, an attempt to resolve adverse effects to determine appropriate mitigation. The assessment of eligibility will be formally documented in writing as verification that the provisions in CEQA for managing unanticipated discoveries and PRC Section 5024 have been met. | | | | |

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# Appendix A

## Air Quality and Greenhouse Gas Modeling

ESA

**Crawford Canyon Air Quality Emissions Summary**

| Regional | ROG | NOX | CO | SO2 | PM10 Total | PM2.5 Total |
|---|---|---|---|---|---|---|
| **Crawford Canyon Park** | | | | | | |
| Clearing and Grubbing | 2.89 | 27.41 | 19.02 | 0.05 | 3.92 | 2.53 |
| Grading | 3.82 | 40.54 | 25.93 | 0.07 | 4.50 | 2.92 |
| Paving and Construction | 4.71 | 46.35 | 32.87 | 0.08 | 2.37 | 1.96 |
| Landscaping | 0.25 | 2.73 | 4.49 | 0.01 | 0.45 | 0.20 |
| **Sidewalk Extension** | | | | | | |
| Site Preparation | 0.71 | 8.22 | 6.10 | 0.01 | 0.71 | 0.37 |
| Demolition | 1.24 | 10.94 | 15.42 | 0.03 | 0.82 | 0.60 |
| Utility Relocation | 1.07 | 8.09 | 7.10 | 0.03 | 0.43 | 0.31 |
| Storm Drain Construction | 1.10 | 8.14 | 10.95 | 0.02 | 0.69 | 0.42 |
| Sidewalk Construction (Newport) | 0.53 | 4.54 | 5.48 | 0.01 | 0.45 | 0.26 |
| Sidewalk Construction (Crawford) | 0.57 | 4.79 | 5.69 | 0.01 | 0.46 | 0.27 |
| Traffic Signal Modification | 1.13 | 10.90 | 8.82 | 0.03 | 0.73 | 0.47 |
| Paving | 0.78 | 7.64 | 10.30 | 0.02 | 0.57 | 0.41 |
| **Overlapping Phases** | | | | | | |
| Park Landscaping + Sidewalk Site Prep + Sidewalk Demo | 2.20 | 21.90 | 26.02 | 0.05 | 1.98 | 1.17 |
| Sidewalk Utility Relocation + Storm Drain Construction | 2.17 | 16.23 | 18.05 | 0.05 | 1.12 | 0.73 |
| Sidewalk Utility Relocation + Storm Drain Construction + Sidewalk Construction (Newport) | 2.70 | 20.77 | 23.54 | 0.06 | 1.57 | 0.98 |
| Sidewalk Construction (Newport) + Storm Drain Construction + Traffic Signal Mod | 2.76 | 23.58 | 25.26 | 0.06 | 1.87 | 1.14 |
| Sidewalk Construction (Newport) + Traffic Signal Mod | 1.66 | 15.44 | 14.31 | 0.04 | 1.18 | 0.72 |
| **Daily Maximum Emissions** | **4.71** | **46.35** | **32.87** | **0.08** | **4.50** | **2.92** |
| SCAQMD Regional Threshold | 75 | 100 | 550 | 150 | 150 | 55 |
| Exceeds Threshold? | No | No | No | No | No | No |

**Crawford Canyon Air Quality Emissions Summary**

| Localized | NOX | CO | PM10 | PM2.5 |
|---|---|---|---|---|
| **Crawford Canyon Park** | | | | |
| Clearing and Grubbing | 27.37 | 18.45 | 3.71 | 2.47 |
| Grading | 36.41 | 23.47 | 3.96 | 2.76 |
| Paving and Construction | 46.19 | 31.86 | 2.03 | 1.86 |
| Landscaping | 2.60 | 3.63 | 0.12 | 0.11 |
| **Sidewalk Extension** | | | | |
| Site Preparation | 8.19 | 5.64 | 0.53 | 0.32 |
| Demolition | 10.32 | 14.52 | 0.54 | 0.52 |
| Utility Relocation | 8.07 | 6.75 | 0.29 | 0.27 |
| Storm Drain Construction | 7.12 | 9.52 | 0.33 | 0.32 |
| Sidewalk Construction (Newport) | 3.54 | 4.28 | 0.18 | 0.18 |
| Sidewalk Construction (Crawford) | 3.79 | 4.49 | 0.19 | 0.19 |
| Traffic Signal Modification | 9.89 | 7.51 | 0.41 | 0.38 |
| Paving | 7.61 | 9.84 | 0.39 | 0.36 |
| **Overlapping Phases** | | | | |
| Park Landscaping + Sidewalk Site Prep + Sidewalk Demo | 21.11 | 23.78 | 1.20 | 0.96 |
| Sidewalk Utility Relocation + Storm Drain Construction | 15.19 | 16.27 | 0.63 | 0.59 |
| Sidewalk Utility Relocation + Storm Drain Construction + Sidewalk Construction (Newport) | 18.73 | 20.55 | 0.81 | 0.77 |
| Sidewalk Construction (Newport) + Storm Drain Construction + Traffic Signal Mod | 20.55 | 21.31 | 0.92 | 0.88 |
| Sidewalk Construction (Newport) + Traffic Signal Mod | 13.43 | 11.79 | 0.59 | 0.56 |
| **Daily Maximum Emissions** | **46.19** | **31.86** | **3.96** | **2.76** |
| SCAQMD Localized Threshold | 131 | 993 | 6 | 4 |
| Exceeds Threshold? | No | No | No | No |

**Crawford Canyon GHG Emissions Summary**

Construction

**Crawford Canyon Park**

| | | Onsite (MTCO2e) | Mobile (MTCO2e) | Total (MTCO2e) |
|---|---|---|---|---|
| Clearing and grubbing | 2021 | 40.18 | 1.60 | 42 |
| Grading | 2021 | 153.60 | 44.33 | 198 |
| Paving and Construction | 2021 | 180.38 | 11.71 | 192 |
| Paving and Construction | 2022 | 97.17 | 11.71 | 109 |
| landscaping | 2022 | 20.64 | 11.96 | 33 |

**Sidewalk Extension**

| | | Onsite (MTCO2e) | Mobile (MTCO2e) | Total (MTCO2e) |
|---|---|---|---|---|
| Site Preparation | 2022 | 3.21 | 0.41 | 4 |
| Demolition | 2022 | 15.14 | 2.92 | 18 |
| Utility Relocation | 2022 | 12.93 | 0.57 | 13 |
| Storm Drain Construction | 2022 | 19.87 | 9.15 | 29 |
| Sidewalk Construction (Newport) | 2022 | 5.04 | 3.89 | 9 |
| Sidewalk Construction (Crawford) | 2022 | 5.29 | 3.89 | 9 |
| Traffic Signal Modification | 2022 | 10.79 | 2.86 | 14 |
| Paving | 2022 | 10.65 | 0.07 | 11 |

| | |
|---|---|
| **Total Construction Emissions (MTCO2e)** | **680** |
| **Amortized Emissions (30 years) (MTCO2e)** | **23** |

Park

ESA

# Emissions Summary

ESA

**Air Quality Construction Analysis**

**Unmitigated Construction Scenario**

| Regional | lbs/day | | | | | |
|---|---|---|---|---|---|---|
| | ROG | NOX | CO | SO2 | PM10 Total | Total PM2.5 |
| Clearing and Grubbing | 2.9 | 27.4 | 19.0 | 0.0 | 3.9 | 2.5 |
| Grading | 3.8 | 40.5 | 25.9 | 0.1 | 4.5 | 2.9 |
| Paving and Construction | 4.7 | 46.3 | 32.9 | 0.1 | 2.4 | 2.0 |
| Landscaping | 0.3 | 2.7 | 4.5 | 0.0 | 0.4 | 0.2 |
| **Daily Maximum Emissions** | **4.7** | **46.3** | **32.9** | **0.1** | **4.5** | **2.9** |
| SCAQMD Regional Threshold | 75 | 100 | 550 | 150 | 150 | 55 |
| Exceeds Threshold? | No | No | No | No | No | No |

**Air Quality Construction Analysis**

| Unmitigated Construction Scenario | | | | |
|---|---|---|---|---|
| **Localized Emissions Summary** | **NOX** | **CO** | **PM10 Total** | **Total PM2.5** |
| | **lb/hr** | | | |
| Clearing and Grubbing | 27.4 | 18.4 | 3.7 | 2.5 |
| Grading | 36.4 | 23.5 | 4.0 | 2.8 |
| Paving and Construction | 46.2 | 31.9 | 2.0 | 1.9 |
| Landscaping | 2.6 | 3.6 | 0.1 | 0.1 |
| **Daily Maximum Emissions** | **46.2** | **31.9** | **4.0** | **2.8** |
| SCAQMDLocalized Threshold | 131 | 993 | 6 | 4 |
| Exceeds Threshold? | No | No | No | No |

**Air Quality Construction Analysis**

| summer | Onsite Construction Emissions (CalEEMod) + Onsite Idling (EMFAC2017) | | | | | | | | | | Offsite Construction Emissions - Running (EMFAC2017) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 |
| | lb/day | | | | | | | | | | lb/day | | | | | | | | | |
| Clearing and Grubbing | 2.88 | 27.37 | 18.45 | 0.05 | 2.44 | 1.27 | 3.71 | 1.30 | 1.17 | 2.47 | 0.01 | 0.04 | 0.57 | 0.00 | 0.20 | 0.00 | 0.20 | 0.05 | 0.00 | 0.05 |
| Grading | 3.65 | 36.41 | 23.47 | 0.06 | 2.37 | 1.59 | 3.96 | 1.29 | 1.46 | 2.76 | 0.17 | 4.13 | 2.46 | 0.01 | 0.52 | 0.02 | 0.54 | 0.14 | 0.02 | 0.16 |
| Paving and Construction | 4.69 | 46.19 | 31.86 | 0.08 | 0.00 | 2.03 | 2.03 | 0.00 | 1.86 | 1.86 | 0.02 | 0.15 | 1.01 | 0.00 | 0.34 | 0.00 | 0.34 | 0.09 | 0.00 | 0.09 |
| Landscaping | 0.23 | 2.60 | 3.63 | 0.01 | 0.00 | 0.12 | 0.12 | 0.00 | 0.11 | 0.11 | 0.02 | 0.13 | 0.87 | 0.00 | 0.32 | 0.00 | 0.32 | 0.08 | 0.00 | 0.09 |

| Regional Emissions - ALL | Regional Emissions (On-Site Construction + Worker + Visitors +Vendor+Haul) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 |
| Clearing and Grubbing | 2.89 | 27.41 | 19.02 | 0.05 | 2.64 | 1.27 | 3.92 | 1.35 | 1.17 | 2.53 |
| Grading | 3.82 | 40.54 | 25.93 | 0.07 | 2.89 | 1.61 | 4.50 | 1.43 | 1.49 | 2.92 |
| Paving and Construction | 4.71 | 46.35 | 32.87 | 0.08 | 0.34 | 2.03 | 2.37 | 0.09 | 1.87 | 1.96 |
| Landscaping | 0.25 | 2.73 | 4.49 | 0.01 | 0.32 | 0.13 | 0.45 | 0.08 | 0.12 | 0.20 |
| Maximum Daily Emissions | **4.71** | **46.35** | **32.87** | **0.08** | **2.89** | **2.03** | **4.50** | **1.43** | **1.87** | **2.92** |

**Air Quality Construction Analysis**

| Winter | Onsite Construction Emissions (CalEEMod) + Onsite Idling (EMFAC2017) | | | | | | | | | | Offsite Construction Emissions - Running (EMFAC2017) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 |
| | lb/day | | | | | | | | | | lb/day | | | | | | | | | |
| Clearing and Grubbing | 2.88 | 27.37 | 18.45 | 0.05 | 2.44 | 1.27 | 3.71 | 1.30 | 1.17 | 2.47 | 0.01 | 0.04 | 0.57 | 0.00 | 0.20 | 0.00 | 0.20 | 0.05 | 0.00 | 0.05 |
| Grading | 3.65 | 36.41 | 23.47 | 0.06 | 2.37 | 1.59 | 3.96 | 1.29 | 1.46 | 2.76 | 0.17 | 4.13 | 2.46 | 0.01 | 0.52 | 0.02 | 0.54 | 0.14 | 0.02 | 0.16 |
| Paving and Construction | 4.69 | 46.19 | 31.86 | 0.08 | 0.00 | 2.03 | 2.03 | 0.00 | 1.86 | 1.86 | 0.02 | 0.15 | 1.01 | 0.00 | 0.34 | 0.00 | 0.34 | 0.09 | 0.00 | 0.09 |
| Landscaping | 0.23 | 2.60 | 3.63 | 0.01 | 0.00 | 0.12 | 0.12 | 0.00 | 0.11 | 0.11 | 0.02 | 0.13 | 0.87 | 0.00 | 0.32 | 0.00 | 0.32 | 0.08 | 0.00 | 0.09 |

| Regional Emissions - ALL | Regional Emissions (On-Site Construction + Worker + Visitors +Vendor+Haul) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 |
| Clearing and Grubbing | 2.89 | 27.41 | 19.02 | 0.05 | 2.64 | 1.27 | 3.92 | 1.35 | 1.17 | 2.53 |
| Grading | 3.82 | 40.54 | 25.93 | 0.07 | 2.89 | 1.61 | 4.50 | 1.43 | 1.49 | 2.92 |
| Paving and Construction | 4.71 | 46.35 | 32.87 | 0.08 | 0.34 | 2.03 | 2.37 | 0.09 | 1.87 | 1.96 |
| Landscaping | 0.25 | 2.73 | 4.49 | 0.01 | 0.32 | 0.13 | 0.45 | 0.08 | 0.12 | 0.20 |
| Maximum Daily Emissions | **4.71** | **46.35** | **32.87** | **0.08** | **2.89** | **2.03** | **4.50** | **1.43** | **1.87** | **2.92** |

**GHG Emissions Summary**

| **Construction Summary** | | Onsite | Mobile | Total |
|---|---|---|---|---|
| Clearing and grubbing | 2021 | 40 | 2 | 42 |
| Grading | 2021 | 154 | 44 | 198 |
| Paving and Construction | 2021 | 180 | 12 | 192 |
| Paving and Construction | 2022 | 97 | 12 | 109 |
| landscaping | 2022 | 21 | 12 | 33 |
| | | | Total | 573 |
| | | | Amortized | 19.11 |

**Greenhouse Gas Emissions Inventory**

| | |
|---|---|
| Area | 0.00007 |
| Electricity | 12 |
| Natural Gas | 0 |
| Mobile | 82 |
| Waste | <1 |
| Water | 11 |
| Construction | 19 |
| **Total** | **124** |

# Onroad Emissions

ESA

**Total On-Road Emissions** **Total On-Road Emissions**

260 Max construction days per year

| | Construction Phase | Daily One-Way Trips | Days per Phase (days) | Work Hours per Day (hours/day) | One-Way Trip Distance per Day (miles) | Idling per Day (minutes) | Regional Emissions (pounds/day) ROG | NOX | CO | SO2 | PM10 Dust | PM10 Exh | Total PM10 | PM2.5 Dust | PM2.5 Exh | Total PM2.5 | (MT/yr) Total CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Clearing and Grubbing | 2021 | | | | | | | | | | | | | | | |
| | Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| Clearing anc | Hauling | 0 | 20 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2021Vendo | Vendor | 0 | 20 | 8 | 6.9 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2021Worke | Worker | 18 | 20 | 8 | 14.7 | 0 | 0.01 | 0.04 | 0.57 | 0.00 | 0.20 | 0.00 | 0.20 | 0.05 | 0.00 | 0.05 | 1.60 |
| | | | | **Onroad Emissions - Clearing and Grubbing** | | | **0.01** | **0.04** | **0.57** | **0.00** | **0.20** | **0.00** | **0.20** | **0.05** | **0.00** | **0.05** | **1.60** |
| | Grading | 2021 | | | | | | | | | | | | | | | |
| | Total Haul Trips | 989 | | | | | | | | | | | | | | | |
| 2021Hauling | Hauling | 17 | 60 | 8 | 20 | 15 | 0.16 | 4.08 | 1.82 | 0.01 | 0.30 | 0.02 | 0.32 | 0.08 | 0.02 | 0.10 | 39.00 |
| 2021Vendo | Vendor | 0 | 60 | 8 | 6.9 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2021Worke | Worker | 20 | 60 | 8 | 14.7 | 0 | 0.01 | 0.05 | 0.64 | 0.00 | 0.22 | 0.00 | 0.22 | 0.06 | 0.00 | 0.06 | 5.34 |
| | | | | | **Onroad Emissions - Grading** | | **0.17** | **4.13** | **2.46** | **0.01** | **0.52** | **0.02** | **0.54** | **0.14** | **0.02** | **0.16** | **44.33** |
| | Paving and Construction | 2021 | | | | | | | | | | | | | | | |
| | Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| 2021Hauling | Hauling | 0 | 80 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2021Vendo | Vendor | 1 | 80 | 8 | 6.9 | 15 | 0.00 | 0.08 | 0.05 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 1.04 |
| 2021Worke | Worker | 30 | 80 | 8 | 14.7 | 0 | 0.02 | 0.07 | 0.96 | 0.00 | 0.34 | 0.00 | 0.34 | 0.09 | 0.00 | 0.09 | 10.67 |
| | | | | **Onroad Emissions - Paving and Construction** | | | **0.02** | **0.15** | **1.01** | **0.00** | **0.34** | **0.00** | **0.34** | **0.09** | **0.00** | **0.09** | **11.71** |
| | Landscaping | 2022 | | | | | | | | | | | | | | | |
| | Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| 2022Hauling | Hauling | 0 | 90 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2022Vendo | Vendor | 1 | 90 | 8 | 6.9 | 15 | 0.00 | 0.07 | 0.05 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 1.12 |
| 2022Worke | Worker | 28 | 90 | 8 | 14.7 | 0 | 0.02 | 0.06 | 0.81 | 0.00 | 0.31 | 0.00 | 0.31 | 0.08 | 0.00 | 0.08 | 10.84 |
| | | | | | **Onroad Emissions - Landscaping** | | **0.02** | **0.13** | **0.87** | **0.00** | **0.32** | **0.00** | **0.32** | **0.08** | **0.00** | **0.09** | **11.96** |

**Total On-Road Emissions** **Total On-Road Emissions**

260 Max construction days per year

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | One-Way Trip Distance per Day (miles) | Idling per Day (minutes) | Regional Emissions (Tons/year) ROG | NOX | CO | SO2 | PM10 Dust | PM10 Exh | Total PM10 | PM2.5 Dust | PM2.5 Exh | Total PM2.5 | (MT/yr) Total CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Clearing and Grubbing | 2021 | | | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| Hauling | 0 | 20 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 0 | 20 | 8 | 6.9 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 18 | 20 | 8 | 14.7 | 0 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 |
| | | | | | | **0.00** | **0.00** | **0.01** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **1.60** |
| Grading | 2021 | | | | | | | | | | | | | | | |
| Total Haul Trips | 989 | | | | | | | | | | | | | | | |
| Hauling | 17 | 60 | 8 | 20 | 15 | 0.00 | 0.12 | 0.05 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 39.00 |
| Vendor | 0 | 60 | 8 | 6.9 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 20 | 60 | 8 | 14.7 | 0 | 0.00 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 5.34 |
| | | | | | | **0.01** | **0.12** | **0.07** | **0.00** | **0.02** | **0.00** | **0.02** | **0.00** | **0.00** | **0.00** | **44.33** |
| Paving and Construction | 2021 | | | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| Hauling | 0 | 80 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 1 | 80 | 8 | 6.9 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.04 |
| Worker | 30 | 80 | 8 | 14.7 | 0 | 0.00 | 0.00 | 0.04 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 10.67 |
| | | | | | | **0.00** | **0.01** | **0.04** | **0.00** | **0.01** | **0.00** | **0.01** | **0.00** | **0.00** | **0.00** | **11.71** |
| Landscaping | 2022 | | | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| Hauling | 0 | 90 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 1 | 90 | 8 | 6.9 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.12 |
| Worker | 28 | 90 | 8 | 14.7 | 0 | 0.00 | 0.00 | 0.04 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 10.84 |
| | | | | | | **0.00** | **0.01** | **0.04** | **0.00** | **0.01** | **0.00** | **0.01** | **0.00** | **0.00** | **0.00** | **11.96** |

**Running Emissions**

| | | Running Emissions Factor (grams/mile) | | | | | | Running Emissions Factor (grams/mile) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ROG | NOX | CO | SO2 | PM10 | PM2.5 | CO2 | CH4 | N2O |
| 2020Hauling | Hauling | 0.12467436 | 4.127586075 | 0.70244559 | 0.01389473 | 0.04956172 | 0.04741766 | 1520.07529 | 0.08121693 | 0.2410944 |
| 2020Vendor | Vendor | 0.12175156 | 3.217634225 | 0.70325362 | 0.01222293 | 0.05527116 | 0.05287672 | 1311.85371 | 0.04440854 | 0.18764154 |
| 2020Worker | Worker | 0.02296702 | 0.083024116 | 1.08430473 | 0.00306823 | 0.00220351 | 0.002029 | 310.119284 | 0.00538825 | 0.00712331 |
| 2021Hauling | Hauling | 0.08103572 | 3.571515626 | 0.57499969 | 0.01347655 | 0.0279869 | 0.02677616 | 1477.43548 | 0.08019506 | 0.23446951 |
| 2021Vendor | Vendor | 0.0717977 | 2.602453214 | 0.52331731 | 0.01185125 | 0.02991351 | 0.02861613 | 1273.54109 | 0.04239589 | 0.18204996 |
| 2021Worker | Worker | 0.01983596 | 0.07223241 | 0.98341812 | 0.00297251 | 0.00205695 | 0.00189393 | 300.448479 | 0.00471177 | 0.00646256 |
| 2022Hauling | Hauling | 0.02463044 | 2.696920068 | 0.45130496 | 0.01267644 | 0.01843607 | 0.0176385 | 1394.21089 | 0.07850131 | 0.22145577 |
| 2022Vendor | Vendor | 0.01991806 | 1.889760516 | 0.36497107 | 0.01125961 | 0.01227567 | 0.01174136 | 1211.83967 | 0.04029686 | 0.17274956 |
| 2022Worker | Worker | 0.01716262 | 0.063167612 | 0.89784164 | 0.00287684 | 0.00193578 | 0.00178222 | 290.781675 | 0.00413135 | 0.00590029 |
| 2023Hauling | Hauling | 0.02438513 | 2.70726027 | 0.46544535 | 0.01247986 | 0.01859168 | 0.01778737 | 1374.48104 | 0.07922973 | 0.21840565 |
| 2023Vendor | Vendor | 0.01904515 | 1.897817151 | 0.35240371 | 0.01108069 | 0.01237071 | 0.01183229 | 1193.62946 | 0.0405116 | 0.17033183 |
| 2023Worker | Worker | 0.01513169 | 0.055897597 | 0.83140276 | 0.00279565 | 0.00185735 | 0.00170978 | 282.578076 | 0.00368669 | 0.00544537 |
| GWP | | N/A | N/A | N/A | N/A | N/A | N/A | 1 | 25 | 290 |

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | One-Way Trip Distance per Day (miles) | Regional Emissions (pounds/day) | | | | | | Regional Emissions (MT/year) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ROG | NOX | CO | SO2 | PM10 | PM2.5 | CO2 | CH4 | N2O | CO2e |
| Clearing and Grubbing | 2021 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 20 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 0 | 20 | 8 | 6.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 18 | 20 | 8 | 14.7 | 0.01 | 0.04 | 0.57 | 0.00 | 0.00 | 0.00 | 1.59 | 0.00 | 0.01 | 1.60 |
| | | | | | **0.01** | **0.04** | **0.57** | **0.00** | **0.00** | **0.00** | **1.59** | **0.00** | **0.01** | **1.60** |
| Grading | 2021 | | | | | | | | | | | | | |
| Total Haul Trips | 989 | | | | | | | | | | | | | |
| Hauling | 17 | 60 | 8 | 20 | 0.06 | 2.68 | 0.43 | 0.01 | 0.02 | 0.02 | 30.14 | 0.04 | 1.39 | 31.57 |
| Vendor | 0 | 60 | 8 | 6.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 20 | 60 | 8 | 14.7 | 0.01 | 0.05 | 0.64 | 0.00 | 0.00 | 0.00 | 5.30 | 0.00 | 0.03 | 5.34 |
| | | | | | **0.07** | **2.72** | **1.07** | **0.01** | **0.02** | **0.02** | **35.44** | **0.04** | **1.42** | **36.90** |
| Paving and Construction | 2021 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 80 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 1 | 80 | 8 | 6.9 | 0.00 | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.70 | 0.00 | 0.03 | 0.73 |
| Worker | 30 | 80 | 8 | 14.7 | 0.02 | 0.07 | 0.96 | 0.00 | 0.00 | 0.00 | 10.60 | 0.00 | 0.07 | 10.67 |
| | | | | | **0.02** | **0.11** | **0.96** | **0.00** | **0.00** | **0.00** | **11.30** | **0.00** | **0.10** | **11.40** |
| Landscaping | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 90 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 1 | 90 | 8 | 6.9 | 0.00 | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 0.75 | 0.00 | 0.03 | 0.78 |
| Worker | 28 | 90 | 8 | 14.7 | 0.02 | 0.06 | 0.81 | 0.00 | 0.00 | 0.00 | 10.77 | 0.00 | 0.06 | 10.84 |
| | | | | | **0.02** | **0.09** | **0.82** | **0.00** | **0.00** | **0.00** | **11.52** | **0.00** | **0.09** | **11.62** |

**Idling Emissions**

| | | Idling Emissions Factor (grams/minute) | | | | | | Idling Emissions Factor (grams/minute) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ROG | NOX | CO | SO2 | PM10 | PM2.5 | CO2 | CH4 | N2O |
| 2020 | Hauling Hauling | 0.18203757 | 2.514257339 | 2.34424676 | 0.00425698 | 0.00364827 | 0.00349045 | 457.401286 | 0.01060122 | 0.07221486 |
| 2020 | Vendor Vendor | 0.09655158 | 1.389498887 | 1.26412887 | 0.00228127 | 0.00225118 | 0.00215379 | 244.777779 | 0.00633167 | 0.03834928 |
| 2020 | Worker Worker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2021 | Hauling Hauling | 0.17992826 | 2.494221613 | 2.47137063 | 0.00431707 | 0.00153707 | 0.00147058 | 463.979458 | 0.01057258 | 0.07325903 |
| 2021 | Vendor Vendor | 0.09512038 | 1.358206146 | 1.32735389 | 0.00230801 | 0.00101987 | 0.00097575 | 247.718477 | 0.00631023 | 0.03882087 |
| 2021 | Worker Worker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2022 | Hauling Hauling | 0.1794334 | 2.268893827 | 2.65540888 | 0.00413434 | 0.00124387 | 0.00119006 | 444.864297 | 0.01062746 | 0.07026495 |
| 2022 | Vendor Vendor | 0.09453686 | 1.21688302 | 1.42143188 | 0.00221115 | 0.00069792 | 0.00066773 | 237.578447 | 0.00634204 | 0.03723243 |
| 2022 | Worker Worker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2023 | Hauling Hauling | 0.17974307 | 2.262044342 | 2.6647617 | 0.00409118 | 0.00119718 | 0.00114539 | 440.393976 | 0.01068902 | 0.06956683 |
| 2023 | Vendor Vendor | 0.09456838 | 1.210583463 | 1.42500372 | 0.00218695 | 0.00066414 | 0.00063541 | 235.070306 | 0.00635061 | 0.03685329 |
| 2023 | Worker Worker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | GWP | N/A | N/A | N/A | N/A | N/A | N/A | 1 | 25 | 290 |

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | Idling minutes per Day (miles) | Regional Emissions (pounds/day) | | | | | | Regional Emissions (MT/year) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ROG | NOX | CO | SO2 | PM10 | PM2.5 | CO2 | CH4 | N2O | CO2e |
| Clearing and Grubbing | 2021 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 20 | 8 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 0 | 20 | 8 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 18 | 20 | 8 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| Grading | 2021 | | | | | | | | | | | | | |
| Total Haul Trips | 989 | | | | | | | | | | | | | |
| Hauling | 17 | 60 | 8 | 15 | 0.10 | 1.40 | 1.39 | 0.00 | 0.00 | 0.00 | 7.10 | 0.00 | 0.33 | 7.43 |
| Vendor | 0 | 60 | 8 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 20 | 60 | 8 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | | **0.10** | **1.40** | **1.39** | **0.00** | **0.00** | **0.00** | **7.10** | **0.00** | **0.33** | **7.43** |
| Paving and Construction | 2021 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 80 | 8 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 1 | 80 | 8 | 15 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.30 | 0.00 | 0.01 | 0.31 |
| Worker | 30 | 80 | 8 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | | **0.00** | **0.04** | **0.04** | **0.00** | **0.00** | **0.00** | **0.30** | **0.00** | **0.01** | **0.31** |
| Landscaping | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 90 | 8 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 1 | 90 | 8 | 15 | 0.00 | 0.04 | 0.05 | 0.00 | 0.00 | 0.00 | 0.32 | 0.00 | 0.01 | 0.34 |
| Worker | 28 | 90 | 8 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | | **0.00** | **0.04** | **0.05** | **0.00** | **0.00** | **0.00** | **0.32** | **0.00** | **0.01** | **0.34** |

**Road Dust, Break Wear, and Tire wear Emissions**

| | Emission Factors (grams/mile) | | | | | |
|---|---|---|---|---|---|---|
| | | PM10 | | | PM2.5 | |
| | RD | BW | TW | RD | BW | TW |
| 2020Hauling Hauling | 3.00E-01 | 0.061048007 | 0.03558331 | 7.36E-02 | 0.02616343 | 0.00889583 |
| 2020Vendor Vendor | 3.00E-01 | 0.095694022 | 0.02379166 | 7.36E-02 | 0.04101172 | 0.00594791 |
| 2020Worker Worker | 3.00E-01 | 0.036750011 | 0.008 | 7.36E-02 | 0.01575 | 0.002 |
| 2021Hauling Hauling | 3.00E-01 | 0.061055751 | 0.0355879 | 7.36E-02 | 0.02616675 | 0.00889698 |
| 2021Vendor Vendor | 3.00E-01 | 0.095697894 | 0.02379395 | 7.36E-02 | 0.04101338 | 0.00594849 |
| 2021Worker Worker | 3.00E-01 | 0.036750011 | 0.008 | 7.36E-02 | 0.01575 | 0.002 |
| 2022Hauling Hauling | 3.00E-01 | 0.061063462 | 0.03559233 | 7.36E-02 | 0.02617005 | 0.00889808 |
| 2022Vendor Vendor | 3.00E-01 | 0.095701749 | 0.02379617 | 7.36E-02 | 0.04101504 | 0.00594904 |
| 2022Worker Worker | 3.00E-01 | 0.036750011 | 0.008 | 7.36E-02 | 0.01575 | 0.002 |
| 2023Hauling Hauling | 3.00E-01 | 0.06107028 | 0.03559616 | 7.36E-02 | 0.02617298 | 0.00889904 |
| 2023Vendor Vendor | 3.00E-01 | 0.095705158 | 0.02379808 | 7.36E-02 | 0.0410165 | 0.00594952 |
| 2023Worker Worker | 3.00E-01 | 0.036750011 | 0.008 | 7.36E-02 | 0.01575 | 0.002 |

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | One-Way Trip Distance per Day (miles) | Regional Emissions (pounds/day) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | PM10 | | | PM2.5 | |
| | | | | | RD | BW | TW | RD | BW | TW |
| Clearing and Grubbing | 2021 | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | |
| Hauling | 0 | 20 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 0 | 20 | 8 | 6.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 18 | 20 | 8 | 14.7 | 0.17 | 0.02 | 0.00 | 0.04 | 0.01 | 0.00 |
| Grading | 2021 | | | | | | | | | |
| Total Haul Trips | 989 | | | | | | | | | |
| Hauling | 17 | 60 | 8 | 20 | 0.22 | 0.05 | 0.03 | 0.06 | 0.02 | 0.01 |
| Vendor | 0 | 60 | 8 | 6.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 20 | 60 | 8 | 14.7 | 0.19 | 0.02 | 0.01 | 0.05 | 0.01 | 0.00 |
| Paving and Construction | 2021 | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | |
| Hauling | 0 | 80 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 1 | 80 | 8 | 6.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 80 | 8 | 14.7 | 0.29 | 0.04 | 0.01 | 0.07 | 0.02 | 0.00 |
| Landscaping | 2022 | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | |
| Hauling | 0 | 90 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 1 | 90 | 8 | 6.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 28 | 90 | 8 | 14.7 | 0.27 | 0.03 | 0.01 | 0.07 | 0.01 | 0.00 |

# CalEEMod Output

ESA

# Crawford Park

**South Coast Air Basin, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| City Park | 2.50 | Acre | 2.50 | 108,900.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 31 |
| **Climate Zone** | 8 | | | **Operational Year** | 2023 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Schedule provided by applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Trips and VMT - Import 10,000 CY soil, vendor trips for construction and landscaping

Grading - Import 10,000 CY

Vehicle Trips - Trip Generation Source: Translutions, 2020

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Energy Use - Lighting from CalEEMod user guide for open parking lot lighting

Construction Off-road Equipment Mitigation - Water exposed area 3 times daily

Fleet Mix - EMFAC2017

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstructionPhase | NumDays | 220.00 | 80.00 |
| tblConstructionPhase | NumDays | 220.00 | 90.00 |
| tblConstructionPhase | NumDays | 6.00 | 60.00 |
| tblConstructionPhase | NumDays | 3.00 | 20.00 |
| tblEnergyUse | LightingElect | 0.00 | 0.35 |
| tblFleetMix | HHD | 0.03 | 0.02 |
| tblFleetMix | LDA | 0.55 | 0.55 |
| tblFleetMix | LDT1 | 0.04 | 0.06 |
| tblFleetMix | LDT2 | 0.20 | 0.19 |
| tblFleetMix | LHD1 | 0.02 | 0.02 |
| tblFleetMix | LHD2 | 5.8470e-003 | 6.0390e-003 |
| tblFleetMix | MCY | 4.8220e-003 | 4.4870e-003 |
| tblFleetMix | MDV | 0.12 | 0.12 |
| tblFleetMix | MH | 8.6900e-004 | 9.1200e-004 |
| tblFleetMix | MHD | 0.02 | 0.02 |
| tblFleetMix | OBUS | 2.1100e-003 | 1.4160e-003 |
| tblFleetMix | SBUS | 7.1000e-004 | 6.2300e-004 |
| tblFleetMix | UBUS | 1.7690e-003 | 1.6780e-003 |
| tblGrading | AcresOfGrading | 60.00 | 3.00 |
| tblGrading | AcresOfGrading | 0.00 | 4.50 |

| | | | |
|---|---|---|---|
| tblGrading | MaterialImported | 0.00 | 10,000.00 |
| tblLandUse | RecSwimmingAreaAllowEdit | 0.00 | 108,900.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblTripsAndVMT | VendorTripNumber | 18.00 | 10.00 |
| tblVehicleEF | HHD | 0.52 | 0.03 |
| tblVehicleEF | HHD | 0.09 | 0.08 |
| tblVehicleEF | HHD | 0.07 | 1.0000e-006 |
| tblVehicleEF | HHD | 1.59 | 6.32 |
| tblVehicleEF | HHD | 0.96 | 0.58 |
| tblVehicleEF | HHD | 3.04 | 9.3040e-003 |
| tblVehicleEF | HHD | 4,355.32 | 1,186.71 |
| tblVehicleEF | HHD | 1,551.76 | 1,477.44 |
| tblVehicleEF | HHD | 9.81 | 0.09 |
| tblVehicleEF | HHD | 13.94 | 6.38 |
| tblVehicleEF | HHD | 1.91 | 3.57 |
| tblVehicleEF | HHD | 19.62 | 2.07 |

| | | | |
|---|---|---|---|
| tblVehicleEF | HHD | 9.5610e-003 | 3.9310e-003 |
| tblVehicleEF | HHD | 0.06 | 0.06 |
| tblVehicleEF | HHD | 0.04 | 0.04 |
| tblVehicleEF | HHD | 6.0750e-003 | 0.03 |
| tblVehicleEF | HHD | 8.4000e-005 | 2.0000e-006 |
| tblVehicleEF | HHD | 9.1470e-003 | 3.7610e-003 |
| tblVehicleEF | HHD | 0.03 | 0.03 |
| tblVehicleEF | HHD | 8.8000e-003 | 8.8970e-003 |
| tblVehicleEF | HHD | 5.8120e-003 | 0.03 |
| tblVehicleEF | HHD | 7.7000e-005 | 1.0000e-006 |
| tblVehicleEF | HHD | 9.9000e-005 | 7.0000e-006 |
| tblVehicleEF | HHD | 4.1500e-003 | 2.6800e-004 |
| tblVehicleEF | HHD | 0.40 | 0.46 |
| tblVehicleEF | HHD | 7.3000e-005 | 5.0000e-006 |
| tblVehicleEF | HHD | 0.08 | 0.08 |
| tblVehicleEF | HHD | 3.3800e-004 | 1.4610e-003 |
| tblVehicleEF | HHD | 0.07 | 3.0000e-006 |
| tblVehicleEF | HHD | 0.04 | 0.01 |
| tblVehicleEF | HHD | 0.01 | 0.01 |
| tblVehicleEF | HHD | 1.4800e-004 | 1.0000e-006 |
| tblVehicleEF | HHD | 9.9000e-005 | 7.0000e-006 |
| tblVehicleEF | HHD | 4.1500e-003 | 2.6800e-004 |
| tblVehicleEF | HHD | 0.48 | 0.53 |
| tblVehicleEF | HHD | 7.3000e-005 | 5.0000e-006 |
| tblVehicleEF | HHD | 0.19 | 0.17 |
| tblVehicleEF | HHD | 3.3800e-004 | 1.4610e-003 |
| tblVehicleEF | HHD | 0.08 | 3.0000e-006 |
| tblVehicleEF | HHD | 0.49 | 0.00 |
| tblVehicleEF | HHD | 0.09 | 4.84 |

| | | | |
|---|---|---|---|
| tblVehicleEF | HHD | 0.07 | 2.7300e-004 |
| tblVehicleEF | HHD | 1.16 | 4.3510e-003 |
| tblVehicleEF | HHD | 0.97 | 11,782.57 |
| tblVehicleEF | HHD | 2.89 | 0.09 |
| tblVehicleEF | HHD | 4,614.07 | 2.0000e-006 |
| tblVehicleEF | HHD | 1,551.76 | 1.85 |
| tblVehicleEF | HHD | 9.81 | 0.08 |
| tblVehicleEF | HHD | 14.39 | 0.00 |
| tblVehicleEF | HHD | 1.80 | 0.24 |
| tblVehicleEF | HHD | 19.61 | 0.24 |
| tblVehicleEF | HHD | 8.0610e-003 | 7.0000e-006 |
| tblVehicleEF | HHD | 0.06 | 5.53 |
| tblVehicleEF | HHD | 0.04 | 0.17 |
| tblVehicleEF | HHD | 6.0750e-003 | 6.3500e-004 |
| tblVehicleEF | HHD | 8.4000e-005 | 2.1900e-004 |
| tblVehicleEF | HHD | 7.7120e-003 | 1.4000e-005 |
| tblVehicleEF | HHD | 0.03 | 9.6000e-005 |
| tblVehicleEF | HHD | 8.8000e-003 | 6.6000e-005 |
| tblVehicleEF | HHD | 5.8120e-003 | 1.0000e-006 |
| tblVehicleEF | HHD | 7.7000e-005 | 1.4410e-003 |
| tblVehicleEF | HHD | 1.5500e-004 | 9.1000e-004 |
| tblVehicleEF | HHD | 4.3060e-003 | 0.03 |
| tblVehicleEF | HHD | 0.38 | 6.19 |
| tblVehicleEF | HHD | 1.1000e-004 | 0.00 |
| tblVehicleEF | HHD | 0.08 | 3.38 |
| tblVehicleEF | HHD | 3.3000e-004 | 0.03 |
| tblVehicleEF | HHD | 0.07 | 2.07 |
| tblVehicleEF | HHD | 0.04 | 6.18 |
| tblVehicleEF | HHD | 0.01 | 0.58 |

| | | | |
|---|---|---|---|
| tblVehicleEF | HHD | 1.4500e-004 | 8.8350e-003 |
| tblVehicleEF | HHD | 1.5500e-004 | 156.80 |
| tblVehicleEF | HHD | 4.3060e-003 | 2.0000e-006 |
| tblVehicleEF | HHD | 0.45 | 2.8010e-003 |
| tblVehicleEF | HHD | 1.1000e-004 | 6.2480e-003 |
| tblVehicleEF | HHD | 0.19 | 0.03 |
| tblVehicleEF | HHD | 3.3000e-004 | 0.04 |
| tblVehicleEF | HHD | 0.07 | 0.03 |
| tblVehicleEF | HHD | 0.56 | 0.00 |
| tblVehicleEF | HHD | 0.09 | 4.33 |
| tblVehicleEF | HHD | 0.07 | 3.0500e-004 |
| tblVehicleEF | HHD | 2.20 | 4.3950e-003 |
| tblVehicleEF | HHD | 0.96 | 11,875.11 |
| tblVehicleEF | HHD | 3.06 | 0.09 |
| tblVehicleEF | HHD | 3,998.00 | 2.0000e-006 |
| tblVehicleEF | HHD | 1,551.76 | 1.87 |
| tblVehicleEF | HHD | 9.81 | 0.08 |
| tblVehicleEF | HHD | 13.32 | 0.00 |
| tblVehicleEF | HHD | 1.87 | 0.22 |
| tblVehicleEF | HHD | 19.62 | 0.24 |
| tblVehicleEF | HHD | 0.01 | 5.0000e-006 |
| tblVehicleEF | HHD | 0.06 | 4.95 |
| tblVehicleEF | HHD | 0.04 | 0.17 |
| tblVehicleEF | HHD | 6.0750e-003 | 6.8400e-004 |
| tblVehicleEF | HHD | 8.4000e-005 | 1.4600e-004 |
| tblVehicleEF | HHD | 0.01 | 1.5000e-005 |
| tblVehicleEF | HHD | 0.03 | 6.4000e-005 |
| tblVehicleEF | HHD | 8.8000e-003 | 4.3000e-005 |
| tblVehicleEF | HHD | 5.8120e-003 | 1.0000e-006 |

| | | | |
|---|---|---|---|
| tblVehicleEF | HHD | 7.7000e-005 | 1.5510e-003 |
| tblVehicleEF | HHD | 9.6000e-005 | 9.1000e-004 |
| tblVehicleEF | HHD | 4.4260e-003 | 0.03 |
| tblVehicleEF | HHD | 0.43 | 6.64 |
| tblVehicleEF | HHD | 7.1000e-005 | 0.00 |
| tblVehicleEF | HHD | 0.08 | 3.51 |
| tblVehicleEF | HHD | 3.6700e-004 | 0.04 |
| tblVehicleEF | HHD | 0.07 | 2.07 |
| tblVehicleEF | HHD | 0.04 | 6.51 |
| tblVehicleEF | HHD | 0.01 | 0.57 |
| tblVehicleEF | HHD | 1.4800e-004 | 9.3940e-003 |
| tblVehicleEF | HHD | 9.6000e-005 | 156.80 |
| tblVehicleEF | HHD | 4.4260e-003 | 2.0000e-006 |
| tblVehicleEF | HHD | 0.51 | 2.8010e-003 |
| tblVehicleEF | HHD | 7.1000e-005 | 6.2480e-003 |
| tblVehicleEF | HHD | 0.19 | 0.03 |
| tblVehicleEF | HHD | 3.6700e-004 | 0.04 |
| tblVehicleEF | HHD | 0.08 | 0.04 |
| tblVehicleEF | LDA | 4.2840e-003 | 3.0340e-003 |
| tblVehicleEF | LDA | 4.4900e-003 | 0.05 |
| tblVehicleEF | LDA | 0.57 | 0.72 |
| tblVehicleEF | LDA | 1.00 | 2.11 |
| tblVehicleEF | LDA | 253.57 | 270.89 |
| tblVehicleEF | LDA | 54.70 | 53.31 |
| tblVehicleEF | LDA | 0.04 | 0.04 |
| tblVehicleEF | LDA | 0.06 | 0.18 |
| tblVehicleEF | LDA | 1.9580e-003 | 1.7990e-003 |
| tblVehicleEF | LDA | 2.2420e-003 | 1.8430e-003 |
| tblVehicleEF | LDA | 1.8050e-003 | 1.6570e-003 |

| | | | |
|---|---|---|---|
| tblVehicleEF | LDA | 2.0610e-003 | 1.6940e-003 |
| tblVehicleEF | LDA | 0.04 | 0.05 |
| tblVehicleEF | LDA | 0.09 | 0.10 |
| tblVehicleEF | LDA | 0.03 | 0.05 |
| tblVehicleEF | LDA | 0.01 | 0.01 |
| tblVehicleEF | LDA | 0.04 | 0.21 |
| tblVehicleEF | LDA | 0.06 | 0.22 |
| tblVehicleEF | LDA | 2.5390e-003 | 2.6800e-003 |
| tblVehicleEF | LDA | 5.6400e-004 | 5.2800e-004 |
| tblVehicleEF | LDA | 0.04 | 0.05 |
| tblVehicleEF | LDA | 0.09 | 0.10 |
| tblVehicleEF | LDA | 0.03 | 0.05 |
| tblVehicleEF | LDA | 0.02 | 0.02 |
| tblVehicleEF | LDA | 0.04 | 0.21 |
| tblVehicleEF | LDA | 0.07 | 0.25 |
| tblVehicleEF | LDA | 0.00 | 0.04 |
| tblVehicleEF | LDA | 4.5820e-003 | 0.00 |
| tblVehicleEF | LDA | 3.9780e-003 | 0.10 |
| tblVehicleEF | LDA | 0.00 | 11.18 |
| tblVehicleEF | LDA | 0.64 | 0.00 |
| tblVehicleEF | LDA | 0.86 | 3.2530e-003 |
| tblVehicleEF | LDA | 0.00 | 5.0530e-003 |
| tblVehicleEF | LDA | 266.77 | 0.00 |
| tblVehicleEF | LDA | 54.70 | 0.01 |
| tblVehicleEF | LDA | 0.00 | 9.4890e-003 |
| tblVehicleEF | LDA | 0.04 | 0.00 |
| tblVehicleEF | LDA | 0.05 | 4.4120e-003 |
| tblVehicleEF | LDA | 0.00 | 0.07 |
| tblVehicleEF | LDA | 0.04 | 0.00 |

| | | | |
|---|---|---|---|
| tblVehicleEF | LDA | 8.0000e-003 | 0.02 |
| tblVehicleEF | LDA | 1.9580e-003 | 0.20 |
| tblVehicleEF | LDA | 2.2420e-003 | 0.39 |
| tblVehicleEF | LDA | 0.00 | 0.02 |
| tblVehicleEF | LDA | 0.02 | 0.39 |
| tblVehicleEF | LDA | 2.0000e-003 | 0.33 |
| tblVehicleEF | LDA | 1.8050e-003 | 0.22 |
| tblVehicleEF | LDA | 2.0610e-003 | 0.20 |
| tblVehicleEF | LDA | 0.06 | 0.00 |
| tblVehicleEF | LDA | 0.10 | 1.4850e-003 |
| tblVehicleEF | LDA | 0.05 | 1.7000e-005 |
| tblVehicleEF | LDA | 0.01 | 0.04 |
| tblVehicleEF | LDA | 0.03 | 0.00 |
| tblVehicleEF | LDA | 2.6720e-003 | 0.79 |
| tblVehicleEF | LDA | 5.6100e-004 | 1.79 |
| tblVehicleEF | LDA | 0.06 | 60.05 |
| tblVehicleEF | LDA | 0.10 | 1.8400e-003 |
| tblVehicleEF | LDA | 0.00 | 3.8000e-004 |
| tblVehicleEF | LDA | 0.05 | 7.7830e-003 |
| tblVehicleEF | LDA | 0.02 | 0.02 |
| tblVehicleEF | LDA | 0.03 | 8.0020e-003 |
| tblVehicleEF | LDA | 0.06 | 0.00 |
| tblVehicleEF | LDA | 0.00 | 0.05 |
| tblVehicleEF | LDA | 4.1990e-003 | 0.00 |
| tblVehicleEF | LDA | 4.5800e-003 | 0.11 |
| tblVehicleEF | LDA | 0.00 | 11.32 |
| tblVehicleEF | LDA | 0.55 | 0.00 |
| tblVehicleEF | LDA | 1.03 | 2.9740e-003 |
| tblVehicleEF | LDA | 0.00 | 5.3880e-003 |

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|---|---|---|---|
| tblVehicleEF | LDA | 249.51 | 0.00 |
| tblVehicleEF | LDA | 54.70 | 0.01 |
| tblVehicleEF | LDA | 0.00 | 0.01 |
| tblVehicleEF | LDA | 0.04 | 0.00 |
| tblVehicleEF | LDA | 0.06 | 4.7000e-003 |
| tblVehicleEF | LDA | 0.00 | 0.05 |
| tblVehicleEF | LDA | 0.04 | 0.00 |
| tblVehicleEF | LDA | 8.0000e-003 | 0.02 |
| tblVehicleEF | LDA | 1.9580e-003 | 0.24 |
| tblVehicleEF | LDA | 2.2420e-003 | 0.24 |
| tblVehicleEF | LDA | 0.00 | 0.02 |
| tblVehicleEF | LDA | 0.02 | 0.24 |
| tblVehicleEF | LDA | 2.0000e-003 | 0.22 |
| tblVehicleEF | LDA | 1.8050e-003 | 0.25 |
| tblVehicleEF | LDA | 2.0610e-003 | 0.24 |
| tblVehicleEF | LDA | 0.03 | 0.00 |
| tblVehicleEF | LDA | 0.10 | 1.4850e-003 |
| tblVehicleEF | LDA | 0.03 | 1.7000e-005 |
| tblVehicleEF | LDA | 0.01 | 0.04 |
| tblVehicleEF | LDA | 0.04 | 0.00 |
| tblVehicleEF | LDA | 2.4980e-003 | 0.69 |
| tblVehicleEF | LDA | 5.6400e-004 | 2.17 |
| tblVehicleEF | LDA | 0.03 | 56.49 |
| tblVehicleEF | LDA | 0.10 | 1.8400e-003 |
| tblVehicleEF | LDA | 0.00 | 3.8000e-004 |
| tblVehicleEF | LDA | 0.03 | 7.7830e-003 |
| tblVehicleEF | LDA | 0.02 | 0.02 |
| tblVehicleEF | LDA | 0.04 | 8.0020e-003 |
| tblVehicleEF | LDA | 0.07 | 0.00 |

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|---|---|---|---|
| tblVehicleEF | LDT1 | 0.01 | 7.7890e-003 |
| tblVehicleEF | LDT1 | 0.01 | 0.07 |
| tblVehicleEF | LDT1 | 1.36 | 1.46 |
| tblVehicleEF | LDT1 | 2.49 | 2.28 |
| tblVehicleEF | LDT1 | 319.38 | 318.65 |
| tblVehicleEF | LDT1 | 67.76 | 63.32 |
| tblVehicleEF | LDT1 | 0.13 | 0.12 |
| tblVehicleEF | LDT1 | 0.15 | 0.26 |
| tblVehicleEF | LDT1 | 2.9980e-003 | 2.7210e-003 |
| tblVehicleEF | LDT1 | 3.2550e-003 | 2.6380e-003 |
| tblVehicleEF | LDT1 | 2.7600e-003 | 2.5050e-003 |
| tblVehicleEF | LDT1 | 2.9930e-003 | 2.4250e-003 |
| tblVehicleEF | LDT1 | 0.12 | 0.13 |
| tblVehicleEF | LDT1 | 0.25 | 0.20 |
| tblVehicleEF | LDT1 | 0.10 | 0.11 |
| tblVehicleEF | LDT1 | 0.03 | 0.03 |
| tblVehicleEF | LDT1 | 0.16 | 0.70 |
| tblVehicleEF | LDT1 | 0.17 | 0.36 |
| tblVehicleEF | LDT1 | 3.2100e-003 | 3.1530e-003 |
| tblVehicleEF | LDT1 | 7.2100e-004 | 6.2700e-004 |
| tblVehicleEF | LDT1 | 0.12 | 0.13 |
| tblVehicleEF | LDT1 | 0.25 | 0.20 |
| tblVehicleEF | LDT1 | 0.10 | 0.11 |
| tblVehicleEF | LDT1 | 0.04 | 0.05 |
| tblVehicleEF | LDT1 | 0.16 | 0.70 |
| tblVehicleEF | LDT1 | 0.19 | 0.39 |
| tblVehicleEF | LDT1 | 0.00 | 0.07 |
| tblVehicleEF | LDT1 | 0.01 | 0.00 |
| tblVehicleEF | LDT1 | 0.01 | 0.21 |

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|---|---|---|---|
| tblVehicleEF | LDT1 | 0.00 | 13.55 |
| tblVehicleEF | LDT1 | 1.49 | 0.00 |
| tblVehicleEF | LDT1 | 2.12 | 8.2760e-003 |
| tblVehicleEF | LDT1 | 0.00 | 5.8840e-003 |
| tblVehicleEF | LDT1 | 334.82 | 0.00 |
| tblVehicleEF | LDT1 | 67.76 | 0.04 |
| tblVehicleEF | LDT1 | 0.00 | 0.01 |
| tblVehicleEF | LDT1 | 0.11 | 0.00 |
| tblVehicleEF | LDT1 | 0.13 | 8.0850e-003 |
| tblVehicleEF | LDT1 | 0.00 | 0.15 |
| tblVehicleEF | LDT1 | 0.04 | 0.00 |
| tblVehicleEF | LDT1 | 8.0000e-003 | 0.05 |
| tblVehicleEF | LDT1 | 2.9980e-003 | 0.65 |
| tblVehicleEF | LDT1 | 3.2550e-003 | 0.93 |
| tblVehicleEF | LDT1 | 0.00 | 0.05 |
| tblVehicleEF | LDT1 | 0.02 | 0.93 |
| tblVehicleEF | LDT1 | 2.0000e-003 | 0.71 |
| tblVehicleEF | LDT1 | 2.7600e-003 | 0.35 |
| tblVehicleEF | LDT1 | 2.9930e-003 | 0.65 |
| tblVehicleEF | LDT1 | 0.20 | 0.00 |
| tblVehicleEF | LDT1 | 0.27 | 2.3930e-003 |
| tblVehicleEF | LDT1 | 0.15 | 3.5000e-005 |
| tblVehicleEF | LDT1 | 0.03 | 0.11 |
| tblVehicleEF | LDT1 | 0.15 | 0.00 |
| tblVehicleEF | LDT1 | 3.3670e-003 | 1.59 |
| tblVehicleEF | LDT1 | 7.1400e-004 | 1.93 |
| tblVehicleEF | LDT1 | 0.20 | 71.69 |
| tblVehicleEF | LDT1 | 0.27 | 2.6340e-003 |
| tblVehicleEF | LDT1 | 0.00 | 5.9400e-004 |

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|---|---|---|---|
| tblVehicleEF | LDT1 | 0.15 | 7.9510e-003 |
| tblVehicleEF | LDT1 | 0.05 | 0.02 |
| tblVehicleEF | LDT1 | 0.15 | 8.0020e-003 |
| tblVehicleEF | LDT1 | 0.16 | 0.00 |
| tblVehicleEF | LDT1 | 0.00 | 0.08 |
| tblVehicleEF | LDT1 | 0.01 | 0.00 |
| tblVehicleEF | LDT1 | 0.01 | 0.23 |
| tblVehicleEF | LDT1 | 0.00 | 13.73 |
| tblVehicleEF | LDT1 | 1.32 | 0.00 |
| tblVehicleEF | LDT1 | 2.56 | 7.6540e-003 |
| tblVehicleEF | LDT1 | 0.00 | 6.2690e-003 |
| tblVehicleEF | LDT1 | 314.49 | 0.00 |
| tblVehicleEF | LDT1 | 67.76 | 0.03 |
| tblVehicleEF | LDT1 | 0.00 | 0.02 |
| tblVehicleEF | LDT1 | 0.12 | 0.00 |
| tblVehicleEF | LDT1 | 0.15 | 8.6860e-003 |
| tblVehicleEF | LDT1 | 0.00 | 0.10 |
| tblVehicleEF | LDT1 | 0.04 | 0.00 |
| tblVehicleEF | LDT1 | 8.0000e-003 | 0.05 |
| tblVehicleEF | LDT1 | 2.9980e-003 | 0.83 |
| tblVehicleEF | LDT1 | 3.2550e-003 | 0.60 |
| tblVehicleEF | LDT1 | 0.00 | 0.05 |
| tblVehicleEF | LDT1 | 0.02 | 0.59 |
| tblVehicleEF | LDT1 | 2.0000e-003 | 0.48 |
| tblVehicleEF | LDT1 | 2.7600e-003 | 0.40 |
| tblVehicleEF | LDT1 | 2.9930e-003 | 0.83 |
| tblVehicleEF | LDT1 | 0.12 | 0.00 |
| tblVehicleEF | LDT1 | 0.28 | 2.3930e-003 |
| tblVehicleEF | LDT1 | 0.10 | 3.5000e-005 |

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|---|---|---|---|
| tblVehicleEF | LDT1 | 0.03 | 0.12 |
| tblVehicleEF | LDT1 | 0.19 | 0.00 |
| tblVehicleEF | LDT1 | 3.1610e-003 | 1.41 |
| tblVehicleEF | LDT1 | 7.2200e-004 | 2.35 |
| tblVehicleEF | LDT1 | 0.12 | 68.01 |
| tblVehicleEF | LDT1 | 0.28 | 2.6340e-003 |
| tblVehicleEF | LDT1 | 0.00 | 5.9400e-004 |
| tblVehicleEF | LDT1 | 0.10 | 7.9510e-003 |
| tblVehicleEF | LDT1 | 0.04 | 0.02 |
| tblVehicleEF | LDT1 | 0.19 | 8.0020e-003 |
| tblVehicleEF | LDT1 | 0.19 | 0.00 |
| tblVehicleEF | LDT2 | 5.9720e-003 | 4.9910e-003 |
| tblVehicleEF | LDT2 | 5.6870e-003 | 0.07 |
| tblVehicleEF | LDT2 | 0.75 | 1.03 |
| tblVehicleEF | LDT2 | 1.24 | 2.65 |
| tblVehicleEF | LDT2 | 356.41 | 341.38 |
| tblVehicleEF | LDT2 | 75.77 | 68.34 |
| tblVehicleEF | LDT2 | 0.07 | 0.09 |
| tblVehicleEF | LDT2 | 0.09 | 0.28 |
| tblVehicleEF | LDT2 | 1.9990e-003 | 1.9090e-003 |
| tblVehicleEF | LDT2 | 2.3560e-003 | 1.8910e-003 |
| tblVehicleEF | LDT2 | 1.8380e-003 | 1.7570e-003 |
| tblVehicleEF | LDT2 | 2.1660e-003 | 1.7390e-003 |
| tblVehicleEF | LDT2 | 0.04 | 0.07 |
| tblVehicleEF | LDT2 | 0.10 | 0.12 |
| tblVehicleEF | LDT2 | 0.04 | 0.07 |
| tblVehicleEF | LDT2 | 0.01 | 0.02 |
| tblVehicleEF | LDT2 | 0.06 | 0.41 |
| tblVehicleEF | LDT2 | 0.08 | 0.31 |

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|---|---|---|---|
| tblVehicleEF | LDT2 | 3.5700e-003 | 3.3770e-003 |
| tblVehicleEF | LDT2 | 7.7800e-004 | 6.7600e-004 |
| tblVehicleEF | LDT2 | 0.04 | 0.07 |
| tblVehicleEF | LDT2 | 0.10 | 0.12 |
| tblVehicleEF | LDT2 | 0.04 | 0.07 |
| tblVehicleEF | LDT2 | 0.02 | 0.03 |
| tblVehicleEF | LDT2 | 0.06 | 0.41 |
| tblVehicleEF | LDT2 | 0.08 | 0.34 |
| tblVehicleEF | LDT2 | 0.00 | 0.06 |
| tblVehicleEF | LDT2 | 6.3770e-003 | 0.00 |
| tblVehicleEF | LDT2 | 5.0410e-003 | 0.13 |
| tblVehicleEF | LDT2 | 0.00 | 14.40 |
| tblVehicleEF | LDT2 | 0.83 | 0.00 |
| tblVehicleEF | LDT2 | 1.06 | 5.3180e-003 |
| tblVehicleEF | LDT2 | 0.00 | 6.4670e-003 |
| tblVehicleEF | LDT2 | 374.21 | 0.00 |
| tblVehicleEF | LDT2 | 75.77 | 0.02 |
| tblVehicleEF | LDT2 | 0.00 | 0.01 |
| tblVehicleEF | LDT2 | 0.06 | 0.00 |
| tblVehicleEF | LDT2 | 0.09 | 6.6250e-003 |
| tblVehicleEF | LDT2 | 0.00 | 0.10 |
| tblVehicleEF | LDT2 | 0.04 | 0.00 |
| tblVehicleEF | LDT2 | 8.0000e-003 | 0.03 |
| tblVehicleEF | LDT2 | 1.9990e-003 | 0.38 |
| tblVehicleEF | LDT2 | 2.3560e-003 | 0.54 |
| tblVehicleEF | LDT2 | 0.00 | 0.03 |
| tblVehicleEF | LDT2 | 0.02 | 0.54 |
| tblVehicleEF | LDT2 | 2.0000e-003 | 0.49 |
| tblVehicleEF | LDT2 | 1.8380e-003 | 0.31 |

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|---|---|---|---|
| tblVehicleEF | LDT2 | 2.1660e-003 | 0.38 |
| tblVehicleEF | LDT2 | 0.07 | 0.00 |
| tblVehicleEF | LDT2 | 0.10 | 1.6180e-003 |
| tblVehicleEF | LDT2 | 0.06 | 1.7000e-005 |
| tblVehicleEF | LDT2 | 0.02 | 0.08 |
| tblVehicleEF | LDT2 | 0.05 | 0.00 |
| tblVehicleEF | LDT2 | 3.7490e-003 | 1.12 |
| tblVehicleEF | LDT2 | 7.7500e-004 | 2.26 |
| tblVehicleEF | LDT2 | 0.07 | 75.14 |
| tblVehicleEF | LDT2 | 0.10 | 1.8890e-003 |
| tblVehicleEF | LDT2 | 0.00 | 4.0400e-004 |
| tblVehicleEF | LDT2 | 0.06 | 7.8210e-003 |
| tblVehicleEF | LDT2 | 0.02 | 0.02 |
| tblVehicleEF | LDT2 | 0.05 | 8.0020e-003 |
| tblVehicleEF | LDT2 | 0.07 | 0.00 |
| tblVehicleEF | LDT2 | 0.00 | 0.07 |
| tblVehicleEF | LDT2 | 5.8560e-003 | 0.00 |
| tblVehicleEF | LDT2 | 5.8000e-003 | 0.13 |
| tblVehicleEF | LDT2 | 0.00 | 14.59 |
| tblVehicleEF | LDT2 | 0.72 | 0.00 |
| tblVehicleEF | LDT2 | 1.27 | 4.8870e-003 |
| tblVehicleEF | LDT2 | 0.00 | 6.8940e-003 |
| tblVehicleEF | LDT2 | 350.82 | 0.00 |
| tblVehicleEF | LDT2 | 75.77 | 0.02 |
| tblVehicleEF | LDT2 | 0.00 | 0.01 |
| tblVehicleEF | LDT2 | 0.07 | 0.00 |
| tblVehicleEF | LDT2 | 0.09 | 7.0820e-003 |
| tblVehicleEF | LDT2 | 0.00 | 0.07 |
| tblVehicleEF | LDT2 | 0.04 | 0.00 |

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|---|---|---|---|
| tblVehicleEF | LDT2 | 8.0000e-003 | 0.03 |
| tblVehicleEF | LDT2 | 1.9990e-003 | 0.48 |
| tblVehicleEF | LDT2 | 2.3560e-003 | 0.33 |
| tblVehicleEF | LDT2 | 0.00 | 0.03 |
| tblVehicleEF | LDT2 | 0.02 | 0.33 |
| tblVehicleEF | LDT2 | 2.0000e-003 | 0.33 |
| tblVehicleEF | LDT2 | 1.8380e-003 | 0.35 |
| tblVehicleEF | LDT2 | 2.1660e-003 | 0.48 |
| tblVehicleEF | LDT2 | 0.04 | 0.00 |
| tblVehicleEF | LDT2 | 0.10 | 1.6180e-003 |
| tblVehicleEF | LDT2 | 0.04 | 1.7000e-005 |
| tblVehicleEF | LDT2 | 0.01 | 0.08 |
| tblVehicleEF | LDT2 | 0.07 | 0.00 |
| tblVehicleEF | LDT2 | 3.5130e-003 | 0.99 |
| tblVehicleEF | LDT2 | 7.7900e-004 | 2.74 |
| tblVehicleEF | LDT2 | 0.04 | 71.61 |
| tblVehicleEF | LDT2 | 0.10 | 1.8890e-003 |
| tblVehicleEF | LDT2 | 0.00 | 4.0400e-004 |
| tblVehicleEF | LDT2 | 0.04 | 7.8210e-003 |
| tblVehicleEF | LDT2 | 0.02 | 0.02 |
| tblVehicleEF | LDT2 | 0.07 | 8.0020e-003 |
| tblVehicleEF | LDT2 | 0.09 | 0.00 |
| tblVehicleEF | LHD1 | 5.2120e-003 | 5.5830e-003 |
| tblVehicleEF | LHD1 | 9.8600e-003 | 5.7240e-003 |
| tblVehicleEF | LHD1 | 0.02 | 0.02 |
| tblVehicleEF | LHD1 | 0.15 | 0.19 |
| tblVehicleEF | LHD1 | 0.74 | 0.65 |
| tblVehicleEF | LHD1 | 2.42 | 1.14 |
| tblVehicleEF | LHD1 | 9.02 | 8.89 |

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|---|---|---|---|
| tblVehicleEF | LHD1 | 594.63 | 666.21 |
| tblVehicleEF | LHD1 | 31.53 | 12.43 |
| tblVehicleEF | LHD1 | 0.07 | 0.05 |
| tblVehicleEF | LHD1 | 1.08 | 0.65 |
| tblVehicleEF | LHD1 | 0.94 | 0.33 |
| tblVehicleEF | LHD1 | 8.6300e-004 | 7.5700e-004 |
| tblVehicleEF | LHD1 | 0.01 | 9.6790e-003 |
| tblVehicleEF | LHD1 | 9.7700e-003 | 6.4420e-003 |
| tblVehicleEF | LHD1 | 8.9700e-004 | 2.8500e-004 |
| tblVehicleEF | LHD1 | 8.2600e-004 | 7.2400e-004 |
| tblVehicleEF | LHD1 | 2.5390e-003 | 2.4200e-003 |
| tblVehicleEF | LHD1 | 9.3240e-003 | 6.1330e-003 |
| tblVehicleEF | LHD1 | 8.2500e-004 | 2.6200e-004 |
| tblVehicleEF | LHD1 | 2.9620e-003 | 2.5670e-003 |
| tblVehicleEF | LHD1 | 0.10 | 0.08 |
| tblVehicleEF | LHD1 | 0.02 | 0.02 |
| tblVehicleEF | LHD1 | 1.7810e-003 | 1.5640e-003 |
| tblVehicleEF | LHD1 | 0.06 | 0.05 |
| tblVehicleEF | LHD1 | 0.30 | 0.56 |
| tblVehicleEF | LHD1 | 0.24 | 0.08 |
| tblVehicleEF | LHD1 | 9.0000e-005 | 8.6000e-005 |
| tblVehicleEF | LHD1 | 5.8320e-003 | 6.5060e-003 |
| tblVehicleEF | LHD1 | 3.6100e-004 | 1.2300e-004 |
| tblVehicleEF | LHD1 | 2.9620e-003 | 2.5670e-003 |
| tblVehicleEF | LHD1 | 0.10 | 0.08 |
| tblVehicleEF | LHD1 | 0.02 | 0.03 |
| tblVehicleEF | LHD1 | 1.7810e-003 | 1.5640e-003 |
| tblVehicleEF | LHD1 | 0.08 | 0.06 |
| tblVehicleEF | LHD1 | 0.30 | 0.56 |

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|---|---|---|---|
| tblVehicleEF | LHD1 | 0.26 | 0.09 |
| tblVehicleEF | LHD1 | 5.2120e-003 | 5.1340e-003 |
| tblVehicleEF | LHD1 | 0.01 | 0.30 |
| tblVehicleEF | LHD1 | 0.02 | 0.08 |
| tblVehicleEF | LHD1 | 0.15 | 0.83 |
| tblVehicleEF | LHD1 | 0.75 | 124.98 |
| tblVehicleEF | LHD1 | 2.31 | 6.2080e-003 |
| tblVehicleEF | LHD1 | 9.02 | 1.7780e-003 |
| tblVehicleEF | LHD1 | 594.63 | 0.01 |
| tblVehicleEF | LHD1 | 31.53 | 0.05 |
| tblVehicleEF | LHD1 | 0.07 | 1.0420e-003 |
| tblVehicleEF | LHD1 | 1.01 | 0.07 |
| tblVehicleEF | LHD1 | 0.91 | 0.03 |
| tblVehicleEF | LHD1 | 8.6300e-004 | 2.2100e-003 |
| tblVehicleEF | LHD1 | 0.08 | 0.42 |
| tblVehicleEF | LHD1 | 0.01 | 0.06 |
| tblVehicleEF | LHD1 | 9.7700e-003 | 0.48 |
| tblVehicleEF | LHD1 | 8.9700e-004 | 0.06 |
| tblVehicleEF | LHD1 | 8.2600e-004 | 5.6060e-003 |
| tblVehicleEF | LHD1 | 0.03 | 0.05 |
| tblVehicleEF | LHD1 | 2.5390e-003 | 0.03 |
| tblVehicleEF | LHD1 | 9.3240e-003 | 0.07 |
| tblVehicleEF | LHD1 | 8.2500e-004 | 0.54 |
| tblVehicleEF | LHD1 | 4.5380e-003 | 1.7000e-004 |
| tblVehicleEF | LHD1 | 0.10 | 5.2380e-003 |
| tblVehicleEF | LHD1 | 0.02 | 0.05 |
| tblVehicleEF | LHD1 | 2.6400e-003 | 1.8000e-005 |
| tblVehicleEF | LHD1 | 0.06 | 0.61 |
| tblVehicleEF | LHD1 | 0.29 | 9.1050e-003 |

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|---|---|---|---|
| tblVehicleEF | LHD1 | 0.23 | 0.32 |
| tblVehicleEF | LHD1 | 9.0000e-005 | 0.19 |
| tblVehicleEF | LHD1 | 5.8320e-003 | 0.67 |
| tblVehicleEF | LHD1 | 3.5900e-004 | 1.09 |
| tblVehicleEF | LHD1 | 4.5380e-003 | 48.48 |
| tblVehicleEF | LHD1 | 0.10 | 2.8500e-004 |
| tblVehicleEF | LHD1 | 0.02 | 4.2700e-004 |
| tblVehicleEF | LHD1 | 2.6400e-003 | 5.4550e-003 |
| tblVehicleEF | LHD1 | 0.08 | 0.03 |
| tblVehicleEF | LHD1 | 0.29 | 9.3700e-003 |
| tblVehicleEF | LHD1 | 0.25 | 9.5160e-003 |
| tblVehicleEF | LHD1 | 5.2120e-003 | 5.3710e-003 |
| tblVehicleEF | LHD1 | 9.8170e-003 | 0.30 |
| tblVehicleEF | LHD1 | 0.02 | 0.09 |
| tblVehicleEF | LHD1 | 0.15 | 0.84 |
| tblVehicleEF | LHD1 | 0.73 | 124.98 |
| tblVehicleEF | LHD1 | 2.43 | 6.0400e-003 |
| tblVehicleEF | LHD1 | 9.02 | 1.8370e-003 |
| tblVehicleEF | LHD1 | 594.63 | 0.01 |
| tblVehicleEF | LHD1 | 31.53 | 0.05 |
| tblVehicleEF | LHD1 | 0.07 | 1.0870e-003 |
| tblVehicleEF | LHD1 | 1.06 | 0.07 |
| tblVehicleEF | LHD1 | 0.95 | 0.03 |
| tblVehicleEF | LHD1 | 8.6300e-004 | 1.5420e-003 |
| tblVehicleEF | LHD1 | 0.08 | 0.42 |
| tblVehicleEF | LHD1 | 0.01 | 0.06 |
| tblVehicleEF | LHD1 | 9.7700e-003 | 0.53 |
| tblVehicleEF | LHD1 | 8.9700e-004 | 0.04 |
| tblVehicleEF | LHD1 | 8.2600e-004 | 6.2420e-003 |

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|---|---|---|---|
| tblVehicleEF | LHD1 | 0.03 | 0.04 |
| tblVehicleEF | LHD1 | 2.5390e-003 | 0.02 |
| tblVehicleEF | LHD1 | 9.3240e-003 | 0.08 |
| tblVehicleEF | LHD1 | 8.2500e-004 | 0.60 |
| tblVehicleEF | LHD1 | 3.0750e-003 | 1.7000e-004 |
| tblVehicleEF | LHD1 | 0.11 | 5.2380e-003 |
| tblVehicleEF | LHD1 | 0.02 | 0.05 |
| tblVehicleEF | LHD1 | 1.7770e-003 | 1.8000e-005 |
| tblVehicleEF | LHD1 | 0.06 | 0.64 |
| tblVehicleEF | LHD1 | 0.32 | 9.1050e-003 |
| tblVehicleEF | LHD1 | 0.24 | 0.34 |
| tblVehicleEF | LHD1 | 9.0000e-005 | 0.19 |
| tblVehicleEF | LHD1 | 5.8320e-003 | 0.65 |
| tblVehicleEF | LHD1 | 3.6100e-004 | 1.14 |
| tblVehicleEF | LHD1 | 3.0750e-003 | 48.48 |
| tblVehicleEF | LHD1 | 0.11 | 2.8500e-004 |
| tblVehicleEF | LHD1 | 0.02 | 4.2700e-004 |
| tblVehicleEF | LHD1 | 1.7770e-003 | 5.4550e-003 |
| tblVehicleEF | LHD1 | 0.08 | 0.03 |
| tblVehicleEF | LHD1 | 0.32 | 9.3700e-003 |
| tblVehicleEF | LHD1 | 0.26 | 9.5160e-003 |
| tblVehicleEF | LHD2 | 3.6840e-003 | 3.9120e-003 |
| tblVehicleEF | LHD2 | 3.6840e-003 | 3.9650e-003 |
| tblVehicleEF | LHD2 | 7.3420e-003 | 0.01 |
| tblVehicleEF | LHD2 | 0.13 | 0.15 |
| tblVehicleEF | LHD2 | 0.32 | 0.44 |
| tblVehicleEF | LHD2 | 1.21 | 0.76 |
| tblVehicleEF | LHD2 | 13.71 | 13.45 |
| tblVehicleEF | LHD2 | 608.08 | 667.35 |

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|---|---|---|---|
| tblVehicleEF | LHD2 | 26.39 | 9.56 |
| tblVehicleEF | LHD2 | 0.09 | 0.09 |
| tblVehicleEF | LHD2 | 0.67 | 0.84 |
| tblVehicleEF | LHD2 | 0.50 | 0.23 |
| tblVehicleEF | LHD2 | 1.1670e-003 | 1.2520e-003 |
| tblVehicleEF | LHD2 | 0.01 | 0.01 |
| tblVehicleEF | LHD2 | 8.9870e-003 | 0.01 |
| tblVehicleEF | LHD2 | 4.2200e-004 | 1.6200e-004 |
| tblVehicleEF | LHD2 | 1.1160e-003 | 1.1980e-003 |
| tblVehicleEF | LHD2 | 2.6680e-003 | 2.6330e-003 |
| tblVehicleEF | LHD2 | 8.5850e-003 | 9.5770e-003 |
| tblVehicleEF | LHD2 | 3.8800e-004 | 1.4900e-004 |
| tblVehicleEF | LHD2 | 1.0410e-003 | 1.5680e-003 |
| tblVehicleEF | LHD2 | 0.03 | 0.05 |
| tblVehicleEF | LHD2 | 0.01 | 0.02 |
| tblVehicleEF | LHD2 | 6.8300e-004 | 9.7100e-004 |
| tblVehicleEF | LHD2 | 0.04 | 0.05 |
| tblVehicleEF | LHD2 | 0.07 | 0.35 |
| tblVehicleEF | LHD2 | 0.10 | 0.05 |
| tblVehicleEF | LHD2 | 1.3400e-004 | 1.2900e-004 |
| tblVehicleEF | LHD2 | 5.9210e-003 | 6.4600e-003 |
| tblVehicleEF | LHD2 | 2.8600e-004 | 9.5000e-005 |
| tblVehicleEF | LHD2 | 1.0410e-003 | 1.5680e-003 |
| tblVehicleEF | LHD2 | 0.03 | 0.05 |
| tblVehicleEF | LHD2 | 0.02 | 0.02 |
| tblVehicleEF | LHD2 | 6.8300e-004 | 9.7100e-004 |
| tblVehicleEF | LHD2 | 0.05 | 0.06 |
| tblVehicleEF | LHD2 | 0.07 | 0.35 |
| tblVehicleEF | LHD2 | 0.11 | 0.06 |

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|---|---|---|---|
| tblVehicleEF | LHD2 | 3.6840e-003 | 3.5540e-003 |
| tblVehicleEF | LHD2 | 3.7270e-003 | 0.23 |
| tblVehicleEF | LHD2 | 7.0950e-003 | 0.06 |
| tblVehicleEF | LHD2 | 0.13 | 0.64 |
| tblVehicleEF | LHD2 | 0.32 | 184.31 |
| tblVehicleEF | LHD2 | 1.16 | 4.2190e-003 |
| tblVehicleEF | LHD2 | 13.71 | 1.2050e-003 |
| tblVehicleEF | LHD2 | 608.08 | 0.02 |
| tblVehicleEF | LHD2 | 26.39 | 0.05 |
| tblVehicleEF | LHD2 | 0.09 | 7.2200e-004 |
| tblVehicleEF | LHD2 | 0.64 | 0.05 |
| tblVehicleEF | LHD2 | 0.48 | 0.05 |
| tblVehicleEF | LHD2 | 1.1670e-003 | 1.3640e-003 |
| tblVehicleEF | LHD2 | 0.09 | 0.31 |
| tblVehicleEF | LHD2 | 0.01 | 0.06 |
| tblVehicleEF | LHD2 | 8.9870e-003 | 0.28 |
| tblVehicleEF | LHD2 | 4.2200e-004 | 0.03 |
| tblVehicleEF | LHD2 | 1.1160e-003 | 3.7590e-003 |
| tblVehicleEF | LHD2 | 0.04 | 0.03 |
| tblVehicleEF | LHD2 | 2.6680e-003 | 0.02 |
| tblVehicleEF | LHD2 | 8.5850e-003 | 0.05 |
| tblVehicleEF | LHD2 | 3.8800e-004 | 0.34 |
| tblVehicleEF | LHD2 | 1.5870e-003 | 1.9200e-004 |
| tblVehicleEF | LHD2 | 0.04 | 8.5420e-003 |
| tblVehicleEF | LHD2 | 0.01 | 0.09 |
| tblVehicleEF | LHD2 | 9.9900e-004 | 1.0000e-005 |
| tblVehicleEF | LHD2 | 0.04 | 0.79 |
| tblVehicleEF | LHD2 | 0.07 | 0.02 |
| tblVehicleEF | LHD2 | 0.10 | 0.22 |

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|---|---|---|---|
| tblVehicleEF | LHD2 | 1.3400e-004 | 0.15 |
| tblVehicleEF | LHD2 | 5.9210e-003 | 0.44 |
| tblVehicleEF | LHD2 | 2.8500e-004 | 0.73 |
| tblVehicleEF | LHD2 | 1.5870e-003 | 50.51 |
| tblVehicleEF | LHD2 | 0.04 | 1.6200e-004 |
| tblVehicleEF | LHD2 | 0.02 | 7.0500e-004 |
| tblVehicleEF | LHD2 | 9.9900e-004 | 6.5990e-003 |
| tblVehicleEF | LHD2 | 0.05 | 0.04 |
| tblVehicleEF | LHD2 | 0.07 | 0.01 |
| tblVehicleEF | LHD2 | 0.10 | 0.02 |
| tblVehicleEF | LHD2 | 3.6840e-003 | 3.7180e-003 |
| tblVehicleEF | LHD2 | 3.6740e-003 | 0.23 |
| tblVehicleEF | LHD2 | 7.3760e-003 | 0.06 |
| tblVehicleEF | LHD2 | 0.13 | 0.64 |
| tblVehicleEF | LHD2 | 0.32 | 184.31 |
| tblVehicleEF | LHD2 | 1.22 | 4.1490e-003 |
| tblVehicleEF | LHD2 | 13.71 | 1.2430e-003 |
| tblVehicleEF | LHD2 | 608.08 | 0.02 |
| tblVehicleEF | LHD2 | 26.39 | 0.05 |
| tblVehicleEF | LHD2 | 0.09 | 7.5300e-004 |
| tblVehicleEF | LHD2 | 0.66 | 0.05 |
| tblVehicleEF | LHD2 | 0.50 | 0.05 |
| tblVehicleEF | LHD2 | 1.1670e-003 | 9.4300e-004 |
| tblVehicleEF | LHD2 | 0.09 | 0.31 |
| tblVehicleEF | LHD2 | 0.01 | 0.06 |
| tblVehicleEF | LHD2 | 8.9870e-003 | 0.32 |
| tblVehicleEF | LHD2 | 4.2200e-004 | 0.02 |
| tblVehicleEF | LHD2 | 1.1160e-003 | 4.0970e-003 |
| tblVehicleEF | LHD2 | 0.04 | 0.02 |

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|---|---|---|---|
| tblVehicleEF | LHD2 | 2.6680e-003 | 0.01 |
| tblVehicleEF | LHD2 | 8.5850e-003 | 0.05 |
| tblVehicleEF | LHD2 | 3.8800e-004 | 0.38 |
| tblVehicleEF | LHD2 | 1.0460e-003 | 1.9200e-004 |
| tblVehicleEF | LHD2 | 0.04 | 8.5420e-003 |
| tblVehicleEF | LHD2 | 0.01 | 0.09 |
| tblVehicleEF | LHD2 | 6.7100e-004 | 1.0000e-005 |
| tblVehicleEF | LHD2 | 0.04 | 0.82 |
| tblVehicleEF | LHD2 | 0.08 | 0.02 |
| tblVehicleEF | LHD2 | 0.10 | 0.23 |
| tblVehicleEF | LHD2 | 1.3400e-004 | 0.15 |
| tblVehicleEF | LHD2 | 5.9210e-003 | 0.44 |
| tblVehicleEF | LHD2 | 2.8600e-004 | 0.77 |
| tblVehicleEF | LHD2 | 1.0460e-003 | 50.50 |
| tblVehicleEF | LHD2 | 0.04 | 1.6200e-004 |
| tblVehicleEF | LHD2 | 0.02 | 7.0500e-004 |
| tblVehicleEF | LHD2 | 6.7100e-004 | 6.5990e-003 |
| tblVehicleEF | LHD2 | 0.05 | 0.04 |
| tblVehicleEF | LHD2 | 0.08 | 0.01 |
| tblVehicleEF | LHD2 | 0.11 | 0.02 |
| tblVehicleEF | MCY | 0.51 | 0.38 |
| tblVehicleEF | MCY | 0.15 | 0.24 |
| tblVehicleEF | MCY | 18.57 | 19.19 |
| tblVehicleEF | MCY | 9.67 | 8.53 |
| tblVehicleEF | MCY | 183.90 | 223.45 |
| tblVehicleEF | MCY | 44.44 | 59.65 |
| tblVehicleEF | MCY | 1.13 | 1.13 |
| tblVehicleEF | MCY | 0.31 | 0.26 |
| tblVehicleEF | MCY | 2.3320e-003 | 2.4320e-003 |

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|---|---|---|---|
| tblVehicleEF | MCY | 3.6000e-003 | 3.2970e-003 |
| tblVehicleEF | MCY | 2.1780e-003 | 2.2730e-003 |
| tblVehicleEF | MCY | 3.3840e-003 | 3.1040e-003 |
| tblVehicleEF | MCY | 1.14 | 1.09 |
| tblVehicleEF | MCY | 0.66 | 0.66 |
| tblVehicleEF | MCY | 0.67 | 0.67 |
| tblVehicleEF | MCY | 2.47 | 2.61 |
| tblVehicleEF | MCY | 0.60 | 1.99 |
| tblVehicleEF | MCY | 2.04 | 1.82 |
| tblVehicleEF | MCY | 2.2170e-003 | 2.2110e-003 |
| tblVehicleEF | MCY | 6.6200e-004 | 5.9000e-004 |
| tblVehicleEF | MCY | 1.14 | 1.09 |
| tblVehicleEF | MCY | 0.66 | 0.66 |
| tblVehicleEF | MCY | 0.67 | 0.67 |
| tblVehicleEF | MCY | 3.08 | 3.24 |
| tblVehicleEF | MCY | 0.60 | 1.99 |
| tblVehicleEF | MCY | 2.22 | 1.98 |
| tblVehicleEF | MCY | 0.00 | 0.81 |
| tblVehicleEF | MCY | 0.50 | 0.00 |
| tblVehicleEF | MCY | 0.13 | 0.73 |
| tblVehicleEF | MCY | 0.00 | 28.87 |
| tblVehicleEF | MCY | 18.00 | 0.00 |
| tblVehicleEF | MCY | 8.85 | 0.37 |
| tblVehicleEF | MCY | 0.00 | 7.4230e-003 |
| tblVehicleEF | MCY | 183.90 | 0.00 |
| tblVehicleEF | MCY | 44.44 | 2.55 |
| tblVehicleEF | MCY | 0.00 | 0.10 |
| tblVehicleEF | MCY | 0.98 | 0.00 |
| tblVehicleEF | MCY | 0.29 | 0.06 |

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|---|---|---|---|
| tblVehicleEF | MCY | 0.00 | 1.10 |
| tblVehicleEF | MCY | 0.01 | 0.00 |
| tblVehicleEF | MCY | 4.0000e-003 | 3.17 |
| tblVehicleEF | MCY | 2.3320e-003 | 1.87 |
| tblVehicleEF | MCY | 3.6000e-003 | 3.53 |
| tblVehicleEF | MCY | 0.00 | 0.37 |
| tblVehicleEF | MCY | 5.0400e-003 | 3.53 |
| tblVehicleEF | MCY | 1.0000e-003 | 2.20 |
| tblVehicleEF | MCY | 2.1780e-003 | 1.75 |
| tblVehicleEF | MCY | 3.3840e-003 | 1.87 |
| tblVehicleEF | MCY | 1.88 | 5.0000e-004 |
| tblVehicleEF | MCY | 0.75 | 2.2730e-003 |
| tblVehicleEF | MCY | 1.17 | 1.5520e-003 |
| tblVehicleEF | MCY | 2.42 | 0.99 |
| tblVehicleEF | MCY | 0.57 | 0.00 |
| tblVehicleEF | MCY | 1.82 | 0.25 |
| tblVehicleEF | MCY | 2.2060e-003 | 18.47 |
| tblVehicleEF | MCY | 6.4200e-004 | 7.76 |
| tblVehicleEF | MCY | 1.88 | 111.05 |
| tblVehicleEF | MCY | 0.75 | 3.2970e-003 |
| tblVehicleEF | MCY | 0.00 | 1.2160e-003 |
| tblVehicleEF | MCY | 1.17 | 5.8800e-003 |
| tblVehicleEF | MCY | 3.01 | 5.0400e-003 |
| tblVehicleEF | MCY | 0.57 | 4.0000e-003 |
| tblVehicleEF | MCY | 1.98 | 0.00 |
| tblVehicleEF | MCY | 0.00 | 0.93 |
| tblVehicleEF | MCY | 0.52 | 0.00 |
| tblVehicleEF | MCY | 0.15 | 0.85 |
| tblVehicleEF | MCY | 0.00 | 30.00 |

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|---|---|---|---|
| tblVehicleEF | MCY | 18.58 | 0.00 |
| tblVehicleEF | MCY | 9.75 | 0.38 |
| tblVehicleEF | MCY | 0.00 | 7.6700e-003 |
| tblVehicleEF | MCY | 183.90 | 0.00 |
| tblVehicleEF | MCY | 44.44 | 2.62 |
| tblVehicleEF | MCY | 0.00 | 0.12 |
| tblVehicleEF | MCY | 1.10 | 0.00 |
| tblVehicleEF | MCY | 0.31 | 0.06 |
| tblVehicleEF | MCY | 0.00 | 0.64 |
| tblVehicleEF | MCY | 0.01 | 0.00 |
| tblVehicleEF | MCY | 4.0000e-003 | 3.26 |
| tblVehicleEF | MCY | 2.3320e-003 | 2.29 |
| tblVehicleEF | MCY | 3.6000e-003 | 2.37 |
| tblVehicleEF | MCY | 0.00 | 0.43 |
| tblVehicleEF | MCY | 5.0400e-003 | 2.37 |
| tblVehicleEF | MCY | 1.0000e-003 | 1.27 |
| tblVehicleEF | MCY | 2.1780e-003 | 2.02 |
| tblVehicleEF | MCY | 3.3840e-003 | 2.29 |
| tblVehicleEF | MCY | 1.25 | 5.0000e-004 |
| tblVehicleEF | MCY | 0.85 | 2.2730e-003 |
| tblVehicleEF | MCY | 0.66 | 1.5520e-003 |
| tblVehicleEF | MCY | 2.48 | 1.11 |
| tblVehicleEF | MCY | 0.69 | 0.00 |
| tblVehicleEF | MCY | 2.07 | 0.27 |
| tblVehicleEF | MCY | 2.2180e-003 | 19.29 |
| tblVehicleEF | MCY | 6.6500e-004 | 8.66 |
| tblVehicleEF | MCY | 1.25 | 111.83 |
| tblVehicleEF | MCY | 0.85 | 3.2970e-003 |
| tblVehicleEF | MCY | 0.00 | 1.2160e-003 |

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|---|---|---|---|
| tblVehicleEF | MCY | 0.66 | 5.8800e-003 |
| tblVehicleEF | MCY | 3.09 | 5.0400e-003 |
| tblVehicleEF | MCY | 0.69 | 4.0000e-003 |
| tblVehicleEF | MCY | 2.25 | 0.00 |
| tblVehicleEF | MDV | 0.01 | 6.5750e-003 |
| tblVehicleEF | MDV | 0.01 | 0.08 |
| tblVehicleEF | MDV | 1.17 | 1.22 |
| tblVehicleEF | MDV | 2.29 | 3.11 |
| tblVehicleEF | MDV | 483.40 | 419.24 |
| tblVehicleEF | MDV | 101.24 | 83.18 |
| tblVehicleEF | MDV | 0.13 | 0.11 |
| tblVehicleEF | MDV | 0.20 | 0.35 |
| tblVehicleEF | MDV | 2.1080e-003 | 2.0860e-003 |
| tblVehicleEF | MDV | 2.4110e-003 | 2.0610e-003 |
| tblVehicleEF | MDV | 1.9430e-003 | 1.9230e-003 |
| tblVehicleEF | MDV | 2.2170e-003 | 1.8960e-003 |
| tblVehicleEF | MDV | 0.07 | 0.08 |
| tblVehicleEF | MDV | 0.15 | 0.14 |
| tblVehicleEF | MDV | 0.07 | 0.09 |
| tblVehicleEF | MDV | 0.03 | 0.03 |
| tblVehicleEF | MDV | 0.09 | 0.43 |
| tblVehicleEF | MDV | 0.17 | 0.40 |
| tblVehicleEF | MDV | 4.8410e-003 | 4.1450e-003 |
| tblVehicleEF | MDV | 1.0520e-003 | 8.2300e-004 |
| tblVehicleEF | MDV | 0.07 | 0.08 |
| tblVehicleEF | MDV | 0.15 | 0.14 |
| tblVehicleEF | MDV | 0.07 | 0.09 |
| tblVehicleEF | MDV | 0.04 | 0.04 |
| tblVehicleEF | MDV | 0.09 | 0.43 |

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|---|---|---|---|
| tblVehicleEF | MDV | 0.19 | 0.44 |
| tblVehicleEF | MDV | 0.00 | 0.08 |
| tblVehicleEF | MDV | 0.01 | 0.00 |
| tblVehicleEF | MDV | 0.01 | 0.15 |
| tblVehicleEF | MDV | 0.00 | 17.75 |
| tblVehicleEF | MDV | 1.29 | 0.00 |
| tblVehicleEF | MDV | 1.96 | 7.0040e-003 |
| tblVehicleEF | MDV | 0.00 | 7.1080e-003 |
| tblVehicleEF | MDV | 507.25 | 0.00 |
| tblVehicleEF | MDV | 101.24 | 0.03 |
| tblVehicleEF | MDV | 0.00 | 0.02 |
| tblVehicleEF | MDV | 0.11 | 0.00 |
| tblVehicleEF | MDV | 0.19 | 9.1800e-003 |
| tblVehicleEF | MDV | 0.00 | 0.13 |
| tblVehicleEF | MDV | 0.04 | 0.00 |
| tblVehicleEF | MDV | 8.0000e-003 | 0.04 |
| tblVehicleEF | MDV | 2.1080e-003 | 0.40 |
| tblVehicleEF | MDV | 2.4110e-003 | 0.62 |
| tblVehicleEF | MDV | 0.00 | 0.03 |
| tblVehicleEF | MDV | 0.02 | 0.61 |
| tblVehicleEF | MDV | 2.0000e-003 | 0.58 |
| tblVehicleEF | MDV | 1.9430e-003 | 0.39 |
| tblVehicleEF | MDV | 2.2170e-003 | 0.40 |
| tblVehicleEF | MDV | 0.11 | 0.00 |
| tblVehicleEF | MDV | 0.16 | 1.7780e-003 |
| tblVehicleEF | MDV | 0.10 | 2.1000e-005 |
| tblVehicleEF | MDV | 0.03 | 0.10 |
| tblVehicleEF | MDV | 0.09 | 0.00 |
| tblVehicleEF | MDV | 5.0810e-003 | 1.33 |

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|---|---|---|---|
| tblVehicleEF | MDV | 1.0460e-003 | 2.64 |
| tblVehicleEF | MDV | 0.11 | 93.07 |
| tblVehicleEF | MDV | 0.16 | 2.0580e-003 |
| tblVehicleEF | MDV | 0.00 | 4.4600e-004 |
| tblVehicleEF | MDV | 0.10 | 7.9160e-003 |
| tblVehicleEF | MDV | 0.04 | 0.02 |
| tblVehicleEF | MDV | 0.09 | 8.0020e-003 |
| tblVehicleEF | MDV | 0.17 | 0.00 |
| tblVehicleEF | MDV | 0.00 | 0.09 |
| tblVehicleEF | MDV | 0.01 | 0.00 |
| tblVehicleEF | MDV | 0.01 | 0.15 |
| tblVehicleEF | MDV | 0.00 | 17.99 |
| tblVehicleEF | MDV | 1.13 | 0.00 |
| tblVehicleEF | MDV | 2.35 | 6.4530e-003 |
| tblVehicleEF | MDV | 0.00 | 7.5770e-003 |
| tblVehicleEF | MDV | 476.03 | 0.00 |
| tblVehicleEF | MDV | 101.24 | 0.03 |
| tblVehicleEF | MDV | 0.00 | 0.02 |
| tblVehicleEF | MDV | 0.12 | 0.00 |
| tblVehicleEF | MDV | 0.21 | 9.7530e-003 |
| tblVehicleEF | MDV | 0.00 | 0.09 |
| tblVehicleEF | MDV | 0.04 | 0.00 |
| tblVehicleEF | MDV | 8.0000e-003 | 0.04 |
| tblVehicleEF | MDV | 2.1080e-003 | 0.50 |
| tblVehicleEF | MDV | 2.4110e-003 | 0.37 |
| tblVehicleEF | MDV | 0.00 | 0.03 |
| tblVehicleEF | MDV | 0.02 | 0.37 |
| tblVehicleEF | MDV | 2.0000e-003 | 0.40 |
| tblVehicleEF | MDV | 1.9430e-003 | 0.45 |

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|---|---|---|---|
| tblVehicleEF | MDV | 2.2170e-003 | 0.50 |
| tblVehicleEF | MDV | 0.07 | 0.00 |
| tblVehicleEF | MDV | 0.17 | 1.7780e-003 |
| tblVehicleEF | MDV | 0.07 | 2.1000e-005 |
| tblVehicleEF | MDV | 0.03 | 0.11 |
| tblVehicleEF | MDV | 0.11 | 0.00 |
| tblVehicleEF | MDV | 4.7660e-003 | 1.18 |
| tblVehicleEF | MDV | 1.0530e-003 | 3.21 |
| tblVehicleEF | MDV | 0.07 | 89.28 |
| tblVehicleEF | MDV | 0.17 | 2.0580e-003 |
| tblVehicleEF | MDV | 0.00 | 4.4600e-004 |
| tblVehicleEF | MDV | 0.07 | 7.9160e-003 |
| tblVehicleEF | MDV | 0.04 | 0.02 |
| tblVehicleEF | MDV | 0.11 | 8.0020e-003 |
| tblVehicleEF | MDV | 0.19 | 0.00 |
| tblVehicleEF | MH | 0.02 | 0.01 |
| tblVehicleEF | MH | 0.02 | 0.02 |
| tblVehicleEF | MH | 1.75 | 1.21 |
| tblVehicleEF | MH | 5.15 | 2.15 |
| tblVehicleEF | MH | 1,102.46 | 1,501.21 |
| tblVehicleEF | MH | 58.88 | 19.42 |
| tblVehicleEF | MH | 1.12 | 1.11 |
| tblVehicleEF | MH | 0.75 | 0.25 |
| tblVehicleEF | MH | 0.01 | 0.01 |
| tblVehicleEF | MH | 0.02 | 0.02 |
| tblVehicleEF | MH | 1.0110e-003 | 2.8400e-004 |
| tblVehicleEF | MH | 3.2180e-003 | 3.2450e-003 |
| tblVehicleEF | MH | 0.02 | 0.02 |
| tblVehicleEF | MH | 9.3000e-004 | 2.6100e-004 |

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|---|---|---|---|
| tblVehicleEF | MH | 0.93 | 0.84 |
| tblVehicleEF | MH | 0.06 | 0.06 |
| tblVehicleEF | MH | 0.38 | 0.35 |
| tblVehicleEF | MH | 0.07 | 0.06 |
| tblVehicleEF | MH | 0.02 | 1.46 |
| tblVehicleEF | MH | 0.30 | 0.10 |
| tblVehicleEF | MH | 0.01 | 0.01 |
| tblVehicleEF | MH | 6.7800e-004 | 1.9200e-004 |
| tblVehicleEF | MH | 0.93 | 0.84 |
| tblVehicleEF | MH | 0.06 | 0.06 |
| tblVehicleEF | MH | 0.38 | 0.35 |
| tblVehicleEF | MH | 0.10 | 0.08 |
| tblVehicleEF | MH | 0.02 | 1.46 |
| tblVehicleEF | MH | 0.33 | 0.11 |
| tblVehicleEF | MH | 0.00 | 0.92 |
| tblVehicleEF | MH | 0.02 | 0.00 |
| tblVehicleEF | MH | 0.02 | 0.06 |
| tblVehicleEF | MH | 0.00 | 192.01 |
| tblVehicleEF | MH | 1.80 | 0.00 |
| tblVehicleEF | MH | 4.84 | 0.01 |
| tblVehicleEF | MH | 0.00 | 0.27 |
| tblVehicleEF | MH | 1,102.46 | 0.00 |
| tblVehicleEF | MH | 58.88 | 0.06 |
| tblVehicleEF | MH | 0.00 | 0.22 |
| tblVehicleEF | MH | 1.04 | 0.00 |
| tblVehicleEF | MH | 0.72 | 0.05 |
| tblVehicleEF | MH | 0.00 | 0.50 |
| tblVehicleEF | MH | 0.13 | 0.00 |
| tblVehicleEF | MH | 0.01 | 0.08 |

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|---|---|---|---|
| tblVehicleEF | MH | 0.02 | 1.42 |
| tblVehicleEF | MH | 1.0110e-003 | 0.12 |
| tblVehicleEF | MH | 0.00 | 0.60 |
| tblVehicleEF | MH | 0.06 | 0.12 |
| tblVehicleEF | MH | 3.2180e-003 | 0.05 |
| tblVehicleEF | MH | 0.02 | 0.10 |
| tblVehicleEF | MH | 9.3000e-004 | 1.43 |
| tblVehicleEF | MH | 1.40 | 0.03 |
| tblVehicleEF | MH | 0.06 | 0.02 |
| tblVehicleEF | MH | 0.58 | 2.6060e-003 |
| tblVehicleEF | MH | 0.07 | 1.03 |
| tblVehicleEF | MH | 0.02 | 0.00 |
| tblVehicleEF | MH | 0.28 | 0.24 |
| tblVehicleEF | MH | 0.01 | 1.24 |
| tblVehicleEF | MH | 6.7300e-004 | 2.03 |
| tblVehicleEF | MH | 1.40 | 15,054.74 |
| tblVehicleEF | MH | 0.06 | 2.8400e-004 |
| tblVehicleEF | MH | 0.00 | 0.19 |
| tblVehicleEF | MH | 0.58 | 1.30 |
| tblVehicleEF | MH | 0.10 | 0.06 |
| tblVehicleEF | MH | 0.02 | 0.01 |
| tblVehicleEF | MH | 0.31 | 0.00 |
| tblVehicleEF | MH | 0.00 | 0.97 |
| tblVehicleEF | MH | 0.02 | 0.00 |
| tblVehicleEF | MH | 0.02 | 0.07 |
| tblVehicleEF | MH | 0.00 | 194.46 |
| tblVehicleEF | MH | 1.74 | 0.00 |
| tblVehicleEF | MH | 5.19 | 0.01 |
| tblVehicleEF | MH | 0.00 | 0.28 |

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|---|---|---|---|
| tblVehicleEF | MH | 1,102.46 | 0.00 |
| tblVehicleEF | MH | 58.88 | 0.06 |
| tblVehicleEF | MH | 0.00 | 0.24 |
| tblVehicleEF | MH | 1.10 | 0.00 |
| tblVehicleEF | MH | 0.75 | 0.05 |
| tblVehicleEF | MH | 0.00 | 0.36 |
| tblVehicleEF | MH | 0.13 | 0.00 |
| tblVehicleEF | MH | 0.01 | 0.08 |
| tblVehicleEF | MH | 0.02 | 1.53 |
| tblVehicleEF | MH | 1.0110e-003 | 0.09 |
| tblVehicleEF | MH | 0.00 | 0.71 |
| tblVehicleEF | MH | 0.06 | 0.09 |
| tblVehicleEF | MH | 3.2180e-003 | 0.04 |
| tblVehicleEF | MH | 0.02 | 0.11 |
| tblVehicleEF | MH | 9.3000e-004 | 1.54 |
| tblVehicleEF | MH | 1.03 | 0.03 |
| tblVehicleEF | MH | 0.08 | 0.02 |
| tblVehicleEF | MH | 0.40 | 2.6060e-003 |
| tblVehicleEF | MH | 0.07 | 1.09 |
| tblVehicleEF | MH | 0.02 | 0.00 |
| tblVehicleEF | MH | 0.30 | 0.25 |
| tblVehicleEF | MH | 0.01 | 1.20 |
| tblVehicleEF | MH | 6.7900e-004 | 2.18 |
| tblVehicleEF | MH | 1.03 | 15,054.02 |
| tblVehicleEF | MH | 0.08 | 2.8400e-004 |
| tblVehicleEF | MH | 0.00 | 0.19 |
| tblVehicleEF | MH | 0.40 | 1.30 |
| tblVehicleEF | MH | 0.10 | 0.06 |
| tblVehicleEF | MH | 0.02 | 0.01 |

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|---|---|---|---|
| tblVehicleEF | MH | 0.33 | 0.00 |
| tblVehicleEF | MHD | 0.02 | 4.3860e-003 |
| tblVehicleEF | MHD | 3.3120e-003 | 4.5970e-003 |
| tblVehicleEF | MHD | 0.05 | 0.01 |
| tblVehicleEF | MHD | 0.34 | 0.39 |
| tblVehicleEF | MHD | 0.28 | 0.47 |
| tblVehicleEF | MHD | 5.26 | 1.42 |
| tblVehicleEF | MHD | 138.52 | 67.37 |
| tblVehicleEF | MHD | 1,128.29 | 1,069.65 |
| tblVehicleEF | MHD | 59.14 | 12.05 |
| tblVehicleEF | MHD | 0.37 | 0.48 |
| tblVehicleEF | MHD | 0.70 | 1.63 |
| tblVehicleEF | MHD | 10.62 | 1.29 |
| tblVehicleEF | MHD | 1.0200e-004 | 1.0770e-003 |
| tblVehicleEF | MHD | 2.8190e-003 | 0.03 |
| tblVehicleEF | MHD | 7.6400e-004 | 1.3700e-004 |
| tblVehicleEF | MHD | 9.8000e-005 | 1.0300e-003 |
| tblVehicleEF | MHD | 2.6930e-003 | 0.03 |
| tblVehicleEF | MHD | 7.0300e-004 | 1.2600e-004 |
| tblVehicleEF | MHD | 1.0280e-003 | 6.6200e-004 |
| tblVehicleEF | MHD | 0.04 | 0.03 |
| tblVehicleEF | MHD | 0.02 | 0.02 |
| tblVehicleEF | MHD | 6.7100e-004 | 4.2600e-004 |
| tblVehicleEF | MHD | 0.03 | 0.06 |
| tblVehicleEF | MHD | 0.02 | 0.14 |
| tblVehicleEF | MHD | 0.32 | 0.07 |
| tblVehicleEF | MHD | 1.3330e-003 | 6.4000e-004 |
| tblVehicleEF | MHD | 0.01 | 0.01 |
| tblVehicleEF | MHD | 6.8400e-004 | 1.1900e-004 |

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|---|---|---|---|
| tblVehicleEF | MHD | 1.0280e-003 | 6.6200e-004 |
| tblVehicleEF | MHD | 0.04 | 0.03 |
| tblVehicleEF | MHD | 0.03 | 0.03 |
| tblVehicleEF | MHD | 6.7100e-004 | 4.2600e-004 |
| tblVehicleEF | MHD | 0.04 | 0.07 |
| tblVehicleEF | MHD | 0.02 | 0.14 |
| tblVehicleEF | MHD | 0.35 | 0.07 |
| tblVehicleEF | MHD | 0.01 | 3.1600e-003 |
| tblVehicleEF | MHD | 3.3570e-003 | 0.23 |
| tblVehicleEF | MHD | 0.04 | 0.03 |
| tblVehicleEF | MHD | 0.25 | 0.60 |
| tblVehicleEF | MHD | 0.28 | 801.62 |
| tblVehicleEF | MHD | 5.00 | 6.3020e-003 |
| tblVehicleEF | MHD | 146.72 | 4.4400e-004 |
| tblVehicleEF | MHD | 1,128.29 | 0.11 |
| tblVehicleEF | MHD | 59.14 | 0.06 |
| tblVehicleEF | MHD | 0.38 | 5.9500e-004 |
| tblVehicleEF | MHD | 0.66 | 0.04 |
| tblVehicleEF | MHD | 10.59 | 0.11 |
| tblVehicleEF | MHD | 8.6000e-005 | 6.0400e-004 |
| tblVehicleEF | MHD | 0.13 | 0.31 |
| tblVehicleEF | MHD | 0.01 | 0.07 |
| tblVehicleEF | MHD | 2.8190e-003 | 0.07 |
| tblVehicleEF | MHD | 7.6400e-004 | 0.02 |
| tblVehicleEF | MHD | 8.3000e-005 | 1.3950e-003 |
| tblVehicleEF | MHD | 0.06 | 0.01 |
| tblVehicleEF | MHD | 3.0000e-003 | 6.2570e-003 |
| tblVehicleEF | MHD | 2.6930e-003 | 0.04 |
| tblVehicleEF | MHD | 7.0300e-004 | 0.14 |

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|---|---|---|---|
| tblVehicleEF | MHD | 1.5610e-003 | 2.5700e-004 |
| tblVehicleEF | MHD | 0.04 | 0.03 |
| tblVehicleEF | MHD | 0.02 | 0.48 |
| tblVehicleEF | MHD | 9.8200e-004 | 6.0000e-006 |
| tblVehicleEF | MHD | 0.03 | 1.54 |
| tblVehicleEF | MHD | 0.02 | 8.5670e-003 |
| tblVehicleEF | MHD | 0.31 | 1.29 |
| tblVehicleEF | MHD | 1.4110e-003 | 0.32 |
| tblVehicleEF | MHD | 0.01 | 0.48 |
| tblVehicleEF | MHD | 6.7900e-004 | 1.35 |
| tblVehicleEF | MHD | 1.5610e-003 | 92.89 |
| tblVehicleEF | MHD | 0.04 | 1.3700e-004 |
| tblVehicleEF | MHD | 0.03 | 2.6640e-003 |
| tblVehicleEF | MHD | 9.8200e-004 | 0.01 |
| tblVehicleEF | MHD | 0.04 | 0.06 |
| tblVehicleEF | MHD | 0.02 | 0.01 |
| tblVehicleEF | MHD | 0.34 | 8.9540e-003 |
| tblVehicleEF | MHD | 0.02 | 3.3190e-003 |
| tblVehicleEF | MHD | 3.3000e-003 | 0.25 |
| tblVehicleEF | MHD | 0.05 | 0.03 |
| tblVehicleEF | MHD | 0.47 | 0.60 |
| tblVehicleEF | MHD | 0.28 | 779.65 |
| tblVehicleEF | MHD | 5.30 | 6.1700e-003 |
| tblVehicleEF | MHD | 127.19 | 4.5700e-004 |
| tblVehicleEF | MHD | 1,128.29 | 0.11 |
| tblVehicleEF | MHD | 59.14 | 0.06 |
| tblVehicleEF | MHD | 0.35 | 6.2100e-004 |
| tblVehicleEF | MHD | 0.69 | 0.05 |
| tblVehicleEF | MHD | 10.63 | 0.11 |

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|---|---|---|---|
| tblVehicleEF | MHD | 1.2500e-004 | 4.1600e-004 |
| tblVehicleEF | MHD | 0.13 | 0.34 |
| tblVehicleEF | MHD | 0.01 | 0.07 |
| tblVehicleEF | MHD | 2.8190e-003 | 0.08 |
| tblVehicleEF | MHD | 7.6400e-004 | 0.01 |
| tblVehicleEF | MHD | 1.1900e-004 | 1.4610e-003 |
| tblVehicleEF | MHD | 0.06 | 7.1060e-003 |
| tblVehicleEF | MHD | 3.0000e-003 | 4.3140e-003 |
| tblVehicleEF | MHD | 2.6930e-003 | 0.04 |
| tblVehicleEF | MHD | 7.0300e-004 | 0.16 |
| tblVehicleEF | MHD | 1.0490e-003 | 2.5700e-004 |
| tblVehicleEF | MHD | 0.04 | 0.03 |
| tblVehicleEF | MHD | 0.03 | 0.48 |
| tblVehicleEF | MHD | 6.6300e-004 | 6.0000e-006 |
| tblVehicleEF | MHD | 0.03 | 1.60 |
| tblVehicleEF | MHD | 0.02 | 0.01 |
| tblVehicleEF | MHD | 0.33 | 1.29 |
| tblVehicleEF | MHD | 1.2270e-003 | 0.49 |
| tblVehicleEF | MHD | 0.01 | 0.47 |
| tblVehicleEF | MHD | 6.8400e-004 | 1.44 |
| tblVehicleEF | MHD | 1.0490e-003 | 92.89 |
| tblVehicleEF | MHD | 0.04 | 1.3700e-004 |
| tblVehicleEF | MHD | 0.04 | 2.6640e-003 |
| tblVehicleEF | MHD | 6.6300e-004 | 0.01 |
| tblVehicleEF | MHD | 0.04 | 0.06 |
| tblVehicleEF | MHD | 0.02 | 0.01 |
| tblVehicleEF | MHD | 0.36 | 0.01 |
| tblVehicleEF | OBUS | 0.01 | 8.4810e-003 |
| tblVehicleEF | OBUS | 6.0680e-003 | 7.0170e-003 |

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|---|---|---|---|
| tblVehicleEF | OBUS | 0.03 | 0.02 |
| tblVehicleEF | OBUS | 0.25 | 0.60 |
| tblVehicleEF | OBUS | 0.45 | 0.79 |
| tblVehicleEF | OBUS | 5.23 | 2.39 |
| tblVehicleEF | OBUS | 92.13 | 94.60 |
| tblVehicleEF | OBUS | 1,229.05 | 1,392.48 |
| tblVehicleEF | OBUS | 68.41 | 19.23 |
| tblVehicleEF | OBUS | 0.19 | 0.46 |
| tblVehicleEF | OBUS | 0.64 | 1.57 |
| tblVehicleEF | OBUS | 2.34 | 0.76 |
| tblVehicleEF | OBUS | 1.8000e-005 | 7.9300e-004 |
| tblVehicleEF | OBUS | 2.5270e-003 | 0.02 |
| tblVehicleEF | OBUS | 8.5100e-004 | 1.9700e-004 |
| tblVehicleEF | OBUS | 1.7000e-005 | 7.5900e-004 |
| tblVehicleEF | OBUS | 2.4010e-003 | 0.02 |
| tblVehicleEF | OBUS | 7.8200e-004 | 1.8100e-004 |
| tblVehicleEF | OBUS | 1.4810e-003 | 1.8440e-003 |
| tblVehicleEF | OBUS | 0.02 | 0.02 |
| tblVehicleEF | OBUS | 0.03 | 0.06 |
| tblVehicleEF | OBUS | 7.8200e-004 | 9.4300e-004 |
| tblVehicleEF | OBUS | 0.04 | 0.06 |
| tblVehicleEF | OBUS | 0.04 | 0.26 |
| tblVehicleEF | OBUS | 0.33 | 0.11 |
| tblVehicleEF | OBUS | 8.9100e-004 | 9.0000e-004 |
| tblVehicleEF | OBUS | 0.01 | 0.01 |
| tblVehicleEF | OBUS | 7.7600e-004 | 1.9000e-004 |
| tblVehicleEF | OBUS | 1.4810e-003 | 1.8440e-003 |
| tblVehicleEF | OBUS | 0.02 | 0.02 |
| tblVehicleEF | OBUS | 0.05 | 0.07 |

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|---|---|---|---|
| tblVehicleEF | OBUS | 7.8200e-004 | 9.4300e-004 |
| tblVehicleEF | OBUS | 0.05 | 0.08 |
| tblVehicleEF | OBUS | 0.04 | 0.26 |
| tblVehicleEF | OBUS | 0.36 | 0.13 |
| tblVehicleEF | OBUS | 0.01 | 5.5090e-003 |
| tblVehicleEF | OBUS | 6.1800e-003 | 0.93 |
| tblVehicleEF | OBUS | 0.03 | 0.02 |
| tblVehicleEF | OBUS | 0.24 | 0.95 |
| tblVehicleEF | OBUS | 0.45 | 1,847.71 |
| tblVehicleEF | OBUS | 4.94 | 0.01 |
| tblVehicleEF | OBUS | 96.60 | 8.9700e-004 |
| tblVehicleEF | OBUS | 1,229.05 | 0.27 |
| tblVehicleEF | OBUS | 68.41 | 0.06 |
| tblVehicleEF | OBUS | 0.20 | 1.0490e-003 |
| tblVehicleEF | OBUS | 0.60 | 0.11 |
| tblVehicleEF | OBUS | 2.30 | 0.07 |
| tblVehicleEF | OBUS | 1.5000e-005 | 1.3250e-003 |
| tblVehicleEF | OBUS | 0.13 | 1.16 |
| tblVehicleEF | OBUS | 0.01 | 0.08 |
| tblVehicleEF | OBUS | 2.5270e-003 | 0.15 |
| tblVehicleEF | OBUS | 8.5100e-004 | 0.05 |
| tblVehicleEF | OBUS | 1.4000e-005 | 1.1330e-003 |
| tblVehicleEF | OBUS | 0.06 | 0.03 |
| tblVehicleEF | OBUS | 3.0000e-003 | 0.02 |
| tblVehicleEF | OBUS | 2.4010e-003 | 0.07 |
| tblVehicleEF | OBUS | 7.8200e-004 | 0.26 |
| tblVehicleEF | OBUS | 2.2200e-003 | 1.9300e-004 |
| tblVehicleEF | OBUS | 0.02 | 8.2800e-003 |
| tblVehicleEF | OBUS | 0.03 | 0.45 |

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|---|---|---|---|
| tblVehicleEF | OBUS | 1.1540e-003 | 9.0000e-006 |
| tblVehicleEF | OBUS | 0.04 | 1.47 |
| tblVehicleEF | OBUS | 0.04 | 6.3020e-003 |
| tblVehicleEF | OBUS | 0.31 | 0.75 |
| tblVehicleEF | OBUS | 9.3400e-004 | 0.58 |
| tblVehicleEF | OBUS | 0.01 | 0.80 |
| tblVehicleEF | OBUS | 7.7100e-004 | 2.26 |
| tblVehicleEF | OBUS | 2.2200e-003 | 94.66 |
| tblVehicleEF | OBUS | 0.02 | 1.9700e-004 |
| tblVehicleEF | OBUS | 0.05 | 8.5200e-004 |
| tblVehicleEF | OBUS | 1.1540e-003 | 8.3860e-003 |
| tblVehicleEF | OBUS | 0.05 | 0.06 |
| tblVehicleEF | OBUS | 0.04 | 0.01 |
| tblVehicleEF | OBUS | 0.34 | 6.5870e-003 |
| tblVehicleEF | OBUS | 0.01 | 5.7950e-003 |
| tblVehicleEF | OBUS | 6.0410e-003 | 0.89 |
| tblVehicleEF | OBUS | 0.03 | 0.02 |
| tblVehicleEF | OBUS | 0.25 | 0.96 |
| tblVehicleEF | OBUS | 0.45 | 1,854.49 |
| tblVehicleEF | OBUS | 5.28 | 0.01 |
| tblVehicleEF | OBUS | 85.94 | 9.2400e-004 |
| tblVehicleEF | OBUS | 1,229.05 | 0.27 |
| tblVehicleEF | OBUS | 68.41 | 0.06 |
| tblVehicleEF | OBUS | 0.18 | 1.1010e-003 |
| tblVehicleEF | OBUS | 0.63 | 0.11 |
| tblVehicleEF | OBUS | 2.34 | 0.07 |
| tblVehicleEF | OBUS | 2.1000e-005 | 9.2500e-004 |
| tblVehicleEF | OBUS | 0.13 | 1.11 |
| tblVehicleEF | OBUS | 0.01 | 0.08 |

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|---|---|---|---|
| tblVehicleEF | OBUS | 2.5270e-003 | 0.16 |
| tblVehicleEF | OBUS | 8.5100e-004 | 0.04 |
| tblVehicleEF | OBUS | 2.0000e-005 | 1.1750e-003 |
| tblVehicleEF | OBUS | 0.06 | 0.02 |
| tblVehicleEF | OBUS | 3.0000e-003 | 0.01 |
| tblVehicleEF | OBUS | 2.4010e-003 | 0.07 |
| tblVehicleEF | OBUS | 7.8200e-004 | 0.28 |
| tblVehicleEF | OBUS | 1.5070e-003 | 1.9300e-004 |
| tblVehicleEF | OBUS | 0.02 | 8.2800e-003 |
| tblVehicleEF | OBUS | 0.03 | 0.47 |
| tblVehicleEF | OBUS | 7.7100e-004 | 9.0000e-006 |
| tblVehicleEF | OBUS | 0.04 | 1.54 |
| tblVehicleEF | OBUS | 0.04 | 8.9540e-003 |
| tblVehicleEF | OBUS | 0.33 | 0.76 |
| tblVehicleEF | OBUS | 8.3200e-004 | 0.62 |
| tblVehicleEF | OBUS | 0.01 | 0.79 |
| tblVehicleEF | OBUS | 7.7700e-004 | 2.42 |
| tblVehicleEF | OBUS | 1.5070e-003 | 94.65 |
| tblVehicleEF | OBUS | 0.02 | 1.9700e-004 |
| tblVehicleEF | OBUS | 0.05 | 8.5200e-004 |
| tblVehicleEF | OBUS | 7.7100e-004 | 8.3860e-003 |
| tblVehicleEF | OBUS | 0.05 | 0.06 |
| tblVehicleEF | OBUS | 0.04 | 0.01 |
| tblVehicleEF | OBUS | 0.36 | 9.3590e-003 |
| tblVehicleEF | SBUS | 0.83 | 0.07 |
| tblVehicleEF | SBUS | 0.01 | 7.0580e-003 |
| tblVehicleEF | SBUS | 0.06 | 6.2120e-003 |
| tblVehicleEF | SBUS | 8.05 | 2.77 |
| tblVehicleEF | SBUS | 0.70 | 0.59 |

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|---|---|---|---|
| tblVehicleEF | SBUS | 7.21 | 0.85 |
| tblVehicleEF | SBUS | 1,117.62 | 351.72 |
| tblVehicleEF | SBUS | 1,084.59 | 1,109.67 |
| tblVehicleEF | SBUS | 55.10 | 5.24 |
| tblVehicleEF | SBUS | 8.67 | 3.22 |
| tblVehicleEF | SBUS | 3.92 | 4.87 |
| tblVehicleEF | SBUS | 12.12 | 0.88 |
| tblVehicleEF | SBUS | 8.2760e-003 | 4.1230e-003 |
| tblVehicleEF | SBUS | 0.01 | 0.01 |
| tblVehicleEF | SBUS | 0.02 | 0.03 |
| tblVehicleEF | SBUS | 7.8500e-004 | 5.1000e-005 |
| tblVehicleEF | SBUS | 7.9180e-003 | 3.9440e-003 |
| tblVehicleEF | SBUS | 2.6790e-003 | 2.6820e-003 |
| tblVehicleEF | SBUS | 0.02 | 0.03 |
| tblVehicleEF | SBUS | 7.2200e-004 | 4.7000e-005 |
| tblVehicleEF | SBUS | 3.5810e-003 | 9.0700e-004 |
| tblVehicleEF | SBUS | 0.03 | 7.8550e-003 |
| tblVehicleEF | SBUS | 0.96 | 0.32 |
| tblVehicleEF | SBUS | 1.9090e-003 | 4.8200e-004 |
| tblVehicleEF | SBUS | 0.10 | 0.10 |
| tblVehicleEF | SBUS | 0.01 | 0.05 |
| tblVehicleEF | SBUS | 0.38 | 0.04 |
| tblVehicleEF | SBUS | 0.01 | 3.3550e-003 |
| tblVehicleEF | SBUS | 0.01 | 0.01 |
| tblVehicleEF | SBUS | 6.7600e-004 | 5.2000e-005 |
| tblVehicleEF | SBUS | 3.5810e-003 | 9.0700e-004 |
| tblVehicleEF | SBUS | 0.03 | 7.8550e-003 |
| tblVehicleEF | SBUS | 1.38 | 0.46 |
| tblVehicleEF | SBUS | 1.9090e-003 | 4.8200e-004 |

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|---|---|---|---|
| tblVehicleEF | SBUS | 0.12 | 0.11 |
| tblVehicleEF | SBUS | 0.01 | 0.05 |
| tblVehicleEF | SBUS | 0.42 | 0.04 |
| tblVehicleEF | SBUS | 0.83 | 7.9680e-003 |
| tblVehicleEF | SBUS | 0.01 | 3.57 |
| tblVehicleEF | SBUS | 0.06 | 7.9970e-003 |
| tblVehicleEF | SBUS | 7.94 | 1.24 |
| tblVehicleEF | SBUS | 0.71 | 3,371.97 |
| tblVehicleEF | SBUS | 5.75 | 5.9880e-003 |
| tblVehicleEF | SBUS | 1,167.88 | 1.4740e-003 |
| tblVehicleEF | SBUS | 1,084.59 | 0.43 |
| tblVehicleEF | SBUS | 55.10 | 0.11 |
| tblVehicleEF | SBUS | 8.95 | 1.3830e-003 |
| tblVehicleEF | SBUS | 3.70 | 0.78 |
| tblVehicleEF | SBUS | 12.09 | 0.17 |
| tblVehicleEF | SBUS | 6.9770e-003 | 6.7400e-004 |
| tblVehicleEF | SBUS | 0.74 | 5.14 |
| tblVehicleEF | SBUS | 0.01 | 0.11 |
| tblVehicleEF | SBUS | 0.02 | 0.13 |
| tblVehicleEF | SBUS | 7.8500e-004 | 5.2810e-003 |
| tblVehicleEF | SBUS | 6.6750e-003 | 1.9990e-003 |
| tblVehicleEF | SBUS | 0.32 | 0.02 |
| tblVehicleEF | SBUS | 2.6790e-003 | 7.7120e-003 |
| tblVehicleEF | SBUS | 0.02 | 0.10 |
| tblVehicleEF | SBUS | 7.2200e-004 | 0.05 |
| tblVehicleEF | SBUS | 5.4810e-003 | 2.8700e-004 |
| tblVehicleEF | SBUS | 0.03 | 0.04 |
| tblVehicleEF | SBUS | 0.95 | 3.29 |
| tblVehicleEF | SBUS | 2.8990e-003 | 1.2000e-005 |

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|---|---|---|---|
| tblVehicleEF | SBUS | 0.10 | 4.59 |
| tblVehicleEF | SBUS | 0.01 | 0.04 |
| tblVehicleEF | SBUS | 0.34 | 0.87 |
| tblVehicleEF | SBUS | 0.01 | 2.74 |
| tblVehicleEF | SBUS | 0.01 | 0.60 |
| tblVehicleEF | SBUS | 6.5100e-004 | 0.69 |
| tblVehicleEF | SBUS | 5.4810e-003 | 118.27 |
| tblVehicleEF | SBUS | 0.03 | 5.1000e-005 |
| tblVehicleEF | SBUS | 1.38 | 3.2450e-003 |
| tblVehicleEF | SBUS | 2.8990e-003 | 0.08 |
| tblVehicleEF | SBUS | 0.12 | 0.32 |
| tblVehicleEF | SBUS | 0.01 | 0.01 |
| tblVehicleEF | SBUS | 0.37 | 0.04 |
| tblVehicleEF | SBUS | 0.83 | 9.1700e-003 |
| tblVehicleEF | SBUS | 0.01 | 3.57 |
| tblVehicleEF | SBUS | 0.06 | 8.2560e-003 |
| tblVehicleEF | SBUS | 8.20 | 1.32 |
| tblVehicleEF | SBUS | 0.70 | 3,202.19 |
| tblVehicleEF | SBUS | 7.43 | 5.9530e-003 |
| tblVehicleEF | SBUS | 1,048.22 | 1.5370e-003 |
| tblVehicleEF | SBUS | 1,084.59 | 0.40 |
| tblVehicleEF | SBUS | 55.10 | 0.11 |
| tblVehicleEF | SBUS | 8.29 | 1.5910e-003 |
| tblVehicleEF | SBUS | 3.86 | 0.77 |
| tblVehicleEF | SBUS | 12.12 | 0.17 |
| tblVehicleEF | SBUS | 0.01 | 4.6300e-004 |
| tblVehicleEF | SBUS | 0.74 | 5.15 |
| tblVehicleEF | SBUS | 0.01 | 0.11 |
| tblVehicleEF | SBUS | 0.02 | 0.18 |

| | | | |
|---|---|---|---|
| tblVehicleEF | SBUS | 7.8500e-004 | 3.6810e-003 |
| tblVehicleEF | SBUS | 9.6340e-003 | 2.0640e-003 |
| tblVehicleEF | SBUS | 0.32 | 0.01 |
| tblVehicleEF | SBUS | 2.6790e-003 | 5.2960e-003 |
| tblVehicleEF | SBUS | 0.02 | 0.11 |
| tblVehicleEF | SBUS | 7.2200e-004 | 0.06 |
| tblVehicleEF | SBUS | 3.5300e-003 | 2.8700e-004 |
| tblVehicleEF | SBUS | 0.03 | 0.04 |
| tblVehicleEF | SBUS | 0.96 | 3.13 |
| tblVehicleEF | SBUS | 1.8720e-003 | 1.2000e-005 |
| tblVehicleEF | SBUS | 0.10 | 4.79 |
| tblVehicleEF | SBUS | 0.02 | 0.06 |
| tblVehicleEF | SBUS | 0.39 | 0.88 |
| tblVehicleEF | SBUS | 0.01 | 2.83 |
| tblVehicleEF | SBUS | 0.01 | 0.58 |
| tblVehicleEF | SBUS | 6.7900e-004 | 0.88 |
| tblVehicleEF | SBUS | 3.5300e-003 | 118.27 |
| tblVehicleEF | SBUS | 0.03 | 5.1000e-005 |
| tblVehicleEF | SBUS | 1.39 | 3.2450e-003 |
| tblVehicleEF | SBUS | 1.8720e-003 | 0.08 |
| tblVehicleEF | SBUS | 0.12 | 0.32 |
| tblVehicleEF | SBUS | 0.02 | 0.01 |
| tblVehicleEF | SBUS | 0.43 | 0.06 |
| tblVehicleEF | UBUS | 2.23 | 5.80 |
| tblVehicleEF | UBUS | 0.06 | 0.01 |
| tblVehicleEF | UBUS | 10.02 | 45.07 |
| tblVehicleEF | UBUS | 10.14 | 0.71 |
| tblVehicleEF | UBUS | 1,910.27 | 1,988.80 |
| tblVehicleEF | UBUS | 112.81 | 8.53 |

| | | | |
|---|---|---|---|
| tblVehicleEF | UBUS | 7.96 | 0.48 |
| tblVehicleEF | UBUS | 14.44 | 0.08 |
| tblVehicleEF | UBUS | 0.58 | 0.07 |
| tblVehicleEF | UBUS | 0.01 | 0.03 |
| tblVehicleEF | UBUS | 0.10 | 3.2120e-003 |
| tblVehicleEF | UBUS | 1.2160e-003 | 4.6000e-005 |
| tblVehicleEF | UBUS | 0.25 | 0.03 |
| tblVehicleEF | UBUS | 3.0000e-003 | 7.9830e-003 |
| tblVehicleEF | UBUS | 0.10 | 3.0700e-003 |
| tblVehicleEF | UBUS | 1.1180e-003 | 4.2000e-005 |
| tblVehicleEF | UBUS | 4.9050e-003 | 6.1100e-004 |
| tblVehicleEF | UBUS | 0.08 | 8.4590e-003 |
| tblVehicleEF | UBUS | 2.8380e-003 | 4.9000e-004 |
| tblVehicleEF | UBUS | 0.70 | 0.08 |
| tblVehicleEF | UBUS | 0.03 | 0.05 |
| tblVehicleEF | UBUS | 0.79 | 0.05 |
| tblVehicleEF | UBUS | 9.5820e-003 | 1.5580e-003 |
| tblVehicleEF | UBUS | 1.3110e-003 | 8.4000e-005 |
| tblVehicleEF | UBUS | 4.9050e-003 | 6.1100e-004 |
| tblVehicleEF | UBUS | 0.08 | 8.4590e-003 |
| tblVehicleEF | UBUS | 2.8380e-003 | 4.9000e-004 |
| tblVehicleEF | UBUS | 3.01 | 5.92 |
| tblVehicleEF | UBUS | 0.03 | 0.05 |
| tblVehicleEF | UBUS | 0.86 | 0.05 |
| tblVehicleEF | UBUS | 0.00 | 0.01 |
| tblVehicleEF | UBUS | 2.23 | 0.00 |
| tblVehicleEF | UBUS | 0.05 | 8.7350e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.10 |
| tblVehicleEF | UBUS | 10.08 | 0.00 |

| | | | |
|---|---|---|---|
| tblVehicleEF | UBUS | 8.80 | 0.67 |
| tblVehicleEF | UBUS | 0.00 | 1.7650e-003 |
| tblVehicleEF | UBUS | 1,910.27 | 0.00 |
| tblVehicleEF | UBUS | 112.81 | 2.0170e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.5820e-003 |
| tblVehicleEF | UBUS | 7.50 | 0.00 |
| tblVehicleEF | UBUS | 14.38 | 4.3400e-003 |
| tblVehicleEF | UBUS | 0.00 | 6.8000e-004 |
| tblVehicleEF | UBUS | 0.58 | 0.00 |
| tblVehicleEF | UBUS | 0.01 | 5.92 |
| tblVehicleEF | UBUS | 0.10 | 0.03 |
| tblVehicleEF | UBUS | 1.2160e-003 | 3.5700e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.1840e-003 |
| tblVehicleEF | UBUS | 0.25 | 2.5140e-003 |
| tblVehicleEF | UBUS | 3.0000e-003 | 1.9150e-003 |
| tblVehicleEF | UBUS | 0.10 | 0.03 |
| tblVehicleEF | UBUS | 1.1180e-003 | 0.05 |
| tblVehicleEF | UBUS | 7.1810e-003 | 9.1000e-005 |
| tblVehicleEF | UBUS | 0.08 | 1.5700e-004 |
| tblVehicleEF | UBUS | 4.1630e-003 | 1.0000e-005 |
| tblVehicleEF | UBUS | 0.71 | 0.48 |
| tblVehicleEF | UBUS | 0.02 | 0.00 |
| tblVehicleEF | UBUS | 0.72 | 0.08 |
| tblVehicleEF | UBUS | 9.5830e-003 | 45.07 |
| tblVehicleEF | UBUS | 1.2880e-003 | 0.62 |
| tblVehicleEF | UBUS | 7.1810e-003 | 53.30 |
| tblVehicleEF | UBUS | 0.08 | 4.6000e-005 |
| tblVehicleEF | UBUS | 0.00 | 4.2000e-005 |
| tblVehicleEF | UBUS | 4.1630e-003 | 3.2690e-003 |

| | | | |
|---|---|---|---|
| tblVehicleEF | UBUS | 3.02 | 0.03 |
| tblVehicleEF | UBUS | 0.02 | 1.4510e-003 |
| tblVehicleEF | UBUS | 0.79 | 0.00 |
| tblVehicleEF | UBUS | 0.00 | 0.01 |
| tblVehicleEF | UBUS | 2.23 | 0.00 |
| tblVehicleEF | UBUS | 0.06 | 9.0200e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.14 |
| tblVehicleEF | UBUS | 10.01 | 0.00 |
| tblVehicleEF | UBUS | 10.32 | 0.67 |
| tblVehicleEF | UBUS | 0.00 | 1.8120e-003 |
| tblVehicleEF | UBUS | 1,910.27 | 0.00 |
| tblVehicleEF | UBUS | 112.81 | 1.9670e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.8220e-003 |
| tblVehicleEF | UBUS | 7.81 | 0.00 |
| tblVehicleEF | UBUS | 14.45 | 4.5080e-003 |
| tblVehicleEF | UBUS | 0.00 | 4.6500e-004 |
| tblVehicleEF | UBUS | 0.58 | 0.00 |
| tblVehicleEF | UBUS | 0.01 | 5.92 |
| tblVehicleEF | UBUS | 0.10 | 0.05 |
| tblVehicleEF | UBUS | 1.2160e-003 | 2.3810e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.2550e-003 |
| tblVehicleEF | UBUS | 0.25 | 1.6770e-003 |
| tblVehicleEF | UBUS | 3.0000e-003 | 1.3100e-003 |
| tblVehicleEF | UBUS | 0.10 | 0.04 |
| tblVehicleEF | UBUS | 1.1180e-003 | 0.07 |
| tblVehicleEF | UBUS | 5.4680e-003 | 9.1000e-005 |
| tblVehicleEF | UBUS | 0.09 | 1.5700e-004 |
| tblVehicleEF | UBUS | 2.9720e-003 | 1.0000e-005 |
| tblVehicleEF | UBUS | 0.70 | 0.48 |

| | | | |
|---|---|---|---|
| tblVehicleEF | UBUS | 0.03 | 0.00 |
| tblVehicleEF | UBUS | 0.80 | 0.08 |
| tblVehicleEF | UBUS | 9.5820e-003 | 45.07 |
| tblVehicleEF | UBUS | 1.3140e-003 | 0.72 |
| tblVehicleEF | UBUS | 5.4680e-003 | 53.30 |
| tblVehicleEF | UBUS | 0.09 | 4.6000e-005 |
| tblVehicleEF | UBUS | 0.00 | 4.2000e-005 |
| tblVehicleEF | UBUS | 2.9720e-003 | 3.2690e-003 |
| tblVehicleEF | UBUS | 3.01 | 0.03 |
| tblVehicleEF | UBUS | 0.03 | 1.4510e-003 |
| tblVehicleEF | UBUS | 0.88 | 0.00 |
| tblVehicleTrips | SU_TR | 16.74 | 19.50 |
| tblVehicleTrips | WD_TR | 1.89 | 34.00 |

## 2.0 Emissions Summary

### 2.1 Overall Construction

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.2726 | 2.7504 | 1.8205 | 4.9100e-003 | 0.2760 | 0.1138 | 0.3898 | 0.1413 | 0.1047 | 0.2460 | 0.0000 | 436.8267 | 436.8267 | 0.1239 | 0.0000 | 439.9246 |
| 2022 | 0.0792 | 0.7101 | 0.6862 | 1.7800e-003 | 0.0342 | 0.0285 | 0.0627 | 9.1800e-003 | 0.0262 | 0.0354 | 0.0000 | 158.8016 | 158.8016 | 0.0395 | 0.0000 | 159.7889 |
| **Maximum** | **0.2726** | **2.7504** | **1.8205** | **4.9100e-003** | **0.2760** | **0.1138** | **0.3898** | **0.1413** | **0.1047** | **0.2460** | **0.0000** | **436.8267** | **436.8267** | **0.1239** | **0.0000** | **439.9246** |

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.2726 | 2.7504 | 1.8205 | 4.9100e-003 | 0.1267 | 0.1138 | 0.2404 | 0.0602 | 0.1047 | 0.1649 | 0.0000 | 436.8263 | 436.8263 | 0.1239 | 0.0000 | 439.9242 |
| 2022 | 0.0792 | 0.7101 | 0.6862 | 1.7800e-003 | 0.0342 | 0.0285 | 0.0627 | 9.1800e-003 | 0.0262 | 0.0354 | 0.0000 | 158.8015 | 158.8015 | 0.0395 | 0.0000 | 159.7888 |
| **Maximum** | **0.2726** | **2.7504** | **1.8205** | **4.9100e-003** | **0.1267** | **0.1138** | **0.2404** | **0.0602** | **0.1047** | **0.1649** | **0.0000** | **436.8263** | **436.8263** | **0.1239** | **0.0000** | **439.9242** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **48.15** | **0.00** | **33.01** | **53.87** | **0.00** | **28.80** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| **1** | **7-1-2021** | **9-30-2021** | 1.3220 | 1.3220 |
| **2** | **10-1-2021** | **12-31-2021** | 1.6817 | 1.6817 |
| **3** | **1-1-2022** | **3-31-2022** | 0.6903 | 0.6903 |
| **4** | **4-1-2022** | **6-30-2022** | 0.1104 | 0.1104 |
| | | **Highest** | 1.6817 | 1.6817 |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 1.0300e-003 | 0.0000 | 3.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 6.0000e-005 | 6.0000e-005 | 0.0000 | 0.0000 | 7.0000e-005 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 12.1443 | 12.1443 | 5.0000e-004 | 1.0000e-004 | 12.1877 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mobile | 0.0332 | 0.0646 | 0.3215 | 8.8000e-004 | 0.0825 | 8.5000e-004 | 0.0834 | 0.0221 | 8.0000e-004 | 0.0229 | 0.0000 | 82.2062 | 82.2062 | 5.3900e-003 | 0.0000 | 82.3411 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0426 | 0.0000 | 0.0426 | 2.5200e-003 | 0.0000 | 0.1056 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 10.5443 | 10.5443 | 4.4000e-004 | 9.0000e-005 | 10.5820 |
| **Total** | **0.0343** | **0.0646** | **0.3215** | **8.8000e-004** | **0.0825** | **8.5000e-004** | **0.0834** | **0.0221** | **8.0000e-004** | **0.0229** | **0.0426** | **104.8948** | **104.9374** | **8.8500e-003** | **1.9000e-004** | **105.2164** |

## Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 1.0300e-003 | 0.0000 | 3.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 6.0000e-005 | 6.0000e-005 | 0.0000 | 0.0000 | 7.0000e-005 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 12.1443 | 12.1443 | 5.0000e-004 | 1.0000e-004 | 12.1877 |
| Mobile | 0.0332 | 0.0646 | 0.3215 | 8.8000e-004 | 0.0825 | 8.5000e-004 | 0.0834 | 0.0221 | 8.0000e-004 | 0.0229 | 0.0000 | 82.2062 | 82.2062 | 5.3900e-003 | 0.0000 | 82.3411 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0426 | 0.0000 | 0.0426 | 2.5200e-003 | 0.0000 | 0.1056 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 10.5443 | 10.5443 | 4.4000e-004 | 9.0000e-005 | 10.5820 |
| **Total** | **0.0343** | **0.0646** | **0.3215** | **8.8000e-004** | **0.0825** | **8.5000e-004** | **0.0834** | **0.0221** | **8.0000e-004** | **0.0229** | **0.0426** | **104.8948** | **104.9374** | **8.8500e-003** | **1.9000e-004** | **105.2164** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

# 3.0 Construction Detail

## Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Clearing and Grubbing | Site Preparation | 7/1/2021 | 7/28/2021 | 5 | 20 | |
| 2 | Grading | Grading | 7/29/2021 | 10/20/2021 | 5 | 60 | |
| 3 | Paving and Construction | Building Construction | 10/21/2021 | 2/9/2022 | 5 | 80 | |
| 4 | Landscaping | Building Construction | 2/10/2022 | 6/15/2022 | 5 | 90 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 3**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Clearing and Grubbing | Excavators | 1 | 8.00 | 158 | 0.38 |
| Clearing and Grubbing | Graders | 0 | 8.00 | 187 | 0.41 |
| Clearing and Grubbing | Off-Highway Trucks | 2 | 8.00 | 402 | 0.38 |
| Clearing and Grubbing | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Clearing and Grubbing | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Clearing and Grubbing | Sweepers/Scrubbers | 1 | 8.00 | 64 | 0.46 |
| Clearing and Grubbing | Tractors/Loaders/Backhoes | 1 | 7.00 | 97 | 0.37 |
| Grading | Excavators | 1 | 8.00 | 158 | 0.38 |
| Grading | Graders | 0 | 8.00 | 187 | 0.41 |
| Grading | Off-Highway Trucks | 2 | 8.00 | 402 | 0.38 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 1 | 8.00 | 367 | 0.48 |
| Grading | Sweepers/Scrubbers | 1 | 8.00 | 64 | 0.46 |
| Grading | Tractors/Loaders/Backhoes | 0 | 7.00 | 97 | 0.37 |
| Paving and Construction | Cranes | 0 | 8.00 | 231 | 0.29 |
| Paving and Construction | Excavators | 1 | 8.00 | 158 | 0.38 |

| | | | | | |
|---|---|---|---|---|---|
| Paving and Construction | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Paving and Construction | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Paving and Construction | Off-Highway Trucks | 3 | 8.00 | 402 | 0.38 |
| Paving and Construction | Pavers | 1 | 8.00 | 130 | 0.42 |
| Paving and Construction | Rollers | 1 | 8.00 | 80 | 0.38 |
| Paving and Construction | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Paving and Construction | Scrapers | 1 | 8.00 | 367 | 0.48 |
| Paving and Construction | Sweepers/Scrubbers | 1 | 8.00 | 64 | 0.46 |
| Paving and Construction | Tractors/Loaders/Backhoes | 0 | 6.00 | 97 | 0.37 |
| Paving and Construction | Welders | 0 | 8.00 | 46 | 0.45 |
| Landscaping | Air Compressors | 0 | 6.00 | 78 | 0.48 |
| Landscaping | Cranes | 0 | 8.00 | 231 | 0.29 |
| Landscaping | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Landscaping | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Landscaping | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Landscaping | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Landscaping | Welders | 0 | 8.00 | 46 | 0.45 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Clearing and Grubbing | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 6 | 15.00 | 0.00 | 989.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving and Construction | 9 | 46.00 | 18.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Landscaping | 2 | 46.00 | 10.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

## 3.2 Clearing and Grubbing - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0626 | 0.0000 | 0.0626 | 0.0334 | 0.0000 | 0.0334 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0288 | 0.2737 | 0.1845 | 4.5000e-004 | | 0.0127 | 0.0127 | | 0.0117 | 0.0117 | 0.0000 | 39.8622 | 39.8622 | 0.0129 | 0.0000 | 40.1845 |
| **Total** | **0.0288** | **0.2737** | **0.1845** | **4.5000e-004** | **0.0626** | **0.0127** | **0.0753** | **0.0334** | **0.0117** | **0.0451** | **0.0000** | **39.8622** | **39.8622** | **0.0129** | **0.0000** | **40.1845** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.2000e-004 | 4.6000e-004 | 5.2300e-003 | 2.0000e-005 | 1.6500e-003 | 1.0000e-005 | 1.6600e-003 | 4.4000e-004 | 1.0000e-005 | 4.5000e-004 | 0.0000 | 1.4350 | 1.4350 | 4.0000e-005 | 0.0000 | 1.4359 |
| **Total** | **6.2000e-004** | **4.6000e-004** | **5.2300e-003** | **2.0000e-005** | **1.6500e-003** | **1.0000e-005** | **1.6600e-003** | **4.4000e-004** | **1.0000e-005** | **4.5000e-004** | **0.0000** | **1.4350** | **1.4350** | **4.0000e-005** | **0.0000** | **1.4359** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0244 | 0.0000 | 0.0244 | 0.0130 | 0.0000 | 0.0130 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0288 | 0.2737 | 0.1845 | 4.5000e-004 | | 0.0127 | 0.0127 | | 0.0117 | 0.0117 | 0.0000 | 39.8621 | 39.8621 | 0.0129 | 0.0000 | 40.1845 |
| **Total** | **0.0288** | **0.2737** | **0.1845** | **4.5000e-004** | **0.0244** | **0.0127** | **0.0371** | **0.0130** | **0.0117** | **0.0247** | **0.0000** | **39.8621** | **39.8621** | **0.0129** | **0.0000** | **40.1845** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.2000e-004 | 4.6000e-004 | 5.2300e-003 | 2.0000e-005 | 1.6500e-003 | 1.0000e-005 | 1.6600e-003 | 4.4000e-004 | 1.0000e-005 | 4.5000e-004 | 0.0000 | 1.4350 | 1.4350 | 4.0000e-005 | 0.0000 | 1.4359 |
| **Total** | **6.2000e-004** | **4.6000e-004** | **5.2300e-003** | **2.0000e-005** | **1.6500e-003** | **1.0000e-005** | **1.6600e-003** | **4.4000e-004** | **1.0000e-005** | **4.5000e-004** | **0.0000** | **1.4350** | **1.4350** | **4.0000e-005** | **0.0000** | **1.4359** |

## 3.3 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1823 | 0.0000 | 0.1823 | 0.0995 | 0.0000 | 0.0995 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Off-Road | 0.1094 | 1.0923 | 0.7042 | 1.7300e-003 | | 0.0477 | 0.0477 | | 0.0439 | 0.0439 | 0.0000 | 152.3711 | 152.3711 | 0.0493 | 0.0000 | 153.6031 |
| **Total** | **0.1094** | **1.0923** | **0.7042** | **1.7300e-003** | **0.1823** | **0.0477** | **0.2300** | **0.0995** | **0.0439** | **0.1434** | **0.0000** | **152.3711** | **152.3711** | **0.0493** | **0.0000** | **153.6031** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 3.8000e-003 | 0.1323 | 0.0291 | 3.8000e-004 | 8.5000e-003 | 4.0000e-004 | 8.9000e-003 | 2.3300e-003 | 3.8000e-004 | 2.7200e-003 | 0.0000 | 37.1109 | 37.1109 | 2.6800e-003 | 0.0000 | 37.1778 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.8700e-003 | 1.3900e-003 | 0.0157 | 5.0000e-005 | 4.9400e-003 | 4.0000e-005 | 4.9700e-003 | 1.3100e-003 | 3.0000e-005 | 1.3500e-003 | 0.0000 | 4.3049 | 4.3049 | 1.2000e-004 | 0.0000 | 4.3078 |
| **Total** | **5.6700e-003** | **0.1337** | **0.0448** | **4.3000e-004** | **0.0134** | **4.4000e-004** | **0.0139** | **3.6400e-003** | **4.1000e-004** | **4.0700e-003** | **0.0000** | **41.4158** | **41.4158** | **2.8000e-003** | **0.0000** | **41.4856** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0711 | 0.0000 | 0.0711 | 0.0388 | 0.0000 | 0.0388 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.1094 | 1.0923 | 0.7042 | 1.7300e-003 | | 0.0477 | 0.0477 | | 0.0439 | 0.0439 | 0.0000 | 152.3709 | 152.3709 | 0.0493 | 0.0000 | 153.6029 |
| **Total** | **0.1094** | **1.0923** | **0.7042** | **1.7300e-003** | **0.0711** | **0.0477** | **0.1188** | **0.0388** | **0.0439** | **0.0827** | **0.0000** | **152.3709** | **152.3709** | **0.0493** | **0.0000** | **153.6029** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 3.8000e-003 | 0.1323 | 0.0291 | 3.8000e-004 | 8.5000e-003 | 4.0000e-004 | 8.9000e-003 | 2.3300e-003 | 3.8000e-004 | 2.7200e-003 | 0.0000 | 37.1109 | 37.1109 | 2.6800e-003 | 0.0000 | 37.1778 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.8700e-003 | 1.3900e-003 | 0.0157 | 5.0000e-005 | 4.9400e-003 | 4.0000e-005 | 4.9700e-003 | 1.3100e-003 | 3.0000e-005 | 1.3500e-003 | 0.0000 | 4.3049 | 4.3049 | 1.2000e-004 | 0.0000 | 4.3078 |
| **Total** | **5.6700e-003** | **0.1337** | **0.0448** | **4.3000e-004** | **0.0134** | **4.4000e-004** | **0.0139** | **3.6400e-003** | **4.1000e-004** | **4.0700e-003** | **0.0000** | **41.4158** | **41.4158** | **2.8000e-003** | **0.0000** | **41.4856** |

## 3.4 Paving and Construction - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1219 | 1.2010 | 0.8285 | 2.0400e-003 | | 0.0527 | 0.0527 | | 0.0485 | 0.0485 | 0.0000 | 178.9378 | 178.9378 | 0.0579 | 0.0000 | 180.3846 |
| **Total** | **0.1219** | **1.2010** | **0.8285** | **2.0400e-003** | | **0.0527** | **0.0527** | | **0.0485** | **0.0485** | **0.0000** | **178.9378** | **178.9378** | **0.0579** | **0.0000** | **180.3846** |

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 1.3500e-003 | 0.0455 | 0.0115 | 1.2000e-004 | 2.9500e-003 | 9.0000e-005 | 3.0400e-003 | 8.5000e-004 | 9.0000e-005 | 9.4000e-004 | 0.0000 | 11.3634 | 11.3634 | 7.3000e-004 | 0.0000 | 11.3817 |
| Worker | 4.9700e-003 | 3.6900e-003 | 0.0417 | 1.3000e-004 | 0.0131 | 1.0000e-004 | 0.0132 | 3.4800e-003 | 9.0000e-005 | 3.5800e-003 | 0.0000 | 11.4416 | 11.4416 | 3.1000e-004 | 0.0000 | 11.4493 |
| **Total** | **6.3200e-003** | **0.0492** | **0.0533** | **2.5000e-004** | **0.0161** | **1.9000e-004** | **0.0163** | **4.3300e-003** | **1.8000e-004** | **4.5200e-003** | **0.0000** | **22.8049** | **22.8049** | **1.0400e-003** | **0.0000** | **22.8309** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1219 | 1.2010 | 0.8285 | 2.0400e-003 | | 0.0527 | 0.0527 | | 0.0485 | 0.0485 | 0.0000 | 178.9376 | 178.9376 | 0.0579 | 0.0000 | 180.3844 |
| **Total** | **0.1219** | **1.2010** | **0.8285** | **2.0400e-003** | | **0.0527** | **0.0527** | | **0.0485** | **0.0485** | **0.0000** | **178.9376** | **178.9376** | **0.0579** | **0.0000** | **180.3844** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Vendor | 1.3500e-003 | 0.0455 | 0.0115 | 1.2000e-004 | 2.9500e-003 | 9.0000e-005 | 3.0400e-003 | 8.5000e-004 | 9.0000e-005 | 9.4000e-004 | 0.0000 | 11.3634 | 11.3634 | 7.3000e-004 | 0.0000 | 11.3817 |
| Worker | 4.9700e-003 | 3.6900e-003 | 0.0417 | 1.3000e-004 | 0.0131 | 1.0000e-004 | 0.0132 | 3.4800e-003 | 9.0000e-005 | 3.5800e-003 | 0.0000 | 11.4416 | 11.4416 | 3.1000e-004 | 0.0000 | 11.4493 |
| **Total** | **6.3200e-003** | **0.0492** | **0.0533** | **2.5000e-004** | **0.0161** | **1.9000e-004** | **0.0163** | **4.3300e-003** | **1.8000e-004** | **4.5200e-003** | **0.0000** | **22.8049** | **22.8049** | **1.0400e-003** | **0.0000** | **22.8309** |

## 3.4 Paving and Construction - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0562 | 0.5206 | 0.4193 | 1.1000e-003 | | 0.0225 | 0.0225 | | 0.0207 | 0.0207 | 0.0000 | 96.3954 | 96.3954 | 0.0312 | 0.0000 | 97.1748 |
| **Total** | **0.0562** | **0.5206** | **0.4193** | **1.1000e-003** | | **0.0225** | **0.0225** | | **0.0207** | **0.0207** | **0.0000** | **96.3954** | **96.3954** | **0.0312** | **0.0000** | **97.1748** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 6.8000e-004 | 0.0233 | 5.8700e-003 | 6.0000e-005 | 1.5900e-003 | 4.0000e-005 | 1.6300e-003 | 4.6000e-004 | 4.0000e-005 | 5.0000e-004 | 0.0000 | 6.0647 | 6.0647 | 3.8000e-004 | 0.0000 | 6.0742 |
| Worker | 2.5100e-003 | 1.7900e-003 | 0.0208 | 7.0000e-005 | 7.0700e-003 | 5.0000e-005 | 7.1200e-003 | 1.8800e-003 | 5.0000e-005 | 1.9200e-003 | 0.0000 | 5.9402 | 5.9402 | 1.5000e-004 | 0.0000 | 5.9439 |
| **Total** | **3.1900e-003** | **0.0251** | **0.0266** | **1.3000e-004** | **8.6600e-003** | **9.0000e-005** | **8.7500e-003** | **2.3400e-003** | **9.0000e-005** | **2.4200e-003** | **0.0000** | **12.0048** | **12.0048** | **5.3000e-004** | **0.0000** | **12.0181** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0562 | 0.5206 | 0.4193 | 1.1000e-003 | | 0.0225 | 0.0225 | | 0.0207 | 0.0207 | 0.0000 | 96.3953 | 96.3953 | 0.0312 | 0.0000 | 97.1747 |
| **Total** | **0.0562** | **0.5206** | **0.4193** | **1.1000e-003** | | **0.0225** | **0.0225** | | **0.0207** | **0.0207** | **0.0000** | **96.3953** | **96.3953** | **0.0312** | **0.0000** | **97.1747** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 6.8000e-004 | 0.0233 | 5.8700e-003 | 6.0000e-005 | 1.5900e-003 | 4.0000e-005 | 1.6300e-003 | 4.6000e-004 | 4.0000e-005 | 5.0000e-004 | 0.0000 | 6.0647 | 6.0647 | 3.8000e-004 | 0.0000 | 6.0742 |
| Worker | 2.5100e-003 | 1.7900e-003 | 0.0208 | 7.0000e-005 | 7.0700e-003 | 5.0000e-005 | 7.1200e-003 | 1.8800e-003 | 5.0000e-005 | 1.9200e-003 | 0.0000 | 5.9402 | 5.9402 | 1.5000e-004 | 0.0000 | 5.9439 |
| **Total** | **3.1900e-003** | **0.0251** | **0.0266** | **1.3000e-004** | **8.6600e-003** | **9.0000e-005** | **8.7500e-003** | **2.3400e-003** | **9.0000e-005** | **2.4200e-003** | **0.0000** | **12.0048** | **12.0048** | **5.3000e-004** | **0.0000** | **12.0181** |

# 3.5 Landscaping - 2022

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0105 | 0.1172 | 0.1631 | 2.3000e-004 | | 5.6100e-003 | 5.6100e-003 | | 5.1600e-003 | 5.1600e-003 | 0.0000 | 20.4782 | 20.4782 | 6.6200e-003 | 0.0000 | 20.6438 |
| **Total** | **0.0105** | **0.1172** | **0.1631** | **2.3000e-004** | | **5.6100e-003** | **5.6100e-003** | | **5.1600e-003** | **5.1600e-003** | **0.0000** | **20.4782** | **20.4782** | **6.6200e-003** | **0.0000** | **20.6438** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 1.2100e-003 | 0.0415 | 0.0105 | 1.1000e-004 | 2.8400e-003 | 8.0000e-005 | 2.9100e-003 | 8.2000e-004 | 7.0000e-005 | 8.9000e-004 | 0.0000 | 10.8298 | 10.8298 | 6.8000e-004 | 0.0000 | 10.8468 |
| Worker | 8.0800e-003 | 5.7700e-003 | 0.0667 | 2.1000e-004 | 0.0227 | 1.7000e-004 | 0.0229 | 6.0300e-003 | 1.5000e-004 | 6.1800e-003 | 0.0000 | 19.0934 | 19.0934 | 4.8000e-004 | 0.0000 | 19.1054 |
| **Total** | **9.2900e-003** | **0.0473** | **0.0772** | **3.2000e-004** | **0.0256** | **2.5000e-004** | **0.0258** | **6.8500e-003** | **2.2000e-004** | **7.0700e-003** | **0.0000** | **29.9232** | **29.9232** | **1.1600e-003** | **0.0000** | **29.9522** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0105 | 0.1172 | 0.1631 | 2.3000e-004 | | 5.6100e-003 | 5.6100e-003 | | 5.1600e-003 | 5.1600e-003 | 0.0000 | 20.4782 | 20.4782 | 6.6200e-003 | 0.0000 | 20.6438 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total** | **0.0105** | **0.1172** | **0.1631** | **2.3000e-004** | | **5.6100e-003** | **5.6100e-003** | | **5.1600e-003** | **5.1600e-003** | **0.0000** | **20.4782** | **20.4782** | **6.6200e-003** | **0.0000** | **20.6438** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 1.2100e-003 | 0.0415 | 0.0105 | 1.1000e-004 | 2.8400e-003 | 8.0000e-005 | 2.9100e-003 | 8.2000e-004 | 7.0000e-005 | 8.9000e-004 | 0.0000 | 10.8298 | 10.8298 | 6.8000e-004 | 0.0000 | 10.8468 |
| Worker | 8.0800e-003 | 5.7700e-003 | 0.0667 | 2.1000e-004 | 0.0227 | 1.7000e-004 | 0.0229 | 6.0300e-003 | 1.5000e-004 | 6.1800e-003 | 0.0000 | 19.0934 | 19.0934 | 4.8000e-004 | 0.0000 | 19.1054 |
| **Total** | **9.2900e-003** | **0.0473** | **0.0772** | **3.2000e-004** | **0.0256** | **2.5000e-004** | **0.0258** | **6.8500e-003** | **2.2000e-004** | **7.0700e-003** | **0.0000** | **29.9232** | **29.9232** | **1.1600e-003** | **0.0000** | **29.9522** |

# 4.0 Operational Detail - Mobile

## 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.0332 | 0.0646 | 0.3215 | 8.8000e-004 | 0.0825 | 8.5000e-004 | 0.0834 | 0.0221 | 8.0000e-004 | 0.0229 | 0.0000 | 82.2062 | 82.2062 | 5.3900e-003 | 0.0000 | 82.3411 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unmitigated | 0.0332 | 0.0646 | 0.3215 | 8.8000e-004 | 0.0825 | 8.5000e-004 | 0.0834 | 0.0221 | 8.0000e-004 | 0.0229 | 0.0000 | 82.2062 | 82.2062 | 5.3900e-003 | 0.0000 | 82.3411 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| City Park | 85.00 | 56.88 | 48.75 | 218,128 | 218,128 |
| Total | 85.00 | 56.88 | 48.75 | 218,128 | 218,128 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| City Park | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 66 | 28 | 6 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| City Park | 0.552603 | 0.061033 | 0.186728 | 0.118579 | 0.023437 | 0.006039 | 0.017620 | 0.024846 | 0.001416 | 0.001678 | 0.004487 | 0.000623 | 0.000912 |

# 5.0 Energy Detail

Historical Energy Use: N

## 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 12.1443 | 12.1443 | 5.0000e-004 | 1.0000e-004 | 12.1877 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 12.1443 | 12.1443 | 5.0000e-004 | 1.0000e-004 | 12.1877 |
| NaturalGas Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| NaturalGas Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

## 5.2 Energy by Land Use - NaturalGas

### Unmitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| City Park | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

### Mitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| City Park | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| City Park | 38115 | 12.1443 | 5.0000e-004 | 1.0000e-004 | 12.1877 |
| **Total** | | **12.1443** | **5.0000e-004** | **1.0000e-004** | **12.1877** |

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| City Park | 38115 | 12.1443 | 5.0000e-004 | 1.0000e-004 | 12.1877 |
| **Total** | | **12.1443** | **5.0000e-004** | **1.0000e-004** | **12.1877** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 1.0300e-003 | 0.0000 | 3.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 6.0000e-005 | 6.0000e-005 | 0.0000 | 0.0000 | 7.0000e-005 |
| Unmitigated | 1.0300e-003 | 0.0000 | 3.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 6.0000e-005 | 6.0000e-005 | 0.0000 | 0.0000 | 7.0000e-005 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 1.0200e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.0000 | 0.0000 | 3.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 6.0000e-005 | 6.0000e-005 | 0.0000 | 0.0000 | 7.0000e-005 |
| **Total** | **1.0200e-003** | **0.0000** | **3.0000e-005** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **6.0000e-005** | **6.0000e-005** | **0.0000** | **0.0000** | **7.0000e-005** |

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 1.0200e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.0000 | 0.0000 | 3.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 6.0000e-005 | 6.0000e-005 | 0.0000 | 0.0000 | 7.0000e-005 |
| **Total** | **1.0200e-003** | **0.0000** | **3.0000e-005** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **6.0000e-005** | **6.0000e-005** | **0.0000** | **0.0000** | **7.0000e-005** |

# 7.0 Water Detail

## 7.1 Mitigation Measures Water

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 10.5443 | 4.4000e-004 | 9.0000e-005 | 10.5820 |
| Unmitigated | 10.5443 | 4.4000e-004 | 9.0000e-005 | 10.5820 |

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|

| Land Use | Mgal | MT/yr | | | |
|---|---|---|---|---|---|
| City Park | 0 / 2.9787 | 10.5443 | 4.4000e-004 | 9.0000e-005 | 10.5820 |
| **Total** | | **10.5443** | **4.4000e-004** | **9.0000e-005** | **10.5820** |

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| City Park | 0 / 2.9787 | 10.5443 | 4.4000e-004 | 9.0000e-005 | 10.5820 |
| **Total** | | **10.5443** | **4.4000e-004** | **9.0000e-005** | **10.5820** |

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |

| | | | | |
|---|---|---|---|---|
| Mitigated | 0.0426 | 2.5200e-003 | 0.0000 | 0.1056 |
| Unmitigated | 0.0426 | 2.5200e-003 | 0.0000 | 0.1056 |

## 8.2 Waste by Land Use

### Unmitigated

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| City Park | 0.21 | 0.0426 | 2.5200e-003 | 0.0000 | 0.1056 |
| **Total** | | **0.0426** | **2.5200e-003** | **0.0000** | **0.1056** |

### Mitigated

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| City Park | 0.21 | 0.0426 | 2.5200e-003 | 0.0000 | 0.1056 |
| **Total** | | **0.0426** | **2.5200e-003** | **0.0000** | **0.1056** |

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# Crawford Park

**South Coast Air Basin, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| City Park | 2.50 | Acre | 2.50 | 108,900.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 31 |
| **Climate Zone** | 8 | | | **Operational Year** | 2023 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Schedule provided by applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Trips and VMT - Import 10,000 CY soil, vendor trips for construction and landscaping

Grading - Import 10,000 CY

Vehicle Trips - Trip Generation Source: Translutions, 2020

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Energy Use - Lighting from CalEEMod user guide for open parking lot lighting

Construction Off-road Equipment Mitigation - Water exposed area 3 times daily

Fleet Mix - EMFAC2017

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstructionPhase | NumDays | 220.00 | 80.00 |
| tblConstructionPhase | NumDays | 220.00 | 90.00 |
| tblConstructionPhase | NumDays | 6.00 | 60.00 |
| tblConstructionPhase | NumDays | 3.00 | 20.00 |
| tblEnergyUse | LightingElect | 0.00 | 0.35 |
| tblFleetMix | HHD | 0.03 | 0.02 |
| tblFleetMix | LDA | 0.55 | 0.55 |
| tblFleetMix | LDT1 | 0.04 | 0.06 |
| tblFleetMix | LDT2 | 0.20 | 0.19 |
| tblFleetMix | LHD1 | 0.02 | 0.02 |
| tblFleetMix | LHD2 | 5.8470e-003 | 6.0390e-003 |
| tblFleetMix | MCY | 4.8220e-003 | 4.4870e-003 |
| tblFleetMix | MDV | 0.12 | 0.12 |
| tblFleetMix | MH | 8.6900e-004 | 9.1200e-004 |
| tblFleetMix | MHD | 0.02 | 0.02 |
| tblFleetMix | OBUS | 2.1100e-003 | 1.4160e-003 |
| tblFleetMix | SBUS | 7.1000e-004 | 6.2300e-004 |
| tblFleetMix | UBUS | 1.7690e-003 | 1.6780e-003 |
| tblGrading | AcresOfGrading | 60.00 | 3.00 |
| tblGrading | AcresOfGrading | 0.00 | 4.50 |

| | | | |
|---|---|---|---|
| tblGrading | MaterialImported | 0.00 | 10,000.00 |
| tblLandUse | RecSwimmingAreaAllowEdit | 0.00 | 108,900.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblTripsAndVMT | VendorTripNumber | 18.00 | 10.00 |
| tblVehicleEF | HHD | 0.52 | 0.03 |
| tblVehicleEF | HHD | 0.09 | 0.08 |
| tblVehicleEF | HHD | 0.07 | 1.0000e-006 |
| tblVehicleEF | HHD | 1.59 | 6.32 |
| tblVehicleEF | HHD | 0.96 | 0.58 |
| tblVehicleEF | HHD | 3.04 | 9.3040e-003 |
| tblVehicleEF | HHD | 4,355.32 | 1,186.71 |
| tblVehicleEF | HHD | 1,551.76 | 1,477.44 |
| tblVehicleEF | HHD | 9.81 | 0.09 |
| tblVehicleEF | HHD | 13.94 | 6.38 |
| tblVehicleEF | HHD | 1.91 | 3.57 |
| tblVehicleEF | HHD | 19.62 | 2.07 |

| | | | |
|---|---|---|---|
| tblVehicleEF | HHD | 9.5610e-003 | 3.9310e-003 |
| tblVehicleEF | HHD | 0.06 | 0.06 |
| tblVehicleEF | HHD | 0.04 | 0.04 |
| tblVehicleEF | HHD | 6.0750e-003 | 0.03 |
| tblVehicleEF | HHD | 8.4000e-005 | 2.0000e-006 |
| tblVehicleEF | HHD | 9.1470e-003 | 3.7610e-003 |
| tblVehicleEF | HHD | 0.03 | 0.03 |
| tblVehicleEF | HHD | 8.8000e-003 | 8.8970e-003 |
| tblVehicleEF | HHD | 5.8120e-003 | 0.03 |
| tblVehicleEF | HHD | 7.7000e-005 | 1.0000e-006 |
| tblVehicleEF | HHD | 9.9000e-005 | 7.0000e-006 |
| tblVehicleEF | HHD | 4.1500e-003 | 2.6800e-004 |
| tblVehicleEF | HHD | 0.40 | 0.46 |
| tblVehicleEF | HHD | 7.3000e-005 | 5.0000e-006 |
| tblVehicleEF | HHD | 0.08 | 0.08 |
| tblVehicleEF | HHD | 3.3800e-004 | 1.4610e-003 |
| tblVehicleEF | HHD | 0.07 | 3.0000e-006 |
| tblVehicleEF | HHD | 0.04 | 0.01 |
| tblVehicleEF | HHD | 0.01 | 0.01 |
| tblVehicleEF | HHD | 1.4800e-004 | 1.0000e-006 |
| tblVehicleEF | HHD | 9.9000e-005 | 7.0000e-006 |
| tblVehicleEF | HHD | 4.1500e-003 | 2.6800e-004 |
| tblVehicleEF | HHD | 0.48 | 0.53 |
| tblVehicleEF | HHD | 7.3000e-005 | 5.0000e-006 |
| tblVehicleEF | HHD | 0.19 | 0.17 |
| tblVehicleEF | HHD | 3.3800e-004 | 1.4610e-003 |
| tblVehicleEF | HHD | 0.08 | 3.0000e-006 |
| tblVehicleEF | HHD | 0.49 | 0.00 |
| tblVehicleEF | HHD | 0.09 | 4.84 |

| | | | |
|---|---|---|---|
| tblVehicleEF | HHD | 0.07 | 2.7300e-004 |
| tblVehicleEF | HHD | 1.16 | 4.3510e-003 |
| tblVehicleEF | HHD | 0.97 | 11,782.57 |
| tblVehicleEF | HHD | 2.89 | 0.09 |
| tblVehicleEF | HHD | 4,614.07 | 2.0000e-006 |
| tblVehicleEF | HHD | 1,551.76 | 1.85 |
| tblVehicleEF | HHD | 9.81 | 0.08 |
| tblVehicleEF | HHD | 14.39 | 0.00 |
| tblVehicleEF | HHD | 1.80 | 0.24 |
| tblVehicleEF | HHD | 19.61 | 0.24 |
| tblVehicleEF | HHD | 8.0610e-003 | 7.0000e-006 |
| tblVehicleEF | HHD | 0.06 | 5.53 |
| tblVehicleEF | HHD | 0.04 | 0.17 |
| tblVehicleEF | HHD | 6.0750e-003 | 6.3500e-004 |
| tblVehicleEF | HHD | 8.4000e-005 | 2.1900e-004 |
| tblVehicleEF | HHD | 7.7120e-003 | 1.4000e-005 |
| tblVehicleEF | HHD | 0.03 | 9.6000e-005 |
| tblVehicleEF | HHD | 8.8000e-003 | 6.6000e-005 |
| tblVehicleEF | HHD | 5.8120e-003 | 1.0000e-006 |
| tblVehicleEF | HHD | 7.7000e-005 | 1.4410e-003 |
| tblVehicleEF | HHD | 1.5500e-004 | 9.1000e-004 |
| tblVehicleEF | HHD | 4.3060e-003 | 0.03 |
| tblVehicleEF | HHD | 0.38 | 6.19 |
| tblVehicleEF | HHD | 1.1000e-004 | 0.00 |
| tblVehicleEF | HHD | 0.08 | 3.38 |
| tblVehicleEF | HHD | 3.3000e-004 | 0.03 |
| tblVehicleEF | HHD | 0.07 | 2.07 |
| tblVehicleEF | HHD | 0.04 | 6.18 |
| tblVehicleEF | HHD | 0.01 | 0.58 |

| | | | |
|---|---|---|---|
| tblVehicleEF | HHD | 1.4500e-004 | 8.8350e-003 |
| tblVehicleEF | HHD | 1.5500e-004 | 156.80 |
| tblVehicleEF | HHD | 4.3060e-003 | 2.0000e-006 |
| tblVehicleEF | HHD | 0.45 | 2.8010e-003 |
| tblVehicleEF | HHD | 1.1000e-004 | 6.2480e-003 |
| tblVehicleEF | HHD | 0.19 | 0.03 |
| tblVehicleEF | HHD | 3.3000e-004 | 0.04 |
| tblVehicleEF | HHD | 0.07 | 0.03 |
| tblVehicleEF | HHD | 0.56 | 0.00 |
| tblVehicleEF | HHD | 0.09 | 4.33 |
| tblVehicleEF | HHD | 0.07 | 3.0500e-004 |
| tblVehicleEF | HHD | 2.20 | 4.3950e-003 |
| tblVehicleEF | HHD | 0.96 | 11,875.11 |
| tblVehicleEF | HHD | 3.06 | 0.09 |
| tblVehicleEF | HHD | 3,998.00 | 2.0000e-006 |
| tblVehicleEF | HHD | 1,551.76 | 1.87 |
| tblVehicleEF | HHD | 9.81 | 0.08 |
| tblVehicleEF | HHD | 13.32 | 0.00 |
| tblVehicleEF | HHD | 1.87 | 0.22 |
| tblVehicleEF | HHD | 19.62 | 0.24 |
| tblVehicleEF | HHD | 0.01 | 5.0000e-006 |
| tblVehicleEF | HHD | 0.06 | 4.95 |
| tblVehicleEF | HHD | 0.04 | 0.17 |
| tblVehicleEF | HHD | 6.0750e-003 | 6.8400e-004 |
| tblVehicleEF | HHD | 8.4000e-005 | 1.4600e-004 |
| tblVehicleEF | HHD | 0.01 | 1.5000e-005 |
| tblVehicleEF | HHD | 0.03 | 6.4000e-005 |
| tblVehicleEF | HHD | 8.8000e-003 | 4.3000e-005 |
| tblVehicleEF | HHD | 5.8120e-003 | 1.0000e-006 |

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|---|---|---|---|
| tblVehicleEF | HHD | 7.7000e-005 | 1.5510e-003 |
| tblVehicleEF | HHD | 9.6000e-005 | 9.1000e-004 |
| tblVehicleEF | HHD | 4.4260e-003 | 0.03 |
| tblVehicleEF | HHD | 0.43 | 6.64 |
| tblVehicleEF | HHD | 7.1000e-005 | 0.00 |
| tblVehicleEF | HHD | 0.08 | 3.51 |
| tblVehicleEF | HHD | 3.6700e-004 | 0.04 |
| tblVehicleEF | HHD | 0.07 | 2.07 |
| tblVehicleEF | HHD | 0.04 | 6.51 |
| tblVehicleEF | HHD | 0.01 | 0.57 |
| tblVehicleEF | HHD | 1.4800e-004 | 9.3940e-003 |
| tblVehicleEF | HHD | 9.6000e-005 | 156.80 |
| tblVehicleEF | HHD | 4.4260e-003 | 2.0000e-006 |
| tblVehicleEF | HHD | 0.51 | 2.8010e-003 |
| tblVehicleEF | HHD | 7.1000e-005 | 6.2480e-003 |
| tblVehicleEF | HHD | 0.19 | 0.03 |
| tblVehicleEF | HHD | 3.6700e-004 | 0.04 |
| tblVehicleEF | HHD | 0.08 | 0.04 |
| tblVehicleEF | LDA | 4.2840e-003 | 3.0340e-003 |
| tblVehicleEF | LDA | 4.4900e-003 | 0.05 |
| tblVehicleEF | LDA | 0.57 | 0.72 |
| tblVehicleEF | LDA | 1.00 | 2.11 |
| tblVehicleEF | LDA | 253.57 | 270.89 |
| tblVehicleEF | LDA | 54.70 | 53.31 |
| tblVehicleEF | LDA | 0.04 | 0.04 |
| tblVehicleEF | LDA | 0.06 | 0.18 |
| tblVehicleEF | LDA | 1.9580e-003 | 1.7990e-003 |
| tblVehicleEF | LDA | 2.2420e-003 | 1.8430e-003 |
| tblVehicleEF | LDA | 1.8050e-003 | 1.6570e-003 |

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|---|---|---|---|
| tblVehicleEF | LDA | 2.0610e-003 | 1.6940e-003 |
| tblVehicleEF | LDA | 0.04 | 0.05 |
| tblVehicleEF | LDA | 0.09 | 0.10 |
| tblVehicleEF | LDA | 0.03 | 0.05 |
| tblVehicleEF | LDA | 0.01 | 0.01 |
| tblVehicleEF | LDA | 0.04 | 0.21 |
| tblVehicleEF | LDA | 0.06 | 0.22 |
| tblVehicleEF | LDA | 2.5390e-003 | 2.6800e-003 |
| tblVehicleEF | LDA | 5.6400e-004 | 5.2800e-004 |
| tblVehicleEF | LDA | 0.04 | 0.05 |
| tblVehicleEF | LDA | 0.09 | 0.10 |
| tblVehicleEF | LDA | 0.03 | 0.05 |
| tblVehicleEF | LDA | 0.02 | 0.02 |
| tblVehicleEF | LDA | 0.04 | 0.21 |
| tblVehicleEF | LDA | 0.07 | 0.25 |
| tblVehicleEF | LDA | 0.00 | 0.04 |
| tblVehicleEF | LDA | 4.5820e-003 | 0.00 |
| tblVehicleEF | LDA | 3.9780e-003 | 0.10 |
| tblVehicleEF | LDA | 0.00 | 11.18 |
| tblVehicleEF | LDA | 0.64 | 0.00 |
| tblVehicleEF | LDA | 0.86 | 3.2530e-003 |
| tblVehicleEF | LDA | 0.00 | 5.0530e-003 |
| tblVehicleEF | LDA | 266.77 | 0.00 |
| tblVehicleEF | LDA | 54.70 | 0.01 |
| tblVehicleEF | LDA | 0.00 | 9.4890e-003 |
| tblVehicleEF | LDA | 0.04 | 0.00 |
| tblVehicleEF | LDA | 0.05 | 4.4120e-003 |
| tblVehicleEF | LDA | 0.00 | 0.07 |
| tblVehicleEF | LDA | 0.04 | 0.00 |

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|---|---|---|---|
| tblVehicleEF | LDA | 8.0000e-003 | 0.02 |
| tblVehicleEF | LDA | 1.9580e-003 | 0.20 |
| tblVehicleEF | LDA | 2.2420e-003 | 0.39 |
| tblVehicleEF | LDA | 0.00 | 0.02 |
| tblVehicleEF | LDA | 0.02 | 0.39 |
| tblVehicleEF | LDA | 2.0000e-003 | 0.33 |
| tblVehicleEF | LDA | 1.8050e-003 | 0.22 |
| tblVehicleEF | LDA | 2.0610e-003 | 0.20 |
| tblVehicleEF | LDA | 0.06 | 0.00 |
| tblVehicleEF | LDA | 0.10 | 1.4850e-003 |
| tblVehicleEF | LDA | 0.05 | 1.7000e-005 |
| tblVehicleEF | LDA | 0.01 | 0.04 |
| tblVehicleEF | LDA | 0.03 | 0.00 |
| tblVehicleEF | LDA | 2.6720e-003 | 0.79 |
| tblVehicleEF | LDA | 5.6100e-004 | 1.79 |
| tblVehicleEF | LDA | 0.06 | 60.05 |
| tblVehicleEF | LDA | 0.10 | 1.8400e-003 |
| tblVehicleEF | LDA | 0.00 | 3.8000e-004 |
| tblVehicleEF | LDA | 0.05 | 7.7830e-003 |
| tblVehicleEF | LDA | 0.02 | 0.02 |
| tblVehicleEF | LDA | 0.03 | 8.0020e-003 |
| tblVehicleEF | LDA | 0.06 | 0.00 |
| tblVehicleEF | LDA | 0.00 | 0.05 |
| tblVehicleEF | LDA | 4.1990e-003 | 0.00 |
| tblVehicleEF | LDA | 4.5800e-003 | 0.11 |
| tblVehicleEF | LDA | 0.00 | 11.32 |
| tblVehicleEF | LDA | 0.55 | 0.00 |
| tblVehicleEF | LDA | 1.03 | 2.9740e-003 |
| tblVehicleEF | LDA | 0.00 | 5.3880e-003 |

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|---|---|---|---|
| tblVehicleEF | LDA | 249.51 | 0.00 |
| tblVehicleEF | LDA | 54.70 | 0.01 |
| tblVehicleEF | LDA | 0.00 | 0.01 |
| tblVehicleEF | LDA | 0.04 | 0.00 |
| tblVehicleEF | LDA | 0.06 | 4.7000e-003 |
| tblVehicleEF | LDA | 0.00 | 0.05 |
| tblVehicleEF | LDA | 0.04 | 0.00 |
| tblVehicleEF | LDA | 8.0000e-003 | 0.02 |
| tblVehicleEF | LDA | 1.9580e-003 | 0.24 |
| tblVehicleEF | LDA | 2.2420e-003 | 0.24 |
| tblVehicleEF | LDA | 0.00 | 0.02 |
| tblVehicleEF | LDA | 0.02 | 0.24 |
| tblVehicleEF | LDA | 2.0000e-003 | 0.22 |
| tblVehicleEF | LDA | 1.8050e-003 | 0.25 |
| tblVehicleEF | LDA | 2.0610e-003 | 0.24 |
| tblVehicleEF | LDA | 0.03 | 0.00 |
| tblVehicleEF | LDA | 0.10 | 1.4850e-003 |
| tblVehicleEF | LDA | 0.03 | 1.7000e-005 |
| tblVehicleEF | LDA | 0.01 | 0.04 |
| tblVehicleEF | LDA | 0.04 | 0.00 |
| tblVehicleEF | LDA | 2.4980e-003 | 0.69 |
| tblVehicleEF | LDA | 5.6400e-004 | 2.17 |
| tblVehicleEF | LDA | 0.03 | 56.49 |
| tblVehicleEF | LDA | 0.10 | 1.8400e-003 |
| tblVehicleEF | LDA | 0.00 | 3.8000e-004 |
| tblVehicleEF | LDA | 0.03 | 7.7830e-003 |
| tblVehicleEF | LDA | 0.02 | 0.02 |
| tblVehicleEF | LDA | 0.04 | 8.0020e-003 |
| tblVehicleEF | LDA | 0.07 | 0.00 |

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|---|---|---|---|
| tblVehicleEF | LDT1 | 0.01 | 7.7890e-003 |
| tblVehicleEF | LDT1 | 0.01 | 0.07 |
| tblVehicleEF | LDT1 | 1.36 | 1.46 |
| tblVehicleEF | LDT1 | 2.49 | 2.28 |
| tblVehicleEF | LDT1 | 319.38 | 318.65 |
| tblVehicleEF | LDT1 | 67.76 | 63.32 |
| tblVehicleEF | LDT1 | 0.13 | 0.12 |
| tblVehicleEF | LDT1 | 0.15 | 0.26 |
| tblVehicleEF | LDT1 | 2.9980e-003 | 2.7210e-003 |
| tblVehicleEF | LDT1 | 3.2550e-003 | 2.6380e-003 |
| tblVehicleEF | LDT1 | 2.7600e-003 | 2.5050e-003 |
| tblVehicleEF | LDT1 | 2.9930e-003 | 2.4250e-003 |
| tblVehicleEF | LDT1 | 0.12 | 0.13 |
| tblVehicleEF | LDT1 | 0.25 | 0.20 |
| tblVehicleEF | LDT1 | 0.10 | 0.11 |
| tblVehicleEF | LDT1 | 0.03 | 0.03 |
| tblVehicleEF | LDT1 | 0.16 | 0.70 |
| tblVehicleEF | LDT1 | 0.17 | 0.36 |
| tblVehicleEF | LDT1 | 3.2100e-003 | 3.1530e-003 |
| tblVehicleEF | LDT1 | 7.2100e-004 | 6.2700e-004 |
| tblVehicleEF | LDT1 | 0.12 | 0.13 |
| tblVehicleEF | LDT1 | 0.25 | 0.20 |
| tblVehicleEF | LDT1 | 0.10 | 0.11 |
| tblVehicleEF | LDT1 | 0.04 | 0.05 |
| tblVehicleEF | LDT1 | 0.16 | 0.70 |
| tblVehicleEF | LDT1 | 0.19 | 0.39 |
| tblVehicleEF | LDT1 | 0.00 | 0.07 |
| tblVehicleEF | LDT1 | 0.01 | 0.00 |
| tblVehicleEF | LDT1 | 0.01 | 0.21 |

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|---|---|---|---|
| tblVehicleEF | LDT1 | 0.00 | 13.55 |
| tblVehicleEF | LDT1 | 1.49 | 0.00 |
| tblVehicleEF | LDT1 | 2.12 | 8.2760e-003 |
| tblVehicleEF | LDT1 | 0.00 | 5.8840e-003 |
| tblVehicleEF | LDT1 | 334.82 | 0.00 |
| tblVehicleEF | LDT1 | 67.76 | 0.04 |
| tblVehicleEF | LDT1 | 0.00 | 0.01 |
| tblVehicleEF | LDT1 | 0.11 | 0.00 |
| tblVehicleEF | LDT1 | 0.13 | 8.0850e-003 |
| tblVehicleEF | LDT1 | 0.00 | 0.15 |
| tblVehicleEF | LDT1 | 0.04 | 0.00 |
| tblVehicleEF | LDT1 | 8.0000e-003 | 0.05 |
| tblVehicleEF | LDT1 | 2.9980e-003 | 0.65 |
| tblVehicleEF | LDT1 | 3.2550e-003 | 0.93 |
| tblVehicleEF | LDT1 | 0.00 | 0.05 |
| tblVehicleEF | LDT1 | 0.02 | 0.93 |
| tblVehicleEF | LDT1 | 2.0000e-003 | 0.71 |
| tblVehicleEF | LDT1 | 2.7600e-003 | 0.35 |
| tblVehicleEF | LDT1 | 2.9930e-003 | 0.65 |
| tblVehicleEF | LDT1 | 0.20 | 0.00 |
| tblVehicleEF | LDT1 | 0.27 | 2.3930e-003 |
| tblVehicleEF | LDT1 | 0.15 | 3.5000e-005 |
| tblVehicleEF | LDT1 | 0.03 | 0.11 |
| tblVehicleEF | LDT1 | 0.15 | 0.00 |
| tblVehicleEF | LDT1 | 3.3670e-003 | 1.59 |
| tblVehicleEF | LDT1 | 7.1400e-004 | 1.93 |
| tblVehicleEF | LDT1 | 0.20 | 71.69 |
| tblVehicleEF | LDT1 | 0.27 | 2.6340e-003 |
| tblVehicleEF | LDT1 | 0.00 | 5.9400e-004 |

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|---|---|---|---|
| tblVehicleEF | LDT1 | 0.15 | 7.9510e-003 |
| tblVehicleEF | LDT1 | 0.05 | 0.02 |
| tblVehicleEF | LDT1 | 0.15 | 8.0020e-003 |
| tblVehicleEF | LDT1 | 0.16 | 0.00 |
| tblVehicleEF | LDT1 | 0.00 | 0.08 |
| tblVehicleEF | LDT1 | 0.01 | 0.00 |
| tblVehicleEF | LDT1 | 0.01 | 0.23 |
| tblVehicleEF | LDT1 | 0.00 | 13.73 |
| tblVehicleEF | LDT1 | 1.32 | 0.00 |
| tblVehicleEF | LDT1 | 2.56 | 7.6540e-003 |
| tblVehicleEF | LDT1 | 0.00 | 6.2690e-003 |
| tblVehicleEF | LDT1 | 314.49 | 0.00 |
| tblVehicleEF | LDT1 | 67.76 | 0.03 |
| tblVehicleEF | LDT1 | 0.00 | 0.02 |
| tblVehicleEF | LDT1 | 0.12 | 0.00 |
| tblVehicleEF | LDT1 | 0.15 | 8.6860e-003 |
| tblVehicleEF | LDT1 | 0.00 | 0.10 |
| tblVehicleEF | LDT1 | 0.04 | 0.00 |
| tblVehicleEF | LDT1 | 8.0000e-003 | 0.05 |
| tblVehicleEF | LDT1 | 2.9980e-003 | 0.83 |
| tblVehicleEF | LDT1 | 3.2550e-003 | 0.60 |
| tblVehicleEF | LDT1 | 0.00 | 0.05 |
| tblVehicleEF | LDT1 | 0.02 | 0.59 |
| tblVehicleEF | LDT1 | 2.0000e-003 | 0.48 |
| tblVehicleEF | LDT1 | 2.7600e-003 | 0.40 |
| tblVehicleEF | LDT1 | 2.9930e-003 | 0.83 |
| tblVehicleEF | LDT1 | 0.12 | 0.00 |
| tblVehicleEF | LDT1 | 0.28 | 2.3930e-003 |
| tblVehicleEF | LDT1 | 0.10 | 3.5000e-005 |

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|---|---|---|---|
| tblVehicleEF | LDT1 | 0.03 | 0.12 |
| tblVehicleEF | LDT1 | 0.19 | 0.00 |
| tblVehicleEF | LDT1 | 3.1610e-003 | 1.41 |
| tblVehicleEF | LDT1 | 7.2200e-004 | 2.35 |
| tblVehicleEF | LDT1 | 0.12 | 68.01 |
| tblVehicleEF | LDT1 | 0.28 | 2.6340e-003 |
| tblVehicleEF | LDT1 | 0.00 | 5.9400e-004 |
| tblVehicleEF | LDT1 | 0.10 | 7.9510e-003 |
| tblVehicleEF | LDT1 | 0.04 | 0.02 |
| tblVehicleEF | LDT1 | 0.19 | 8.0020e-003 |
| tblVehicleEF | LDT1 | 0.19 | 0.00 |
| tblVehicleEF | LDT2 | 5.9720e-003 | 4.9910e-003 |
| tblVehicleEF | LDT2 | 5.6870e-003 | 0.07 |
| tblVehicleEF | LDT2 | 0.75 | 1.03 |
| tblVehicleEF | LDT2 | 1.24 | 2.65 |
| tblVehicleEF | LDT2 | 356.41 | 341.38 |
| tblVehicleEF | LDT2 | 75.77 | 68.34 |
| tblVehicleEF | LDT2 | 0.07 | 0.09 |
| tblVehicleEF | LDT2 | 0.09 | 0.28 |
| tblVehicleEF | LDT2 | 1.9990e-003 | 1.9090e-003 |
| tblVehicleEF | LDT2 | 2.3560e-003 | 1.8910e-003 |
| tblVehicleEF | LDT2 | 1.8380e-003 | 1.7570e-003 |
| tblVehicleEF | LDT2 | 2.1660e-003 | 1.7390e-003 |
| tblVehicleEF | LDT2 | 0.04 | 0.07 |
| tblVehicleEF | LDT2 | 0.10 | 0.12 |
| tblVehicleEF | LDT2 | 0.04 | 0.07 |
| tblVehicleEF | LDT2 | 0.01 | 0.02 |
| tblVehicleEF | LDT2 | 0.06 | 0.41 |
| tblVehicleEF | LDT2 | 0.08 | 0.31 |

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|---|---|---|---|
| tblVehicleEF | LDT2 | 3.5700e-003 | 3.3770e-003 |
| tblVehicleEF | LDT2 | 7.7800e-004 | 6.7600e-004 |
| tblVehicleEF | LDT2 | 0.04 | 0.07 |
| tblVehicleEF | LDT2 | 0.10 | 0.12 |
| tblVehicleEF | LDT2 | 0.04 | 0.07 |
| tblVehicleEF | LDT2 | 0.02 | 0.03 |
| tblVehicleEF | LDT2 | 0.06 | 0.41 |
| tblVehicleEF | LDT2 | 0.08 | 0.34 |
| tblVehicleEF | LDT2 | 0.00 | 0.06 |
| tblVehicleEF | LDT2 | 6.3770e-003 | 0.00 |
| tblVehicleEF | LDT2 | 5.0410e-003 | 0.13 |
| tblVehicleEF | LDT2 | 0.00 | 14.40 |
| tblVehicleEF | LDT2 | 0.83 | 0.00 |
| tblVehicleEF | LDT2 | 1.06 | 5.3180e-003 |
| tblVehicleEF | LDT2 | 0.00 | 6.4670e-003 |
| tblVehicleEF | LDT2 | 374.21 | 0.00 |
| tblVehicleEF | LDT2 | 75.77 | 0.02 |
| tblVehicleEF | LDT2 | 0.00 | 0.01 |
| tblVehicleEF | LDT2 | 0.06 | 0.00 |
| tblVehicleEF | LDT2 | 0.09 | 6.6250e-003 |
| tblVehicleEF | LDT2 | 0.00 | 0.10 |
| tblVehicleEF | LDT2 | 0.04 | 0.00 |
| tblVehicleEF | LDT2 | 8.0000e-003 | 0.03 |
| tblVehicleEF | LDT2 | 1.9990e-003 | 0.38 |
| tblVehicleEF | LDT2 | 2.3560e-003 | 0.54 |
| tblVehicleEF | LDT2 | 0.00 | 0.03 |
| tblVehicleEF | LDT2 | 0.02 | 0.54 |
| tblVehicleEF | LDT2 | 2.0000e-003 | 0.49 |
| tblVehicleEF | LDT2 | 1.8380e-003 | 0.31 |

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|---|---|---|---|
| tblVehicleEF | LDT2 | 2.1660e-003 | 0.38 |
| tblVehicleEF | LDT2 | 0.07 | 0.00 |
| tblVehicleEF | LDT2 | 0.10 | 1.6180e-003 |
| tblVehicleEF | LDT2 | 0.06 | 1.7000e-005 |
| tblVehicleEF | LDT2 | 0.02 | 0.08 |
| tblVehicleEF | LDT2 | 0.05 | 0.00 |
| tblVehicleEF | LDT2 | 3.7490e-003 | 1.12 |
| tblVehicleEF | LDT2 | 7.7500e-004 | 2.26 |
| tblVehicleEF | LDT2 | 0.07 | 75.14 |
| tblVehicleEF | LDT2 | 0.10 | 1.8890e-003 |
| tblVehicleEF | LDT2 | 0.00 | 4.0400e-004 |
| tblVehicleEF | LDT2 | 0.06 | 7.8210e-003 |
| tblVehicleEF | LDT2 | 0.02 | 0.02 |
| tblVehicleEF | LDT2 | 0.05 | 8.0020e-003 |
| tblVehicleEF | LDT2 | 0.07 | 0.00 |
| tblVehicleEF | LDT2 | 0.00 | 0.07 |
| tblVehicleEF | LDT2 | 5.8560e-003 | 0.00 |
| tblVehicleEF | LDT2 | 5.8000e-003 | 0.13 |
| tblVehicleEF | LDT2 | 0.00 | 14.59 |
| tblVehicleEF | LDT2 | 0.72 | 0.00 |
| tblVehicleEF | LDT2 | 1.27 | 4.8870e-003 |
| tblVehicleEF | LDT2 | 0.00 | 6.8940e-003 |
| tblVehicleEF | LDT2 | 350.82 | 0.00 |
| tblVehicleEF | LDT2 | 75.77 | 0.02 |
| tblVehicleEF | LDT2 | 0.00 | 0.01 |
| tblVehicleEF | LDT2 | 0.07 | 0.00 |
| tblVehicleEF | LDT2 | 0.09 | 7.0820e-003 |
| tblVehicleEF | LDT2 | 0.00 | 0.07 |
| tblVehicleEF | LDT2 | 0.04 | 0.00 |

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|---|---|---|---|
| tblVehicleEF | LDT2 | 8.0000e-003 | 0.03 |
| tblVehicleEF | LDT2 | 1.9990e-003 | 0.48 |
| tblVehicleEF | LDT2 | 2.3560e-003 | 0.33 |
| tblVehicleEF | LDT2 | 0.00 | 0.03 |
| tblVehicleEF | LDT2 | 0.02 | 0.33 |
| tblVehicleEF | LDT2 | 2.0000e-003 | 0.33 |
| tblVehicleEF | LDT2 | 1.8380e-003 | 0.35 |
| tblVehicleEF | LDT2 | 2.1660e-003 | 0.48 |
| tblVehicleEF | LDT2 | 0.04 | 0.00 |
| tblVehicleEF | LDT2 | 0.10 | 1.6180e-003 |
| tblVehicleEF | LDT2 | 0.04 | 1.7000e-005 |
| tblVehicleEF | LDT2 | 0.01 | 0.08 |
| tblVehicleEF | LDT2 | 0.07 | 0.00 |
| tblVehicleEF | LDT2 | 3.5130e-003 | 0.99 |
| tblVehicleEF | LDT2 | 7.7900e-004 | 2.74 |
| tblVehicleEF | LDT2 | 0.04 | 71.61 |
| tblVehicleEF | LDT2 | 0.10 | 1.8890e-003 |
| tblVehicleEF | LDT2 | 0.00 | 4.0400e-004 |
| tblVehicleEF | LDT2 | 0.04 | 7.8210e-003 |
| tblVehicleEF | LDT2 | 0.02 | 0.02 |
| tblVehicleEF | LDT2 | 0.07 | 8.0020e-003 |
| tblVehicleEF | LDT2 | 0.09 | 0.00 |
| tblVehicleEF | LHD1 | 5.2120e-003 | 5.5830e-003 |
| tblVehicleEF | LHD1 | 9.8600e-003 | 5.7240e-003 |
| tblVehicleEF | LHD1 | 0.02 | 0.02 |
| tblVehicleEF | LHD1 | 0.15 | 0.19 |
| tblVehicleEF | LHD1 | 0.74 | 0.65 |
| tblVehicleEF | LHD1 | 2.42 | 1.14 |
| tblVehicleEF | LHD1 | 9.02 | 8.89 |

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|---|---|---|---|
| tblVehicleEF | LHD1 | 594.63 | 666.21 |
| tblVehicleEF | LHD1 | 31.53 | 12.43 |
| tblVehicleEF | LHD1 | 0.07 | 0.05 |
| tblVehicleEF | LHD1 | 1.08 | 0.65 |
| tblVehicleEF | LHD1 | 0.94 | 0.33 |
| tblVehicleEF | LHD1 | 8.6300e-004 | 7.5700e-004 |
| tblVehicleEF | LHD1 | 0.01 | 9.6790e-003 |
| tblVehicleEF | LHD1 | 9.7700e-003 | 6.4420e-003 |
| tblVehicleEF | LHD1 | 8.9700e-004 | 2.8500e-004 |
| tblVehicleEF | LHD1 | 8.2600e-004 | 7.2400e-004 |
| tblVehicleEF | LHD1 | 2.5390e-003 | 2.4200e-003 |
| tblVehicleEF | LHD1 | 9.3240e-003 | 6.1330e-003 |
| tblVehicleEF | LHD1 | 8.2500e-004 | 2.6200e-004 |
| tblVehicleEF | LHD1 | 2.9620e-003 | 2.5670e-003 |
| tblVehicleEF | LHD1 | 0.10 | 0.08 |
| tblVehicleEF | LHD1 | 0.02 | 0.02 |
| tblVehicleEF | LHD1 | 1.7810e-003 | 1.5640e-003 |
| tblVehicleEF | LHD1 | 0.06 | 0.05 |
| tblVehicleEF | LHD1 | 0.30 | 0.56 |
| tblVehicleEF | LHD1 | 0.24 | 0.08 |
| tblVehicleEF | LHD1 | 9.0000e-005 | 8.6000e-005 |
| tblVehicleEF | LHD1 | 5.8320e-003 | 6.5060e-003 |
| tblVehicleEF | LHD1 | 3.6100e-004 | 1.2300e-004 |
| tblVehicleEF | LHD1 | 2.9620e-003 | 2.5670e-003 |
| tblVehicleEF | LHD1 | 0.10 | 0.08 |
| tblVehicleEF | LHD1 | 0.02 | 0.03 |
| tblVehicleEF | LHD1 | 1.7810e-003 | 1.5640e-003 |
| tblVehicleEF | LHD1 | 0.08 | 0.06 |
| tblVehicleEF | LHD1 | 0.30 | 0.56 |

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|---|---|---|---|
| tblVehicleEF | LHD1 | 0.26 | 0.09 |
| tblVehicleEF | LHD1 | 5.2120e-003 | 5.1340e-003 |
| tblVehicleEF | LHD1 | 0.01 | 0.30 |
| tblVehicleEF | LHD1 | 0.02 | 0.08 |
| tblVehicleEF | LHD1 | 0.15 | 0.83 |
| tblVehicleEF | LHD1 | 0.75 | 124.98 |
| tblVehicleEF | LHD1 | 2.31 | 6.2080e-003 |
| tblVehicleEF | LHD1 | 9.02 | 1.7780e-003 |
| tblVehicleEF | LHD1 | 594.63 | 0.01 |
| tblVehicleEF | LHD1 | 31.53 | 0.05 |
| tblVehicleEF | LHD1 | 0.07 | 1.0420e-003 |
| tblVehicleEF | LHD1 | 1.01 | 0.07 |
| tblVehicleEF | LHD1 | 0.91 | 0.03 |
| tblVehicleEF | LHD1 | 8.6300e-004 | 2.2100e-003 |
| tblVehicleEF | LHD1 | 0.08 | 0.42 |
| tblVehicleEF | LHD1 | 0.01 | 0.06 |
| tblVehicleEF | LHD1 | 9.7700e-003 | 0.48 |
| tblVehicleEF | LHD1 | 8.9700e-004 | 0.06 |
| tblVehicleEF | LHD1 | 8.2600e-004 | 5.6060e-003 |
| tblVehicleEF | LHD1 | 0.03 | 0.05 |
| tblVehicleEF | LHD1 | 2.5390e-003 | 0.03 |
| tblVehicleEF | LHD1 | 9.3240e-003 | 0.07 |
| tblVehicleEF | LHD1 | 8.2500e-004 | 0.54 |
| tblVehicleEF | LHD1 | 4.5380e-003 | 1.7000e-004 |
| tblVehicleEF | LHD1 | 0.10 | 5.2380e-003 |
| tblVehicleEF | LHD1 | 0.02 | 0.05 |
| tblVehicleEF | LHD1 | 2.6400e-003 | 1.8000e-005 |
| tblVehicleEF | LHD1 | 0.06 | 0.61 |
| tblVehicleEF | LHD1 | 0.29 | 9.1050e-003 |

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|---|---|---|---|
| tblVehicleEF | LHD1 | 0.23 | 0.32 |
| tblVehicleEF | LHD1 | 9.0000e-005 | 0.19 |
| tblVehicleEF | LHD1 | 5.8320e-003 | 0.67 |
| tblVehicleEF | LHD1 | 3.5900e-004 | 1.09 |
| tblVehicleEF | LHD1 | 4.5380e-003 | 48.48 |
| tblVehicleEF | LHD1 | 0.10 | 2.8500e-004 |
| tblVehicleEF | LHD1 | 0.02 | 4.2700e-004 |
| tblVehicleEF | LHD1 | 2.6400e-003 | 5.4550e-003 |
| tblVehicleEF | LHD1 | 0.08 | 0.03 |
| tblVehicleEF | LHD1 | 0.29 | 9.3700e-003 |
| tblVehicleEF | LHD1 | 0.25 | 9.5160e-003 |
| tblVehicleEF | LHD1 | 5.2120e-003 | 5.3710e-003 |
| tblVehicleEF | LHD1 | 9.8170e-003 | 0.30 |
| tblVehicleEF | LHD1 | 0.02 | 0.09 |
| tblVehicleEF | LHD1 | 0.15 | 0.84 |
| tblVehicleEF | LHD1 | 0.73 | 124.98 |
| tblVehicleEF | LHD1 | 2.43 | 6.0400e-003 |
| tblVehicleEF | LHD1 | 9.02 | 1.8370e-003 |
| tblVehicleEF | LHD1 | 594.63 | 0.01 |
| tblVehicleEF | LHD1 | 31.53 | 0.05 |
| tblVehicleEF | LHD1 | 0.07 | 1.0870e-003 |
| tblVehicleEF | LHD1 | 1.06 | 0.07 |
| tblVehicleEF | LHD1 | 0.95 | 0.03 |
| tblVehicleEF | LHD1 | 8.6300e-004 | 1.5420e-003 |
| tblVehicleEF | LHD1 | 0.08 | 0.42 |
| tblVehicleEF | LHD1 | 0.01 | 0.06 |
| tblVehicleEF | LHD1 | 9.7700e-003 | 0.53 |
| tblVehicleEF | LHD1 | 8.9700e-004 | 0.04 |
| tblVehicleEF | LHD1 | 8.2600e-004 | 6.2420e-003 |

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|---|---|---|---|
| tblVehicleEF | LHD1 | 0.03 | 0.04 |
| tblVehicleEF | LHD1 | 2.5390e-003 | 0.02 |
| tblVehicleEF | LHD1 | 9.3240e-003 | 0.08 |
| tblVehicleEF | LHD1 | 8.2500e-004 | 0.60 |
| tblVehicleEF | LHD1 | 3.0750e-003 | 1.7000e-004 |
| tblVehicleEF | LHD1 | 0.11 | 5.2380e-003 |
| tblVehicleEF | LHD1 | 0.02 | 0.05 |
| tblVehicleEF | LHD1 | 1.7770e-003 | 1.8000e-005 |
| tblVehicleEF | LHD1 | 0.06 | 0.64 |
| tblVehicleEF | LHD1 | 0.32 | 9.1050e-003 |
| tblVehicleEF | LHD1 | 0.24 | 0.34 |
| tblVehicleEF | LHD1 | 9.0000e-005 | 0.19 |
| tblVehicleEF | LHD1 | 5.8320e-003 | 0.65 |
| tblVehicleEF | LHD1 | 3.6100e-004 | 1.14 |
| tblVehicleEF | LHD1 | 3.0750e-003 | 48.48 |
| tblVehicleEF | LHD1 | 0.11 | 2.8500e-004 |
| tblVehicleEF | LHD1 | 0.02 | 4.2700e-004 |
| tblVehicleEF | LHD1 | 1.7770e-003 | 5.4550e-003 |
| tblVehicleEF | LHD1 | 0.08 | 0.03 |
| tblVehicleEF | LHD1 | 0.32 | 9.3700e-003 |
| tblVehicleEF | LHD1 | 0.26 | 9.5160e-003 |
| tblVehicleEF | LHD2 | 3.6840e-003 | 3.9120e-003 |
| tblVehicleEF | LHD2 | 3.6840e-003 | 3.9650e-003 |
| tblVehicleEF | LHD2 | 7.3420e-003 | 0.01 |
| tblVehicleEF | LHD2 | 0.13 | 0.15 |
| tblVehicleEF | LHD2 | 0.32 | 0.44 |
| tblVehicleEF | LHD2 | 1.21 | 0.76 |
| tblVehicleEF | LHD2 | 13.71 | 13.45 |
| tblVehicleEF | LHD2 | 608.08 | 667.35 |

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|---|---|---|---|
| tblVehicleEF | LHD2 | 26.39 | 9.56 |
| tblVehicleEF | LHD2 | 0.09 | 0.09 |
| tblVehicleEF | LHD2 | 0.67 | 0.84 |
| tblVehicleEF | LHD2 | 0.50 | 0.23 |
| tblVehicleEF | LHD2 | 1.1670e-003 | 1.2520e-003 |
| tblVehicleEF | LHD2 | 0.01 | 0.01 |
| tblVehicleEF | LHD2 | 8.9870e-003 | 0.01 |
| tblVehicleEF | LHD2 | 4.2200e-004 | 1.6200e-004 |
| tblVehicleEF | LHD2 | 1.1160e-003 | 1.1980e-003 |
| tblVehicleEF | LHD2 | 2.6680e-003 | 2.6330e-003 |
| tblVehicleEF | LHD2 | 8.5850e-003 | 9.5770e-003 |
| tblVehicleEF | LHD2 | 3.8800e-004 | 1.4900e-004 |
| tblVehicleEF | LHD2 | 1.0410e-003 | 1.5680e-003 |
| tblVehicleEF | LHD2 | 0.03 | 0.05 |
| tblVehicleEF | LHD2 | 0.01 | 0.02 |
| tblVehicleEF | LHD2 | 6.8300e-004 | 9.7100e-004 |
| tblVehicleEF | LHD2 | 0.04 | 0.05 |
| tblVehicleEF | LHD2 | 0.07 | 0.35 |
| tblVehicleEF | LHD2 | 0.10 | 0.05 |
| tblVehicleEF | LHD2 | 1.3400e-004 | 1.2900e-004 |
| tblVehicleEF | LHD2 | 5.9210e-003 | 6.4600e-003 |
| tblVehicleEF | LHD2 | 2.8600e-004 | 9.5000e-005 |
| tblVehicleEF | LHD2 | 1.0410e-003 | 1.5680e-003 |
| tblVehicleEF | LHD2 | 0.03 | 0.05 |
| tblVehicleEF | LHD2 | 0.02 | 0.02 |
| tblVehicleEF | LHD2 | 6.8300e-004 | 9.7100e-004 |
| tblVehicleEF | LHD2 | 0.05 | 0.06 |
| tblVehicleEF | LHD2 | 0.07 | 0.35 |
| tblVehicleEF | LHD2 | 0.11 | 0.06 |

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|---|---|---|---|
| tblVehicleEF | LHD2 | 3.6840e-003 | 3.5540e-003 |
| tblVehicleEF | LHD2 | 3.7270e-003 | 0.23 |
| tblVehicleEF | LHD2 | 7.0950e-003 | 0.06 |
| tblVehicleEF | LHD2 | 0.13 | 0.64 |
| tblVehicleEF | LHD2 | 0.32 | 184.31 |
| tblVehicleEF | LHD2 | 1.16 | 4.2190e-003 |
| tblVehicleEF | LHD2 | 13.71 | 1.2050e-003 |
| tblVehicleEF | LHD2 | 608.08 | 0.02 |
| tblVehicleEF | LHD2 | 26.39 | 0.05 |
| tblVehicleEF | LHD2 | 0.09 | 7.2200e-004 |
| tblVehicleEF | LHD2 | 0.64 | 0.05 |
| tblVehicleEF | LHD2 | 0.48 | 0.05 |
| tblVehicleEF | LHD2 | 1.1670e-003 | 1.3640e-003 |
| tblVehicleEF | LHD2 | 0.09 | 0.31 |
| tblVehicleEF | LHD2 | 0.01 | 0.06 |
| tblVehicleEF | LHD2 | 8.9870e-003 | 0.28 |
| tblVehicleEF | LHD2 | 4.2200e-004 | 0.03 |
| tblVehicleEF | LHD2 | 1.1160e-003 | 3.7590e-003 |
| tblVehicleEF | LHD2 | 0.04 | 0.03 |
| tblVehicleEF | LHD2 | 2.6680e-003 | 0.02 |
| tblVehicleEF | LHD2 | 8.5850e-003 | 0.05 |
| tblVehicleEF | LHD2 | 3.8800e-004 | 0.34 |
| tblVehicleEF | LHD2 | 1.5870e-003 | 1.9200e-004 |
| tblVehicleEF | LHD2 | 0.04 | 8.5420e-003 |
| tblVehicleEF | LHD2 | 0.01 | 0.09 |
| tblVehicleEF | LHD2 | 9.9900e-004 | 1.0000e-005 |
| tblVehicleEF | LHD2 | 0.04 | 0.79 |
| tblVehicleEF | LHD2 | 0.07 | 0.02 |
| tblVehicleEF | LHD2 | 0.10 | 0.22 |

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|---|---|---|---|
| tblVehicleEF | LHD2 | 1.3400e-004 | 0.15 |
| tblVehicleEF | LHD2 | 5.9210e-003 | 0.44 |
| tblVehicleEF | LHD2 | 2.8500e-004 | 0.73 |
| tblVehicleEF | LHD2 | 1.5870e-003 | 50.51 |
| tblVehicleEF | LHD2 | 0.04 | 1.6200e-004 |
| tblVehicleEF | LHD2 | 0.02 | 7.0500e-004 |
| tblVehicleEF | LHD2 | 9.9900e-004 | 6.5990e-003 |
| tblVehicleEF | LHD2 | 0.05 | 0.04 |
| tblVehicleEF | LHD2 | 0.07 | 0.01 |
| tblVehicleEF | LHD2 | 0.10 | 0.02 |
| tblVehicleEF | LHD2 | 3.6840e-003 | 3.7180e-003 |
| tblVehicleEF | LHD2 | 3.6740e-003 | 0.23 |
| tblVehicleEF | LHD2 | 7.3760e-003 | 0.06 |
| tblVehicleEF | LHD2 | 0.13 | 0.64 |
| tblVehicleEF | LHD2 | 0.32 | 184.31 |
| tblVehicleEF | LHD2 | 1.22 | 4.1490e-003 |
| tblVehicleEF | LHD2 | 13.71 | 1.2430e-003 |
| tblVehicleEF | LHD2 | 608.08 | 0.02 |
| tblVehicleEF | LHD2 | 26.39 | 0.05 |
| tblVehicleEF | LHD2 | 0.09 | 7.5300e-004 |
| tblVehicleEF | LHD2 | 0.66 | 0.05 |
| tblVehicleEF | LHD2 | 0.50 | 0.05 |
| tblVehicleEF | LHD2 | 1.1670e-003 | 9.4300e-004 |
| tblVehicleEF | LHD2 | 0.09 | 0.31 |
| tblVehicleEF | LHD2 | 0.01 | 0.06 |
| tblVehicleEF | LHD2 | 8.9870e-003 | 0.32 |
| tblVehicleEF | LHD2 | 4.2200e-004 | 0.02 |
| tblVehicleEF | LHD2 | 1.1160e-003 | 4.0970e-003 |
| tblVehicleEF | LHD2 | 0.04 | 0.02 |

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|---|---|---|---|
| tblVehicleEF | LHD2 | 2.6680e-003 | 0.01 |
| tblVehicleEF | LHD2 | 8.5850e-003 | 0.05 |
| tblVehicleEF | LHD2 | 3.8800e-004 | 0.38 |
| tblVehicleEF | LHD2 | 1.0460e-003 | 1.9200e-004 |
| tblVehicleEF | LHD2 | 0.04 | 8.5420e-003 |
| tblVehicleEF | LHD2 | 0.01 | 0.09 |
| tblVehicleEF | LHD2 | 6.7100e-004 | 1.0000e-005 |
| tblVehicleEF | LHD2 | 0.04 | 0.82 |
| tblVehicleEF | LHD2 | 0.08 | 0.02 |
| tblVehicleEF | LHD2 | 0.10 | 0.23 |
| tblVehicleEF | LHD2 | 1.3400e-004 | 0.15 |
| tblVehicleEF | LHD2 | 5.9210e-003 | 0.44 |
| tblVehicleEF | LHD2 | 2.8600e-004 | 0.77 |
| tblVehicleEF | LHD2 | 1.0460e-003 | 50.50 |
| tblVehicleEF | LHD2 | 0.04 | 1.6200e-004 |
| tblVehicleEF | LHD2 | 0.02 | 7.0500e-004 |
| tblVehicleEF | LHD2 | 6.7100e-004 | 6.5990e-003 |
| tblVehicleEF | LHD2 | 0.05 | 0.04 |
| tblVehicleEF | LHD2 | 0.08 | 0.01 |
| tblVehicleEF | LHD2 | 0.11 | 0.02 |
| tblVehicleEF | MCY | 0.51 | 0.38 |
| tblVehicleEF | MCY | 0.15 | 0.24 |
| tblVehicleEF | MCY | 18.57 | 19.19 |
| tblVehicleEF | MCY | 9.67 | 8.53 |
| tblVehicleEF | MCY | 183.90 | 223.45 |
| tblVehicleEF | MCY | 44.44 | 59.65 |
| tblVehicleEF | MCY | 1.13 | 1.13 |
| tblVehicleEF | MCY | 0.31 | 0.26 |
| tblVehicleEF | MCY | 2.3320e-003 | 2.4320e-003 |

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|---|---|---|---|
| tblVehicleEF | MCY | 3.6000e-003 | 3.2970e-003 |
| tblVehicleEF | MCY | 2.1780e-003 | 2.2730e-003 |
| tblVehicleEF | MCY | 3.3840e-003 | 3.1040e-003 |
| tblVehicleEF | MCY | 1.14 | 1.09 |
| tblVehicleEF | MCY | 0.66 | 0.66 |
| tblVehicleEF | MCY | 0.67 | 0.67 |
| tblVehicleEF | MCY | 2.47 | 2.61 |
| tblVehicleEF | MCY | 0.60 | 1.99 |
| tblVehicleEF | MCY | 2.04 | 1.82 |
| tblVehicleEF | MCY | 2.2170e-003 | 2.2110e-003 |
| tblVehicleEF | MCY | 6.6200e-004 | 5.9000e-004 |
| tblVehicleEF | MCY | 1.14 | 1.09 |
| tblVehicleEF | MCY | 0.66 | 0.66 |
| tblVehicleEF | MCY | 0.67 | 0.67 |
| tblVehicleEF | MCY | 3.08 | 3.24 |
| tblVehicleEF | MCY | 0.60 | 1.99 |
| tblVehicleEF | MCY | 2.22 | 1.98 |
| tblVehicleEF | MCY | 0.00 | 0.81 |
| tblVehicleEF | MCY | 0.50 | 0.00 |
| tblVehicleEF | MCY | 0.13 | 0.73 |
| tblVehicleEF | MCY | 0.00 | 28.87 |
| tblVehicleEF | MCY | 18.00 | 0.00 |
| tblVehicleEF | MCY | 8.85 | 0.37 |
| tblVehicleEF | MCY | 0.00 | 7.4230e-003 |
| tblVehicleEF | MCY | 183.90 | 0.00 |
| tblVehicleEF | MCY | 44.44 | 2.55 |
| tblVehicleEF | MCY | 0.00 | 0.10 |
| tblVehicleEF | MCY | 0.98 | 0.00 |
| tblVehicleEF | MCY | 0.29 | 0.06 |

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|---|---|---|---|
| tblVehicleEF | MCY | 0.00 | 1.10 |
| tblVehicleEF | MCY | 0.01 | 0.00 |
| tblVehicleEF | MCY | 4.0000e-003 | 3.17 |
| tblVehicleEF | MCY | 2.3320e-003 | 1.87 |
| tblVehicleEF | MCY | 3.6000e-003 | 3.53 |
| tblVehicleEF | MCY | 0.00 | 0.37 |
| tblVehicleEF | MCY | 5.0400e-003 | 3.53 |
| tblVehicleEF | MCY | 1.0000e-003 | 2.20 |
| tblVehicleEF | MCY | 2.1780e-003 | 1.75 |
| tblVehicleEF | MCY | 3.3840e-003 | 1.87 |
| tblVehicleEF | MCY | 1.88 | 5.0000e-004 |
| tblVehicleEF | MCY | 0.75 | 2.2730e-003 |
| tblVehicleEF | MCY | 1.17 | 1.5520e-003 |
| tblVehicleEF | MCY | 2.42 | 0.99 |
| tblVehicleEF | MCY | 0.57 | 0.00 |
| tblVehicleEF | MCY | 1.82 | 0.25 |
| tblVehicleEF | MCY | 2.2060e-003 | 18.47 |
| tblVehicleEF | MCY | 6.4200e-004 | 7.76 |
| tblVehicleEF | MCY | 1.88 | 111.05 |
| tblVehicleEF | MCY | 0.75 | 3.2970e-003 |
| tblVehicleEF | MCY | 0.00 | 1.2160e-003 |
| tblVehicleEF | MCY | 1.17 | 5.8800e-003 |
| tblVehicleEF | MCY | 3.01 | 5.0400e-003 |
| tblVehicleEF | MCY | 0.57 | 4.0000e-003 |
| tblVehicleEF | MCY | 1.98 | 0.00 |
| tblVehicleEF | MCY | 0.00 | 0.93 |
| tblVehicleEF | MCY | 0.52 | 0.00 |
| tblVehicleEF | MCY | 0.15 | 0.85 |
| tblVehicleEF | MCY | 0.00 | 30.00 |

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|---|---|---|---|
| tblVehicleEF | MCY | 18.58 | 0.00 |
| tblVehicleEF | MCY | 9.75 | 0.38 |
| tblVehicleEF | MCY | 0.00 | 7.6700e-003 |
| tblVehicleEF | MCY | 183.90 | 0.00 |
| tblVehicleEF | MCY | 44.44 | 2.62 |
| tblVehicleEF | MCY | 0.00 | 0.12 |
| tblVehicleEF | MCY | 1.10 | 0.00 |
| tblVehicleEF | MCY | 0.31 | 0.06 |
| tblVehicleEF | MCY | 0.00 | 0.64 |
| tblVehicleEF | MCY | 0.01 | 0.00 |
| tblVehicleEF | MCY | 4.0000e-003 | 3.26 |
| tblVehicleEF | MCY | 2.3320e-003 | 2.29 |
| tblVehicleEF | MCY | 3.6000e-003 | 2.37 |
| tblVehicleEF | MCY | 0.00 | 0.43 |
| tblVehicleEF | MCY | 5.0400e-003 | 2.37 |
| tblVehicleEF | MCY | 1.0000e-003 | 1.27 |
| tblVehicleEF | MCY | 2.1780e-003 | 2.02 |
| tblVehicleEF | MCY | 3.3840e-003 | 2.29 |
| tblVehicleEF | MCY | 1.25 | 5.0000e-004 |
| tblVehicleEF | MCY | 0.85 | 2.2730e-003 |
| tblVehicleEF | MCY | 0.66 | 1.5520e-003 |
| tblVehicleEF | MCY | 2.48 | 1.11 |
| tblVehicleEF | MCY | 0.69 | 0.00 |
| tblVehicleEF | MCY | 2.07 | 0.27 |
| tblVehicleEF | MCY | 2.2180e-003 | 19.29 |
| tblVehicleEF | MCY | 6.6500e-004 | 8.66 |
| tblVehicleEF | MCY | 1.25 | 111.83 |
| tblVehicleEF | MCY | 0.85 | 3.2970e-003 |
| tblVehicleEF | MCY | 0.00 | 1.2160e-003 |

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|---|---|---|---|
| tblVehicleEF | MCY | 0.66 | 5.8800e-003 |
| tblVehicleEF | MCY | 3.09 | 5.0400e-003 |
| tblVehicleEF | MCY | 0.69 | 4.0000e-003 |
| tblVehicleEF | MCY | 2.25 | 0.00 |
| tblVehicleEF | MDV | 0.01 | 6.5750e-003 |
| tblVehicleEF | MDV | 0.01 | 0.08 |
| tblVehicleEF | MDV | 1.17 | 1.22 |
| tblVehicleEF | MDV | 2.29 | 3.11 |
| tblVehicleEF | MDV | 483.40 | 419.24 |
| tblVehicleEF | MDV | 101.24 | 83.18 |
| tblVehicleEF | MDV | 0.13 | 0.11 |
| tblVehicleEF | MDV | 0.20 | 0.35 |
| tblVehicleEF | MDV | 2.1080e-003 | 2.0860e-003 |
| tblVehicleEF | MDV | 2.4110e-003 | 2.0610e-003 |
| tblVehicleEF | MDV | 1.9430e-003 | 1.9230e-003 |
| tblVehicleEF | MDV | 2.2170e-003 | 1.8960e-003 |
| tblVehicleEF | MDV | 0.07 | 0.08 |
| tblVehicleEF | MDV | 0.15 | 0.14 |
| tblVehicleEF | MDV | 0.07 | 0.09 |
| tblVehicleEF | MDV | 0.03 | 0.03 |
| tblVehicleEF | MDV | 0.09 | 0.43 |
| tblVehicleEF | MDV | 0.17 | 0.40 |
| tblVehicleEF | MDV | 4.8410e-003 | 4.1450e-003 |
| tblVehicleEF | MDV | 1.0520e-003 | 8.2300e-004 |
| tblVehicleEF | MDV | 0.07 | 0.08 |
| tblVehicleEF | MDV | 0.15 | 0.14 |
| tblVehicleEF | MDV | 0.07 | 0.09 |
| tblVehicleEF | MDV | 0.04 | 0.04 |
| tblVehicleEF | MDV | 0.09 | 0.43 |

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|---|---|---|---|
| tblVehicleEF | MDV | 0.19 | 0.44 |
| tblVehicleEF | MDV | 0.00 | 0.08 |
| tblVehicleEF | MDV | 0.01 | 0.00 |
| tblVehicleEF | MDV | 0.01 | 0.15 |
| tblVehicleEF | MDV | 0.00 | 17.75 |
| tblVehicleEF | MDV | 1.29 | 0.00 |
| tblVehicleEF | MDV | 1.96 | 7.0040e-003 |
| tblVehicleEF | MDV | 0.00 | 7.1080e-003 |
| tblVehicleEF | MDV | 507.25 | 0.00 |
| tblVehicleEF | MDV | 101.24 | 0.03 |
| tblVehicleEF | MDV | 0.00 | 0.02 |
| tblVehicleEF | MDV | 0.11 | 0.00 |
| tblVehicleEF | MDV | 0.19 | 9.1800e-003 |
| tblVehicleEF | MDV | 0.00 | 0.13 |
| tblVehicleEF | MDV | 0.04 | 0.00 |
| tblVehicleEF | MDV | 8.0000e-003 | 0.04 |
| tblVehicleEF | MDV | 2.1080e-003 | 0.40 |
| tblVehicleEF | MDV | 2.4110e-003 | 0.62 |
| tblVehicleEF | MDV | 0.00 | 0.03 |
| tblVehicleEF | MDV | 0.02 | 0.61 |
| tblVehicleEF | MDV | 2.0000e-003 | 0.58 |
| tblVehicleEF | MDV | 1.9430e-003 | 0.39 |
| tblVehicleEF | MDV | 2.2170e-003 | 0.40 |
| tblVehicleEF | MDV | 0.11 | 0.00 |
| tblVehicleEF | MDV | 0.16 | 1.7780e-003 |
| tblVehicleEF | MDV | 0.10 | 2.1000e-005 |
| tblVehicleEF | MDV | 0.03 | 0.10 |
| tblVehicleEF | MDV | 0.09 | 0.00 |
| tblVehicleEF | MDV | 5.0810e-003 | 1.33 |

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|---|---|---|---|
| tblVehicleEF | MDV | 1.0460e-003 | 2.64 |
| tblVehicleEF | MDV | 0.11 | 93.07 |
| tblVehicleEF | MDV | 0.16 | 2.0580e-003 |
| tblVehicleEF | MDV | 0.00 | 4.4600e-004 |
| tblVehicleEF | MDV | 0.10 | 7.9160e-003 |
| tblVehicleEF | MDV | 0.04 | 0.02 |
| tblVehicleEF | MDV | 0.09 | 8.0020e-003 |
| tblVehicleEF | MDV | 0.17 | 0.00 |
| tblVehicleEF | MDV | 0.00 | 0.09 |
| tblVehicleEF | MDV | 0.01 | 0.00 |
| tblVehicleEF | MDV | 0.01 | 0.15 |
| tblVehicleEF | MDV | 0.00 | 17.99 |
| tblVehicleEF | MDV | 1.13 | 0.00 |
| tblVehicleEF | MDV | 2.35 | 6.4530e-003 |
| tblVehicleEF | MDV | 0.00 | 7.5770e-003 |
| tblVehicleEF | MDV | 476.03 | 0.00 |
| tblVehicleEF | MDV | 101.24 | 0.03 |
| tblVehicleEF | MDV | 0.00 | 0.02 |
| tblVehicleEF | MDV | 0.12 | 0.00 |
| tblVehicleEF | MDV | 0.21 | 9.7530e-003 |
| tblVehicleEF | MDV | 0.00 | 0.09 |
| tblVehicleEF | MDV | 0.04 | 0.00 |
| tblVehicleEF | MDV | 8.0000e-003 | 0.04 |
| tblVehicleEF | MDV | 2.1080e-003 | 0.50 |
| tblVehicleEF | MDV | 2.4110e-003 | 0.37 |
| tblVehicleEF | MDV | 0.00 | 0.03 |
| tblVehicleEF | MDV | 0.02 | 0.37 |
| tblVehicleEF | MDV | 2.0000e-003 | 0.40 |
| tblVehicleEF | MDV | 1.9430e-003 | 0.45 |

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|---|---|---|---|
| tblVehicleEF | MDV | 2.2170e-003 | 0.50 |
| tblVehicleEF | MDV | 0.07 | 0.00 |
| tblVehicleEF | MDV | 0.17 | 1.7780e-003 |
| tblVehicleEF | MDV | 0.07 | 2.1000e-005 |
| tblVehicleEF | MDV | 0.03 | 0.11 |
| tblVehicleEF | MDV | 0.11 | 0.00 |
| tblVehicleEF | MDV | 4.7660e-003 | 1.18 |
| tblVehicleEF | MDV | 1.0530e-003 | 3.21 |
| tblVehicleEF | MDV | 0.07 | 89.28 |
| tblVehicleEF | MDV | 0.17 | 2.0580e-003 |
| tblVehicleEF | MDV | 0.00 | 4.4600e-004 |
| tblVehicleEF | MDV | 0.07 | 7.9160e-003 |
| tblVehicleEF | MDV | 0.04 | 0.02 |
| tblVehicleEF | MDV | 0.11 | 8.0020e-003 |
| tblVehicleEF | MDV | 0.19 | 0.00 |
| tblVehicleEF | MH | 0.02 | 0.01 |
| tblVehicleEF | MH | 0.02 | 0.02 |
| tblVehicleEF | MH | 1.75 | 1.21 |
| tblVehicleEF | MH | 5.15 | 2.15 |
| tblVehicleEF | MH | 1,102.46 | 1,501.21 |
| tblVehicleEF | MH | 58.88 | 19.42 |
| tblVehicleEF | MH | 1.12 | 1.11 |
| tblVehicleEF | MH | 0.75 | 0.25 |
| tblVehicleEF | MH | 0.01 | 0.01 |
| tblVehicleEF | MH | 0.02 | 0.02 |
| tblVehicleEF | MH | 1.0110e-003 | 2.8400e-004 |
| tblVehicleEF | MH | 3.2180e-003 | 3.2450e-003 |
| tblVehicleEF | MH | 0.02 | 0.02 |
| tblVehicleEF | MH | 9.3000e-004 | 2.6100e-004 |

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|---|---|---|---|
| tblVehicleEF | MH | 0.93 | 0.84 |
| tblVehicleEF | MH | 0.06 | 0.06 |
| tblVehicleEF | MH | 0.38 | 0.35 |
| tblVehicleEF | MH | 0.07 | 0.06 |
| tblVehicleEF | MH | 0.02 | 1.46 |
| tblVehicleEF | MH | 0.30 | 0.10 |
| tblVehicleEF | MH | 0.01 | 0.01 |
| tblVehicleEF | MH | 6.7800e-004 | 1.9200e-004 |
| tblVehicleEF | MH | 0.93 | 0.84 |
| tblVehicleEF | MH | 0.06 | 0.06 |
| tblVehicleEF | MH | 0.38 | 0.35 |
| tblVehicleEF | MH | 0.10 | 0.08 |
| tblVehicleEF | MH | 0.02 | 1.46 |
| tblVehicleEF | MH | 0.33 | 0.11 |
| tblVehicleEF | MH | 0.00 | 0.92 |
| tblVehicleEF | MH | 0.02 | 0.00 |
| tblVehicleEF | MH | 0.02 | 0.06 |
| tblVehicleEF | MH | 0.00 | 192.01 |
| tblVehicleEF | MH | 1.80 | 0.00 |
| tblVehicleEF | MH | 4.84 | 0.01 |
| tblVehicleEF | MH | 0.00 | 0.27 |
| tblVehicleEF | MH | 1,102.46 | 0.00 |
| tblVehicleEF | MH | 58.88 | 0.06 |
| tblVehicleEF | MH | 0.00 | 0.22 |
| tblVehicleEF | MH | 1.04 | 0.00 |
| tblVehicleEF | MH | 0.72 | 0.05 |
| tblVehicleEF | MH | 0.00 | 0.50 |
| tblVehicleEF | MH | 0.13 | 0.00 |
| tblVehicleEF | MH | 0.01 | 0.08 |

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|---|---|---|---|
| tblVehicleEF | MH | 0.02 | 1.42 |
| tblVehicleEF | MH | 1.0110e-003 | 0.12 |
| tblVehicleEF | MH | 0.00 | 0.60 |
| tblVehicleEF | MH | 0.06 | 0.12 |
| tblVehicleEF | MH | 3.2180e-003 | 0.05 |
| tblVehicleEF | MH | 0.02 | 0.10 |
| tblVehicleEF | MH | 9.3000e-004 | 1.43 |
| tblVehicleEF | MH | 1.40 | 0.03 |
| tblVehicleEF | MH | 0.06 | 0.02 |
| tblVehicleEF | MH | 0.58 | 2.6060e-003 |
| tblVehicleEF | MH | 0.07 | 1.03 |
| tblVehicleEF | MH | 0.02 | 0.00 |
| tblVehicleEF | MH | 0.28 | 0.24 |
| tblVehicleEF | MH | 0.01 | 1.24 |
| tblVehicleEF | MH | 6.7300e-004 | 2.03 |
| tblVehicleEF | MH | 1.40 | 15,054.74 |
| tblVehicleEF | MH | 0.06 | 2.8400e-004 |
| tblVehicleEF | MH | 0.00 | 0.19 |
| tblVehicleEF | MH | 0.58 | 1.30 |
| tblVehicleEF | MH | 0.10 | 0.06 |
| tblVehicleEF | MH | 0.02 | 0.01 |
| tblVehicleEF | MH | 0.31 | 0.00 |
| tblVehicleEF | MH | 0.00 | 0.97 |
| tblVehicleEF | MH | 0.02 | 0.00 |
| tblVehicleEF | MH | 0.02 | 0.07 |
| tblVehicleEF | MH | 0.00 | 194.46 |
| tblVehicleEF | MH | 1.74 | 0.00 |
| tblVehicleEF | MH | 5.19 | 0.01 |
| tblVehicleEF | MH | 0.00 | 0.28 |

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|---|---|---|---|
| tblVehicleEF | MH | 1,102.46 | 0.00 |
| tblVehicleEF | MH | 58.88 | 0.06 |
| tblVehicleEF | MH | 0.00 | 0.24 |
| tblVehicleEF | MH | 1.10 | 0.00 |
| tblVehicleEF | MH | 0.75 | 0.05 |
| tblVehicleEF | MH | 0.00 | 0.36 |
| tblVehicleEF | MH | 0.13 | 0.00 |
| tblVehicleEF | MH | 0.01 | 0.08 |
| tblVehicleEF | MH | 0.02 | 1.53 |
| tblVehicleEF | MH | 1.0110e-003 | 0.09 |
| tblVehicleEF | MH | 0.00 | 0.71 |
| tblVehicleEF | MH | 0.06 | 0.09 |
| tblVehicleEF | MH | 3.2180e-003 | 0.04 |
| tblVehicleEF | MH | 0.02 | 0.11 |
| tblVehicleEF | MH | 9.3000e-004 | 1.54 |
| tblVehicleEF | MH | 1.03 | 0.03 |
| tblVehicleEF | MH | 0.08 | 0.02 |
| tblVehicleEF | MH | 0.40 | 2.6060e-003 |
| tblVehicleEF | MH | 0.07 | 1.09 |
| tblVehicleEF | MH | 0.02 | 0.00 |
| tblVehicleEF | MH | 0.30 | 0.25 |
| tblVehicleEF | MH | 0.01 | 1.20 |
| tblVehicleEF | MH | 6.7900e-004 | 2.18 |
| tblVehicleEF | MH | 1.03 | 15,054.02 |
| tblVehicleEF | MH | 0.08 | 2.8400e-004 |
| tblVehicleEF | MH | 0.00 | 0.19 |
| tblVehicleEF | MH | 0.40 | 1.30 |
| tblVehicleEF | MH | 0.10 | 0.06 |
| tblVehicleEF | MH | 0.02 | 0.01 |

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|---|---|---|---|
| tblVehicleEF | MH | 0.33 | 0.00 |
| tblVehicleEF | MHD | 0.02 | 4.3860e-003 |
| tblVehicleEF | MHD | 3.3120e-003 | 4.5970e-003 |
| tblVehicleEF | MHD | 0.05 | 0.01 |
| tblVehicleEF | MHD | 0.34 | 0.39 |
| tblVehicleEF | MHD | 0.28 | 0.47 |
| tblVehicleEF | MHD | 5.26 | 1.42 |
| tblVehicleEF | MHD | 138.52 | 67.37 |
| tblVehicleEF | MHD | 1,128.29 | 1,069.65 |
| tblVehicleEF | MHD | 59.14 | 12.05 |
| tblVehicleEF | MHD | 0.37 | 0.48 |
| tblVehicleEF | MHD | 0.70 | 1.63 |
| tblVehicleEF | MHD | 10.62 | 1.29 |
| tblVehicleEF | MHD | 1.0200e-004 | 1.0770e-003 |
| tblVehicleEF | MHD | 2.8190e-003 | 0.03 |
| tblVehicleEF | MHD | 7.6400e-004 | 1.3700e-004 |
| tblVehicleEF | MHD | 9.8000e-005 | 1.0300e-003 |
| tblVehicleEF | MHD | 2.6930e-003 | 0.03 |
| tblVehicleEF | MHD | 7.0300e-004 | 1.2600e-004 |
| tblVehicleEF | MHD | 1.0280e-003 | 6.6200e-004 |
| tblVehicleEF | MHD | 0.04 | 0.03 |
| tblVehicleEF | MHD | 0.02 | 0.02 |
| tblVehicleEF | MHD | 6.7100e-004 | 4.2600e-004 |
| tblVehicleEF | MHD | 0.03 | 0.06 |
| tblVehicleEF | MHD | 0.02 | 0.14 |
| tblVehicleEF | MHD | 0.32 | 0.07 |
| tblVehicleEF | MHD | 1.3330e-003 | 6.4000e-004 |
| tblVehicleEF | MHD | 0.01 | 0.01 |
| tblVehicleEF | MHD | 6.8400e-004 | 1.1900e-004 |

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|---|---|---|---|
| tblVehicleEF | MHD | 1.0280e-003 | 6.6200e-004 |
| tblVehicleEF | MHD | 0.04 | 0.03 |
| tblVehicleEF | MHD | 0.03 | 0.03 |
| tblVehicleEF | MHD | 6.7100e-004 | 4.2600e-004 |
| tblVehicleEF | MHD | 0.04 | 0.07 |
| tblVehicleEF | MHD | 0.02 | 0.14 |
| tblVehicleEF | MHD | 0.35 | 0.07 |
| tblVehicleEF | MHD | 0.01 | 3.1600e-003 |
| tblVehicleEF | MHD | 3.3570e-003 | 0.23 |
| tblVehicleEF | MHD | 0.04 | 0.03 |
| tblVehicleEF | MHD | 0.25 | 0.60 |
| tblVehicleEF | MHD | 0.28 | 801.62 |
| tblVehicleEF | MHD | 5.00 | 6.3020e-003 |
| tblVehicleEF | MHD | 146.72 | 4.4400e-004 |
| tblVehicleEF | MHD | 1,128.29 | 0.11 |
| tblVehicleEF | MHD | 59.14 | 0.06 |
| tblVehicleEF | MHD | 0.38 | 5.9500e-004 |
| tblVehicleEF | MHD | 0.66 | 0.04 |
| tblVehicleEF | MHD | 10.59 | 0.11 |
| tblVehicleEF | MHD | 8.6000e-005 | 6.0400e-004 |
| tblVehicleEF | MHD | 0.13 | 0.31 |
| tblVehicleEF | MHD | 0.01 | 0.07 |
| tblVehicleEF | MHD | 2.8190e-003 | 0.07 |
| tblVehicleEF | MHD | 7.6400e-004 | 0.02 |
| tblVehicleEF | MHD | 8.3000e-005 | 1.3950e-003 |
| tblVehicleEF | MHD | 0.06 | 0.01 |
| tblVehicleEF | MHD | 3.0000e-003 | 6.2570e-003 |
| tblVehicleEF | MHD | 2.6930e-003 | 0.04 |
| tblVehicleEF | MHD | 7.0300e-004 | 0.14 |

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|---|---|---|---|
| tblVehicleEF | MHD | 1.5610e-003 | 2.5700e-004 |
| tblVehicleEF | MHD | 0.04 | 0.03 |
| tblVehicleEF | MHD | 0.02 | 0.48 |
| tblVehicleEF | MHD | 9.8200e-004 | 6.0000e-006 |
| tblVehicleEF | MHD | 0.03 | 1.54 |
| tblVehicleEF | MHD | 0.02 | 8.5670e-003 |
| tblVehicleEF | MHD | 0.31 | 1.29 |
| tblVehicleEF | MHD | 1.4110e-003 | 0.32 |
| tblVehicleEF | MHD | 0.01 | 0.48 |
| tblVehicleEF | MHD | 6.7900e-004 | 1.35 |
| tblVehicleEF | MHD | 1.5610e-003 | 92.89 |
| tblVehicleEF | MHD | 0.04 | 1.3700e-004 |
| tblVehicleEF | MHD | 0.03 | 2.6640e-003 |
| tblVehicleEF | MHD | 9.8200e-004 | 0.01 |
| tblVehicleEF | MHD | 0.04 | 0.06 |
| tblVehicleEF | MHD | 0.02 | 0.01 |
| tblVehicleEF | MHD | 0.34 | 8.9540e-003 |
| tblVehicleEF | MHD | 0.02 | 3.3190e-003 |
| tblVehicleEF | MHD | 3.3000e-003 | 0.25 |
| tblVehicleEF | MHD | 0.05 | 0.03 |
| tblVehicleEF | MHD | 0.47 | 0.60 |
| tblVehicleEF | MHD | 0.28 | 779.65 |
| tblVehicleEF | MHD | 5.30 | 6.1700e-003 |
| tblVehicleEF | MHD | 127.19 | 4.5700e-004 |
| tblVehicleEF | MHD | 1,128.29 | 0.11 |
| tblVehicleEF | MHD | 59.14 | 0.06 |
| tblVehicleEF | MHD | 0.35 | 6.2100e-004 |
| tblVehicleEF | MHD | 0.69 | 0.05 |
| tblVehicleEF | MHD | 10.63 | 0.11 |

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|---|---|---|---|
| tblVehicleEF | MHD | 1.2500e-004 | 4.1600e-004 |
| tblVehicleEF | MHD | 0.13 | 0.34 |
| tblVehicleEF | MHD | 0.01 | 0.07 |
| tblVehicleEF | MHD | 2.8190e-003 | 0.08 |
| tblVehicleEF | MHD | 7.6400e-004 | 0.01 |
| tblVehicleEF | MHD | 1.1900e-004 | 1.4610e-003 |
| tblVehicleEF | MHD | 0.06 | 7.1060e-003 |
| tblVehicleEF | MHD | 3.0000e-003 | 4.3140e-003 |
| tblVehicleEF | MHD | 2.6930e-003 | 0.04 |
| tblVehicleEF | MHD | 7.0300e-004 | 0.16 |
| tblVehicleEF | MHD | 1.0490e-003 | 2.5700e-004 |
| tblVehicleEF | MHD | 0.04 | 0.03 |
| tblVehicleEF | MHD | 0.03 | 0.48 |
| tblVehicleEF | MHD | 6.6300e-004 | 6.0000e-006 |
| tblVehicleEF | MHD | 0.03 | 1.60 |
| tblVehicleEF | MHD | 0.02 | 0.01 |
| tblVehicleEF | MHD | 0.33 | 1.29 |
| tblVehicleEF | MHD | 1.2270e-003 | 0.49 |
| tblVehicleEF | MHD | 0.01 | 0.47 |
| tblVehicleEF | MHD | 6.8400e-004 | 1.44 |
| tblVehicleEF | MHD | 1.0490e-003 | 92.89 |
| tblVehicleEF | MHD | 0.04 | 1.3700e-004 |
| tblVehicleEF | MHD | 0.04 | 2.6640e-003 |
| tblVehicleEF | MHD | 6.6300e-004 | 0.01 |
| tblVehicleEF | MHD | 0.04 | 0.06 |
| tblVehicleEF | MHD | 0.02 | 0.01 |
| tblVehicleEF | MHD | 0.36 | 0.01 |
| tblVehicleEF | OBUS | 0.01 | 8.4810e-003 |
| tblVehicleEF | OBUS | 6.0680e-003 | 7.0170e-003 |

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|---|---|---|---|
| tblVehicleEF | OBUS | 0.03 | 0.02 |
| tblVehicleEF | OBUS | 0.25 | 0.60 |
| tblVehicleEF | OBUS | 0.45 | 0.79 |
| tblVehicleEF | OBUS | 5.23 | 2.39 |
| tblVehicleEF | OBUS | 92.13 | 94.60 |
| tblVehicleEF | OBUS | 1,229.05 | 1,392.48 |
| tblVehicleEF | OBUS | 68.41 | 19.23 |
| tblVehicleEF | OBUS | 0.19 | 0.46 |
| tblVehicleEF | OBUS | 0.64 | 1.57 |
| tblVehicleEF | OBUS | 2.34 | 0.76 |
| tblVehicleEF | OBUS | 1.8000e-005 | 7.9300e-004 |
| tblVehicleEF | OBUS | 2.5270e-003 | 0.02 |
| tblVehicleEF | OBUS | 8.5100e-004 | 1.9700e-004 |
| tblVehicleEF | OBUS | 1.7000e-005 | 7.5900e-004 |
| tblVehicleEF | OBUS | 2.4010e-003 | 0.02 |
| tblVehicleEF | OBUS | 7.8200e-004 | 1.8100e-004 |
| tblVehicleEF | OBUS | 1.4810e-003 | 1.8440e-003 |
| tblVehicleEF | OBUS | 0.02 | 0.02 |
| tblVehicleEF | OBUS | 0.03 | 0.06 |
| tblVehicleEF | OBUS | 7.8200e-004 | 9.4300e-004 |
| tblVehicleEF | OBUS | 0.04 | 0.06 |
| tblVehicleEF | OBUS | 0.04 | 0.26 |
| tblVehicleEF | OBUS | 0.33 | 0.11 |
| tblVehicleEF | OBUS | 8.9100e-004 | 9.0000e-004 |
| tblVehicleEF | OBUS | 0.01 | 0.01 |
| tblVehicleEF | OBUS | 7.7600e-004 | 1.9000e-004 |
| tblVehicleEF | OBUS | 1.4810e-003 | 1.8440e-003 |
| tblVehicleEF | OBUS | 0.02 | 0.02 |
| tblVehicleEF | OBUS | 0.05 | 0.07 |

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|---|---|---|---|
| tblVehicleEF | OBUS | 7.8200e-004 | 9.4300e-004 |
| tblVehicleEF | OBUS | 0.05 | 0.08 |
| tblVehicleEF | OBUS | 0.04 | 0.26 |
| tblVehicleEF | OBUS | 0.36 | 0.13 |
| tblVehicleEF | OBUS | 0.01 | 5.5090e-003 |
| tblVehicleEF | OBUS | 6.1800e-003 | 0.93 |
| tblVehicleEF | OBUS | 0.03 | 0.02 |
| tblVehicleEF | OBUS | 0.24 | 0.95 |
| tblVehicleEF | OBUS | 0.45 | 1,847.71 |
| tblVehicleEF | OBUS | 4.94 | 0.01 |
| tblVehicleEF | OBUS | 96.60 | 8.9700e-004 |
| tblVehicleEF | OBUS | 1,229.05 | 0.27 |
| tblVehicleEF | OBUS | 68.41 | 0.06 |
| tblVehicleEF | OBUS | 0.20 | 1.0490e-003 |
| tblVehicleEF | OBUS | 0.60 | 0.11 |
| tblVehicleEF | OBUS | 2.30 | 0.07 |
| tblVehicleEF | OBUS | 1.5000e-005 | 1.3250e-003 |
| tblVehicleEF | OBUS | 0.13 | 1.16 |
| tblVehicleEF | OBUS | 0.01 | 0.08 |
| tblVehicleEF | OBUS | 2.5270e-003 | 0.15 |
| tblVehicleEF | OBUS | 8.5100e-004 | 0.05 |
| tblVehicleEF | OBUS | 1.4000e-005 | 1.1330e-003 |
| tblVehicleEF | OBUS | 0.06 | 0.03 |
| tblVehicleEF | OBUS | 3.0000e-003 | 0.02 |
| tblVehicleEF | OBUS | 2.4010e-003 | 0.07 |
| tblVehicleEF | OBUS | 7.8200e-004 | 0.26 |
| tblVehicleEF | OBUS | 2.2200e-003 | 1.9300e-004 |
| tblVehicleEF | OBUS | 0.02 | 8.2800e-003 |
| tblVehicleEF | OBUS | 0.03 | 0.45 |

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|---|---|---|---|
| tblVehicleEF | OBUS | 1.1540e-003 | 9.0000e-006 |
| tblVehicleEF | OBUS | 0.04 | 1.47 |
| tblVehicleEF | OBUS | 0.04 | 6.3020e-003 |
| tblVehicleEF | OBUS | 0.31 | 0.75 |
| tblVehicleEF | OBUS | 9.3400e-004 | 0.58 |
| tblVehicleEF | OBUS | 0.01 | 0.80 |
| tblVehicleEF | OBUS | 7.7100e-004 | 2.26 |
| tblVehicleEF | OBUS | 2.2200e-003 | 94.66 |
| tblVehicleEF | OBUS | 0.02 | 1.9700e-004 |
| tblVehicleEF | OBUS | 0.05 | 8.5200e-004 |
| tblVehicleEF | OBUS | 1.1540e-003 | 8.3860e-003 |
| tblVehicleEF | OBUS | 0.05 | 0.06 |
| tblVehicleEF | OBUS | 0.04 | 0.01 |
| tblVehicleEF | OBUS | 0.34 | 6.5870e-003 |
| tblVehicleEF | OBUS | 0.01 | 5.7950e-003 |
| tblVehicleEF | OBUS | 6.0410e-003 | 0.89 |
| tblVehicleEF | OBUS | 0.03 | 0.02 |
| tblVehicleEF | OBUS | 0.25 | 0.96 |
| tblVehicleEF | OBUS | 0.45 | 1,854.49 |
| tblVehicleEF | OBUS | 5.28 | 0.01 |
| tblVehicleEF | OBUS | 85.94 | 9.2400e-004 |
| tblVehicleEF | OBUS | 1,229.05 | 0.27 |
| tblVehicleEF | OBUS | 68.41 | 0.06 |
| tblVehicleEF | OBUS | 0.18 | 1.1010e-003 |
| tblVehicleEF | OBUS | 0.63 | 0.11 |
| tblVehicleEF | OBUS | 2.34 | 0.07 |
| tblVehicleEF | OBUS | 2.1000e-005 | 9.2500e-004 |
| tblVehicleEF | OBUS | 0.13 | 1.11 |
| tblVehicleEF | OBUS | 0.01 | 0.08 |

| | | | |
|---|---|---|---|
| tblVehicleEF | OBUS | 2.5270e-003 | 0.16 |
| tblVehicleEF | OBUS | 8.5100e-004 | 0.04 |
| tblVehicleEF | OBUS | 2.0000e-005 | 1.1750e-003 |
| tblVehicleEF | OBUS | 0.06 | 0.02 |
| tblVehicleEF | OBUS | 3.0000e-003 | 0.01 |
| tblVehicleEF | OBUS | 2.4010e-003 | 0.07 |
| tblVehicleEF | OBUS | 7.8200e-004 | 0.28 |
| tblVehicleEF | OBUS | 1.5070e-003 | 1.9300e-004 |
| tblVehicleEF | OBUS | 0.02 | 8.2800e-003 |
| tblVehicleEF | OBUS | 0.03 | 0.47 |
| tblVehicleEF | OBUS | 7.7100e-004 | 9.0000e-006 |
| tblVehicleEF | OBUS | 0.04 | 1.54 |
| tblVehicleEF | OBUS | 0.04 | 8.9540e-003 |
| tblVehicleEF | OBUS | 0.33 | 0.76 |
| tblVehicleEF | OBUS | 8.3200e-004 | 0.62 |
| tblVehicleEF | OBUS | 0.01 | 0.79 |
| tblVehicleEF | OBUS | 7.7700e-004 | 2.42 |
| tblVehicleEF | OBUS | 1.5070e-003 | 94.65 |
| tblVehicleEF | OBUS | 0.02 | 1.9700e-004 |
| tblVehicleEF | OBUS | 0.05 | 8.5200e-004 |
| tblVehicleEF | OBUS | 7.7100e-004 | 8.3860e-003 |
| tblVehicleEF | OBUS | 0.05 | 0.06 |
| tblVehicleEF | OBUS | 0.04 | 0.01 |
| tblVehicleEF | OBUS | 0.36 | 9.3590e-003 |
| tblVehicleEF | SBUS | 0.83 | 0.07 |
| tblVehicleEF | SBUS | 0.01 | 7.0580e-003 |
| tblVehicleEF | SBUS | 0.06 | 6.2120e-003 |
| tblVehicleEF | SBUS | 8.05 | 2.77 |
| tblVehicleEF | SBUS | 0.70 | 0.59 |

| | | | |
|---|---|---|---|
| tblVehicleEF | SBUS | 7.21 | 0.85 |
| tblVehicleEF | SBUS | 1,117.62 | 351.72 |
| tblVehicleEF | SBUS | 1,084.59 | 1,109.67 |
| tblVehicleEF | SBUS | 55.10 | 5.24 |
| tblVehicleEF | SBUS | 8.67 | 3.22 |
| tblVehicleEF | SBUS | 3.92 | 4.87 |
| tblVehicleEF | SBUS | 12.12 | 0.88 |
| tblVehicleEF | SBUS | 8.2760e-003 | 4.1230e-003 |
| tblVehicleEF | SBUS | 0.01 | 0.01 |
| tblVehicleEF | SBUS | 0.02 | 0.03 |
| tblVehicleEF | SBUS | 7.8500e-004 | 5.1000e-005 |
| tblVehicleEF | SBUS | 7.9180e-003 | 3.9440e-003 |
| tblVehicleEF | SBUS | 2.6790e-003 | 2.6820e-003 |
| tblVehicleEF | SBUS | 0.02 | 0.03 |
| tblVehicleEF | SBUS | 7.2200e-004 | 4.7000e-005 |
| tblVehicleEF | SBUS | 3.5810e-003 | 9.0700e-004 |
| tblVehicleEF | SBUS | 0.03 | 7.8550e-003 |
| tblVehicleEF | SBUS | 0.96 | 0.32 |
| tblVehicleEF | SBUS | 1.9090e-003 | 4.8200e-004 |
| tblVehicleEF | SBUS | 0.10 | 0.10 |
| tblVehicleEF | SBUS | 0.01 | 0.05 |
| tblVehicleEF | SBUS | 0.38 | 0.04 |
| tblVehicleEF | SBUS | 0.01 | 3.3550e-003 |
| tblVehicleEF | SBUS | 0.01 | 0.01 |
| tblVehicleEF | SBUS | 6.7600e-004 | 5.2000e-005 |
| tblVehicleEF | SBUS | 3.5810e-003 | 9.0700e-004 |
| tblVehicleEF | SBUS | 0.03 | 7.8550e-003 |
| tblVehicleEF | SBUS | 1.38 | 0.46 |
| tblVehicleEF | SBUS | 1.9090e-003 | 4.8200e-004 |

| | | | |
|---|---|---|---|
| tblVehicleEF | SBUS | 0.12 | 0.11 |
| tblVehicleEF | SBUS | 0.01 | 0.05 |
| tblVehicleEF | SBUS | 0.42 | 0.04 |
| tblVehicleEF | SBUS | 0.83 | 7.9680e-003 |
| tblVehicleEF | SBUS | 0.01 | 3.57 |
| tblVehicleEF | SBUS | 0.06 | 7.9970e-003 |
| tblVehicleEF | SBUS | 7.94 | 1.24 |
| tblVehicleEF | SBUS | 0.71 | 3,371.97 |
| tblVehicleEF | SBUS | 5.75 | 5.9880e-003 |
| tblVehicleEF | SBUS | 1,167.88 | 1.4740e-003 |
| tblVehicleEF | SBUS | 1,084.59 | 0.43 |
| tblVehicleEF | SBUS | 55.10 | 0.11 |
| tblVehicleEF | SBUS | 8.95 | 1.3830e-003 |
| tblVehicleEF | SBUS | 3.70 | 0.78 |
| tblVehicleEF | SBUS | 12.09 | 0.17 |
| tblVehicleEF | SBUS | 6.9770e-003 | 6.7400e-004 |
| tblVehicleEF | SBUS | 0.74 | 5.14 |
| tblVehicleEF | SBUS | 0.01 | 0.11 |
| tblVehicleEF | SBUS | 0.02 | 0.13 |
| tblVehicleEF | SBUS | 7.8500e-004 | 5.2810e-003 |
| tblVehicleEF | SBUS | 6.6750e-003 | 1.9990e-003 |
| tblVehicleEF | SBUS | 0.32 | 0.02 |
| tblVehicleEF | SBUS | 2.6790e-003 | 7.7120e-003 |
| tblVehicleEF | SBUS | 0.02 | 0.10 |
| tblVehicleEF | SBUS | 7.2200e-004 | 0.05 |
| tblVehicleEF | SBUS | 5.4810e-003 | 2.8700e-004 |
| tblVehicleEF | SBUS | 0.03 | 0.04 |
| tblVehicleEF | SBUS | 0.95 | 3.29 |
| tblVehicleEF | SBUS | 2.8990e-003 | 1.2000e-005 |

| | | | |
|---|---|---|---|
| tblVehicleEF | SBUS | 0.10 | 4.59 |
| tblVehicleEF | SBUS | 0.01 | 0.04 |
| tblVehicleEF | SBUS | 0.34 | 0.87 |
| tblVehicleEF | SBUS | 0.01 | 2.74 |
| tblVehicleEF | SBUS | 0.01 | 0.60 |
| tblVehicleEF | SBUS | 6.5100e-004 | 0.69 |
| tblVehicleEF | SBUS | 5.4810e-003 | 118.27 |
| tblVehicleEF | SBUS | 0.03 | 5.1000e-005 |
| tblVehicleEF | SBUS | 1.38 | 3.2450e-003 |
| tblVehicleEF | SBUS | 2.8990e-003 | 0.08 |
| tblVehicleEF | SBUS | 0.12 | 0.32 |
| tblVehicleEF | SBUS | 0.01 | 0.01 |
| tblVehicleEF | SBUS | 0.37 | 0.04 |
| tblVehicleEF | SBUS | 0.83 | 9.1700e-003 |
| tblVehicleEF | SBUS | 0.01 | 3.57 |
| tblVehicleEF | SBUS | 0.06 | 8.2560e-003 |
| tblVehicleEF | SBUS | 8.20 | 1.32 |
| tblVehicleEF | SBUS | 0.70 | 3,202.19 |
| tblVehicleEF | SBUS | 7.43 | 5.9530e-003 |
| tblVehicleEF | SBUS | 1,048.22 | 1.5370e-003 |
| tblVehicleEF | SBUS | 1,084.59 | 0.40 |
| tblVehicleEF | SBUS | 55.10 | 0.11 |
| tblVehicleEF | SBUS | 8.29 | 1.5910e-003 |
| tblVehicleEF | SBUS | 3.86 | 0.77 |
| tblVehicleEF | SBUS | 12.12 | 0.17 |
| tblVehicleEF | SBUS | 0.01 | 4.6300e-004 |
| tblVehicleEF | SBUS | 0.74 | 5.15 |
| tblVehicleEF | SBUS | 0.01 | 0.11 |
| tblVehicleEF | SBUS | 0.02 | 0.18 |

| | | | |
|---|---|---|---|
| tblVehicleEF | SBUS | 7.8500e-004 | 3.6810e-003 |
| tblVehicleEF | SBUS | 9.6340e-003 | 2.0640e-003 |
| tblVehicleEF | SBUS | 0.32 | 0.01 |
| tblVehicleEF | SBUS | 2.6790e-003 | 5.2960e-003 |
| tblVehicleEF | SBUS | 0.02 | 0.11 |
| tblVehicleEF | SBUS | 7.2200e-004 | 0.06 |
| tblVehicleEF | SBUS | 3.5300e-003 | 2.8700e-004 |
| tblVehicleEF | SBUS | 0.03 | 0.04 |
| tblVehicleEF | SBUS | 0.96 | 3.13 |
| tblVehicleEF | SBUS | 1.8720e-003 | 1.2000e-005 |
| tblVehicleEF | SBUS | 0.10 | 4.79 |
| tblVehicleEF | SBUS | 0.02 | 0.06 |
| tblVehicleEF | SBUS | 0.39 | 0.88 |
| tblVehicleEF | SBUS | 0.01 | 2.83 |
| tblVehicleEF | SBUS | 0.01 | 0.58 |
| tblVehicleEF | SBUS | 6.7900e-004 | 0.88 |
| tblVehicleEF | SBUS | 3.5300e-003 | 118.27 |
| tblVehicleEF | SBUS | 0.03 | 5.1000e-005 |
| tblVehicleEF | SBUS | 1.39 | 3.2450e-003 |
| tblVehicleEF | SBUS | 1.8720e-003 | 0.08 |
| tblVehicleEF | SBUS | 0.12 | 0.32 |
| tblVehicleEF | SBUS | 0.02 | 0.01 |
| tblVehicleEF | SBUS | 0.43 | 0.06 |
| tblVehicleEF | UBUS | 2.23 | 5.80 |
| tblVehicleEF | UBUS | 0.06 | 0.01 |
| tblVehicleEF | UBUS | 10.02 | 45.07 |
| tblVehicleEF | UBUS | 10.14 | 0.71 |
| tblVehicleEF | UBUS | 1,910.27 | 1,988.80 |
| tblVehicleEF | UBUS | 112.81 | 8.53 |

| | | | |
|---|---|---|---|
| tblVehicleEF | UBUS | 7.96 | 0.48 |
| tblVehicleEF | UBUS | 14.44 | 0.08 |
| tblVehicleEF | UBUS | 0.58 | 0.07 |
| tblVehicleEF | UBUS | 0.01 | 0.03 |
| tblVehicleEF | UBUS | 0.10 | 3.2120e-003 |
| tblVehicleEF | UBUS | 1.2160e-003 | 4.6000e-005 |
| tblVehicleEF | UBUS | 0.25 | 0.03 |
| tblVehicleEF | UBUS | 3.0000e-003 | 7.9830e-003 |
| tblVehicleEF | UBUS | 0.10 | 3.0700e-003 |
| tblVehicleEF | UBUS | 1.1180e-003 | 4.2000e-005 |
| tblVehicleEF | UBUS | 4.9050e-003 | 6.1100e-004 |
| tblVehicleEF | UBUS | 0.08 | 8.4590e-003 |
| tblVehicleEF | UBUS | 2.8380e-003 | 4.9000e-004 |
| tblVehicleEF | UBUS | 0.70 | 0.08 |
| tblVehicleEF | UBUS | 0.03 | 0.05 |
| tblVehicleEF | UBUS | 0.79 | 0.05 |
| tblVehicleEF | UBUS | 9.5820e-003 | 1.5580e-003 |
| tblVehicleEF | UBUS | 1.3110e-003 | 8.4000e-005 |
| tblVehicleEF | UBUS | 4.9050e-003 | 6.1100e-004 |
| tblVehicleEF | UBUS | 0.08 | 8.4590e-003 |
| tblVehicleEF | UBUS | 2.8380e-003 | 4.9000e-004 |
| tblVehicleEF | UBUS | 3.01 | 5.92 |
| tblVehicleEF | UBUS | 0.03 | 0.05 |
| tblVehicleEF | UBUS | 0.86 | 0.05 |
| tblVehicleEF | UBUS | 0.00 | 0.01 |
| tblVehicleEF | UBUS | 2.23 | 0.00 |
| tblVehicleEF | UBUS | 0.05 | 8.7350e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.10 |
| tblVehicleEF | UBUS | 10.08 | 0.00 |

| | | | |
|---|---|---|---|
| tblVehicleEF | UBUS | 8.80 | 0.67 |
| tblVehicleEF | UBUS | 0.00 | 1.7650e-003 |
| tblVehicleEF | UBUS | 1,910.27 | 0.00 |
| tblVehicleEF | UBUS | 112.81 | 2.0170e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.5820e-003 |
| tblVehicleEF | UBUS | 7.50 | 0.00 |
| tblVehicleEF | UBUS | 14.38 | 4.3400e-003 |
| tblVehicleEF | UBUS | 0.00 | 6.8000e-004 |
| tblVehicleEF | UBUS | 0.58 | 0.00 |
| tblVehicleEF | UBUS | 0.01 | 5.92 |
| tblVehicleEF | UBUS | 0.10 | 0.03 |
| tblVehicleEF | UBUS | 1.2160e-003 | 3.5700e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.1840e-003 |
| tblVehicleEF | UBUS | 0.25 | 2.5140e-003 |
| tblVehicleEF | UBUS | 3.0000e-003 | 1.9150e-003 |
| tblVehicleEF | UBUS | 0.10 | 0.03 |
| tblVehicleEF | UBUS | 1.1180e-003 | 0.05 |
| tblVehicleEF | UBUS | 7.1810e-003 | 9.1000e-005 |
| tblVehicleEF | UBUS | 0.08 | 1.5700e-004 |
| tblVehicleEF | UBUS | 4.1630e-003 | 1.0000e-005 |
| tblVehicleEF | UBUS | 0.71 | 0.48 |
| tblVehicleEF | UBUS | 0.02 | 0.00 |
| tblVehicleEF | UBUS | 0.72 | 0.08 |
| tblVehicleEF | UBUS | 9.5830e-003 | 45.07 |
| tblVehicleEF | UBUS | 1.2880e-003 | 0.62 |
| tblVehicleEF | UBUS | 7.1810e-003 | 53.30 |
| tblVehicleEF | UBUS | 0.08 | 4.6000e-005 |
| tblVehicleEF | UBUS | 0.00 | 4.2000e-005 |
| tblVehicleEF | UBUS | 4.1630e-003 | 3.2690e-003 |

| | | | |
|---|---|---|---|
| tblVehicleEF | UBUS | 3.02 | 0.03 |
| tblVehicleEF | UBUS | 0.02 | 1.4510e-003 |
| tblVehicleEF | UBUS | 0.79 | 0.00 |
| tblVehicleEF | UBUS | 0.00 | 0.01 |
| tblVehicleEF | UBUS | 2.23 | 0.00 |
| tblVehicleEF | UBUS | 0.06 | 9.0200e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.14 |
| tblVehicleEF | UBUS | 10.01 | 0.00 |
| tblVehicleEF | UBUS | 10.32 | 0.67 |
| tblVehicleEF | UBUS | 0.00 | 1.8120e-003 |
| tblVehicleEF | UBUS | 1,910.27 | 0.00 |
| tblVehicleEF | UBUS | 112.81 | 1.9670e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.8220e-003 |
| tblVehicleEF | UBUS | 7.81 | 0.00 |
| tblVehicleEF | UBUS | 14.45 | 4.5080e-003 |
| tblVehicleEF | UBUS | 0.00 | 4.6500e-004 |
| tblVehicleEF | UBUS | 0.58 | 0.00 |
| tblVehicleEF | UBUS | 0.01 | 5.92 |
| tblVehicleEF | UBUS | 0.10 | 0.05 |
| tblVehicleEF | UBUS | 1.2160e-003 | 2.3810e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.2550e-003 |
| tblVehicleEF | UBUS | 0.25 | 1.6770e-003 |
| tblVehicleEF | UBUS | 3.0000e-003 | 1.3100e-003 |
| tblVehicleEF | UBUS | 0.10 | 0.04 |
| tblVehicleEF | UBUS | 1.1180e-003 | 0.07 |
| tblVehicleEF | UBUS | 5.4680e-003 | 9.1000e-005 |
| tblVehicleEF | UBUS | 0.09 | 1.5700e-004 |
| tblVehicleEF | UBUS | 2.9720e-003 | 1.0000e-005 |
| tblVehicleEF | UBUS | 0.70 | 0.48 |

| | | | |
|---|---|---|---|
| tblVehicleEF | UBUS | 0.03 | 0.00 |
| tblVehicleEF | UBUS | 0.80 | 0.08 |
| tblVehicleEF | UBUS | 9.5820e-003 | 45.07 |
| tblVehicleEF | UBUS | 1.3140e-003 | 0.72 |
| tblVehicleEF | UBUS | 5.4680e-003 | 53.30 |
| tblVehicleEF | UBUS | 0.09 | 4.6000e-005 |
| tblVehicleEF | UBUS | 0.00 | 4.2000e-005 |
| tblVehicleEF | UBUS | 2.9720e-003 | 3.2690e-003 |
| tblVehicleEF | UBUS | 3.01 | 0.03 |
| tblVehicleEF | UBUS | 0.03 | 1.4510e-003 |
| tblVehicleEF | UBUS | 0.88 | 0.00 |
| tblVehicleTrips | SU_TR | 16.74 | 19.50 |
| tblVehicleTrips | WD_TR | 1.89 | 34.00 |

## 2.0 Emissions Summary

### 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.9302 | 48.0434 | 34.0093 | 0.0880 | 6.5307 | 2.0341 | 8.1359 | 3.4393 | 1.8715 | 4.9166 | 0.0000 | 8,582.8628 | 8,582.8628 | 2.4974 | 0.0000 | 8,645.2987 |
| 2022 | 4.2387 | 38.9337 | 31.9439 | 0.0878 | 0.6294 | 1.6167 | 2.2461 | 0.1695 | 1.4875 | 1.6570 | 0.0000 | 8,563.8460 | 8,563.8460 | 2.4962 | 0.0000 | 8,626.2514 |
| **Maximum** | **4.9302** | **48.0434** | **34.0093** | **0.0880** | **6.5307** | **2.0341** | **8.1359** | **3.4393** | **1.8715** | **4.9166** | **0.0000** | **8,582.8628** | **8,582.8628** | **2.4974** | **0.0000** | **8,645.2987** |

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.9302 | 48.0434 | 34.0093 | 0.0880 | 2.8249 | 2.0341 | 4.4301 | 1.4166 | 1.8715 | 2.8939 | 0.0000 | 8,582.8628 | 8,582.8628 | 2.4974 | 0.0000 | 8,645.2987 |
| 2022 | 4.2387 | 38.9337 | 31.9439 | 0.0878 | 0.6294 | 1.6167 | 2.2461 | 0.1695 | 1.4875 | 1.6570 | 0.0000 | 8,563.8460 | 8,563.8460 | 2.4962 | 0.0000 | 8,626.2514 |
| **Maximum** | **4.9302** | **48.0434** | **34.0093** | **0.0880** | **2.8249** | **2.0341** | **4.4301** | **1.4166** | **1.8715** | **2.8939** | **0.0000** | **8,582.8628** | **8,582.8628** | **2.4974** | **0.0000** | **8,645.2987** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **51.76** | **0.00** | **35.69** | **56.05** | **0.00** | **30.77** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 5.6300e-003 | 0.0000 | 2.6000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 5.5000e-004 | 5.5000e-004 | 0.0000 | | 5.8000e-004 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.3477 | 0.0189 | 469.8572 | 2.0320 | 0.7642 | 0.5372 | 1.3014 | 1.3797 | 0.4410 | 1.8207 | | 0.0800 | 0.0800 | 0.2340 | | 5.9288 |
| **Total** | **0.3533** | **0.0189** | **469.8574** | **2.0320** | **0.7642** | **0.5372** | **1.3014** | **1.3797** | **0.4410** | **1.8207** | | **0.0805** | **0.0805** | **0.2340** | **0.0000** | **5.9293** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 5.6300e-003 | 0.0000 | 2.6000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 5.5000e-004 | 5.5000e-004 | 0.0000 | | 5.8000e-004 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.3477 | 0.0189 | 469.8572 | 2.0320 | 0.7642 | 0.5372 | 1.3014 | 1.3797 | 0.4410 | 1.8207 | | 0.0800 | 0.0800 | 0.2340 | | 5.9288 |
| **Total** | **0.3533** | **0.0189** | **469.8574** | **2.0320** | **0.7642** | **0.5372** | **1.3014** | **1.3797** | **0.4410** | **1.8207** | | **0.0805** | **0.0805** | **0.2340** | **0.0000** | **5.9293** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

### Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Clearing and Grubbing | Site Preparation | 7/1/2021 | 7/28/2021 | 5 | 20 | |
| 2 | Grading | Grading | 7/29/2021 | 10/20/2021 | 5 | 60 | |
| 3 | Paving and Construction | Building Construction | 10/21/2021 | 2/9/2022 | 5 | 80 | |
| 4 | Landscaping | Building Construction | 2/10/2022 | 6/15/2022 | 5 | 90 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 3**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0**

## OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Clearing and Grubbing | Excavators | 1 | 8.00 | 158 | 0.38 |
| Clearing and Grubbing | Graders | 0 | 8.00 | 187 | 0.41 |
| Clearing and Grubbing | Off-Highway Trucks | 2 | 8.00 | 402 | 0.38 |
| Clearing and Grubbing | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Clearing and Grubbing | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Clearing and Grubbing | Sweepers/Scrubbers | 1 | 8.00 | 64 | 0.46 |
| Clearing and Grubbing | Tractors/Loaders/Backhoes | 1 | 7.00 | 97 | 0.37 |
| Grading | Excavators | 1 | 8.00 | 158 | 0.38 |
| Grading | Graders | 0 | 8.00 | 187 | 0.41 |
| Grading | Off-Highway Trucks | 2 | 8.00 | 402 | 0.38 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 1 | 8.00 | 367 | 0.48 |
| Grading | Sweepers/Scrubbers | 1 | 8.00 | 64 | 0.46 |
| Grading | Tractors/Loaders/Backhoes | 0 | 7.00 | 97 | 0.37 |
| Paving and Construction | Cranes | 0 | 8.00 | 231 | 0.29 |
| Paving and Construction | Excavators | 1 | 8.00 | 158 | 0.38 |
| Paving and Construction | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Paving and Construction | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Paving and Construction | Off-Highway Trucks | 3 | 8.00 | 402 | 0.38 |
| Paving and Construction | Pavers | 1 | 8.00 | 130 | 0.42 |
| Paving and Construction | Rollers | 1 | 8.00 | 80 | 0.38 |
| Paving and Construction | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Paving and Construction | Scrapers | 1 | 8.00 | 367 | 0.48 |
| Paving and Construction | Sweepers/Scrubbers | 1 | 8.00 | 64 | 0.46 |
| Paving and Construction | Tractors/Loaders/Backhoes | 0 | 6.00 | 97 | 0.37 |
| Paving and Construction | Welders | 0 | 8.00 | 46 | 0.45 |
| Landscaping | Air Compressors | 0 | 6.00 | 78 | 0.48 |

| | | | | | |
|---|---|---|---|---|---|
| Landscaping | Cranes | 0 | 8.00 | 231 | 0.29 |
| Landscaping | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Landscaping | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Landscaping | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Landscaping | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Landscaping | Welders | 0 | 8.00 | 46 | 0.45 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Clearing and Grubbing | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 6 | 15.00 | 0.00 | 989.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving and Construction | 9 | 46.00 | 18.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Landscaping | 2 | 46.00 | 10.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

## 3.2 Clearing and Grubbing - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 6.2607 | 0.0000 | 6.2607 | 3.3360 | 0.0000 | 3.3360 | | | 0.0000 | | | 0.0000 |
| Off-Road | 2.8798 | 27.3674 | 18.4470 | 0.0454 | | 1.2721 | 1.2721 | | 1.1704 | 1.1704 | | 4,394.0541 | 4,394.0541 | 1.4211 | | 4,429.5823 |
| **Total** | **2.8798** | **27.3674** | **18.4470** | **0.0454** | **6.2607** | **1.2721** | **7.5328** | **3.3360** | **1.1704** | **4.5063** | | **4,394.0541** | **4,394.0541** | **1.4211** | | **4,429.5823** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0628 | 0.0410 | 0.5632 | 1.6700e-003 | 0.1677 | 1.2400e-003 | 0.1689 | 0.0445 | 1.1400e-003 | 0.0456 | | 166.0347 | 166.0347 | 4.4800e-003 | | 166.1466 |
| **Total** | **0.0628** | **0.0410** | **0.5632** | **1.6700e-003** | **0.1677** | **1.2400e-003** | **0.1689** | **0.0445** | **1.1400e-003** | **0.0456** | | **166.0347** | **166.0347** | **4.4800e-003** | | **166.1466** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 2.4417 | 0.0000 | 2.4417 | 1.3010 | 0.0000 | 1.3010 | | | 0.0000 | | | 0.0000 |
| Off-Road | 2.8798 | 27.3674 | 18.4470 | 0.0454 | | 1.2721 | 1.2721 | | 1.1704 | 1.1704 | 0.0000 | 4,394.0541 | 4,394.0541 | 1.4211 | | 4,429.5823 |
| **Total** | **2.8798** | **27.3674** | **18.4470** | **0.0454** | **2.4417** | **1.2721** | **3.7138** | **1.3010** | **1.1704** | **2.4714** | **0.0000** | **4,394.0541** | **4,394.0541** | **1.4211** | | **4,429.5823** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0628 | 0.0410 | 0.5632 | 1.6700e-003 | 0.1677 | 1.2400e-003 | 0.1689 | 0.0445 | 1.1400e-003 | 0.0456 | | 166.0347 | 166.0347 | 4.4800e-003 | | 166.1466 |
| **Total** | **0.0628** | **0.0410** | **0.5632** | **1.6700e-003** | **0.1677** | **1.2400e-003** | **0.1689** | **0.0445** | **1.1400e-003** | **0.0456** | | **166.0347** | **166.0347** | **4.4800e-003** | | **166.1466** |

## 3.3 Grading - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 6.0751 | 0.0000 | 6.0751 | 3.3160 | 0.0000 | 3.3160 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6454 | 36.4114 | 23.4740 | 0.0578 | | 1.5907 | 1.5907 | | 1.4634 | 1.4634 | | 5,598.6781 | 5,598.6781 | 1.8107 | | 5,643.9462 |
| **Total** | **3.6454** | **36.4114** | **23.4740** | **0.0578** | **6.0751** | **1.5907** | **7.6658** | **3.3160** | **1.4634** | **4.7794** | | **5,598.6781** | **5,598.6781** | **1.8107** | | **5,643.9462** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1253 | 4.2738 | 0.9441 | 0.0126 | 0.2879 | 0.0133 | 0.3012 | 0.0789 | 0.0128 | 0.0916 | | 1,373.4961 | 1,373.4961 | 0.0968 | | 1,375.9161 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0628 | 0.0410 | 0.5632 | 1.6700e-003 | 0.1677 | 1.2400e-003 | 0.1689 | 0.0445 | 1.1400e-003 | 0.0456 | | 166.0347 | 166.0347 | 4.4800e-003 | | 166.1466 |
| **Total** | **0.1881** | **4.3148** | **1.5073** | **0.0143** | **0.4556** | **0.0146** | **0.4701** | **0.1234** | **0.0139** | **0.1372** | | **1,539.5308** | **1,539.5308** | **0.1013** | | **1,542.0627** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 2.3693 | 0.0000 | 2.3693 | 1.2932 | 0.0000 | 1.2932 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6454 | 36.4114 | 23.4740 | 0.0578 | | 1.5907 | 1.5907 | | 1.4634 | 1.4634 | 0.0000 | 5,598.6781 | 5,598.6781 | 1.8107 | | 5,643.9462 |
| **Total** | **3.6454** | **36.4114** | **23.4740** | **0.0578** | **2.3693** | **1.5907** | **3.9600** | **1.2932** | **1.4634** | **2.7567** | **0.0000** | **5,598.6781** | **5,598.6781** | **1.8107** | | **5,643.9462** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1253 | 4.2738 | 0.9441 | 0.0126 | 0.2879 | 0.0133 | 0.3012 | 0.0789 | 0.0128 | 0.0916 | | 1,373.4961 | 1,373.4961 | 0.0968 | | 1,375.9161 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0628 | 0.0410 | 0.5632 | 1.6700e-003 | 0.1677 | 1.2400e-003 | 0.1689 | 0.0445 | 1.1400e-003 | 0.0456 | | 166.0347 | 166.0347 | 4.4800e-003 | | 166.1466 |
| **Total** | **0.1881** | **4.3148** | **1.5073** | **0.0143** | **0.4556** | **0.0146** | **0.4701** | **0.1234** | **0.0139** | **0.1372** | | **1,539.5308** | **1,539.5308** | **0.1013** | | **1,542.0627** |

## 3.4 Paving and Construction - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 4.6870 | 46.1940 | 31.8636 | 0.0783 | | 2.0268 | 2.0268 | | 1.8647 | 1.8647 | | 7,586.3508 | 7,586.3508 | 2.4536 | | 7,647.6903 |
| **Total** | **4.6870** | **46.1940** | **31.8636** | **0.0783** | | **2.0268** | **2.0268** | | **1.8647** | **1.8647** | | **7,586.3508** | **7,586.3508** | **2.4536** | | **7,647.6903** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0506 | 1.7238 | 0.4186 | 4.5500e-003 | 0.1152 | 3.5200e-003 | 0.1187 | 0.0332 | 3.3700e-003 | 0.0365 | | 487.3387 | 487.3387 | 0.0301 | | 488.0921 |
| Worker | 0.1925 | 0.1256 | 1.7272 | 5.1100e-003 | 0.5142 | 3.8100e-003 | 0.5180 | 0.1364 | 3.5000e-003 | 0.1399 | | 509.1732 | 509.1732 | 0.0137 | | 509.5163 |
| **Total** | **0.2432** | **1.8494** | **2.1457** | **9.6600e-003** | **0.6294** | **7.3300e-003** | **0.6367** | **0.1695** | **6.8700e-003** | **0.1764** | | **996.5120** | **996.5120** | **0.0439** | | **997.6084** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 4.6870 | 46.1940 | 31.8636 | 0.0783 | | 2.0268 | 2.0268 | | 1.8647 | 1.8647 | 0.0000 | 7,586.3508 | 7,586.3508 | 2.4536 | | 7,647.6903 |
| **Total** | **4.6870** | **46.1940** | **31.8636** | **0.0783** | | **2.0268** | **2.0268** | | **1.8647** | **1.8647** | **0.0000** | **7,586.3508** | **7,586.3508** | **2.4536** | | **7,647.6903** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0506 | 1.7238 | 0.4186 | 4.5500e-003 | 0.1152 | 3.5200e-003 | 0.1187 | 0.0332 | 3.3700e-003 | 0.0365 | | 487.3387 | 487.3387 | 0.0301 | | 488.0921 |
| Worker | 0.1925 | 0.1256 | 1.7272 | 5.1100e-003 | 0.5142 | 3.8100e-003 | 0.5180 | 0.1364 | 3.5000e-003 | 0.1399 | | 509.1732 | 509.1732 | 0.0137 | | 509.5163 |
| **Total** | **0.2432** | **1.8494** | **2.1457** | **9.6600e-003** | **0.6294** | **7.3300e-003** | **0.6367** | **0.1695** | **6.8700e-003** | **0.1764** | | **996.5120** | **996.5120** | **0.0439** | | **997.6084** |

## 3.4 Paving and Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 4.0106 | 37.1829 | 29.9504 | 0.0784 | | 1.6100 | 1.6100 | | 1.4812 | 1.4812 | | 7,589.8386 | 7,589.8386 | 2.4547 | | 7,651.2063 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total** | **4.0106** | **37.1829** | **29.9504** | **0.0784** | | **1.6100** | **1.6100** | | **1.4812** | **1.4812** | | **7,589.8386** | **7,589.8386** | **2.4547** | | **7,651.2063** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0475 | 1.6373 | 0.3963 | 4.5100e-003 | 0.1152 | 3.0600e-003 | 0.1182 | 0.0332 | 2.9300e-003 | 0.0361 | | 483.0664 | 483.0664 | 0.0291 | | 483.7939 |
| Worker | 0.1806 | 0.1134 | 1.5972 | 4.9300e-003 | 0.5142 | 3.7000e-003 | 0.5179 | 0.1364 | 3.4000e-003 | 0.1398 | | 490.9411 | 490.9411 | 0.0124 | | 491.2512 |
| **Total** | **0.2281** | **1.7508** | **1.9935** | **9.4400e-003** | **0.6294** | **6.7600e-003** | **0.6361** | **0.1695** | **6.3300e-003** | **0.1759** | | **974.0075** | **974.0075** | **0.0415** | | **975.0451** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 4.0106 | 37.1829 | 29.9504 | 0.0784 | | 1.6100 | 1.6100 | | 1.4812 | 1.4812 | 0.0000 | 7,589.8386 | 7,589.8386 | 2.4547 | | 7,651.2063 |
| **Total** | **4.0106** | **37.1829** | **29.9504** | **0.0784** | | **1.6100** | **1.6100** | | **1.4812** | **1.4812** | **0.0000** | **7,589.8386** | **7,589.8386** | **2.4547** | | **7,651.2063** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0475 | 1.6373 | 0.3963 | 4.5100e-003 | 0.1152 | 3.0600e-003 | 0.1182 | 0.0332 | 2.9300e-003 | 0.0361 | | 483.0664 | 483.0664 | 0.0291 | | 483.7939 |
| Worker | 0.1806 | 0.1134 | 1.5972 | 4.9300e-003 | 0.5142 | 3.7000e-003 | 0.5179 | 0.1364 | 3.4000e-003 | 0.1398 | | 490.9411 | 490.9411 | 0.0124 | | 491.2512 |
| **Total** | **0.2281** | **1.7508** | **1.9935** | **9.4400e-003** | **0.6294** | **6.7600e-003** | **0.6361** | **0.1695** | **6.3300e-003** | **0.1759** | | **974.0075** | **974.0075** | **0.0415** | | **975.0451** |

## 3.5 Landscaping - 2022

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.2343 | 2.6042 | 3.6251 | 5.1800e-003 | | 0.1246 | 0.1246 | | 0.1147 | 0.1147 | | 501.6302 | 501.6302 | 0.1622 | | 505.6861 |
| **Total** | **0.2343** | **2.6042** | **3.6251** | **5.1800e-003** | | **0.1246** | **0.1246** | | **0.1147** | **0.1147** | | **501.6302** | **501.6302** | **0.1622** | | **505.6861** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0264 | 0.9096 | 0.2202 | 2.5100e-003 | 0.0640 | 1.7000e-003 | 0.0657 | 0.0184 | 1.6300e-003 | 0.0201 | | 268.3702 | 268.3702 | 0.0162 | | 268.7744 |
| Worker | 0.1806 | 0.1134 | 1.5972 | 4.9300e-003 | 0.5142 | 3.7000e-003 | 0.5179 | 0.1364 | 3.4000e-003 | 0.1398 | | 490.9411 | 490.9411 | 0.0124 | | 491.2512 |
| **Total** | **0.2070** | **1.0231** | **1.8174** | **7.4400e-003** | **0.5782** | **5.4000e-003** | **0.5836** | **0.1548** | **5.0300e-003** | **0.1598** | | **759.3113** | **759.3113** | **0.0286** | | **760.0256** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.2343 | 2.6042 | 3.6251 | 5.1800e-003 | | 0.1246 | 0.1246 | | 0.1147 | 0.1147 | 0.0000 | 501.6302 | 501.6302 | 0.1622 | | 505.6861 |
| **Total** | **0.2343** | **2.6042** | **3.6251** | **5.1800e-003** | | **0.1246** | **0.1246** | | **0.1147** | **0.1147** | **0.0000** | **501.6302** | **501.6302** | **0.1622** | | **505.6861** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Vendor | 0.0264 | 0.9096 | 0.2202 | 2.5100e-003 | 0.0640 | 1.7000e-003 | 0.0657 | 0.0184 | 1.6300e-003 | 0.0201 | | 268.3702 | 268.3702 | 0.0162 | | 268.7744 |
| Worker | 0.1806 | 0.1134 | 1.5972 | 4.9300e-003 | 0.5142 | 3.7000e-003 | 0.5179 | 0.1364 | 3.4000e-003 | 0.1398 | | 490.9411 | 490.9411 | 0.0124 | | 491.2512 |
| **Total** | **0.2070** | **1.0231** | **1.8174** | **7.4400e-003** | **0.5782** | **5.4000e-003** | **0.5836** | **0.1548** | **5.0300e-003** | **0.1598** | | **759.3113** | **759.3113** | **0.0286** | | **760.0256** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.3477 | 0.0189 | 469.8572 | 2.0320 | 0.7642 | 0.5372 | 1.3014 | 1.3797 | 0.4410 | 1.8207 | | 0.0800 | 0.0800 | 0.2340 | | 5.9288 |
| Unmitigated | 0.3477 | 0.0189 | 469.8572 | 2.0320 | 0.7642 | 0.5372 | 1.3014 | 1.3797 | 0.4410 | 1.8207 | | 0.0800 | 0.0800 | 0.2340 | | 5.9288 |

### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| City Park | 85.00 | 56.88 | 48.75 | 218,128 | 218,128 |
| Total | 85.00 | 56.88 | 48.75 | 218,128 | 218,128 |

### 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| City Park | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 66 | 28 | 6 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| City Park | 0.552603 | 0.061033 | 0.186728 | 0.118579 | 0.023437 | 0.006039 | 0.017620 | 0.024846 | 0.001416 | 0.001678 | 0.004487 | 0.000623 | 0.000912 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| NaturalGas Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

### 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| City Park | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| City Park | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 5.6300e-003 | 0.0000 | 2.6000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 5.5000e-004 | 5.5000e-004 | 0.0000 | | 5.8000e-004 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unmitigated | 5.6300e-003 | 0.0000 | 2.6000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 5.5000e-004 | 5.5000e-004 | 0.0000 | | 5.8000e-004 |

## 6.2 Area by SubCategory

### Unmitigated

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 5.6100e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 2.0000e-005 | 0.0000 | 2.6000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 5.5000e-004 | 5.5000e-004 | 0.0000 | | 5.8000e-004 |
| **Total** | **5.6300e-003** | **0.0000** | **2.6000e-004** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **5.5000e-004** | **5.5000e-004** | **0.0000** | | **5.8000e-004** |

### Mitigated

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 5.6100e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 2.0000e-005 | 0.0000 | 2.6000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 5.5000e-004 | 5.5000e-004 | 0.0000 | | 5.8000e-004 |
| **Total** | **5.6300e-003** | **0.0000** | **2.6000e-004** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **5.5000e-004** | **5.5000e-004** | **0.0000** | | **5.8000e-004** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# Crawford Park

**South Coast Air Basin, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| City Park | 2.50 | Acre | 2.50 | 108,900.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 31 |
| **Climate Zone** | 8 | | | **Operational Year** | 2023 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Schedule provided by applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Off-road Equipment - Equipment provided by Applicant

Trips and VMT - Import 10,000 CY soil, vendor trips for construction and landscaping

Grading - Import 10,000 CY

Vehicle Trips - Trip Generation Source: Translutions, 2020

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Energy Use - Lighting from CalEEMod user guide for open parking lot lighting

Construction Off-road Equipment Mitigation - Water exposed area 3 times daily

Fleet Mix - EMFAC2017

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstructionPhase | NumDays | 220.00 | 80.00 |
| tblConstructionPhase | NumDays | 220.00 | 90.00 |
| tblConstructionPhase | NumDays | 6.00 | 60.00 |
| tblConstructionPhase | NumDays | 3.00 | 20.00 |
| tblEnergyUse | LightingElect | 0.00 | 0.35 |
| tblFleetMix | HHD | 0.03 | 0.02 |
| tblFleetMix | LDA | 0.55 | 0.55 |
| tblFleetMix | LDT1 | 0.04 | 0.06 |
| tblFleetMix | LDT2 | 0.20 | 0.19 |
| tblFleetMix | LHD1 | 0.02 | 0.02 |
| tblFleetMix | LHD2 | 5.8470e-003 | 6.0390e-003 |
| tblFleetMix | MCY | 4.8220e-003 | 4.4870e-003 |
| tblFleetMix | MDV | 0.12 | 0.12 |
| tblFleetMix | MH | 8.6900e-004 | 9.1200e-004 |
| tblFleetMix | MHD | 0.02 | 0.02 |
| tblFleetMix | OBUS | 2.1100e-003 | 1.4160e-003 |
| tblFleetMix | SBUS | 7.1000e-004 | 6.2300e-004 |
| tblFleetMix | UBUS | 1.7690e-003 | 1.6780e-003 |
| tblGrading | AcresOfGrading | 60.00 | 3.00 |
| tblGrading | AcresOfGrading | 0.00 | 4.50 |

| | | | |
|---|---|---|---|
| tblGrading | MaterialImported | 0.00 | 10,000.00 |
| tblLandUse | RecSwimmingAreaAllowEdit | 0.00 | 108,900.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblTripsAndVMT | VendorTripNumber | 18.00 | 10.00 |
| tblVehicleEF | HHD | 0.52 | 0.03 |
| tblVehicleEF | HHD | 0.09 | 0.08 |
| tblVehicleEF | HHD | 0.07 | 1.0000e-006 |
| tblVehicleEF | HHD | 1.59 | 6.32 |
| tblVehicleEF | HHD | 0.96 | 0.58 |
| tblVehicleEF | HHD | 3.04 | 9.3040e-003 |
| tblVehicleEF | HHD | 4,355.32 | 1,186.71 |
| tblVehicleEF | HHD | 1,551.76 | 1,477.44 |
| tblVehicleEF | HHD | 9.81 | 0.09 |
| tblVehicleEF | HHD | 13.94 | 6.38 |
| tblVehicleEF | HHD | 1.91 | 3.57 |
| tblVehicleEF | HHD | 19.62 | 2.07 |

| | | | |
|---|---|---|---|
| tblVehicleEF | HHD | 9.5610e-003 | 3.9310e-003 |
| tblVehicleEF | HHD | 0.06 | 0.06 |
| tblVehicleEF | HHD | 0.04 | 0.04 |
| tblVehicleEF | HHD | 6.0750e-003 | 0.03 |
| tblVehicleEF | HHD | 8.4000e-005 | 2.0000e-006 |
| tblVehicleEF | HHD | 9.1470e-003 | 3.7610e-003 |
| tblVehicleEF | HHD | 0.03 | 0.03 |
| tblVehicleEF | HHD | 8.8000e-003 | 8.8970e-003 |
| tblVehicleEF | HHD | 5.8120e-003 | 0.03 |
| tblVehicleEF | HHD | 7.7000e-005 | 1.0000e-006 |
| tblVehicleEF | HHD | 9.9000e-005 | 7.0000e-006 |
| tblVehicleEF | HHD | 4.1500e-003 | 2.6800e-004 |
| tblVehicleEF | HHD | 0.40 | 0.46 |
| tblVehicleEF | HHD | 7.3000e-005 | 5.0000e-006 |
| tblVehicleEF | HHD | 0.08 | 0.08 |
| tblVehicleEF | HHD | 3.3800e-004 | 1.4610e-003 |
| tblVehicleEF | HHD | 0.07 | 3.0000e-006 |
| tblVehicleEF | HHD | 0.04 | 0.01 |
| tblVehicleEF | HHD | 0.01 | 0.01 |
| tblVehicleEF | HHD | 1.4800e-004 | 1.0000e-006 |
| tblVehicleEF | HHD | 9.9000e-005 | 7.0000e-006 |
| tblVehicleEF | HHD | 4.1500e-003 | 2.6800e-004 |
| tblVehicleEF | HHD | 0.48 | 0.53 |
| tblVehicleEF | HHD | 7.3000e-005 | 5.0000e-006 |
| tblVehicleEF | HHD | 0.19 | 0.17 |
| tblVehicleEF | HHD | 3.3800e-004 | 1.4610e-003 |
| tblVehicleEF | HHD | 0.08 | 3.0000e-006 |
| tblVehicleEF | HHD | 0.49 | 0.00 |
| tblVehicleEF | HHD | 0.09 | 4.84 |

| | | | |
|---|---|---|---|
| tblVehicleEF | HHD | 0.07 | 2.7300e-004 |
| tblVehicleEF | HHD | 1.16 | 4.3510e-003 |
| tblVehicleEF | HHD | 0.97 | 11,782.57 |
| tblVehicleEF | HHD | 2.89 | 0.09 |
| tblVehicleEF | HHD | 4,614.07 | 2.0000e-006 |
| tblVehicleEF | HHD | 1,551.76 | 1.85 |
| tblVehicleEF | HHD | 9.81 | 0.08 |
| tblVehicleEF | HHD | 14.39 | 0.00 |
| tblVehicleEF | HHD | 1.80 | 0.24 |
| tblVehicleEF | HHD | 19.61 | 0.24 |
| tblVehicleEF | HHD | 8.0610e-003 | 7.0000e-006 |
| tblVehicleEF | HHD | 0.06 | 5.53 |
| tblVehicleEF | HHD | 0.04 | 0.17 |
| tblVehicleEF | HHD | 6.0750e-003 | 6.3500e-004 |
| tblVehicleEF | HHD | 8.4000e-005 | 2.1900e-004 |
| tblVehicleEF | HHD | 7.7120e-003 | 1.4000e-005 |
| tblVehicleEF | HHD | 0.03 | 9.6000e-005 |
| tblVehicleEF | HHD | 8.8000e-003 | 6.6000e-005 |
| tblVehicleEF | HHD | 5.8120e-003 | 1.0000e-006 |
| tblVehicleEF | HHD | 7.7000e-005 | 1.4410e-003 |
| tblVehicleEF | HHD | 1.5500e-004 | 9.1000e-004 |
| tblVehicleEF | HHD | 4.3060e-003 | 0.03 |
| tblVehicleEF | HHD | 0.38 | 6.19 |
| tblVehicleEF | HHD | 1.1000e-004 | 0.00 |
| tblVehicleEF | HHD | 0.08 | 3.38 |
| tblVehicleEF | HHD | 3.3000e-004 | 0.03 |
| tblVehicleEF | HHD | 0.07 | 2.07 |
| tblVehicleEF | HHD | 0.04 | 6.18 |
| tblVehicleEF | HHD | 0.01 | 0.58 |

| | | | |
|---|---|---|---|
| tblVehicleEF | HHD | 1.4500e-004 | 8.8350e-003 |
| tblVehicleEF | HHD | 1.5500e-004 | 156.80 |
| tblVehicleEF | HHD | 4.3060e-003 | 2.0000e-006 |
| tblVehicleEF | HHD | 0.45 | 2.8010e-003 |
| tblVehicleEF | HHD | 1.1000e-004 | 6.2480e-003 |
| tblVehicleEF | HHD | 0.19 | 0.03 |
| tblVehicleEF | HHD | 3.3000e-004 | 0.04 |
| tblVehicleEF | HHD | 0.07 | 0.03 |
| tblVehicleEF | HHD | 0.56 | 0.00 |
| tblVehicleEF | HHD | 0.09 | 4.33 |
| tblVehicleEF | HHD | 0.07 | 3.0500e-004 |
| tblVehicleEF | HHD | 2.20 | 4.3950e-003 |
| tblVehicleEF | HHD | 0.96 | 11,875.11 |
| tblVehicleEF | HHD | 3.06 | 0.09 |
| tblVehicleEF | HHD | 3,998.00 | 2.0000e-006 |
| tblVehicleEF | HHD | 1,551.76 | 1.87 |
| tblVehicleEF | HHD | 9.81 | 0.08 |
| tblVehicleEF | HHD | 13.32 | 0.00 |
| tblVehicleEF | HHD | 1.87 | 0.22 |
| tblVehicleEF | HHD | 19.62 | 0.24 |
| tblVehicleEF | HHD | 0.01 | 5.0000e-006 |
| tblVehicleEF | HHD | 0.06 | 4.95 |
| tblVehicleEF | HHD | 0.04 | 0.17 |
| tblVehicleEF | HHD | 6.0750e-003 | 6.8400e-004 |
| tblVehicleEF | HHD | 8.4000e-005 | 1.4600e-004 |
| tblVehicleEF | HHD | 0.01 | 1.5000e-005 |
| tblVehicleEF | HHD | 0.03 | 6.4000e-005 |
| tblVehicleEF | HHD | 8.8000e-003 | 4.3000e-005 |
| tblVehicleEF | HHD | 5.8120e-003 | 1.0000e-006 |

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|---|---|---|---|
| tblVehicleEF | HHD | 7.7000e-005 | 1.5510e-003 |
| tblVehicleEF | HHD | 9.6000e-005 | 9.1000e-004 |
| tblVehicleEF | HHD | 4.4260e-003 | 0.03 |
| tblVehicleEF | HHD | 0.43 | 6.64 |
| tblVehicleEF | HHD | 7.1000e-005 | 0.00 |
| tblVehicleEF | HHD | 0.08 | 3.51 |
| tblVehicleEF | HHD | 3.6700e-004 | 0.04 |
| tblVehicleEF | HHD | 0.07 | 2.07 |
| tblVehicleEF | HHD | 0.04 | 6.51 |
| tblVehicleEF | HHD | 0.01 | 0.57 |
| tblVehicleEF | HHD | 1.4800e-004 | 9.3940e-003 |
| tblVehicleEF | HHD | 9.6000e-005 | 156.80 |
| tblVehicleEF | HHD | 4.4260e-003 | 2.0000e-006 |
| tblVehicleEF | HHD | 0.51 | 2.8010e-003 |
| tblVehicleEF | HHD | 7.1000e-005 | 6.2480e-003 |
| tblVehicleEF | HHD | 0.19 | 0.03 |
| tblVehicleEF | HHD | 3.6700e-004 | 0.04 |
| tblVehicleEF | HHD | 0.08 | 0.04 |
| tblVehicleEF | LDA | 4.2840e-003 | 3.0340e-003 |
| tblVehicleEF | LDA | 4.4900e-003 | 0.05 |
| tblVehicleEF | LDA | 0.57 | 0.72 |
| tblVehicleEF | LDA | 1.00 | 2.11 |
| tblVehicleEF | LDA | 253.57 | 270.89 |
| tblVehicleEF | LDA | 54.70 | 53.31 |
| tblVehicleEF | LDA | 0.04 | 0.04 |
| tblVehicleEF | LDA | 0.06 | 0.18 |
| tblVehicleEF | LDA | 1.9580e-003 | 1.7990e-003 |
| tblVehicleEF | LDA | 2.2420e-003 | 1.8430e-003 |
| tblVehicleEF | LDA | 1.8050e-003 | 1.6570e-003 |

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|---|---|---|---|
| tblVehicleEF | LDA | 2.0610e-003 | 1.6940e-003 |
| tblVehicleEF | LDA | 0.04 | 0.05 |
| tblVehicleEF | LDA | 0.09 | 0.10 |
| tblVehicleEF | LDA | 0.03 | 0.05 |
| tblVehicleEF | LDA | 0.01 | 0.01 |
| tblVehicleEF | LDA | 0.04 | 0.21 |
| tblVehicleEF | LDA | 0.06 | 0.22 |
| tblVehicleEF | LDA | 2.5390e-003 | 2.6800e-003 |
| tblVehicleEF | LDA | 5.6400e-004 | 5.2800e-004 |
| tblVehicleEF | LDA | 0.04 | 0.05 |
| tblVehicleEF | LDA | 0.09 | 0.10 |
| tblVehicleEF | LDA | 0.03 | 0.05 |
| tblVehicleEF | LDA | 0.02 | 0.02 |
| tblVehicleEF | LDA | 0.04 | 0.21 |
| tblVehicleEF | LDA | 0.07 | 0.25 |
| tblVehicleEF | LDA | 0.00 | 0.04 |
| tblVehicleEF | LDA | 4.5820e-003 | 0.00 |
| tblVehicleEF | LDA | 3.9780e-003 | 0.10 |
| tblVehicleEF | LDA | 0.00 | 11.18 |
| tblVehicleEF | LDA | 0.64 | 0.00 |
| tblVehicleEF | LDA | 0.86 | 3.2530e-003 |
| tblVehicleEF | LDA | 0.00 | 5.0530e-003 |
| tblVehicleEF | LDA | 266.77 | 0.00 |
| tblVehicleEF | LDA | 54.70 | 0.01 |
| tblVehicleEF | LDA | 0.00 | 9.4890e-003 |
| tblVehicleEF | LDA | 0.04 | 0.00 |
| tblVehicleEF | LDA | 0.05 | 4.4120e-003 |
| tblVehicleEF | LDA | 0.00 | 0.07 |
| tblVehicleEF | LDA | 0.04 | 0.00 |

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|---|---|---|---|
| tblVehicleEF | LDA | 8.0000e-003 | 0.02 |
| tblVehicleEF | LDA | 1.9580e-003 | 0.20 |
| tblVehicleEF | LDA | 2.2420e-003 | 0.39 |
| tblVehicleEF | LDA | 0.00 | 0.02 |
| tblVehicleEF | LDA | 0.02 | 0.39 |
| tblVehicleEF | LDA | 2.0000e-003 | 0.33 |
| tblVehicleEF | LDA | 1.8050e-003 | 0.22 |
| tblVehicleEF | LDA | 2.0610e-003 | 0.20 |
| tblVehicleEF | LDA | 0.06 | 0.00 |
| tblVehicleEF | LDA | 0.10 | 1.4850e-003 |
| tblVehicleEF | LDA | 0.05 | 1.7000e-005 |
| tblVehicleEF | LDA | 0.01 | 0.04 |
| tblVehicleEF | LDA | 0.03 | 0.00 |
| tblVehicleEF | LDA | 2.6720e-003 | 0.79 |
| tblVehicleEF | LDA | 5.6100e-004 | 1.79 |
| tblVehicleEF | LDA | 0.06 | 60.05 |
| tblVehicleEF | LDA | 0.10 | 1.8400e-003 |
| tblVehicleEF | LDA | 0.00 | 3.8000e-004 |
| tblVehicleEF | LDA | 0.05 | 7.7830e-003 |
| tblVehicleEF | LDA | 0.02 | 0.02 |
| tblVehicleEF | LDA | 0.03 | 8.0020e-003 |
| tblVehicleEF | LDA | 0.06 | 0.00 |
| tblVehicleEF | LDA | 0.00 | 0.05 |
| tblVehicleEF | LDA | 4.1990e-003 | 0.00 |
| tblVehicleEF | LDA | 4.5800e-003 | 0.11 |
| tblVehicleEF | LDA | 0.00 | 11.32 |
| tblVehicleEF | LDA | 0.55 | 0.00 |
| tblVehicleEF | LDA | 1.03 | 2.9740e-003 |
| tblVehicleEF | LDA | 0.00 | 5.3880e-003 |

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|---|---|---|---|
| tblVehicleEF | LDA | 249.51 | 0.00 |
| tblVehicleEF | LDA | 54.70 | 0.01 |
| tblVehicleEF | LDA | 0.00 | 0.01 |
| tblVehicleEF | LDA | 0.04 | 0.00 |
| tblVehicleEF | LDA | 0.06 | 4.7000e-003 |
| tblVehicleEF | LDA | 0.00 | 0.05 |
| tblVehicleEF | LDA | 0.04 | 0.00 |
| tblVehicleEF | LDA | 8.0000e-003 | 0.02 |
| tblVehicleEF | LDA | 1.9580e-003 | 0.24 |
| tblVehicleEF | LDA | 2.2420e-003 | 0.24 |
| tblVehicleEF | LDA | 0.00 | 0.02 |
| tblVehicleEF | LDA | 0.02 | 0.24 |
| tblVehicleEF | LDA | 2.0000e-003 | 0.22 |
| tblVehicleEF | LDA | 1.8050e-003 | 0.25 |
| tblVehicleEF | LDA | 2.0610e-003 | 0.24 |
| tblVehicleEF | LDA | 0.03 | 0.00 |
| tblVehicleEF | LDA | 0.10 | 1.4850e-003 |
| tblVehicleEF | LDA | 0.03 | 1.7000e-005 |
| tblVehicleEF | LDA | 0.01 | 0.04 |
| tblVehicleEF | LDA | 0.04 | 0.00 |
| tblVehicleEF | LDA | 2.4980e-003 | 0.69 |
| tblVehicleEF | LDA | 5.6400e-004 | 2.17 |
| tblVehicleEF | LDA | 0.03 | 56.49 |
| tblVehicleEF | LDA | 0.10 | 1.8400e-003 |
| tblVehicleEF | LDA | 0.00 | 3.8000e-004 |
| tblVehicleEF | LDA | 0.03 | 7.7830e-003 |
| tblVehicleEF | LDA | 0.02 | 0.02 |
| tblVehicleEF | LDA | 0.04 | 8.0020e-003 |
| tblVehicleEF | LDA | 0.07 | 0.00 |

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|---|---|---|---|
| tblVehicleEF | LDT1 | 0.01 | 7.7890e-003 |
| tblVehicleEF | LDT1 | 0.01 | 0.07 |
| tblVehicleEF | LDT1 | 1.36 | 1.46 |
| tblVehicleEF | LDT1 | 2.49 | 2.28 |
| tblVehicleEF | LDT1 | 319.38 | 318.65 |
| tblVehicleEF | LDT1 | 67.76 | 63.32 |
| tblVehicleEF | LDT1 | 0.13 | 0.12 |
| tblVehicleEF | LDT1 | 0.15 | 0.26 |
| tblVehicleEF | LDT1 | 2.9980e-003 | 2.7210e-003 |
| tblVehicleEF | LDT1 | 3.2550e-003 | 2.6380e-003 |
| tblVehicleEF | LDT1 | 2.7600e-003 | 2.5050e-003 |
| tblVehicleEF | LDT1 | 2.9930e-003 | 2.4250e-003 |
| tblVehicleEF | LDT1 | 0.12 | 0.13 |
| tblVehicleEF | LDT1 | 0.25 | 0.20 |
| tblVehicleEF | LDT1 | 0.10 | 0.11 |
| tblVehicleEF | LDT1 | 0.03 | 0.03 |
| tblVehicleEF | LDT1 | 0.16 | 0.70 |
| tblVehicleEF | LDT1 | 0.17 | 0.36 |
| tblVehicleEF | LDT1 | 3.2100e-003 | 3.1530e-003 |
| tblVehicleEF | LDT1 | 7.2100e-004 | 6.2700e-004 |
| tblVehicleEF | LDT1 | 0.12 | 0.13 |
| tblVehicleEF | LDT1 | 0.25 | 0.20 |
| tblVehicleEF | LDT1 | 0.10 | 0.11 |
| tblVehicleEF | LDT1 | 0.04 | 0.05 |
| tblVehicleEF | LDT1 | 0.16 | 0.70 |
| tblVehicleEF | LDT1 | 0.19 | 0.39 |
| tblVehicleEF | LDT1 | 0.00 | 0.07 |
| tblVehicleEF | LDT1 | 0.01 | 0.00 |
| tblVehicleEF | LDT1 | 0.01 | 0.21 |

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|---|---|---|---|
| tblVehicleEF | LDT1 | 0.00 | 13.55 |
| tblVehicleEF | LDT1 | 1.49 | 0.00 |
| tblVehicleEF | LDT1 | 2.12 | 8.2760e-003 |
| tblVehicleEF | LDT1 | 0.00 | 5.8840e-003 |
| tblVehicleEF | LDT1 | 334.82 | 0.00 |
| tblVehicleEF | LDT1 | 67.76 | 0.04 |
| tblVehicleEF | LDT1 | 0.00 | 0.01 |
| tblVehicleEF | LDT1 | 0.11 | 0.00 |
| tblVehicleEF | LDT1 | 0.13 | 8.0850e-003 |
| tblVehicleEF | LDT1 | 0.00 | 0.15 |
| tblVehicleEF | LDT1 | 0.04 | 0.00 |
| tblVehicleEF | LDT1 | 8.0000e-003 | 0.05 |
| tblVehicleEF | LDT1 | 2.9980e-003 | 0.65 |
| tblVehicleEF | LDT1 | 3.2550e-003 | 0.93 |
| tblVehicleEF | LDT1 | 0.00 | 0.05 |
| tblVehicleEF | LDT1 | 0.02 | 0.93 |
| tblVehicleEF | LDT1 | 2.0000e-003 | 0.71 |
| tblVehicleEF | LDT1 | 2.7600e-003 | 0.35 |
| tblVehicleEF | LDT1 | 2.9930e-003 | 0.65 |
| tblVehicleEF | LDT1 | 0.20 | 0.00 |
| tblVehicleEF | LDT1 | 0.27 | 2.3930e-003 |
| tblVehicleEF | LDT1 | 0.15 | 3.5000e-005 |
| tblVehicleEF | LDT1 | 0.03 | 0.11 |
| tblVehicleEF | LDT1 | 0.15 | 0.00 |
| tblVehicleEF | LDT1 | 3.3670e-003 | 1.59 |
| tblVehicleEF | LDT1 | 7.1400e-004 | 1.93 |
| tblVehicleEF | LDT1 | 0.20 | 71.69 |
| tblVehicleEF | LDT1 | 0.27 | 2.6340e-003 |
| tblVehicleEF | LDT1 | 0.00 | 5.9400e-004 |

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|---|---|---|---|
| tblVehicleEF | LDT1 | 0.15 | 7.9510e-003 |
| tblVehicleEF | LDT1 | 0.05 | 0.02 |
| tblVehicleEF | LDT1 | 0.15 | 8.0020e-003 |
| tblVehicleEF | LDT1 | 0.16 | 0.00 |
| tblVehicleEF | LDT1 | 0.00 | 0.08 |
| tblVehicleEF | LDT1 | 0.01 | 0.00 |
| tblVehicleEF | LDT1 | 0.01 | 0.23 |
| tblVehicleEF | LDT1 | 0.00 | 13.73 |
| tblVehicleEF | LDT1 | 1.32 | 0.00 |
| tblVehicleEF | LDT1 | 2.56 | 7.6540e-003 |
| tblVehicleEF | LDT1 | 0.00 | 6.2690e-003 |
| tblVehicleEF | LDT1 | 314.49 | 0.00 |
| tblVehicleEF | LDT1 | 67.76 | 0.03 |
| tblVehicleEF | LDT1 | 0.00 | 0.02 |
| tblVehicleEF | LDT1 | 0.12 | 0.00 |
| tblVehicleEF | LDT1 | 0.15 | 8.6860e-003 |
| tblVehicleEF | LDT1 | 0.00 | 0.10 |
| tblVehicleEF | LDT1 | 0.04 | 0.00 |
| tblVehicleEF | LDT1 | 8.0000e-003 | 0.05 |
| tblVehicleEF | LDT1 | 2.9980e-003 | 0.83 |
| tblVehicleEF | LDT1 | 3.2550e-003 | 0.60 |
| tblVehicleEF | LDT1 | 0.00 | 0.05 |
| tblVehicleEF | LDT1 | 0.02 | 0.59 |
| tblVehicleEF | LDT1 | 2.0000e-003 | 0.48 |
| tblVehicleEF | LDT1 | 2.7600e-003 | 0.40 |
| tblVehicleEF | LDT1 | 2.9930e-003 | 0.83 |
| tblVehicleEF | LDT1 | 0.12 | 0.00 |
| tblVehicleEF | LDT1 | 0.28 | 2.3930e-003 |
| tblVehicleEF | LDT1 | 0.10 | 3.5000e-005 |

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|---|---|---|---|
| tblVehicleEF | LDT1 | 0.03 | 0.12 |
| tblVehicleEF | LDT1 | 0.19 | 0.00 |
| tblVehicleEF | LDT1 | 3.1610e-003 | 1.41 |
| tblVehicleEF | LDT1 | 7.2200e-004 | 2.35 |
| tblVehicleEF | LDT1 | 0.12 | 68.01 |
| tblVehicleEF | LDT1 | 0.28 | 2.6340e-003 |
| tblVehicleEF | LDT1 | 0.00 | 5.9400e-004 |
| tblVehicleEF | LDT1 | 0.10 | 7.9510e-003 |
| tblVehicleEF | LDT1 | 0.04 | 0.02 |
| tblVehicleEF | LDT1 | 0.19 | 8.0020e-003 |
| tblVehicleEF | LDT1 | 0.19 | 0.00 |
| tblVehicleEF | LDT2 | 5.9720e-003 | 4.9910e-003 |
| tblVehicleEF | LDT2 | 5.6870e-003 | 0.07 |
| tblVehicleEF | LDT2 | 0.75 | 1.03 |
| tblVehicleEF | LDT2 | 1.24 | 2.65 |
| tblVehicleEF | LDT2 | 356.41 | 341.38 |
| tblVehicleEF | LDT2 | 75.77 | 68.34 |
| tblVehicleEF | LDT2 | 0.07 | 0.09 |
| tblVehicleEF | LDT2 | 0.09 | 0.28 |
| tblVehicleEF | LDT2 | 1.9990e-003 | 1.9090e-003 |
| tblVehicleEF | LDT2 | 2.3560e-003 | 1.8910e-003 |
| tblVehicleEF | LDT2 | 1.8380e-003 | 1.7570e-003 |
| tblVehicleEF | LDT2 | 2.1660e-003 | 1.7390e-003 |
| tblVehicleEF | LDT2 | 0.04 | 0.07 |
| tblVehicleEF | LDT2 | 0.10 | 0.12 |
| tblVehicleEF | LDT2 | 0.04 | 0.07 |
| tblVehicleEF | LDT2 | 0.01 | 0.02 |
| tblVehicleEF | LDT2 | 0.06 | 0.41 |
| tblVehicleEF | LDT2 | 0.08 | 0.31 |

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|---|---|---|---|
| tblVehicleEF | LDT2 | 3.5700e-003 | 3.3770e-003 |
| tblVehicleEF | LDT2 | 7.7800e-004 | 6.7600e-004 |
| tblVehicleEF | LDT2 | 0.04 | 0.07 |
| tblVehicleEF | LDT2 | 0.10 | 0.12 |
| tblVehicleEF | LDT2 | 0.04 | 0.07 |
| tblVehicleEF | LDT2 | 0.02 | 0.03 |
| tblVehicleEF | LDT2 | 0.06 | 0.41 |
| tblVehicleEF | LDT2 | 0.08 | 0.34 |
| tblVehicleEF | LDT2 | 0.00 | 0.06 |
| tblVehicleEF | LDT2 | 6.3770e-003 | 0.00 |
| tblVehicleEF | LDT2 | 5.0410e-003 | 0.13 |
| tblVehicleEF | LDT2 | 0.00 | 14.40 |
| tblVehicleEF | LDT2 | 0.83 | 0.00 |
| tblVehicleEF | LDT2 | 1.06 | 5.3180e-003 |
| tblVehicleEF | LDT2 | 0.00 | 6.4670e-003 |
| tblVehicleEF | LDT2 | 374.21 | 0.00 |
| tblVehicleEF | LDT2 | 75.77 | 0.02 |
| tblVehicleEF | LDT2 | 0.00 | 0.01 |
| tblVehicleEF | LDT2 | 0.06 | 0.00 |
| tblVehicleEF | LDT2 | 0.09 | 6.6250e-003 |
| tblVehicleEF | LDT2 | 0.00 | 0.10 |
| tblVehicleEF | LDT2 | 0.04 | 0.00 |
| tblVehicleEF | LDT2 | 8.0000e-003 | 0.03 |
| tblVehicleEF | LDT2 | 1.9990e-003 | 0.38 |
| tblVehicleEF | LDT2 | 2.3560e-003 | 0.54 |
| tblVehicleEF | LDT2 | 0.00 | 0.03 |
| tblVehicleEF | LDT2 | 0.02 | 0.54 |
| tblVehicleEF | LDT2 | 2.0000e-003 | 0.49 |
| tblVehicleEF | LDT2 | 1.8380e-003 | 0.31 |

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|---|---|---|---|
| tblVehicleEF | LDT2 | 2.1660e-003 | 0.38 |
| tblVehicleEF | LDT2 | 0.07 | 0.00 |
| tblVehicleEF | LDT2 | 0.10 | 1.6180e-003 |
| tblVehicleEF | LDT2 | 0.06 | 1.7000e-005 |
| tblVehicleEF | LDT2 | 0.02 | 0.08 |
| tblVehicleEF | LDT2 | 0.05 | 0.00 |
| tblVehicleEF | LDT2 | 3.7490e-003 | 1.12 |
| tblVehicleEF | LDT2 | 7.7500e-004 | 2.26 |
| tblVehicleEF | LDT2 | 0.07 | 75.14 |
| tblVehicleEF | LDT2 | 0.10 | 1.8890e-003 |
| tblVehicleEF | LDT2 | 0.00 | 4.0400e-004 |
| tblVehicleEF | LDT2 | 0.06 | 7.8210e-003 |
| tblVehicleEF | LDT2 | 0.02 | 0.02 |
| tblVehicleEF | LDT2 | 0.05 | 8.0020e-003 |
| tblVehicleEF | LDT2 | 0.07 | 0.00 |
| tblVehicleEF | LDT2 | 0.00 | 0.07 |
| tblVehicleEF | LDT2 | 5.8560e-003 | 0.00 |
| tblVehicleEF | LDT2 | 5.8000e-003 | 0.13 |
| tblVehicleEF | LDT2 | 0.00 | 14.59 |
| tblVehicleEF | LDT2 | 0.72 | 0.00 |
| tblVehicleEF | LDT2 | 1.27 | 4.8870e-003 |
| tblVehicleEF | LDT2 | 0.00 | 6.8940e-003 |
| tblVehicleEF | LDT2 | 350.82 | 0.00 |
| tblVehicleEF | LDT2 | 75.77 | 0.02 |
| tblVehicleEF | LDT2 | 0.00 | 0.01 |
| tblVehicleEF | LDT2 | 0.07 | 0.00 |
| tblVehicleEF | LDT2 | 0.09 | 7.0820e-003 |
| tblVehicleEF | LDT2 | 0.00 | 0.07 |
| tblVehicleEF | LDT2 | 0.04 | 0.00 |

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|---|---|---|---|
| tblVehicleEF | LDT2 | 8.0000e-003 | 0.03 |
| tblVehicleEF | LDT2 | 1.9990e-003 | 0.48 |
| tblVehicleEF | LDT2 | 2.3560e-003 | 0.33 |
| tblVehicleEF | LDT2 | 0.00 | 0.03 |
| tblVehicleEF | LDT2 | 0.02 | 0.33 |
| tblVehicleEF | LDT2 | 2.0000e-003 | 0.33 |
| tblVehicleEF | LDT2 | 1.8380e-003 | 0.35 |
| tblVehicleEF | LDT2 | 2.1660e-003 | 0.48 |
| tblVehicleEF | LDT2 | 0.04 | 0.00 |
| tblVehicleEF | LDT2 | 0.10 | 1.6180e-003 |
| tblVehicleEF | LDT2 | 0.04 | 1.7000e-005 |
| tblVehicleEF | LDT2 | 0.01 | 0.08 |
| tblVehicleEF | LDT2 | 0.07 | 0.00 |
| tblVehicleEF | LDT2 | 3.5130e-003 | 0.99 |
| tblVehicleEF | LDT2 | 7.7900e-004 | 2.74 |
| tblVehicleEF | LDT2 | 0.04 | 71.61 |
| tblVehicleEF | LDT2 | 0.10 | 1.8890e-003 |
| tblVehicleEF | LDT2 | 0.00 | 4.0400e-004 |
| tblVehicleEF | LDT2 | 0.04 | 7.8210e-003 |
| tblVehicleEF | LDT2 | 0.02 | 0.02 |
| tblVehicleEF | LDT2 | 0.07 | 8.0020e-003 |
| tblVehicleEF | LDT2 | 0.09 | 0.00 |
| tblVehicleEF | LHD1 | 5.2120e-003 | 5.5830e-003 |
| tblVehicleEF | LHD1 | 9.8600e-003 | 5.7240e-003 |
| tblVehicleEF | LHD1 | 0.02 | 0.02 |
| tblVehicleEF | LHD1 | 0.15 | 0.19 |
| tblVehicleEF | LHD1 | 0.74 | 0.65 |
| tblVehicleEF | LHD1 | 2.42 | 1.14 |
| tblVehicleEF | LHD1 | 9.02 | 8.89 |

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|---|---|---|---|
| tblVehicleEF | LHD1 | 594.63 | 666.21 |
| tblVehicleEF | LHD1 | 31.53 | 12.43 |
| tblVehicleEF | LHD1 | 0.07 | 0.05 |
| tblVehicleEF | LHD1 | 1.08 | 0.65 |
| tblVehicleEF | LHD1 | 0.94 | 0.33 |
| tblVehicleEF | LHD1 | 8.6300e-004 | 7.5700e-004 |
| tblVehicleEF | LHD1 | 0.01 | 9.6790e-003 |
| tblVehicleEF | LHD1 | 9.7700e-003 | 6.4420e-003 |
| tblVehicleEF | LHD1 | 8.9700e-004 | 2.8500e-004 |
| tblVehicleEF | LHD1 | 8.2600e-004 | 7.2400e-004 |
| tblVehicleEF | LHD1 | 2.5390e-003 | 2.4200e-003 |
| tblVehicleEF | LHD1 | 9.3240e-003 | 6.1330e-003 |
| tblVehicleEF | LHD1 | 8.2500e-004 | 2.6200e-004 |
| tblVehicleEF | LHD1 | 2.9620e-003 | 2.5670e-003 |
| tblVehicleEF | LHD1 | 0.10 | 0.08 |
| tblVehicleEF | LHD1 | 0.02 | 0.02 |
| tblVehicleEF | LHD1 | 1.7810e-003 | 1.5640e-003 |
| tblVehicleEF | LHD1 | 0.06 | 0.05 |
| tblVehicleEF | LHD1 | 0.30 | 0.56 |
| tblVehicleEF | LHD1 | 0.24 | 0.08 |
| tblVehicleEF | LHD1 | 9.0000e-005 | 8.6000e-005 |
| tblVehicleEF | LHD1 | 5.8320e-003 | 6.5060e-003 |
| tblVehicleEF | LHD1 | 3.6100e-004 | 1.2300e-004 |
| tblVehicleEF | LHD1 | 2.9620e-003 | 2.5670e-003 |
| tblVehicleEF | LHD1 | 0.10 | 0.08 |
| tblVehicleEF | LHD1 | 0.02 | 0.03 |
| tblVehicleEF | LHD1 | 1.7810e-003 | 1.5640e-003 |
| tblVehicleEF | LHD1 | 0.08 | 0.06 |
| tblVehicleEF | LHD1 | 0.30 | 0.56 |

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|---|---|---|---|
| tblVehicleEF | LHD1 | 0.26 | 0.09 |
| tblVehicleEF | LHD1 | 5.2120e-003 | 5.1340e-003 |
| tblVehicleEF | LHD1 | 0.01 | 0.30 |
| tblVehicleEF | LHD1 | 0.02 | 0.08 |
| tblVehicleEF | LHD1 | 0.15 | 0.83 |
| tblVehicleEF | LHD1 | 0.75 | 124.98 |
| tblVehicleEF | LHD1 | 2.31 | 6.2080e-003 |
| tblVehicleEF | LHD1 | 9.02 | 1.7780e-003 |
| tblVehicleEF | LHD1 | 594.63 | 0.01 |
| tblVehicleEF | LHD1 | 31.53 | 0.05 |
| tblVehicleEF | LHD1 | 0.07 | 1.0420e-003 |
| tblVehicleEF | LHD1 | 1.01 | 0.07 |
| tblVehicleEF | LHD1 | 0.91 | 0.03 |
| tblVehicleEF | LHD1 | 8.6300e-004 | 2.2100e-003 |
| tblVehicleEF | LHD1 | 0.08 | 0.42 |
| tblVehicleEF | LHD1 | 0.01 | 0.06 |
| tblVehicleEF | LHD1 | 9.7700e-003 | 0.48 |
| tblVehicleEF | LHD1 | 8.9700e-004 | 0.06 |
| tblVehicleEF | LHD1 | 8.2600e-004 | 5.6060e-003 |
| tblVehicleEF | LHD1 | 0.03 | 0.05 |
| tblVehicleEF | LHD1 | 2.5390e-003 | 0.03 |
| tblVehicleEF | LHD1 | 9.3240e-003 | 0.07 |
| tblVehicleEF | LHD1 | 8.2500e-004 | 0.54 |
| tblVehicleEF | LHD1 | 4.5380e-003 | 1.7000e-004 |
| tblVehicleEF | LHD1 | 0.10 | 5.2380e-003 |
| tblVehicleEF | LHD1 | 0.02 | 0.05 |
| tblVehicleEF | LHD1 | 2.6400e-003 | 1.8000e-005 |
| tblVehicleEF | LHD1 | 0.06 | 0.61 |
| tblVehicleEF | LHD1 | 0.29 | 9.1050e-003 |

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|---|---|---|---|
| tblVehicleEF | LHD1 | 0.23 | 0.32 |
| tblVehicleEF | LHD1 | 9.0000e-005 | 0.19 |
| tblVehicleEF | LHD1 | 5.8320e-003 | 0.67 |
| tblVehicleEF | LHD1 | 3.5900e-004 | 1.09 |
| tblVehicleEF | LHD1 | 4.5380e-003 | 48.48 |
| tblVehicleEF | LHD1 | 0.10 | 2.8500e-004 |
| tblVehicleEF | LHD1 | 0.02 | 4.2700e-004 |
| tblVehicleEF | LHD1 | 2.6400e-003 | 5.4550e-003 |
| tblVehicleEF | LHD1 | 0.08 | 0.03 |
| tblVehicleEF | LHD1 | 0.29 | 9.3700e-003 |
| tblVehicleEF | LHD1 | 0.25 | 9.5160e-003 |
| tblVehicleEF | LHD1 | 5.2120e-003 | 5.3710e-003 |
| tblVehicleEF | LHD1 | 9.8170e-003 | 0.30 |
| tblVehicleEF | LHD1 | 0.02 | 0.09 |
| tblVehicleEF | LHD1 | 0.15 | 0.84 |
| tblVehicleEF | LHD1 | 0.73 | 124.98 |
| tblVehicleEF | LHD1 | 2.43 | 6.0400e-003 |
| tblVehicleEF | LHD1 | 9.02 | 1.8370e-003 |
| tblVehicleEF | LHD1 | 594.63 | 0.01 |
| tblVehicleEF | LHD1 | 31.53 | 0.05 |
| tblVehicleEF | LHD1 | 0.07 | 1.0870e-003 |
| tblVehicleEF | LHD1 | 1.06 | 0.07 |
| tblVehicleEF | LHD1 | 0.95 | 0.03 |
| tblVehicleEF | LHD1 | 8.6300e-004 | 1.5420e-003 |
| tblVehicleEF | LHD1 | 0.08 | 0.42 |
| tblVehicleEF | LHD1 | 0.01 | 0.06 |
| tblVehicleEF | LHD1 | 9.7700e-003 | 0.53 |
| tblVehicleEF | LHD1 | 8.9700e-004 | 0.04 |
| tblVehicleEF | LHD1 | 8.2600e-004 | 6.2420e-003 |

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|---|---|---|---|
| tblVehicleEF | LHD1 | 0.03 | 0.04 |
| tblVehicleEF | LHD1 | 2.5390e-003 | 0.02 |
| tblVehicleEF | LHD1 | 9.3240e-003 | 0.08 |
| tblVehicleEF | LHD1 | 8.2500e-004 | 0.60 |
| tblVehicleEF | LHD1 | 3.0750e-003 | 1.7000e-004 |
| tblVehicleEF | LHD1 | 0.11 | 5.2380e-003 |
| tblVehicleEF | LHD1 | 0.02 | 0.05 |
| tblVehicleEF | LHD1 | 1.7770e-003 | 1.8000e-005 |
| tblVehicleEF | LHD1 | 0.06 | 0.64 |
| tblVehicleEF | LHD1 | 0.32 | 9.1050e-003 |
| tblVehicleEF | LHD1 | 0.24 | 0.34 |
| tblVehicleEF | LHD1 | 9.0000e-005 | 0.19 |
| tblVehicleEF | LHD1 | 5.8320e-003 | 0.65 |
| tblVehicleEF | LHD1 | 3.6100e-004 | 1.14 |
| tblVehicleEF | LHD1 | 3.0750e-003 | 48.48 |
| tblVehicleEF | LHD1 | 0.11 | 2.8500e-004 |
| tblVehicleEF | LHD1 | 0.02 | 4.2700e-004 |
| tblVehicleEF | LHD1 | 1.7770e-003 | 5.4550e-003 |
| tblVehicleEF | LHD1 | 0.08 | 0.03 |
| tblVehicleEF | LHD1 | 0.32 | 9.3700e-003 |
| tblVehicleEF | LHD1 | 0.26 | 9.5160e-003 |
| tblVehicleEF | LHD2 | 3.6840e-003 | 3.9120e-003 |
| tblVehicleEF | LHD2 | 3.6840e-003 | 3.9650e-003 |
| tblVehicleEF | LHD2 | 7.3420e-003 | 0.01 |
| tblVehicleEF | LHD2 | 0.13 | 0.15 |
| tblVehicleEF | LHD2 | 0.32 | 0.44 |
| tblVehicleEF | LHD2 | 1.21 | 0.76 |
| tblVehicleEF | LHD2 | 13.71 | 13.45 |
| tblVehicleEF | LHD2 | 608.08 | 667.35 |

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|---|---|---|---|
| tblVehicleEF | LHD2 | 26.39 | 9.56 |
| tblVehicleEF | LHD2 | 0.09 | 0.09 |
| tblVehicleEF | LHD2 | 0.67 | 0.84 |
| tblVehicleEF | LHD2 | 0.50 | 0.23 |
| tblVehicleEF | LHD2 | 1.1670e-003 | 1.2520e-003 |
| tblVehicleEF | LHD2 | 0.01 | 0.01 |
| tblVehicleEF | LHD2 | 8.9870e-003 | 0.01 |
| tblVehicleEF | LHD2 | 4.2200e-004 | 1.6200e-004 |
| tblVehicleEF | LHD2 | 1.1160e-003 | 1.1980e-003 |
| tblVehicleEF | LHD2 | 2.6680e-003 | 2.6330e-003 |
| tblVehicleEF | LHD2 | 8.5850e-003 | 9.5770e-003 |
| tblVehicleEF | LHD2 | 3.8800e-004 | 1.4900e-004 |
| tblVehicleEF | LHD2 | 1.0410e-003 | 1.5680e-003 |
| tblVehicleEF | LHD2 | 0.03 | 0.05 |
| tblVehicleEF | LHD2 | 0.01 | 0.02 |
| tblVehicleEF | LHD2 | 6.8300e-004 | 9.7100e-004 |
| tblVehicleEF | LHD2 | 0.04 | 0.05 |
| tblVehicleEF | LHD2 | 0.07 | 0.35 |
| tblVehicleEF | LHD2 | 0.10 | 0.05 |
| tblVehicleEF | LHD2 | 1.3400e-004 | 1.2900e-004 |
| tblVehicleEF | LHD2 | 5.9210e-003 | 6.4600e-003 |
| tblVehicleEF | LHD2 | 2.8600e-004 | 9.5000e-005 |
| tblVehicleEF | LHD2 | 1.0410e-003 | 1.5680e-003 |
| tblVehicleEF | LHD2 | 0.03 | 0.05 |
| tblVehicleEF | LHD2 | 0.02 | 0.02 |
| tblVehicleEF | LHD2 | 6.8300e-004 | 9.7100e-004 |
| tblVehicleEF | LHD2 | 0.05 | 0.06 |
| tblVehicleEF | LHD2 | 0.07 | 0.35 |
| tblVehicleEF | LHD2 | 0.11 | 0.06 |

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|---|---|---|---|
| tblVehicleEF | LHD2 | 3.6840e-003 | 3.5540e-003 |
| tblVehicleEF | LHD2 | 3.7270e-003 | 0.23 |
| tblVehicleEF | LHD2 | 7.0950e-003 | 0.06 |
| tblVehicleEF | LHD2 | 0.13 | 0.64 |
| tblVehicleEF | LHD2 | 0.32 | 184.31 |
| tblVehicleEF | LHD2 | 1.16 | 4.2190e-003 |
| tblVehicleEF | LHD2 | 13.71 | 1.2050e-003 |
| tblVehicleEF | LHD2 | 608.08 | 0.02 |
| tblVehicleEF | LHD2 | 26.39 | 0.05 |
| tblVehicleEF | LHD2 | 0.09 | 7.2200e-004 |
| tblVehicleEF | LHD2 | 0.64 | 0.05 |
| tblVehicleEF | LHD2 | 0.48 | 0.05 |
| tblVehicleEF | LHD2 | 1.1670e-003 | 1.3640e-003 |
| tblVehicleEF | LHD2 | 0.09 | 0.31 |
| tblVehicleEF | LHD2 | 0.01 | 0.06 |
| tblVehicleEF | LHD2 | 8.9870e-003 | 0.28 |
| tblVehicleEF | LHD2 | 4.2200e-004 | 0.03 |
| tblVehicleEF | LHD2 | 1.1160e-003 | 3.7590e-003 |
| tblVehicleEF | LHD2 | 0.04 | 0.03 |
| tblVehicleEF | LHD2 | 2.6680e-003 | 0.02 |
| tblVehicleEF | LHD2 | 8.5850e-003 | 0.05 |
| tblVehicleEF | LHD2 | 3.8800e-004 | 0.34 |
| tblVehicleEF | LHD2 | 1.5870e-003 | 1.9200e-004 |
| tblVehicleEF | LHD2 | 0.04 | 8.5420e-003 |
| tblVehicleEF | LHD2 | 0.01 | 0.09 |
| tblVehicleEF | LHD2 | 9.9900e-004 | 1.0000e-005 |
| tblVehicleEF | LHD2 | 0.04 | 0.79 |
| tblVehicleEF | LHD2 | 0.07 | 0.02 |
| tblVehicleEF | LHD2 | 0.10 | 0.22 |

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|---|---|---|---|
| tblVehicleEF | LHD2 | 1.3400e-004 | 0.15 |
| tblVehicleEF | LHD2 | 5.9210e-003 | 0.44 |
| tblVehicleEF | LHD2 | 2.8500e-004 | 0.73 |
| tblVehicleEF | LHD2 | 1.5870e-003 | 50.51 |
| tblVehicleEF | LHD2 | 0.04 | 1.6200e-004 |
| tblVehicleEF | LHD2 | 0.02 | 7.0500e-004 |
| tblVehicleEF | LHD2 | 9.9900e-004 | 6.5990e-003 |
| tblVehicleEF | LHD2 | 0.05 | 0.04 |
| tblVehicleEF | LHD2 | 0.07 | 0.01 |
| tblVehicleEF | LHD2 | 0.10 | 0.02 |
| tblVehicleEF | LHD2 | 3.6840e-003 | 3.7180e-003 |
| tblVehicleEF | LHD2 | 3.6740e-003 | 0.23 |
| tblVehicleEF | LHD2 | 7.3760e-003 | 0.06 |
| tblVehicleEF | LHD2 | 0.13 | 0.64 |
| tblVehicleEF | LHD2 | 0.32 | 184.31 |
| tblVehicleEF | LHD2 | 1.22 | 4.1490e-003 |
| tblVehicleEF | LHD2 | 13.71 | 1.2430e-003 |
| tblVehicleEF | LHD2 | 608.08 | 0.02 |
| tblVehicleEF | LHD2 | 26.39 | 0.05 |
| tblVehicleEF | LHD2 | 0.09 | 7.5300e-004 |
| tblVehicleEF | LHD2 | 0.66 | 0.05 |
| tblVehicleEF | LHD2 | 0.50 | 0.05 |
| tblVehicleEF | LHD2 | 1.1670e-003 | 9.4300e-004 |
| tblVehicleEF | LHD2 | 0.09 | 0.31 |
| tblVehicleEF | LHD2 | 0.01 | 0.06 |
| tblVehicleEF | LHD2 | 8.9870e-003 | 0.32 |
| tblVehicleEF | LHD2 | 4.2200e-004 | 0.02 |
| tblVehicleEF | LHD2 | 1.1160e-003 | 4.0970e-003 |
| tblVehicleEF | LHD2 | 0.04 | 0.02 |

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|---|---|---|---|
| tblVehicleEF | LHD2 | 2.6680e-003 | 0.01 |
| tblVehicleEF | LHD2 | 8.5850e-003 | 0.05 |
| tblVehicleEF | LHD2 | 3.8800e-004 | 0.38 |
| tblVehicleEF | LHD2 | 1.0460e-003 | 1.9200e-004 |
| tblVehicleEF | LHD2 | 0.04 | 8.5420e-003 |
| tblVehicleEF | LHD2 | 0.01 | 0.09 |
| tblVehicleEF | LHD2 | 6.7100e-004 | 1.0000e-005 |
| tblVehicleEF | LHD2 | 0.04 | 0.82 |
| tblVehicleEF | LHD2 | 0.08 | 0.02 |
| tblVehicleEF | LHD2 | 0.10 | 0.23 |
| tblVehicleEF | LHD2 | 1.3400e-004 | 0.15 |
| tblVehicleEF | LHD2 | 5.9210e-003 | 0.44 |
| tblVehicleEF | LHD2 | 2.8600e-004 | 0.77 |
| tblVehicleEF | LHD2 | 1.0460e-003 | 50.50 |
| tblVehicleEF | LHD2 | 0.04 | 1.6200e-004 |
| tblVehicleEF | LHD2 | 0.02 | 7.0500e-004 |
| tblVehicleEF | LHD2 | 6.7100e-004 | 6.5990e-003 |
| tblVehicleEF | LHD2 | 0.05 | 0.04 |
| tblVehicleEF | LHD2 | 0.08 | 0.01 |
| tblVehicleEF | LHD2 | 0.11 | 0.02 |
| tblVehicleEF | MCY | 0.51 | 0.38 |
| tblVehicleEF | MCY | 0.15 | 0.24 |
| tblVehicleEF | MCY | 18.57 | 19.19 |
| tblVehicleEF | MCY | 9.67 | 8.53 |
| tblVehicleEF | MCY | 183.90 | 223.45 |
| tblVehicleEF | MCY | 44.44 | 59.65 |
| tblVehicleEF | MCY | 1.13 | 1.13 |
| tblVehicleEF | MCY | 0.31 | 0.26 |
| tblVehicleEF | MCY | 2.3320e-003 | 2.4320e-003 |

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|---|---|---|---|
| tblVehicleEF | MCY | 3.6000e-003 | 3.2970e-003 |
| tblVehicleEF | MCY | 2.1780e-003 | 2.2730e-003 |
| tblVehicleEF | MCY | 3.3840e-003 | 3.1040e-003 |
| tblVehicleEF | MCY | 1.14 | 1.09 |
| tblVehicleEF | MCY | 0.66 | 0.66 |
| tblVehicleEF | MCY | 0.67 | 0.67 |
| tblVehicleEF | MCY | 2.47 | 2.61 |
| tblVehicleEF | MCY | 0.60 | 1.99 |
| tblVehicleEF | MCY | 2.04 | 1.82 |
| tblVehicleEF | MCY | 2.2170e-003 | 2.2110e-003 |
| tblVehicleEF | MCY | 6.6200e-004 | 5.9000e-004 |
| tblVehicleEF | MCY | 1.14 | 1.09 |
| tblVehicleEF | MCY | 0.66 | 0.66 |
| tblVehicleEF | MCY | 0.67 | 0.67 |
| tblVehicleEF | MCY | 3.08 | 3.24 |
| tblVehicleEF | MCY | 0.60 | 1.99 |
| tblVehicleEF | MCY | 2.22 | 1.98 |
| tblVehicleEF | MCY | 0.00 | 0.81 |
| tblVehicleEF | MCY | 0.50 | 0.00 |
| tblVehicleEF | MCY | 0.13 | 0.73 |
| tblVehicleEF | MCY | 0.00 | 28.87 |
| tblVehicleEF | MCY | 18.00 | 0.00 |
| tblVehicleEF | MCY | 8.85 | 0.37 |
| tblVehicleEF | MCY | 0.00 | 7.4230e-003 |
| tblVehicleEF | MCY | 183.90 | 0.00 |
| tblVehicleEF | MCY | 44.44 | 2.55 |
| tblVehicleEF | MCY | 0.00 | 0.10 |
| tblVehicleEF | MCY | 0.98 | 0.00 |
| tblVehicleEF | MCY | 0.29 | 0.06 |

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|---|---|---|---|
| tblVehicleEF | MCY | 0.00 | 1.10 |
| tblVehicleEF | MCY | 0.01 | 0.00 |
| tblVehicleEF | MCY | 4.0000e-003 | 3.17 |
| tblVehicleEF | MCY | 2.3320e-003 | 1.87 |
| tblVehicleEF | MCY | 3.6000e-003 | 3.53 |
| tblVehicleEF | MCY | 0.00 | 0.37 |
| tblVehicleEF | MCY | 5.0400e-003 | 3.53 |
| tblVehicleEF | MCY | 1.0000e-003 | 2.20 |
| tblVehicleEF | MCY | 2.1780e-003 | 1.75 |
| tblVehicleEF | MCY | 3.3840e-003 | 1.87 |
| tblVehicleEF | MCY | 1.88 | 5.0000e-004 |
| tblVehicleEF | MCY | 0.75 | 2.2730e-003 |
| tblVehicleEF | MCY | 1.17 | 1.5520e-003 |
| tblVehicleEF | MCY | 2.42 | 0.99 |
| tblVehicleEF | MCY | 0.57 | 0.00 |
| tblVehicleEF | MCY | 1.82 | 0.25 |
| tblVehicleEF | MCY | 2.2060e-003 | 18.47 |
| tblVehicleEF | MCY | 6.4200e-004 | 7.76 |
| tblVehicleEF | MCY | 1.88 | 111.05 |
| tblVehicleEF | MCY | 0.75 | 3.2970e-003 |
| tblVehicleEF | MCY | 0.00 | 1.2160e-003 |
| tblVehicleEF | MCY | 1.17 | 5.8800e-003 |
| tblVehicleEF | MCY | 3.01 | 5.0400e-003 |
| tblVehicleEF | MCY | 0.57 | 4.0000e-003 |
| tblVehicleEF | MCY | 1.98 | 0.00 |
| tblVehicleEF | MCY | 0.00 | 0.93 |
| tblVehicleEF | MCY | 0.52 | 0.00 |
| tblVehicleEF | MCY | 0.15 | 0.85 |
| tblVehicleEF | MCY | 0.00 | 30.00 |

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|---|---|---|---|
| tblVehicleEF | MCY | 18.58 | 0.00 |
| tblVehicleEF | MCY | 9.75 | 0.38 |
| tblVehicleEF | MCY | 0.00 | 7.6700e-003 |
| tblVehicleEF | MCY | 183.90 | 0.00 |
| tblVehicleEF | MCY | 44.44 | 2.62 |
| tblVehicleEF | MCY | 0.00 | 0.12 |
| tblVehicleEF | MCY | 1.10 | 0.00 |
| tblVehicleEF | MCY | 0.31 | 0.06 |
| tblVehicleEF | MCY | 0.00 | 0.64 |
| tblVehicleEF | MCY | 0.01 | 0.00 |
| tblVehicleEF | MCY | 4.0000e-003 | 3.26 |
| tblVehicleEF | MCY | 2.3320e-003 | 2.29 |
| tblVehicleEF | MCY | 3.6000e-003 | 2.37 |
| tblVehicleEF | MCY | 0.00 | 0.43 |
| tblVehicleEF | MCY | 5.0400e-003 | 2.37 |
| tblVehicleEF | MCY | 1.0000e-003 | 1.27 |
| tblVehicleEF | MCY | 2.1780e-003 | 2.02 |
| tblVehicleEF | MCY | 3.3840e-003 | 2.29 |
| tblVehicleEF | MCY | 1.25 | 5.0000e-004 |
| tblVehicleEF | MCY | 0.85 | 2.2730e-003 |
| tblVehicleEF | MCY | 0.66 | 1.5520e-003 |
| tblVehicleEF | MCY | 2.48 | 1.11 |
| tblVehicleEF | MCY | 0.69 | 0.00 |
| tblVehicleEF | MCY | 2.07 | 0.27 |
| tblVehicleEF | MCY | 2.2180e-003 | 19.29 |
| tblVehicleEF | MCY | 6.6500e-004 | 8.66 |
| tblVehicleEF | MCY | 1.25 | 111.83 |
| tblVehicleEF | MCY | 0.85 | 3.2970e-003 |
| tblVehicleEF | MCY | 0.00 | 1.2160e-003 |

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|---|---|---|---|
| tblVehicleEF | MCY | 0.66 | 5.8800e-003 |
| tblVehicleEF | MCY | 3.09 | 5.0400e-003 |
| tblVehicleEF | MCY | 0.69 | 4.0000e-003 |
| tblVehicleEF | MCY | 2.25 | 0.00 |
| tblVehicleEF | MDV | 0.01 | 6.5750e-003 |
| tblVehicleEF | MDV | 0.01 | 0.08 |
| tblVehicleEF | MDV | 1.17 | 1.22 |
| tblVehicleEF | MDV | 2.29 | 3.11 |
| tblVehicleEF | MDV | 483.40 | 419.24 |
| tblVehicleEF | MDV | 101.24 | 83.18 |
| tblVehicleEF | MDV | 0.13 | 0.11 |
| tblVehicleEF | MDV | 0.20 | 0.35 |
| tblVehicleEF | MDV | 2.1080e-003 | 2.0860e-003 |
| tblVehicleEF | MDV | 2.4110e-003 | 2.0610e-003 |
| tblVehicleEF | MDV | 1.9430e-003 | 1.9230e-003 |
| tblVehicleEF | MDV | 2.2170e-003 | 1.8960e-003 |
| tblVehicleEF | MDV | 0.07 | 0.08 |
| tblVehicleEF | MDV | 0.15 | 0.14 |
| tblVehicleEF | MDV | 0.07 | 0.09 |
| tblVehicleEF | MDV | 0.03 | 0.03 |
| tblVehicleEF | MDV | 0.09 | 0.43 |
| tblVehicleEF | MDV | 0.17 | 0.40 |
| tblVehicleEF | MDV | 4.8410e-003 | 4.1450e-003 |
| tblVehicleEF | MDV | 1.0520e-003 | 8.2300e-004 |
| tblVehicleEF | MDV | 0.07 | 0.08 |
| tblVehicleEF | MDV | 0.15 | 0.14 |
| tblVehicleEF | MDV | 0.07 | 0.09 |
| tblVehicleEF | MDV | 0.04 | 0.04 |
| tblVehicleEF | MDV | 0.09 | 0.43 |

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|---|---|---|---|
| tblVehicleEF | MDV | 0.19 | 0.44 |
| tblVehicleEF | MDV | 0.00 | 0.08 |
| tblVehicleEF | MDV | 0.01 | 0.00 |
| tblVehicleEF | MDV | 0.01 | 0.15 |
| tblVehicleEF | MDV | 0.00 | 17.75 |
| tblVehicleEF | MDV | 1.29 | 0.00 |
| tblVehicleEF | MDV | 1.96 | 7.0040e-003 |
| tblVehicleEF | MDV | 0.00 | 7.1080e-003 |
| tblVehicleEF | MDV | 507.25 | 0.00 |
| tblVehicleEF | MDV | 101.24 | 0.03 |
| tblVehicleEF | MDV | 0.00 | 0.02 |
| tblVehicleEF | MDV | 0.11 | 0.00 |
| tblVehicleEF | MDV | 0.19 | 9.1800e-003 |
| tblVehicleEF | MDV | 0.00 | 0.13 |
| tblVehicleEF | MDV | 0.04 | 0.00 |
| tblVehicleEF | MDV | 8.0000e-003 | 0.04 |
| tblVehicleEF | MDV | 2.1080e-003 | 0.40 |
| tblVehicleEF | MDV | 2.4110e-003 | 0.62 |
| tblVehicleEF | MDV | 0.00 | 0.03 |
| tblVehicleEF | MDV | 0.02 | 0.61 |
| tblVehicleEF | MDV | 2.0000e-003 | 0.58 |
| tblVehicleEF | MDV | 1.9430e-003 | 0.39 |
| tblVehicleEF | MDV | 2.2170e-003 | 0.40 |
| tblVehicleEF | MDV | 0.11 | 0.00 |
| tblVehicleEF | MDV | 0.16 | 1.7780e-003 |
| tblVehicleEF | MDV | 0.10 | 2.1000e-005 |
| tblVehicleEF | MDV | 0.03 | 0.10 |
| tblVehicleEF | MDV | 0.09 | 0.00 |
| tblVehicleEF | MDV | 5.0810e-003 | 1.33 |

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|---|---|---|---|
| tblVehicleEF | MDV | 1.0460e-003 | 2.64 |
| tblVehicleEF | MDV | 0.11 | 93.07 |
| tblVehicleEF | MDV | 0.16 | 2.0580e-003 |
| tblVehicleEF | MDV | 0.00 | 4.4600e-004 |
| tblVehicleEF | MDV | 0.10 | 7.9160e-003 |
| tblVehicleEF | MDV | 0.04 | 0.02 |
| tblVehicleEF | MDV | 0.09 | 8.0020e-003 |
| tblVehicleEF | MDV | 0.17 | 0.00 |
| tblVehicleEF | MDV | 0.00 | 0.09 |
| tblVehicleEF | MDV | 0.01 | 0.00 |
| tblVehicleEF | MDV | 0.01 | 0.15 |
| tblVehicleEF | MDV | 0.00 | 17.99 |
| tblVehicleEF | MDV | 1.13 | 0.00 |
| tblVehicleEF | MDV | 2.35 | 6.4530e-003 |
| tblVehicleEF | MDV | 0.00 | 7.5770e-003 |
| tblVehicleEF | MDV | 476.03 | 0.00 |
| tblVehicleEF | MDV | 101.24 | 0.03 |
| tblVehicleEF | MDV | 0.00 | 0.02 |
| tblVehicleEF | MDV | 0.12 | 0.00 |
| tblVehicleEF | MDV | 0.21 | 9.7530e-003 |
| tblVehicleEF | MDV | 0.00 | 0.09 |
| tblVehicleEF | MDV | 0.04 | 0.00 |
| tblVehicleEF | MDV | 8.0000e-003 | 0.04 |
| tblVehicleEF | MDV | 2.1080e-003 | 0.50 |
| tblVehicleEF | MDV | 2.4110e-003 | 0.37 |
| tblVehicleEF | MDV | 0.00 | 0.03 |
| tblVehicleEF | MDV | 0.02 | 0.37 |
| tblVehicleEF | MDV | 2.0000e-003 | 0.40 |
| tblVehicleEF | MDV | 1.9430e-003 | 0.45 |

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|---|---|---|---|
| tblVehicleEF | MDV | 2.2170e-003 | 0.50 |
| tblVehicleEF | MDV | 0.07 | 0.00 |
| tblVehicleEF | MDV | 0.17 | 1.7780e-003 |
| tblVehicleEF | MDV | 0.07 | 2.1000e-005 |
| tblVehicleEF | MDV | 0.03 | 0.11 |
| tblVehicleEF | MDV | 0.11 | 0.00 |
| tblVehicleEF | MDV | 4.7660e-003 | 1.18 |
| tblVehicleEF | MDV | 1.0530e-003 | 3.21 |
| tblVehicleEF | MDV | 0.07 | 89.28 |
| tblVehicleEF | MDV | 0.17 | 2.0580e-003 |
| tblVehicleEF | MDV | 0.00 | 4.4600e-004 |
| tblVehicleEF | MDV | 0.07 | 7.9160e-003 |
| tblVehicleEF | MDV | 0.04 | 0.02 |
| tblVehicleEF | MDV | 0.11 | 8.0020e-003 |
| tblVehicleEF | MDV | 0.19 | 0.00 |
| tblVehicleEF | MH | 0.02 | 0.01 |
| tblVehicleEF | MH | 0.02 | 0.02 |
| tblVehicleEF | MH | 1.75 | 1.21 |
| tblVehicleEF | MH | 5.15 | 2.15 |
| tblVehicleEF | MH | 1,102.46 | 1,501.21 |
| tblVehicleEF | MH | 58.88 | 19.42 |
| tblVehicleEF | MH | 1.12 | 1.11 |
| tblVehicleEF | MH | 0.75 | 0.25 |
| tblVehicleEF | MH | 0.01 | 0.01 |
| tblVehicleEF | MH | 0.02 | 0.02 |
| tblVehicleEF | MH | 1.0110e-003 | 2.8400e-004 |
| tblVehicleEF | MH | 3.2180e-003 | 3.2450e-003 |
| tblVehicleEF | MH | 0.02 | 0.02 |
| tblVehicleEF | MH | 9.3000e-004 | 2.6100e-004 |

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|---|---|---|---|
| tblVehicleEF | MH | 0.93 | 0.84 |
| tblVehicleEF | MH | 0.06 | 0.06 |
| tblVehicleEF | MH | 0.38 | 0.35 |
| tblVehicleEF | MH | 0.07 | 0.06 |
| tblVehicleEF | MH | 0.02 | 1.46 |
| tblVehicleEF | MH | 0.30 | 0.10 |
| tblVehicleEF | MH | 0.01 | 0.01 |
| tblVehicleEF | MH | 6.7800e-004 | 1.9200e-004 |
| tblVehicleEF | MH | 0.93 | 0.84 |
| tblVehicleEF | MH | 0.06 | 0.06 |
| tblVehicleEF | MH | 0.38 | 0.35 |
| tblVehicleEF | MH | 0.10 | 0.08 |
| tblVehicleEF | MH | 0.02 | 1.46 |
| tblVehicleEF | MH | 0.33 | 0.11 |
| tblVehicleEF | MH | 0.00 | 0.92 |
| tblVehicleEF | MH | 0.02 | 0.00 |
| tblVehicleEF | MH | 0.02 | 0.06 |
| tblVehicleEF | MH | 0.00 | 192.01 |
| tblVehicleEF | MH | 1.80 | 0.00 |
| tblVehicleEF | MH | 4.84 | 0.01 |
| tblVehicleEF | MH | 0.00 | 0.27 |
| tblVehicleEF | MH | 1,102.46 | 0.00 |
| tblVehicleEF | MH | 58.88 | 0.06 |
| tblVehicleEF | MH | 0.00 | 0.22 |
| tblVehicleEF | MH | 1.04 | 0.00 |
| tblVehicleEF | MH | 0.72 | 0.05 |
| tblVehicleEF | MH | 0.00 | 0.50 |
| tblVehicleEF | MH | 0.13 | 0.00 |
| tblVehicleEF | MH | 0.01 | 0.08 |

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|---|---|---|---|
| tblVehicleEF | MH | 0.02 | 1.42 |
| tblVehicleEF | MH | 1.0110e-003 | 0.12 |
| tblVehicleEF | MH | 0.00 | 0.60 |
| tblVehicleEF | MH | 0.06 | 0.12 |
| tblVehicleEF | MH | 3.2180e-003 | 0.05 |
| tblVehicleEF | MH | 0.02 | 0.10 |
| tblVehicleEF | MH | 9.3000e-004 | 1.43 |
| tblVehicleEF | MH | 1.40 | 0.03 |
| tblVehicleEF | MH | 0.06 | 0.02 |
| tblVehicleEF | MH | 0.58 | 2.6060e-003 |
| tblVehicleEF | MH | 0.07 | 1.03 |
| tblVehicleEF | MH | 0.02 | 0.00 |
| tblVehicleEF | MH | 0.28 | 0.24 |
| tblVehicleEF | MH | 0.01 | 1.24 |
| tblVehicleEF | MH | 6.7300e-004 | 2.03 |
| tblVehicleEF | MH | 1.40 | 15,054.74 |
| tblVehicleEF | MH | 0.06 | 2.8400e-004 |
| tblVehicleEF | MH | 0.00 | 0.19 |
| tblVehicleEF | MH | 0.58 | 1.30 |
| tblVehicleEF | MH | 0.10 | 0.06 |
| tblVehicleEF | MH | 0.02 | 0.01 |
| tblVehicleEF | MH | 0.31 | 0.00 |
| tblVehicleEF | MH | 0.00 | 0.97 |
| tblVehicleEF | MH | 0.02 | 0.00 |
| tblVehicleEF | MH | 0.02 | 0.07 |
| tblVehicleEF | MH | 0.00 | 194.46 |
| tblVehicleEF | MH | 1.74 | 0.00 |
| tblVehicleEF | MH | 5.19 | 0.01 |
| tblVehicleEF | MH | 0.00 | 0.28 |

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|---|---|---|---|
| tblVehicleEF | MH | 1,102.46 | 0.00 |
| tblVehicleEF | MH | 58.88 | 0.06 |
| tblVehicleEF | MH | 0.00 | 0.24 |
| tblVehicleEF | MH | 1.10 | 0.00 |
| tblVehicleEF | MH | 0.75 | 0.05 |
| tblVehicleEF | MH | 0.00 | 0.36 |
| tblVehicleEF | MH | 0.13 | 0.00 |
| tblVehicleEF | MH | 0.01 | 0.08 |
| tblVehicleEF | MH | 0.02 | 1.53 |
| tblVehicleEF | MH | 1.0110e-003 | 0.09 |
| tblVehicleEF | MH | 0.00 | 0.71 |
| tblVehicleEF | MH | 0.06 | 0.09 |
| tblVehicleEF | MH | 3.2180e-003 | 0.04 |
| tblVehicleEF | MH | 0.02 | 0.11 |
| tblVehicleEF | MH | 9.3000e-004 | 1.54 |
| tblVehicleEF | MH | 1.03 | 0.03 |
| tblVehicleEF | MH | 0.08 | 0.02 |
| tblVehicleEF | MH | 0.40 | 2.6060e-003 |
| tblVehicleEF | MH | 0.07 | 1.09 |
| tblVehicleEF | MH | 0.02 | 0.00 |
| tblVehicleEF | MH | 0.30 | 0.25 |
| tblVehicleEF | MH | 0.01 | 1.20 |
| tblVehicleEF | MH | 6.7900e-004 | 2.18 |
| tblVehicleEF | MH | 1.03 | 15,054.02 |
| tblVehicleEF | MH | 0.08 | 2.8400e-004 |
| tblVehicleEF | MH | 0.00 | 0.19 |
| tblVehicleEF | MH | 0.40 | 1.30 |
| tblVehicleEF | MH | 0.10 | 0.06 |
| tblVehicleEF | MH | 0.02 | 0.01 |

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|---|---|---|---|
| tblVehicleEF | MH | 0.33 | 0.00 |
| tblVehicleEF | MHD | 0.02 | 4.3860e-003 |
| tblVehicleEF | MHD | 3.3120e-003 | 4.5970e-003 |
| tblVehicleEF | MHD | 0.05 | 0.01 |
| tblVehicleEF | MHD | 0.34 | 0.39 |
| tblVehicleEF | MHD | 0.28 | 0.47 |
| tblVehicleEF | MHD | 5.26 | 1.42 |
| tblVehicleEF | MHD | 138.52 | 67.37 |
| tblVehicleEF | MHD | 1,128.29 | 1,069.65 |
| tblVehicleEF | MHD | 59.14 | 12.05 |
| tblVehicleEF | MHD | 0.37 | 0.48 |
| tblVehicleEF | MHD | 0.70 | 1.63 |
| tblVehicleEF | MHD | 10.62 | 1.29 |
| tblVehicleEF | MHD | 1.0200e-004 | 1.0770e-003 |
| tblVehicleEF | MHD | 2.8190e-003 | 0.03 |
| tblVehicleEF | MHD | 7.6400e-004 | 1.3700e-004 |
| tblVehicleEF | MHD | 9.8000e-005 | 1.0300e-003 |
| tblVehicleEF | MHD | 2.6930e-003 | 0.03 |
| tblVehicleEF | MHD | 7.0300e-004 | 1.2600e-004 |
| tblVehicleEF | MHD | 1.0280e-003 | 6.6200e-004 |
| tblVehicleEF | MHD | 0.04 | 0.03 |
| tblVehicleEF | MHD | 0.02 | 0.02 |
| tblVehicleEF | MHD | 6.7100e-004 | 4.2600e-004 |
| tblVehicleEF | MHD | 0.03 | 0.06 |
| tblVehicleEF | MHD | 0.02 | 0.14 |
| tblVehicleEF | MHD | 0.32 | 0.07 |
| tblVehicleEF | MHD | 1.3330e-003 | 6.4000e-004 |
| tblVehicleEF | MHD | 0.01 | 0.01 |
| tblVehicleEF | MHD | 6.8400e-004 | 1.1900e-004 |

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|---|---|---|---|
| tblVehicleEF | MHD | 1.0280e-003 | 6.6200e-004 |
| tblVehicleEF | MHD | 0.04 | 0.03 |
| tblVehicleEF | MHD | 0.03 | 0.03 |
| tblVehicleEF | MHD | 6.7100e-004 | 4.2600e-004 |
| tblVehicleEF | MHD | 0.04 | 0.07 |
| tblVehicleEF | MHD | 0.02 | 0.14 |
| tblVehicleEF | MHD | 0.35 | 0.07 |
| tblVehicleEF | MHD | 0.01 | 3.1600e-003 |
| tblVehicleEF | MHD | 3.3570e-003 | 0.23 |
| tblVehicleEF | MHD | 0.04 | 0.03 |
| tblVehicleEF | MHD | 0.25 | 0.60 |
| tblVehicleEF | MHD | 0.28 | 801.62 |
| tblVehicleEF | MHD | 5.00 | 6.3020e-003 |
| tblVehicleEF | MHD | 146.72 | 4.4400e-004 |
| tblVehicleEF | MHD | 1,128.29 | 0.11 |
| tblVehicleEF | MHD | 59.14 | 0.06 |
| tblVehicleEF | MHD | 0.38 | 5.9500e-004 |
| tblVehicleEF | MHD | 0.66 | 0.04 |
| tblVehicleEF | MHD | 10.59 | 0.11 |
| tblVehicleEF | MHD | 8.6000e-005 | 6.0400e-004 |
| tblVehicleEF | MHD | 0.13 | 0.31 |
| tblVehicleEF | MHD | 0.01 | 0.07 |
| tblVehicleEF | MHD | 2.8190e-003 | 0.07 |
| tblVehicleEF | MHD | 7.6400e-004 | 0.02 |
| tblVehicleEF | MHD | 8.3000e-005 | 1.3950e-003 |
| tblVehicleEF | MHD | 0.06 | 0.01 |
| tblVehicleEF | MHD | 3.0000e-003 | 6.2570e-003 |
| tblVehicleEF | MHD | 2.6930e-003 | 0.04 |
| tblVehicleEF | MHD | 7.0300e-004 | 0.14 |

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|---|---|---|---|
| tblVehicleEF | MHD | 1.5610e-003 | 2.5700e-004 |
| tblVehicleEF | MHD | 0.04 | 0.03 |
| tblVehicleEF | MHD | 0.02 | 0.48 |
| tblVehicleEF | MHD | 9.8200e-004 | 6.0000e-006 |
| tblVehicleEF | MHD | 0.03 | 1.54 |
| tblVehicleEF | MHD | 0.02 | 8.5670e-003 |
| tblVehicleEF | MHD | 0.31 | 1.29 |
| tblVehicleEF | MHD | 1.4110e-003 | 0.32 |
| tblVehicleEF | MHD | 0.01 | 0.48 |
| tblVehicleEF | MHD | 6.7900e-004 | 1.35 |
| tblVehicleEF | MHD | 1.5610e-003 | 92.89 |
| tblVehicleEF | MHD | 0.04 | 1.3700e-004 |
| tblVehicleEF | MHD | 0.03 | 2.6640e-003 |
| tblVehicleEF | MHD | 9.8200e-004 | 0.01 |
| tblVehicleEF | MHD | 0.04 | 0.06 |
| tblVehicleEF | MHD | 0.02 | 0.01 |
| tblVehicleEF | MHD | 0.34 | 8.9540e-003 |
| tblVehicleEF | MHD | 0.02 | 3.3190e-003 |
| tblVehicleEF | MHD | 3.3000e-003 | 0.25 |
| tblVehicleEF | MHD | 0.05 | 0.03 |
| tblVehicleEF | MHD | 0.47 | 0.60 |
| tblVehicleEF | MHD | 0.28 | 779.65 |
| tblVehicleEF | MHD | 5.30 | 6.1700e-003 |
| tblVehicleEF | MHD | 127.19 | 4.5700e-004 |
| tblVehicleEF | MHD | 1,128.29 | 0.11 |
| tblVehicleEF | MHD | 59.14 | 0.06 |
| tblVehicleEF | MHD | 0.35 | 6.2100e-004 |
| tblVehicleEF | MHD | 0.69 | 0.05 |
| tblVehicleEF | MHD | 10.63 | 0.11 |

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|---|---|---|---|
| tblVehicleEF | MHD | 1.2500e-004 | 4.1600e-004 |
| tblVehicleEF | MHD | 0.13 | 0.34 |
| tblVehicleEF | MHD | 0.01 | 0.07 |
| tblVehicleEF | MHD | 2.8190e-003 | 0.08 |
| tblVehicleEF | MHD | 7.6400e-004 | 0.01 |
| tblVehicleEF | MHD | 1.1900e-004 | 1.4610e-003 |
| tblVehicleEF | MHD | 0.06 | 7.1060e-003 |
| tblVehicleEF | MHD | 3.0000e-003 | 4.3140e-003 |
| tblVehicleEF | MHD | 2.6930e-003 | 0.04 |
| tblVehicleEF | MHD | 7.0300e-004 | 0.16 |
| tblVehicleEF | MHD | 1.0490e-003 | 2.5700e-004 |
| tblVehicleEF | MHD | 0.04 | 0.03 |
| tblVehicleEF | MHD | 0.03 | 0.48 |
| tblVehicleEF | MHD | 6.6300e-004 | 6.0000e-006 |
| tblVehicleEF | MHD | 0.03 | 1.60 |
| tblVehicleEF | MHD | 0.02 | 0.01 |
| tblVehicleEF | MHD | 0.33 | 1.29 |
| tblVehicleEF | MHD | 1.2270e-003 | 0.49 |
| tblVehicleEF | MHD | 0.01 | 0.47 |
| tblVehicleEF | MHD | 6.8400e-004 | 1.44 |
| tblVehicleEF | MHD | 1.0490e-003 | 92.89 |
| tblVehicleEF | MHD | 0.04 | 1.3700e-004 |
| tblVehicleEF | MHD | 0.04 | 2.6640e-003 |
| tblVehicleEF | MHD | 6.6300e-004 | 0.01 |
| tblVehicleEF | MHD | 0.04 | 0.06 |
| tblVehicleEF | MHD | 0.02 | 0.01 |
| tblVehicleEF | MHD | 0.36 | 0.01 |
| tblVehicleEF | OBUS | 0.01 | 8.4810e-003 |
| tblVehicleEF | OBUS | 6.0680e-003 | 7.0170e-003 |

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|---|---|---|---|
| tblVehicleEF | OBUS | 0.03 | 0.02 |
| tblVehicleEF | OBUS | 0.25 | 0.60 |
| tblVehicleEF | OBUS | 0.45 | 0.79 |
| tblVehicleEF | OBUS | 5.23 | 2.39 |
| tblVehicleEF | OBUS | 92.13 | 94.60 |
| tblVehicleEF | OBUS | 1,229.05 | 1,392.48 |
| tblVehicleEF | OBUS | 68.41 | 19.23 |
| tblVehicleEF | OBUS | 0.19 | 0.46 |
| tblVehicleEF | OBUS | 0.64 | 1.57 |
| tblVehicleEF | OBUS | 2.34 | 0.76 |
| tblVehicleEF | OBUS | 1.8000e-005 | 7.9300e-004 |
| tblVehicleEF | OBUS | 2.5270e-003 | 0.02 |
| tblVehicleEF | OBUS | 8.5100e-004 | 1.9700e-004 |
| tblVehicleEF | OBUS | 1.7000e-005 | 7.5900e-004 |
| tblVehicleEF | OBUS | 2.4010e-003 | 0.02 |
| tblVehicleEF | OBUS | 7.8200e-004 | 1.8100e-004 |
| tblVehicleEF | OBUS | 1.4810e-003 | 1.8440e-003 |
| tblVehicleEF | OBUS | 0.02 | 0.02 |
| tblVehicleEF | OBUS | 0.03 | 0.06 |
| tblVehicleEF | OBUS | 7.8200e-004 | 9.4300e-004 |
| tblVehicleEF | OBUS | 0.04 | 0.06 |
| tblVehicleEF | OBUS | 0.04 | 0.26 |
| tblVehicleEF | OBUS | 0.33 | 0.11 |
| tblVehicleEF | OBUS | 8.9100e-004 | 9.0000e-004 |
| tblVehicleEF | OBUS | 0.01 | 0.01 |
| tblVehicleEF | OBUS | 7.7600e-004 | 1.9000e-004 |
| tblVehicleEF | OBUS | 1.4810e-003 | 1.8440e-003 |
| tblVehicleEF | OBUS | 0.02 | 0.02 |
| tblVehicleEF | OBUS | 0.05 | 0.07 |

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|---|---|---|---|
| tblVehicleEF | OBUS | 7.8200e-004 | 9.4300e-004 |
| tblVehicleEF | OBUS | 0.05 | 0.08 |
| tblVehicleEF | OBUS | 0.04 | 0.26 |
| tblVehicleEF | OBUS | 0.36 | 0.13 |
| tblVehicleEF | OBUS | 0.01 | 5.5090e-003 |
| tblVehicleEF | OBUS | 6.1800e-003 | 0.93 |
| tblVehicleEF | OBUS | 0.03 | 0.02 |
| tblVehicleEF | OBUS | 0.24 | 0.95 |
| tblVehicleEF | OBUS | 0.45 | 1,847.71 |
| tblVehicleEF | OBUS | 4.94 | 0.01 |
| tblVehicleEF | OBUS | 96.60 | 8.9700e-004 |
| tblVehicleEF | OBUS | 1,229.05 | 0.27 |
| tblVehicleEF | OBUS | 68.41 | 0.06 |
| tblVehicleEF | OBUS | 0.20 | 1.0490e-003 |
| tblVehicleEF | OBUS | 0.60 | 0.11 |
| tblVehicleEF | OBUS | 2.30 | 0.07 |
| tblVehicleEF | OBUS | 1.5000e-005 | 1.3250e-003 |
| tblVehicleEF | OBUS | 0.13 | 1.16 |
| tblVehicleEF | OBUS | 0.01 | 0.08 |
| tblVehicleEF | OBUS | 2.5270e-003 | 0.15 |
| tblVehicleEF | OBUS | 8.5100e-004 | 0.05 |
| tblVehicleEF | OBUS | 1.4000e-005 | 1.1330e-003 |
| tblVehicleEF | OBUS | 0.06 | 0.03 |
| tblVehicleEF | OBUS | 3.0000e-003 | 0.02 |
| tblVehicleEF | OBUS | 2.4010e-003 | 0.07 |
| tblVehicleEF | OBUS | 7.8200e-004 | 0.26 |
| tblVehicleEF | OBUS | 2.2200e-003 | 1.9300e-004 |
| tblVehicleEF | OBUS | 0.02 | 8.2800e-003 |
| tblVehicleEF | OBUS | 0.03 | 0.45 |

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|---|---|---|---|
| tblVehicleEF | OBUS | 1.1540e-003 | 9.0000e-006 |
| tblVehicleEF | OBUS | 0.04 | 1.47 |
| tblVehicleEF | OBUS | 0.04 | 6.3020e-003 |
| tblVehicleEF | OBUS | 0.31 | 0.75 |
| tblVehicleEF | OBUS | 9.3400e-004 | 0.58 |
| tblVehicleEF | OBUS | 0.01 | 0.80 |
| tblVehicleEF | OBUS | 7.7100e-004 | 2.26 |
| tblVehicleEF | OBUS | 2.2200e-003 | 94.66 |
| tblVehicleEF | OBUS | 0.02 | 1.9700e-004 |
| tblVehicleEF | OBUS | 0.05 | 8.5200e-004 |
| tblVehicleEF | OBUS | 1.1540e-003 | 8.3860e-003 |
| tblVehicleEF | OBUS | 0.05 | 0.06 |
| tblVehicleEF | OBUS | 0.04 | 0.01 |
| tblVehicleEF | OBUS | 0.34 | 6.5870e-003 |
| tblVehicleEF | OBUS | 0.01 | 5.7950e-003 |
| tblVehicleEF | OBUS | 6.0410e-003 | 0.89 |
| tblVehicleEF | OBUS | 0.03 | 0.02 |
| tblVehicleEF | OBUS | 0.25 | 0.96 |
| tblVehicleEF | OBUS | 0.45 | 1,854.49 |
| tblVehicleEF | OBUS | 5.28 | 0.01 |
| tblVehicleEF | OBUS | 85.94 | 9.2400e-004 |
| tblVehicleEF | OBUS | 1,229.05 | 0.27 |
| tblVehicleEF | OBUS | 68.41 | 0.06 |
| tblVehicleEF | OBUS | 0.18 | 1.1010e-003 |
| tblVehicleEF | OBUS | 0.63 | 0.11 |
| tblVehicleEF | OBUS | 2.34 | 0.07 |
| tblVehicleEF | OBUS | 2.1000e-005 | 9.2500e-004 |
| tblVehicleEF | OBUS | 0.13 | 1.11 |
| tblVehicleEF | OBUS | 0.01 | 0.08 |

| | | | |
|---|---|---|---|
| tblVehicleEF | OBUS | 2.5270e-003 | 0.16 |
| tblVehicleEF | OBUS | 8.5100e-004 | 0.04 |
| tblVehicleEF | OBUS | 2.0000e-005 | 1.1750e-003 |
| tblVehicleEF | OBUS | 0.06 | 0.02 |
| tblVehicleEF | OBUS | 3.0000e-003 | 0.01 |
| tblVehicleEF | OBUS | 2.4010e-003 | 0.07 |
| tblVehicleEF | OBUS | 7.8200e-004 | 0.28 |
| tblVehicleEF | OBUS | 1.5070e-003 | 1.9300e-004 |
| tblVehicleEF | OBUS | 0.02 | 8.2800e-003 |
| tblVehicleEF | OBUS | 0.03 | 0.47 |
| tblVehicleEF | OBUS | 7.7100e-004 | 9.0000e-006 |
| tblVehicleEF | OBUS | 0.04 | 1.54 |
| tblVehicleEF | OBUS | 0.04 | 8.9540e-003 |
| tblVehicleEF | OBUS | 0.33 | 0.76 |
| tblVehicleEF | OBUS | 8.3200e-004 | 0.62 |
| tblVehicleEF | OBUS | 0.01 | 0.79 |
| tblVehicleEF | OBUS | 7.7700e-004 | 2.42 |
| tblVehicleEF | OBUS | 1.5070e-003 | 94.65 |
| tblVehicleEF | OBUS | 0.02 | 1.9700e-004 |
| tblVehicleEF | OBUS | 0.05 | 8.5200e-004 |
| tblVehicleEF | OBUS | 7.7100e-004 | 8.3860e-003 |
| tblVehicleEF | OBUS | 0.05 | 0.06 |
| tblVehicleEF | OBUS | 0.04 | 0.01 |
| tblVehicleEF | OBUS | 0.36 | 9.3590e-003 |
| tblVehicleEF | SBUS | 0.83 | 0.07 |
| tblVehicleEF | SBUS | 0.01 | 7.0580e-003 |
| tblVehicleEF | SBUS | 0.06 | 6.2120e-003 |
| tblVehicleEF | SBUS | 8.05 | 2.77 |
| tblVehicleEF | SBUS | 0.70 | 0.59 |

| | | | |
|---|---|---|---|
| tblVehicleEF | SBUS | 7.21 | 0.85 |
| tblVehicleEF | SBUS | 1,117.62 | 351.72 |
| tblVehicleEF | SBUS | 1,084.59 | 1,109.67 |
| tblVehicleEF | SBUS | 55.10 | 5.24 |
| tblVehicleEF | SBUS | 8.67 | 3.22 |
| tblVehicleEF | SBUS | 3.92 | 4.87 |
| tblVehicleEF | SBUS | 12.12 | 0.88 |
| tblVehicleEF | SBUS | 8.2760e-003 | 4.1230e-003 |
| tblVehicleEF | SBUS | 0.01 | 0.01 |
| tblVehicleEF | SBUS | 0.02 | 0.03 |
| tblVehicleEF | SBUS | 7.8500e-004 | 5.1000e-005 |
| tblVehicleEF | SBUS | 7.9180e-003 | 3.9440e-003 |
| tblVehicleEF | SBUS | 2.6790e-003 | 2.6820e-003 |
| tblVehicleEF | SBUS | 0.02 | 0.03 |
| tblVehicleEF | SBUS | 7.2200e-004 | 4.7000e-005 |
| tblVehicleEF | SBUS | 3.5810e-003 | 9.0700e-004 |
| tblVehicleEF | SBUS | 0.03 | 7.8550e-003 |
| tblVehicleEF | SBUS | 0.96 | 0.32 |
| tblVehicleEF | SBUS | 1.9090e-003 | 4.8200e-004 |
| tblVehicleEF | SBUS | 0.10 | 0.10 |
| tblVehicleEF | SBUS | 0.01 | 0.05 |
| tblVehicleEF | SBUS | 0.38 | 0.04 |
| tblVehicleEF | SBUS | 0.01 | 3.3550e-003 |
| tblVehicleEF | SBUS | 0.01 | 0.01 |
| tblVehicleEF | SBUS | 6.7600e-004 | 5.2000e-005 |
| tblVehicleEF | SBUS | 3.5810e-003 | 9.0700e-004 |
| tblVehicleEF | SBUS | 0.03 | 7.8550e-003 |
| tblVehicleEF | SBUS | 1.38 | 0.46 |
| tblVehicleEF | SBUS | 1.9090e-003 | 4.8200e-004 |

| | | | |
|---|---|---|---|
| tblVehicleEF | SBUS | 0.12 | 0.11 |
| tblVehicleEF | SBUS | 0.01 | 0.05 |
| tblVehicleEF | SBUS | 0.42 | 0.04 |
| tblVehicleEF | SBUS | 0.83 | 7.9680e-003 |
| tblVehicleEF | SBUS | 0.01 | 3.57 |
| tblVehicleEF | SBUS | 0.06 | 7.9970e-003 |
| tblVehicleEF | SBUS | 7.94 | 1.24 |
| tblVehicleEF | SBUS | 0.71 | 3,371.97 |
| tblVehicleEF | SBUS | 5.75 | 5.9880e-003 |
| tblVehicleEF | SBUS | 1,167.88 | 1.4740e-003 |
| tblVehicleEF | SBUS | 1,084.59 | 0.43 |
| tblVehicleEF | SBUS | 55.10 | 0.11 |
| tblVehicleEF | SBUS | 8.95 | 1.3830e-003 |
| tblVehicleEF | SBUS | 3.70 | 0.78 |
| tblVehicleEF | SBUS | 12.09 | 0.17 |
| tblVehicleEF | SBUS | 6.9770e-003 | 6.7400e-004 |
| tblVehicleEF | SBUS | 0.74 | 5.14 |
| tblVehicleEF | SBUS | 0.01 | 0.11 |
| tblVehicleEF | SBUS | 0.02 | 0.13 |
| tblVehicleEF | SBUS | 7.8500e-004 | 5.2810e-003 |
| tblVehicleEF | SBUS | 6.6750e-003 | 1.9990e-003 |
| tblVehicleEF | SBUS | 0.32 | 0.02 |
| tblVehicleEF | SBUS | 2.6790e-003 | 7.7120e-003 |
| tblVehicleEF | SBUS | 0.02 | 0.10 |
| tblVehicleEF | SBUS | 7.2200e-004 | 0.05 |
| tblVehicleEF | SBUS | 5.4810e-003 | 2.8700e-004 |
| tblVehicleEF | SBUS | 0.03 | 0.04 |
| tblVehicleEF | SBUS | 0.95 | 3.29 |
| tblVehicleEF | SBUS | 2.8990e-003 | 1.2000e-005 |

| | | | |
|---|---|---|---|
| tblVehicleEF | SBUS | 0.10 | 4.59 |
| tblVehicleEF | SBUS | 0.01 | 0.04 |
| tblVehicleEF | SBUS | 0.34 | 0.87 |
| tblVehicleEF | SBUS | 0.01 | 2.74 |
| tblVehicleEF | SBUS | 0.01 | 0.60 |
| tblVehicleEF | SBUS | 6.5100e-004 | 0.69 |
| tblVehicleEF | SBUS | 5.4810e-003 | 118.27 |
| tblVehicleEF | SBUS | 0.03 | 5.1000e-005 |
| tblVehicleEF | SBUS | 1.38 | 3.2450e-003 |
| tblVehicleEF | SBUS | 2.8990e-003 | 0.08 |
| tblVehicleEF | SBUS | 0.12 | 0.32 |
| tblVehicleEF | SBUS | 0.01 | 0.01 |
| tblVehicleEF | SBUS | 0.37 | 0.04 |
| tblVehicleEF | SBUS | 0.83 | 9.1700e-003 |
| tblVehicleEF | SBUS | 0.01 | 3.57 |
| tblVehicleEF | SBUS | 0.06 | 8.2560e-003 |
| tblVehicleEF | SBUS | 8.20 | 1.32 |
| tblVehicleEF | SBUS | 0.70 | 3,202.19 |
| tblVehicleEF | SBUS | 7.43 | 5.9530e-003 |
| tblVehicleEF | SBUS | 1,048.22 | 1.5370e-003 |
| tblVehicleEF | SBUS | 1,084.59 | 0.40 |
| tblVehicleEF | SBUS | 55.10 | 0.11 |
| tblVehicleEF | SBUS | 8.29 | 1.5910e-003 |
| tblVehicleEF | SBUS | 3.86 | 0.77 |
| tblVehicleEF | SBUS | 12.12 | 0.17 |
| tblVehicleEF | SBUS | 0.01 | 4.6300e-004 |
| tblVehicleEF | SBUS | 0.74 | 5.15 |
| tblVehicleEF | SBUS | 0.01 | 0.11 |
| tblVehicleEF | SBUS | 0.02 | 0.18 |

| | | | |
|---|---|---|---|
| tblVehicleEF | SBUS | 7.8500e-004 | 3.6810e-003 |
| tblVehicleEF | SBUS | 9.6340e-003 | 2.0640e-003 |
| tblVehicleEF | SBUS | 0.32 | 0.01 |
| tblVehicleEF | SBUS | 2.6790e-003 | 5.2960e-003 |
| tblVehicleEF | SBUS | 0.02 | 0.11 |
| tblVehicleEF | SBUS | 7.2200e-004 | 0.06 |
| tblVehicleEF | SBUS | 3.5300e-003 | 2.8700e-004 |
| tblVehicleEF | SBUS | 0.03 | 0.04 |
| tblVehicleEF | SBUS | 0.96 | 3.13 |
| tblVehicleEF | SBUS | 1.8720e-003 | 1.2000e-005 |
| tblVehicleEF | SBUS | 0.10 | 4.79 |
| tblVehicleEF | SBUS | 0.02 | 0.06 |
| tblVehicleEF | SBUS | 0.39 | 0.88 |
| tblVehicleEF | SBUS | 0.01 | 2.83 |
| tblVehicleEF | SBUS | 0.01 | 0.58 |
| tblVehicleEF | SBUS | 6.7900e-004 | 0.88 |
| tblVehicleEF | SBUS | 3.5300e-003 | 118.27 |
| tblVehicleEF | SBUS | 0.03 | 5.1000e-005 |
| tblVehicleEF | SBUS | 1.39 | 3.2450e-003 |
| tblVehicleEF | SBUS | 1.8720e-003 | 0.08 |
| tblVehicleEF | SBUS | 0.12 | 0.32 |
| tblVehicleEF | SBUS | 0.02 | 0.01 |
| tblVehicleEF | SBUS | 0.43 | 0.06 |
| tblVehicleEF | UBUS | 2.23 | 5.80 |
| tblVehicleEF | UBUS | 0.06 | 0.01 |
| tblVehicleEF | UBUS | 10.02 | 45.07 |
| tblVehicleEF | UBUS | 10.14 | 0.71 |
| tblVehicleEF | UBUS | 1,910.27 | 1,988.80 |
| tblVehicleEF | UBUS | 112.81 | 8.53 |

| | | | |
|---|---|---|---|
| tblVehicleEF | UBUS | 7.96 | 0.48 |
| tblVehicleEF | UBUS | 14.44 | 0.08 |
| tblVehicleEF | UBUS | 0.58 | 0.07 |
| tblVehicleEF | UBUS | 0.01 | 0.03 |
| tblVehicleEF | UBUS | 0.10 | 3.2120e-003 |
| tblVehicleEF | UBUS | 1.2160e-003 | 4.6000e-005 |
| tblVehicleEF | UBUS | 0.25 | 0.03 |
| tblVehicleEF | UBUS | 3.0000e-003 | 7.9830e-003 |
| tblVehicleEF | UBUS | 0.10 | 3.0700e-003 |
| tblVehicleEF | UBUS | 1.1180e-003 | 4.2000e-005 |
| tblVehicleEF | UBUS | 4.9050e-003 | 6.1100e-004 |
| tblVehicleEF | UBUS | 0.08 | 8.4590e-003 |
| tblVehicleEF | UBUS | 2.8380e-003 | 4.9000e-004 |
| tblVehicleEF | UBUS | 0.70 | 0.08 |
| tblVehicleEF | UBUS | 0.03 | 0.05 |
| tblVehicleEF | UBUS | 0.79 | 0.05 |
| tblVehicleEF | UBUS | 9.5820e-003 | 1.5580e-003 |
| tblVehicleEF | UBUS | 1.3110e-003 | 8.4000e-005 |
| tblVehicleEF | UBUS | 4.9050e-003 | 6.1100e-004 |
| tblVehicleEF | UBUS | 0.08 | 8.4590e-003 |
| tblVehicleEF | UBUS | 2.8380e-003 | 4.9000e-004 |
| tblVehicleEF | UBUS | 3.01 | 5.92 |
| tblVehicleEF | UBUS | 0.03 | 0.05 |
| tblVehicleEF | UBUS | 0.86 | 0.05 |
| tblVehicleEF | UBUS | 0.00 | 0.01 |
| tblVehicleEF | UBUS | 2.23 | 0.00 |
| tblVehicleEF | UBUS | 0.05 | 8.7350e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.10 |
| tblVehicleEF | UBUS | 10.08 | 0.00 |

| | | | |
|---|---|---|---|
| tblVehicleEF | UBUS | 8.80 | 0.67 |
| tblVehicleEF | UBUS | 0.00 | 1.7650e-003 |
| tblVehicleEF | UBUS | 1,910.27 | 0.00 |
| tblVehicleEF | UBUS | 112.81 | 2.0170e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.5820e-003 |
| tblVehicleEF | UBUS | 7.50 | 0.00 |
| tblVehicleEF | UBUS | 14.38 | 4.3400e-003 |
| tblVehicleEF | UBUS | 0.00 | 6.8000e-004 |
| tblVehicleEF | UBUS | 0.58 | 0.00 |
| tblVehicleEF | UBUS | 0.01 | 5.92 |
| tblVehicleEF | UBUS | 0.10 | 0.03 |
| tblVehicleEF | UBUS | 1.2160e-003 | 3.5700e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.1840e-003 |
| tblVehicleEF | UBUS | 0.25 | 2.5140e-003 |
| tblVehicleEF | UBUS | 3.0000e-003 | 1.9150e-003 |
| tblVehicleEF | UBUS | 0.10 | 0.03 |
| tblVehicleEF | UBUS | 1.1180e-003 | 0.05 |
| tblVehicleEF | UBUS | 7.1810e-003 | 9.1000e-005 |
| tblVehicleEF | UBUS | 0.08 | 1.5700e-004 |
| tblVehicleEF | UBUS | 4.1630e-003 | 1.0000e-005 |
| tblVehicleEF | UBUS | 0.71 | 0.48 |
| tblVehicleEF | UBUS | 0.02 | 0.00 |
| tblVehicleEF | UBUS | 0.72 | 0.08 |
| tblVehicleEF | UBUS | 9.5830e-003 | 45.07 |
| tblVehicleEF | UBUS | 1.2880e-003 | 0.62 |
| tblVehicleEF | UBUS | 7.1810e-003 | 53.30 |
| tblVehicleEF | UBUS | 0.08 | 4.6000e-005 |
| tblVehicleEF | UBUS | 0.00 | 4.2000e-005 |
| tblVehicleEF | UBUS | 4.1630e-003 | 3.2690e-003 |

| | | | |
|---|---|---|---|
| tblVehicleEF | UBUS | 3.02 | 0.03 |
| tblVehicleEF | UBUS | 0.02 | 1.4510e-003 |
| tblVehicleEF | UBUS | 0.79 | 0.00 |
| tblVehicleEF | UBUS | 0.00 | 0.01 |
| tblVehicleEF | UBUS | 2.23 | 0.00 |
| tblVehicleEF | UBUS | 0.06 | 9.0200e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.14 |
| tblVehicleEF | UBUS | 10.01 | 0.00 |
| tblVehicleEF | UBUS | 10.32 | 0.67 |
| tblVehicleEF | UBUS | 0.00 | 1.8120e-003 |
| tblVehicleEF | UBUS | 1,910.27 | 0.00 |
| tblVehicleEF | UBUS | 112.81 | 1.9670e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.8220e-003 |
| tblVehicleEF | UBUS | 7.81 | 0.00 |
| tblVehicleEF | UBUS | 14.45 | 4.5080e-003 |
| tblVehicleEF | UBUS | 0.00 | 4.6500e-004 |
| tblVehicleEF | UBUS | 0.58 | 0.00 |
| tblVehicleEF | UBUS | 0.01 | 5.92 |
| tblVehicleEF | UBUS | 0.10 | 0.05 |
| tblVehicleEF | UBUS | 1.2160e-003 | 2.3810e-003 |
| tblVehicleEF | UBUS | 0.00 | 2.2550e-003 |
| tblVehicleEF | UBUS | 0.25 | 1.6770e-003 |
| tblVehicleEF | UBUS | 3.0000e-003 | 1.3100e-003 |
| tblVehicleEF | UBUS | 0.10 | 0.04 |
| tblVehicleEF | UBUS | 1.1180e-003 | 0.07 |
| tblVehicleEF | UBUS | 5.4680e-003 | 9.1000e-005 |
| tblVehicleEF | UBUS | 0.09 | 1.5700e-004 |
| tblVehicleEF | UBUS | 2.9720e-003 | 1.0000e-005 |
| tblVehicleEF | UBUS | 0.70 | 0.48 |

| | | | |
|---|---|---|---|
| tblVehicleEF | UBUS | 0.03 | 0.00 |
| tblVehicleEF | UBUS | 0.80 | 0.08 |
| tblVehicleEF | UBUS | 9.5820e-003 | 45.07 |
| tblVehicleEF | UBUS | 1.3140e-003 | 0.72 |
| tblVehicleEF | UBUS | 5.4680e-003 | 53.30 |
| tblVehicleEF | UBUS | 0.09 | 4.6000e-005 |
| tblVehicleEF | UBUS | 0.00 | 4.2000e-005 |
| tblVehicleEF | UBUS | 2.9720e-003 | 3.2690e-003 |
| tblVehicleEF | UBUS | 3.01 | 0.03 |
| tblVehicleEF | UBUS | 0.03 | 1.4510e-003 |
| tblVehicleEF | UBUS | 0.88 | 0.00 |
| tblVehicleTrips | SU_TR | 16.74 | 19.50 |
| tblVehicleTrips | WD_TR | 1.89 | 34.00 |

## 2.0 Emissions Summary

### 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.9524 | 48.0517 | 33.8922 | 0.0876 | 6.5307 | 2.0342 | 8.1361 | 3.4393 | 1.8716 | 4.9168 | 0.0000 | 8,537.9731 | 8,537.9731 | 2.4986 | 0.0000 | 8,600.4389 |
| 2022 | 4.2600 | 38.9398 | 31.8342 | 0.0874 | 0.6294 | 1.6168 | 2.2462 | 0.1695 | 1.4876 | 1.6571 | 0.0000 | 8,520.1286 | 8,520.1286 | 2.4974 | 0.0000 | 8,582.5633 |
| **Maximum** | **4.9524** | **48.0517** | **33.8922** | **0.0876** | **6.5307** | **2.0342** | **8.1361** | **3.4393** | **1.8716** | **4.9168** | **0.0000** | **8,537.9731** | **8,537.9731** | **2.4986** | **0.0000** | **8,600.4389** |

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.9524 | 48.0517 | 33.8922 | 0.0876 | 2.8249 | 2.0342 | 4.4303 | 1.4166 | 1.8716 | 2.8941 | 0.0000 | 8,537.9731 | 8,537.9731 | 2.4986 | 0.0000 | 8,600.4389 |
| 2022 | 4.2600 | 38.9398 | 31.8342 | 0.0874 | 0.6294 | 1.6168 | 2.2462 | 0.1695 | 1.4876 | 1.6571 | 0.0000 | 8,520.1286 | 8,520.1286 | 2.4974 | 0.0000 | 8,582.5632 |
| **Maximum** | **4.9524** | **48.0517** | **33.8922** | **0.0876** | **2.8249** | **2.0342** | **4.4303** | **1.4166** | **1.8716** | **2.8941** | **0.0000** | **8,537.9731** | **8,537.9731** | **2.4986** | **0.0000** | **8,600.4389** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **51.76** | **0.00** | **35.69** | **56.05** | **0.00** | **30.77** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 5.6300e-003 | 0.0000 | 2.6000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 5.5000e-004 | 5.5000e-004 | 0.0000 | | 5.8000e-004 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.3691 | 0.0185 | 472.5784 | 1.9533 | 0.7413 | 0.5997 | 1.3410 | 0.9324 | 0.5107 | 1.4431 | | 0.0803 | 0.0803 | 0.2182 | | 5.5360 |
| **Total** | **0.3747** | **0.0185** | **472.5786** | **1.9533** | **0.7413** | **0.5997** | **1.3410** | **0.9324** | **0.5107** | **1.4431** | | **0.0809** | **0.0809** | **0.2182** | **0.0000** | **5.5366** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 5.6300e-003 | 0.0000 | 2.6000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 5.5000e-004 | 5.5000e-004 | 0.0000 | | 5.8000e-004 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.3691 | 0.0185 | 472.5784 | 1.9533 | 0.7413 | 0.5997 | 1.3410 | 0.9324 | 0.5107 | 1.4431 | | 0.0803 | 0.0803 | 0.2182 | | 5.5360 |
| **Total** | **0.3747** | **0.0185** | **472.5786** | **1.9533** | **0.7413** | **0.5997** | **1.3410** | **0.9324** | **0.5107** | **1.4431** | | **0.0809** | **0.0809** | **0.2182** | **0.0000** | **5.5366** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

### Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Clearing and Grubbing | Site Preparation | 7/1/2021 | 7/28/2021 | 5 | 20 | |
| 2 | Grading | Grading | 7/29/2021 | 10/20/2021 | 5 | 60 | |
| 3 | Paving and Construction | Building Construction | 10/21/2021 | 2/9/2022 | 5 | 80 | |
| 4 | Landscaping | Building Construction | 2/10/2022 | 6/15/2022 | 5 | 90 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 3**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0**

## OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Clearing and Grubbing | Excavators | 1 | 8.00 | 158 | 0.38 |
| Clearing and Grubbing | Graders | 0 | 8.00 | 187 | 0.41 |
| Clearing and Grubbing | Off-Highway Trucks | 2 | 8.00 | 402 | 0.38 |
| Clearing and Grubbing | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Clearing and Grubbing | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Clearing and Grubbing | Sweepers/Scrubbers | 1 | 8.00 | 64 | 0.46 |
| Clearing and Grubbing | Tractors/Loaders/Backhoes | 1 | 7.00 | 97 | 0.37 |
| Grading | Excavators | 1 | 8.00 | 158 | 0.38 |
| Grading | Graders | 0 | 8.00 | 187 | 0.41 |
| Grading | Off-Highway Trucks | 2 | 8.00 | 402 | 0.38 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 1 | 8.00 | 367 | 0.48 |
| Grading | Sweepers/Scrubbers | 1 | 8.00 | 64 | 0.46 |
| Grading | Tractors/Loaders/Backhoes | 0 | 7.00 | 97 | 0.37 |
| Paving and Construction | Cranes | 0 | 8.00 | 231 | 0.29 |
| Paving and Construction | Excavators | 1 | 8.00 | 158 | 0.38 |
| Paving and Construction | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Paving and Construction | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Paving and Construction | Off-Highway Trucks | 3 | 8.00 | 402 | 0.38 |
| Paving and Construction | Pavers | 1 | 8.00 | 130 | 0.42 |
| Paving and Construction | Rollers | 1 | 8.00 | 80 | 0.38 |
| Paving and Construction | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Paving and Construction | Scrapers | 1 | 8.00 | 367 | 0.48 |
| Paving and Construction | Sweepers/Scrubbers | 1 | 8.00 | 64 | 0.46 |
| Paving and Construction | Tractors/Loaders/Backhoes | 0 | 6.00 | 97 | 0.37 |
| Paving and Construction | Welders | 0 | 8.00 | 46 | 0.45 |
| Landscaping | Air Compressors | 0 | 6.00 | 78 | 0.48 |

| | | | | | |
|---|---|---|---|---|---|
| Landscaping | Cranes | 0 | 8.00 | 231 | 0.29 |
| Landscaping | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Landscaping | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Landscaping | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Landscaping | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Landscaping | Welders | 0 | 8.00 | 46 | 0.45 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Clearing and Grubbing | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 6 | 15.00 | 0.00 | 989.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving and Construction | 9 | 46.00 | 18.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Landscaping | 2 | 46.00 | 10.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

## 3.2 Clearing and Grubbing - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 6.2607 | 0.0000 | 6.2607 | 3.3360 | 0.0000 | 3.3360 | | | 0.0000 | | | 0.0000 |
| Off-Road | 2.8798 | 27.3674 | 18.4470 | 0.0454 | | 1.2721 | 1.2721 | | 1.1704 | 1.1704 | | 4,394.0541 | 4,394.0541 | 1.4211 | | 4,429.5823 |
| **Total** | **2.8798** | **27.3674** | **18.4470** | **0.0454** | **6.2607** | **1.2721** | **7.5328** | **3.3360** | **1.1704** | **4.5063** | | **4,394.0541** | **4,394.0541** | **1.4211** | | **4,429.5823** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0692 | 0.0450 | 0.5098 | 1.5600e-003 | 0.1677 | 1.2400e-003 | 0.1689 | 0.0445 | 1.1400e-003 | 0.0456 | | 155.7227 | 155.7227 | 4.1900e-003 | | 155.8274 |
| **Total** | **0.0692** | **0.0450** | **0.5098** | **1.5600e-003** | **0.1677** | **1.2400e-003** | **0.1689** | **0.0445** | **1.1400e-003** | **0.0456** | | **155.7227** | **155.7227** | **4.1900e-003** | | **155.8274** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 2.4417 | 0.0000 | 2.4417 | 1.3010 | 0.0000 | 1.3010 | | | 0.0000 | | | 0.0000 |
| Off-Road | 2.8798 | 27.3674 | 18.4470 | 0.0454 | | 1.2721 | 1.2721 | | 1.1704 | 1.1704 | 0.0000 | 4,394.0541 | 4,394.0541 | 1.4211 | | 4,429.5823 |
| **Total** | **2.8798** | **27.3674** | **18.4470** | **0.0454** | **2.4417** | **1.2721** | **3.7138** | **1.3010** | **1.1704** | **2.4714** | **0.0000** | **4,394.0541** | **4,394.0541** | **1.4211** | | **4,429.5823** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0692 | 0.0450 | 0.5098 | 1.5600e-003 | 0.1677 | 1.2400e-003 | 0.1689 | 0.0445 | 1.1400e-003 | 0.0456 | | 155.7227 | 155.7227 | 4.1900e-003 | | 155.8274 |
| **Total** | **0.0692** | **0.0450** | **0.5098** | **1.5600e-003** | **0.1677** | **1.2400e-003** | **0.1689** | **0.0445** | **1.1400e-003** | **0.0456** | | **155.7227** | **155.7227** | **4.1900e-003** | | **155.8274** |

## 3.3 Grading - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 6.0751 | 0.0000 | 6.0751 | 3.3160 | 0.0000 | 3.3160 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6454 | 36.4114 | 23.4740 | 0.0578 | | 1.5907 | 1.5907 | | 1.4634 | 1.4634 | | 5,598.6781 | 5,598.6781 | 1.8107 | | 5,643.9462 |
| **Total** | **3.6454** | **36.4114** | **23.4740** | **0.0578** | **6.0751** | **1.5907** | **7.6658** | **3.3160** | **1.4634** | **4.7794** | | **5,598.6781** | **5,598.6781** | **1.8107** | | **5,643.9462** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1285 | 4.3265 | 1.0058 | 0.0124 | 0.2879 | 0.0135 | 0.3014 | 0.0789 | 0.0129 | 0.0918 | | 1,349.9133 | 1,349.9133 | 0.1004 | | 1,352.4238 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0692 | 0.0450 | 0.5098 | 1.5600e-003 | 0.1677 | 1.2400e-003 | 0.1689 | 0.0445 | 1.1400e-003 | 0.0456 | | 155.7227 | 155.7227 | 4.1900e-003 | | 155.8274 |
| **Total** | **0.1977** | **4.3715** | **1.5156** | **0.0140** | **0.4556** | **0.0148** | **0.4703** | **0.1234** | **0.0141** | **0.1374** | | **1,505.6360** | **1,505.6360** | **0.1046** | | **1,508.2512** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 2.3693 | 0.0000 | 2.3693 | 1.2932 | 0.0000 | 1.2932 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6454 | 36.4114 | 23.4740 | 0.0578 | | 1.5907 | 1.5907 | | 1.4634 | 1.4634 | 0.0000 | 5,598.6781 | 5,598.6781 | 1.8107 | | 5,643.9462 |
| **Total** | **3.6454** | **36.4114** | **23.4740** | **0.0578** | **2.3693** | **1.5907** | **3.9600** | **1.2932** | **1.4634** | **2.7567** | **0.0000** | **5,598.6781** | **5,598.6781** | **1.8107** | | **5,643.9462** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1285 | 4.3265 | 1.0058 | 0.0124 | 0.2879 | 0.0135 | 0.3014 | 0.0789 | 0.0129 | 0.0918 | | 1,349.9133 | 1,349.9133 | 0.1004 | | 1,352.4238 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0692 | 0.0450 | 0.5098 | 1.5600e-003 | 0.1677 | 1.2400e-003 | 0.1689 | 0.0445 | 1.1400e-003 | 0.0456 | | 155.7227 | 155.7227 | 4.1900e-003 | | 155.8274 |
| **Total** | **0.1977** | **4.3715** | **1.5156** | **0.0140** | **0.4556** | **0.0148** | **0.4703** | **0.1234** | **0.0141** | **0.1374** | | **1,505.6360** | **1,505.6360** | **0.1046** | | **1,508.2512** |

## 3.4 Paving and Construction - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 4.6870 | 46.1940 | 31.8636 | 0.0783 | | 2.0268 | 2.0268 | | 1.8647 | 1.8647 | | 7,586.3508 | 7,586.3508 | 2.4536 | | 7,647.6903 |
| **Total** | **4.6870** | **46.1940** | **31.8636** | **0.0783** | | **2.0268** | **2.0268** | | **1.8647** | **1.8647** | | **7,586.3508** | **7,586.3508** | **2.4536** | | **7,647.6903** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0532 | 1.7198 | 0.4653 | 4.4300e-003 | 0.1152 | 3.6300e-003 | 0.1188 | 0.0332 | 3.4700e-003 | 0.0366 | | 474.0728 | 474.0728 | 0.0322 | | 474.8780 |
| Worker | 0.2121 | 0.1379 | 1.5634 | 4.7900e-003 | 0.5142 | 3.8100e-003 | 0.5180 | 0.1364 | 3.5000e-003 | 0.1399 | | 477.5495 | 477.5495 | 0.0128 | | 477.8706 |
| **Total** | **0.2653** | **1.8577** | **2.0287** | **9.2200e-003** | **0.6294** | **7.4400e-003** | **0.6368** | **0.1695** | **6.9700e-003** | **0.1765** | | **951.6223** | **951.6223** | **0.0451** | | **952.7486** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 4.6870 | 46.1940 | 31.8636 | 0.0783 | | 2.0268 | 2.0268 | | 1.8647 | 1.8647 | 0.0000 | 7,586.3508 | 7,586.3508 | 2.4536 | | 7,647.6903 |
| **Total** | **4.6870** | **46.1940** | **31.8636** | **0.0783** | | **2.0268** | **2.0268** | | **1.8647** | **1.8647** | **0.0000** | **7,586.3508** | **7,586.3508** | **2.4536** | | **7,647.6903** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0532 | 1.7198 | 0.4653 | 4.4300e-003 | 0.1152 | 3.6300e-003 | 0.1188 | 0.0332 | 3.4700e-003 | 0.0366 | | 474.0728 | 474.0728 | 0.0322 | | 474.8780 |
| Worker | 0.2121 | 0.1379 | 1.5634 | 4.7900e-003 | 0.5142 | 3.8100e-003 | 0.5180 | 0.1364 | 3.5000e-003 | 0.1399 | | 477.5495 | 477.5495 | 0.0128 | | 477.8706 |
| **Total** | **0.2653** | **1.8577** | **2.0287** | **9.2200e-003** | **0.6294** | **7.4400e-003** | **0.6368** | **0.1695** | **6.9700e-003** | **0.1765** | | **951.6223** | **951.6223** | **0.0451** | | **952.7486** |

## 3.4 Paving and Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 4.0106 | 37.1829 | 29.9504 | 0.0784 | | 1.6100 | 1.6100 | | 1.4812 | 1.4812 | | 7,589.8386 | 7,589.8386 | 2.4547 | | 7,651.2063 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total** | **4.0106** | **37.1829** | **29.9504** | **0.0784** | | **1.6100** | **1.6100** | | **1.4812** | **1.4812** | | **7,589.8386** | **7,589.8386** | **2.4547** | | **7,651.2063** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0499 | 1.6323 | 0.4407 | 4.3900e-003 | 0.1152 | 3.1600e-003 | 0.1183 | 0.0332 | 3.0200e-003 | 0.0362 | | 469.8398 | 469.8398 | 0.0311 | | 470.6167 |
| Worker | 0.1995 | 0.1246 | 1.4432 | 4.6200e-003 | 0.5142 | 3.7000e-003 | 0.5179 | 0.1364 | 3.4000e-003 | 0.1398 | | 460.4503 | 460.4503 | 0.0116 | | 460.7403 |
| **Total** | **0.2495** | **1.7569** | **1.8839** | **9.0100e-003** | **0.6294** | **6.8600e-003** | **0.6362** | **0.1695** | **6.4200e-003** | **0.1759** | | **930.2901** | **930.2901** | **0.0427** | | **931.3570** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 4.0106 | 37.1829 | 29.9504 | 0.0784 | | 1.6100 | 1.6100 | | 1.4812 | 1.4812 | 0.0000 | 7,589.8386 | 7,589.8386 | 2.4547 | | 7,651.2063 |
| **Total** | **4.0106** | **37.1829** | **29.9504** | **0.0784** | | **1.6100** | **1.6100** | | **1.4812** | **1.4812** | **0.0000** | **7,589.8386** | **7,589.8386** | **2.4547** | | **7,651.2063** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0499 | 1.6323 | 0.4407 | 4.3900e-003 | 0.1152 | 3.1600e-003 | 0.1183 | 0.0332 | 3.0200e-003 | 0.0362 | | 469.8398 | 469.8398 | 0.0311 | | 470.6167 |
| Worker | 0.1995 | 0.1246 | 1.4432 | 4.6200e-003 | 0.5142 | 3.7000e-003 | 0.5179 | 0.1364 | 3.4000e-003 | 0.1398 | | 460.4503 | 460.4503 | 0.0116 | | 460.7403 |
| **Total** | **0.2495** | **1.7569** | **1.8839** | **9.0100e-003** | **0.6294** | **6.8600e-003** | **0.6362** | **0.1695** | **6.4200e-003** | **0.1759** | | **930.2901** | **930.2901** | **0.0427** | | **931.3570** |

## 3.5 Landscaping - 2022

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.2343 | 2.6042 | 3.6251 | 5.1800e-003 | | 0.1246 | 0.1246 | | 0.1147 | 0.1147 | | 501.6302 | 501.6302 | 0.1622 | | 505.6861 |
| **Total** | **0.2343** | **2.6042** | **3.6251** | **5.1800e-003** | | **0.1246** | **0.1246** | | **0.1147** | **0.1147** | | **501.6302** | **501.6302** | **0.1622** | | **505.6861** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0278 | 0.9068 | 0.2448 | 2.4400e-003 | 0.0640 | 1.7600e-003 | 0.0657 | 0.0184 | 1.6800e-003 | 0.0201 | | 261.0221 | 261.0221 | 0.0173 | | 261.4537 |
| Worker | 0.1995 | 0.1246 | 1.4432 | 4.6200e-003 | 0.5142 | 3.7000e-003 | 0.5179 | 0.1364 | 3.4000e-003 | 0.1398 | | 460.4503 | 460.4503 | 0.0116 | | 460.7403 |
| **Total** | **0.2273** | **1.0314** | **1.6880** | **7.0600e-003** | **0.5782** | **5.4600e-003** | **0.5836** | **0.1548** | **5.0800e-003** | **0.1599** | | **721.4724** | **721.4724** | **0.0289** | | **722.1940** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.2343 | 2.6042 | 3.6251 | 5.1800e-003 | | 0.1246 | 0.1246 | | 0.1147 | 0.1147 | 0.0000 | 501.6302 | 501.6302 | 0.1622 | | 505.6861 |
| **Total** | **0.2343** | **2.6042** | **3.6251** | **5.1800e-003** | | **0.1246** | **0.1246** | | **0.1147** | **0.1147** | **0.0000** | **501.6302** | **501.6302** | **0.1622** | | **505.6861** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Vendor | 0.0278 | 0.9068 | 0.2448 | 2.4400e-003 | 0.0640 | 1.7600e-003 | 0.0657 | 0.0184 | 1.6800e-003 | 0.0201 | | 261.0221 | 261.0221 | 0.0173 | | 261.4537 |
| Worker | 0.1995 | 0.1246 | 1.4432 | 4.6200e-003 | 0.5142 | 3.7000e-003 | 0.5179 | 0.1364 | 3.4000e-003 | 0.1398 | | 460.4503 | 460.4503 | 0.0116 | | 460.7403 |
| **Total** | **0.2273** | **1.0314** | **1.6880** | **7.0600e-003** | **0.5782** | **5.4600e-003** | **0.5836** | **0.1548** | **5.0800e-003** | **0.1599** | | **721.4724** | **721.4724** | **0.0289** | | **722.1940** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.3691 | 0.0185 | 472.5784 | 1.9533 | 0.7413 | 0.5997 | 1.3410 | 0.9324 | 0.5107 | 1.4431 | | 0.0803 | 0.0803 | 0.2182 | | 5.5360 |
| Unmitigated | 0.3691 | 0.0185 | 472.5784 | 1.9533 | 0.7413 | 0.5997 | 1.3410 | 0.9324 | 0.5107 | 1.4431 | | 0.0803 | 0.0803 | 0.2182 | | 5.5360 |

### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| City Park | 85.00 | 56.88 | 48.75 | 218,128 | 218,128 |
| Total | 85.00 | 56.88 | 48.75 | 218,128 | 218,128 |

### 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| City Park | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 66 | 28 | 6 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| City Park | 0.552603 | 0.061033 | 0.186728 | 0.118579 | 0.023437 | 0.006039 | 0.017620 | 0.024846 | 0.001416 | 0.001678 | 0.004487 | 0.000623 | 0.000912 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| NaturalGas Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

### 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| City Park | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| City Park | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 5.6300e-003 | 0.0000 | 2.6000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 5.5000e-004 | 5.5000e-004 | 0.0000 | | 5.8000e-004 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unmitigated | 5.6300e-003 | 0.0000 | 2.6000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 5.5000e-004 | 5.5000e-004 | 0.0000 | | 5.8000e-004 |

## 6.2 Area by SubCategory

### Unmitigated

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 5.6100e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 2.0000e-005 | 0.0000 | 2.6000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 5.5000e-004 | 5.5000e-004 | 0.0000 | | 5.8000e-004 |
| **Total** | **5.6300e-003** | **0.0000** | **2.6000e-004** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **5.5000e-004** | **5.5000e-004** | **0.0000** | | **5.8000e-004** |

### Mitigated

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 5.6100e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 2.0000e-005 | 0.0000 | 2.6000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 5.5000e-004 | 5.5000e-004 | 0.0000 | | 5.8000e-004 |
| **Total** | **5.6300e-003** | **0.0000** | **2.6000e-004** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **5.5000e-004** | **5.5000e-004** | **0.0000** | | **5.8000e-004** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# Sidewalk Extension

ESA

# Emissions Summary

ESA

**Air Quality Construction Analysis**

**Unmitigated Construction Scenario**

| Regional | lbs/day | | | | | |
|---|---|---|---|---|---|---|
| | ROG | NOX | CO | SO2 | PM10 Total | Total PM2.5 |
| | | | | | | |
| Site Preparation | 0.7 | 8.2 | 6.1 | 0.0 | 0.7 | 0.4 |
| Demolition | 1.2 | 10.9 | 15.4 | 0.0 | 0.8 | 0.6 |
| Utility Relocation | 1.1 | 8.1 | 7.1 | 0.0 | 0.4 | 0.3 |
| Storm Drain Construction | 1.1 | 8.1 | 11.0 | 0.0 | 0.7 | 0.4 |
| Sidewalk Construction (Newport) | 0.5 | 4.5 | 5.5 | 0.0 | 0.5 | 0.3 |
| Sidewalk Construction (Crawford) | 0.6 | 4.8 | 5.7 | 0.0 | 0.5 | 0.3 |
| Traffic Signal Modification | 1.1 | 10.9 | 8.8 | 0.0 | 0.7 | 0.5 |
| Paving | 0.8 | 7.6 | 10.3 | 0.0 | 0.6 | 0.4 |
| **Daily Maximum Emissions** | **1.2** | **10.9** | **15.4** | **0.0** | **0.8** | **0.6** |
| SCAQMD Regional Threshold | 75 | 100 | 550 | 150 | 150 | 55 |
| Exceeds Threshold? | No | No | No | No | No | No |

**Air Quality Construction Analysis**

| Unmitigated Construction Scenario | | | | |
|---|---|---|---|---|
| **Localized Emissions Summary** | **NOX** | **CO** | **PM10 Total** | **Total PM2.5** |
| **0** | **lb/hr** | | | |
| Site Preparation | 8.2 | 5.6 | 0.5 | 0.3 |
| Demolition | 10.3 | 14.5 | 0.5 | 0.5 |
| Utility Relocation | 8.1 | 6.8 | 0.3 | 0.3 |
| Storm Drain Construction | 7.1 | 9.5 | 0.3 | 0.3 |
| Sidewalk Construction (Newport) | 3.5 | 4.3 | 0.2 | 0.2 |
| Sidewalk Construction (Crawford) | 3.8 | 4.5 | 0.2 | 0.2 |
| Traffic Signal Modification | 9.9 | 7.5 | 0.4 | 0.4 |
| Paving | 7.6 | 9.8 | 0.4 | 0.4 |
| **Daily Maximum Emissions** | **10.3** | **14.5** | **0.5** | **0.5** |
| SCAQMDLocalized Threshold | 131 | 993 | 6 | 4 |
| Exceeds Threshold? | No | No | No | No |

**Air Quality Construction Analysis**

| summer | Onsite Construction Emissions (CalEEMod) + Onsite Idling (EMFAC2017) | | | | | | | | | | Offsite Construction Emissions - Running (EMFAC2017) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 |
| | lb/day | | | | | | | | | | lb/day | | | | | | | | | |
| Site Preparation | 0.70 | 8.19 | 5.64 | 0.01 | 0.21 | 0.32 | 0.53 | 0.02 | 0.30 | 0.32 | 0.01 | 0.03 | 0.47 | 0.00 | 0.18 | 0.00 | 0.18 | 0.05 | 0.00 | 0.05 |
| Demolition | 1.21 | 10.32 | 14.52 | 0.02 | 0.00 | 0.54 | 0.54 | 0.00 | 0.52 | 0.52 | 0.03 | 0.62 | 0.91 | 0.00 | 0.28 | 0.00 | 0.28 | 0.07 | 0.00 | 0.08 |
| Utility Relocation | 1.06 | 8.07 | 6.75 | 0.03 | 0.00 | 0.29 | 0.29 | 0.00 | 0.27 | 0.27 | 0.01 | 0.02 | 0.35 | 0.00 | 0.13 | 0.00 | 0.13 | 0.04 | 0.00 | 0.04 |
| Storm Drain Construction | 1.04 | 7.12 | 9.52 | 0.01 | 0.00 | 0.33 | 0.33 | 0.00 | 0.32 | 0.32 | 0.06 | 1.01 | 1.43 | 0.01 | 0.36 | 0.00 | 0.36 | 0.10 | 0.00 | 0.10 |
| Sidewalk Construction (Newport) | 0.48 | 3.54 | 4.28 | 0.01 | 0.00 | 0.18 | 0.18 | 0.00 | 0.18 | 0.18 | 0.06 | 1.00 | 1.20 | 0.00 | 0.27 | 0.00 | 0.27 | 0.07 | 0.00 | 0.08 |
| Sidewalk Construction (Crawford) | 0.52 | 3.79 | 4.49 | 0.01 | 0.00 | 0.19 | 0.19 | 0.00 | 0.19 | 0.19 | 0.06 | 1.00 | 1.20 | 0.00 | 0.27 | 0.00 | 0.27 | 0.07 | 0.00 | 0.08 |
| Traffic Signal Modification | 1.07 | 9.89 | 7.51 | 0.02 | 0.00 | 0.41 | 0.41 | 0.00 | 0.38 | 0.38 | 0.06 | 1.01 | 1.32 | 0.01 | 0.31 | 0.00 | 0.32 | 0.08 | 0.00 | 0.09 |
| Paving | 0.77 | 7.61 | 9.84 | 0.02 | 0.00 | 0.39 | 0.39 | 0.00 | 0.36 | 0.36 | 0.01 | 0.03 | 0.47 | 0.00 | 0.18 | 0.00 | 0.18 | 0.05 | 0.00 | 0.05 |

| Regional Emissions - ALL | Regional Emissions (On-Site Construction + Worker + Visitors +Vendor+Haul) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 |
| Site Preparation | 0.71 | 8.22 | 6.10 | 0.01 | 0.39 | 0.33 | 0.71 | 0.07 | 0.30 | 0.37 |
| Demolition | 1.24 | 10.94 | 15.42 | 0.03 | 0.28 | 0.55 | 0.82 | 0.07 | 0.53 | 0.60 |
| Utility Relocation | 1.07 | 8.09 | 7.10 | 0.03 | 0.13 | 0.29 | 0.43 | 0.04 | 0.27 | 0.31 |
| Storm Drain Construction | 1.10 | 8.14 | 10.95 | 0.02 | 0.36 | 0.34 | 0.69 | 0.10 | 0.32 | 0.42 |
| Sidewalk Construction (Newport) | 0.53 | 4.54 | 5.48 | 0.01 | 0.27 | 0.18 | 0.45 | 0.07 | 0.18 | 0.26 |
| Sidewalk Construction (Crawford) | 0.57 | 4.79 | 5.69 | 0.01 | 0.27 | 0.19 | 0.46 | 0.07 | 0.19 | 0.27 |
| Traffic Signal Modification | 1.13 | 10.90 | 8.82 | 0.03 | 0.31 | 0.41 | 0.73 | 0.08 | 0.38 | 0.47 |
| Paving | 0.78 | 7.64 | 10.30 | 0.02 | 0.18 | 0.39 | 0.57 | 0.05 | 0.36 | 0.41 |
| Maximum Daily Emissions | **1.24** | **10.94** | **15.42** | **0.03** | **0.39** | **0.55** | **0.82** | **0.10** | **0.53** | **0.60** |

**Air Quality Construction Analysis**

| Winter | Onsite Construction Emissions (CalEEMod) + Onsite Idling (EMFAC2017) | | | | | | | | | | Offsite Construction Emissions - Running (EMFAC2017) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 |
| | lb/day | | | | | | | | | | lb/day | | | | | | | | | |
| Site Preparation | 0.70 | 8.19 | 5.64 | 0.01 | 0.21 | 0.32 | 0.53 | 0.02 | 0.30 | 0.32 | 0.01 | 0.03 | 0.47 | 0.00 | 0.18 | 0.00 | 0.18 | 0.05 | 0.00 | 0.05 |
| Demolition | 1.21 | 10.32 | 14.52 | 0.02 | 0.00 | 0.54 | 0.54 | 0.00 | 0.52 | 0.52 | 0.03 | 0.62 | 0.91 | 0.00 | 0.28 | 0.00 | 0.28 | 0.07 | 0.00 | 0.08 |
| Utility Relocation | 1.06 | 8.07 | 6.75 | 0.03 | 0.00 | 0.29 | 0.29 | 0.00 | 0.27 | 0.27 | 0.01 | 0.02 | 0.35 | 0.00 | 0.13 | 0.00 | 0.13 | 0.04 | 0.00 | 0.04 |
| Storm Drain Construction | 1.04 | 7.12 | 9.52 | 0.01 | 0.00 | 0.33 | 0.33 | 0.00 | 0.32 | 0.32 | 0.06 | 1.01 | 1.43 | 0.01 | 0.36 | 0.00 | 0.36 | 0.10 | 0.00 | 0.10 |
| Sidewalk Construction (Newport) | 0.48 | 3.54 | 4.28 | 0.01 | 0.00 | 0.18 | 0.18 | 0.00 | 0.18 | 0.18 | 0.06 | 1.00 | 1.20 | 0.00 | 0.27 | 0.00 | 0.27 | 0.07 | 0.00 | 0.08 |
| Sidewalk Construction (Crawford) | 0.52 | 3.79 | 4.49 | 0.01 | 0.00 | 0.19 | 0.19 | 0.00 | 0.19 | 0.19 | 0.06 | 1.00 | 1.20 | 0.00 | 0.27 | 0.00 | 0.27 | 0.07 | 0.00 | 0.08 |
| Traffic Signal Modification | 1.07 | 9.89 | 7.51 | 0.02 | 0.00 | 0.41 | 0.41 | 0.00 | 0.38 | 0.38 | 0.06 | 1.01 | 1.32 | 0.01 | 0.31 | 0.00 | 0.32 | 0.08 | 0.00 | 0.09 |
| Paving | 0.77 | 7.61 | 9.84 | 0.02 | 0.00 | 0.39 | 0.39 | 0.00 | 0.36 | 0.36 | 0.01 | 0.03 | 0.47 | 0.00 | 0.18 | 0.00 | 0.18 | 0.05 | 0.00 | 0.05 |

| Regional Emissions - ALL | Regional Emissions (On-Site Construction + Worker + Visitors +Vendor+Haul) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 |
| Site Preparation | 0.71 | 8.22 | 6.10 | 0.01 | 0.39 | 0.33 | 0.71 | 0.07 | 0.30 | 0.37 |
| Demolition | 1.24 | 10.94 | 15.42 | 0.03 | 0.28 | 0.55 | 0.82 | 0.07 | 0.53 | 0.60 |
| Utility Relocation | 1.07 | 8.09 | 7.10 | 0.03 | 0.13 | 0.29 | 0.43 | 0.04 | 0.27 | 0.31 |
| Storm Drain Construction | 1.10 | 8.14 | 10.95 | 0.02 | 0.36 | 0.34 | 0.69 | 0.10 | 0.32 | 0.42 |
| Sidewalk Construction (Newport) | 0.53 | 4.54 | 5.48 | 0.01 | 0.27 | 0.18 | 0.45 | 0.07 | 0.18 | 0.26 |
| Sidewalk Construction (Crawford) | 0.57 | 4.79 | 5.69 | 0.01 | 0.27 | 0.19 | 0.46 | 0.07 | 0.19 | 0.27 |
| Traffic Signal Modification | 1.13 | 10.90 | 8.82 | 0.03 | 0.31 | 0.41 | 0.73 | 0.08 | 0.38 | 0.47 |
| Paving | 0.78 | 7.64 | 10.30 | 0.02 | 0.18 | 0.39 | 0.57 | 0.05 | 0.36 | 0.41 |
| Maximum Daily Emissions | **1.24** | **10.94** | **15.42** | **0.03** | **0.39** | **0.55** | **0.82** | **0.10** | **0.53** | **0.60** |

**Greenhouse Gas Emissions**

| Construction Summary | | Onsite | Mobile | Total |
|---|---|---|---|---|
| Site Preparation | 2022 | 3.21 | 0.41 | 4 |
| Demolition | 2022 | 15.14 | 2.92 | 18 |
| Utility Relocation | 2022 | 12.93 | 0.57 | 13 |
| Storm Drain Construction | 2022 | 19.87 | 9.15 | 29 |
| Sidewalk Construction (Newport) | 2022 | 5.04 | 3.89 | 9 |
| Sidewalk Construction (Crawford) | 2022 | 5.29 | 3.89 | 9 |
| Traffic Signal Modification | 2022 | 10.79 | 2.86 | 14 |
| Paving | 2022 | 10.65 | 0.07 | 11 |
| | | | Total | 107 |
| | | | Amortized | 3.56 |

# Onroad Emissions

ESA

**Total On-Road Emissions** **Total On-Road Emissions**

260 Max construction days per year

| | Construction Phase | Daily One-Way Trips | Days per Phase (days) | Work Hours per Day (hours/day) | One-Way Trip Distance per Day (miles) | Idling per Day (minutes) | Regional Emissions (pounds/day) ROG | NOX | CO | SO2 | PM10 Dust | PM10 Exh | Total PM10 | PM2.5 Dust | PM2.5 Exh | Total PM2.5 | (MT/yr) Total CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Site Preparation | 2022 | | | | | | | | | | | | | | | |
| | Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| Site Prepara | Hauling | 0 | 6 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2022Vendor | Vendor | 0 | 6 | 8 | 6.9 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2022Worker | Worker | 16 | 6 | 8 | 14.7 | 0 | 0.01 | 0.03 | 0.47 | 0.00 | 0.18 | 0.00 | 0.18 | 0.05 | 0.00 | 0.05 | 0.41 |
| | | | | | **Onroad Emissions - Site Preparation** | | **0.01** | **0.03** | **0.47** | **0.00** | **0.18** | **0.00** | **0.18** | **0.05** | **0.00** | **0.05** | **0.41** |
| | Demolition | 2022 | | | | | | | | | | | | | | | |
| | Total Haul Trips | 32 | | | | | | | | | | | | | | | |
| 2022Hauling | Hauling | 3 | 15 | 8 | 20 | 15 | 0.02 | 0.58 | 0.32 | 0.00 | 0.05 | 0.00 | 0.06 | 0.01 | 0.00 | 0.02 | 1.63 |
| 2022Vendor | Vendor | 0 | 15 | 8 | 6.9 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2022Worker | Worker | 20 | 15 | 8 | 14.7 | 0 | 0.01 | 0.04 | 0.58 | 0.00 | 0.22 | 0.00 | 0.22 | 0.06 | 0.00 | 0.06 | 1.29 |
| | | | | | **Onroad Emissions - Demolition** | | **0.03** | **0.62** | **0.91** | **0.00** | **0.28** | **0.00** | **0.28** | **0.07** | **0.00** | **0.08** | **2.92** |
| | Utility Relocation | 2022 | | | | | | | | | | | | | | | |
| | Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| 2022Hauling | Hauling | 0 | 11 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2022Vendor | Vendor | 0 | 11 | 8 | 6.9 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2022Worker | Worker | 12 | 11 | 8 | 14.7 | 0 | 0.01 | 0.02 | 0.35 | 0.00 | 0.13 | 0.00 | 0.13 | 0.04 | 0.00 | 0.04 | 0.57 |
| | | | | | **Onroad Emissions - Utility Relocation** | | **0.01** | **0.02** | **0.35** | **0.00** | **0.13** | **0.00** | **0.13** | **0.04** | **0.00** | **0.04** | **0.57** |
| | Storm Drain Construction | 2022 | | | | | | | | | | | | | | | |
| | Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| 2022Hauling | Hauling | 0 | 33 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2022Vendor | Vendor | 14 | 33 | 8 | 6.9 | 15 | 0.05 | 0.97 | 0.74 | 0.00 | 0.09 | 0.00 | 0.09 | 0.03 | 0.00 | 0.03 | 5.75 |
| 2022Worker | Worker | 24 | 33 | 8 | 14.7 | 0 | 0.01 | 0.05 | 0.70 | 0.00 | 0.27 | 0.00 | 0.27 | 0.07 | 0.00 | 0.07 | 3.41 |
| | | | | | **Onroad Emissions - Storm Drain Construction** | | **0.06** | **1.01** | **1.43** | **0.01** | **0.36** | **0.00** | **0.36** | **0.10** | **0.00** | **0.10** | **9.15** |
| | Sidewalk Contruction (Newport) | 2022 | | | | | | | | | | | | | | | 13.05 |
| | Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| 2022Hauling | Hauling | 0 | 16 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2022Vendor | Vendor | 14 | 16 | 8 | 6.9 | 15 | 0.05 | 0.97 | 0.74 | 0.00 | 0.09 | 0.00 | 0.09 | 0.03 | 0.00 | 0.03 | 2.79 |
| 2022Worker | Worker | 16 | 16 | 8 | 14.7 | 0 | 0.01 | 0.03 | 0.47 | 0.00 | 0.18 | 0.00 | 0.18 | 0.05 | 0.00 | 0.05 | 1.10 |
| | | | | | **Onroad Emissions - Sidewalk Contruction (Newport)** | | **0.06** | **1.00** | **1.20** | **0.00** | **0.27** | **0.00** | **0.27** | **0.07** | **0.00** | **0.08** | **3.89** |
| | Sidewalk Construction (Crawford) | 2022 | | | | | | | | | | | | | | | |
| | Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| 2022Hauling | Hauling | 0 | 16 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2022Vendor | Vendor | 14 | 16 | 8 | 6.9 | 15 | 0.05 | 0.97 | 0.74 | 0.00 | 0.00 | 0.00 | 2.67 | 0.00 | 0.11 | 2.79 | 0.00 |
| 2022Worker | Worker | 16 | 16 | 8 | 14.7 | 0 | 0.01 | 0.03 | 0.47 | 0.00 | 0.00 | 0.00 | 1.09 | 0.00 | 0.01 | 1.10 | 0.00 |
| | | | | | **Onroad Emissions - Sidewalk Construction (Crawford)** | | **0.06** | **1.00** | **1.20** | **0.00** | **0.00** | **0.00** | **3.77** | **0.00** | **0.12** | **3.89** | **0.00** |
| | Traffic Signal Modification | 2022 | | | | | | | | | | | | | | | |
| | Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| 2022Hauling | Hauling | 0 | 11 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2022Vendor | Vendor | 14 | 11 | 8 | 6.9 | 15 | 0.05 | 0.97 | 0.74 | 0.00 | 0.09 | 0.00 | 0.09 | 0.03 | 0.00 | 0.03 | 1.92 |
| 2022Worker | Worker | 20 | 11 | 8 | 14.7 | 0 | 0.01 | 0.04 | 0.58 | 0.00 | 0.22 | 0.00 | 0.22 | 0.06 | 0.00 | 0.06 | 0.95 |
| | | | | | **Onroad Emissions - Traffic Signal Modification** | | **0.06** | **1.01** | **1.32** | **0.01** | **0.31** | **0.00** | **0.32** | **0.08** | **0.00** | **0.09** | **2.86** |
| | Paving | 2022 | | | | | | | | | | | | | | | |
| | Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| | Hauling | 0 | 1 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Vendor | 0 | 1 | 8 | 6.9 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Worker | 16 | 1 | 8 | 14.7 | 0 | 0.01 | 0.03 | 0.47 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 | 0.07 | 0.00 |
| | | | | | **Onroad Emissions - Paving** | | **0.01** | **0.03** | **0.47** | **0.00** | **0.00** | **0.00** | **0.07** | **0.00** | **0.00** | **0.07** | **0.00** |

**Total On-Road Emissions** **Total On-Road Emissions**

260 Max construction days per year

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | One-Way Trip Distance per Day (miles) | Idling per Day (minutes) | Regional Emissions (Tons/year) ROG | NOX | CO | SO2 | PM10 Dust | PM10 Exh | Total PM10 | PM2.5 Dust | PM2.5 Exh | Total PM2.5 | (MT/yr) Total CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 2022 | | | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| Hauling | 0 | 6 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 0 | 6 | 8 | 6.9 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 16 | 6 | 8 | 14.7 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.41 |
| | | | | | | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.41** |
| Demolition | 2022 | | | | | | | | | | | | | | | |
| Total Haul Trips | 32 | | | | | | | | | | | | | | | |
| Hauling | 3 | 15 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.63 |
| Vendor | 0 | 15 | 8 | 6.9 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 20 | 15 | 8 | 14.7 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.29 |
| | | | | | | **0.00** | **0.00** | **0.01** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **2.92** |
| Utility Relocation | 2022 | | | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| Hauling | 0 | 11 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 0 | 11 | 8 | 6.9 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 12 | 11 | 8 | 14.7 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.57 |
| | | | | | | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.57** |
| Storm Drain Construction | 2022 | | | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| Hauling | 0 | 33 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 14 | 33 | 8 | 6.9 | 15 | 0.00 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.75 |
| Worker | 24 | 33 | 8 | 14.7 | 0 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.41 |
| | | | | | | **0.00** | **0.02** | **0.02** | **0.00** | **0.01** | **0.00** | **0.01** | **0.00** | **0.00** | **0.00** | **9.15** |
| Sidewalk Contruction (Newport) | 2022 | | | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| Hauling | 0 | 16 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 14 | 16 | 8 | 6.9 | 15 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.79 |
| Worker | 16 | 16 | 8 | 14.7 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.10 |
| | | | | | | **0.00** | **0.01** | **0.01** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **3.89** |
| Sidewalk Construction (Crawford | 2022 | | | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| Hauling | 0 | 16 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 14 | 16 | 8 | 6.9 | 15 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.02 | 0.00 |
| Worker | 16 | 16 | 8 | 14.7 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 |
| | | | | | | **0.00** | **0.01** | **0.01** | **0.00** | **0.00** | **0.00** | **0.03** | **0.00** | **0.00** | **0.03** | **0.00** |
| Traffic Signal Modification | 2022 | | | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| Hauling | 0 | 11 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 14 | 11 | 8 | 6.9 | 15 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.92 |
| Worker | 20 | 11 | 8 | 14.7 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.95 |
| | | | | | | **0.00** | **0.01** | **0.01** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **2.86** |
| Paving | 2022 | | | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | | | |
| Hauling | 0 | 1 | 8 | 20 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 0 | 1 | 8 | 7 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 16 | 1 | 8 | 15 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | | | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

**Running Emissions**

| | | Running Emissions Factor (grams/mile) | | | | | | Running Emissions Factor (grams/mile) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ROG | NOX | CO | SO2 | PM10 | PM2.5 | CO2 | CH4 | N2O |
| 2020Hauling | Hauling | 0.12467436 | 4.127586075 | 0.70244559 | 0.01389473 | 0.04956172 | 0.04741766 | 1520.07529 | 0.08121693 | 0.2410944 |
| 2020Vendor | Vendor | 0.12175156 | 3.217634225 | 0.70325362 | 0.01222293 | 0.05527116 | 0.05287672 | 1311.85371 | 0.04440854 | 0.18764154 |
| 2020Worker | Worker | 0.02296702 | 0.083024116 | 1.08430473 | 0.00306823 | 0.00220351 | 0.002029 | 310.119284 | 0.00538825 | 0.00712331 |
| 2021Hauling | Hauling | 0.08103572 | 3.571515626 | 0.57499969 | 0.01347655 | 0.0279869 | 0.02677616 | 1477.43548 | 0.08019506 | 0.23446951 |
| 2021Vendor | Vendor | 0.0717977 | 2.602453214 | 0.52331731 | 0.01185125 | 0.02991351 | 0.02861613 | 1273.54109 | 0.04239589 | 0.18204996 |
| 2021Worker | Worker | 0.01983596 | 0.07223241 | 0.98341812 | 0.00297251 | 0.00205695 | 0.00189393 | 300.448479 | 0.00471177 | 0.00646256 |
| 2022Hauling | Hauling | 0.02463044 | 2.696920068 | 0.45130496 | 0.01267644 | 0.01843607 | 0.0176385 | 1394.21089 | 0.07850131 | 0.22145577 |
| 2022Vendor | Vendor | 0.01991806 | 1.889760516 | 0.36497107 | 0.01125961 | 0.01227567 | 0.01174136 | 1211.83967 | 0.04029686 | 0.17274956 |
| 2022Worker | Worker | 0.01716262 | 0.063167612 | 0.89784164 | 0.00287684 | 0.00193578 | 0.00178222 | 290.781675 | 0.00413135 | 0.00590029 |
| 2023Hauling | Hauling | 0.02438513 | 2.70726027 | 0.46544535 | 0.01247986 | 0.01859168 | 0.01778737 | 1374.48104 | 0.07922973 | 0.21840565 |
| 2023Vendor | Vendor | 0.01904515 | 1.897817151 | 0.35240371 | 0.01108069 | 0.01237071 | 0.01183229 | 1193.62946 | 0.0405116 | 0.17033183 |
| 2023Worker | Worker | 0.01513169 | 0.055897597 | 0.83140276 | 0.00279565 | 0.00185735 | 0.00170978 | 282.578076 | 0.00368669 | 0.00544537 |
| GWP | | N/A | N/A | N/A | N/A | N/A | N/A | 1 | 25 | 290 |

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | One-Way Trip Distance per Day (miles) | Regional Emissions (pounds/day) | | | | | | Regional Emissions (MT/year) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ROG | NOX | CO | SO2 | PM10 | PM2.5 | CO2 | CH4 | N2O | CO2e |
| Site Preparation | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 6 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 0 | 6 | 8 | 6.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 16 | 6 | 8 | 14.7 | 0.01 | 0.03 | 0.47 | 0.00 | 0.00 | 0.00 | 0.41 | 0.00 | 0.00 | 0.41 |
| | | | | | **0.01** | **0.03** | **0.47** | **0.00** | **0.00** | **0.00** | **0.41** | **0.00** | **0.00** | **0.41** |
| Demolition | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 32 | | | | | | | | | | | | | |
| Hauling | 3 | 15 | 8 | 20 | 0.00 | 0.36 | 0.06 | 0.00 | 0.00 | 0.00 | 1.25 | 0.00 | 0.06 | 1.31 |
| Vendor | 0 | 15 | 8 | 6.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 20 | 15 | 8 | 14.7 | 0.01 | 0.04 | 0.58 | 0.00 | 0.00 | 0.00 | 1.28 | 0.00 | 0.01 | 1.29 |
| | | | | | **0.01** | **0.40** | **0.64** | **0.00** | **0.00** | **0.00** | **2.54** | **0.00** | **0.07** | **2.60** |
| Utility Relocation | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 11 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 0 | 11 | 8 | 6.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 12 | 11 | 8 | 14.7 | 0.01 | 0.02 | 0.35 | 0.00 | 0.00 | 0.00 | 0.56 | 0.00 | 0.00 | 0.57 |
| | | | | | **0.01** | **0.02** | **0.35** | **0.00** | **0.00** | **0.00** | **0.56** | **0.00** | **0.00** | **0.57** |
| Storm Drain Construction | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 33 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 14 | 33 | 8 | 6.9 | 0.00 | 0.40 | 0.08 | 0.00 | 0.00 | 0.00 | 3.86 | 0.00 | 0.16 | 4.03 |
| Worker | 24 | 33 | 8 | 14.7 | 0.01 | 0.05 | 0.70 | 0.00 | 0.00 | 0.00 | 3.39 | 0.00 | 0.02 | 3.41 |
| | | | | | **0.02** | **0.45** | **0.78** | **0.00** | **0.00** | **0.00** | **7.25** | **0.00** | **0.18** | **7.43** |
| Sidewalk Contruction (Nev | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 16 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 14 | 16 | 8 | 6.9 | 0.00 | 0.40 | 0.08 | 0.00 | 0.00 | 0.00 | 1.87 | 0.00 | 0.08 | 1.95 |
| Worker | 16 | 16 | 8 | 14.7 | 0.01 | 0.03 | 0.47 | 0.00 | 0.00 | 0.00 | 1.09 | 0.00 | 0.01 | 1.10 |
| | | | | | **0.01** | **0.44** | **0.54** | **0.00** | **0.00** | **0.00** | **2.97** | **0.00** | **0.08** | **3.05** |
| Sidewalk Construction (Cra | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 16 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 14 | 16 | 8 | 6.9 | 0.00 | 0.40 | 0.08 | 0.00 | 0.00 | 0.00 | 1.87 | 0.00 | 0.08 | 1.95 |
| Worker | 16 | 16 | 8 | 14.7 | 0.01 | 0.03 | 0.47 | 0.00 | 0.00 | 0.00 | 1.09 | 0.00 | 0.01 | 1.10 |
| | | | | | **0.01** | **0.44** | **0.54** | **0.00** | **0.00** | **0.00** | **2.97** | **0.00** | **0.08** | **3.05** |
| Traffic Signal Modification | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 11 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 14 | 11 | 8 | 6.9 | 0.00 | 0.40 | 0.08 | 0.00 | 0.00 | 0.00 | 1.29 | 0.00 | 0.05 | 1.34 |
| Worker | 20 | 11 | 8 | 14.7 | 0.01 | 0.04 | 0.58 | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 | 0.01 | 0.95 |
| | | | | | **0.02** | **0.44** | **0.66** | **0.00** | **0.00** | **0.00** | **2.23** | **0.00** | **0.06** | **2.29** |
| Paving | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 1 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 0 | 1 | 8 | 6.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 16 | 1 | 8 | 14.7 | 0.01 | 0.03 | 0.47 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 | 0.07 |
| | | | | | **0.01** | **0.03** | **0.47** | **0.00** | **0.00** | **0.00** | **0.07** | **0.00** | **0.00** | **0.07** |

**Idling Emissions**

| | Idling Emissions Factor (grams/minute) | | | | | | Idling Emissions Factor (grams/minute) | | |
|---|---|---|---|---|---|---|---|---|---|
| | ROG | NOX | CO | SO2 | PM10 | PM2.5 | CO2 | CH4 | N2O |
| 2020Hauling Hauling | 0.182037569 | 2.514257339 | 2.344246757 | 0.00425698 | 0.003648271 | 0.003490448 | 457.4012863 | 0.010601217 | 0.072214857 |
| 2020Vendor Vendor | 0.096551578 | 1.389498887 | 1.264128866 | 0.002281269 | 0.002251179 | 0.002153794 | 244.7777788 | 0.006331669 | 0.038349282 |
| 2020Worker Worker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2021Hauling Hauling | 0.179928256 | 2.494221613 | 2.47137063 | 0.004317067 | 0.001537071 | 0.001470578 | 463.9794578 | 0.010572582 | 0.073259029 |
| 2021Vendor Vendor | 0.095120382 | 1.358206146 | 1.327353892 | 0.002308011 | 0.001019868 | 0.000975749 | 247.7184766 | 0.006310233 | 0.03882087 |
| 2021Worker Worker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2022Hauling Hauling | 0.179433405 | 2.268893827 | 2.655408876 | 0.00413434 | 0.001243874 | 0.001190065 | 444.8642971 | 0.010627465 | 0.070264947 |
| 2022Vendor Vendor | 0.094536862 | 1.21688302 | 1.421431884 | 0.002211148 | 0.000697923 | 0.000667731 | 237.5784467 | 0.00634204 | 0.037232428 |
| 2022Worker Worker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2023Hauling Hauling | 0.179743074 | 2.262044342 | 2.6647617 | 0.004091185 | 0.001197181 | 0.001145392 | 440.3939763 | 0.01068902 | 0.069566829 |
| 2023Vendor Vendor | 0.094568385 | 1.210583463 | 1.425003725 | 0.002186954 | 0.000664142 | 0.000635412 | 235.0703056 | 0.006350607 | 0.036853294 |
| 2023Worker Worker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| GWP | N/A | N/A | N/A | N/A | N/A | N/A | 1 | 25 | 290 |

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | Idling minutes per Day (miles) | Regional Emissions (pounds/day) | | | | | | Regional Emissions (MT/year) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ROG | NOX | CO | SO2 | PM10 | PM2.5 | CO2 | CH4 | N2O | CO2e |
| Site Preparation | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 6 | 8 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 0 | 6 | 8 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 16 | 6 | 8 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| Demolition | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 32 | | | | | | | | | | | | | |
| Hauling | 3 | 15 | 8 | 15 | 0.02 | 0.23 | 0.26 | 0.00 | 0.00 | 0.00 | 0.30 | 0.00 | 0.01 | 0.31 |
| Vendor | 0 | 15 | 8 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 20 | 15 | 8 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | | **0.02** | **0.23** | **0.26** | **0.00** | **0.00** | **0.00** | **0.30** | **0.00** | **0.01** | **0.31** |
| Utility Relocation | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 11 | 8 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 0 | 11 | 8 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 12 | 11 | 8 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| Storm Drain Construction | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 33 | 8 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 14 | 33 | 8 | 15 | 0.04 | 0.56 | 0.66 | 0.00 | 0.00 | 0.00 | 1.65 | 0.00 | 0.07 | 1.72 |
| Worker | 24 | 33 | 8 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | | **0.04** | **0.56** | **0.66** | **0.00** | **0.00** | **0.00** | **1.65** | **0.00** | **0.07** | **1.72** |
| Sidewalk Contruction (New | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 16 | 8 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 14 | 16 | 8 | 15 | 0.04 | 0.56 | 0.66 | 0.00 | 0.00 | 0.00 | 0.80 | 0.00 | 0.04 | 0.84 |
| Worker | 16 | 16 | 8 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | | **0.04** | **0.56** | **0.66** | **0.00** | **0.00** | **0.00** | **0.80** | **0.00** | **0.04** | **0.84** |
| Sidewalk Construction (Cras | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 16 | 8 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 14 | 16 | 8 | 15 | 0.04 | 0.56 | 0.66 | 0.00 | 0.00 | 0.00 | 0.80 | 0.00 | 0.04 | 0.84 |
| Worker | 16 | 16 | 8 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | | **0.04** | **0.56** | **0.66** | **0.00** | **0.00** | **0.00** | **0.80** | **0.00** | **0.04** | **0.84** |
| Traffic Signal Modification | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 11 | 8 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 14 | 11 | 8 | 15 | 0.04 | 0.56 | 0.66 | 0.00 | 0.00 | 0.00 | 0.55 | 0.00 | 0.02 | 0.57 |
| Worker | 20 | 11 | 8 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | | **0.04** | **0.56** | **0.66** | **0.00** | **0.00** | **0.00** | **0.55** | **0.00** | **0.02** | **0.57** |
| Paving | 2022 | | | | | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | | | | | |
| Hauling | 0 | 1 | 8 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 0 | 1 | 8 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 16 | 1 | 8 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

**Road Dust, Break Wear, and Tire wear Emissions**

| | Emission Factors (grams/mile) | | | | | |
|---|---|---|---|---|---|---|
| | PM10 | | | PM2.5 | | |
| | RD | BW | TW | RD | BW | TW |
| 2020Hauling Hauling | 3.00E-01 | 0.061048007 | 0.03558331 | 7.36E-02 | 0.02616343 | 0.00889583 |
| 2020Vendor Vendor | 3.00E-01 | 0.095694022 | 0.02379166 | 7.36E-02 | 0.04101172 | 0.00594791 |
| 2020Worker Worker | 3.00E-01 | 0.036750011 | 0.008 | 7.36E-02 | 0.01575 | 0.002 |
| 2021Hauling Hauling | 3.00E-01 | 0.061055751 | 0.0355879 | 7.36E-02 | 0.02616675 | 0.00889698 |
| 2021Vendor Vendor | 3.00E-01 | 0.095697894 | 0.02379395 | 7.36E-02 | 0.04101338 | 0.00594849 |
| 2021Worker Worker | 3.00E-01 | 0.036750011 | 0.008 | 7.36E-02 | 0.01575 | 0.002 |
| 2022Hauling Hauling | 3.00E-01 | 0.061063462 | 0.03559233 | 7.36E-02 | 0.02617005 | 0.00889808 |
| 2022Vendor Vendor | 3.00E-01 | 0.095701749 | 0.02379617 | 7.36E-02 | 0.04101504 | 0.00594904 |
| 2022Worker Worker | 3.00E-01 | 0.036750011 | 0.008 | 7.36E-02 | 0.01575 | 0.002 |
| 2023Hauling Hauling | 3.00E-01 | 0.06107028 | 0.03559616 | 7.36E-02 | 0.02617298 | 0.00889904 |
| 2023Vendor Vendor | 3.00E-01 | 0.095705158 | 0.02379808 | 7.36E-02 | 0.0410165 | 0.00594952 |
| 2023Worker Worker | 3.00E-01 | 0.036750011 | 0.008 | 7.36E-02 | 0.01575 | 0.002 |

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | One-Way Trip Distance per Day (miles) | Regional Emissions (pounds/day) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PM10 | | | PM2.5 | | |
| | | | | | RD | BW | TW | RD | BW | TW |
| Site Preparation | 2022 | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | |
| Hauling | 0 | 6 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 0 | 6 | 8 | 6.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 16 | 6 | 8 | 14.7 | 0.16 | 0.02 | 0.00 | 0.04 | 0.01 | 0.00 |
| Demolition | 2022 | | | | | | | | | |
| Total Haul Trips | 32 | | | | | | | | | |
| Hauling | 3 | 15 | 8 | 20 | 0.04 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 |
| Vendor | 0 | 15 | 8 | 6.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 20 | 15 | 8 | 14.7 | 0.19 | 0.02 | 0.01 | 0.05 | 0.01 | 0.00 |
| Utility Relocation | 2022 | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | |
| Hauling | 0 | 11 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 0 | 11 | 8 | 6.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 12 | 11 | 8 | 14.7 | 0.12 | 0.01 | 0.00 | 0.03 | 0.01 | 0.00 |
| Storm Drain Construction | 2022 | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | |
| Hauling | 0 | 33 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 14 | 33 | 8 | 6.9 | 0.06 | 0.02 | 0.01 | 0.02 | 0.01 | 0.00 |
| Worker | 24 | 33 | 8 | 14.7 | 0.23 | 0.03 | 0.01 | 0.06 | 0.01 | 0.00 |
| Sidewalk Contruction (New | 2022 | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | |
| Hauling | 0 | 16 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 14 | 16 | 8 | 6.9 | 0.06 | 0.02 | 0.01 | 0.02 | 0.01 | 0.00 |
| Worker | 16 | 16 | 8 | 14.7 | 0.16 | 0.02 | 0.00 | 0.04 | 0.01 | 0.00 |
| Sidewalk Construction (Cra | 2022 | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | |
| Hauling | 0 | 16 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 14 | 16 | 8 | 6.9 | 0.06 | 0.02 | 0.01 | 0.02 | 0.01 | 0.00 |
| Worker | 16 | 16 | 8 | 14.7 | 0.16 | 0.02 | 0.00 | 0.04 | 0.01 | 0.00 |
| Traffic Signal Modification | 2022 | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | |
| Hauling | 0 | 11 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 14 | 11 | 8 | 6.9 | 0.06 | 0.02 | 0.01 | 0.02 | 0.01 | 0.00 |
| Worker | 20 | 11 | 8 | 14.7 | 0.19 | 0.02 | 0.01 | 0.05 | 0.01 | 0.00 |
| Paving | 2022 | | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | | |
| Hauling | 0 | 1 | 8 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vendor | 0 | 1 | 8 | 6.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 16 | 1 | 8 | 14.7 | 0.16 | 0.02 | 0.00 | 0.04 | 0.01 | 0.00 |

# CalEEMod Output

ESA

# Crawford Canyon Sidewalk Extension

**South Coast Air Basin, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Other Non-Asphalt Surfaces | 2.00 | Acre | 2.00 | 87,120.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 31 |
| **Climate Zone** | 8 | | | **Operational Year** | 2023 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Schedule provided by applicant

Off-road Equipment - Equipment provided by Applicant

Trips and VMT - Project Data

Grading -

Vehicle Trips -

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Energy Use -

Construction Off-road Equipment Mitigation - Water exposed area 3 times daily

Fleet Mix - EMFAC2017

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Demolition -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstructionPhase | NumDays | 200.00 | 33.00 |
| tblConstructionPhase | NumDays | 20.00 | 15.00 |
| tblConstructionPhase | NumDays | 2.00 | 6.00 |
| tblConstructionPhase | NumDays | 200.00 | 16.00 |
| tblConstructionPhase | NumDays | 200.00 | 16.00 |
| tblConstructionPhase | NumDays | 200.00 | 11.00 |
| tblConstructionPhase | NumDays | 10.00 | 16.00 |
| tblConstructionPhase | PhaseEndDate | 4/14/2022 | 7/14/2022 |
| tblConstructionPhase | PhaseEndDate | 1/19/2023 | 8/15/2022 |
| tblConstructionPhase | PhaseEndDate | 7/8/2021 | 6/29/2022 |
| tblConstructionPhase | PhaseEndDate | 7/2/2021 | 6/8/2022 |
| tblConstructionPhase | PhaseStartDate | 7/9/2021 | 6/30/2022 |
| tblConstructionPhase | PhaseStartDate | 4/15/2022 | 6/30/2022 |
| tblConstructionPhase | PhaseStartDate | 7/3/2021 | 6/9/2022 |

| | | | |
|---|---|---|---|
| tblConstructionPhase | PhaseStartDate | 7/1/2021 | 6/1/2022 |
| tblOffRoadEquipment | HorsePower | 8.00 | 81.00 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.43 | 0.73 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Excavators |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Excavators |
| tblOffRoadEquipment | OffRoadEquipmentType | | Cement and Mortar Mixers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Cement and Mortar Mixers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Plate Compactors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Concrete/Industrial Saws |
| tblOffRoadEquipment | OffRoadEquipmentType | | Cement and Mortar Mixers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Plate Compactors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Concrete/Industrial Saws |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 8.00 | 7.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblTripsAndVMT | HaulingTripNumber | 16.00 | 32.00 |
| tblTripsAndVMT | WorkerTripNumber | 13.00 | 10.00 |
| tblTripsAndVMT | WorkerTripNumber | 5.00 | 6.00 |
| tblTripsAndVMT | WorkerTripNumber | 37.00 | 12.00 |
| tblTripsAndVMT | WorkerTripNumber | 37.00 | 8.00 |
| tblTripsAndVMT | WorkerTripNumber | 37.00 | 8.00 |
| tblTripsAndVMT | WorkerTripNumber | 37.00 | 10.00 |
| tblTripsAndVMT | WorkerTripNumber | 13.00 | 8.00 |

## 2.0 Emissions Summary

### 2.1 Overall Construction

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2022 | 0.0580 | 0.4924 | 0.5420 | 1.1700e-003 | 0.0116 | 0.0206 | 0.0322 | 2.9000e-003 | 0.0196 | 0.0225 | 0.0000 | 101.7318 | 101.7318 | 0.0211 | 0.0000 | 102.2603 |
| **Maximum** | **0.0580** | **0.4924** | **0.5420** | **1.1700e-003** | **0.0116** | **0.0206** | **0.0322** | **2.9000e-003** | **0.0196** | **0.0225** | **0.0000** | **101.7318** | **101.7318** | **0.0211** | **0.0000** | **102.2603** |

## Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2022 | 0.0580 | 0.4924 | 0.5420 | 1.1700e-003 | 0.0106 | 0.0206 | 0.0312 | 2.7900e-003 | 0.0196 | 0.0224 | 0.0000 | 101.7317 | 101.7317 | 0.0211 | 0.0000 | 102.2602 |
| **Maximum** | **0.0580** | **0.4924** | **0.5420** | **1.1700e-003** | **0.0106** | **0.0206** | **0.0312** | **2.7900e-003** | **0.0196** | **0.0224** | **0.0000** | **101.7317** | **101.7317** | **0.0211** | **0.0000** | **102.2602** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **8.40** | **0.00** | **3.02** | **3.79** | **0.00** | **0.49** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| **4** | **4-1-2022** | **6-30-2022** | 0.1251 | 0.1251 |
| **5** | **7-1-2022** | **9-30-2022** | 0.4199 | 0.4199 |
| | | **Highest** | 0.4199 | 0.4199 |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 6.8500e-003 | 0.0000 | 3.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 5.0000e-005 | 5.0000e-005 | 0.0000 | 0.0000 | 5.0000e-005 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.8500e-003** | **0.0000** | **3.0000e-005** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **5.0000e-005** | **5.0000e-005** | **0.0000** | **0.0000** | **5.0000e-005** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 6.8500e-003 | 0.0000 | 3.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 5.0000e-005 | 5.0000e-005 | 0.0000 | 0.0000 | 5.0000e-005 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total** | **6.8500e-003** | **0.0000** | **3.0000e-005** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **5.0000e-005** | **5.0000e-005** | **0.0000** | **0.0000** | **5.0000e-005** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

### Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 6/1/2022 | 6/8/2022 | 5 | 6 | |
| 2 | Demolition | Demolition | 6/9/2022 | 6/29/2022 | 5 | 15 | |
| 3 | Utility Relocation | Trenching | 6/30/2022 | 7/14/2022 | 5 | 11 | |
| 4 | Storm Drain Construction | Building Construction | 6/30/2022 | 8/15/2022 | 5 | 33 | |
| 5 | Sidewalk Construction (Newport) | Building Construction | 6/30/2022 | 7/21/2022 | 5 | 16 | |
| 6 | Sidewalk Construction (Crawford) | Building Construction | 8/15/2022 | 9/5/2022 | 5 | 16 | |
| 7 | Traffic Signal Modification | Building Construction | 7/21/2022 | 8/4/2022 | 5 | 11 | |
| 8 | Paving | Paving | 9/6/2022 | 9/27/2022 | 5 | 16 | |

**Acres of Grading (Site Preparation Phase): 3**

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 2**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0**

### OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Paving | Cement and Mortar Mixers | 1 | 8.00 | 9 | 0.56 |
| Site Preparation | Graders | 1 | 8.00 | 187 | 0.41 |
| Demolition | Concrete/Industrial Saws | 2 | 8.00 | 81 | 0.73 |

| | | | | | |
|---|---|---|---|---|---|
| Sidewalk Construction (Newport) | Cranes | 0 | 8.00 | 231 | 0.29 |
| Site Preparation | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Sidewalk Construction (Crawford) | Cranes | 0 | 8.00 | 231 | 0.29 |
| Site Preparation | Tractors/Loaders/Backhoes | 2 | 7.00 | 97 | 0.37 |
| Traffic Signal Modification | Cranes | 1 | 8.00 | 231 | 0.29 |
| Demolition | Graders | 0 | 8.00 | 187 | 0.41 |
| Sidewalk Construction (Newport) | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Demolition | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Sidewalk Construction (Crawford) | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Traffic Signal Modification | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Demolition | Tractors/Loaders/Backhoes | 2 | 7.00 | 97 | 0.37 |
| Utility Relocation | Cranes | 0 | 8.00 | 231 | 0.29 |
| Sidewalk Construction (Newport) | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Utility Relocation | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Utility Relocation | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Sidewalk Construction (Crawford) | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Traffic Signal Modification | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Paving | Pavers | 1 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 1 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 1 | 8.00 | 80 | 0.38 |
| Sidewalk Construction (Newport) | Tractors/Loaders/Backhoes | 0 | 6.00 | 97 | 0.37 |
| Utility Relocation | Tractors/Loaders/Backhoes | 0 | 6.00 | 97 | 0.37 |
| Utility Relocation | Welders | 0 | 8.00 | 46 | 0.45 |
| Sidewalk Construction (Crawford) | Tractors/Loaders/Backhoes | 0 | 6.00 | 97 | 0.37 |
| Storm Drain Construction | Cranes | 0 | 8.00 | 231 | 0.29 |
| Storm Drain Construction | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Storm Drain Construction | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Traffic Signal Modification | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Storm Drain Construction | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |

| | | | | | |
|---|---|---|---|---|---|
| Storm Drain Construction | Welders | 2 | 8.00 | 46 | 0.45 |
| Paving | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Sidewalk Construction (Newport) | Welders | 0 | 8.00 | 46 | 0.45 |
| Sidewalk Construction (Crawford) | Welders | 0 | 8.00 | 46 | 0.45 |
| Traffic Signal Modification | Welders | 0 | 8.00 | 46 | 0.45 |
| Demolition | Excavators | 1 | 8.00 | 158 | 0.38 |
| Utility Relocation | Off-Highway Trucks | 2 | 8.00 | 402 | 0.38 |
| Storm Drain Construction | Excavators | 1 | 8.00 | 158 | 0.38 |
| Storm Drain Construction | Cement and Mortar Mixers | 2 | 8.00 | 9 | 0.56 |
| Sidewalk Construction (Newport) | Cement and Mortar Mixers | 2 | 8.00 | 9 | 0.56 |
| Sidewalk Construction (Newport) | Plate Compactors | 1 | 8.00 | 81 | 0.73 |
| Sidewalk Construction (Newport) | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Sidewalk Construction (Crawford) | Cement and Mortar Mixers | 2 | 8.00 | 9 | 0.56 |
| Sidewalk Construction (Crawford) | Plate Compactors | 1 | 8.00 | 8 | 0.43 |
| Sidewalk Construction (Crawford) | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Traffic Signal Modification | Off-Highway Trucks | 1 | 8.00 | 402 | 0.38 |

## Trips and VMT

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 3 | 8.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Demolition | 5 | 10.00 | 0.00 | 32.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Utility Relocation | 2 | 6.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Storm Drain Construction | 6 | 12.00 | 14.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Sidewalk Construction (Newport) | 4 | 8.00 | 14.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Sidewalk Construction (Crawford) | 4 | 8.00 | 14.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Traffic Signal Modification | 3 | 10.00 | 14.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 5 | 8.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

## 3.2 Site Preparation - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 1.5900e-003 | 0.0000 | 1.5900e-003 | 1.7000e-004 | 0.0000 | 1.7000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.1100e-003 | 0.0246 | 0.0169 | 4.0000e-005 | | 9.7000e-004 | 9.7000e-004 | | 9.0000e-004 | 9.0000e-004 | 0.0000 | 3.1800 | 3.1800 | 1.0300e-003 | 0.0000 | 3.2057 |
| **Total** | **2.1100e-003** | **0.0246** | **0.0169** | **4.0000e-005** | **1.5900e-003** | **9.7000e-004** | **2.5600e-003** | **1.7000e-004** | **9.0000e-004** | **1.0700e-003** | **0.0000** | **3.1800** | **3.1800** | **1.0300e-003** | **0.0000** | **3.2057** |

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 9.0000e-005 | 7.0000e-005 | 7.7000e-004 | 0.0000 | 2.6000e-004 | 0.0000 | 2.7000e-004 | 7.0000e-005 | 0.0000 | 7.0000e-005 | 0.0000 | 0.2214 | 0.2214 | 1.0000e-005 | 0.0000 | 0.2215 |
| **Total** | **9.0000e-005** | **7.0000e-005** | **7.7000e-004** | **0.0000** | **2.6000e-004** | **0.0000** | **2.7000e-004** | **7.0000e-005** | **0.0000** | **7.0000e-005** | **0.0000** | **0.2214** | **0.2214** | **1.0000e-005** | **0.0000** | **0.2215** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 6.2000e-004 | 0.0000 | 6.2000e-004 | 7.0000e-005 | 0.0000 | 7.0000e-005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.1100e-003 | 0.0246 | 0.0169 | 4.0000e-005 | | 9.7000e-004 | 9.7000e-004 | | 9.0000e-004 | 9.0000e-004 | 0.0000 | 3.1800 | 3.1800 | 1.0300e-003 | 0.0000 | 3.2057 |
| **Total** | **2.1100e-003** | **0.0246** | **0.0169** | **4.0000e-005** | **6.2000e-004** | **9.7000e-004** | **1.5900e-003** | **7.0000e-005** | **9.0000e-004** | **9.7000e-004** | **0.0000** | **3.1800** | **3.1800** | **1.0300e-003** | **0.0000** | **3.2057** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 9.0000e-005 | 7.0000e-005 | 7.7000e-004 | 0.0000 | 2.6000e-004 | 0.0000 | 2.7000e-004 | 7.0000e-005 | 0.0000 | 7.0000e-005 | 0.0000 | 0.2214 | 0.2214 | 1.0000e-005 | 0.0000 | 0.2215 |
| **Total** | **9.0000e-005** | **7.0000e-005** | **7.7000e-004** | **0.0000** | **2.6000e-004** | **0.0000** | **2.7000e-004** | **7.0000e-005** | **0.0000** | **7.0000e-005** | **0.0000** | **0.2214** | **0.2214** | **1.0000e-005** | **0.0000** | **0.2215** |

## 3.3 Demolition - 2022

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Off-Road | 9.0500e-003 | 0.0774 | 0.1089 | 1.7000e-004 | | 4.0800e-003 | 4.0800e-003 | | 3.9400e-003 | 3.9400e-003 | 0.0000 | 15.0707 | 15.0707 | 2.7100e-003 | 0.0000 | 15.1383 |
| **Total** | **9.0500e-003** | **0.0774** | **0.1089** | **1.7000e-004** | | **4.0800e-003** | **4.0800e-003** | | **3.9400e-003** | **3.9400e-003** | **0.0000** | **15.0707** | **15.0707** | **2.7100e-003** | **0.0000** | **15.1383** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.2000e-004 | 3.9600e-003 | 9.3000e-004 | 1.0000e-005 | 2.7000e-004 | 1.0000e-005 | 2.9000e-004 | 8.0000e-005 | 1.0000e-005 | 9.0000e-005 | 0.0000 | 1.1864 | 1.1864 | 9.0000e-005 | 0.0000 | 1.1885 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.9000e-004 | 2.1000e-004 | 2.4200e-003 | 1.0000e-005 | 8.2000e-004 | 1.0000e-005 | 8.3000e-004 | 2.2000e-004 | 1.0000e-005 | 2.2000e-004 | 0.0000 | 0.6918 | 0.6918 | 2.0000e-005 | 0.0000 | 0.6922 |
| **Total** | **4.1000e-004** | **4.1700e-003** | **3.3500e-003** | **2.0000e-005** | **1.0900e-003** | **2.0000e-005** | **1.1200e-003** | **3.0000e-004** | **2.0000e-005** | **3.1000e-004** | **0.0000** | **1.8782** | **1.8782** | **1.1000e-004** | **0.0000** | **1.8807** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 9.0500e-003 | 0.0774 | 0.1089 | 1.7000e-004 | | 4.0800e-003 | 4.0800e-003 | | 3.9400e-003 | 3.9400e-003 | 0.0000 | 15.0707 | 15.0707 | 2.7100e-003 | 0.0000 | 15.1383 |
| **Total** | **9.0500e-003** | **0.0774** | **0.1089** | **1.7000e-004** | | **4.0800e-003** | **4.0800e-003** | | **3.9400e-003** | **3.9400e-003** | **0.0000** | **15.0707** | **15.0707** | **2.7100e-003** | **0.0000** | **15.1383** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.2000e-004 | 3.9600e-003 | 9.3000e-004 | 1.0000e-005 | 2.7000e-004 | 1.0000e-005 | 2.9000e-004 | 8.0000e-005 | 1.0000e-005 | 9.0000e-005 | 0.0000 | 1.1864 | 1.1864 | 9.0000e-005 | 0.0000 | 1.1885 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.9000e-004 | 2.1000e-004 | 2.4200e-003 | 1.0000e-005 | 8.2000e-004 | 1.0000e-005 | 8.3000e-004 | 2.2000e-004 | 1.0000e-005 | 2.2000e-004 | 0.0000 | 0.6918 | 0.6918 | 2.0000e-005 | 0.0000 | 0.6922 |
| **Total** | **4.1000e-004** | **4.1700e-003** | **3.3500e-003** | **2.0000e-005** | **1.0900e-003** | **2.0000e-005** | **1.1200e-003** | **3.0000e-004** | **2.0000e-005** | **3.1000e-004** | **0.0000** | **1.8782** | **1.8782** | **1.1000e-004** | **0.0000** | **1.8807** |

## 3.4 Utility Relocation - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 5.8400e-003 | 0.0444 | 0.0371 | 1.5000e-004 | | 1.6100e-003 | 1.6100e-003 | | 1.4800e-003 | 1.4800e-003 | 0.0000 | 12.8269 | 12.8269 | 4.1500e-003 | 0.0000 | 12.9306 |
| **Total** | **5.8400e-003** | **0.0444** | **0.0371** | **1.5000e-004** | | **1.6100e-003** | **1.6100e-003** | | **1.4800e-003** | **1.4800e-003** | **0.0000** | **12.8269** | **12.8269** | **4.1500e-003** | **0.0000** | **12.9306** |

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.3000e-004 | 9.0000e-005 | 1.0600e-003 | 0.0000 | 3.6000e-004 | 0.0000 | 3.6000e-004 | 1.0000e-004 | 0.0000 | 1.0000e-004 | 0.0000 | 0.3044 | 0.3044 | 1.0000e-005 | 0.0000 | 0.3046 |
| **Total** | **1.3000e-004** | **9.0000e-005** | **1.0600e-003** | **0.0000** | **3.6000e-004** | **0.0000** | **3.6000e-004** | **1.0000e-004** | **0.0000** | **1.0000e-004** | **0.0000** | **0.3044** | **0.3044** | **1.0000e-005** | **0.0000** | **0.3046** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 5.8400e-003 | 0.0444 | 0.0371 | 1.5000e-004 | | 1.6100e-003 | 1.6100e-003 | | 1.4800e-003 | 1.4800e-003 | 0.0000 | 12.8268 | 12.8268 | 4.1500e-003 | 0.0000 | 12.9306 |
| **Total** | **5.8400e-003** | **0.0444** | **0.0371** | **1.5000e-004** | | **1.6100e-003** | **1.6100e-003** | | **1.4800e-003** | **1.4800e-003** | **0.0000** | **12.8268** | **12.8268** | **4.1500e-003** | **0.0000** | **12.9306** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.3000e-004 | 9.0000e-005 | 1.0600e-003 | 0.0000 | 3.6000e-004 | 0.0000 | 3.6000e-004 | 1.0000e-004 | 0.0000 | 1.0000e-004 | 0.0000 | 0.3044 | 0.3044 | 1.0000e-005 | 0.0000 | 0.3046 |
| **Total** | **1.3000e-004** | **9.0000e-005** | **1.0600e-003** | **0.0000** | **3.6000e-004** | **0.0000** | **3.6000e-004** | **1.0000e-004** | **0.0000** | **1.0000e-004** | **0.0000** | **0.3044** | **0.3044** | **1.0000e-005** | **0.0000** | **0.3046** |

## 3.5 Storm Drain Construction - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0172 | 0.1175 | 0.1571 | 2.4000e-004 | | 5.4900e-003 | 5.4900e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.7546 | 19.7546 | 4.7900e-003 | 0.0000 | 19.8744 |
| **Total** | **0.0172** | **0.1175** | **0.1571** | **2.4000e-004** | | **5.4900e-003** | **5.4900e-003** | | **5.2600e-003** | **5.2600e-003** | **0.0000** | **19.7546** | **19.7546** | **4.7900e-003** | **0.0000** | **19.8744** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 6.2000e-004 | 0.0213 | 5.3800e-003 | 6.0000e-005 | 1.4600e-003 | 4.0000e-005 | 1.5000e-003 | 4.2000e-004 | 4.0000e-005 | 4.6000e-004 | 0.0000 | 5.5593 | 5.5593 | 3.5000e-004 | 0.0000 | 5.5680 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Worker | 7.7000e-004 | 5.5000e-004 | 6.3800e-003 | 2.0000e-005 | 2.1700e-003 | 2.0000e-005 | 2.1900e-003 | 5.8000e-004 | 1.0000e-005 | 5.9000e-004 | 0.0000 | 1.8263 | 1.8263 | 5.0000e-005 | 0.0000 | 1.8275 |
| **Total** | **1.3900e-003** | **0.0219** | **0.0118** | **8.0000e-005** | **3.6300e-003** | **6.0000e-005** | **3.6900e-003** | **1.0000e-003** | **5.0000e-005** | **1.0500e-003** | **0.0000** | **7.3856** | **7.3856** | **4.0000e-004** | **0.0000** | **7.3955** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0172 | 0.1175 | 0.1571 | 2.4000e-004 | | 5.4900e-003 | 5.4900e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.7546 | 19.7546 | 4.7900e-003 | 0.0000 | 19.8744 |
| **Total** | **0.0172** | **0.1175** | **0.1571** | **2.4000e-004** | | **5.4900e-003** | **5.4900e-003** | | **5.2600e-003** | **5.2600e-003** | **0.0000** | **19.7546** | **19.7546** | **4.7900e-003** | **0.0000** | **19.8744** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 6.2000e-004 | 0.0213 | 5.3800e-003 | 6.0000e-005 | 1.4600e-003 | 4.0000e-005 | 1.5000e-003 | 4.2000e-004 | 4.0000e-005 | 4.6000e-004 | 0.0000 | 5.5593 | 5.5593 | 3.5000e-004 | 0.0000 | 5.5680 |
| Worker | 7.7000e-004 | 5.5000e-004 | 6.3800e-003 | 2.0000e-005 | 2.1700e-003 | 2.0000e-005 | 2.1900e-003 | 5.8000e-004 | 1.0000e-005 | 5.9000e-004 | 0.0000 | 1.8263 | 1.8263 | 5.0000e-005 | 0.0000 | 1.8275 |
| **Total** | **1.3900e-003** | **0.0219** | **0.0118** | **8.0000e-005** | **3.6300e-003** | **6.0000e-005** | **3.6900e-003** | **1.0000e-003** | **5.0000e-005** | **1.0500e-003** | **0.0000** | **7.3856** | **7.3856** | **4.0000e-004** | **0.0000** | **7.3955** |

## 3.6 Sidewalk Construction (Newport) - 2022

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 3.8000e-003 | 0.0283 | 0.0343 | 6.0000e-005 | | 1.4300e-003 | 1.4300e-003 | | 1.4300e-003 | 1.4300e-003 | 0.0000 | 5.0345 | 5.0345 | 3.1000e-004 | 0.0000 | 5.0423 |
| **Total** | **3.8000e-003** | **0.0283** | **0.0343** | **6.0000e-005** | | **1.4300e-003** | **1.4300e-003** | | **1.4300e-003** | **1.4300e-003** | **0.0000** | **5.0345** | **5.0345** | **3.1000e-004** | **0.0000** | **5.0423** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 3.0000e-004 | 0.0103 | 2.6100e-003 | 3.0000e-005 | 7.1000e-004 | 2.0000e-005 | 7.3000e-004 | 2.0000e-004 | 2.0000e-005 | 2.2000e-004 | 0.0000 | 2.6954 | 2.6954 | 1.7000e-004 | 0.0000 | 2.6996 |
| Worker | 2.5000e-004 | 1.8000e-004 | 2.0600e-003 | 1.0000e-005 | 7.0000e-004 | 1.0000e-005 | 7.1000e-004 | 1.9000e-004 | 0.0000 | 1.9000e-004 | 0.0000 | 0.5903 | 0.5903 | 1.0000e-005 | 0.0000 | 0.5907 |
| **Total** | **5.5000e-004** | **0.0105** | **4.6700e-003** | **4.0000e-005** | **1.4100e-003** | **3.0000e-005** | **1.4400e-003** | **3.9000e-004** | **2.0000e-005** | **4.1000e-004** | **0.0000** | **3.2857** | **3.2857** | **1.8000e-004** | **0.0000** | **3.2903** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Off-Road | 3.8000e-003 | 0.0283 | 0.0343 | 6.0000e-005 | | 1.4300e-003 | 1.4300e-003 | | 1.4300e-003 | 1.4300e-003 | 0.0000 | 5.0345 | 5.0345 | 3.1000e-004 | 0.0000 | 5.0423 |
| **Total** | **3.8000e-003** | **0.0283** | **0.0343** | **6.0000e-005** | | **1.4300e-003** | **1.4300e-003** | | **1.4300e-003** | **1.4300e-003** | **0.0000** | **5.0345** | **5.0345** | **3.1000e-004** | **0.0000** | **5.0423** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 3.0000e-004 | 0.0103 | 2.6100e-003 | 3.0000e-005 | 7.1000e-004 | 2.0000e-005 | 7.3000e-004 | 2.0000e-004 | 2.0000e-005 | 2.2000e-004 | 0.0000 | 2.6954 | 2.6954 | 1.7000e-004 | 0.0000 | 2.6996 |
| Worker | 2.5000e-004 | 1.8000e-004 | 2.0600e-003 | 1.0000e-005 | 7.0000e-004 | 1.0000e-005 | 7.1000e-004 | 1.9000e-004 | 0.0000 | 1.9000e-004 | 0.0000 | 0.5903 | 0.5903 | 1.0000e-005 | 0.0000 | 0.5907 |
| **Total** | **5.5000e-004** | **0.0105** | **4.6700e-003** | **4.0000e-005** | **1.4100e-003** | **3.0000e-005** | **1.4400e-003** | **3.9000e-004** | **2.0000e-005** | **4.1000e-004** | **0.0000** | **3.2857** | **3.2857** | **1.8000e-004** | **0.0000** | **3.2903** |

## 3.7 Sidewalk Construction (Crawford) - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 4.1200e-003 | 0.0303 | 0.0359 | 7.0000e-005 | | 1.5100e-003 | 1.5100e-003 | | 1.5100e-003 | 1.5100e-003 | 0.0000 | 5.2847 | 5.2847 | 3.4000e-004 | 0.0000 | 5.2931 |
| **Total** | **4.1200e-003** | **0.0303** | **0.0359** | **7.0000e-005** | | **1.5100e-003** | **1.5100e-003** | | **1.5100e-003** | **1.5100e-003** | **0.0000** | **5.2847** | **5.2847** | **3.4000e-004** | **0.0000** | **5.2931** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 3.0000e-004 | 0.0103 | 2.6100e-003 | 3.0000e-005 | 7.1000e-004 | 2.0000e-005 | 7.3000e-004 | 2.0000e-004 | 2.0000e-005 | 2.2000e-004 | 0.0000 | 2.6954 | 2.6954 | 1.7000e-004 | 0.0000 | 2.6996 |
| Worker | 2.5000e-004 | 1.8000e-004 | 2.0600e-003 | 1.0000e-005 | 7.0000e-004 | 1.0000e-005 | 7.1000e-004 | 1.9000e-004 | 0.0000 | 1.9000e-004 | 0.0000 | 0.5903 | 0.5903 | 1.0000e-005 | 0.0000 | 0.5907 |
| **Total** | **5.5000e-004** | **0.0105** | **4.6700e-003** | **4.0000e-005** | **1.4100e-003** | **3.0000e-005** | **1.4400e-003** | **3.9000e-004** | **2.0000e-005** | **4.1000e-004** | **0.0000** | **3.2857** | **3.2857** | **1.8000e-004** | **0.0000** | **3.2903** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 4.1200e-003 | 0.0303 | 0.0359 | 7.0000e-005 | | 1.5100e-003 | 1.5100e-003 | | 1.5100e-003 | 1.5100e-003 | 0.0000 | 5.2847 | 5.2847 | 3.4000e-004 | 0.0000 | 5.2931 |
| **Total** | **4.1200e-003** | **0.0303** | **0.0359** | **7.0000e-005** | | **1.5100e-003** | **1.5100e-003** | | **1.5100e-003** | **1.5100e-003** | **0.0000** | **5.2847** | **5.2847** | **3.4000e-004** | **0.0000** | **5.2931** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 3.0000e-004 | 0.0103 | 2.6100e-003 | 3.0000e-005 | 7.1000e-004 | 2.0000e-005 | 7.3000e-004 | 2.0000e-004 | 2.0000e-005 | 2.2000e-004 | 0.0000 | 2.6954 | 2.6954 | 1.7000e-004 | 0.0000 | 2.6996 |
| Worker | 2.5000e-004 | 1.8000e-004 | 2.0600e-003 | 1.0000e-005 | 7.0000e-004 | 1.0000e-005 | 7.1000e-004 | 1.9000e-004 | 0.0000 | 1.9000e-004 | 0.0000 | 0.5903 | 0.5903 | 1.0000e-005 | 0.0000 | 0.5907 |
| **Total** | **5.5000e-004** | **0.0105** | **4.6700e-003** | **4.0000e-005** | **1.4100e-003** | **3.0000e-005** | **1.4400e-003** | **3.9000e-004** | **2.0000e-005** | **4.1000e-004** | **0.0000** | **3.2857** | **3.2857** | **1.8000e-004** | **0.0000** | **3.2903** |

## 3.8 Traffic Signal Modification - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 5.8800e-003 | 0.0544 | 0.0413 | 1.2000e-004 | | 2.2600e-003 | 2.2600e-003 | | 2.0800e-003 | 2.0800e-003 | 0.0000 | 10.7048 | 10.7048 | 3.4600e-003 | 0.0000 | 10.7913 |
| **Total** | **5.8800e-003** | **0.0544** | **0.0413** | **1.2000e-004** | | **2.2600e-003** | **2.2600e-003** | | **2.0800e-003** | **2.0800e-003** | **0.0000** | **10.7048** | **10.7048** | **3.4600e-003** | **0.0000** | **10.7913** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 2.1000e-004 | 7.1100e-003 | 1.7900e-003 | 2.0000e-005 | 4.9000e-004 | 1.0000e-005 | 5.0000e-004 | 1.4000e-004 | 1.0000e-005 | 1.5000e-004 | 0.0000 | 1.8531 | 1.8531 | 1.2000e-004 | 0.0000 | 1.8560 |
| Worker | 2.1000e-004 | 1.5000e-004 | 1.7700e-003 | 1.0000e-005 | 6.0000e-004 | 0.0000 | 6.1000e-004 | 1.6000e-004 | 0.0000 | 1.6000e-004 | 0.0000 | 0.5073 | 0.5073 | 1.0000e-005 | 0.0000 | 0.5076 |
| **Total** | **4.2000e-004** | **7.2600e-003** | **3.5600e-003** | **3.0000e-005** | **1.0900e-003** | **1.0000e-005** | **1.1100e-003** | **3.0000e-004** | **1.0000e-005** | **3.1000e-004** | **0.0000** | **2.3604** | **2.3604** | **1.3000e-004** | **0.0000** | **2.3636** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 5.8800e-003 | 0.0544 | 0.0413 | 1.2000e-004 | | 2.2600e-003 | 2.2600e-003 | | 2.0800e-003 | 2.0800e-003 | 0.0000 | 10.7047 | 10.7047 | 3.4600e-003 | 0.0000 | 10.7913 |
| **Total** | **5.8800e-003** | **0.0544** | **0.0413** | **1.2000e-004** | | **2.2600e-003** | **2.2600e-003** | | **2.0800e-003** | **2.0800e-003** | **0.0000** | **10.7047** | **10.7047** | **3.4600e-003** | **0.0000** | **10.7913** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 2.1000e-004 | 7.1100e-003 | 1.7900e-003 | 2.0000e-005 | 4.9000e-004 | 1.0000e-005 | 5.0000e-004 | 1.4000e-004 | 1.0000e-005 | 1.5000e-004 | 0.0000 | 1.8531 | 1.8531 | 1.2000e-004 | 0.0000 | 1.8560 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Worker | 2.1000e-004 | 1.5000e-004 | 1.7700e-003 | 1.0000e-005 | 6.0000e-004 | 0.0000 | 6.1000e-004 | 1.6000e-004 | 0.0000 | 1.6000e-004 | 0.0000 | 0.5073 | 0.5073 | 1.0000e-005 | 0.0000 | 0.5076 |
| **Total** | **4.2000e-004** | **7.2600e-003** | **3.5600e-003** | **3.0000e-005** | **1.0900e-003** | **1.0000e-005** | **1.1100e-003** | **3.0000e-004** | **1.0000e-005** | **3.1000e-004** | **0.0000** | **2.3604** | **2.3604** | **1.3000e-004** | **0.0000** | **2.3636** |

## 3.9 Paving - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.2000e-003 | 0.0609 | 0.0787 | 1.2000e-004 | | 3.1100e-003 | 3.1100e-003 | | 2.8700e-003 | 2.8700e-003 | 0.0000 | 10.5639 | 10.5639 | 3.3400e-003 | 0.0000 | 10.6473 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.2000e-003** | **0.0609** | **0.0787** | **1.2000e-004** | | **3.1100e-003** | **3.1100e-003** | | **2.8700e-003** | **2.8700e-003** | **0.0000** | **10.5639** | **10.5639** | **3.3400e-003** | **0.0000** | **10.6473** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.5000e-004 | 1.8000e-004 | 2.0600e-003 | 1.0000e-005 | 7.0000e-004 | 1.0000e-005 | 7.1000e-004 | 1.9000e-004 | 0.0000 | 1.9000e-004 | 0.0000 | 0.5903 | 0.5903 | 1.0000e-005 | 0.0000 | 0.5907 |
| **Total** | **2.5000e-004** | **1.8000e-004** | **2.0600e-003** | **1.0000e-005** | **7.0000e-004** | **1.0000e-005** | **7.1000e-004** | **1.9000e-004** | **0.0000** | **1.9000e-004** | **0.0000** | **0.5903** | **0.5903** | **1.0000e-005** | **0.0000** | **0.5907** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.2000e-003 | 0.0609 | 0.0787 | 1.2000e-004 | | 3.1100e-003 | 3.1100e-003 | | 2.8700e-003 | 2.8700e-003 | 0.0000 | 10.5639 | 10.5639 | 3.3400e-003 | 0.0000 | 10.6473 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.2000e-003** | **0.0609** | **0.0787** | **1.2000e-004** | | **3.1100e-003** | **3.1100e-003** | | **2.8700e-003** | **2.8700e-003** | **0.0000** | **10.5639** | **10.5639** | **3.3400e-003** | **0.0000** | **10.6473** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.5000e-004 | 1.8000e-004 | 2.0600e-003 | 1.0000e-005 | 7.0000e-004 | 1.0000e-005 | 7.1000e-004 | 1.9000e-004 | 0.0000 | 1.9000e-004 | 0.0000 | 0.5903 | 0.5903 | 1.0000e-005 | 0.0000 | 0.5907 |
| **Total** | **2.5000e-004** | **1.8000e-004** | **2.0600e-003** | **1.0000e-005** | **7.0000e-004** | **1.0000e-005** | **7.1000e-004** | **1.9000e-004** | **0.0000** | **1.9000e-004** | **0.0000** | **0.5903** | **0.5903** | **1.0000e-005** | **0.0000** | **0.5907** |

# 4.0 Operational Detail - Mobile

## 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Other Non-Asphalt Surfaces | 0.00 | 0.00 | 0.00 | | |
| Total | 0.00 | 0.00 | 0.00 | | |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Other Non-Asphalt Surfaces | 16.60 | 8.40 | 6.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Other Non-Asphalt Surfaces | 0.552712 | 0.042774 | 0.202769 | 0.116939 | 0.015078 | 0.005847 | 0.021692 | 0.031910 | 0.002110 | 0.001769 | 0.004822 | 0.000710 | 0.000869 |

# 5.0 Energy Detail

Historical Energy Use: N

## 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| NaturalGas Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| NaturalGas Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Other Non-Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Other Non-Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Other Non-Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |

| | | | | | |
|---|---|---|---|---|---|
| Other Non-Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 6.8500e-003 | 0.0000 | 3.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 5.0000e-005 | 5.0000e-005 | 0.0000 | 0.0000 | 5.0000e-005 |
| Unmitigated | 6.8500e-003 | 0.0000 | 3.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 5.0000e-005 | 5.0000e-005 | 0.0000 | 0.0000 | 5.0000e-005 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 1.2100e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Consumer Products | 5.6300e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.0000 | 0.0000 | 3.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 5.0000e-005 | 5.0000e-005 | 0.0000 | 0.0000 | 5.0000e-005 |
| **Total** | **6.8400e-003** | **0.0000** | **3.0000e-005** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **5.0000e-005** | **5.0000e-005** | **0.0000** | **0.0000** | **5.0000e-005** |

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 1.2100e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 5.6300e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.0000 | 0.0000 | 3.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 5.0000e-005 | 5.0000e-005 | 0.0000 | 0.0000 | 5.0000e-005 |
| **Total** | **6.8400e-003** | **0.0000** | **3.0000e-005** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **5.0000e-005** | **5.0000e-005** | **0.0000** | **0.0000** | **5.0000e-005** |

# 7.0 Water Detail

## 7.1 Mitigation Measures Water

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

| | | | | |
|---|---|---|---|---|
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Other Non-Asphalt Surfaces | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Other Non-Asphalt Surfaces | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 8.0 Waste Detail

## 8.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Other Non-Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Other Non-Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# Crawford Canyon Sidewalk Extension

**South Coast Air Basin, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Other Non-Asphalt Surfaces | 2.00 | Acre | 2.00 | 87,120.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 31 |
| **Climate Zone** | 8 | | | **Operational Year** | 2023 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Schedule provided by applicant

Off-road Equipment - Equipment provided by Applicant

Trips and VMT - Project Data

Grading -

Vehicle Trips -

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Energy Use -

Construction Off-road Equipment Mitigation - Water exposed area 3 times daily

Fleet Mix - EMFAC2017

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Demolition -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstructionPhase | NumDays | 200.00 | 33.00 |
| tblConstructionPhase | NumDays | 20.00 | 15.00 |
| tblConstructionPhase | NumDays | 2.00 | 6.00 |
| tblConstructionPhase | NumDays | 200.00 | 16.00 |
| tblConstructionPhase | NumDays | 200.00 | 16.00 |
| tblConstructionPhase | NumDays | 200.00 | 11.00 |
| tblConstructionPhase | NumDays | 10.00 | 16.00 |
| tblConstructionPhase | PhaseEndDate | 4/14/2022 | 7/14/2022 |
| tblConstructionPhase | PhaseEndDate | 1/19/2023 | 8/15/2022 |
| tblConstructionPhase | PhaseEndDate | 7/8/2021 | 6/29/2022 |
| tblConstructionPhase | PhaseEndDate | 7/2/2021 | 6/8/2022 |
| tblConstructionPhase | PhaseStartDate | 7/9/2021 | 6/30/2022 |
| tblConstructionPhase | PhaseStartDate | 4/15/2022 | 6/30/2022 |
| tblConstructionPhase | PhaseStartDate | 7/3/2021 | 6/9/2022 |

| | | | |
|---|---|---|---|
| tblConstructionPhase | PhaseStartDate | 7/1/2021 | 6/1/2022 |
| tblOffRoadEquipment | HorsePower | 8.00 | 81.00 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.43 | 0.73 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Excavators |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Excavators |
| tblOffRoadEquipment | OffRoadEquipmentType | | Cement and Mortar Mixers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Cement and Mortar Mixers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Plate Compactors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Concrete/Industrial Saws |
| tblOffRoadEquipment | OffRoadEquipmentType | | Cement and Mortar Mixers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Plate Compactors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Concrete/Industrial Saws |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 8.00 | 7.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblTripsAndVMT | HaulingTripNumber | 16.00 | 32.00 |
| tblTripsAndVMT | WorkerTripNumber | 13.00 | 10.00 |
| tblTripsAndVMT | WorkerTripNumber | 5.00 | 6.00 |
| tblTripsAndVMT | WorkerTripNumber | 37.00 | 12.00 |
| tblTripsAndVMT | WorkerTripNumber | 37.00 | 8.00 |
| tblTripsAndVMT | WorkerTripNumber | 37.00 | 8.00 |
| tblTripsAndVMT | WorkerTripNumber | 37.00 | 10.00 |
| tblTripsAndVMT | WorkerTripNumber | 13.00 | 8.00 |

## 2.0 Emissions Summary

### 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2022 | 2.8118 | 24.4493 | 23.2716 | 0.0589 | 0.6197 | 0.9318 | 1.5358 | 0.1663 | 0.8843 | 1.0506 | 0.0000 | 5,613.1252 | 5,613.1252 | 1.2466 | 0.0000 | 5,644.2908 |
| **Maximum** | **2.8118** | **24.4493** | **23.2716** | **0.0589** | **0.6197** | **0.9318** | **1.5358** | **0.1663** | **0.8843** | **1.0506** | **0.0000** | **5,613.1252** | **5,613.1252** | **1.2466** | **0.0000** | **5,644.2908** |

## Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2022 | 2.8118 | 24.4493 | 23.2716 | 0.0589 | 0.6041 | 0.9318 | 1.5358 | 0.1663 | 0.8843 | 1.0506 | 0.0000 | 5,613.1252 | 5,613.1252 | 1.2466 | 0.0000 | 5,644.2908 |
| **Maximum** | **2.8118** | **24.4493** | **23.2716** | **0.0589** | **0.6041** | **0.9318** | **1.5358** | **0.1663** | **0.8843** | **1.0506** | **0.0000** | **5,613.1252** | **5,613.1252** | **1.2466** | **0.0000** | **5,644.2908** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **2.52** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 0.0375 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 4.4000e-004 | 4.4000e-004 | 0.0000 | | 4.7000e-004 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **0.0375** | **0.0000** | **2.0000e-004** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **4.4000e-004** | **4.4000e-004** | **0.0000** | **0.0000** | **4.7000e-004** |

## Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 0.0375 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 4.4000e-004 | 4.4000e-004 | 0.0000 | | 4.7000e-004 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **0.0375** | **0.0000** | **2.0000e-004** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **4.4000e-004** | **4.4000e-004** | **0.0000** | **0.0000** | **4.7000e-004** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

# 3.0 Construction Detail

## Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 6/1/2022 | 6/8/2022 | 5 | 6 | |
| 2 | Demolition | Demolition | 6/9/2022 | 6/29/2022 | 5 | 15 | |
| 3 | Utility Relocation | Trenching | 6/30/2022 | 7/14/2022 | 5 | 11 | |
| 4 | Storm Drain Construction | Building Construction | 6/30/2022 | 8/15/2022 | 5 | 33 | |
| 5 | Sidewalk Construction (Newport) | Building Construction | 6/30/2022 | 7/21/2022 | 5 | 16 | |
| 6 | Sidewalk Construction (Crawford) | Building Construction | 8/15/2022 | 9/5/2022 | 5 | 16 | |
| 7 | Traffic Signal Modification | Building Construction | 7/21/2022 | 8/4/2022 | 5 | 11 | |
| 8 | Paving | Paving | 9/6/2022 | 9/27/2022 | 5 | 16 | |

**Acres of Grading (Site Preparation Phase): 3**

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 2**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Paving | Cement and Mortar Mixers | 1 | 8.00 | 9 | 0.56 |
| Site Preparation | Graders | 1 | 8.00 | 187 | 0.41 |
| Demolition | Concrete/Industrial Saws | 2 | 8.00 | 81 | 0.73 |
| Sidewalk Construction (Newport) | Cranes | 0 | 8.00 | 231 | 0.29 |
| Site Preparation | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Sidewalk Construction (Crawford) | Cranes | 0 | 8.00 | 231 | 0.29 |
| Site Preparation | Tractors/Loaders/Backhoes | 2 | 7.00 | 97 | 0.37 |
| Traffic Signal Modification | Cranes | 1 | 8.00 | 231 | 0.29 |
| Demolition | Graders | 0 | 8.00 | 187 | 0.41 |
| Sidewalk Construction (Newport) | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Demolition | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Sidewalk Construction (Crawford) | Forklifts | 0 | 7.00 | 89 | 0.20 |

| | | | | | |
|---|---|---|---|---|---|
| Traffic Signal Modification | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Demolition | Tractors/Loaders/Backhoes | 2 | 7.00 | 97 | 0.37 |
| Utility Relocation | Cranes | 0 | 8.00 | 231 | 0.29 |
| Sidewalk Construction (Newport) | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Utility Relocation | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Utility Relocation | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Sidewalk Construction (Crawford) | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Traffic Signal Modification | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Paving | Pavers | 1 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 1 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 1 | 8.00 | 80 | 0.38 |
| Sidewalk Construction (Newport) | Tractors/Loaders/Backhoes | 0 | 6.00 | 97 | 0.37 |
| Utility Relocation | Tractors/Loaders/Backhoes | 0 | 6.00 | 97 | 0.37 |
| Utility Relocation | Welders | 0 | 8.00 | 46 | 0.45 |
| Sidewalk Construction (Crawford) | Tractors/Loaders/Backhoes | 0 | 6.00 | 97 | 0.37 |
| Storm Drain Construction | Cranes | 0 | 8.00 | 231 | 0.29 |
| Storm Drain Construction | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Storm Drain Construction | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Traffic Signal Modification | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Storm Drain Construction | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Storm Drain Construction | Welders | 2 | 8.00 | 46 | 0.45 |
| Paving | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Sidewalk Construction (Newport) | Welders | 0 | 8.00 | 46 | 0.45 |
| Sidewalk Construction (Crawford) | Welders | 0 | 8.00 | 46 | 0.45 |
| Traffic Signal Modification | Welders | 0 | 8.00 | 46 | 0.45 |
| Demolition | Excavators | 1 | 8.00 | 158 | 0.38 |
| Utility Relocation | Off-Highway Trucks | 2 | 8.00 | 402 | 0.38 |
| Storm Drain Construction | Excavators | 1 | 8.00 | 158 | 0.38 |
| Storm Drain Construction | Cement and Mortar Mixers | 2 | 8.00 | 9 | 0.56 |

| | | | | | |
|---|---|---|---|---|---|
| Sidewalk Construction (Newport) | Cement and Mortar Mixers | 2 | 8.00 | 9 | 0.56 |
| Sidewalk Construction (Newport) | Plate Compactors | 1 | 8.00 | 81 | 0.73 |
| Sidewalk Construction (Newport) | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Sidewalk Construction (Crawford) | Cement and Mortar Mixers | 2 | 8.00 | 9 | 0.56 |
| Sidewalk Construction (Crawford) | Plate Compactors | 1 | 8.00 | 8 | 0.43 |
| Sidewalk Construction (Crawford) | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Traffic Signal Modification | Off-Highway Trucks | 1 | 8.00 | 402 | 0.38 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 3 | 8.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Demolition | 5 | 10.00 | 0.00 | 32.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Utility Relocation | 2 | 6.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Storm Drain Construction | 6 | 12.00 | 14.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Sidewalk Construction (Newport) | 4 | 8.00 | 14.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Sidewalk Construction (Crawford) | 4 | 8.00 | 14.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Traffic Signal Modification | 3 | 10.00 | 14.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 5 | 8.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

## 3.2 Site Preparation - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Category | lb/day | | | | | | | | | | lb/day | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fugitive Dust | | | | | 0.5303 | 0.0000 | 0.5303 | 0.0573 | 0.0000 | 0.0573 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.7032 | 8.1900 | 5.6382 | 0.0121 | | 0.3249 | 0.3249 | | 0.2989 | 0.2989 | | 1,168.4471 | 1,168.4471 | 0.3779 | | 1,177.8946 |
| **Total** | **0.7032** | **8.1900** | **5.6382** | **0.0121** | **0.5303** | **0.3249** | **0.8552** | **0.0573** | **0.2989** | **0.3562** | | **1,168.4471** | **1,168.4471** | **0.3779** | | **1,177.8946** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0314 | 0.0197 | 0.2778 | 8.6000e-004 | 0.0894 | 6.4000e-004 | 0.0901 | 0.0237 | 5.9000e-004 | 0.0243 | | 85.3811 | 85.3811 | 2.1600e-003 | | 85.4350 |
| **Total** | **0.0314** | **0.0197** | **0.2778** | **8.6000e-004** | **0.0894** | **6.4000e-004** | **0.0901** | **0.0237** | **5.9000e-004** | **0.0243** | | **85.3811** | **85.3811** | **2.1600e-003** | | **85.4350** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.2068 | 0.0000 | 0.2068 | 0.0223 | 0.0000 | 0.0223 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.7032 | 8.1900 | 5.6382 | 0.0121 | | 0.3249 | 0.3249 | | 0.2989 | 0.2989 | 0.0000 | 1,168.4471 | 1,168.4471 | 0.3779 | | 1,177.8946 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total** | **0.7032** | **8.1900** | **5.6382** | **0.0121** | **0.2068** | **0.3249** | **0.5317** | **0.0223** | **0.2989** | **0.3213** | **0.0000** | **1,168.4471** | **1,168.4471** | **0.3779** | | **1,177.8946** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0314 | 0.0197 | 0.2778 | 8.6000e-004 | 0.0894 | 6.4000e-004 | 0.0901 | 0.0237 | 5.9000e-004 | 0.0243 | | 85.3811 | 85.3811 | 2.1600e-003 | | 85.4350 |
| **Total** | **0.0314** | **0.0197** | **0.2778** | **8.6000e-004** | **0.0894** | **6.4000e-004** | **0.0901** | **0.0237** | **5.9000e-004** | **0.0243** | | **85.3811** | **85.3811** | **2.1600e-003** | | **85.4350** |

## 3.3 Demolition - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.2071 | 10.3206 | 14.5171 | 0.0232 | | 0.5444 | 0.5444 | | 0.5249 | 0.5249 | | 2,215.0128 | 2,215.0128 | 0.3977 | | 2,224.9548 |
| **Total** | **1.2071** | **10.3206** | **14.5171** | **0.0232** | | **0.5444** | **0.5444** | | **0.5249** | **0.5249** | | **2,215.0128** | **2,215.0128** | **0.3977** | | **2,224.9548** |

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0154 | 0.5120 | 0.1209 | 1.6100e-003 | 0.0373 | 1.4900e-003 | 0.0388 | 0.0102 | 1.4300e-003 | 0.0116 | | 175.6449 | 175.6449 | 0.0123 | | 175.9531 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0393 | 0.0247 | 0.3472 | 1.0700e-003 | 0.1118 | 8.0000e-004 | 0.1126 | 0.0296 | 7.4000e-004 | 0.0304 | | 106.7263 | 106.7263 | 2.7000e-003 | | 106.7937 |
| **Total** | **0.0547** | **0.5367** | **0.4681** | **2.6800e-003** | **0.1490** | **2.2900e-003** | **0.1513** | **0.0399** | **2.1700e-003** | **0.0420** | | **282.3713** | **282.3713** | **0.0150** | | **282.7469** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.2071 | 10.3206 | 14.5171 | 0.0232 | | 0.5444 | 0.5444 | | 0.5249 | 0.5249 | 0.0000 | 2,215.0128 | 2,215.0128 | 0.3977 | | 2,224.9548 |
| **Total** | **1.2071** | **10.3206** | **14.5171** | **0.0232** | | **0.5444** | **0.5444** | | **0.5249** | **0.5249** | **0.0000** | **2,215.0128** | **2,215.0128** | **0.3977** | | **2,224.9548** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Category | lb/day | | | | | | | | | | lb/day | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hauling | 0.0154 | 0.5120 | 0.1209 | 1.6100e-003 | 0.0373 | 1.4900e-003 | 0.0388 | 0.0102 | 1.4300e-003 | 0.0116 | | 175.6449 | 175.6449 | 0.0123 | | 175.9531 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0393 | 0.0247 | 0.3472 | 1.0700e-003 | 0.1118 | 8.0000e-004 | 0.1126 | 0.0296 | 7.4000e-004 | 0.0304 | | 106.7263 | 106.7263 | 2.7000e-003 | | 106.7937 |
| **Total** | **0.0547** | **0.5367** | **0.4681** | **2.6800e-003** | **0.1490** | **2.2900e-003** | **0.1513** | **0.0399** | **2.1700e-003** | **0.0420** | | **282.3713** | **282.3713** | **0.0150** | | **282.7469** |

## 3.4 Utility Relocation - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0621 | 8.0676 | 6.7510 | 0.0266 | | 0.2934 | 0.2934 | | 0.2699 | 0.2699 | | 2,570.7604 | 2,570.7604 | 0.8314 | | 2,591.5463 |
| **Total** | **1.0621** | **8.0676** | **6.7510** | **0.0266** | | **0.2934** | **0.2934** | | **0.2699** | **0.2699** | | **2,570.7604** | **2,570.7604** | **0.8314** | | **2,591.5463** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Worker | 0.0236 | 0.0148 | 0.2083 | 6.4000e-004 | 0.0671 | 4.8000e-004 | 0.0676 | 0.0178 | 4.4000e-004 | 0.0182 | | 64.0358 | 64.0358 | 1.6200e-003 | | 64.0762 |
| **Total** | **0.0236** | **0.0148** | **0.2083** | **6.4000e-004** | **0.0671** | **4.8000e-004** | **0.0676** | **0.0178** | **4.4000e-004** | **0.0182** | | **64.0358** | **64.0358** | **1.6200e-003** | | **64.0762** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0621 | 8.0676 | 6.7510 | 0.0266 | | 0.2934 | 0.2934 | | 0.2699 | 0.2699 | 0.0000 | 2,570.7604 | 2,570.7604 | 0.8314 | | 2,591.5463 |
| **Total** | **1.0621** | **8.0676** | **6.7510** | **0.0266** | | **0.2934** | **0.2934** | | **0.2699** | **0.2699** | **0.0000** | **2,570.7604** | **2,570.7604** | **0.8314** | | **2,591.5463** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0236 | 0.0148 | 0.2083 | 6.4000e-004 | 0.0671 | 4.8000e-004 | 0.0676 | 0.0178 | 4.4000e-004 | 0.0182 | | 64.0358 | 64.0358 | 1.6200e-003 | | 64.0762 |
| **Total** | **0.0236** | **0.0148** | **0.2083** | **6.4000e-004** | **0.0671** | **4.8000e-004** | **0.0676** | **0.0178** | **4.4000e-004** | **0.0182** | | **64.0358** | **64.0358** | **1.6200e-003** | | **64.0762** |

## 3.5 Storm Drain Construction - 2022

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0391 | 7.1237 | 9.5179 | 0.0148 | | 0.3329 | 0.3329 | | 0.3188 | 0.3188 | | 1,319.7424 | 1,319.7424 | 0.3201 | | 1,327.7447 |
| **Total** | **1.0391** | **7.1237** | **9.5179** | **0.0148** | | **0.3329** | **0.3329** | | **0.3188** | **0.3188** | | **1,319.7424** | **1,319.7424** | **0.3201** | | **1,327.7447** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0370 | 1.2735 | 0.3082 | 3.5100e-003 | 0.0896 | 2.3800e-003 | 0.0920 | 0.0258 | 2.2800e-003 | 0.0281 | | 375.7183 | 375.7183 | 0.0226 | | 376.2842 |
| Worker | 0.0471 | 0.0296 | 0.4167 | 1.2900e-003 | 0.1341 | 9.6000e-004 | 0.1351 | 0.0356 | 8.9000e-004 | 0.0365 | | 128.0716 | 128.0716 | 3.2400e-003 | | 128.1525 |
| **Total** | **0.0841** | **1.3031** | **0.7249** | **4.8000e-003** | **0.2237** | **3.3400e-003** | **0.2271** | **0.0614** | **3.1700e-003** | **0.0645** | | **503.7899** | **503.7899** | **0.0259** | | **504.4367** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Category | lb/day | | | | | | | | | | lb/day | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Off-Road | 1.0391 | 7.1237 | 9.5179 | 0.0148 | | 0.3329 | 0.3329 | | 0.3188 | 0.3188 | 0.0000 | 1,319.7424 | 1,319.7424 | 0.3201 | | 1,327.7447 |
| **Total** | **1.0391** | **7.1237** | **9.5179** | **0.0148** | | **0.3329** | **0.3329** | | **0.3188** | **0.3188** | **0.0000** | **1,319.7424** | **1,319.7424** | **0.3201** | | **1,327.7447** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0370 | 1.2735 | 0.3082 | 3.5100e-003 | 0.0896 | 2.3800e-003 | 0.0920 | 0.0258 | 2.2800e-003 | 0.0281 | | 375.7183 | 375.7183 | 0.0226 | | 376.2842 |
| Worker | 0.0471 | 0.0296 | 0.4167 | 1.2900e-003 | 0.1341 | 9.6000e-004 | 0.1351 | 0.0356 | 8.9000e-004 | 0.0365 | | 128.0716 | 128.0716 | 3.2400e-003 | | 128.1525 |
| **Total** | **0.0841** | **1.3031** | **0.7249** | **4.8000e-003** | **0.2237** | **3.3400e-003** | **0.2271** | **0.0614** | **3.1700e-003** | **0.0645** | | **503.7899** | **503.7899** | **0.0259** | | **504.4367** |

## 3.6 Sidewalk Construction (Newport) - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.4752 | 3.5375 | 4.2816 | 7.6800e-003 | | 0.1788 | 0.1788 | | 0.1788 | 0.1788 | | 693.6973 | 693.6973 | 0.0428 | | 694.7677 |
| **Total** | **0.4752** | **3.5375** | **4.2816** | **7.6800e-003** | | **0.1788** | **0.1788** | | **0.1788** | **0.1788** | | **693.6973** | **693.6973** | **0.0428** | | **694.7677** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0370 | 1.2735 | 0.3082 | 3.5100e-003 | 0.0896 | 2.3800e-003 | 0.0920 | 0.0258 | 2.2800e-003 | 0.0281 | | 375.7183 | 375.7183 | 0.0226 | | 376.2842 |
| Worker | 0.0314 | 0.0197 | 0.2778 | 8.6000e-004 | 0.0894 | 6.4000e-004 | 0.0901 | 0.0237 | 5.9000e-004 | 0.0243 | | 85.3811 | 85.3811 | 2.1600e-003 | | 85.4350 |
| **Total** | **0.0684** | **1.2932** | **0.5860** | **4.3700e-003** | **0.1790** | **3.0200e-003** | **0.1820** | **0.0495** | **2.8700e-003** | **0.0524** | | **461.0994** | **461.0994** | **0.0248** | | **461.7192** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.4752 | 3.5375 | 4.2816 | 7.6800e-003 | | 0.1788 | 0.1788 | | 0.1788 | 0.1788 | 0.0000 | 693.6973 | 693.6973 | 0.0428 | | 694.7677 |
| **Total** | **0.4752** | **3.5375** | **4.2816** | **7.6800e-003** | | **0.1788** | **0.1788** | | **0.1788** | **0.1788** | **0.0000** | **693.6973** | **693.6973** | **0.0428** | | **694.7677** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0370 | 1.2735 | 0.3082 | 3.5100e-003 | 0.0896 | 2.3800e-003 | 0.0920 | 0.0258 | 2.2800e-003 | 0.0281 | | 375.7183 | 375.7183 | 0.0226 | | 376.2842 |
| Worker | 0.0314 | 0.0197 | 0.2778 | 8.6000e-004 | 0.0894 | 6.4000e-004 | 0.0901 | 0.0237 | 5.9000e-004 | 0.0243 | | 85.3811 | 85.3811 | 2.1600e-003 | | 85.4350 |
| **Total** | **0.0684** | **1.2932** | **0.5860** | **4.3700e-003** | **0.1790** | **3.0200e-003** | **0.1820** | **0.0495** | **2.8700e-003** | **0.0524** | | **461.0994** | **461.0994** | **0.0248** | | **461.7192** |

## 3.7 Sidewalk Construction (Crawford) - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.5153 | 3.7888 | 4.4920 | 8.1600e-003 | | 0.1886 | 0.1886 | | 0.1886 | 0.1886 | | 728.1767 | 728.1767 | 0.0464 | | 729.3366 |
| **Total** | **0.5153** | **3.7888** | **4.4920** | **8.1600e-003** | | **0.1886** | **0.1886** | | **0.1886** | **0.1886** | | **728.1767** | **728.1767** | **0.0464** | | **729.3366** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Category | lb/day | | | | | | | | | | lb/day | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0370 | 1.2735 | 0.3082 | 3.5100e-003 | 0.0896 | 2.3800e-003 | 0.0920 | 0.0258 | 2.2800e-003 | 0.0281 | | 375.7183 | 375.7183 | 0.0226 | | 376.2842 |
| Worker | 0.0314 | 0.0197 | 0.2778 | 8.6000e-004 | 0.0894 | 6.4000e-004 | 0.0901 | 0.0237 | 5.9000e-004 | 0.0243 | | 85.3811 | 85.3811 | 2.1600e-003 | | 85.4350 |
| **Total** | **0.0684** | **1.2932** | **0.5860** | **4.3700e-003** | **0.1790** | **3.0200e-003** | **0.1820** | **0.0495** | **2.8700e-003** | **0.0524** | | **461.0994** | **461.0994** | **0.0248** | | **461.7192** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.5153 | 3.7888 | 4.4920 | 8.1600e-003 | | 0.1886 | 0.1886 | | 0.1886 | 0.1886 | 0.0000 | 728.1767 | 728.1767 | 0.0464 | | 729.3366 |
| **Total** | **0.5153** | **3.7888** | **4.4920** | **8.1600e-003** | | **0.1886** | **0.1886** | | **0.1886** | **0.1886** | **0.0000** | **728.1767** | **728.1767** | **0.0464** | | **729.3366** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0370 | 1.2735 | 0.3082 | 3.5100e-003 | 0.0896 | 2.3800e-003 | 0.0920 | 0.0258 | 2.2800e-003 | 0.0281 | | 375.7183 | 375.7183 | 0.0226 | | 376.2842 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Worker | 0.0314 | 0.0197 | 0.2778 | 8.6000e-004 | 0.0894 | 6.4000e-004 | 0.0901 | 0.0237 | 5.9000e-004 | 0.0243 | | 85.3811 | 85.3811 | 2.1600e-003 | | 85.4350 |
| **Total** | **0.0684** | **1.2932** | **0.5860** | **4.3700e-003** | **0.1790** | **3.0200e-003** | **0.1820** | **0.0495** | **2.8700e-003** | **0.0524** | | **461.0994** | **461.0994** | **0.0248** | | **461.7192** |

## 3.8 Traffic Signal Modification - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0688 | 9.8937 | 7.5058 | 0.0222 | | 0.4105 | 0.4105 | | 0.3777 | 0.3777 | | 2,145.4495 | 2,145.4495 | 0.6939 | | 2,162.7966 |
| **Total** | **1.0688** | **9.8937** | **7.5058** | **0.0222** | | **0.4105** | **0.4105** | | **0.3777** | **0.3777** | | **2,145.4495** | **2,145.4495** | **0.6939** | | **2,162.7966** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0370 | 1.2735 | 0.3082 | 3.5100e-003 | 0.0896 | 2.3800e-003 | 0.0920 | 0.0258 | 2.2800e-003 | 0.0281 | | 375.7183 | 375.7183 | 0.0226 | | 376.2842 |
| Worker | 0.0393 | 0.0247 | 0.3472 | 1.0700e-003 | 0.1118 | 8.0000e-004 | 0.1126 | 0.0296 | 7.4000e-004 | 0.0304 | | 106.7263 | 106.7263 | 2.7000e-003 | | 106.7937 |
| **Total** | **0.0762** | **1.2982** | **0.6555** | **4.5800e-003** | **0.2014** | **3.1800e-003** | **0.2045** | **0.0554** | **3.0200e-003** | **0.0585** | | **482.4446** | **482.4446** | **0.0253** | | **483.0779** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0688 | 9.8937 | 7.5058 | 0.0222 | | 0.4105 | 0.4105 | | 0.3777 | 0.3777 | 0.0000 | 2,145.4495 | 2,145.4495 | 0.6939 | | 2,162.7966 |
| **Total** | **1.0688** | **9.8937** | **7.5058** | **0.0222** | | **0.4105** | **0.4105** | | **0.3777** | **0.3777** | **0.0000** | **2,145.4495** | **2,145.4495** | **0.6939** | | **2,162.7966** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0370 | 1.2735 | 0.3082 | 3.5100e-003 | 0.0896 | 2.3800e-003 | 0.0920 | 0.0258 | 2.2800e-003 | 0.0281 | | 375.7183 | 375.7183 | 0.0226 | | 376.2842 |
| Worker | 0.0393 | 0.0247 | 0.3472 | 1.0700e-003 | 0.1118 | 8.0000e-004 | 0.1126 | 0.0296 | 7.4000e-004 | 0.0304 | | 106.7263 | 106.7263 | 2.7000e-003 | | 106.7937 |
| **Total** | **0.0762** | **1.2982** | **0.6555** | **4.5800e-003** | **0.2014** | **3.1800e-003** | **0.2045** | **0.0554** | **3.0200e-003** | **0.0585** | | **482.4446** | **482.4446** | **0.0253** | | **483.0779** |

## 3.9 Paving - 2022

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Category | lb/day | | | | | | | | | | lb/day | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Off-Road | 0.7749 | 7.6063 | 9.8366 | 0.0152 | | 0.3884 | 0.3884 | | 0.3585 | 0.3585 | | 1,455.5854 | 1,455.5854 | 0.4597 | | 1,467.0772 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.7749** | **7.6063** | **9.8366** | **0.0152** | | **0.3884** | **0.3884** | | **0.3585** | **0.3585** | | **1,455.5854** | **1,455.5854** | **0.4597** | | **1,467.0772** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0314 | 0.0197 | 0.2778 | 8.6000e-004 | 0.0894 | 6.4000e-004 | 0.0901 | 0.0237 | 5.9000e-004 | 0.0243 | | 85.3811 | 85.3811 | 2.1600e-003 | | 85.4350 |
| **Total** | **0.0314** | **0.0197** | **0.2778** | **8.6000e-004** | **0.0894** | **6.4000e-004** | **0.0901** | **0.0237** | **5.9000e-004** | **0.0243** | | **85.3811** | **85.3811** | **2.1600e-003** | | **85.4350** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.7749 | 7.6063 | 9.8366 | 0.0152 | | 0.3884 | 0.3884 | | 0.3585 | 0.3585 | 0.0000 | 1,455.5854 | 1,455.5854 | 0.4597 | | 1,467.0772 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total** | **0.7749** | **7.6063** | **9.8366** | **0.0152** | | **0.3884** | **0.3884** | | **0.3585** | **0.3585** | **0.0000** | **1,455.5854** | **1,455.5854** | **0.4597** | | **1,467.0772** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0314 | 0.0197 | 0.2778 | 8.6000e-004 | 0.0894 | 6.4000e-004 | 0.0901 | 0.0237 | 5.9000e-004 | 0.0243 | | 85.3811 | 85.3811 | 2.1600e-003 | | 85.4350 |
| **Total** | **0.0314** | **0.0197** | **0.2778** | **8.6000e-004** | **0.0894** | **6.4000e-004** | **0.0901** | **0.0237** | **5.9000e-004** | **0.0243** | | **85.3811** | **85.3811** | **2.1600e-003** | | **85.4350** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Other Non-Asphalt Surfaces | 0.00 | 0.00 | 0.00 | | |
| Total | 0.00 | 0.00 | 0.00 | | |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Other Non-Asphalt Surfaces | 16.60 | 8.40 | 6.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Other Non-Asphalt Surfaces | 0.552712 | 0.042774 | 0.202769 | 0.116939 | 0.015078 | 0.005847 | 0.021692 | 0.031910 | 0.002110 | 0.001769 | 0.004822 | 0.000710 | 0.000869 |

# 5.0 Energy Detail

Historical Energy Use: N

## 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NaturalGas Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Other Non-Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Other Non-Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.0375 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 4.4000e-004 | 4.4000e-004 | 0.0000 | | 4.7000e-004 |
| Unmitigated | 0.0375 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 4.4000e-004 | 4.4000e-004 | 0.0000 | | 4.7000e-004 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 6.6400e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 0.0309 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 2.0000e-005 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 4.4000e-004 | 4.4000e-004 | 0.0000 | | 4.7000e-004 |
| **Total** | **0.0375** | **0.0000** | **2.0000e-004** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **4.4000e-004** | **4.4000e-004** | **0.0000** | | **4.7000e-004** |

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 6.6400e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 0.0309 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 2.0000e-005 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 4.4000e-004 | 4.4000e-004 | 0.0000 | | 4.7000e-004 |
| **Total** | **0.0375** | **0.0000** | **2.0000e-004** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **4.4000e-004** | **4.4000e-004** | **0.0000** | | **4.7000e-004** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
| --- | --- |

## 11.0 Vegetation

# Crawford Canyon Sidewalk Extension

**South Coast Air Basin, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Other Non-Asphalt Surfaces | 2.00 | Acre | 2.00 | 87,120.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 31 |
| **Climate Zone** | 8 | | | **Operational Year** | 2023 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Schedule provided by applicant

Off-road Equipment - Equipment provided by Applicant

Trips and VMT - Project Data

Grading -

Vehicle Trips -

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Energy Use -

Construction Off-road Equipment Mitigation - Water exposed area 3 times daily

Fleet Mix - EMFAC2017

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Demolition -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstructionPhase | NumDays | 200.00 | 33.00 |
| tblConstructionPhase | NumDays | 20.00 | 15.00 |
| tblConstructionPhase | NumDays | 2.00 | 6.00 |
| tblConstructionPhase | NumDays | 200.00 | 16.00 |
| tblConstructionPhase | NumDays | 200.00 | 16.00 |
| tblConstructionPhase | NumDays | 200.00 | 11.00 |
| tblConstructionPhase | NumDays | 10.00 | 16.00 |
| tblConstructionPhase | PhaseEndDate | 4/14/2022 | 7/14/2022 |
| tblConstructionPhase | PhaseEndDate | 1/19/2023 | 8/15/2022 |
| tblConstructionPhase | PhaseEndDate | 7/8/2021 | 6/29/2022 |
| tblConstructionPhase | PhaseEndDate | 7/2/2021 | 6/8/2022 |
| tblConstructionPhase | PhaseStartDate | 7/9/2021 | 6/30/2022 |
| tblConstructionPhase | PhaseStartDate | 4/15/2022 | 6/30/2022 |
| tblConstructionPhase | PhaseStartDate | 7/3/2021 | 6/9/2022 |

| | | | |
|---|---|---|---|
| tblConstructionPhase | PhaseStartDate | 7/1/2021 | 6/1/2022 |
| tblOffRoadEquipment | HorsePower | 8.00 | 81.00 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.43 | 0.73 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Excavators |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Excavators |
| tblOffRoadEquipment | OffRoadEquipmentType | | Cement and Mortar Mixers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Cement and Mortar Mixers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Plate Compactors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Concrete/Industrial Saws |
| tblOffRoadEquipment | OffRoadEquipmentType | | Cement and Mortar Mixers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Plate Compactors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Concrete/Industrial Saws |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 8.00 | 7.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblTripsAndVMT | HaulingTripNumber | 16.00 | 32.00 |
| tblTripsAndVMT | WorkerTripNumber | 13.00 | 10.00 |
| tblTripsAndVMT | WorkerTripNumber | 5.00 | 6.00 |
| tblTripsAndVMT | WorkerTripNumber | 37.00 | 12.00 |
| tblTripsAndVMT | WorkerTripNumber | 37.00 | 8.00 |
| tblTripsAndVMT | WorkerTripNumber | 37.00 | 8.00 |
| tblTripsAndVMT | WorkerTripNumber | 37.00 | 10.00 |
| tblTripsAndVMT | WorkerTripNumber | 13.00 | 8.00 |

## 2.0 Emissions Summary

### 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2022 | 2.8297 | 24.4449 | 23.2747 | 0.0585 | 0.6197 | 0.9320 | 1.5361 | 0.1663 | 0.8845 | 1.0508 | 0.0000 | 5,575.3165 | 5,575.3165 | 1.2493 | 0.0000 | 5,606.5476 |
| **Maximum** | **2.8297** | **24.4449** | **23.2747** | **0.0585** | **0.6197** | **0.9320** | **1.5361** | **0.1663** | **0.8845** | **1.0508** | **0.0000** | **5,575.3165** | **5,575.3165** | **1.2493** | **0.0000** | **5,606.5476** |

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2022 | 2.8297 | 24.4449 | 23.2747 | 0.0585 | 0.6041 | 0.9320 | 1.5361 | 0.1663 | 0.8845 | 1.0508 | 0.0000 | 5,575.3165 | 5,575.3165 | 1.2493 | 0.0000 | 5,606.5476 |
| **Maximum** | **2.8297** | **24.4449** | **23.2747** | **0.0585** | **0.6041** | **0.9320** | **1.5361** | **0.1663** | **0.8845** | **1.0508** | **0.0000** | **5,575.3165** | **5,575.3165** | **1.2493** | **0.0000** | **5,606.5476** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **2.52** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 0.0375 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 4.4000e-004 | 4.4000e-004 | 0.0000 | | 4.7000e-004 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **0.0375** | **0.0000** | **2.0000e-004** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **4.4000e-004** | **4.4000e-004** | **0.0000** | **0.0000** | **4.7000e-004** |

## Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 0.0375 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 4.4000e-004 | 4.4000e-004 | 0.0000 | | 4.7000e-004 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **0.0375** | **0.0000** | **2.0000e-004** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **4.4000e-004** | **4.4000e-004** | **0.0000** | **0.0000** | **4.7000e-004** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

# 3.0 Construction Detail

## Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 6/1/2022 | 6/8/2022 | 5 | 6 | |
| 2 | Demolition | Demolition | 6/9/2022 | 6/29/2022 | 5 | 15 | |
| 3 | Utility Relocation | Trenching | 6/30/2022 | 7/14/2022 | 5 | 11 | |
| 4 | Storm Drain Construction | Building Construction | 6/30/2022 | 8/15/2022 | 5 | 33 | |
| 5 | Sidewalk Construction (Newport) | Building Construction | 6/30/2022 | 7/21/2022 | 5 | 16 | |
| 6 | Sidewalk Construction (Crawford) | Building Construction | 8/15/2022 | 9/5/2022 | 5 | 16 | |
| 7 | Traffic Signal Modification | Building Construction | 7/21/2022 | 8/4/2022 | 5 | 11 | |
| 8 | Paving | Paving | 9/6/2022 | 9/27/2022 | 5 | 16 | |

**Acres of Grading (Site Preparation Phase): 3**

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 2**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Paving | Cement and Mortar Mixers | 1 | 8.00 | 9 | 0.56 |
| Site Preparation | Graders | 1 | 8.00 | 187 | 0.41 |
| Demolition | Concrete/Industrial Saws | 2 | 8.00 | 81 | 0.73 |
| Sidewalk Construction (Newport) | Cranes | 0 | 8.00 | 231 | 0.29 |
| Site Preparation | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Sidewalk Construction (Crawford) | Cranes | 0 | 8.00 | 231 | 0.29 |
| Site Preparation | Tractors/Loaders/Backhoes | 2 | 7.00 | 97 | 0.37 |
| Traffic Signal Modification | Cranes | 1 | 8.00 | 231 | 0.29 |
| Demolition | Graders | 0 | 8.00 | 187 | 0.41 |
| Sidewalk Construction (Newport) | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Demolition | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Sidewalk Construction (Crawford) | Forklifts | 0 | 7.00 | 89 | 0.20 |

| | | | | | |
|---|---|---|---|---|---|
| Traffic Signal Modification | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Demolition | Tractors/Loaders/Backhoes | 2 | 7.00 | 97 | 0.37 |
| Utility Relocation | Cranes | 0 | 8.00 | 231 | 0.29 |
| Sidewalk Construction (Newport) | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Utility Relocation | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Utility Relocation | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Sidewalk Construction (Crawford) | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Traffic Signal Modification | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Paving | Pavers | 1 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 1 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 1 | 8.00 | 80 | 0.38 |
| Sidewalk Construction (Newport) | Tractors/Loaders/Backhoes | 0 | 6.00 | 97 | 0.37 |
| Utility Relocation | Tractors/Loaders/Backhoes | 0 | 6.00 | 97 | 0.37 |
| Utility Relocation | Welders | 0 | 8.00 | 46 | 0.45 |
| Sidewalk Construction (Crawford) | Tractors/Loaders/Backhoes | 0 | 6.00 | 97 | 0.37 |
| Storm Drain Construction | Cranes | 0 | 8.00 | 231 | 0.29 |
| Storm Drain Construction | Forklifts | 0 | 7.00 | 89 | 0.20 |
| Storm Drain Construction | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Traffic Signal Modification | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Storm Drain Construction | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Storm Drain Construction | Welders | 2 | 8.00 | 46 | 0.45 |
| Paving | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Sidewalk Construction (Newport) | Welders | 0 | 8.00 | 46 | 0.45 |
| Sidewalk Construction (Crawford) | Welders | 0 | 8.00 | 46 | 0.45 |
| Traffic Signal Modification | Welders | 0 | 8.00 | 46 | 0.45 |
| Demolition | Excavators | 1 | 8.00 | 158 | 0.38 |
| Utility Relocation | Off-Highway Trucks | 2 | 8.00 | 402 | 0.38 |
| Storm Drain Construction | Excavators | 1 | 8.00 | 158 | 0.38 |
| Storm Drain Construction | Cement and Mortar Mixers | 2 | 8.00 | 9 | 0.56 |

| | | | | | |
|---|---|---|---|---|---|
| Sidewalk Construction (Newport) | Cement and Mortar Mixers | 2 | 8.00 | 9 | 0.56 |
| Sidewalk Construction (Newport) | Plate Compactors | 1 | 8.00 | 81 | 0.73 |
| Sidewalk Construction (Newport) | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Sidewalk Construction (Crawford) | Cement and Mortar Mixers | 2 | 8.00 | 9 | 0.56 |
| Sidewalk Construction (Crawford) | Plate Compactors | 1 | 8.00 | 8 | 0.43 |
| Sidewalk Construction (Crawford) | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Traffic Signal Modification | Off-Highway Trucks | 1 | 8.00 | 402 | 0.38 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 3 | 8.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Demolition | 5 | 10.00 | 0.00 | 32.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Utility Relocation | 2 | 6.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Storm Drain Construction | 6 | 12.00 | 14.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Sidewalk Construction (Newport) | 4 | 8.00 | 14.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Sidewalk Construction (Crawford) | 4 | 8.00 | 14.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Traffic Signal Modification | 3 | 10.00 | 14.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 5 | 8.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

## 3.2 Site Preparation - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Category | lb/day | | | | | | | | | | lb/day | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fugitive Dust | | | | | 0.5303 | 0.0000 | 0.5303 | 0.0573 | 0.0000 | 0.0573 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.7032 | 8.1900 | 5.6382 | 0.0121 | | 0.3249 | 0.3249 | | 0.2989 | 0.2989 | | 1,168.4471 | 1,168.4471 | 0.3779 | | 1,177.8946 |
| **Total** | **0.7032** | **8.1900** | **5.6382** | **0.0121** | **0.5303** | **0.3249** | **0.8552** | **0.0573** | **0.2989** | **0.3562** | | **1,168.4471** | **1,168.4471** | **0.3779** | | **1,177.8946** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0347 | 0.0217 | 0.2510 | 8.0000e-004 | 0.0894 | 6.4000e-004 | 0.0901 | 0.0237 | 5.9000e-004 | 0.0243 | | 80.0783 | 80.0783 | 2.0200e-003 | | 80.1288 |
| **Total** | **0.0347** | **0.0217** | **0.2510** | **8.0000e-004** | **0.0894** | **6.4000e-004** | **0.0901** | **0.0237** | **5.9000e-004** | **0.0243** | | **80.0783** | **80.0783** | **2.0200e-003** | | **80.1288** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.2068 | 0.0000 | 0.2068 | 0.0223 | 0.0000 | 0.0223 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.7032 | 8.1900 | 5.6382 | 0.0121 | | 0.3249 | 0.3249 | | 0.2989 | 0.2989 | 0.0000 | 1,168.4471 | 1,168.4471 | 0.3779 | | 1,177.8946 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total** | **0.7032** | **8.1900** | **5.6382** | **0.0121** | **0.2068** | **0.3249** | **0.5317** | **0.0223** | **0.2989** | **0.3213** | **0.0000** | **1,168.4471** | **1,168.4471** | **0.3779** | | **1,177.8946** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0347 | 0.0217 | 0.2510 | 8.0000e-004 | 0.0894 | 6.4000e-004 | 0.0901 | 0.0237 | 5.9000e-004 | 0.0243 | | 80.0783 | 80.0783 | 2.0200e-003 | | 80.1288 |
| **Total** | **0.0347** | **0.0217** | **0.2510** | **8.0000e-004** | **0.0894** | **6.4000e-004** | **0.0901** | **0.0237** | **5.9000e-004** | **0.0243** | | **80.0783** | **80.0783** | **2.0200e-003** | | **80.1288** |

## 3.3 Demolition - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.2071 | 10.3206 | 14.5171 | 0.0232 | | 0.5444 | 0.5444 | | 0.5249 | 0.5249 | | 2,215.0128 | 2,215.0128 | 0.3977 | | 2,224.9548 |
| **Total** | **1.2071** | **10.3206** | **14.5171** | **0.0232** | | **0.5444** | **0.5444** | | **0.5249** | **0.5249** | | **2,215.0128** | **2,215.0128** | **0.3977** | | **2,224.9548** |

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0158 | 0.5178 | 0.1285 | 1.5900e-003 | 0.0373 | 1.5100e-003 | 0.0388 | 0.0102 | 1.4500e-003 | 0.0117 | | 172.6033 | 172.6033 | 0.0128 | | 172.9227 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0434 | 0.0271 | 0.3137 | 1.0000e-003 | 0.1118 | 8.0000e-004 | 0.1126 | 0.0296 | 7.4000e-004 | 0.0304 | | 100.0979 | 100.0979 | 2.5200e-003 | | 100.1609 |
| **Total** | **0.0592** | **0.5449** | **0.4423** | **2.5900e-003** | **0.1490** | **2.3100e-003** | **0.1514** | **0.0399** | **2.1900e-003** | **0.0420** | | **272.7012** | **272.7012** | **0.0153** | | **273.0836** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.2071 | 10.3206 | 14.5171 | 0.0232 | | 0.5444 | 0.5444 | | 0.5249 | 0.5249 | 0.0000 | 2,215.0128 | 2,215.0128 | 0.3977 | | 2,224.9548 |
| **Total** | **1.2071** | **10.3206** | **14.5171** | **0.0232** | | **0.5444** | **0.5444** | | **0.5249** | **0.5249** | **0.0000** | **2,215.0128** | **2,215.0128** | **0.3977** | | **2,224.9548** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Category | lb/day | | | | | | | | | | lb/day | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hauling | 0.0158 | 0.5178 | 0.1285 | 1.5900e-003 | 0.0373 | 1.5100e-003 | 0.0388 | 0.0102 | 1.4500e-003 | 0.0117 | | 172.6033 | 172.6033 | 0.0128 | | 172.9227 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0434 | 0.0271 | 0.3137 | 1.0000e-003 | 0.1118 | 8.0000e-004 | 0.1126 | 0.0296 | 7.4000e-004 | 0.0304 | | 100.0979 | 100.0979 | 2.5200e-003 | | 100.1609 |
| **Total** | **0.0592** | **0.5449** | **0.4423** | **2.5900e-003** | **0.1490** | **2.3100e-003** | **0.1514** | **0.0399** | **2.1900e-003** | **0.0420** | | **272.7012** | **272.7012** | **0.0153** | | **273.0836** |

## 3.4 Utility Relocation - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0621 | 8.0676 | 6.7510 | 0.0266 | | 0.2934 | 0.2934 | | 0.2699 | 0.2699 | | 2,570.7604 | 2,570.7604 | 0.8314 | | 2,591.5463 |
| **Total** | **1.0621** | **8.0676** | **6.7510** | **0.0266** | | **0.2934** | **0.2934** | | **0.2699** | **0.2699** | | **2,570.7604** | **2,570.7604** | **0.8314** | | **2,591.5463** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Worker | 0.0260 | 0.0163 | 0.1882 | 6.0000e-004 | 0.0671 | 4.8000e-004 | 0.0676 | 0.0178 | 4.4000e-004 | 0.0182 | | 60.0587 | 60.0587 | 1.5100e-003 | | 60.0966 |
| **Total** | **0.0260** | **0.0163** | **0.1882** | **6.0000e-004** | **0.0671** | **4.8000e-004** | **0.0676** | **0.0178** | **4.4000e-004** | **0.0182** | | **60.0587** | **60.0587** | **1.5100e-003** | | **60.0966** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0621 | 8.0676 | 6.7510 | 0.0266 | | 0.2934 | 0.2934 | | 0.2699 | 0.2699 | 0.0000 | 2,570.7604 | 2,570.7604 | 0.8314 | | 2,591.5463 |
| **Total** | **1.0621** | **8.0676** | **6.7510** | **0.0266** | | **0.2934** | **0.2934** | | **0.2699** | **0.2699** | **0.0000** | **2,570.7604** | **2,570.7604** | **0.8314** | | **2,591.5463** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0260 | 0.0163 | 0.1882 | 6.0000e-004 | 0.0671 | 4.8000e-004 | 0.0676 | 0.0178 | 4.4000e-004 | 0.0182 | | 60.0587 | 60.0587 | 1.5100e-003 | | 60.0966 |
| **Total** | **0.0260** | **0.0163** | **0.1882** | **6.0000e-004** | **0.0671** | **4.8000e-004** | **0.0676** | **0.0178** | **4.4000e-004** | **0.0182** | | **60.0587** | **60.0587** | **1.5100e-003** | | **60.0966** |

## 3.5 Storm Drain Construction - 2022

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0391 | 7.1237 | 9.5179 | 0.0148 | | 0.3329 | 0.3329 | | 0.3188 | 0.3188 | | 1,319.7424 | 1,319.7424 | 0.3201 | | 1,327.7447 |
| **Total** | **1.0391** | **7.1237** | **9.5179** | **0.0148** | | **0.3329** | **0.3329** | | **0.3188** | **0.3188** | | **1,319.7424** | **1,319.7424** | **0.3201** | | **1,327.7447** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0388 | 1.2696 | 0.3428 | 3.4100e-003 | 0.0896 | 2.4600e-003 | 0.0920 | 0.0258 | 2.3500e-003 | 0.0281 | | 365.4310 | 365.4310 | 0.0242 | | 366.0352 |
| Worker | 0.0521 | 0.0325 | 0.3765 | 1.2100e-003 | 0.1341 | 9.6000e-004 | 0.1351 | 0.0356 | 8.9000e-004 | 0.0365 | | 120.1175 | 120.1175 | 3.0300e-003 | | 120.1931 |
| **Total** | **0.0909** | **1.3021** | **0.7192** | **4.6200e-003** | **0.2237** | **3.4200e-003** | **0.2271** | **0.0614** | **3.2400e-003** | **0.0646** | | **485.5484** | **485.5484** | **0.0272** | | **486.2283** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Category | lb/day | | | | | | | | | | lb/day | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Off-Road | 1.0391 | 7.1237 | 9.5179 | 0.0148 | | 0.3329 | 0.3329 | | 0.3188 | 0.3188 | 0.0000 | 1,319.7424 | 1,319.7424 | 0.3201 | | 1,327.7447 |
| **Total** | **1.0391** | **7.1237** | **9.5179** | **0.0148** | | **0.3329** | **0.3329** | | **0.3188** | **0.3188** | **0.0000** | **1,319.7424** | **1,319.7424** | **0.3201** | | **1,327.7447** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0388 | 1.2696 | 0.3428 | 3.4100e-003 | 0.0896 | 2.4600e-003 | 0.0920 | 0.0258 | 2.3500e-003 | 0.0281 | | 365.4310 | 365.4310 | 0.0242 | | 366.0352 |
| Worker | 0.0521 | 0.0325 | 0.3765 | 1.2100e-003 | 0.1341 | 9.6000e-004 | 0.1351 | 0.0356 | 8.9000e-004 | 0.0365 | | 120.1175 | 120.1175 | 3.0300e-003 | | 120.1931 |
| **Total** | **0.0909** | **1.3021** | **0.7192** | **4.6200e-003** | **0.2237** | **3.4200e-003** | **0.2271** | **0.0614** | **3.2400e-003** | **0.0646** | | **485.5484** | **485.5484** | **0.0272** | | **486.2283** |

## 3.6 Sidewalk Construction (Newport) - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.4752 | 3.5375 | 4.2816 | 7.6800e-003 | | 0.1788 | 0.1788 | | 0.1788 | 0.1788 | | 693.6973 | 693.6973 | 0.0428 | | 694.7677 |
| **Total** | **0.4752** | **3.5375** | **4.2816** | **7.6800e-003** | | **0.1788** | **0.1788** | | **0.1788** | **0.1788** | | **693.6973** | **693.6973** | **0.0428** | | **694.7677** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0388 | 1.2696 | 0.3428 | 3.4100e-003 | 0.0896 | 2.4600e-003 | 0.0920 | 0.0258 | 2.3500e-003 | 0.0281 | | 365.4310 | 365.4310 | 0.0242 | | 366.0352 |
| Worker | 0.0347 | 0.0217 | 0.2510 | 8.0000e-004 | 0.0894 | 6.4000e-004 | 0.0901 | 0.0237 | 5.9000e-004 | 0.0243 | | 80.0783 | 80.0783 | 2.0200e-003 | | 80.1288 |
| **Total** | **0.0735** | **1.2912** | **0.5937** | **4.2100e-003** | **0.1790** | **3.1000e-003** | **0.1821** | **0.0495** | **2.9400e-003** | **0.0525** | | **445.5093** | **445.5093** | **0.0262** | | **446.1640** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.4752 | 3.5375 | 4.2816 | 7.6800e-003 | | 0.1788 | 0.1788 | | 0.1788 | 0.1788 | 0.0000 | 693.6973 | 693.6973 | 0.0428 | | 694.7677 |
| **Total** | **0.4752** | **3.5375** | **4.2816** | **7.6800e-003** | | **0.1788** | **0.1788** | | **0.1788** | **0.1788** | **0.0000** | **693.6973** | **693.6973** | **0.0428** | | **694.7677** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0388 | 1.2696 | 0.3428 | 3.4100e-003 | 0.0896 | 2.4600e-003 | 0.0920 | 0.0258 | 2.3500e-003 | 0.0281 | | 365.4310 | 365.4310 | 0.0242 | | 366.0352 |
| Worker | 0.0347 | 0.0217 | 0.2510 | 8.0000e-004 | 0.0894 | 6.4000e-004 | 0.0901 | 0.0237 | 5.9000e-004 | 0.0243 | | 80.0783 | 80.0783 | 2.0200e-003 | | 80.1288 |
| **Total** | **0.0735** | **1.2912** | **0.5937** | **4.2100e-003** | **0.1790** | **3.1000e-003** | **0.1821** | **0.0495** | **2.9400e-003** | **0.0525** | | **445.5093** | **445.5093** | **0.0262** | | **446.1640** |

## 3.7 Sidewalk Construction (Crawford) - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.5153 | 3.7888 | 4.4920 | 8.1600e-003 | | 0.1886 | 0.1886 | | 0.1886 | 0.1886 | | 728.1767 | 728.1767 | 0.0464 | | 729.3366 |
| **Total** | **0.5153** | **3.7888** | **4.4920** | **8.1600e-003** | | **0.1886** | **0.1886** | | **0.1886** | **0.1886** | | **728.1767** | **728.1767** | **0.0464** | | **729.3366** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Category | lb/day | | | | | | | | | | | lb/day | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0388 | 1.2696 | 0.3428 | 3.4100e-003 | 0.0896 | 2.4600e-003 | 0.0920 | 0.0258 | 2.3500e-003 | 0.0281 | | 365.4310 | 365.4310 | 0.0242 | | 366.0352 |
| Worker | 0.0347 | 0.0217 | 0.2510 | 8.0000e-004 | 0.0894 | 6.4000e-004 | 0.0901 | 0.0237 | 5.9000e-004 | 0.0243 | | 80.0783 | 80.0783 | 2.0200e-003 | | 80.1288 |
| **Total** | **0.0735** | **1.2912** | **0.5937** | **4.2100e-003** | **0.1790** | **3.1000e-003** | **0.1821** | **0.0495** | **2.9400e-003** | **0.0525** | | **445.5093** | **445.5093** | **0.0262** | | **446.1640** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.5153 | 3.7888 | 4.4920 | 8.1600e-003 | | 0.1886 | 0.1886 | | 0.1886 | 0.1886 | 0.0000 | 728.1767 | 728.1767 | 0.0464 | | 729.3366 |
| **Total** | **0.5153** | **3.7888** | **4.4920** | **8.1600e-003** | | **0.1886** | **0.1886** | | **0.1886** | **0.1886** | **0.0000** | **728.1767** | **728.1767** | **0.0464** | | **729.3366** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0388 | 1.2696 | 0.3428 | 3.4100e-003 | 0.0896 | 2.4600e-003 | 0.0920 | 0.0258 | 2.3500e-003 | 0.0281 | | 365.4310 | 365.4310 | 0.0242 | | 366.0352 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Worker | 0.0347 | 0.0217 | 0.2510 | 8.0000e-004 | 0.0894 | 6.4000e-004 | 0.0901 | 0.0237 | 5.9000e-004 | 0.0243 | | 80.0783 | 80.0783 | 2.0200e-003 | | 80.1288 |
| **Total** | **0.0735** | **1.2912** | **0.5937** | **4.2100e-003** | **0.1790** | **3.1000e-003** | **0.1821** | **0.0495** | **2.9400e-003** | **0.0525** | | **445.5093** | **445.5093** | **0.0262** | | **446.1640** |

## 3.8 Traffic Signal Modification - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0688 | 9.8937 | 7.5058 | 0.0222 | | 0.4105 | 0.4105 | | 0.3777 | 0.3777 | | 2,145.4495 | 2,145.4495 | 0.6939 | | 2,162.7966 |
| **Total** | **1.0688** | **9.8937** | **7.5058** | **0.0222** | | **0.4105** | **0.4105** | | **0.3777** | **0.3777** | | **2,145.4495** | **2,145.4495** | **0.6939** | | **2,162.7966** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0388 | 1.2696 | 0.3428 | 3.4100e-003 | 0.0896 | 2.4600e-003 | 0.0920 | 0.0258 | 2.3500e-003 | 0.0281 | | 365.4310 | 365.4310 | 0.0242 | | 366.0352 |
| Worker | 0.0434 | 0.0271 | 0.3137 | 1.0000e-003 | 0.1118 | 8.0000e-004 | 0.1126 | 0.0296 | 7.4000e-004 | 0.0304 | | 100.0979 | 100.0979 | 2.5200e-003 | | 100.1609 |
| **Total** | **0.0822** | **1.2967** | **0.6565** | **4.4100e-003** | **0.2014** | **3.2600e-003** | **0.2046** | **0.0554** | **3.0900e-003** | **0.0585** | | **465.5288** | **465.5288** | **0.0267** | | **466.1961** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0688 | 9.8937 | 7.5058 | 0.0222 | | 0.4105 | 0.4105 | | 0.3777 | 0.3777 | 0.0000 | 2,145.4495 | 2,145.4495 | 0.6939 | | 2,162.7966 |
| **Total** | **1.0688** | **9.8937** | **7.5058** | **0.0222** | | **0.4105** | **0.4105** | | **0.3777** | **0.3777** | **0.0000** | **2,145.4495** | **2,145.4495** | **0.6939** | | **2,162.7966** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0388 | 1.2696 | 0.3428 | 3.4100e-003 | 0.0896 | 2.4600e-003 | 0.0920 | 0.0258 | 2.3500e-003 | 0.0281 | | 365.4310 | 365.4310 | 0.0242 | | 366.0352 |
| Worker | 0.0434 | 0.0271 | 0.3137 | 1.0000e-003 | 0.1118 | 8.0000e-004 | 0.1126 | 0.0296 | 7.4000e-004 | 0.0304 | | 100.0979 | 100.0979 | 2.5200e-003 | | 100.1609 |
| **Total** | **0.0822** | **1.2967** | **0.6565** | **4.4100e-003** | **0.2014** | **3.2600e-003** | **0.2046** | **0.0554** | **3.0900e-003** | **0.0585** | | **465.5288** | **465.5288** | **0.0267** | | **466.1961** |

# 3.9 Paving - 2022

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Category | lb/day | | | | | | | | | | lb/day | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Off-Road | 0.7749 | 7.6063 | 9.8366 | 0.0152 | | 0.3884 | 0.3884 | | 0.3585 | 0.3585 | | 1,455.5854 | 1,455.5854 | 0.4597 | | 1,467.0772 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.7749** | **7.6063** | **9.8366** | **0.0152** | | **0.3884** | **0.3884** | | **0.3585** | **0.3585** | | **1,455.5854** | **1,455.5854** | **0.4597** | | **1,467.0772** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0347 | 0.0217 | 0.2510 | 8.0000e-004 | 0.0894 | 6.4000e-004 | 0.0901 | 0.0237 | 5.9000e-004 | 0.0243 | | 80.0783 | 80.0783 | 2.0200e-003 | | 80.1288 |
| **Total** | **0.0347** | **0.0217** | **0.2510** | **8.0000e-004** | **0.0894** | **6.4000e-004** | **0.0901** | **0.0237** | **5.9000e-004** | **0.0243** | | **80.0783** | **80.0783** | **2.0200e-003** | | **80.1288** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.7749 | 7.6063 | 9.8366 | 0.0152 | | 0.3884 | 0.3884 | | 0.3585 | 0.3585 | 0.0000 | 1,455.5854 | 1,455.5854 | 0.4597 | | 1,467.0772 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total** | **0.7749** | **7.6063** | **9.8366** | **0.0152** | | **0.3884** | **0.3884** | | **0.3585** | **0.3585** | **0.0000** | **1,455.5854** | **1,455.5854** | **0.4597** | | **1,467.0772** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0347 | 0.0217 | 0.2510 | 8.0000e-004 | 0.0894 | 6.4000e-004 | 0.0901 | 0.0237 | 5.9000e-004 | 0.0243 | | 80.0783 | 80.0783 | 2.0200e-003 | | 80.1288 |
| **Total** | **0.0347** | **0.0217** | **0.2510** | **8.0000e-004** | **0.0894** | **6.4000e-004** | **0.0901** | **0.0237** | **5.9000e-004** | **0.0243** | | **80.0783** | **80.0783** | **2.0200e-003** | | **80.1288** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Other Non-Asphalt Surfaces | 0.00 | 0.00 | 0.00 | | |
| Total | 0.00 | 0.00 | 0.00 | | |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Other Non-Asphalt Surfaces | 16.60 | 8.40 | 6.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Other Non-Asphalt Surfaces | 0.552712 | 0.042774 | 0.202769 | 0.116939 | 0.015078 | 0.005847 | 0.021692 | 0.031910 | 0.002110 | 0.001769 | 0.004822 | 0.000710 | 0.000869 |

# 5.0 Energy Detail

Historical Energy Use: N

## 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NaturalGas Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Other Non-Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Other Non-Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.0375 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 4.4000e-004 | 4.4000e-004 | 0.0000 | | 4.7000e-004 |
| Unmitigated | 0.0375 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 4.4000e-004 | 4.4000e-004 | 0.0000 | | 4.7000e-004 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 6.6400e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 0.0309 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 2.0000e-005 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 4.4000e-004 | 4.4000e-004 | 0.0000 | | 4.7000e-004 |
| **Total** | **0.0375** | **0.0000** | **2.0000e-004** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **4.4000e-004** | **4.4000e-004** | **0.0000** | | **4.7000e-004** |

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 6.6400e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 0.0309 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 2.0000e-005 | 0.0000 | 2.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 4.4000e-004 | 4.4000e-004 | 0.0000 | | 4.7000e-004 |
| **Total** | **0.0375** | **0.0000** | **2.0000e-004** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **4.4000e-004** | **4.4000e-004** | **0.0000** | | **4.7000e-004** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
| --- | --- |

## 11.0 Vegetation

# Appendix B
## Biological Constraints Survey Memorandum

ESA

2121 Alton Parkway
Suite 100
Irvine, CA 92606
949.753.7001 phone
949.753.7002 fax

esassoc.com

# memorandum

| | |
|---|---|
| date | March 26, 2021 |
| to | Natalia Gaerlan, PLA, LEED AP, Senior Project Manager, OC Parks - Planning & Design |
| cc | Scott Thomas, Manager, OC Parks – Planning & Design |
| from | Karla Flores, Senior Biologist |
| subject | Biological Constraints Survey Memorandum for the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project |

This memorandum presents the findings of a biological constraints survey, conducted by Environmental Science Associates (ESA), for the Crawford Canyon Park (Park) and Crawford Canyon Road Sidewalk Extension (Sidewalk Extension) project (Project). The survey included a preliminary database review for the project location, followed by two site visits to document existing conditions and to identify potential biological constraints. The assessment to identify potential biological constraints included two separate surveys, one for the Park site and one for the Sidewalk Extension site. Each site was evaluated for the potential to support special-status plant and wildlife species, sensitive habitats, wildlife movement corridors, and waters regulated by the United Stated Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB) and California Department of Fish and Wildlife (CDFW).

## Database Review

Prior to the onsite assessments, ESA conducted a query of the California Natural Diversity Database (CNDDB) and California Native Plant Society (CNPS) Online Rare Plant inventory for the Orange, California U.S. Geological Service 7.5-minute topographic quadrangle and the surrounding eight topographic quadrangles. The surrounding topographic quadrangles included in the query were: La Habra, Yorba Linda, Prado Dam, Anaheim, Black Star Canyon, Newport Beach, Tustin, and Lake Forest. The query was conducted to determine the potential for special-status plant and wildlife species to occur within the Park and the Sidewalk Extension sites, if suitable habitat for these species is present. Additionally, a brief review of the National Wetlands Inventory (NWI) and WebSoil Survey was conducted to determine the potential for hydric soils and wetland jurisdictional features to be present onsite. The CNDDB, CNPS, NWI and WebSoil query results are included as an attachment to this memo.

## Site Assessment

ESA biologist Karla Flores conducted two site visits to evaluate the Crawford Canyon Park site on April 15, 2020 and the Crawford Canyon Sidewalk Extension site on November 12, 2020 the potential of the sites to support

special-status species, sensitive habitats, wildlife movement corridors, and waters regulated by the USACE, RWQCB and the CDFW. Weather conditions for each site visit are summarized in **Table 1**, **Weather Details for Crawford Canyon Park and Sidewalk Extension Site Assessment**. Each site was surveyed on foot by walking the perimeter of the footprint, and examining areas with dense vegetation. Binoculars were used to aid in the identification of bird and other wildlife species detected.

**TABLE 1**
**WEATHER DETAILS FOR CRAWFORD CANYON PARK AND SIDEWALK EXTENSION SITE ASSESSMENT**

| Survey Location | Date | Temperature (ºF) | | Wind (mph) | | Clouds (%) | |
|---|---|---|---|---|---|---|---|
| | | Start | End | Start | End | Start | End |
| Park site | 4/15/2020 | 80º | 83º | 2.4 | 3.8 | 0 | 0 |
| Sidewalk Extension site | 11/12/2020 | 66º | 74º | 3.5 | 2 | 20 | 40 |

## *Vegetation and Wildlife*

### Crawford Canyon Park

Crawford Canyon Park is located at the northwest corner of Newport Avenue and South Crawford Canyon Road in North Tustin, Orange County, California. The Park site is surrounded by residential development on all sides and consists primarily of a disturbed dirt/gravel lot with scattered patches of native and non-native vegetation. Because the Park site is situated along a slope, there are signs of erosion (e.g. surface channels) caused by downhill water flow. In addition to shallow surface channels, there are also more prominent drainage features onsite, including an ephemeral swale that originates in the northeast corner of the site, and drains toward Newport Avenue, then drains into a shallow basin located on an adjacent property at the west end of the project site. The ephemeral swale is confined by artificial mounds created by the deposition of fill material. In addition, two shallow depressions with saturated soil were observed along the northern portion of the site.

Native plants observed onsite included: lemonade berry (*Rhus integrifolia*), laurel sumac (*Malosma laurina*), California buckwheat (*Eriogonum fasciculatum*), chilicothe (*Marah macrocarpa*), and California brittlebush (*Encelia californica*). In addition, scattered mulefat (*Baccharis salicifolia*) plants occur along the ephemeral swale, as well as isolated along the southern portion of the site, all in non-riparian areas. Non-native plants observed onsite included Mexican fan palm (*Washingtonia robusta*), Canary Island date palm (*Phoenix canariensis*), Peruvian pepper tree (*Schinus molle*), Brazilian pepper tree (*Schinus terebinthifolius*), tree tobacco (*Nicotiana glauca*), castor bean (*Ricinus communis*), Russian thistle (*Salsola tragus*), white horehound (*Marrubium vulgare*), common beggartick (*Bidens pilosa*), short-podded mustard (*Hirschfeldia incana*), marsh parsley (*Cyclospermum leptophyllum*), cheeseweed (*Malva parviflora*), common sow thistle (*Sonchus oleraceus*), London rocket (*Sisymbrium irio*), common groundsel (*Senecio vulgaris*), and red-stemmed filaree (*Erodium cicutarium*).

Avian species observed during the survey include house finch (*Haemorhous mexicanus*), Anna's hummingbird (*Calypte anna*), lesser goldfinch (*Spinus psaltria*), black phoebe (*Sayornis nigricans*) and American crow (*Corvus brachyrhynchos*). Other wildlife observed during the survey included California ground squirrel (*Otospermophilus beecheyi*) and side-blotched lizard (*Uta stansburiana*).

#### Sidewalk Extension Site

The Sidewalk Extension site extends from the intersection of South Crawford Canyon Road and Newport Avenue north toward the intersection of Crawford Canyon Road and Country Haven Lane (north side), and west from the South Crawford Canyon Road and Newport Avenue intersection to the Newport Avenue and Hyde Park Drive intersection (west side). The west side of the Sidewalk Extension site consists primarily of a paved sidewalk with ornamental/non-native trees and shrubs, and a concrete lined v-ditch that drains into a box culvert. Plant species on the west side of the Sidewalk Extension site include eucalyptus (*Eucalyptus* sp.), Peruvian pepper tree, castor bean, tree tobacco, carrotwood (*Cupaniopsis anacardioides*), Chinese elm (*Ulmus parvifolia* 'Drake'), variegated Pittosporum (*Pittosporum tobira* 'Variegata'), and weeping fig (*Ficus benjamina*). The north side of the Sidewalk Extension site consists of an uncurbed street (e.g. no sidewalk) with a concrete v-ditch that becomes a dirt erosion channel. The north side of the Sidewalk Extension site is dominated by non-native trees such as salt cedar (*Tamarix ramosissima*) and Mexican fan palm (*Washingtonia robusta*).

Avian species observed during the survey included house finch, lesser goldfinch, ruby-crowned kinglet (*Regulus calendula*), bushtit (*Psaltriparus minimus*), mourning dove (*Zenaida macroura*), American crow, California towhee (*Melozone crissalis)*, yellow rumped warbler (*Setophaga coronata*) and Anna's hummingbird.

### *Potential Constraints*

#### Crawford Canyon Park

No special-status plants, wildlife species, or sensitive natural communities were observed during the site assessment at the Crawford Canyon Park site. However, the scattered patches of vegetation within the Park provide suitable habitat for nesting birds. In addition, the presence of Mexican fan palms may also provide suitable habitat for roosting bats. The surface channels and ephemeral swale traversing the site do not conform to the stream definition under the California Fish and Game Code, and are unlikely to be subject to CDFW jurisdiction. These areas are also unlikely to be subject to USACE or RWQCB jurisdiction.

#### Sidewalk Extension Site

No special-status plants, wildlife, or sensitive natural communities were observed at the Sidewalk Extension site during the site visit. Although the Sidewalk Extension site is primarily vegetated with ornamental and non-native tree and shrub species, native birds are known to nest in these trees. Bushtits and house finches (both observed during the site visit), are known to nest in Peruvian pepper trees. The ornamental trees present may provide similarly suitable nesting habitat. The concrete v-ditches that run along South Crawford Canyon Road and along Newport Avenue are not jurisdictional features and would not be subject to USACE and RWQCB regulation.

## Recommendations and Conclusions

### *Crawford Canyon Park Site and Crawford Canyon Sidewalk Extension Site*

Although the majority of the project site is disturbed, and was previously used by Orange County Public Works (OCPW) as a staging yard for vehicles and sediment deposition, there are areas of suitable habitat for birds and wildlife. The results of the biological constraints survey indicated that there are three biological constraints for this project: (1) presence of suitable nesting bird habitat, (2) presence of suitable roosting habitat for special-status bats, and (3) potential jurisdictional feature along the north and west portions of Sidewalk Extension site.

### *Birds*

ESA recommends that project activities occur outside of the nesting bird season (February 1-September 1 for songbirds and January 1-September 1 for raptors). If work during the nesting bird season cannot be avoided, ESA recommends that a qualified biologist conduct a nesting bird survey prior to initiating construction activities. If active bird nests are present, a qualified biologist should be present onsite to monitor construction activities and to establish and maintain appropriate buffers around nests to minimize impacts to nesting birds until the biologist determines that the nest is no longer active. Smaller buffer areas around an active nest than may apply to native habitat areas may be recommended by the qualified monitoring biologist based on tolerance behavior of the nesting bird.

### *Bats*

ESA also recommends that a qualified biologist should conduct a focused bat survey no less than 3 days, and no more than 7 days, prior to the initiation of construction activities. The survey would take place at an appropriate time of day to maximize detectability, usually just prior to sunset. Survey methods may include one, or a combination of, the following methods: visual surveys, inspection of suitable habitat for bat sign (e.g. guano, urine stains), or usage of ultrasonic acoustical bat detectors. If bats are detected onsite, the number and species of bats present should be determined. Project activities should avoid sensitive roosting periods and habitats for bats, including winter hibernation roosts, day roosts, and maternity colonies with nursing young. If bat roosts must be removed, bats should be passively excluded from the roost site prior to removal. A mitigation program addressing compensation and detailing exclusion methods and roost removal may need to be prepared and approved by CDFW prior to implementation.

Please feel free to contact me directly at (949) 753-1531, if I can be of any further assistance.

Karla L. Flores
Senior Biologist

Daryl Koutnik
Principal

Attachment 1: California Natural Diversity Database 9-Quadrangle Query
Attachment 2: California Native Plant Society Rare Plant Inventory 9-Quadrangle Query
Attachment 3: National Wetland Inventory
Attachment 4: WebSoil Survey Report
Attachment 5: Representative Photographs

<u>References</u>

California Department of Fish and Wildlife. California Natural Diversity Database Rarefind. Accessed April 17, 2020.

California Native Plant Society, Rare Plant Program. 2020. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 17 April 2020]

U.S. Fish and Wildlife Service National Wetlands Inventory. Accessed April 17, 2020.

United States Department of Agriculture, National Resources Conservation Service. Custom Soil Resource Report for Orange County and Part of Riverside County. California. Accessed April 17, 2020

# Attachment 1

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension

# Selected Elements by Common Name

## California Department of Fish and Wildlife

## California Natural Diversity Database

**Query Criteria:** Quad IS (Orange (3311777) OR Black Star Canyon (3311776) OR El Toro (3311766) OR Tustin (3311767) OR Newport Beach (3311768) OR Anaheim (3311778) OR La Habra (3311788) OR Yorba Linda (3311787) OR Prado Dam (3311786))

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| **Allen's pentachaeta**<br>*Pentachaeta aurea ssp. allenii* | PDAST6X021 | None | None | G4T1 | S1 | 1B.1 |
| **American badger**<br>*Taxidea taxus* | AMAJF04010 | None | None | G5 | S3 | SSC |
| **American peregrine falcon**<br>*Falco peregrinus anatum* | ABNKD06071 | Delisted | Delisted | G4T4 | S3S4 | FP |
| **aphanisma**<br>*Aphanisma blitoides* | PDCHE02010 | None | None | G3G4 | S2 | 1B.2 |
| **arroyo toad**<br>*Anaxyrus californicus* | AAABB01230 | Endangered | None | G2G3 | S2S3 | SSC |
| **bald eagle**<br>*Haliaeetus leucocephalus* | ABNKC10010 | Delisted | Endangered | G5 | S3 | FP |
| **bank swallow**<br>*Riparia riparia* | ABPAU08010 | None | Threatened | G5 | S2 | |
| **Belding's savannah sparrow**<br>*Passerculus sandwichensis beldingi* | ABPBX99015 | None | Endangered | G5T3 | S3 | |
| **big free-tailed bat**<br>*Nyctinomops macrotis* | AMACD04020 | None | None | G5 | S3 | SSC |
| **Braunton's milk-vetch**<br>*Astragalus brauntonii* | PDFAB0F1G0 | Endangered | None | G2 | S2 | 1B.1 |
| **burrowing owl**<br>*Athene cunicularia* | ABNSB10010 | None | None | G4 | S3 | SSC |
| **California beardtongue**<br>*Penstemon californicus* | PDSCR1L110 | None | None | G3 | S2 | 1B.2 |
| **California black rail**<br>*Laterallus jamaicensis coturniculus* | ABNME03041 | None | Threatened | G3G4T1 | S1 | FP |
| **California glossy snake**<br>*Arizona elegans occidentalis* | ARADB01017 | None | None | G5T2 | S2 | SSC |
| **California horned lark**<br>*Eremophila alpestris actia* | ABPAT02011 | None | None | G5T4Q | S4 | WL |
| **California least tern**<br>*Sternula antillarum browni* | ABNNM08103 | Endangered | Endangered | G4T2T3Q | S2 | FP |
| **California Orcutt grass**<br>*Orcuttia californica* | PMPOA4G010 | Endangered | Endangered | G1 | S1 | 1B.1 |
| **California Walnut Woodland**<br>*California Walnut Woodland* | CTT71210CA | None | None | G2 | S2.1 | |
| **chaparral nolina**<br>*Nolina cismontana* | PMAGA080E0 | None | None | G3 | S3 | 1B.2 |

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| **chaparral ragwort**<br>*Senecio aphanactis* | PDAST8H060 | None | None | G3 | S2 | 2B.2 |
| **chaparral sand-verbena**<br>*Abronia villosa var. aurita* | PDNYC010P1 | None | None | G5T2? | S2 | 1B.1 |
| **coast horned lizard**<br>*Phrynosoma blainvillii* | ARACF12100 | None | None | G3G4 | S3S4 | SSC |
| **coast patch-nosed snake**<br>*Salvadora hexalepis virgultea* | ARADB30033 | None | None | G5T4 | S2S3 | SSC |
| **Coast Range newt**<br>*Taricha torosa* | AAAAF02032 | None | None | G4 | S4 | SSC |
| **coast woolly-heads**<br>*Nemacaulis denudata var. denudata* | PDPGN0G011 | None | None | G3G4T2 | S2 | 1B.2 |
| **coastal cactus wren**<br>*Campylorhynchus brunneicapillus sandiegensis* | ABPBG02095 | None | None | G5T3Q | S3 | SSC |
| **coastal California gnatcatcher**<br>*Polioptila californica californica* | ABPBJ08081 | Threatened | None | G4G5T2Q | S2 | SSC |
| **coastal whiptail**<br>*Aspidoscelis tigris stejnegeri* | ARACJ02143 | None | None | G5T5 | S3 | SSC |
| **Cooper's hawk**<br>*Accipiter cooperii* | ABNKC12040 | None | None | G5 | S4 | WL |
| **Coulter's goldfields**<br>*Lasthenia glabrata ssp. coulteri* | PDAST5L0A1 | None | None | G4T2 | S2 | 1B.1 |
| **Coulter's saltbush**<br>*Atriplex coulteri* | PDCHE040E0 | None | None | G3 | S1S2 | 1B.2 |
| **Crotch bumble bee**<br>*Bombus crotchii* | IIHYM24480 | None | Candidate Endangered | G3G4 | S1S2 | |
| **Davidson's saltscale**<br>*Atriplex serenana var. davidsonii* | PDCHE041T1 | None | None | G5T1 | S1 | 1B.2 |
| **decumbent goldenbush**<br>*Isocoma menziesii var. decumbens* | PDAST57091 | None | None | G3G5T2T3 | S2 | 1B.2 |
| **estuary seablite**<br>*Suaeda esteroa* | PDCHE0P0D0 | None | None | G3 | S2 | 1B.2 |
| **ferruginous hawk**<br>*Buteo regalis* | ABNKC19120 | None | None | G4 | S3S4 | WL |
| **Gambel's water cress**<br>*Nasturtium gambelii* | PDBRA270V0 | Endangered | Threatened | G1 | S1 | 1B.1 |
| **globose dune beetle**<br>*Coelus globosus* | IICOL4A010 | None | None | G1G2 | S1S2 | |
| **golden eagle**<br>*Aquila chrysaetos* | ABNKC22010 | None | None | G5 | S3 | FP |
| **grasshopper sparrow**<br>*Ammodramus savannarum* | ABPBXA0020 | None | None | G5 | S3 | SSC |

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| **great blue heron**<br>*Ardea herodias* | ABNGA04010 | None | None | G5 | S4 | |
| **heart-leaved pitcher sage**<br>*Lepechinia cardiophylla* | PDLAM0V020 | None | None | G3 | S2S3 | 1B.2 |
| **hoary bat**<br>*Lasiurus cinereus* | AMACC05030 | None | None | G5 | S4 | |
| **Horn's milk-vetch**<br>*Astragalus hornii var. hornii* | PDFAB0F421 | None | None | GUT1 | S1 | 1B.1 |
| **intermediate mariposa-lily**<br>*Calochortus weedii var. intermedius* | PMLIL0D1J1 | None | None | G3G4T2 | S2 | 1B.2 |
| **intermediate monardella**<br>*Monardella hypoleuca ssp. intermedia* | PDLAM180A4 | None | None | G4T2? | S2? | 1B.3 |
| **Jokerst's monardella**<br>*Monardella australis ssp. jokerstii* | PDLAM18112 | None | None | G4T1? | S1? | 1B.1 |
| **least Bell's vireo**<br>*Vireo bellii pusillus* | ABPBW01114 | Endangered | Endangered | G5T2 | S2 | |
| **light-footed Ridgway's rail**<br>*Rallus obsoletus levipes* | ABNME05014 | Endangered | Endangered | G5T1T2 | S1 | FP |
| **long-eared owl**<br>*Asio otus* | ABNSB13010 | None | None | G5 | S3? | SSC |
| **long-spined spineflower**<br>*Chorizanthe polygonoides var. longispina* | PDPGN040K1 | None | None | G5T3 | S3 | 1B.2 |
| **Los Angeles sunflower**<br>*Helianthus nuttallii ssp. parishii* | PDAST4N102 | None | None | G5TH | SH | 1A |
| **lucky morning-glory**<br>*Calystegia felix* | PDCON040P0 | None | None | G1Q | S1 | 1B.1 |
| **Malibu baccharis**<br>*Baccharis malibuensis* | PDAST0W0W0 | None | None | G1 | S1 | 1B.1 |
| **many-stemmed dudleya**<br>*Dudleya multicaulis* | PDCRA040H0 | None | None | G2 | S2 | 1B.2 |
| **mesa horkelia**<br>*Horkelia cuneata var. puberula* | PDROS0W045 | None | None | G4T1 | S1 | 1B.1 |
| **Mexican long-tongued bat**<br>*Choeronycteris mexicana* | AMACB02010 | None | None | G4 | S1 | SSC |
| **mimic tryonia (=California brackishwater snail)**<br>*Tryonia imitator* | IMGASJ7040 | None | None | G2 | S2 | |
| **monarch - California overwintering population**<br>*Danaus plexippus pop. 1* | IILEPP2012 | None | None | G4T2T3 | S2S3 | |
| **mud nama**<br>*Nama stenocarpa* | PDHYD0A0H0 | None | None | G4G5 | S1S2 | 2B.2 |
| **northwestern San Diego pocket mouse**<br>*Chaetodipus fallax fallax* | AMAFD05031 | None | None | G5T3T4 | S3S4 | SSC |

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| **orange-throated whiptail**<br>*Aspidoscelis hyperythra* | ARACJ02060 | None | None | G5 | S2S3 | WL |
| **osprey**<br>*Pandion haliaetus* | ABNKC01010 | None | None | G5 | S4 | WL |
| **Pacific pocket mouse**<br>*Perognathus longimembris pacificus* | AMAFD01042 | Endangered | None | G5T1 | S1 | SSC |
| **pallid bat**<br>*Antrozous pallidus* | AMACC10010 | None | None | G5 | S3 | SSC |
| **Parish's brittlescale**<br>*Atriplex parishii* | PDCHE041D0 | None | None | G1G2 | S1 | 1B.1 |
| **Plummer's mariposa-lily**<br>*Calochortus plummerae* | PMLIL0D150 | None | None | G4 | S4 | 4.2 |
| **pocketed free-tailed bat**<br>*Nyctinomops femorosaccus* | AMACD04010 | None | None | G4 | S3 | SSC |
| **prostrate vernal pool navarretia**<br>*Navarretia prostrata* | PDPLM0C0Q0 | None | None | G2 | S2 | 1B.2 |
| **quino checkerspot butterfly**<br>*Euphydryas editha quino* | IILEPK405L | Endangered | None | G5T1T2 | S1S2 | |
| **red-diamond rattlesnake**<br>*Crotalus ruber* | ARADE02090 | None | None | G4 | S3 | SSC |
| **Riverside fairy shrimp**<br>*Streptocephalus woottoni* | ICBRA07010 | Endangered | None | G1G2 | S1S2 | |
| **Riversidian Alluvial Fan Sage Scrub**<br>*Riversidian Alluvial Fan Sage Scrub* | CTT32720CA | None | None | G1 | S1.1 | |
| **Robinson's pepper-grass**<br>*Lepidium virginicum var. robinsonii* | PDBRA1M114 | None | None | G5T3 | S3 | 4.3 |
| **salt marsh bird's-beak**<br>*Chloropyron maritimum ssp. maritimum* | PDSCR0J0C2 | Endangered | Endangered | G4?T1 | S1 | 1B.2 |
| **salt spring checkerbloom**<br>*Sidalcea neomexicana* | PDMAL110J0 | None | None | G4 | S2 | 2B.2 |
| **San Bernardino aster**<br>*Symphyotrichum defoliatum* | PDASTE80C0 | None | None | G2 | S2 | 1B.2 |
| **San Diego button-celery**<br>*Eryngium aristulatum var. parishii* | PDAPI0Z042 | Endangered | Endangered | G5T1 | S1 | 1B.1 |
| **San Diego desert woodrat**<br>*Neotoma lepida intermedia* | AMAFF08041 | None | None | G5T3T4 | S3S4 | SSC |
| **San Diego fairy shrimp**<br>*Branchinecta sandiegonensis* | ICBRA03060 | Endangered | None | G2 | S2 | |
| **San Fernando Valley spineflower**<br>*Chorizanthe parryi var. fernandina* | PDPGN040J1 | Proposed Threatened | Endangered | G2T1 | S1 | 1B.1 |
| **sandy beach tiger beetle**<br>*Cicindela hirticollis gravida* | IICOL02101 | None | None | G5T2 | S2 | |

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| **Santa Ana River woollystar**<br>*Eriastrum densifolium ssp. sanctorum* | PDPLM03035 | Endangered | Endangered | G4T1 | S1 | 1B.1 |
| **Santa Ana speckled dace**<br>*Rhinichthys osculus ssp. 3* | AFCJB3705K | None | None | G5T1 | S1 | SSC |
| **Santa Ana sucker**<br>*Catostomus santaanae* | AFCJC02190 | Threatened | None | G1 | S1 | |
| **smooth tarplant**<br>*Centromadia pungens ssp. laevis* | PDAST4R0R4 | None | None | G3G4T2 | S2 | 1B.1 |
| **south coast saltscale**<br>*Atriplex pacifica* | PDCHE041C0 | None | None | G4 | S2 | 1B.2 |
| **Southern California Arroyo Chub/Santa Ana Sucker Stream**<br>*Southern California Arroyo Chub/Santa Ana Sucker Stream* | CARE2330CA | None | None | GNR | SNR | |
| **southern California legless lizard**<br>*Anniella stebbinsi* | ARACC01060 | None | None | G3 | S3 | SSC |
| **southern California rufous-crowned sparrow**<br>*Aimophila ruficeps canescens* | ABPBX91091 | None | None | G5T3 | S3 | WL |
| **southern California saltmarsh shrew**<br>*Sorex ornatus salicornicus* | AMABA01104 | None | None | G5T1? | S1 | SSC |
| **Southern Coast Live Oak Riparian Forest**<br>*Southern Coast Live Oak Riparian Forest* | CTT61310CA | None | None | G4 | S4 | |
| **Southern Coastal Salt Marsh**<br>*Southern Coastal Salt Marsh* | CTT52120CA | None | None | G2 | S2.1 | |
| **Southern Cottonwood Willow Riparian Forest**<br>*Southern Cottonwood Willow Riparian Forest* | CTT61330CA | None | None | G3 | S3.2 | |
| **Southern Dune Scrub**<br>*Southern Dune Scrub* | CTT21330CA | None | None | G1 | S1.1 | |
| **Southern Foredunes**<br>*Southern Foredunes* | CTT21230CA | None | None | G2 | S2.1 | |
| **southern grasshopper mouse**<br>*Onychomys torridus ramona* | AMAFF06022 | None | None | G5T3 | S3 | SSC |
| **Southern Interior Cypress Forest**<br>*Southern Interior Cypress Forest* | CTT83230CA | None | None | G2 | S2.1 | |
| **Southern Riparian Scrub**<br>*Southern Riparian Scrub* | CTT63300CA | None | None | G3 | S3.2 | |
| **Southern Sycamore Alder Riparian Woodland**<br>*Southern Sycamore Alder Riparian Woodland* | CTT62400CA | None | None | G4 | S4 | |
| **southern tarplant**<br>*Centromadia parryi ssp. australis* | PDAST4R0P4 | None | None | G3T2 | S2 | 1B.1 |
| **Southern Willow Scrub**<br>*Southern Willow Scrub* | CTT63320CA | None | None | G3 | S2.1 | |
| **southwestern willow flycatcher**<br>*Empidonax traillii extimus* | ABPAE33043 | Endangered | Endangered | G5T2 | S1 | |

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| **steelhead - southern California DPS**<br>*Oncorhynchus mykiss irideus pop. 10* | AFCHA0209J | Endangered | None | G5T1Q | S1 | |
| **Swainson's hawk**<br>*Buteo swainsoni* | ABNKC19070 | None | Threatened | G5 | S3 | |
| **Tecate cypress**<br>*Hesperocyparis forbesii* | PGCUP040C0 | None | None | G2 | S2 | 1B.1 |
| **thread-leaved brodiaea**<br>*Brodiaea filifolia* | PMLIL0C050 | Threatened | Endangered | G2 | S2 | 1B.1 |
| **tricolored blackbird**<br>*Agelaius tricolor* | ABPBXB0020 | None | Threatened | G2G3 | S1S2 | SSC |
| **two-striped gartersnake**<br>*Thamnophis hammondii* | ARADB36160 | None | None | G4 | S3S4 | SSC |
| **wandering (=saltmarsh) skipper**<br>*Panoquina errans* | IILEP84030 | None | None | G4G5 | S2 | |
| **western beach tiger beetle**<br>*Cicindela latesignata latesignata* | IICOL02113 | None | None | G2G4T1T2 | S1 | |
| **western mastiff bat**<br>*Eumops perotis californicus* | AMACD02011 | None | None | G5T4 | S3S4 | SSC |
| **western pond turtle**<br>*Emys marmorata* | ARAAD02030 | None | None | G3G4 | S3 | SSC |
| **western snowy plover**<br>*Charadrius alexandrinus nivosus* | ABNNB03031 | Threatened | None | G3T3 | S2S3 | SSC |
| **western spadefoot**<br>*Spea hammondii* | AAABF02020 | None | None | G3 | S3 | SSC |
| **western tidal-flat tiger beetle**<br>*Cicindela gabbii* | IICOL02080 | None | None | G2G4 | S1 | |
| **western yellow-billed cuckoo**<br>*Coccyzus americanus occidentalis* | ABNRB02022 | Threatened | Endangered | G5T2T3 | S1 | |
| **white rabbit-tobacco**<br>*Pseudognaphalium leucocephalum* | PDAST440C0 | None | None | G4 | S2 | 2B.2 |
| **white-tailed kite**<br>*Elanus leucurus* | ABNKC06010 | None | None | G5 | S3S4 | FP |
| **yellow rail**<br>*Coturnicops noveboracensis* | ABNME01010 | None | None | G4 | S1S2 | SSC |
| **yellow warbler**<br>*Setophaga petechia* | ABPBX03010 | None | None | G5 | S3S4 | SSC |
| **yellow-breasted chat**<br>*Icteria virens* | ABPBX24010 | None | None | G5 | S3 | SSC |
| **Yuma myotis**<br>*Myotis yumanensis* | AMACC01020 | None | None | G5 | S4 | |

**Record Count: 123**

# Attachment 2

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension

CNPS California Native Plant Society

**Inventory of Rare and Endangered Plants**

*The database used to provide updates to the Online Inventory is under construction. View updates and changes made since May 2019 here.

## Plant List

**61** matches found. *Click on scientific name for details*

**Search Criteria**

Found in Quads 3311788, 3311787, 3311786, 3311778, 3311777, 3311776, 3311768 3311767 and 3311766;

Modify Search Criteria Export to Excel Modify Columns Modify Sort Display Photos

| Scientific Name | Common Name | Family | Lifeform | Blooming Period | CA Rare Plant Rank | State Rank | Global Rank |
|---|---|---|---|---|---|---|---|
| Abronia maritima | red sand-verbena | Nyctaginaceae | perennial herb | Feb-Nov | 4.2 | S3? | G4 |
| Abronia villosa var. aurita | chaparral sand-verbena | Nyctaginaceae | annual herb | (Jan)Mar-Sep | 1B.1 | S2 | G5T2? |
| Aphanisma blitoides | aphanisma | Chenopodiaceae | annual herb | Feb-Jun | 1B.2 | S2 | G3G4 |
| Astragalus brauntonii | Braunton's milk-vetch | Fabaceae | perennial herb | Jan-Aug | 1B.1 | S2 | G2 |
| Atriplex coulteri | Coulter's saltbush | Chenopodiaceae | perennial herb | Mar-Oct | 1B.2 | S1S2 | G3 |
| Atriplex pacifica | South Coast saltscale | Chenopodiaceae | annual herb | Mar-Oct | 1B.2 | S2 | G4 |
| Atriplex parishii | Parish's brittlescale | Chenopodiaceae | annual herb | Jun-Oct | 1B.1 | S1 | G1G2 |
| Atriplex serenana var. davidsonii | Davidson's saltscale | Chenopodiaceae | annual herb | Apr-Oct | 1B.2 | S1 | G5T1 |
| Baccharis malibuensis | Malibu baccharis | Asteraceae | perennial deciduous shrub | Aug | 1B.1 | S1 | G1 |
| Brodiaea filifolia | thread-leaved brodiaea | Themidaceae | perennial bulbiferous herb | Mar-Jun | 1B.1 | S2 | G2 |
| Calandrinia breweri | Brewer's calandrinia | Montiaceae | annual herb | (Jan)Mar-Jun | 4.2 | S4 | G4 |
| Calochortus catalinae | Catalina mariposa lily | Liliaceae | perennial bulbiferous herb | (Feb)Mar-Jun | 4.2 | S3S4 | G3G4 |
| Calochortus plummerae | Plummer's mariposa lily | Liliaceae | perennial bulbiferous herb | May-Jul | 4.2 | S4 | G4 |
| Calochortus weedii var. intermedius | intermediate mariposa lily | Liliaceae | perennial bulbiferous herb | May-Jul | 1B.2 | S2 | G3G4T2 |
| Calystegia felix | lucky morning-glory | Convolvulaceae | annual rhizomatous herb | Mar-Sep | 1B.1 | S1 | G1Q |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Camissoniopsis lewisii | Lewis' evening-primrose | Onagraceae | annual herb | Mar-May(Jun) | 3 | S4 | G4 |
| Centromadia parryi ssp. australis | southern tarplant | Asteraceae | annual herb | May-Nov | 1B.1 | S2 | G3T2 |
| Centromadia pungens ssp. laevis | smooth tarplant | Asteraceae | annual herb | Apr-Sep | 1B.1 | S2 | G3G4T2 |
| Chloropyron maritimum ssp. maritimum | salt marsh bird's-beak | Orobanchaceae | annual herb (hemiparasitic) | May-Oct(Nov) | 1B.2 | S1 | G4?T1 |
| Chorizanthe parryi var. fernandina | San Fernando Valley spineflower | Polygonaceae | annual herb | Apr-Jul | 1B.1 | S1 | G2T1 |
| Chorizanthe polygonoides var. longispina | long-spined spineflower | Polygonaceae | annual herb | Apr-Jul | 1B.2 | S3 | G5T3 |
| Convolvulus simulans | small-flowered morning-glory | Convolvulaceae | annual herb | Mar-Jul | 4.2 | S4 | G4 |
| Deinandra paniculata | paniculate tarplant | Asteraceae | annual herb | (Mar)Apr-Nov(Dec) | 4.2 | S4 | G4 |
| Dodecahema leptoceras | slender-horned spineflower | Polygonaceae | annual herb | Apr-Jun | 1B.1 | S1 | G1 |
| Dudleya multicaulis | many-stemmed dudleya | Crassulaceae | perennial herb | Apr-Jul | 1B.2 | S2 | G2 |
| Dudleya stolonifera | Laguna Beach dudleya | Crassulaceae | perennial stoloniferous herb | May-Jul | 1B.1 | S1 | G1 |
| Eriastrum densifolium ssp. sanctorum | Santa Ana River woollystar | Polemoniaceae | perennial herb | Apr-Sep | 1B.1 | S1 | G4T1 |
| Eryngium aristulatum var. parishii | San Diego button-celery | Apiaceae | annual / perennial herb | Apr-Jun | 1B.1 | S1 | G5T1 |
| Harpagonella palmeri | Palmer's grapplinghook | Boraginaceae | annual herb | Mar-May | 4.2 | S3 | G4 |
| Helianthus nuttallii ssp. parishii | Los Angeles sunflower | Asteraceae | perennial rhizomatous herb | Aug-Oct | 1A | SH | G5TH |
| Hesperocyparis forbesii | Tecate cypress | Cupressaceae | perennial evergreen tree | | 1B.1 | S2 | G2 |
| Hordeum intercedens | vernal barley | Poaceae | annual herb | Mar-Jun | 3.2 | S3S4 | G3G4 |
| Horkelia cuneata var. puberula | mesa horkelia | Rosaceae | perennial herb | Feb-Jul(Sep) | 1B.1 | S1 | G4T1 |
| Juglans californica | Southern California black walnut | Juglandaceae | perennial deciduous tree | Mar-Aug | 4.2 | S4 | G4 |
| Juncus acutus ssp. leopoldii | southwestern spiny rush | Juncaceae | perennial rhizomatous herb | (Mar)May-Jun | 4.2 | S4 | G5T5 |
| Lasthenia glabrata ssp. coulteri | Coulter's goldfields | Asteraceae | annual herb | Feb-Jun | 1B.1 | S2 | G4T2 |
| Lepechinia cardiophylla | heart-leaved pitcher sage | Lamiaceae | perennial shrub | Apr-Jul | 1B.2 | S2S3 | G3 |
| Lepidium virginicum var. robinsonii | Robinson's pepper-grass | Brassicaceae | annual herb | Jan-Jul | 4.3 | S3 | G5T3 |
| Lilium humboldtii ssp. ocellatum | ocellated Humboldt lily | Liliaceae | perennial bulbiferous herb | Mar-Jul(Aug) | 4.2 | S4? | G4T4? |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Monardella australis ssp. jokerstii | Jokerst's monardella | Lamiaceae | perennial rhizomatous herb | Jul-Sep | 1B.1 | S1 | G4T1 |
| Monardella hypoleuca ssp. intermedia | intermediate monardella | Lamiaceae | perennial rhizomatous herb | Apr-Sep | 1B.3 | S2? | G4T2? |
| Nama stenocarpa | mud nama | Namaceae | annual / perennial herb | Jan-Jul | 2B.2 | S1S2 | G4G5 |
| Nasturtium gambelii | Gambel's water cress | Brassicaceae | perennial rhizomatous herb | Apr-Oct | 1B.1 | S1 | G1 |
| Navarretia prostrata | prostrate vernal pool navarretia | Polemoniaceae | annual herb | Apr-Jul | 1B.1 | S2 | G2 |
| Nemacaulis denudata var. denudata | coast woolly-heads | Polygonaceae | annual herb | Apr-Sep | 1B.2 | S2 | G3G4T2 |
| Nolina cismontana | chaparral nolina | Ruscaceae | perennial evergreen shrub | (Mar)May-Jul | 1B.2 | S3 | G3 |
| Orcuttia californica | California Orcutt grass | Poaceae | annual herb | Apr-Aug | 1B.1 | S1 | G1 |
| Penstemon californicus | California beardtongue | Plantaginaceae | perennial herb | May-Jun(Aug) | 1B.2 | S2 | G3 |
| Pentachaeta aurea ssp. allenii | Allen's pentachaeta | Asteraceae | annual herb | Mar-Jun | 1B.1 | S1 | G4T1 |
| Phacelia hubbyi | Hubby's phacelia | Hydrophyllaceae | annual herb | Apr-Jul | 4.2 | S4 | G4 |
| Phacelia ramosissima var. austrolitoralis | south coast branching phacelia | Hydrophyllaceae | perennial herb | Mar-Aug | 3.2 | S3 | G5?T3Q |
| Pickeringia montana var. tomentosa | woolly chaparral-pea | Fabaceae | evergreen shrub | May-Aug | 4.3 | S3S4 | G5T3T4 |
| Polygala cornuta var. fishiae | Fish's milkwort | Polygalaceae | perennial deciduous shrub | May-Aug | 4.3 | S4 | G5T4 |
| Pseudognaphalium leucocephalum | white rabbit-tobacco | Asteraceae | perennial herb | (Jul)Aug-Nov(Dec) | 2B.2 | S2 | G4 |
| Quercus engelmannii | Engelmann oak | Fagaceae | perennial deciduous tree | Mar-Jun | 4.2 | S3 | G3 |
| Romneya coulteri | Coulter's matilija poppy | Papaveraceae | perennial rhizomatous herb | Mar-Jul(Aug) | 4.2 | S4 | G4 |
| Sagittaria sanfordii | Sanford's arrowhead | Alismataceae | perennial rhizomatous herb (emergent) | May-Oct(Nov) | 1B.2 | S3 | G3 |
| Senecio aphanactis | chaparral ragwort | Asteraceae | annual herb | Jan-Apr(May) | 2B.2 | S2 | G3 |
| Sidalcea neomexicana | salt spring checkerbloom | Malvaceae | perennial herb | Mar-Jun | 2B.2 | S2 | G4 |
| Suaeda esteroa | estuary seablite | Chenopodiaceae | perennial herb | (May)Jul-Oct(Jan) | 1B.2 | S2 | G3 |
| Symphyotrichum defoliatum | San Bernardino aster | Asteraceae | perennial rhizomatous herb | Jul-Nov(Dec) | 1B.2 | S2 | G2 |

**Suggested Citation**

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The Calflora Database

The California Lichen Society

California Natural Diversity Database

The Jepson Flora Project

The Consortium of California Herbaria

CalPhotos

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**Questions and Comments**

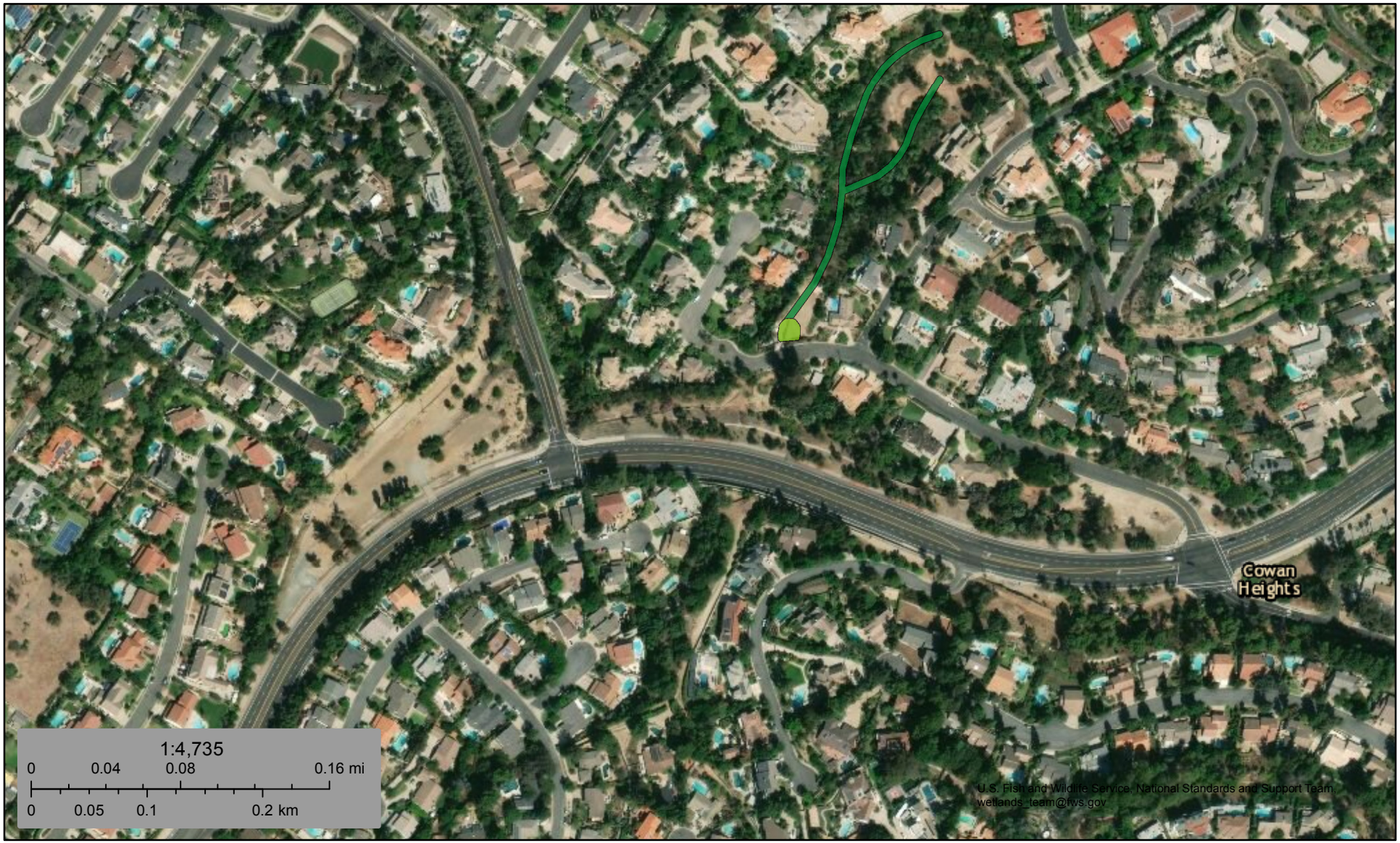
rareplants@cnps.org

# Attachment 3

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension

U.S. Fish and Wildlife Service
National Wetlands Inventory

# Crawford Canyon




April 17, 2020

**Wetlands**

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

# Attachment 4

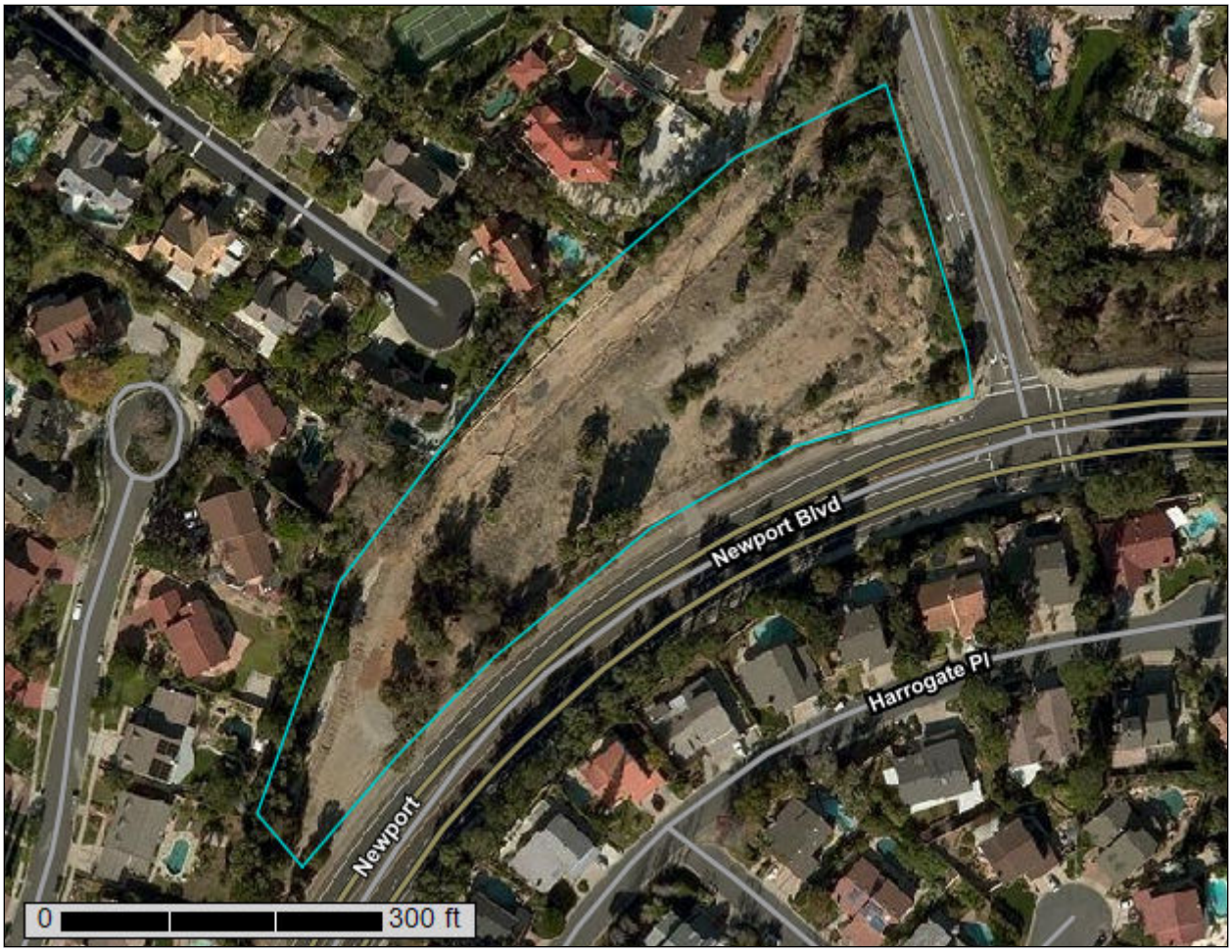
Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension

United States Department of Agriculture

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for Orange County and Part of Riverside County, California




April 17, 2020

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report
## Soil Map

Map Scale: 1:1,580 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

**Special Point Features**

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

**Water Features**

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Orange County and Part of Riverside County, California
Survey Area Data: Version 13, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 3, 2015—Jan 17, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

## MAP LEGEND

## MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| 149 | Cropley clay, 2 to 9 percent slopes, warm MAAT, MLRA 19 | 0.1 | 2.5% |
| 167 | Mocho loam, 2 to 9 percent slopes, warm MAAT, MLRA 19 | 3.7 | 97.5% |
| **Totals for Area of Interest** | | **3.8** | **100.0%** |

# Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The

delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

# Orange County and Part of Riverside County, California

## 149—Cropley clay, 2 to 9 percent slopes, warm MAAT, MLRA 19

### Map Unit Setting

*National map unit symbol:* 2tb9k
*Elevation:* 20 to 3,360 feet
*Mean annual precipitation:* 15 to 27 inches
*Mean annual air temperature:* 60 to 65 degrees F
*Frost-free period:* 270 to 365 days
*Farmland classification:* Prime farmland if irrigated

### Map Unit Composition

*Cropley and similar soils:* 90 percent
*Minor components:* 10 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Cropley

#### Setting

*Landform:* Alluvial fans, terraces
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Base slope
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from calcareous shale

#### Typical profile

*Ap - 0 to 3 inches:* clay
*A - 3 to 15 inches:* clay
*Bss1 - 15 to 29 inches:* clay
*Bss2 - 29 to 38 inches:* clay
*BCk1 - 38 to 49 inches:* clay
*BCk2 - 49 to 79 inches:* clay

#### Properties and qualities

*Slope:* 2 to 9 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 15 percent
*Available water storage in profile:* Moderate (about 9.0 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 2e
*Land capability classification (nonirrigated):* 4e
*Hydrologic Soil Group:* C
*Ecological site:* Coastal Terrace 14-16" p.z. (R020XD047CA), CLAYEY (1975) (R019XD001CA)
*Hydric soil rating:* No

### Minor Components

#### Salinas

*Percent of map unit:* 4 percent
*Landform:* Alluvial fans
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Hydric soil rating:* No

#### Rincon

*Percent of map unit:* 4 percent
*Landform:* Terraces, alluvial fans
*Landform position (three-dimensional):* Tread, talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Hydric soil rating:* No

#### Botella

*Percent of map unit:* 2 percent
*Landform:* Low hills
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Hydric soil rating:* No

## 167—Mocho loam, 2 to 9 percent slopes, warm MAAT, MLRA 19

### Map Unit Setting

*National map unit symbol:* 2tyz1
*Elevation:* 10 to 2,240 feet
*Mean annual precipitation:* 14 to 21 inches
*Mean annual air temperature:* 61 to 65 degrees F
*Frost-free period:* 200 to 350 days
*Farmland classification:* Farmland of statewide importance

### Map Unit Composition

*Mocho and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Mocho

#### Setting

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from sedimentary rock

**Typical profile**

*H1 - 0 to 16 inches:* loam
*H2 - 16 to 60 inches:* loam

**Properties and qualities**

*Slope:* 2 to 9 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 10 percent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water storage in profile:* High (about 9.6 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 2e
*Land capability classification (nonirrigated):* 3e
*Hydrologic Soil Group:* B
*Ecological site:* LOAMY (1975) (R019XD029CA)
*Hydric soil rating:* No

## Minor Components

**Sorrento**

*Percent of map unit:* 4 percent
*Hydric soil rating:* No

**Anacapa**

*Percent of map unit:* 3 percent
*Hydric soil rating:* No

**Pico**

*Percent of map unit:* 3 percent
*Hydric soil rating:* No

**Garretson**

*Percent of map unit:* 2 percent
*Hydric soil rating:* No

**Botella, loam**

*Percent of map unit:* 1 percent
*Hydric soil rating:* No

**Mocho, sandy loam**

*Percent of map unit:* 1 percent
*Hydric soil rating:* No

**Mocho, 0 to 2 percent slopes**

*Percent of map unit:* 1 percent
*Hydric soil rating:* No

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# Attachment 5

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension

Photo 1: Overview of Crawford Canyon Park facing southwest.

Photo 2: Overview of Crawford Canyon Park facing northeast.

Photo 3: Mexican fan palm clusters that may provide roosting habitat for bats.

Photo 4: Surface channel caused by erosion during downhill water flow.

Photo 5: Mexican fan palms and surface depression where water can pool after rain events.

Photo 6: Concrete lined v-ditch along Newport Avenue.

Photo 7: Concrete lined v-ditch drains into box culvert along Newport Avenue.

Photo 8: Concrete lined v-ditch north of Crawford Canyon Park.

Photo 9: Basin at the southwest corner of Crawford Canyon Park.

Photo 10: Salt cedar cluster along south Crawford Canyon Road.

Photo 11: Concrete lined-v-ditch drains into box culvert along south Crawford Canyon Road.

Photo 12 a-b. Concrete lined v-ditch ends and becomes a surface channel near Pine Canyon road and south Crawford Canyon Road.

Photo 13: Eroded surface channel disappears near south Crawford Canyon Road and Country Haven Lane.

# Appendix C

## Cultural Resources Assessment Report

**Confidential Not For Public Distribution**

ESA

# Appendix D
## Energy Modeling

ESA

# Energy Summary

***Construction Fuel Consumption Summary***

| | gallons | | |
|---|---|---|---|
| **Phase** | **Diesel** | **Gas** | **# Years** |
| **Total Project** | ***60,538*** | ***5,832*** | 1.17 |
| **Annual Average** | 51,890 | 4,999 | |

| | | |
|---|---|---|
| **Total Project** | 60,538 | 5,832 |
| **Annual Average** | 51,890 | 4,999 |

| | | |
|---|---|---|
| **County Usage**[1] | 1,402,000,000 | 55,000,000 |
| **Project % County** | 0.0037% | 0.0091% |

| | | |
|---|---|---|
| **Construction** | Total Gallons | |
| **Total** | | |
| Onsite Equipment | 56,309 | diesel |
| Water Truck | 0 | gasoline |
| Haul Trucks | 3,229 | diesel |
| Vendor Trucks | 1,000 | diesel |
| Worker Trips | 5,832 | gasoline |

***Annual OperationalConsumption***

| | gallons | | MMBTU/yr | GWh/yr | | |
|---|---|---|---|---|---|---|
| | **Diesel** | **Gas** | **Natural Gas** | **Electric** | | |
| **2022** | | | | | | |
| Unmitigated | 1,358.00 | 7,603.00 | 0.00 | 0.04 | 38 | 38,115.00 |
| % of County | *0.0001%* | *0.01382%* | 0.00000% | 0.0002% | | |
| %SCE/SoCal (2018) | | | 0.00000% | 0.000% | | |
| %SCE/SoCal (2025) | | | 0.00000% | 0.000% | | |

| | kBTU | MMBTU | kWh | GWh | MWh |
|---|---|---|---|---|---|
| Total Project[2] | 0.00 | 0.00 | 12 | 0.00 | |
| Project | | | 54,645 | 0.05 | |
| | | | | 0.00 | |
| Orange (2019)[3,4] | | 62 | | 19,460 | |
| SCE (2019)[5] | | | | 87,143 | 87,143,000 |
| SCE (2023)[5,6] | | | | 118,294 | 118,294,000 |
| SoCalGas (2018)[7] | | 515,607,000 | | | |
| SoCalGas (2023)[6,7] | | 514,101,159 | | | |

Note: Total Project includes energy from increase in existing booster station.

**Operational Vehicle Fuel Consumption**

*source: EMFAC2017: Goetz*

| | Project | | |
|---|---|---|---|
| | **Unmitigated** | **Mitigated** | |
| Gasoline | 245 | | gallons |
| Diesel | 91 | | gallons |
| Natural Gas | 0 | | MMBTU |

**Assumptions/Constants**

| | | | |
|---|---|---|---|
| 8.78 | Kg of $CO_2$ per gallon of Gasoline | | |
| 10.21 | Kg of $CO_2$ per gallon of Diesel | | |
| 1040 | MMBtu/MMCF | 1040 | MMBtu |
| 1 | MWh= | 0.001 | GWh |
| 100,000 | BTU/therm | | |
| 53.12 | kg CO2/ thousand cubic feet[8] | | |
| 1036 | btu/cubic foot | | |
| 623.1464 | Orange (2019) Therms[3] | | |
| 5156070000 | SoCalGas (2018) Therms[7] | | |
| 1.21192053 | hundred cubic feet of natural gas per gallon | | |

| | | |
|---|---|---|
| Construction | diesel | Used for trucks (haul and vendor) and off-road equipment |
| | gasoline | worker vehicles |
| Operation | diesel | Majority of trucks and buses |
| | gasoline | remaining vehicle mix |

LCFS & Pavley assumed for on-road vehicles after year 2011

Sources:


1 California Energy Commission, 2018. California Retail Fuel Outlet Annual Reporting (CEC-A15) Results. http://listserver.energy.ca.gov/almanac/transportation_data/gasoline/piira_retail_survey.html Accessed, October 2019.

2 ESA, 2020; CalEEMod output

3 http://www.ecdms.energy.ca.gov/gasbycounty.aspx

4 http://www.ecdms.energy.ca.gov/elecbycounty.aspx

5 Edison International and Southern California Edison, 2018. 2018 Annual Report. Available: https://www.edison.com/content/dam/eix/documents/investors/corporate-governance/eix-sce-2018-annual-report.pdf. Accessed October, 2019.

6 California Energy Commission, 2018.SCE TAC Peak and Energy Forecast: CED 2017, Mid Baseline- Mid AAEE/AAPV. Available: https://ww2.energy.ca.gov/2017_energypolicy/documents/ , Accessed 10/2019.

7 http://www.ecdms.energy.ca.gov/gasbyutil.aspx

| 2018 | 2017 | 2016 | 2025 | |
|---|---|---|---|---|
| 5156.07 | 5141.84 | 5124.14 | 5141.011589 | MMTherms (from source 6) |
| 7750 | 7750 | 7600 | 7700 | Mmtherms (from source 7) |
| 0.665299355 | 0.663463226 | 0.674228947 | | % difference |
| | | 0.667663843 | | average % difference |

8 https://www.eia.gov/environment/emissions/co2_vol_mass.php

# Unmitigated Fuel Conversion - Construction

| | Total $CO_2$ MT/yr | Fuel Type | Factor $KGCO_2$/gal | Gallons |
|---|---|---|---|---|
| | *source:* | CalEEMod: Files: Goetz Tank Site; Goetz - Pipeline Construction | | |
| **Total Project** | | | | |
| Clearing and Grubbing | 40.18 | diesel | 10.21 | 3,936 |
| Grading | 153.60 | diesel | 10.21 | 15,044 |
| Paving and Construction | 277.56 | diesel | 10.21 | 27,185 |
| Landscaping | 20.64 | diesel | 10.21 | 2,022 |
| Site Preparation | 3.21 | diesel | 10.21 | 314 |
| Demolition | 15.14 | diesel | 10.21 | 1,483 |
| Utility Relocation | 12.93 | diesel | 10.21 | 1,266 |
| Storm Drain Construction | 19.87 | diesel | 10.21 | 1,947 |
| Sidewalk Construction (Newport) | 5.04 | diesel | 10.21 | 494 |
| Sidewalk Construction (Crawford) | 5.29 | diesel | 10.21 | 518 |
| Traffic Signal Modification | 10.79 | diesel | 10.21 | 1,057 |
| Paving | 10.65 | diesel | 10.21 | 1,043 |
| | | | | 56,309 |

| **Onroad** | *source:* | EMFAC2017 | | |
|---|---|---|---|---|
| | **Hauling** | **Vendor** | **Worker** | |
| **Total Project** | | | | |
| Clearing and Grubbing | 0 | 0 | 160 | |
| Grading | 3100 | 0 | 481 | |
| Paving and Construction | - | 68 | 1967 | |
| Landscaping | 0 | 73 | 2150 | |
| Site Preparation | 0.00 | 0.00 | 50.00 | |
| Demolition | 129.00 | 0.00 | 156.00 | 4,229 |
| Utility Relocation | 0.00 | 0.00 | 69.00 | 56,309 |
| Storm Drain Construction | 0.00 | 373.00 | 411.00 | 60,538 |
| Sidewalk Construction (Newport) | 0.00 | 181.00 | 133.00 | |
| Sidewalk Construction (Crawford) | 0.00 | 181.00 | 133.00 | |
| Traffic Signal Modification | 0.00 | 124.00 | 114.00 | |
| Paving | 0.00 | 0.00 | 8.00 | |

**Total On-Road Fuel Consumption**

| | | gal/mile | gal/min |
|---|---|---|---|
| 2020 | Hauling Hauling | 0.15613658 | 1.50968E-05 |
| 2020 | Vendor Vendor | 0.12720883 | 9.12128E-06 |
| 2020 | Worker Worker | 0.03742093 | 2.06198E-06 |
| 2021 | Hauling Hauling | 0.15194685 | 1.49226E-05 |
| 2021 | Vendor Vendor | 0.12346263 | 8.98135E-06 |
| 2021 | Worker Worker | 0.03636982 | 2.00421E-06 |
| 2022 | Hauling Hauling | 0.14312318 | 1.42709E-05 |
| 2022 | Vendor Vendor | 0.11698571 | 8.58941E-06 |
| 2022 | Worker Worker | 0.03532451 | 1.94677E-06 |
| 2023 | Hauling Hauling | 0.14107785 | 1.41309E-05 |
| 2023 | Vendor Vendor | 0.11532828 | 8.40578E-06 |
| 2023 | Worker Worker | 0.03445725 | 1.96264E-06 |

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | One-Way Trip Distance per Day (miles) | Idling per Day (minutes) | Regional Emissions (gallons) gal/mile | gal/min | gal/day | Total Gallons/yr |
|---|---|---|---|---|---|---|---|---|---|
| Clearing and Grubbing | 2021 | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | |
| Hauling | 0 | 20 | 8 | 20 | 15 | 0.15 | 1.49E-05 | 0 | 0 |
| Vendor | 0 | 20 | 8 | 6.9 | 15 | 0.12 | 8.98E-06 | 0 | 0 |
| Worker | 18 | 20 | 8 | 14.7 | 0 | 0.04 | 2.00E-06 | 10 | 192 |
| Grading | 2021 | | | | | | | | |
| Total Haul Trips | 989 | | | | | | | | |
| Hauling | 17 | 60 | 8 | 20 | 15 | 0.15 | 1.49E-05 | 52 | 3,100 |
| Vendor | 0 | 60 | 8 | 6.9 | 15 | 0.12 | 8.98E-06 | 0 | 0 |
| Worker | 20 | 60 | 8 | 14.7 | 0 | 0.04 | 2.00E-06 | 11 | 642 |
| Paving and Construction | 2021 | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | |
| Hauling | 0 | 80 | 8 | 20 | 15 | 0.15 | 1.49E-05 | 0 | 0 |
| Vendor | 1 | 80 | 8 | 6.9 | 15 | 0.12 | 8.98E-06 | 1 | 68 |
| Worker | 30 | 80 | 8 | 14.7 | 0 | 0.04 | 2.00E-06 | 16 | 1,283 |
| Landscaping | 2022 | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | |
| Hauling | 0 | 90 | 8 | 20 | 15 | 0.14 | 1.43E-05 | 0 | 0 |
| Vendor | 1 | 90 | 8 | 6.9 | 15 | 0.12 | 8.59E-06 | 1 | 73 |
| Worker | 28 | 90 | 8 | 14.7 | 0 | 0.04 | 1.95E-06 | 15 | 1,309 |

**Total On-Road Fuel Consumption**

| | | gal/mile | gal/min |
|---|---|---|---|
| 2020Hauling | Hauling | 0.15613658 | 1.50968E-05 |
| 2020Vendor | Vendor | 0.12720883 | 9.12128E-06 |
| 2020Worker | Worker | 0.03742093 | 2.06198E-06 |
| 2021Hauling | Hauling | 0.15194685 | 1.49226E-05 |
| 2021Vendor | Vendor | 0.12346263 | 8.98135E-06 |
| 2021Worker | Worker | 0.03636982 | 2.00421E-06 |
| 2022Hauling | Hauling | 0.14312318 | 1.42709E-05 |
| 2022Vendor | Vendor | 0.11698571 | 8.58941E-06 |
| 2022Worker | Worker | 0.03532451 | 1.94677E-06 |
| 2023Hauling | Hauling | 0.14107785 | 1.41309E-05 |
| 2023Vendor | Vendor | 0.11532828 | 8.40578E-06 |
| 2023Worker | Worker | 0.03445725 | 1.96264E-06 |

**Total On-Road Fuel Consumption**

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | One-Way Trip Distance per Day (miles) | Idling per Day (minutes) | Regional Emissions (gallons) gal/mile | gal/min | gal/day | Total Gallons/yr |
|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 2022 | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | |
| Hauling | 0 | 6 | 8 | 20 | 15 | 0.14 | 1.43E-05 | 0 | 0 |
| Vendor | 0 | 6 | 8 | 6.9 | 15 | 0.12 | 8.59E-06 | 0 | 0 |
| Worker | 16 | 6 | 8 | 14.7 | 0 | 0.04 | 1.95E-06 | 8 | 50 |
| Demolition | 2022 | | | | | | | | |
| Total Haul Trips | 32 | | | | | | | | |
| Hauling | 3 | 15 | 8 | 20 | 15 | 0.14 | 1.43E-05 | 9 | 129 |
| Vendor | 0 | 15 | 8 | 6.9 | 15 | 0.12 | 8.59E-06 | 0 | 0 |
| Worker | 20 | 15 | 8 | 14.7 | 0 | 0.04 | 1.95E-06 | 10 | 156 |
| Utility Relocation | 2022 | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | |
| Hauling | 0 | 11 | 8 | 20 | 15 | 0.14 | 1.43E-05 | 0 | 0 |
| Vendor | 0 | 11 | 8 | 6.9 | 15 | 0.12 | 8.59E-06 | 0 | 0 |
| Worker | 12 | 11 | 8 | 14.7 | 0 | 0.04 | 1.95E-06 | 6 | 69 |
| Storm Drain Construction | 2022 | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | |
| Hauling | 0 | 33 | 8 | 20 | 15 | 0.14 | 1.43E-05 | 0 | 0 |
| Vendor | 14 | 33 | 8 | 6.9 | 15 | 0.12 | 8.59E-06 | 11 | 373 |
| Worker | 24 | 33 | 8 | 14.7 | 0 | 0.04 | 1.95E-06 | 12 | 411 |
| Sidewalk Contruction (Newport) | 2022 | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | |
| Hauling | 0 | 16 | 8 | 20 | 15 | 0.14 | 1.43E-05 | 0 | 0 |
| Vendor | 14 | 16 | 8 | 6.9 | 15 | 0.12 | 8.59E-06 | 11 | 181 |
| Worker | 16 | 16 | 8 | 14.7 | 0 | 0.04 | 1.95E-06 | 8 | 133 |
| Sidewalk Construction (Crawford | 2022 | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | |
| Hauling | 0 | 16 | 8 | 20 | 15 | 0.14 | 1.43E-05 | 0 | 0 |
| Vendor | 14 | 16 | 8 | 6.9 | 15 | 0.12 | 8.59E-06 | 11 | 181 |
| Worker | 16 | 16 | 8 | 14.7 | 0 | 0.04 | 1.95E-06 | 8 | 133 |
| Traffic Signal Modification | 2022 | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | |
| Hauling | 0 | 11 | 8 | 20 | 15 | 0.14 | 1.43E-05 | 0 | 0 |
| Vendor | 14 | 11 | 8 | 6.9 | 15 | 0.12 | 8.59E-06 | 11 | 124 |
| Worker | 20 | 11 | 8 | 14.7 | 0 | 0.04 | 1.95E-06 | 10 | 114 |
| Paving | 2022 | | | | | | | | |
| Total Haul Trips | 0 | | | | | | | | |
| Hauling | 0 | 1 | 8 | 20 | 15 | 0.14 | 1.43E-05 | 0 | 0 |
| Vendor | 0 | 1 | 8 | 6.9 | 15 | 0.12 | 8.59E-06 | 0 | 0 |
| Worker | 16 | 1 | 8 | 14.7 | 0 | 0.04 | 1.95E-06 | 8 | 8 |

# Appendix E
## Geotechnical Investigation Report

ESA

**Geotechnical Investigation Report,**
**Crawford Canyon Park,**
**Northwest Corner of Newport Avenue**
**And Crawford Canyon Road,**
**Orange, California**

**Prepared For**
**HUNSAKER & ASSOCIATES IRVINE, INC.**

November 6, 2020

GMU Project No. 20-188-00

23241 Arroyo Vista
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**HUNSAKER & ASSOCIATES IRVINE, INC.**
3 Hughes
Irvine, CA 92618

PROJECT: 20-188-00

ATTENTION: Mr. Vojta Safranek

SUBJECT: Geotechnical Investigation Report, Crawford Canyon Park
Northwest Corner of Newport Avenue and Crawford Canyon Road
City of Orange, California

Dear Mr. Safranek:

GMU is pleased to present this geotechnical report for the subject project, which summarizes our data, conclusions, and recommendations.

Please note that this report has not been prepared for the use by other parties or projects other than those named or described herein. This report may not contain sufficient information for other parties or other purposes.

We appreciate the opportunity to work on this project. Please do not hesitate to contact the undersigned if you have any questions regarding any aspect of this report.

Respectfully submitted,

Nadim Sunna, MS, QSP, PE 84197
Senior Engineer

DISTRIBUTION:

Addressee: Electronic copy

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APPENDICES

APPENDIX A: Geotechnical Exploration Procedures and Drill Hole Logs by GMU
APPENDIX B: Geotechnical Laboratory Procedures and Test Results by GMU
APPENDIX C: Infiltration Test Result

# INTRODUCTION

## PURPOSE

This report presents the results of our geotechnical investigation for the proposed development of the Crawford Canyon Park located on the northwest corner of Newport Avenue and Crawford Canyon Road, in the City of Orange, California.

## SCOPE

The scope of our geotechnical investigation consist of the following:

1. Staked nine (9) hollow stem auger drill holes, coordinated with Hunsaker, and contacted Utility Underground Service Alert (USA/Dig Alert) in order to provide advance notification of the 9 subsurface drill holes planned within the park area.

2. Performed a field subsurface exploration program consisting of advancing: two (2) hollow-stem-auger borings to a depth of 21.5 feet below the existing grade, one (1) drill hole to a depth of 26.5 feet below the existing grade, four (4) drill holes a to a depth of 11.5 feet below the existing grade and two (2) drill holes to a depth of 3 and 5 feet below the existing grade for the purpose of performing infiltration testing. Logged the drill holes and obtained bulk and drive soil samples for geotechnical laboratory testing.

3. Performed laboratory testing on soil samples obtained from the drill holes. Testing included moisture and density, particle size, Atterberg Limits, expansion, chemical, compaction, direct shear strength, and R-value tests.

4. Interpreted and evaluated the acquired field and laboratory data to perform geotechnical engineering design which included settlement analysis, bearing capacity and associated settlement, pavement design, and seismic parameters in accordance with the 2019 California Building Code (CBC).

5. Prepared and distributed this formal geotechnical foundation report containing our final geotechnical conclusions and recommendations to support the main project submittal and permitting process.

## LOCATION

The site is located on the northwest corner of Newport Avenue and Crawford Canyon Road in the City of Orange, California. The site is bound by Newport Avenue on the south, existing single family residences on the north and west, and Crawford Canyon Road on the east. The general location of the project site is shown on Plate 1.

## PROPOSED IMPROVEMENTS

Based on our review of the provided conceptual design plans, we understand that the proposed site improvements will consist of the following:

- New asphalt-concrete parking lot
- New storm water basin
- 8-foot wide walkways
- 5-foot wide trails
- Picnic tables and benches
- Exercise station
- Pedestrian bridges
- Various play areas
- Retaining wall in order to create a level area for the new parking lot

As part of the grading for the proposed improvements, cuts and fills on the order of 8 feet will be performed and 2H:1V slopes of up to about 8 feet in maximum height are planned to be constructed at various locations throughout the park area.

## SUBSURFACE EXPLORATION

GMU conducted a subsurface exploration program to evaluate the soil conditions below the proposed park features, parking areas, retaining wall and infiltration locations. A total of nine (9) hollow-stem-auger, truck-mounted drill holes were excavated to a maximum depth of 26.5 feet below the existing grade. The drill hole locations are shown on Plate 2 – Geotechnical Map. Drill hole logs are contained in Appendix A. The drill holes were logged by our Staff Engineer, and samples were collected in each of the drill holes for laboratory testing.

## LABORATORY TESTING

Laboratory testing for the subject investigation was performed to characterize moisture and density, particle size distribution, Atterberg Limits, expansion index, maximum density, corrosion,

direct shear, and R-value. The results of our laboratory testing are summarized on Table B-1 and included within Appendix B – Laboratory Testing.

# GEOLOGIC FINDINGS

## REGIONAL GEOLOGIC SETTING

Based on our site investigation and according to the Dibble Geologic Map, the project site is underlain by alluvium deposits (Qal) that are typically comprised of sands and clays.

## SUBSURFACE MATERIALS

### Artificial Fill (Qaf)

Artificial fill soils were encountered in majority of the excavations at the site. The fills were encountered to a maximum depth of 5 feet below the existing grade and generally consists of yellow and dark brown, damp to moist, firm to stiff, sandy clays.

### Alluvium (Qal)

Alluvium underlay the artificial fill to the maximum depth of the exploratory drill holes. The alluvium consists of brown to dark gray brown to yellow brown, damp to moist, medium dense to very dense, sands and firm to stiff clays.

## GROUNDWATER

Groundwater was not observed during our exploration to a maximum depth of 26.5 feet below the existing grade. Groundwater conditions may vary across the site due to stratigraphic and hydrologic conditions and may change over time as a consequence of seasonal and meteorological fluctuations, or activities by humans at this site and nearby sites. However, based on the above findings, groundwater is unlikely to impact the proposed development.

# GEOLOGIC HAZARDS

## FAULTING AND SEISMICITY

The site is not located within an Alquist-Priolo Earthquake Fault Zone, and no known active faults are shown on the reviewed geologic maps crossing the site, however, the site is located in the seismically active region of Southern California. The nearest known active faults are the San Joaquin Hills and Elsinore fault systems, which are located approximately 6.3 and 7.9 miles from the site, respectively, and capable of generating a maximum earthquake magnitude (Mw) of 7.1 and 7.9, respectively.

Given the proximity of the site to these and numerous other active and potentially active faults, the site will likely be subject to earthquake ground motions in the future. A site $PGA_M$ of 0.64g was calculated for the site in conformance with the 2019 CBC. This $PGA_M$ is primarily dominated by earthquakes with a mean magnitude of 6.6 at a mean distance of 10 miles from the site using the USGS 2014 Interactive Deaggregation website.

## LANDSLIDES

Based on our review of available geologic maps, literature, topographic maps, aerial photographs, and our subsurface evaluation, no landslides or related features underlie or are adjacent to the subject site.

## TSUNAMI, SEICHE, AND FLOODING

The site is not located on any State of California Tsunami Inundation Map for Emergency Planning. The potential for the site to be adversely impacted by earthquake-induced tsunamis is considered to be negligible because the site is located several miles inland from the Pacific Ocean coast at an elevation exceeding the maximum height of potential tsunami inundation.

The potential for the site to be adversely impacted by earthquake-induced seiches is considered to be negligible due to the lack of any significant enclosed bodies of water located in the vicinity of the site.

According to the County of Orange FEMA Flood Insurance Rate Map, majority of the site is located with an Area of Minimal Flood Hazard (Zone X), however, the southwester side of the site is located within “Zone”, an area of 0.2% annual chance flood, 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile, and protected by levees from 1% annual chance flood. The potential for the site to be adversely impacted by significant flooding is considered low.

# GEOTECHNICAL ENGINEERING FINDINGS

## SOIL EXPANSION

Based on our evaluation, experience with similar material types, the soils encountered near the ground surface at the site exhibit a low to medium expansion potential. The recommendations provided in this report are based on a ***medium expansion potential.***

## SOIL CORROSION

Based on laboratory test results for pH, soluble chlorides, sulfate, and minimum resistivity of the site soils obtained during our subsurface investigation, the on-site soils should be considered to have the following:

- A negligible sulfate exposure to concrete per ACI 318-14, Table 19.3.1.1
- A low minimum resistivity indicating conditions that are severely corrosive to ferrous metals.
- Elevated chlorides levels (severely corrosive to ferrous metals).

The laboratory testing program performed for this project does not address the potential for corrosion to copper piping. In this regard, a corrosion engineer should be consulted to perform more detailed testing and develop appropriate mitigation measures (if necessary). The above discussion is provided for general guidance in regards to the corrosiveness of the on-site soils to typical metal structures used for construction. Detailed corrosion testing and recommendations for protecting buried ferrous metal and/or copper elements are beyond our purview. If detailed recommendations are required, a corrosion engineer should be consulted to develop appropriate mitigation measures.

## SETTLEMENT

Based on the remedial and design at the site, long-term settlements are expected to be less than an inch, with a long-term differential settlement of approximately ½ of an inch over a span of 40 feet.

## PRELIMINARY INFILTRATION TESTING

Two (2) preliminary infiltration tests were performed in general conformance with the County of Orange Technical Guidance Document (TGD). The infiltrations drill holes were excavated to depths ranging from 3 and 5 feet below the existing grade using a hollow-stem-auger, truck-mounted drill rig. At the completion of the testing, we have determined the unfactored observed

infiltration rates as shown on Table 1 below. In addition, we have determined the geotechnical factor of safety in accordance with Section A of SOCTGD Worksheet 3 as shown on Table 2 below.

**Table 1: Calculated Infiltration Rates***

| Drill Hole | Depth Below Finish Grade (feet) | Infiltration Rate* (inch/hour) |
|---|---|---|
| DH-5 | 5.0 | 1.35 |
| DH-6 | 5.0 | 0.67 |

**Rates do not incorporate a factor of safety.*

**Table 2: Worksheet 3 Geotechnical Factor of Safety**

| Factor Category | | Factor Description | Assigned Weight (w) | Factor Value (v) | Product (p) P = w x v |
|---|---|---|---|---|---|
| A | Suitability Assessment | Soil assessment methods | 0.25 | 2 | 0.50 |
| | | Predominant soil texture | 0.25 | 2 | 0.50 |
| | | Site soil variability | 0.25 | 2 | 0.50 |
| | | Depth to groundwater / impervious layer | 0.25 | 1 | 0.25 |
| | | Actual Suitability Assessment Safety Factor, $S_A$ | | | 1.75 |
| | | Minimum Suitability Assessment Safety Factor, $S_A$ | | | 2 |

Final determination of infiltration feasibility should be determined by the project civil engineer after applying all the necessary factor of safety in accordance with Worksheet 3.

We note that infiltration is deemed feasible when the design infiltration rates meet and exceeds the minimum infiltration rate of 0.3 inches per hour in accordance with the SOC TGD Manual.

The preliminary infiltration test hole locations are shown on Plate 2 - Geotechnical Map. The results of the infiltration testing are contained in Appendix C of this report.

## EXCAVATION CHARACTERISTICS

### Rippability

Based on our site exploration, it is expected that the soil materials underlying the site can be excavated with scrapers and other conventional grading equipment.

# CONCLUSIONS

Based on our geotechnical findings, the following is a summary of our conclusions:

1. The project area is not underlain by any known active faults.

2. Groundwater is not expected to be encountered and is not anticipated to have a significant impact on the proposed development.

3. Based on the planned slopes configuration (i.e., 2H:1V) and the corrective grading provided in this report, we expect the slopes to be surficially and grossly stable.

4. Different settlement at the site is expected to approximately ½-inch over a horizontal distance of 40 feet.

5. The proposed miscellaneous structures, lightly loaded bridges, and retaining walls may be supported on a shallow foundation system underlain by engineered fill.

6. Site soils within the at-grade foundation influence zone are anticipated to have a low to medium expansion potential based on our recent laboratory test results and local experience. Recommendations for the proposed developments are based on a “medium” expansive condition.

7. Corrosion testing indicates that the on-site soils have a negligible sulfate exposure and are severely corrosive to buried ferrous metals and reinforcing steel. Consequently, any metal exposed to the soil shall be protected.

# RECOMMENDATIONS

## GENERAL SITE PREPARATION AND GRADING

### General

The following recommendations pertain to any required grading associated with the proposed improvements and corrective grading needed to support the proposed improvements. All site preparation and grading should be performed in accordance with the County of Orange grading code requirements and the recommendations presented in this report.

## Clearing and Grubbing

All significant organic material such as weeds, brush, tree branches, or roots, or construction debris such as old irrigation lines, asphalt concrete, and other decomposable material should be removed from the area to be graded. No rock or broken concrete greater than 6 inches in diameter should be utilized in the fills.

## Corrective Grading

Corrective grading is needed at the site to create a firm and workable platform for construction of the proposed developments such as new bridge foundations, retaining wall foundations, parking lot pavement, site hardscape and miscellaneous lightly loaded structures.

It should be noted that the recommendations provided herein are based on our subsurface exploration and knowledge of the geologic conditions at the site. Actual removals may vary in configuration and volume based on observations of geologic materials and conditions encountered during grading. The bottom of all remedial grading removals should be observed by a GMU representative to verify the suitability of in-place soil prior to performing processing and fill placement. Corrective grading recommendations are outlined below:

General:

- The upper 2 feet of soil materials at the site, in areas supporting foundations should be removed to expose dense of firm, native alluvial soils. In areas supporting pavement and hardscape improvements removals may be reduced to 1 foot.
- If loose soil materials are found at depths greater than the proposed remedial grading, then additional removals/ over-excavation may be needed, as determined by a representative of GMU.

Bridge Foundations: Grading recommendations for support of the new bridge foundations should consist of the following:

- Bridge foundations are to be supported by at least 2 feet of engineered fill.
- If the general site removals of 2 feet does not provide for a minimum of 2 feet of engineered fill below the foundation, over-excavation to a depth of at least 2 feet below the bottom of the footing is required.
- The materials exposed at the bottom of all removals and over-excavation should be approved by a representative of GMU.

Retaining Walls and Miscellaneous Structures: Grading recommendations for support of the new retaining walls/site walls and miscellaneous structure foundations should consist of the following:

- The retaining, site wall and miscellaneous footings should be supported by at least 2 feet of engineered fill except for pole foundations, which may be founded on competent alluvial soils.
- If the general site removals of 2 feet does not provide for a minimum of 2 feet of engineered fill below the foundation, over-excavation to a depth of at least 2 feet below the bottom of the footing is required.

- The materials exposed at the bottom of all removals and over-excavation should be approved by a representative of GMU.

Flatwork and Pavement Areas: Grading recommendations for the support of the asphalt and concrete pavement and flatwork improvements should consist of the following:

- The areas below the proposed improvements should be removed to a depth of at least 12 inches below existing grade or subgrade, whichever is deeper, to provide for at least 12 inches of engineered fill under the flatwork and pavement improvements.
- The removal or over-excavation bottom should be approved by a representative of GMU.

**Processing and Fill Placement**

- The bottom of the excavation should then be scarified to a depth of at least 6 inches, moisture conditioned to 3% above optimum moisture content, and compacted to at least 90% relative compaction.
- Onsite soil materials may be used to backfill the corrective grading excavations and achieve the planned grade elevation.
- All fill material should be placed in 6- to- 8-inch-thick lifts, moisture conditioned to at least 3% above optimum moisture content, blended to achieve uniform moisture content and compacted to achieve 90% relative compaction.
- No rock or broken concrete greater than 6 inches in diameter should be utilized in the fills.
- Where existing ground surfaces are at 5:1 or steeper benching in accordance with Plate 5 should be performed

**Temporary Excavations**

Temporary excavations for demolitions, earthwork, footings, and utility trenches are expected. We anticipate that unsurcharged excavations with vertical side slopes less than 4 feet high will generally be stable. Our recommendations for temporary excavations are as follows:

- Temporary, unsurcharged excavation sides over 4 feet in height should be sloped no steeper than an inclination provided by OSHA for a Type B soil.

- Where sloped excavations are created, the tops of the slopes should be barricaded so that vehicles and storage loads do no encroach within 10 feet of the tops of the excavated slopes. A greater setback may be necessary when considering heavy vehicles, such as concrete trucks and cranes. GMU should be advised of such heavy vehicle loadings so that specific setback requirements can be established.
- If the temporary construction slopes are to be maintained during the rainy season, berms are recommended to be graded along the tops of the slopes in order to prevent runoff water from entering the excavation and eroding the slope faces.

Our temporary excavation recommendations are provided only as **minimum** guidelines. All work associated with temporary excavations should meet the minimal requirements as set forth by CAL-OSHA. Temporary slope construction, maintenance, and safety are the responsibility of the contractor.

## STRUCTURE SEISMIC DESIGN

No active or potentially active faults are known to cross the site, therefore, the potential for primary ground rupture due to faulting on-site is very low. However, the site will likely be subject to seismic shaking at some time in the future.

Based on our field exploration and the site soil profile, the site should be designated as Site Class D based on the measured Standard Penetration Resistance within drill holes. The seismic design coefficients based on ASCE 7-16 and 2019 CBC are listed in Table 3 below.

**Table 3: 2019 CBC and ASCE 7-16 Seismic Design Parameters (To be utilized as per the requirements of Section 11.4.8 of ASCE 7-16)**

| Seismic Item | Design Value | 2016 ASCE 7-16 or 2019 CBC Reference |
|---|---|---|
| Site Class based on soil profile (ASCE 7-16 Table 20.3-1) | D[(a)] | ASCE 7-16 Table 20.3-1 |
| Short Period Spectral Acceleration $S_s$ | 1.371[(a)] | CBC Figures 1613.2.1 (1-8) |
| 1-sec. Period Spectral Acceleration $S_1$ | 0.488[(a)] | CBC Figures 1613.2.1 (1-8) |
| Site Coefficient $F_a$ (2019 CBC Table 1613.2.3(1)) | 1.200[(a)] | CBC Table 1613.2.3 (1) |
| Site Coefficient $F_v$ (2019 CBC Table 1613.2.3(2)) | 1.812[(b)] | CBC Table 1613.2.3 (2) |
| Short Period MCE* Spectral Acceleration $S_{MS}$ $S_{MS} = F_a S_s$ | 1.645[(a)] | CBC Equation 16-36 |
| 1-sec. Period MCE Spectral Acceleration $S_{M1}$ $S_{M1} = F_v S_1$ | 0.884[(b)] | CBC Equation 16-37 |
| Short Period Design Spectral Acceleration $S_{DS}$ $S_{DS} = 2/3S_{Ms}$ | 1.097 [(a)] | CBC Equation 16-38 |
| 1-sec. Period Design Spectral Acceleration $S_{D1}$ $S_{D1} = 2/3S_{M1}$ | 0.590[(b)] | CBC Equation 16-39 |
| Short Period Transition Period $T_S$ (sec) $T_S = S_{D1}/S_{DS}$ | 0.538[(b)] | ASCE 7-16 Section 11.4.6 |
| Long Period Transition Period Tl (sec) | 8[(b)] | ASCE 7-16 Figures 22-14 to 22-17 |
| MCE[(c)] Peak Ground Acceleration (PGA) | 0.531[(a)] | ASCE 7-16 Figures 22-9 to 22-13 |
| Site Coefficient $F_{PGA}$ (ASCE 7-16 Table 11.8-1) | 1.200[(a)] | ASCE 7-16 Table 11.8-1 |
| Modified MCE[(c)] Peak Ground Acceleration ($PGA_M$) | 0.637[(a)] | ASCE 7-16 Equation 11.8-1 |

[(a)] Design Values Obtained from USGS Earthquake Hazards Program website that are based on the ASCE-7-16 and 2019 CBC and site coordinates of N33.7747000° and W117.788512°.
[(b)] Design Values Determined per ASCE Table 11.4-2 and CBC Equations 16-36 through 16-39.
[(c)] MCE: Maximum Considered Earthquake.

Since the Site Class is designated as D and the $S_1$ value is greater than or equal to 0.2, the 2019 CBC requires either a site-specific seismic hazard analysis per Section 21.2 of ASCE 7-16 or the application of Exception 2 of Section 11.4.8 of ASCE 7-16. The project structural engineer should apply all requirements of Section 11.4.8 of ASCE 7-16 to determine if increases to the seismic response coefficient (i.e. increases to the loading of the structure) are required.

Per the 2019 CBC and ASCE 7-16, the Design Earthquake peak ground acceleration ($PGA_D$) may be assumed to be equivalent to $S_{DS}/2.5$; therefore, for the subject site, a $PGA_D$ value of 0.35g (0.866g/2.5) should be used.

It should be recognized that much of southern California is subject to some level of damaging ground shaking as a result of movement along the major active (and potentially active) fault zones that characterize this region. Design utilizing the 2019 CBC is not meant to completely protect against damage or loss of function. Therefore, the preceding parameters should be considered as minimum design criteria.

## BRIDGE FOUNDATION DESIGN AND CONSTRUCTION

### General

The criteria contained in the following section may be used for the design and construction of the proposed bridge foundations. Foundation design parameters are presented below.

### General Foundation Design Parameters

- Bearing Material: Minimum 2 feet of Engineered Fill
- Minimum Footing Size:
  - Width: 24 inches
  - Depth: 24 inches embedment below lowest adjacent soil grade (depth)
- Allowable Bearing Capacity: 2,000 psf for the minimum footing size given above.
  - May be increased by 100 psf for every footing width and 400 psf for every footing depth to a maximum allowable bearing pressure of 2,500 psf.
  - Above value may be increased by 1/3 for temporary loads such as wind or seismic
- Lateral Foundation Resistance:
  - Allowable passive resistance: 250 psf/ft (disregard upper 6 inches, max 2,500 psf)
  - Allowable friction coefficient: 0.35
  - Above values may be combined without reduction and may be increased by 1/3 for temporary loads such as wind or seismic

## RETAINING AND SITE WALL DESIGN AND CONSTRUCTION CRITERIA

The following criterion is considered applicable to the design and construction of retaining and site walls at the subject site. The design assumes a maximum 6-foot-high retaining wall (i.e., from top of footing to top of retaining portion of wall) with level backfill conditions. In addition, the design assumes the use of on-site select backfill in accordance with Plate 3 – Retaining Wall Construction Detail.

### Foundation Design Parameters:

| | |
|---|---|
| Minimum Foundation Width: | 24 inches (retaining)<br>12 inches (free standing) |
| Minimum Foundation Depth: | Depth below lowest adjacent grade to bottom of footing:<br>o 24 inches |

| | |
|---|---|
| Bearing Materials: | Minimum 2 feet of Engineered fill |
| Allowable Bearing Capacity: | 2,000 psf for footing on level ground<br>o 1/3 increase for wind or seismic conditions |
| Allowable Coefficient of Friction: | 0.35 |
| Unit Weight of Backfill: | 125 pcf |
| Allowable Passive Earth Pressure: | 250 psf/ft of depth (static)<br>o Disregard upper 6 inches<br>o Reduce passive by one-third when combined with friction in sliding resistance<br>o 1/3 increase for seismic conditions |

**Wall Design Parameters:**

| | |
|---|---|
| Active Earth Pressure: | 45 pcf – level backfill<br>(Assumes the use of select soils in backfill zone) |
| Weight of Backfill: | 125 pcf |
| Control/Construction Joints: | As a minimum, maximum spacing of 15 feet and at angle points |
| Waterproofing: | The back side of all retaining walls should be waterproofed down to the top of the foundation prior to placing subdrains or backfill. The design and selection of the waterproofing system is outside the scope of our report and is outside our purview. |
| Concrete: | See "Structural Concrete" section of this report. |
| Wall Backfill and Drainage: | See Retaining Wall Construction Detail Diagram and Notes (shown on Plate 3) for backfill and drainage requirements. |

The unrestrained (active) values are applicable when the walls are designed and constructed as cantilevered walls allowing sufficient wall movement to mobilize active pressure conditions. This wall movement should not be less than 0.01 H (H = height of wall) for the unrestrained values to be applicable.

Provided that the retaining walls have a maximum height of less than 6 feet, the current 2016 CBC indicates that the incorporation of seismic earth pressures is not required.

## POLE FOUNDATIONS

It is expected that the shade structures and light poles will be supported on pole foundations. As a minimum, the pole foundations should be at least 18 inches in diameter and at least 4 feet deep; however, the actual dimensions should be determined by the project structural engineer based on the following design parameters.

Bearing Materials. The pole foundations may bear into engineered fill soils or competent native soils approved by a representative from GMU.

Bearing Values. End-bearing capacity and skin friction may be combined to determine the allowable bearing capacities of the pole foundations. An allowable bearing pressure of 3,000 pounds per square foot (psf) may be used for pole foundations at least 18 inches in diameter and embedded a minimum of 4 feet below the lowest adjacent grade. A value of 200 pounds per square foot may be used to determine the skin friction between the concrete and surrounding soil.

Lateral Load Design. Lateral loads may be resisted by passive resistance within the adjacent earth materials. For passive resistance, an allowable passive earth pressure of 250 pounds per foot of pile diameter per foot of depth into competent bearing material may be used; however, passive resistance should be disregarded within the upper foot due to possible disturbance during drilling. The passive resistance value may be applied over an area equivalent to two pile diameters.

## STRUCTURAL CONCRETE

Laboratory tests indicate that the onsite soils are classified as having a “negligible” sulfate exposure and “S0” sulfate exposure category per ACI 318-14, Table 19.3.1.1. However, due to the low to moderate soil resistivity and elevated chloride levels obtained from our test result, the on-site soil is severely corrosive to ferrous metals such as reinforcing steel. On this basis, we recommend that a Type II/V cement with a maximum water to cement ratio of 0.50 be used for structural elements (i.e., foundations, walls, etc.). Utilization of CBC moderate sulfate level requirements will also serve to reduce the permeability of the concrete and help minimize the potential of water and/or vapor transmission through the concrete. Wet curing of the concrete per ACI Publication 308 is also recommended.

Wet curing of the concrete per ACI Publication 308 is also recommended.

The aforementioned recommendations in regards to concrete are made from a soils perspective only. Final concrete mix design is beyond our purview. All applicable codes, ordinances,

regulations, and guidelines should be followed in regard to the designing a durable concrete with respect to the potential for sulfate exposure from the on-site soils and/or changes in the environment.

## FERROUS METAL CORROSION PROTECTION

The results of the laboratory chemical tests performed on a sample of soil collected within the site indicate that the on-site soils are severely corrosive to ferrous metals. Consequently, metal structures which will be in direct contact with the soil (i.e., underground metal conduits, pipelines, metal sign posts, etc.) and/or in close proximity to the soil (wrought iron fencing, etc.) may be subject to corrosion. The use of special coatings or cathodic protection around buried metal structures has been shown to be beneficial in reducing corrosion potential. Additional provisions will be required to address high chloride contents of the soil per the 2019 CBC to protect the concrete reinforcement. The laboratory testing program performed for this project does not address the potential for corrosion to copper piping. In this regard, a corrosion engineer should be consulted to perform more detailed testing and develop appropriate mitigation measures (if necessary).

The above discussion is provided for general guidance in regards to the corrosiveness of the on-site soils to typical metal structures used for construction. Detailed corrosion testing and recommendations for protecting buried ferrous metal and/or copper elements are beyond our purview. If detailed testing is required, a corrosion engineer should be consulted to perform the testing and develop appropriate mitigation measures.

## SURFACE DRAINAGE

Surface drainage should be carefully controlled during and after grading to prevent ponding and uncontrolled runoff adjacent to the structures. Particular care will be required during grading to maintain slopes, swales, and other erosion control measures needed to direct runoff toward permanent surface drainage facilities. Positive drainage of at least 2% away from the perimeters of the structures and site pavements should be incorporated into the design. In addition, it is recommended that nuisance water be directed away from the perimeter of the structures by the use of area drains in adjacent landscape and flatwork areas and roof drains tied into the site storm drain system.

## UTILITY TRENCH BACKFILL CONSIDERATIONS

### General

New utility line pipelines should be backfilled with both select bedding materials beneath and around the pipes and compacted soil above the pipe bedding. Recommendations for the types of the materials to be used and the proper placement of these materials are provided in the following sections.

### Pipe Bedding

The pipe bedding materials should extend from at least 6 inches below the pipes to at least 12 inches above the crown of the pipes. Pipe bedding should consist of either clean sand with a sand equivalent (SE) of at least 30 or crushed rock. If crushed rock is used, it should consist of ¾-inch crushed rock that conforms to Table 200-1.2 of the 2018 "Greenbook." Pipe bedding should also meet the minimum requirements of the County of Orange. If the requirements of the County are more stringent, they should take precedence over the geotechnical recommendations. Sufficient laboratory testing should be performed to verify the bedding meets the minimum requirements of the Greenbook.

Based on our subsurface exploration and knowledge of the onsite materials, the soils that will be excavated from the pipeline trenches will not meet the recommendations for pipe bedding materials; therefore, imported materials will be required for pipe bedding.

Granular pipe bedding material having a sand equivalent of 30 or greater should be properly placed in thicknesses not exceeding 3 feet, and then sufficiently jetted in place. With proper techniques, jetting is not expected to have an adverse impact on existing site soils.

Crushed rock, if used, should be capped with filter fabric (Mirafi 140N, or equivalent) to prevent the migration of fines into the rock.

### Trench Backfill

All existing soil material within the limits of the pipeline alignment are considered suitable for use as trench backfill above the pipe bedding zone if care is taken to remove all significant organic and other decomposable debris, moisture condition the soil materials as necessary, and separate and selectively place and/or stockpile any inert materials larger than 6 inches in maximum diameter.

Imported soils are not anticipated for backfill since the on-site soils are suitable. However, if imported soils are used, the soils should consist of clean, granular materials with physical and chemical characteristics similar to those described herein for on-site soils. Any imported soils to be used as backfill should be evaluated and approved by GMU prior to placement.

Soils to be used as trench backfill should be moistened, dried, or blended as necessary to achieve a minimum of 3% over optimum moisture content for compaction, placed in loose lifts no greater than 8 inches thick, and mechanically compacted/densified to at least 90% relative compaction as determined by ASTM Test Method D 1557.

No rock or broken concrete greater than 6 inches in maximum diameter should be utilized in the trench backfills.

## ASPHALT CONCRETE PAVEMENT THICKNESS RECOMMENDATIONS

### Asphalt Pavement Design

Based on the R-value test results, as well as testing completed in the vicinity, an R-value of 26 was used for the design. Table 4 below provides recommended minimum thicknesses for asphalt concrete (AC) and aggregate base sections for two traffic indices.

**Table 4: Recommended Minimum AC and Base Section Thicknesses**

| Location | R-Value | Traffic Index | Asphalt Concrete (in.) | Aggregate Base* (in.) |
|---|---|---|---|---|
| Driveways | 26 | 5.5 | 4.0 | 5.5 |
| Parking Stalls | 26 | 4.0 | 4.0 | 4.0 |

* assumed R-Value = 78

Asphalt concrete pavement construction should be in accordance with the following recommendations:

- The planned pavement structural sections should consist of aggregate base materials (AB) and asphalt concrete materials (AC) of a type meeting the minimum Caltrans and City of Carlsbad requirements.
- The subgrade soils should be prepared in accordance with the ***Corrective Grading*** section of this report.
- The subgrade soils should unyielding and be check by a representative of GMU prior to placing the required AB section.
- The AB and AC should be compacted to at least 95% relative compaction.

## CONCRETE FLATWORK DESIGN CONSIDERATIONS

We recommend that the subgrade for the subject concrete flatwork be moisture conditioned to 3% over optimum to a depth of 18 inches below finish grade and compacted to 90% relative compaction. The concrete for flatwork is considered non-structural and may be designed with concrete strengths that are determined by the engineer or designer responsible for these improvements. The concrete design should account for the elevated levels of chlorides within the onsite soils. Minimum recommendations are provided below:

- Cement Type: II/V
- Maximum Water Cement Ratio/ Concrete Strength:
    - No special requirements. W/C ratio and concrete strength should be selected by the engineer or designer balancing the chloride exposure (i.e., for flatwork only), durability, and project settlement as well as temperature and shrinkage stresses

- See Table 5 below for summary of flatwork recommendations:

**Table 5: Concrete Flatwork Recommendations**

| Description | Subgrade Preparation (1) | Minimum Concrete Thickness | Reinforcement(3) | Joint Spacing ( Max.) | Concrete Cement(4) |
|---|---|---|---|---|---|
| Concrete Paving (Patio, flatwork, sidewalk) (< 5 feet in width) | 3% over optimum to 18 inches at 90% relative compaction | 4 inches | 1) No. 3 bars at 18" o.c. extend into thickened edge, 2) Thickened Edge: two horizontal No. 3 bar placed at the top and bottom 3) dowel into building and curb using 9-inch Speed Dowels @ 18"o.c | 5 feet | Type II/V |
| Concrete Paving (Patio, flatwork, sidewalk) (> 5 feet in width) | 3% over optimum to 18 inches at 90% relative compaction | 4 inches | 1) No. 3 bars at 18" o.c. extend into thickened edge, 2) Thickened Edge: two horizontal No. 3 bar placed at the top and bottom 3) dowel into building and curb using 9-inch Speed Dowels @ 18"o.c | 8 feet | Type II/V |

*(1) The moisture content and compaction of the subgrade must be verified by the geotechnical consultant prior to placement of concrete/reinforcement.*
*(2) For pedestrian usages only, S.E. 30 sand may be used instead of Aggregate Base.*
*(3) Reinforcement to be placed in the middle of the recommended concrete section.*
*(4) Final concrete mix design to be supplied by others.*

## PLANTERS AND TREES

Where new trees or large shrubs are to be located in close proximity of new concrete flatwork, rigid moisture/root barriers should be placed around the perimeter of the flatwork to at least 2 feet in depth in order to offer protection to the adjacent flatwork against potential root and moisture damage. Existing mature trees near flatwork areas should also incorporate a rigid moisture/root barrier placed at least 2 feet in depth below the top of the flatwork.

## PLAN REVIEW / GEOTECHNICAL TESTING DURING GRADING / FUTURE REPORT

### Plan Review

GMU should review the final construction plans (grading and foundation plans) to confirm that they are consistent with our recommendations provided in this report.

### Geotechnical Testing

Geotechnical observation and testing should be performed by the geotechnical engineer of record during the following stages of precise grading and construction:

- During site clearing and grubbing.
- During removal of any buried irrigation lines or other subsurface structures.
- During all phases of grading including over-excavation, temporary excavations, removals, scarification, ground preparation, moisture conditioning, proof-rolling, and placement and compaction of all fill materials.
- During grading for new foundations.
- During pavement and flatwork section placement and compaction.
- When any unusual conditions are encountered.

### Future Report

If required, a report summarizing our construction observation/testing services will be prepared at project completion.

## LIMITATIONS

All parties reviewing or utilizing this report should recognize that the findings, conclusions, and recommendations presented represent the results of our professional geological and geotechnical

engineering efforts and judgments. Due to the inexact nature of the state of the art of these professions and the possible occurrence of undetected variables in subsurface conditions, we cannot guarantee that the conditions actually encountered during grading and site construction will be identical to those observed, sampled, and interpreted during our study, or that there are no unknown subsurface conditions which could have an adverse effect on the use of the property. We have exercised a degree of care comparable to the standard of practice presently maintained by other professionals in the fields of geotechnical engineering and engineering geology, and believe that our findings present a reasonably representative description of geotechnical conditions and their probable influence on the grading and use of the property.

Our conclusions and recommendations are based on the assumption that our firm will act as the geotechnical engineer of record during construction and grading of the project to observe the actual conditions exposed, to verify our design concepts and the grading contractor's general compliance with the project geotechnical specifications, and to provide our revised conclusions and recommendations should subsurface conditions differ significantly from those used as the basis for our conclusions and recommendations presented in this report. Since our conclusions and recommendations are based on a limited amount of current and previous geotechnical exploration and analysis, all parties should recognize the need for possible revisions to our conclusions and recommendations during grading of the project.

It should be further noted that the recommendations presented herein are intended solely to minimize the effects of post-construction soil movements. Consequently, minor cracking and/or distortion of all on-site improvements should be anticipated.

This report has not been prepared for the use by other parties or projects other than those named or described herein. This report may not contain sufficient information for other parties or other purposes.

## CLOSURE

If you have any questions concerning our findings or recommendations, please do not hesitate to contact us and we will be happy to discuss them with you. The Plates and Appendices that complete this report are listed in the Table of Contents.

Respectfully submitted,

**GMU GEOTECHNICAL, INC.**

Nadim Sunna, M.Sc., P.E. 84197
Senior Engineer

Alan B. Mutchnick, PG, CEG 1789
Associate Engineering Geologist

Ns/20-188-00 (11-6-2020)

# REFERENCES

## SITE-SPECIFIC REFERENCES

(1) Site Plan, OC Parks – Crawford Park, prepared by Hunsaker and Associates Irvine, Inc., dated October 16, 2020.

## TECHNICAL REFERENCES

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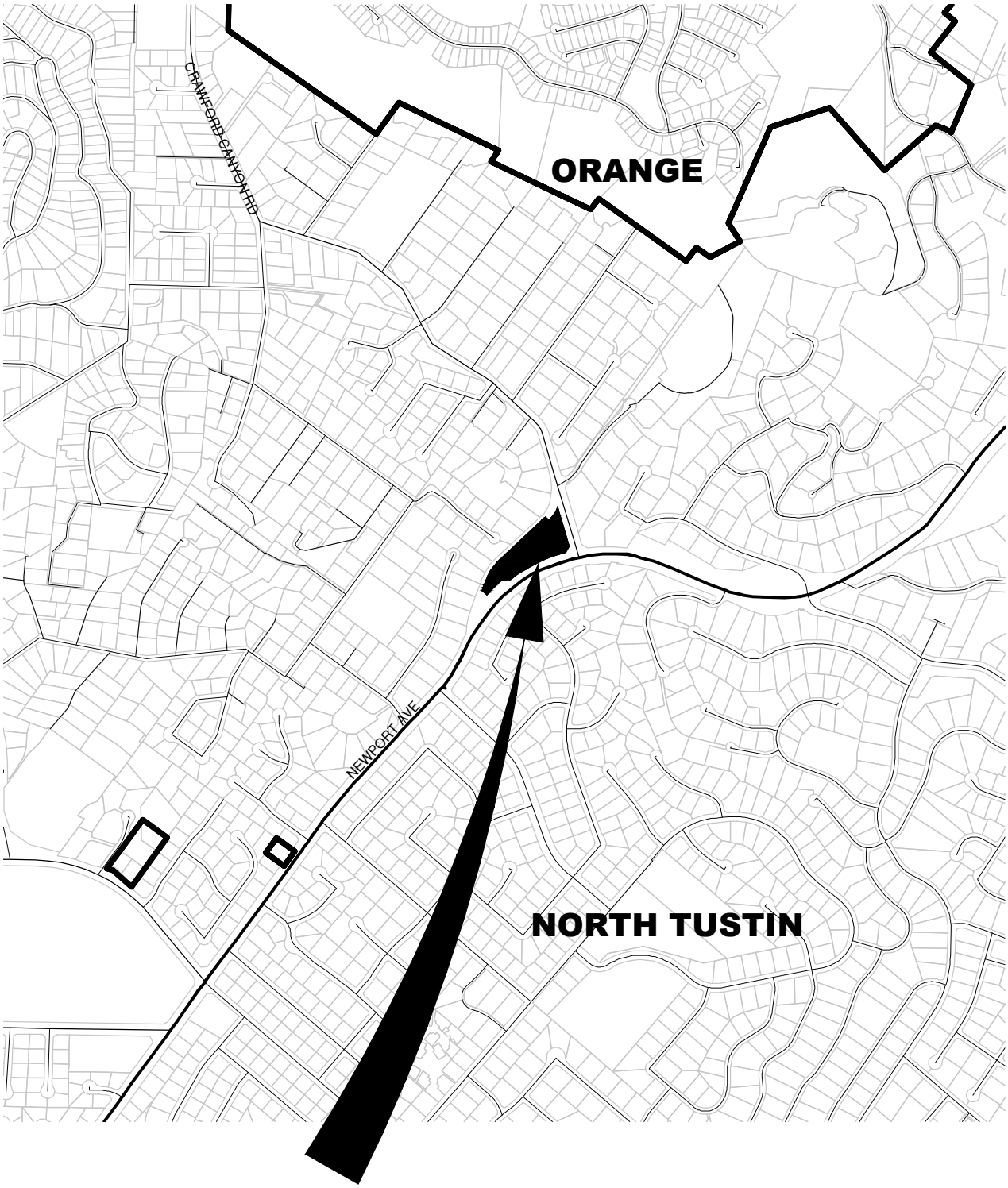


**CRAWFORD PARK**
NEWPORT AVE & CRAWFORD CANYON RD
NORTH TUSTIN, CA

0 1000'

# Location Map

| | | |
|---|---|---|
| GMU | Date: November 6, 2020 | Plate 1 |
| | Project No.: 20-188-00 | |

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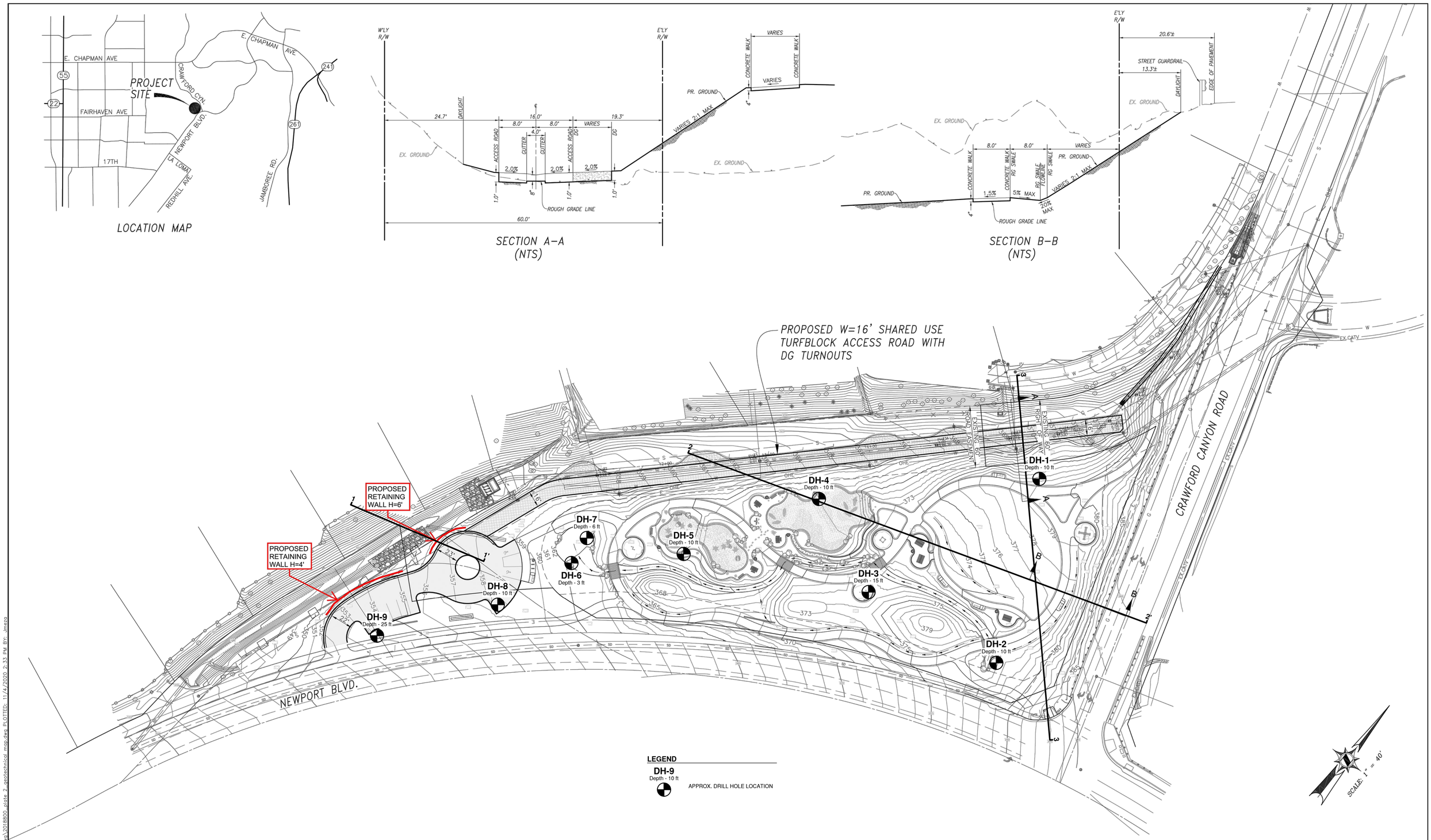
LOCATION MAP




SECTION A–A
(NTS)




SECTION B–B
(NTS)




**LEGEND**

**DH-9**
Depth - 10 ft
APPROX. DRILL HOLE LOCATION

**PREPARED FOR:**

OCparks

**PREPARED BY:**

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

**GEOTECHNICAL MAP**

| GMU | Date: November 6, 2020 | Plate 2 |
|---|---|---|
| | Project No.: 20-188-00 | |

0 20 40 80
SCALE: 1" = 40'

# OC PARKS
# CRAWFORD PARK
# SITE PLAN

October 16, 2020

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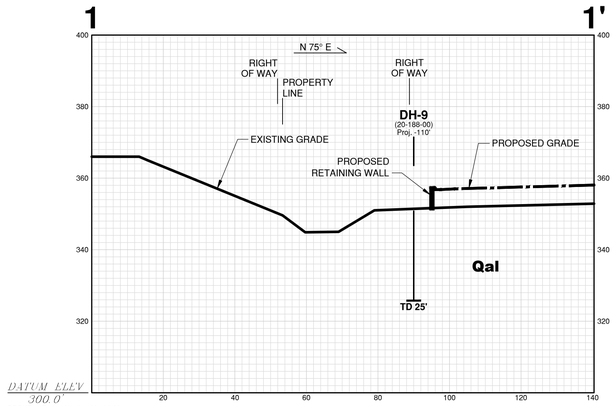
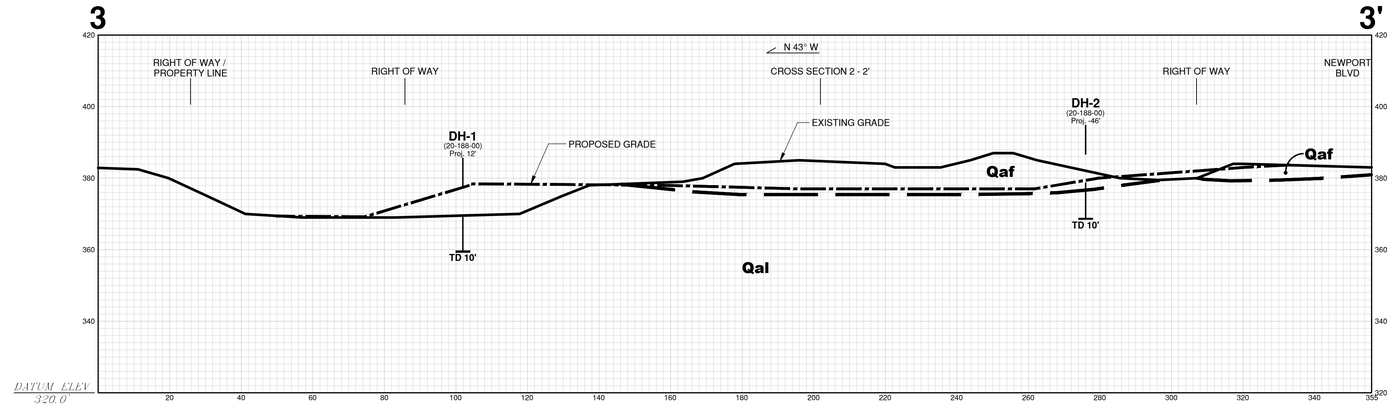
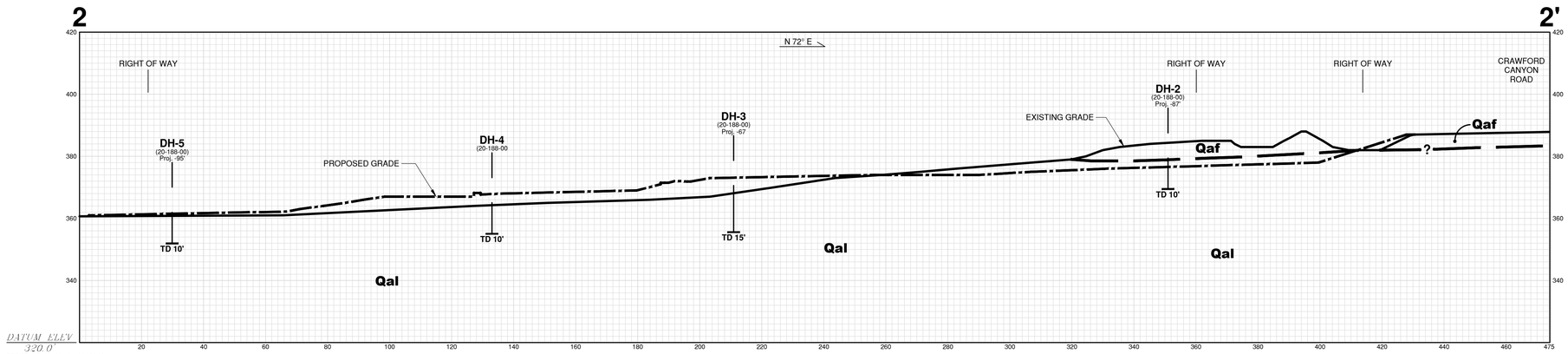



GROUP Project Number 20-188-00
SECTION 1 - 1'
SCALE: 1" = 20'




GROUP Project Number 20-188-00
SECTION 3 - 3'
SCALE: 1" = 20'



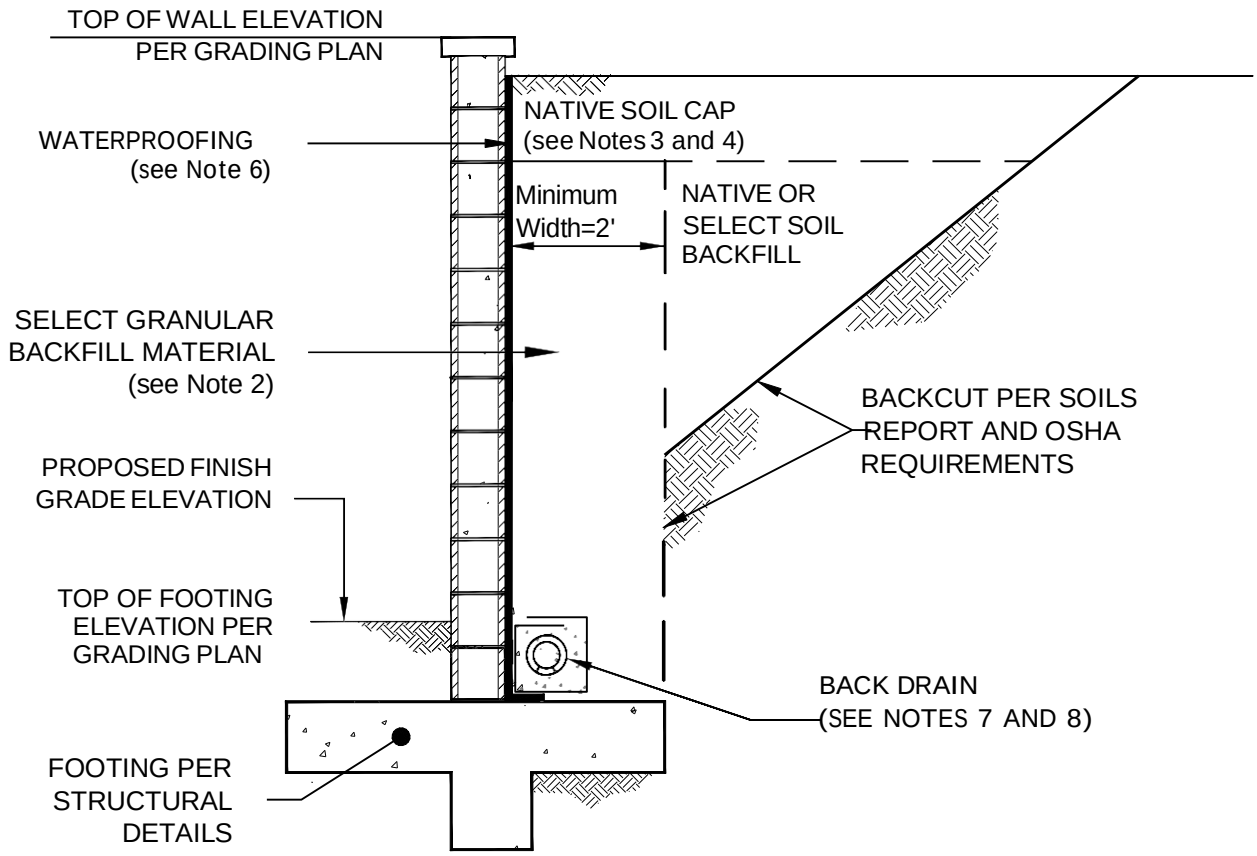

GROUP Project Number 20-188-00
SECTION 2 - 2'
SCALE: 1" = 20'

0 20' 40'

DRAWING: g:\2020\20-188-00\dwg\2018800_plate 3_geo sections.dwg PLOTTED: 11/4/2020 2:31 PM BY: Jimeza

## Geotechnical Sections

| | | |
|---|---|---|
| GMU | Date: November 6, 2020 | Plate 3 |
| | Project No.: 20-188-00 | |




RETAINING WALL DETAIL

NOT TO SCALE

1. FINAL DETERMINATION OF THE MATERIAL TO BE USED FOR BACKFILL SHALL BE MADE BY GMU.

2. ALL SELECT BACKFILL TO WITHIN 1 TO 2 FEET OF FINAL GRADE SHOULD CONSIST OF FREE-DRAINING GRANULAR MATERIAL (I.E. SE 30 SAND, PEA GRAVEL, OR CRUSHED ROCK). CRUSHED ROCK, IF USED, SHOULD BE WRAPPED IN FILTER FABRIC (MIRAFI 140N OR EQUIVALENT) TO MINIMIZE THE POTENTIAL FOR MIGRATION OF FINES INTO THE ROCK. THE SELECT BACKFILL SHOULD BE MOISTURE CONDITIONED TO ACHIEVE OVER OPTIMUM MOISTURE CONTENT PER THE SOILS REPORT AND COMPACTED TO AT LEAST 90% RELATIVE COMPACTION AS DETERMINED BY ASTM TEST METHOD D 1557.

3. FINE-GRAINED NATIVE SOILS SHOULD BE USED TO CAP THE SELECT BACKFILL ZONE.

4. ALL NATIVE OR SELECT SOIL WALL BACKFILL SHOULD BE MOISTURE CONDITIONED AS NECESSARY TO OVER OPTIMUM MOISTURE CONTENT PER THE SOILS REPORT AND COMPACTED TO AT LEAST 90% RELATIVE COMPACTION AS DETERMINED BY ASTM TEST METHOD D 1557.

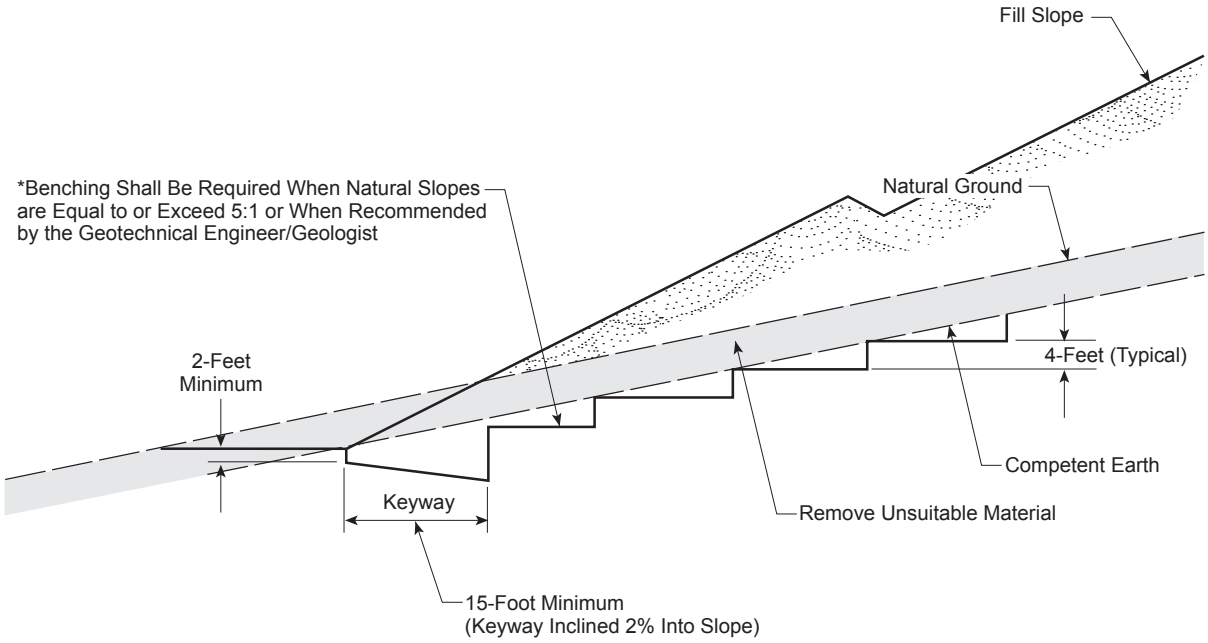
5. THE BACKSIDE OF THE WALLS SHOULD BE WATERPROOFED DOWN TO AND ACROSS THE TOP OF THE FOOTING. THE DESIGN AND SELECTION OF THE WATERPROOFING SYSTEM IS OUTSIDE OF THE PURVIEW OF GMU.

6. THE WATERPROOFING SYSTEM AND ANY DRAIN BOARDS SHOULD BE PROTECTED FROM DAMAGE BY CONSTRUCTION ACTIVITIES. THE TOP EDGE OF THE WATERPROOFING AND ANY DRAIN BOARDS SHOULD BE PROPERLY ADHERED TO THE WALL AND SEALED TO PREVENT THE POSSIBLE ACCUMULATION OF DEBRIS BETWEEN THE DRAINAGE/WATERPROOFING SYSTEM AND THE WALL.

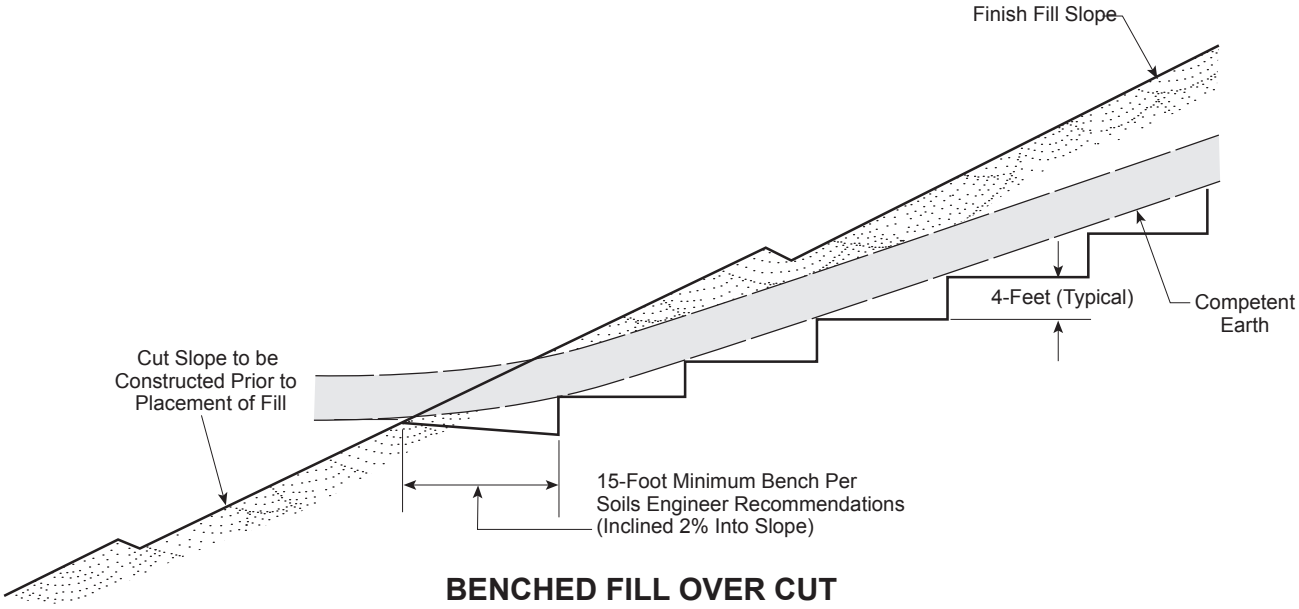
7. THE BACKDRAIN SYSTEM SHOULD CONSIST OF 4" PERFORATED PIPE SURROUNDED BY AT LEAST ONE CUBIC FOOT OF 3/4"-1.5" OPEN GRADED GRAVEL WRAPPED IN MIRAFI 140 N FILTER FABRIC (OR EQUIVALENT). THE PERFORATED PIPE SHOULD CONSIST OF SDR-35 OR SCHEDULE 40 PVC PIPE (OR APPROVED EQUIVALENT) LAID ON AT LEAST 2" OF CRUSHED ROCK WITH THE PERFORATIONS LAID DOWN. THE BACKDRAIN GRADIENT SHOULD NOT BE LESS THAN 1% WHEN POSSIBLE. THE PERFORATED PIPE SHOULD OUTLET INTO AREA DRAINS OR OTHER SUITABLE OUTLET POINTS AT RUNS OF 200 FEET OR LESS, IF PRACTICAL. IF THE BACKDRAINS CANNOT BE OUTLETED BY GRAVITY FLOW, A SUMP PUMP SYSTEM WILL NEED TO BE DESIGNED AND CONSTRUCTED. REDUNDANT BACK-UP PUMPS OR COMPONENTS ARE RECOMMENDED. DESIGN OF THIS SYSTEM IS OUTSIDE OF THE PURVIEW OF GMU.

8. THE TIE-IN LOCATIONS FOR BACKDRAIN OUTLETS SHOULD BE SHOWN ON THE PRECISE GRADING, SITE WALL, AND/OR LANDSCAPE PLANS.

| | | |
|---|---|---|
| GMU | **RETAINING WALL CONSTRUCTION DETAIL** | PLATE<br>**4** |




## BENCHED FILL OVER NATURAL




## BENCHED FILL OVER CUT

GMU

**TYPICAL BENCHING AND KEYWAY**

Plate

**5**

P26-1/1/2002

# APPENDIX A

## Geotechnical Exploration Procedures and Logs

# APPENDIX A

## GMU GEOTECHNICAL EXPLORATION PROCEDURES AND LOGS

Our exploration at the subject site consisted of nine (9) drill holes. The estimated locations of the explorations are shown on Plate 2 – Geotechnical Map. Our drill holes were logged by a Staff Engineer, and drive, bulk, and SPT samples of the excavated soils were collected. "Undisturbed" samples were taken using a 3.0-inch thin walled, outside-diameter drive sampler which contains a 2.416-inch-diameter brass sample sleeve 6 inches in length. Standard penetration testing (SPT) with a 2.0-inch outside diameter split spoon sampler without liners was performed in the borings during advancement. Blow counts recorded during sampling from the drive and SPT sampler are shown on the drill hole logs. The logs of each drill hole are contained in this Appendix A, and the Legend to Logs is presented as Plate A-1 and A-2.

The geologic and engineering field descriptions and classifications that appear on these logs are prepared according to Corps of Engineers and Bureau of Reclamation standards. Major soil classifications are prepared according to the Unified Soil Classification System as modified by ASTM Standard No. 2487. Since the descriptions and classifications that appear on the Log of Drill hole are intended to be that which most accurately describe a given interval of a drill hole (frequently an interval of several feet), discrepancies do occur in the Unified Soil Classification System nomenclature between that interval and a particular sample in that interval. For example, an 8-foot-thick interval in a log may be identified as silty sand (SM) while one sample taken within the interval may have individually been identified as sandy silt (ML). This discrepancy is frequently allowed to remain to emphasize the occurrence of local textural variations in the interval.

| MAJOR DIVISIONS | | | Group Letter | Symbol | TYPICAL NAMES |
|---|---|---|---|---|---|
| COARSE-GRAINED SOILS<br>More Than 50% Retained On No.200 Sieve<br><br>Based on The Material Passing The 3-Inch (75mm) Sieve.<br><br>Reference:<br>ASTM Standard D2487 | **GRAVELS**<br>50% or More of Coarse Fraction Retained on No.4 Sieve | Clean Gravels | GW | | Well Graded Gravels and Gravel-Sand Mixtures, Little or No Fines. |
| | | | GP | | Poorly Graded Gravels and Gravel-Sand Mixtures Little or No Fines. |
| | | Gravels With Fines | GM | | Silty Gravels, Gravel-Sand-Silt Mixtures. |
| | | | GC | | Clayey Gravels, Gravel-Sand-Clay Mixtures. |
| | **SANDS**<br>More Than 50% of Coarse Fraction Passes No.4 Sieve | Clean Sands | SW | | Well Graded Sands and Gravelly Sands, Little or No Fines. |
| | | | SP | | Poorly Graded Sands and Gravelly Sands, Little or No Fines. |
| | | Sands With Fines | SM | | Silty Sands, Sand-Silt Mixtures. |
| | | | SC | | Clayey Sands, Sand-Clay Mixtures. |
| FINE-GRAINED SOILS<br>50% or More Passe The No.200 Sieve<br><br>Based on The Material Passing The 3-Inch (75mm) Sieve.<br><br>Reference:<br>ASTM Standard D2487 | **SILTS AND CLAYS**<br>Liquid Limit Less Than 50% | | ML | | Inorganic Silts, Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts With Slight Plasticity. |
| | | | CL | | Inorganic Clays of Low To Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays. |
| | | | OL | | Organic Silts and Organic Silty Clays of Low Plasticity |
| | **SILTS AND CLAYS**<br>Liquid Limit 50% or Greater | | MH | | Inorganic Silts, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silts. |
| | | | CH | | Inorganic Clays of High Plasticity, Fat Clays. |
| | | | OH | | Organic Clays of Medium To High Plasticity, Organic Silts. |
| HIGHLY ORGANIC SOILS | | | PT | | Peat and Other Highly Organic Soils. |

The descriptive terminology of the logs is modified from current ASTM Standards to suit the purposes of this study

## ADDITIONAL TESTS

- DS = Direct Shear
- HY = Hydrometer Test
- TC = Triaxial Compression Test
- UC = Unconfined Compression
- CN = Consolidation Test
- (T) = Time Rate
- EX = Expansion Test
- CP = Compaction Test
- PS = Particle Size Distribution
- EI = Expansion Index
- SE = Sand Equivalent Test
- AL = Atterberg Limits
- FC = Chemical Tests
- RV = Resistance Value
- SG = Specific Gravity
- SU = Sulfates
- CH = Chlorides
- MR = Minimum Resistivity
- pH
- (N) = Natural Undisturbed Sample
- (R) = Remolded Sample
- CS = Collapse Test/Swell-Settlement

## GEOLOGIC NOMENCLATURE

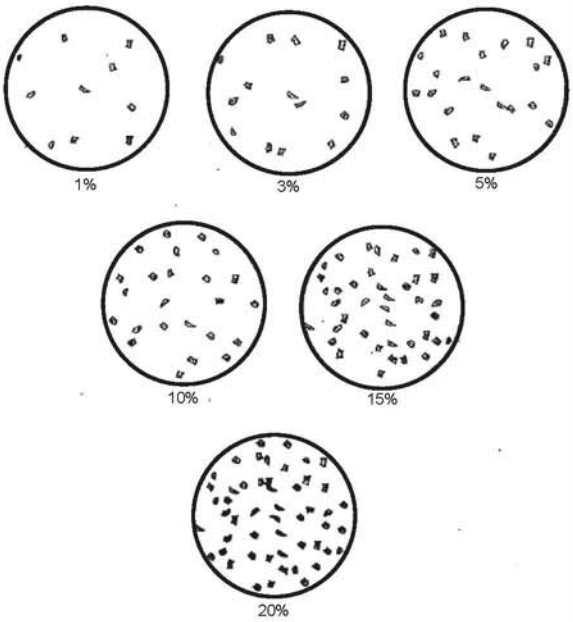
B = Bedding C = Contact J = Joint
F = Fracture Flt = Fault S = Shear
RS = Rupture Surface = Seepage
= Groundwater

## SAMPLE SYMBOLS

- Undisturbed Sample (California Sample)
- Undisturbed Sample (Shelby Tube)
- Bulk Sample
- Unsuccessful Sampling Attempt
- SPT Sample

5
10 Blows per 6-Inches Penetration
15

10: 10 Blows for 12-Inches Penetration
6/4": 6 Blows for 4-Inches Penetration
P: Push
(13): Uncorrected Blow Counts ("N" Values) for 12-Inches Penetration- Standard Penetration Test (SPT)




GMU

**LEGEND TO LOGS**
ASTM Designation: D 2487
(Based on Unified Soil Classification System)

Plate
**A-1**

P8-11/16/2012

## SOIL DENSITY/CONSISTENCY

### FINE GRAINED

| Consistency | Field Test | SPT (#blows/foot) | Mod (#blows/foot) |
|---|---|---|---|
| Very Soft | Easily penetrated by thumb, exudes between fingers | <2 | <3 |
| Soft | Easily penetrated one inch by thumb, molded by fingers | 2-4 | 3-6 |
| Firm | Penetrated over 1/2 inch by thumb with moderate effort | 4-8 | 6-12 |
| Stiff | Penetrated about 1/2 inch by thumb with great effort | 8-15 | 12-25 |
| Very Stiff | Readily indented by thumbnail | 15-30 | 25-50 |
| Hard | Indented with difficulty by thumbnail | >30 | >50 |

### COARSE GRAINED

| Density | Field Test | SPT (#blows/foot) | Mod (#blows/foot) |
|---|---|---|---|
| Very Loose | Easily penetrated with 0.5" rod pushed by hand | <4 | <5 |
| Loose | Easily penetrated with 0.5" rod pushed by hand | 4-10 | 5-12 |
| Medium Dense | Easily penetrated 1' with 0.5" rod driven by 5lb hammer | 10-30 | 12-35 |
| Dense | Dificult to penetrat 1' with 0.5" rod driven by 5lb hammer | 31-50 | 35-60 |
| Very Dense | Penetrated few inches with 0.5" rod driven by 5lb hammer | >50 | >60 |

## BEDROCK HARDNESS

| Density | Field Test | SPT (#blows/foot) |
|---|---|---|
| Soft | Can be crushed by hand, soil like and structureless | 1-30 |
| Moderately Hard | Can be grooved with fingernails, crumbles with hammer | 30-50 |
| Hard | Can't break by hand, can be grooved with knife | 50-100 |
| Very Hard | Scratches with knife, chips with hammer blows | >100 |

## MODIFIERS

| | |
|---|---|
| Trace | 1% |
| Few | 1-5% |
| Some | 5-12% |
| Numerous | 12-20% |
| Abundant | >20% |

## GRAIN SIZE

| Description | | Sieve Size | Grain Size | Approximate Size |
|---|---|---|---|---|
| Boulders | | >12" | >12" | Larger than a basketball |
| Cobbles | | 3-12" | 3-12" | Fist-sized to basketball-sized |
| Gravel | Coarse | 3/4-3" | 3/4-3" | Thumb-sized to fist-sized |
| | Fine | #4-3/4" | 0.19-0.75" | Pea-sized to thumb-sized |
| Sand | Coarse | #10-#4 | 0.079-0.19" | Rock-salt-sized to pea-sized |
| | Medium | #40-#10 | 0.017-0.079" | Sugar-sized to rock salt-sized |
| | Fine | #200-#40 | 0.0029-0.017" | Flour-sized to sugar-sized |
| Fines | | passing #200 | <0.0029" | Flour-sized and smaller |

## MOISTURE CONTENT

Dry- Very little or no moisture
Damp- Some moisture but less than optimum
Moist- Near optimum
Very Moist- Above optimum
Wet/Saturated- Contains free moisture

GMU

**LEGEND TO LOGS**
ASTM Designation: D 2487
(Based on Unified Soil Classification System)

Plate
**A-2**

| | |
|---|---|
| **Project: OC Parks Crawford Park**<br>**Project Location: North Tustin**<br>**Project Number: 20-188-00** | **Log of Drill Hole DH-1**<br>Sheet 1 of 1 |

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **4/28/2020** | Logged By | **RVC** | Checked By | **NS** |
| Drilling Method | **Hollow Stem Auger** | Drilling Contractor | **2R Drilling** | Total Depth of Drill Hole | **11.5 feet** |
| Drill Rig Type | **CME 75** | Diameter(s) of Hole, inches | | Approx. Surface Elevation, ft MSL | **363.0** |
| Groundwater Depth [Elevation], feet | **N/A** [] | Sampling Method(s) | **California Modified Sampler with 6-in sleeve/SPT** | Drill Hole Backfill | **Native** |
| Remarks | | | | Driving Method and Drop | **140 lb hammer, 30" drop** |

| ELEVATION, feet | DEPTH, feet | GRAPHIC LOG | GEOLOGICAL CLASSIFICATION AND DESCRIPTION | ORIENTATION DATA | ENGINEERING CLASSIFICATION AND DESCRIPTION | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS / 6" | SAMPLE DATA: DRIVING WEIGHT, lbs | TEST DATA: MOISTURE CONTENT, % | TEST DATA: DRY UNIT WEIGHT, pcf | TEST DATA: ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **ALLUVIUM (Qal)** | | CLAYEY SAND (SC); yellowish brown and dark grayish brown, moist soft, fine grained sand | | | | 13 | | PS, HY, AL |
| 360 | | | | | | | | | | | |
| | | | | | SILTY SAND (SM); brown, damp, loose, fine grained sand | | | | | | |
| | 5 | | | | | | 3<br>6<br>6 | | 26 | 96 | |
| | | | | | SANDY CLAY (CL); dark grayish brown, firm, damp to moist, fine grained sand | | | | | | |
| 355 | | | | | | | | | | | |
| | 10 | | | | | | 3<br>2<br>3 | | | | |
| | | | | | POORLY GRADED SAND (SP); grayish brown, damp, very loose, fine to medium grained sand | | | | | | |
| | | | | | Total Depth = 11.5 ft<br>No groundwater | | | | | | |

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GMU

**Drill Hole DH-1**

| | |
|---|---|
| **Project: OC Parks Crawford Park**<br>**Project Location: North Tustin**<br>**Project Number: 20-188-00** | **Log of Drill Hole DH-2**<br>Sheet 1 of 2 |

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **4/28/2020** | Logged By | **RVC** | Checked By | **NS** |
| Drilling Method | **Hollow Stem Auger** | Drilling Contractor | **2R Drilling** | Total Depth of Drill Hole | **21.5 feet** |
| Drill Rig Type | **CME 75** | Diameter(s) of Hole, inches | | Approx. Surface Elevation, ft MSL | **374.0** |
| Groundwater Depth [Elevation], feet | **N/A []** | Sampling Method(s) | **California Modified Sampler with 6-in sleeve/SPT** | Drill Hole Backfill | **Native** |
| Remarks | | | | Driving Method and Drop | **140 lb hammer, 30" drop** |

| ELEVATION, feet | DEPTH, feet | GRAPHIC LOG | GEOLOGICAL CLASSIFICATION AND DESCRIPTION | ORIENTATION DATA | ENGINEERING CLASSIFICATION AND DESCRIPTION | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS / 6" | SAMPLE DATA: DRIVING WEIGHT, lbs | TEST DATA: MOISTURE CONTENT, % | TEST DATA: DRY UNIT WEIGHT, pcf | TEST DATA: ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **ARTIFICIAL FILL (Qaf)** | | SANDY CLAY (CL); yellowish and dark brown, damp, medium dense, fine grained sand | | | | 15 | | CP |
| 370 | | | | | | | | | | | |
| | 5 | | **ALLUVIUM (Qal)** | | CLAYEY SAND (SC); yellowish and dark brown, damp, medium dense, fine grained sand | | 9<br>9<br>9 | | 23 | 101 | |
| 365 | | | | | | | | | | | |
| | 10 | | | | | | 7<br>8<br>7 | | | | |
| 360 | | | | | | | | | | | |
| | 15 | | | | Becomes very dense | | 13<br>29<br>44 | | 12 | 121 | |
| 355 | | | | | | | | | | | |



GMU

**Drill Hole DH-2**

**Project: OC Parks Crawford Park**
**Project Location: North Tustin**
**Project Number: 20-188-00**

# Log of Drill Hole DH-2



| ELEVATION, feet | DEPTH, feet | GRAPHIC LOG | GEOLOGICAL CLASSIFICATION AND DESCRIPTION | ORIENTATION DATA | ENGINEERING CLASSIFICATION AND DESCRIPTION | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS / 6" | SAMPLE DATA: DRIVING WEIGHT, lbs | TEST DATA: MOISTURE CONTENT, % | TEST DATA: DRY UNIT WEIGHT, pcf | TEST DATA: ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **ALLUVIUM (Qal)** | | SILTY SAND (SM); brown, dry to damp, medium dense, fine grained sand | | 5<br>9<br>9 | | | | |
| | | | | | Total Depth = 21.5 ft<br>Nogroundwater | | | | | | |

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| | |
|---|---|
| **Project: OC Parks Crawford Park**<br>**Project Location: North Tustin**<br>**Project Number: 20-188-00** | **Log of Drill Hole DH-3**<br>Sheet 1 of 2 |

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **4/28/2020** | Logged By | **RVC** | Checked By | **NS** |
| Drilling Method | **Hollow Stem Auger** | Drilling Contractor | **2R Drilling** | Total Depth of Drill Hole | **21.5 feet** |
| Drill Rig Type | **CME 75** | Diameter(s) of Hole, inches | | Approx. Surface Elevation, ft MSL | **366.0** |
| Groundwater Depth [Elevation], feet | **N/A ▯** | Sampling Method(s) | **California Modified Sampler with 6-in sleeve/SPT** | Drill Hole Backfill | **Native** |
| Remarks | | | | Driving Method and Drop | **140 lb hammer, 30" drop** |

| ELEVATION, feet | DEPTH, feet | GRAPHIC LOG | GEOLOGICAL CLASSIFICATION AND DESCRIPTION | ORIENTATION DATA | ENGINEERING CLASSIFICATION AND DESCRIPTION | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS / 6" | SAMPLE DATA: DRIVING WEIGHT, lbs | TEST DATA: MOISTURE CONTENT, % | TEST DATA: DRY UNIT WEIGHT, pcf | TEST DATA: ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **ALLUVIUM (Qal)** | | SANDY CLAY (CL); brown, damp, dense, fine grained sand | | | | 14 | | EI |
| 365 | | | | | | | | | | | |
| | 5 | | | | CLAYEY SAND (SC); brown, damp, dense, fine grained sand, white veins | | 16<br>16<br>22 | | 10 | 118 | DS |
| 360 | | | | | | | | | | | |
| | 10 | | | | Becomes moist | | 6<br>7<br>10 | | | | |
| 355 | | | | | | | | | | | |
| | 15 | | | | | | 4<br>5<br>8 | | 15 | 109 | |
| 350 | | | | | | | | | | | |

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GMU

**Drill Hole DH-3**

**Project: OC Parks Crawford Park**
**Project Location: North Tustin**
**Project Number: 20-188-00**

# Log of Drill Hole DH-3



| ELEVATION, feet | DEPTH, feet | GRAPHIC LOG | GEOLOGICAL CLASSIFICATION AND DESCRIPTION | ORIENTATION DATA | ENGINEERING CLASSIFICATION AND DESCRIPTION | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS / 6" | SAMPLE DATA: DRIVING WEIGHT, lbs | TEST DATA: MOISTURE CONTENT, % | TEST DATA: DRY UNIT WEIGHT, pcf | TEST DATA: ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 345 | | | **ALLUVIUM (Qal)** | | CLAYEY SAND (SC); brown, damp, medium dense, fine to medium grained sand | | 10<br>13<br>16 | | | | |
| | | | | | Total Depth = 21.5 ft<br>Nogroundwater | | | | | | |

| | |
|---|---|
| **Project: OC Parks Crawford Park**<br>**Project Location: North Tustin**<br>**Project Number: 20-188-00** | **Log of Drill Hole DH-4**<br>Sheet 1 of 1 |

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **4/28/2020** | Logged By | **RVC** | Checked By | **NS** |
| Drilling Method | **Hollow Stem Auger** | Drilling Contractor | **2R Drilling** | Total Depth of Drill Hole | **11.5 feet** |
| Drill Rig Type | **CME 75** | Diameter(s) of Hole, inches | | Approx. Surface Elevation, ft MSL | **360.0** |
| Groundwater Depth [Elevation], feet | **N/A ▯** | Sampling Method(s) | **California Modified Sampler with 6-in sleeve/SPT** | Drill Hole Backfill | **Native** |
| Remarks | | | | Driving Method and Drop | **140 lb hammer, 30" drop** |

| ELEVATION, feet | DEPTH, feet | GRAPHIC LOG | GEOLOGICAL CLASSIFICATION AND DESCRIPTION | ORIENTATION DATA | ENGINEERING CLASSIFICATION AND DESCRIPTION | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS / 6" | SAMPLE DATA: DRIVING WEIGHT, lbs | TEST DATA: MOISTURE CONTENT, % | TEST DATA: DRY UNIT WEIGHT, pcf | TEST DATA: ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **ALLUVIUM (Qal)** | | CLAYEYSAND (SC); brown, dry to damp, medium dense, numerous gravel | | | | 4 | | CP |
| 355 | 5 | | | | Becomes reddish and grayish brown, moist, medium dense, fine grained sand | | 5<br>6<br>13 | | 13 | 117 | |
| | | | | | SILTY CLAY (CL); dark grayish brown, loose, fine grained sand | | | | | | |
| 350 | 10 | | | | CLAYEY SAND (SC); dark grayish brown, dense, fine grained sand | | 4<br>6<br>8 | | | | |
| | | | | | Total depth = 11.5<br>No groundwater | | | | | | |

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GMU

**Drill Hole DH-4**

| | |
|---|---|
| **Project: OC Parks Crawford Park**<br>**Project Location: North Tustin**<br>**Project Number: 20-188-00** | **Log of Drill Hole DH-5**<br>Sheet 1 of 1 |

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **4/28/2020** | Logged By | **RVC** | Checked By | **NS** |
| Drilling Method | **Hollow Stem Auger** | Drilling Contractor | **2R Drilling** | Total Depth of Drill Hole | **11.5 feet** |
| Drill Rig Type | **CME 75** | Diameter(s) of Hole, inches | | Approx. Surface Elevation, ft MSL | **357.0** |
| Groundwater Depth [Elevation], feet | **N/A** [] | Sampling Method(s) | **California Modified Sampler with 6-in sleeve/SPT** | Drill Hole Backfill | **Native** |
| Remarks | | | | Driving Method and Drop | **140 lb hammer, 30" drop** |

| ELEVATION, feet | DEPTH, feet | GRAPHIC LOG | GEOLOGICAL CLASSIFICATION AND DESCRIPTION | ORIENTATION DATA | ENGINEERING CLASSIFICATION AND DESCRIPTION | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS / 6" | SAMPLE DATA: DRIVING WEIGHT, lbs | TEST DATA: MOISTURE CONTENT, % | TEST DATA: DRY UNIT WEIGHT, pcf | TEST DATA: ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **ALLUVIUM (Qal)** | | CLAYEY SAND (SC); dark brown, damp to moist, dense, fine grained sand, some gravel up to 1" | | | | 13 | | PS, HY, AL, FC |
| 355 | | | | | | | | | | | |
| | 5 | | | | | | 7<br>8<br>13 | | 22 | 97 | |
| | | | | | CLAYEY SILT (ML); grayish brown, moist, stiff, trace finr grained sand, olive and orange pockets | | | | | | |
| 350 | | | | | | | | | | | |
| | 10 | | | | CLAYEY SAND (SC); dark brown, moist, dense, fine grained sand | | 7<br>7<br>11 | | | | |
| | | | | | Total Depth = 11.5 ft<br>No groundwater | | | | | | |

DH_REV3 20-188-00.GPJ GMULAB.GPJ 6/22/20

GMU

**Drill Hole DH-5**

| | |
|---|---|
| **Project: OC Parks Crawford Park**<br>**Project Location: North Tustin**<br>**Project Number: 20-188-00** | **Log of Drill Hole DH-6**<br>Sheet 1 of 1 |

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **4/28/2020** | Logged By | **RVC** | Checked By | **NS** |
| Drilling Method | **Hollow Stem Auger** | Drilling Contractor | **2R Drilling** | Total Depth of Drill Hole | **3.0 feet** |
| Drill Rig Type | **CME 75** | Diameter(s) of Hole, inches | | Approx. Surface Elevation, ft MSL | **352.0** |
| Groundwater Depth [Elevation], feet | **N/A ▯** | Sampling Method(s) | **California Modified Sampler with 6-in sleeve/SPT** | Drill Hole Backfill | **Native** |
| Remarks | | | | Driving Method and Drop | **140 lb hammer, 30" drop** |

| ELEVATION, feet | DEPTH, feet | GRAPHIC LOG | GEOLOGICAL CLASSIFICATION AND DESCRIPTION | ORIENTATION DATA | ENGINEERING CLASSIFICATION AND DESCRIPTION | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS / 6" | SAMPLE DATA: DRIVING WEIGHT, lbs | TEST DATA: MOISTURE CONTENT, % | TEST DATA: DRY UNIT WEIGHT, pcf | TEST DATA: ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 350 | | | **ALLUVIUM (Qal)** | | CLAYEY SAND (SC); dark brown, damp, soft, fine grained sand | X | | | 12 | | |
| | | | | | Total Depth = 3 ft<br>No groundwater | | | | | | |

DH_REV3 20-188-00.GPJ GMULAB.GPJ 6/22/20

GMU

**Drill Hole DH-6**

| | |
|---|---|
| **Project: OC Parks Crawford Park**<br>**Project Location: North Tustin**<br>**Project Number: 20-188-00** | **Log of Drill Hole DH-7**<br>Sheet 1 of 1 |

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **4/28/2020** | Logged By | **RVC** | Checked By | **NS** |
| Drilling Method | **Hollow Stem Auger** | Drilling Contractor | **2R Drilling** | Total Depth of Drill Hole | **5.0 feet** |
| Drill Rig Type | **CME 75** | Diameter(s) of Hole, inches | | Approx. Surface Elevation, ft MSL | **352.0** |
| Groundwater Depth [Elevation], feet | **N/A ▯** | Sampling Method(s) | **California Modified Sampler with 6-in sleeve/SPT** | Drill Hole Backfill | **Native** |
| Remarks | | | | Driving Method and Drop | **140 lb hammer, 30" drop** |

| ELEVATION, feet | DEPTH, feet | GRAPHIC LOG | GEOLOGICAL CLASSIFICATION AND DESCRIPTION | ORIENTATION DATA | ENGINEERING CLASSIFICATION AND DESCRIPTION | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS / 6" | SAMPLE DATA: DRIVING WEIGHT, lbs | TEST DATA: MOISTURE CONTENT, % | TEST DATA: DRY UNIT WEIGHT, pcf | TEST DATA: ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 350 | | | **ALLUVIUM (Qal)** | | CLAYEY SAND (SC); dark brown, damp, soft, fine grained | | | | 13 | | PS, HY |
| | 5 | | | | Total Depth = 5 ft<br>No groundwater | | | | | | |

DH_REV3 20-188-00.GPJ GMULAB.GPJ 6/22/20

GMU

**Drill Hole DH-7**

| | |
|---|---|
| **Project: OC Parks Crawford Park**<br>**Project Location: North Tustin**<br>**Project Number: 20-188-00** | **Log of Drill Hole DH-8**<br>Sheet 1 of 1 |

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **4/28/2020** | Logged By | **RVC** | Checked By | **NS** |
| Drilling Method | **Hollow Stem Auger** | Drilling Contractor | **2R Drilling** | Total Depth of Drill Hole | **11.5 feet** |
| Drill Rig Type | **CME 75** | Diameter(s) of Hole, inches | | Approx. Surface Elevation, ft MSL | **350.0** |
| Groundwater Depth [Elevation], feet | **N/A** ▯ | Sampling Method(s) | **California Modified Sampler with 6-in sleeve/SPT** | Drill Hole Backfill | **Native** |
| Remarks | | | | Driving Method and Drop | **140 lb hammer, 30" drop** |

| ELEVATION, feet | DEPTH, feet | GRAPHIC LOG | GEOLOGICAL CLASSIFICATION AND DESCRIPTION | ORIENTATION DATA | ENGINEERING CLASSIFICATION AND DESCRIPTION | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS / 6" | SAMPLE DATA: DRIVING WEIGHT, lbs | TEST DATA: MOISTURE CONTENT, % | TEST DATA: DRY UNIT WEIGHT, pcf | TEST DATA: ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **ALLUVIUM (Qal)** | | CLAYEY SAND (SC); brown, soft, moist, fine grained sand | | | | 16 | | EI |
| 345 | 5 | | | | | | 5<br>6<br>7 | | 13 | 102 | |
| 340 | 10 | | | | | | 3<br>3<br>3 | | | | |
| | | | | | Total depth = 11.5 ft<br>No groundwater | | | | | | |

DH_REV3 20-188-00.GPJ GMULAB.GPJ 6/22/20

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**Drill Hole DH-8**

| | |
|---|---|
| **Project: OC Parks Crawford Park**<br>**Project Location: North Tustin**<br>**Project Number: 20-188-00** | **Log of Drill Hole DH-9**<br>Sheet 1 of 2 |

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **4/28/2020** | Logged By | **RVC** | Checked By | **NS** |
| Drilling Method | **Hollow Stem Auger** | Drilling Contractor | **2R Drilling** | Total Depth of Drill Hole | **26.5 feet** |
| Drill Rig Type | **CME 75** | Diameter(s) of Hole, inches | | Approx. Surface Elevation, ft MSL | **346.0** |
| Groundwater Depth [Elevation], feet | **N/A ▯** | Sampling Method(s) | **California Modified Sampler with 6-in sleeve/SPT** | Drill Hole Backfill | **Native** |
| Remarks | | | | Driving Method and Drop | **140 lb hammer, 30" drop** |

| ELEVATION, feet | DEPTH, feet | GRAPHIC LOG | GEOLOGICAL CLASSIFICATION AND DESCRIPTION | ORIENTATION DATA | ENGINEERING CLASSIFICATION AND DESCRIPTION | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS / 6" | SAMPLE DATA: DRIVING WEIGHT, lbs | TEST DATA: MOISTURE CONTENT, % | TEST DATA: DRY UNIT WEIGHT, pcf | TEST DATA: ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **ALLUVIUM (Qal)** | | CLAYEY SAND (SM); brown, dry, dense, fine grained sand | | | | 10 | | RV, FC |
| 345 | | | | | | | | | | | |
| | | | | | Becomes damp, loose | | | | | | |
| | 5 | | | | | | | | 11 | 98 | DS |
| 340 | | | | | | | | | | | |
| | 10 | | | | | | | | | | |
| 335 | | | | | | | | | | | |
| | 15 | | | | | | | | 11 | 109 | |
| 330 | | | | | | | | | | | |

DH_REV3 20-188-00.GPJ GMULAB.GPJ 6/22/20

GMU

**Drill Hole DH-9**

**Project: OC Parks Crawford Park**
**Project Location: North Tustin**
**Project Number: 20-188-00**

# Log of Drill Hole DH-9



| ELEVATION, feet | DEPTH, feet | GRAPHIC LOG | GEOLOGICAL CLASSIFICATION AND DESCRIPTION | ORIENTATION DATA | ENGINEERING CLASSIFICATION AND DESCRIPTION | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS / 6" | SAMPLE DATA: DRIVING WEIGHT, lbs | TEST DATA: MOISTURE CONTENT, % | TEST DATA: DRY UNIT WEIGHT, pcf | TEST DATA: ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 325 | | | **ALLUVIUM (Qal)** | | CLAYEY SAND (SC); brown, damp, loose to medium dense, fine grained sand | | | | | | |
| | 25 | | | | SILTY SAND (SM); brown, damp, dense, fine grained sand | | | | 6 | 115 | |
| 320 | | | | | Total depth = 26.5 ft<br>No groundwater | | | | | | |

# APPENDIX B

## Geotechnical Laboratory Procedures and Test Results

# APPENDIX B

# GMU GEOTECHNICAL LABORATORY PROCEDURES AND TEST RESULTS

## MOISTURE AND DENSITY

Field moisture content and in-place density were determined for each 6-inch sample sleeve of undisturbed soil material obtained from the drill holes. The field moisture content was determined in general accordance with ASTM Test Method D 2216 by obtaining one-half the moisture sample from each end of the 6-inch sleeve. The in-place dry density of the sample was determined by using the wet weight of the entire sample.

At the same time the field moisture content and in-place density were determined, the soil material at each end of the sleeve was classified according to the Unified Soil Classification System. The results of the field moisture content and in-place density determinations are presented on the right-hand column of the Log of Drill Hole and are summarized on Table B-1. The results of the visual classifications were used for general reference.

## PARTICLE SIZE DISTRIBUTION

As part of the engineering classification of the materials underlying the site, samples were tested to determine the distribution of particle sizes. The distribution was determined in general accordance with ASTM Test Method D 422 using U.S. Standard Sieve Openings 3", 1.5", 3/4, 3/8, and U.S. Standard Sieve Nos. 4, 10, 20, 40, 60, 100, and 200. In addition, on some samples a standard hydrometer test was performed to determine the distribution of particle sizes passing the No. 200 sieve (i.e., silt and clay-size particles). The results of the tests are contained in Appendix B. Key distribution categories (% gravel; % sand, etc.) are contained on Table B-1.

## ATTERBERG LIMITS

As part of the engineering classification of the soil material, samples of the on-site soil material were tested to determine relative plasticity. This relative plasticity is based on the Atterberg limits determined in general accordance with ASTM Test Method D 4318. The results of these tests are contained in this Appendix B and also Table B-1.

## EXPANSION TESTS

To provide a standard definition of one-dimensional expansion, a test was performed on typical on-site materials in general accordance with ASTM Test Method D 4829. The result from this test procedure is reported as an "expansion index". The results of this test are contained in Appendix B and also Table B-1.

## CHEMICAL TESTS

The corrosion potential of typical on-site materials under long-term contact with both metal and concrete was determined by chemical and electrical resistance tests. The soluble sulfate test for potential concrete corrosion was performed in general accordance with California Test Method 417, the minimum resistivity test for potential metal corrosion was performed in general accordance with California Test Method 643, and the concentration of soluble chlorides was determined in general accordance with California Test Method 422. The results of these tests are contained in Appendix B and also Table B-1.

## COMPACTION TESTS

Bulk sample representatives of the on-site materials were tested to determine the maximum dry density and optimum moisture content of the soil. These compactive characteristics were determined in general accordance with ASTM Test Method D 1557. The results of this test are contained in Appendix B and also Table B-1.

## DIRECT SHEAR STRENGTH TESTS

Direct shear tests were performed on typical on-site materials. The general philosophy and procedure of the tests were in accord with ASTM Test Method D 3080 - "Direct Shear Tests for Soils Under Consolidated Drained Conditions".

The tests are single shear tests and are performed using a sample diameter of 2.416 inches and a height of 1.00 inch. The normal load is applied by a vertical dead load system. A constant rate of strain is applied to the upper one-half of the sample until failure occurs. Shear stress is monitored by a strain gauge-type precision load cell and deflection is measured with a digital dial indicator. This data is transferred electronically to data acquisition software which plots shear strength vs. deflection. The shear strength plots are then interpreted to determine either peak or ultimate shear strengths. Residual strengths were obtained through multiple shear box reversals. A strain rate compatible with the grain size distribution of the soils was utilized. The interpreted results of these tests are shown in Appendix B.

## R-VALUE TESTS

Bulk samples representative of the underlying on-site materials were tested to measure the response of a compacted sample to a vertically applied pressure under specific conditions. The R-value of a material is determined when the material is in a state of saturation such that water will be exuded from the compacted test specimen when a 16.8 kN load (2.07 MPa) is applied. The results from these test procedures are reported in this Appendix B-1.

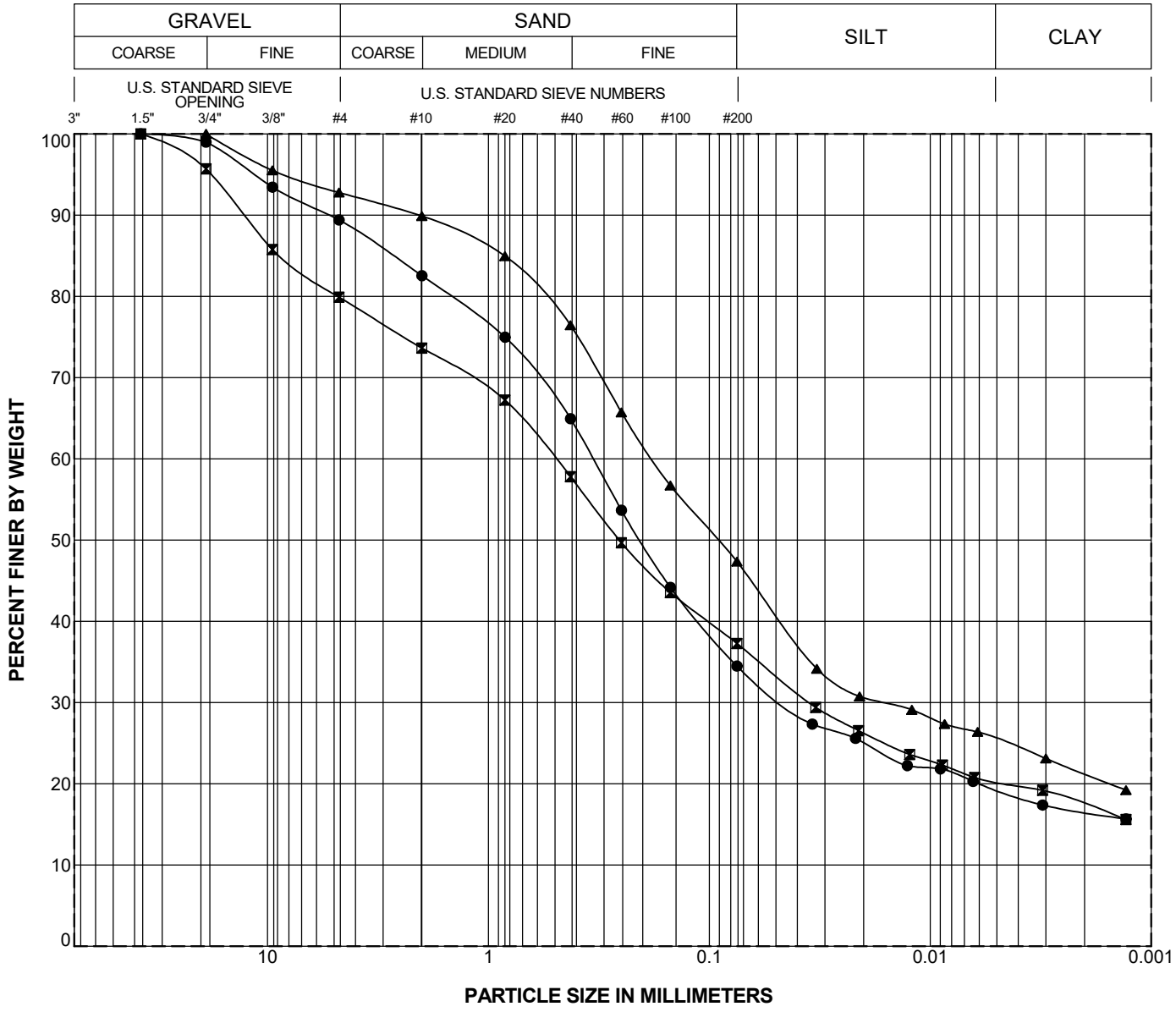
# TABLE B-1
# SUMMARY OF SOIL LABORATORY DATA

| Sample Information | | | Geologic Unit | USCS Group Symbol | In Situ Water Content, % | In Situ Dry Unit Weight, pcf | In Situ Satur-ation, % | Sieve/Hydrometer | | | | Atterberg Limits | | | Compaction | | Expansion Index | R-Value | Chemical Test Results | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Boring Number | Depth, feet | Elevation, feet | | | | | | Gravel, % | Sand, % | <#200, % | <2μ, % | LL | PL | PI | Maximum Dry Unit Weight, pcf | Optimum Water Content, % | | | pH | Sulfate (ppm) | Chloride (ppm) | Min. Resistivity (ohm/cm) |
| DH-1 | 0 | 363.0 | Qal | SC | 13.1 | | | 11 | 55 | 34 | 17 | 31 | 14 | 17 | | | | | | | | |
| DH-1 | 5 | 358.0 | Qal | CL | 26.1 | 96 | 96 | | | | | | | | | | | | | | | |
| DH-2 | 0 | 374.0 | Qaf | CL | 15.4 | | | | | | | | | | 122.0 | 11.5 | | | | | | |
| DH-2 | 5 | 369.0 | Qal | CL/SC | 22.9 | 101 | 96 | | | | | | | | | | | | | | | |
| DH-2 | 15 | 359.0 | Qal | SC | 11.7 | 121 | 84 | | | | | | | | | | | | | | | |
| DH-3 | 0 | 366.0 | Qal | CL | 13.5 | | | | | | | | | | | | 65 | | | | | |
| DH-3 | 5 | 361.0 | Qal | CL-SC | 9.7 | 118 | 64 | | | | | | | | | | | | | | | |
| DH-3 | 15 | 351.0 | Qal | SC | 15.3 | 109 | 79 | | | | | | | | | | | | | | | |
| DH-4 | 0 | 360.0 | Qal | SC | 4.3 | | | | | | | | | | 135.5 | 7.0 | | | | | | |
| DH-4 | 5 | 355.0 | Qal | SC | 13.3 | 117 | 85 | | | | | | | | | | | | | | | |
| DH-5 | 0 | 357.0 | Qal | SC | 13.1 | | | 20 | 43 | 37 | 17 | 36 | 14 | 22 | | | | | 8.3 | 537 | 1128 | 990 |
| DH-5 | 5 | 352.0 | Qal | ML | 22.4 | 97 | 84 | | | | | | | | | | | | | | | |
| DH-6 | 0 | 352.0 | Qal | SC | 12.2 | | | | | | | | | | | | | | | | | |
| DH-7 | 0 | 352.0 | Qal | SC | 13.1 | | | 7 | 45 | 47 | 21 | | | | | | | | | | | |
| DH-8 | 0 | 350.0 | Qal | CL-SC | 16.1 | | | | | | | | | | | | 46 | | | | | |
| DH-8 | 5 | 345.0 | Qal | SC | 13.0 | 102 | 56 | | | | | | | | | | | | | | | |
| DH-9 | 0 | 346.0 | Qal | SC | 9.7 | | | | | | | | | | | | | 26 | 8.3 | 10 | 264 | 1576 |
| DH-9 | 5 | 341.0 | Qal | CL-SC | 11.4 | 98 | 43 | | | | | | | | | | | | | | | |
| DH-9 | 15 | 331.0 | Qal | SC | 11.5 | 109 | 59 | | | | | | | | | | | | | | | |
| DH-9 | 25 | 321.0 | Qal | SM | 6.1 | 115 | 37 | | | | | | | | | | | | | | | |

GMU_TABLE_SOIL_LAB_DATA 20-188-00.GPJ FNC AB GWGN01.GDT 6/23/20

Project: OC Parks Crawford Park
Project No. 20-188-00

GMU




| Boring Number | Depth (feet) | Geologic Unit | Symbol | LL | PI | Classification |
|---|---|---|---|---|---|---|
| DH-1 | 0.0 | Qal | ● | 31 | 17 | CLAYEY SAND (SC) |
| DH-5 | 0.0 | Qal | ⊠ | 36 | 22 | CLAYEY SAND with GRAVEL (SC) |
| DH-7 | 0.0 | Qal | ▲ | | | CLAYEY SAND (SC) |

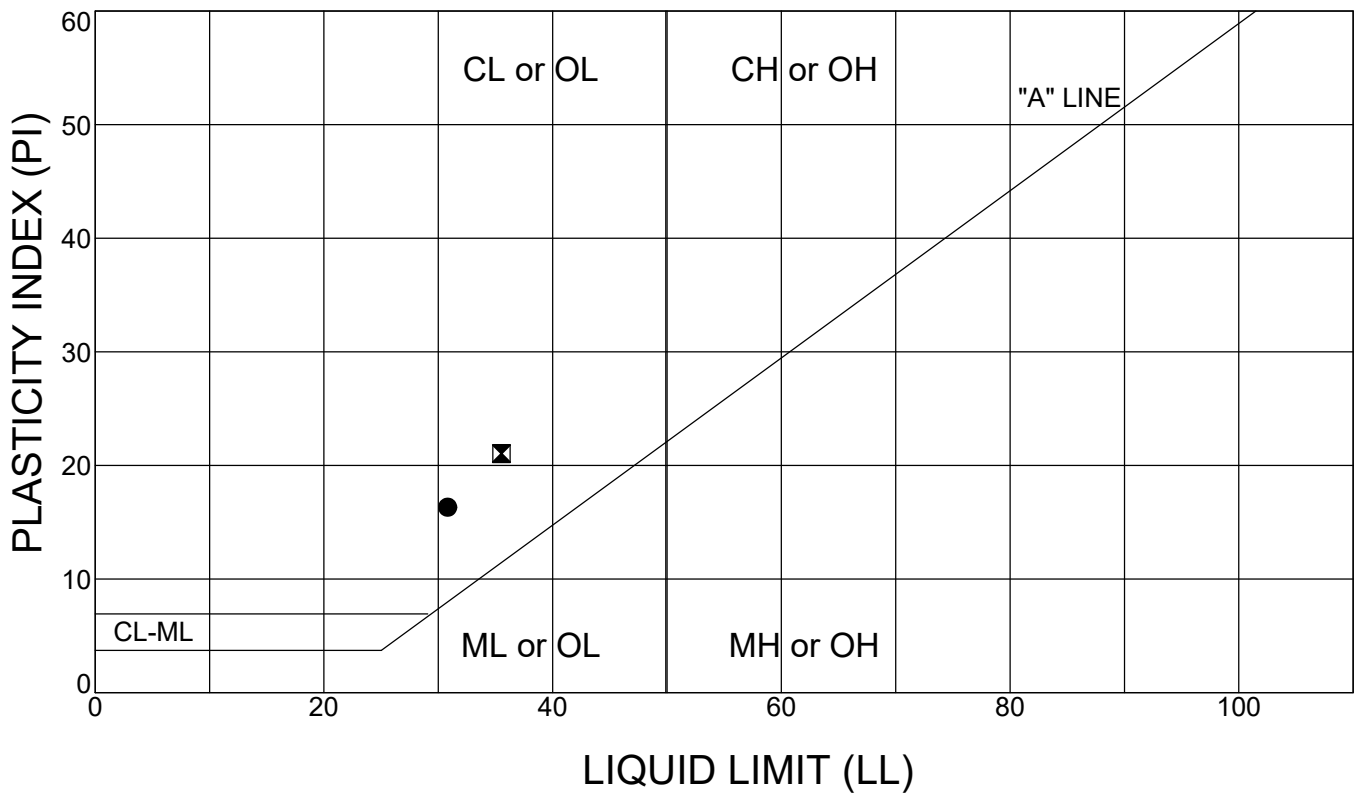
GMU_GRAIN_SIZE 20-188-00.GPJ 6/3/20

# PARTICLE SIZE DISTRIBUTION

Project: OC Parks Crawford Park

Project No. 20-188-00

GMU




| Boring Number | Depth (feet) | Geologic Unit | Test Symbol | Insitu Water Content (%) | LL | PL | PI | Classification |
|---|---|---|---|---|---|---|---|---|
| DH-1 | 0.0 | Qal | ● | 13 | 31 | 14 | 17 | CLAYEY SAND (SC) |
| DH-5 | 0.0 | Qal | ⊠ | 13 | 36 | 14 | 22 | CLAYEY SAND with GRAVEL (SC) |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
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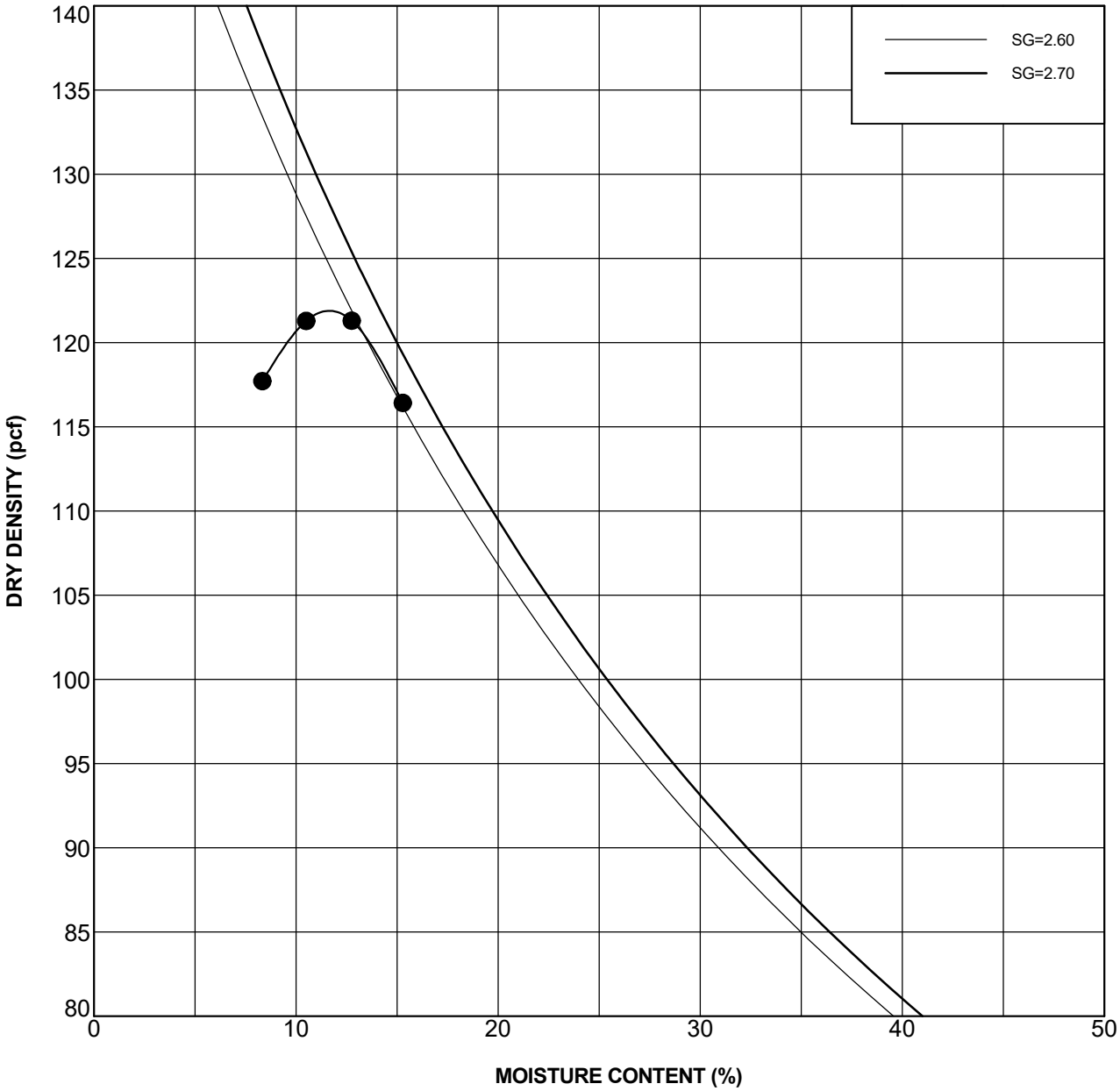
| | | | | | | | | |
| | | | | | | | | |

LIMITS 20-188-00.GPJ 6/23/20

# ATTERBERG LIMITS

Project: OC Parks Crawford Park
Project No. 20-188-00

GMU




| Boring Number | Depth (feet) | Geologic Unit | Symbol | Maximum Dry Density, pcf | Optimum Moisture Content, % | Classification |
|---|---|---|---|---|---|---|
| DH-2 | 0.0 | Qal | ● | 122 | 11.5 | SANDY CLAY (CL) |
| | | | | | | |
| | | | | | | |
| | | | | | | |

DVTCOMP 20-188-00.GPJ 6/3/20

# COMPACTION TEST DATA

Project: OC Parks Crawford Park

Project No. 20-188-00

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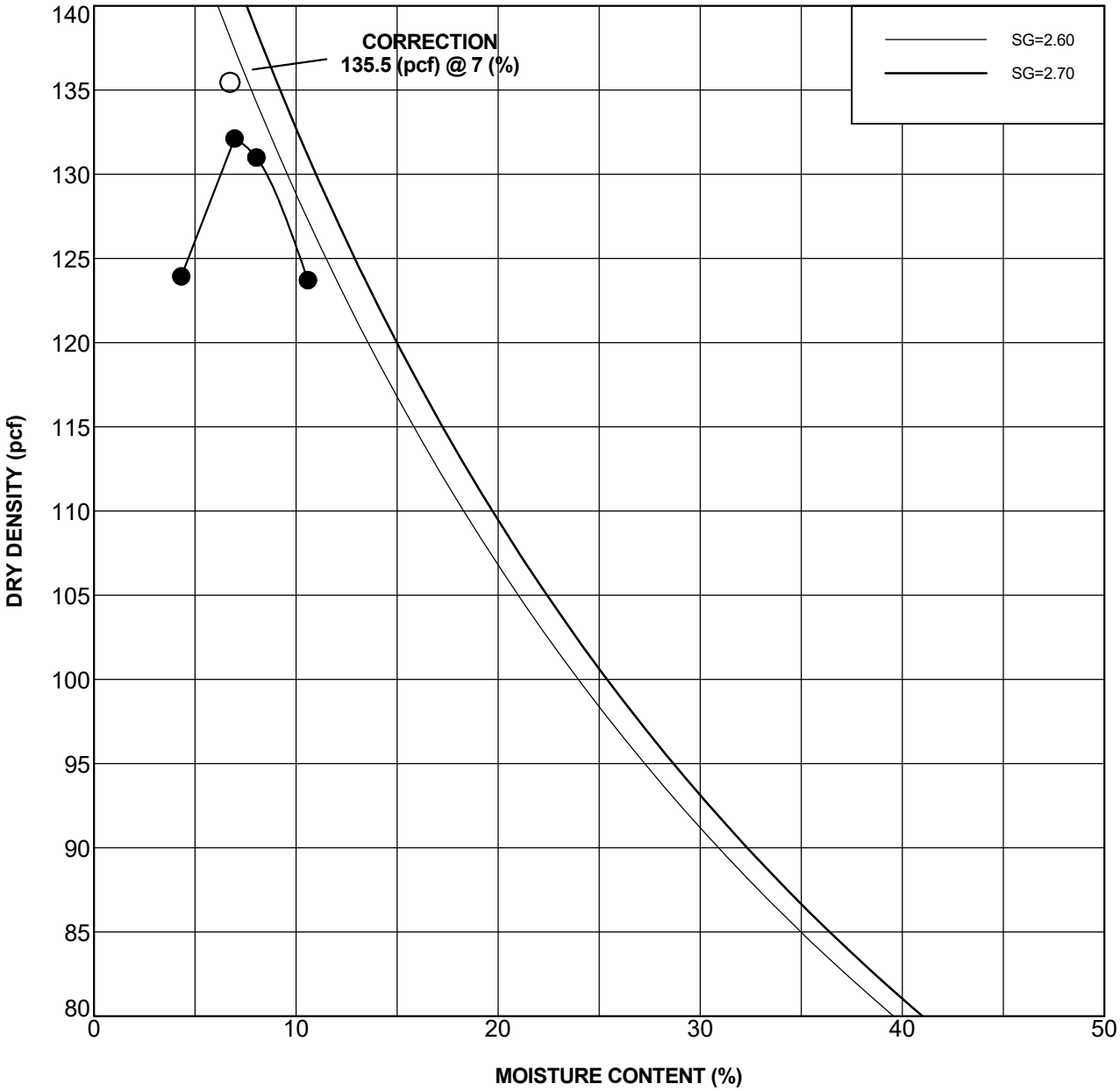


| Boring Number | Depth (feet) | Geologic Unit | Symbol | Maximum Dry Density, pcf | Optimum Moisture Content, % | Classification |
|---|---|---|---|---|---|---|
| DH-4 | 0.0 | Qal | ● | 135.5 | 7 | CLAYEY SAND with GRAVEL (SC) |
| | | | | | | |
| | | | | | | |
| | | | | | | |

DVTCOMP 20-188-00.GPJ 6/3/20

# COMPACTION TEST DATA

Project: OC Parks Crawford Park

Project No. 20-188-00

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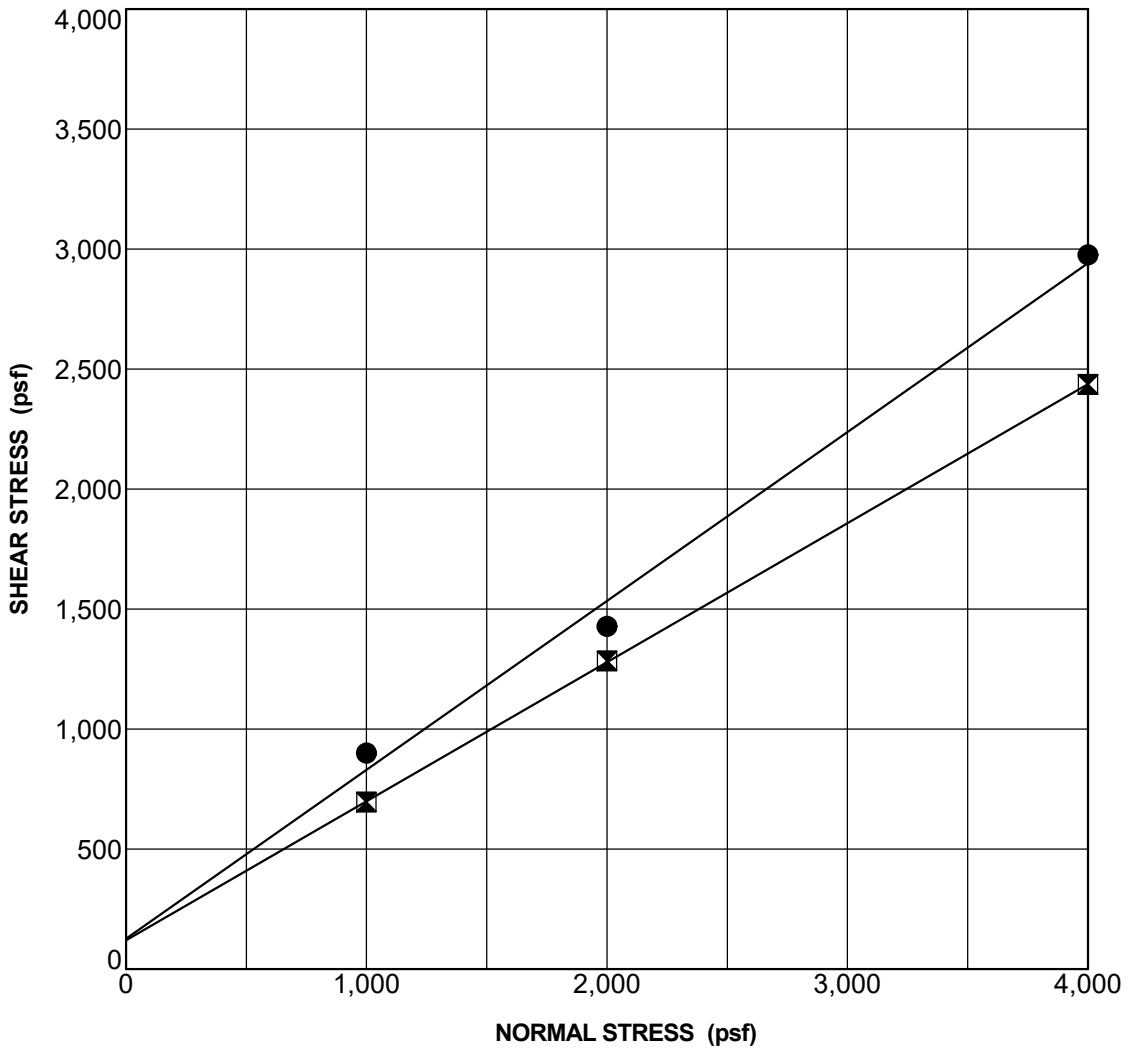



| SAMPLE AND TEST DESCRIPTION |
|---|
| **Sample Location:** DH-3 @ 5.0 ft **Geologic Unit:** Qal **Classification:** SANDY CLAY (CL-SC) |
| **Strain Rate (in/min):** 0.005 **Sample Preparation:** Undisturbed |
| **Notes:** Sample saturated prior and during shearing |

| STRENGTH PARAMETERS | | |
|---|---|---|
| **STRENGTH TYPE** | **COHESION (psf)** | **FRICTION ANGLE (degrees)** |
| ● Peak Strength | 126 | 35.1 |
| ⊠ Ultimate Strength | 120 | 30.1 |

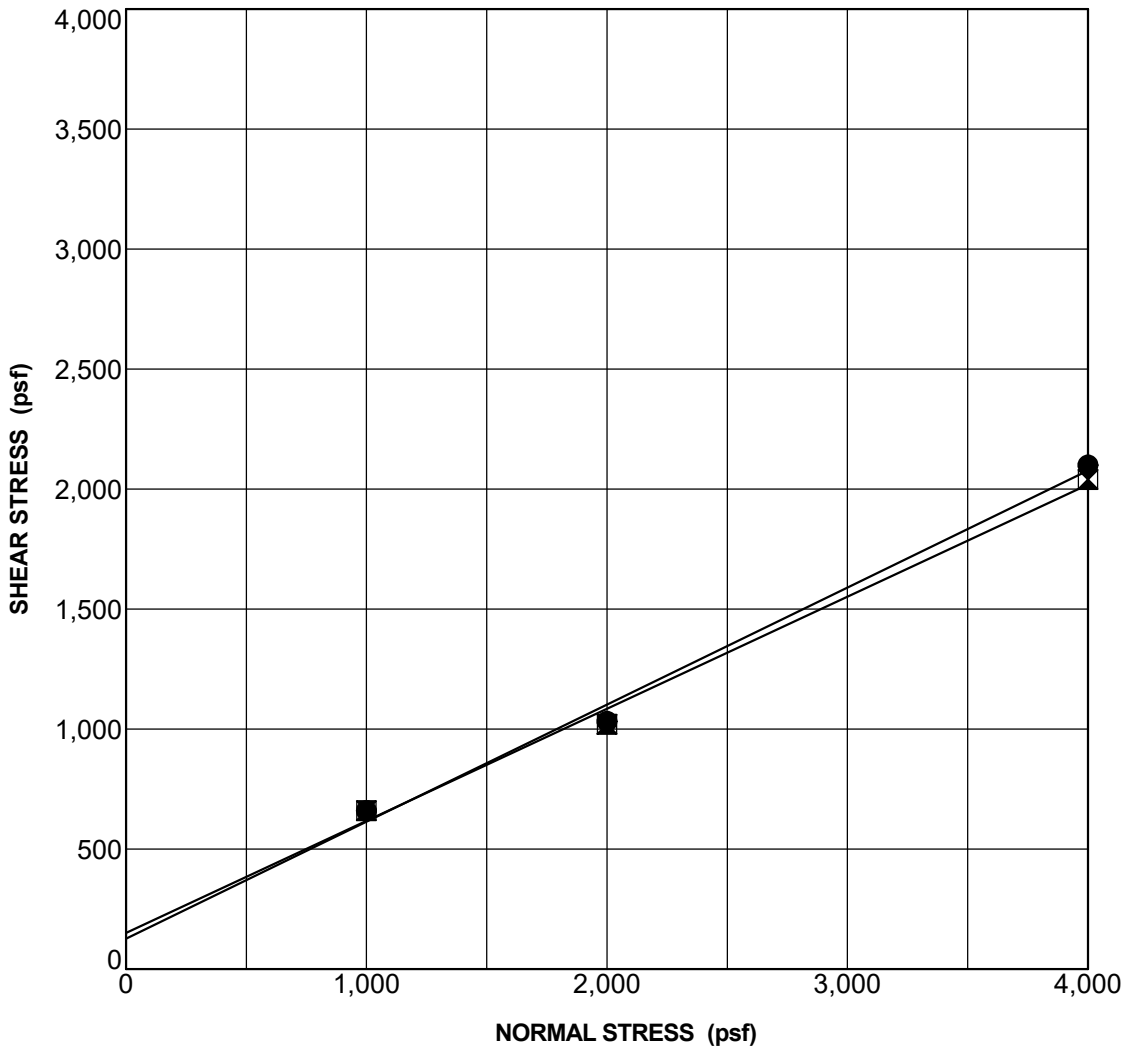
# SHEAR TEST DATA

Project: OC Parks Crawford Park

Project No. 20-188-00

GMU

GMU_DIRECT_SHEAR 20-188-00.GPJ GM&U.GDT 6/3/20




| SAMPLE AND TEST DESCRIPTION |
|---|
| **Sample Location:** DH-9 @ 5.0 ft **Geologic Unit:** Qal **Classification:** SANDY CLAY (CL-SC) |
| **Strain Rate (in/min):** 0.005 **Sample Preparation:** Undisturbed |
| **Notes:** Sample saturated prior and during shearing |

| STRENGTH PARAMETERS | | |
|---|---|---|
| **STRENGTH TYPE** | **COHESION (psf)** | **FRICTION ANGLE (degrees)** |
| ● Peak Strength | 126 | 26.0 |
| ⊠ Ultimate Strength | 150 | 25.0 |

# SHEAR TEST DATA

Project: OC Parks Crawford Park

Project No. 20-188-00

GMU

GMU_DIRECT_SHEAR 20-188-00.GPJ GM&U.GDT 6/3/20

# APPENDIX C

## Infiltration Test Results

# Encased Falling Head Infiltration Test

| | | | | | |
|---|---|---|---|---|---|
| **Project Name:** | OC Parks Crawford Park | | | **Date:** | 4/29/2020 |
| **Project Number:** | 20-188-00 | | | **Tested By:** | RC |
| **Test Hole Number:** | DH-5 | | | **USCS Soil Classification:** | SC |
| **Total Depth :** | 5.00 | feet | | **Water Temperature:** | 70 °F |
| **Test Hole Diameter:** | 6.00 inches | radius= | 3 inches | | |

| | Test No. | Start Time | End Time | ΔT (min) | Total Time (min) | Initial Depth of Water (ft) | Final Depth of Water (ft) | $H_0$ (in) | $H_f$ (in) | ΔH (in) | Unfactored Infiltration Rate (in/hour) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Trial 1 | 1 | 8:18 | 8:38 | 20.0 | 60.0 | 4.00 | 4.06 | 12.00 | 11.25 | 0.75 | 2.25 |
| | 2 | 8:38 | 8:58 | 20.0 | 80.0 | 4.06 | 4.09 | 11.25 | 10.88 | 0.38 | 1.13 |
| | 3 | 8:58 | 9:18 | 20.0 | 100.0 | 4.09 | 4.13 | 10.88 | 10.50 | 0.38 | 1.13 |
| | 4 | 9:18 | 9:38 | 20.0 | 120.0 | 4.13 | 4.16 | 10.50 | 10.13 | 0.38 | 1.13 |
| | 5 | 9:38 | 9:58 | 20.0 | 140.0 | 4.16 | 4.18 | 10.13 | 9.88 | 0.25 | 0.75 |
| | 6 | 9:58 | 10:18 | 20.0 | 160.0 | 4.18 | 4.21 | 9.88 | 9.50 | 0.38 | 1.13 |
| Trial 2 | 1 | 10:18 | 10:38 | 20.0 | 180.0 | 4.00 | 4.04 | 12.00 | 11.50 | 0.50 | 1.50 |
| | 2 | 10:38 | 10:58 | 20.0 | 200.0 | 4.04 | 4.06 | 11.50 | 11.25 | 0.25 | 0.75 |
| | 3 | 10:58 | 11:18 | 20.0 | 220.0 | 4.06 | 4.10 | 11.25 | 10.75 | 0.50 | 1.50 |
| | 4 | 11:18 | 11:38 | 20.0 | 240.0 | 4.10 | 4.13 | 10.75 | 10.50 | 0.25 | 0.75 |
| | 5 | 11:38 | 11:58 | 20.0 | 260.0 | 4.13 | 4.15 | 10.50 | 10.25 | 0.25 | 0.75 |
| | 6 | 11:58 | 12:18 | 20.0 | 280.0 | 4.15 | 4.17 | 10.25 | 10.00 | 0.25 | 0.75 |
| Trial 3 | 1 | 12:15 | 12:35 | 20.0 | 300.0 | 4.00 | 4.02 | 12.00 | 11.75 | 0.25 | 0.75 |
| | 2 | 12:35 | 12:55 | 20.0 | 320.0 | 4.02 | 4.05 | 11.75 | 11.38 | 0.38 | 1.13 |
| | 3 | 12:55 | 13:15 | 20.0 | 340.0 | 4.05 | 4.06 | 11.38 | 11.25 | 0.13 | 0.37 |
| | 4 | 13:15 | 13:35 | 20.0 | 360.0 | 4.06 | 4.09 | 11.25 | 10.88 | 0.38 | 1.13 |
| | 5 | 13:35 | 13:55 | 20.0 | 380.0 | 4.09 | 4.13 | 10.88 | 10.50 | 0.38 | 1.13 |
| | 6 | 13:55 | 14:15 | 20.0 | 400.0 | 4.13 | 4.17 | 10.50 | 10.00 | 0.50 | 1.50 |

| | |
|---|---|
| WATER TEMPERATURE CORRECTION FACTOR: | 0.90 |
| SAFETY FACTOR*: | 2 |
| UNFACTORED INFILTRATION RATE (IN/HR): | 1.35 |
| FACTORED INFILTRATION RATE (IN/HR): | 0.67 |

| Factor Category | Factor Description | Assigned Weight (w) | Factor Value (v) | Product (p) = w x v |
|---|---|---|---|---|
| Suitability Assessment | Soil assessment methods | 0.25 | 2 | 0.5 |
| | Predominant soil texture | 0.25 | 2 | 0.5 |
| | Site soil variablity | 0.25 | 2 | 0.5 |
| | Depth to groundwater | 0.25 | 1 | 0.25 |
| | | | Geotechnical Factor of Safety (SA): | 1.75 |

| Concern Level | Factor Value (v) |
|---|---|
| Low | 1 |
| Medium | 2 |
| High | 3 |

| Factor Description | High Concern | Medium Concern | Low Concern |
|---|---|---|---|
| Soil assessment methods | Use of borhole methods to estimate vertical infiltration rate (not recommended, but may be necessary at a planning level). Less than 2 tests per BMP | At least 2 tests per BMP. Use of borehole tests for dry wells or infiltration trenches. Use of infiltrometer or small scale PIT methods for vertical infiltration BMPs. | Extensive infiltration testing such as: PIT testing or infiltrometer testing at 3+ locations per BMP, and/or commitment to construction phase testing and design adaption if necessary. |
| Predominant soil texture | Silty and clayey soils with significant fines | Finer sandy soils with some loam content | Clean, granular soils (sands) |
| Site soil variablity | Highly variable soils indicated from site assessment or limited soil borings collected during site assessment. | Soil borings/test pits indicate moderately homogeneous soils. | Multiple soil borings/test pits indicate relatively homogeneous soils. |
| Depth to groundwater | Groundwater conditions or movement not well understood. | Seasonal high GW at least 10 ft below facility bottom. | Seasonal high GW at least 15 ft below facility bottom. |

***Factor of safety should not be less than 2. Additional factor of safety in accordance with Table D-7 of the South Orange County Technical Guidance Document should be applied by the project civil engineer.**

# Encased Falling Head Infiltration Test

| | | | | | |
|---|---|---|---|---|---|
| **Project Name:** | OC Parks Crawford Park | | | **Date:** | 4/29/2020 |
| **Project Number:** | 20-188-00 | | | **Tested By:** | RC |
| **Test Hole Number:** | DH-6 | | | **USCS Soil Classification:** | SC |
| **Total Depth :** | 3.00 | feet | | **Water Temperature:** | 70 °F |
| **Test Hole Diameter:** | 6.00 inches | radius= | 3 inches | | |

| | Test No. | Start Time | End Time | ΔT (min) | Total Time (min) | Initial Depth of Water (ft) | Final Depth of Water (ft) | $H_0$ (in) | $H_f$ (in) | ΔH (in) | Unfactored Infiltration Rate (in/hour) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Trial 1 | 1 | 8:15 | 8:35 | 20.0 | 60.0 | 2.00 | 2.10 | 12.00 | 10.75 | 1.25 | 3.75 |
| | 2 | 8:35 | 8:55 | 20.0 | 80.0 | 2.10 | 2.13 | 10.75 | 10.50 | 0.25 | 0.75 |
| | 3 | 8:55 | 9:15 | 20.0 | 100.0 | 2.13 | 2.15 | 10.50 | 10.25 | 0.25 | 0.75 |
| | 4 | 9:15 | 9:35 | 20.0 | 120.0 | 2.15 | 2.18 | 10.25 | 9.88 | 0.38 | 1.13 |
| | 5 | 9:35 | 9:55 | 20.0 | 140.0 | 2.18 | 2.20 | 9.88 | 9.63 | 0.25 | 0.75 |
| | 6 | 9:55 | 10:15 | 20.0 | 160.0 | 2.20 | 2.21 | 9.63 | 9.50 | 0.13 | 0.38 |
| Trial 2 | 1 | 10:15 | 10:35 | 20.0 | 180.0 | 2.00 | 2.03 | 12.00 | 11.63 | 0.38 | 1.13 |
| | 2 | 10:35 | 10:55 | 20.0 | 200.0 | 2.03 | 2.05 | 11.63 | 11.38 | 0.25 | 0.75 |
| | 3 | 10:55 | 11:15 | 20.0 | 220.0 | 2.05 | 2.07 | 11.38 | 11.13 | 0.25 | 0.75 |
| | 4 | 11:15 | 11:35 | 20.0 | 240.0 | 2.07 | 2.08 | 11.13 | 11.00 | 0.13 | 0.38 |
| | 5 | 11:35 | 11:55 | 20.0 | 260.0 | 2.08 | 2.09 | 11.00 | 10.88 | 0.13 | 0.38 |
| | 6 | 11:55 | 12:15 | 20.0 | 280.0 | 2.09 | 2.13 | 10.88 | 10.50 | 0.38 | 1.13 |
| Trial 3 | 1 | 12:15 | 12:35 | 20.0 | 300.0 | 1.95 | 1.97 | 12.63 | 12.38 | 0.25 | 0.75 |
| | 2 | 12:35 | 12:55 | 20.0 | 320.0 | 1.97 | 1.99 | 12.38 | 12.13 | 0.25 | 0.75 |
| | 3 | 12:55 | 13:15 | 20.0 | 340.0 | 1.99 | 2.00 | 12.13 | 12.00 | 0.13 | 0.37 |
| | 4 | 13:15 | 13:35 | 20.0 | 360.0 | 2.00 | 2.02 | 12.00 | 11.75 | 0.25 | 0.75 |
| | 5 | 13:35 | 13:55 | 20.0 | 380.0 | 2.02 | 2.03 | 11.75 | 11.63 | 0.13 | 0.38 |
| | 6 | 13:55 | 14:15 | 20.0 | 400.0 | 2.03 | 2.05 | 11.63 | 11.38 | 0.25 | 0.75 |

| | |
|---|---|
| WATER TEMPERATURE CORRECTION FACTOR: | 0.90 |
| SAFETY FACTOR*: | 2 |
| UNFACTORED INFILTRATION RATE (IN/HR): | 0.67 |
| FACTORED INFILTRATION RATE (IN/HR): | 0.34 |

| Factor Category | Factor Description | Assigned Weight (w) | Factor Value (v) | Product (p) = w x v |
|---|---|---|---|---|
| Suitability Assessment | Soil assessment methods | 0.25 | 2 | 0.5 |
| | Predominant soil texture | 0.25 | 2 | 0.5 |
| | Site soil variablity | 0.25 | 2 | 0.5 |
| | Depth to groundwater | 0.25 | 1 | 0.25 |
| | | | Geotechnical Factor of Safety (SA): | 1.75 |

| Concern Level | Factor Value (v) |
|---|---|
| Low | 1 |
| Medium | 2 |
| High | 3 |

| Factor Description | High Concern | Medium Concern | Low Concern |
|---|---|---|---|
| Soil assessment methods | Use of borhole methods to estimate vertical infiltration rate (not recommended, but may be necessary at a planning level). Less than 2 tests per BMP | At least 2 tests per BMP. Use of borehole tests for dry wells or infiltration trenches. Use of infiltrometer or small scale PIT methods for vertical infiltration BMPs. | Extensive infiltration testing such as: PIT testing or infiltrometer testing at 3+ locations per BMP, and/or commitment to construction phase testing and design adaption if necessary. |
| Predominant soil texture | Silty and clayey soils with significant fines | Finer sandy soils with some loam content | Clean, granular soils (sands) |
| Site soil variablity | Highly variable soils indicated from site assessment or limited soil borings collected during site assessment. | Soil borings/test pits indicate moderately homogeneous soils. | Multiple soil borings/test pits indicate relatively homogeneous soils. |
| Depth to groundwater | Groundwater conditions or movement not well understood. | Seasonal high GW at least 10 ft below facility bottom. | Seasonal high GW at least 15 ft below facility bottom. |

***Factor of safety should not be less than 2. Additional factor of safety in accordance with Table D-7 of the South Orange County Technical Guidance Document should be applied by the project civil engineer.**

# Appendix F
## Hazardous Materials Assessment

ESA

ORANGE COUNTY
OC PublicWorks
Our Community. Our Commitment.

*Jess A. Carbajal, Director*
300 N. Flower Street
Santa Ana, CA

P.O. Box 4048
Santa Ana, CA 92702-4048

Telephone: (714) 834-2300
Fax: (714) 834-5188

# Memorandum

**DATE:** October 24, 2011

**TO:** John D. Pavlik, Manager, Right of Way Engineering

**FROM:** Manager, Environmental Resources

**SUBJECT:** Hazardous Materials Assessment for the North Tustin Park Parcel, Northwest Corner of Newport Avenue and Crawford Canyon Road, Unincorporated Orange County; ROWE I.D. No. 2011-41

---

Please find attached the Hazardous Materials Assessment (HMA) report prepared by Environmental Resources (ER) for the subject property. This HMA was prepared by ER in response to the request dated September 20, 2011 from Right of Way Engineering (ROWE).

The scope of work completed for this HMA involved: 1) a review of historical documents; 2) a regulatory agency database search; 3) interviews; 4) a property inspection; and 5) a reconnaissance of the adjoining sites and areas surrounding the property. The following presents the findings of the HMA:

- The property consists of a triangular unimproved parcel on the northwest corner of Crawford Canyon Road and Newport Avenue.

- The review of historical documents, which included historical topographic maps, aerial photographs, city directories, and Sanborn fire insurance maps did not identify RECs associated with the subject property or adjoining sites.

- The regulatory database search identified one mapped listing around the subject property. Nine orphan sites were also listed in the database search. However, further investigation determined that these target and orphan listings have a low potential for impacting the property.

- The property inspection and area reconnaissance did not identify RECs associated with the property or its adjoining sites. The site does contain some maintenance issues that would be considered *de minimis* conditions including: storm drain outfall maintenance, removing the accumulated soil piles to improve site drainage and sediment/erosion control on the property, and accumulated trash and debris piles on the property.

- Interview activities, including a review of the TDS provided by the property owner, did not identify RECs for the property.

Based on ER's document review, database research, and field reconnaissance, no evidence of environmental degradation to the property from hazardous materials contamination has been identified. Therefore, ER recommends that the property acquisition proceed. Although not necessarily HMA concerns, the following issues should be evaluated as part of the acquisition:

- Maintenance of the storm drain on the northeast corner of the property to facilitate site drainage;
- Re-grading of the property to remove the accumulated soil piles and to improve sediment/erosion control on the property; and
- Disposal of accumulated trash and debris from the site.

This HMA Update will be valid for a period of 18 months, through ~~October~~ April 2013.

Any questions concerning the HMA should be directed to James Fortuna at (714) 955-0677.

Chris Crompton

KB: HMA: TG 800, F6; EC41453

Attachment: Hazardous Materials Assessment

# Appendix G
## Hydrology Analysis

ESA

# HYDROLOGY ANALYSIS

## FOR

# CRAWFORD CANYON PARK

## S. CRAWFORD CANYON ROAD
## & NEWPORT BLVD

**City of Tustin**

**County of Orange, California**

November 16, 2020

Prepared for:

**OC PARKS**

OC Public Works
300 N. Flower Street
Santa Ana, CA 92703-5000

Prepared by:

**Hunsaker & Associate Irvine, Inc.**
3 Hughes
Irvine, CA 92618
(949)583-1010

# HYDROLOGY ANALYSIS

FOR

# CRAWFORD CANYON PARK

## S. CRAWFORD CANYON ROAD
## & NEWPORT BLVD

## City of Tustin

County of Orange

**November 16, 2020**

PREPARED UNDER THE SUPERVISION OF:

11/16/2020

Jianhua "Gary" Guan, R.C.E. 64519, Exp. 06/30/21 Date:

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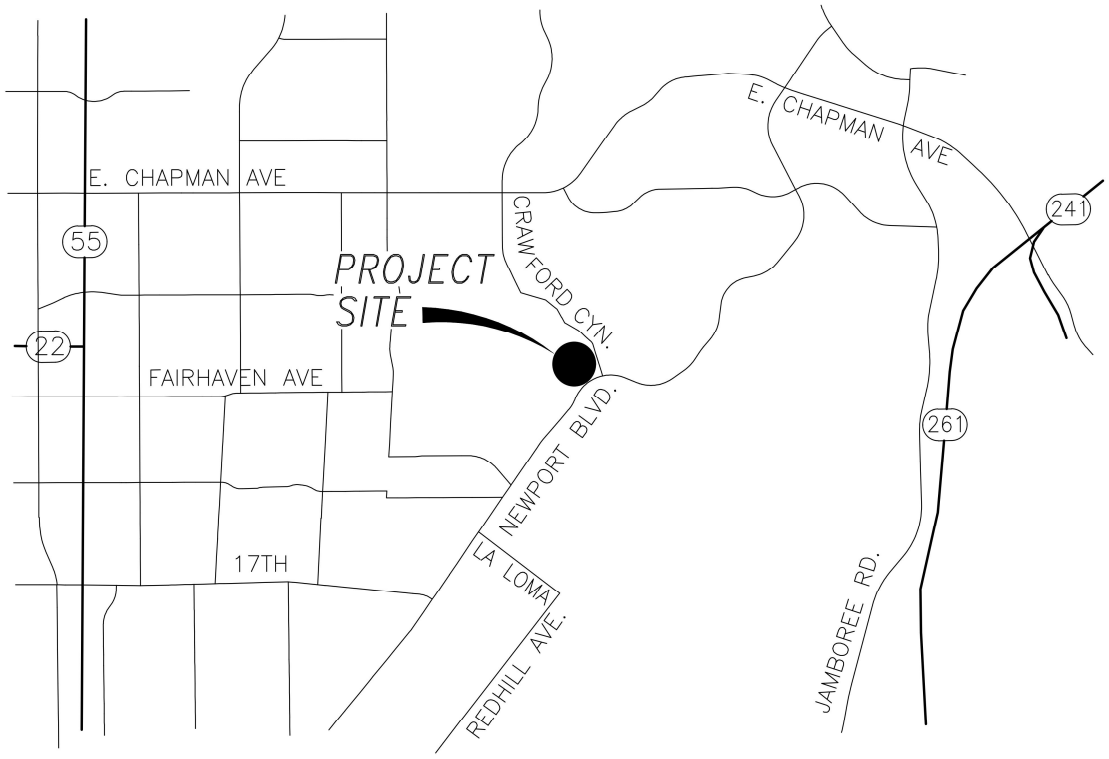
# SECTION I

# INTRODUCTION

## A. PROJECT LOCATION

The project site is located on the northwest corner of Newport Avenue and Crawford Canyon Road in the City of Tustin. The site is bound by Newport Avenue on the south, existing single family residences on the north and west, and Crawford Canyon Road on the east. The general location of the project site can be found blow.




LOCATION MAP

## B. STUDY PURPOSE

The purpose of this preliminary hydrology study is to determine the flow rates produced by the site in its existing and proposed conditions for comparisons. It will also serve as the basis for analyzing and designing the proposed development's required storm drain system. This report has been extended to perform the off-site hydrology analysis for the existing storm drain systems within the project site.

As part of the report, the 2-year, 25- and 100-year storm events for both existing and proposed conditions were analyzed. In addition, water quality BMPs are provided to ensure all flows will be treated prior to release into the existing storm drain systems downstream.

## C. DISCUSSION

### Existing Condition:

The project site in the size of approximate 3.9 acre is located on the northwest corner of Newport Avenue and Crawford Canyon Road in the City of Tustin. Currently, the project site is a public park with paved areas, concrete channels, scattered trees and vegetation.

There are existing storm drain systems within the project site. The existing storm drain systems convey the offsite runoffs from the north and east existing single family residential developments.

There is an existing 30” storm drain and 36” storm drain at the northeast corner of the project for the off-site flows. There is an existing 48” pipe after the confluence of the existing 30” and 36” pipes. The 48” storm drains discharge into an existing energy dissipater and ultimately into the existing trapezoidal earthen/concrete channel. The existing trapezoidal channel joins an existing 42” RCP at the southwest corner of the project and ultimately discharges into an existing 60-inch RCP along Newport Boulevard.

Majority of runoffs within the project site, including west half of Crawford Canyon Road sheet flows from east to west into a depressed area downstream where flows are collected and conveyed into the on-site trapezoidal channel.

Existing concrete v-ditches are located along the southern boundary along Newport Blvd to collect and convey the flows within the project site and are discharged into the existing trapezoidal channel downstream via a concrete down drain.

Refer to Exhibit 1 for off-site hydrology map and Exhibit 2 for on-site hydrology map for detailed drainage facilities

### Proposed Condition:

The park improvements will consist of the following:

- New asphalt-concrete parking lot
- New storm water basin
- 8-foot wide walkways
- 5-foot wide trails
- Picnic tables and benches
- Exercise station
- Pedestrian bridges
- Various play areas
- Retaining wall in order to create a level area for the new parking lot

The proposed project drainage pattern remains the same as the existing condition. The off-site hydrology studies remain the same without any changes.

An inlet is proposed for the concrete down drain at the northeastern corner of the project and will be proposed to join the existing 30-inch RCP underneath. A 16-Ft wide turf block access road will be proposed for the existing 48" pipe.

The majority of the on-site runoffs will be collected and conveyed by a meandering natural creek swale, which traverses the park site from east to west. A Bioretention basin is proposed at the end of the swale for water quality treatments. The storm runoffs from the Bioretention basin discharge to the existing trapezoidal channel.

An inlet and Filterra unit are proposed at the entrance to the parking lot. The storm drain system is proposed to join the existing trapezoidal channel which discharges into by an existing 42-inch RCP and ultimately into an existing 60-inch RCP along Newport Boulevard

Refer to Exhibit 3 for on-site hydrology map and the proposed drainage systems.

## D. HYDROLOGY METHODOLOGY

The rational method was used to calculate the design discharge for the local drainage areas since the watershed area to the proposed storm drain systems is less than one square mile.

Hydrologic calculations to determine the 2-, 25- and 100-year discharges at critical locations throughout the project site were performed using the Orange County Rational Method. A technical description of the rational method is provided in the Orange County Hydrology Manual dated October, 1986. The Rational Method is an empirical computation procedure for developing a peak runoff rate (discharge) for small watersheds for storms of a specified recurrence interval. The rational method equation is based on the assumption that the peak flow rate is directly proportional to the drainage area, rainfall intensity and a loss coefficient which describes the effects of land use and soil type. The design discharges were computed by generating a hydrologic "link-node" model which divides the area into subareas, each tributary to a concentration point or hydrologic "node" point determined by the proposed terrain or street layout.

The following assumptions/guidelines were applied for use of the Rational Method.

- The rational Method Hydrology includes the effects of infiltration caused by soil surface characteristics. The soil map from Orange County Hydrology Manual indicates that the study area consists of soil types B, C & D. Refer to soils Map in Section 4. Hydrologic soils ratings are based on a scale of A through D, where A is the most pervious, providing the least runoff.

- The infiltration rate is also affected by the type of vegetation or ground cover and percentage of impervious surface. The runoff coefficients used for this study were based on the proposed land uses.
- Standard intensity-duration curve data was taken from the Orange County Hydrology Manual, dated October, 1986.

The hydrologic calculations were prepared using the Advanced Engineering Software (A.E.S.) Rational Method computer program. The results of the hydrologic calculations were used to design the required storm drain facilities.

## E. HYDROLOGY STUDY RESULTS

There is only one drainage area within the studied reach for both the existing condition and proposed condition.

There are no available hydrology studies for the existing 30" and 36" pipe at the northeastern corner of the project site. This hydrology study was extended to include the off-site drainage areas. The 2-ft contour interval orthotopo mapping and aerial image was used to determine the drainage boundaries and land uses in the hydrology studies. The off-site hydrology studies (Exhibit 1) remain the same for the existing and proposed conditions.

The existing condition hydrology map and calculations can be found in Section 2 and the proposed condition hydrology analysis can be found in Section 3. Table 1 summarizes the hydrology analysis results for the overall hydrology study.

TABLE 1. CRAWFORD CANYON PARK OVERALL HYDROLOGY SUMMARY

| Drainage Area | Existing Condition | | | | Proposed Condition | | | | Delta (Proposed-Existing) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Area | 2-year | 25-year | 100-year | Area | 2-year | 25-year | 100-year | Area (Ac) | 2-year | 25-year | 100-year |
| | (acre) | (cfs) | (cfs) | (cfs) | (acre) | (cfs) | (cfs) | (cfs) | (acre) | (cfs) | (cfs) | (cfs) |
| Overall | 37.1 | 35.8 | 86.4 | 113.2 | 37.1 | 35.7 | 86.0 | 112.9 | 0.0 | -0.1 | -0.4 | -0.3 |

As indicated in the table 1, the overall peak runoffs are similar to the existing condition after the park improvements. The overall tributary areas remain the same and the proposed condition flow rate are all less than the existing levels.

## F. CONCLUSION

Overall, it is concluded that there will have no adverse impacts to the existing drainage systems due to the project developments.

## H. WATER QUALITY MANGEMENT PLAN REPORT

The water quality BMPs are provided for the project to meet the WQMP and LID requirements and is provided per separate report.

# SECTION II
# EXISTING CONDITION HYDROLOGY CALCULATIONS &MAP

# A. 2-YEAR STORM

```
____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Crawford Park                                        *
* Existing Condition                                                       *
* 2-year Storm                                                             *
 ****************************************************************************

  FILE NAME: CPEX.DAT
  TIME/DATE OF STUDY: 19:25 11/13/2020
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    750.00
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.475
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.797
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.19      0.25     1.000    59    7.47
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.66
  TOTAL AREA(ACRES) =      1.19   PEAK FLOW RATE(CFS) =      1.66

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    750.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.4615
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.66
  FLOW VELOCITY(FEET/SEC) =   5.24 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.03   Tc(MIN.) =    8.51
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.51
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.668
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.90      0.25     1.000    59
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.24      0.20     1.000    67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    1.47
  EFFECTIVE AREA(ACRES) =      2.33   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       2.98

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  600.00  DOWNSTREAM ELEVATION(FEET) =  503.00
```

```
  STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    4.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.62
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =   10.35
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.491
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        3.49      0.20     0.700    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    3.49      SUBAREA RUNOFF(CFS) =    4.24
  EFFECTIVE AREA(ACRES) =      5.82    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.82
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =       6.85

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   5.91
  FLOW VELOCITY(FEET/SEC.) =  6.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1335.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  395.00
  STREET LENGTH(FEET) =  1085.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.09
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.95
  STREET FLOW TRAVEL TIME(MIN.) =   2.85   Tc(MIN.) =   13.20
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.296
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        5.82      0.20     0.700    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    5.82      SUBAREA RUNOFF(CFS) =    6.06
  EFFECTIVE AREA(ACRES) =     11.64    AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      11.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.91
  FLOW VELOCITY(FEET/SEC.) =  6.59   DEPTH*VELOCITY(FT*FT/SEC.) =   2.12
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.90
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   13.28
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    2465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.28
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.292
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D       10.89      0.20     0.700    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =   10.89      SUBAREA RUNOFF(CFS) =   11.29
  EFFECTIVE AREA(ACRES) =     22.53   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      23.14

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.58
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.14
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   13.49
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.49
  RAINFALL INTENSITY(INCH/HR) =   1.28
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =      22.53
  TOTAL STREAM AREA(ACRES) =      22.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.14

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    436.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.036
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.861
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        1.17      0.25     0.700    50    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  436.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   625.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    5.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.36
  STREET FLOW TRAVEL TIME(MIN.) =   1.99   Tc(MIN.) =    9.03
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.613
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        0.65      0.25     0.700    50
  COMMERCIAL                 C        0.30      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.511
  SUBAREA AREA(ACRES) =    0.95      SUBAREA RUNOFF(CFS) =    1.27
  EFFECTIVE AREA(ACRES) =      2.12    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       2.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   6.03
  FLOW VELOCITY(FEET/SEC.) =  5.37   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   385.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.48
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  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.78
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    9.42
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1145.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.42
  RAINFALL INTENSITY(INCH/HR) =   1.57
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =       2.12
  TOTAL STREAM AREA(ACRES) =       2.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.78

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.14   13.49    1.281  0.21( 0.15) 0.73      22.5      10.00
      2        2.78    9.42    1.573  0.25( 0.15) 0.62       2.1      20.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.14    9.42    1.573  0.21( 0.15) 0.72      17.9      20.00
      2       25.35   13.49    1.281  0.21( 0.15) 0.72      24.6      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.35    Tc(MIN.) =    13.49
  EFFECTIVE AREA(ACRES) =      24.65   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       24.6
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   371.00  DOWNSTREAM(FEET) =   367.00
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.77
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.35
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   13.62
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    2815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.62
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.274
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.33      0.30     0.600    36
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        3.00      0.25     0.600    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.33      SUBAREA RUNOFF(CFS) =    3.36
  EFFECTIVE AREA(ACRES) =     27.98   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =       28.0       PEAK FLOW RATE(CFS) =      28.26

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   347.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.82
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.26
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   14.16
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    3295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.16
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.245
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    36
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        0.50      0.25     0.600    50
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.16      0.20     0.600    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    4.66      SUBAREA RUNOFF(CFS) =    4.60
  EFFECTIVE AREA(ACRES) =     32.64   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       32.6       PEAK FLOW RATE(CFS) =      32.15

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0286
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.238
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.13      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      32.21
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.13
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   0.14
  Tc(MIN.) =   14.30
  SUBAREA AREA(ACRES) =     0.13       SUBAREA RUNOFF(CFS) =    0.12
  EFFECTIVE AREA(ACRES) =     32.77     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.22  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =       32.8         PEAK FLOW RATE(CFS) =      32.15
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   8.11
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.30
  RAINFALL INTENSITY(INCH/HR) =   1.24
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =      32.77
  TOTAL STREAM AREA(ACRES) =      32.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.15

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    393.00  DOWNSTREAM(FEET) =    372.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.10      0.20     0.100    57    5.00
  PUBLIC PARK                C        0.30      0.25     0.850    50    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.663
  SUBAREA RUNOFF(CFS) =      0.76
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      0.76

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    372.00  DOWNSTREAM(FEET) =    361.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0328
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.790
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.33      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.21
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   2.53
  Tc(MIN.) =    7.53
  SUBAREA AREA(ACRES) =     1.33       SUBAREA RUNOFF(CFS) =    1.84
  EFFECTIVE AREA(ACRES) =      1.73     AREA-AVERAGED Fm(INCH/HR) =   0.23
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.81
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       2.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   2.52
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    361.00  DOWNSTREAM(FEET) =    350.00
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   263.00   CHANNEL SLOPE =  0.0418
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.617
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.27      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.01
  AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   1.46
  Tc(MIN.) =    8.98
  SUBAREA AREA(ACRES) =     1.27       SUBAREA RUNOFF(CFS) =    1.56
  EFFECTIVE AREA(ACRES) =      3.00     AREA-AVERAGED Fm(INCH/HR) =   0.24
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.82
  TOTAL AREA(ACRES) =        3.0         PEAK FLOW RATE(CFS) =       3.71

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   3.07
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     848.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.32
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.71
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    9.11
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     928.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.11
  RAINFALL INTENSITY(INCH/HR) =   1.60
  AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.29
  AREA-AVERAGED Ap =  0.82
  EFFECTIVE STREAM AREA(ACRES) =       3.00
  TOTAL STREAM AREA(ACRES) =       3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.71

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       31.66   10.25    1.500  0.22( 0.15) 0.68      26.0      20.00
      1       32.15   14.30    1.238  0.22( 0.15) 0.69      32.8      10.00
      2        3.71    9.11    1.604  0.29( 0.24) 0.82       3.0      30.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.05    9.11    1.604  0.23( 0.16) 0.70      26.1      30.00
      2       35.09   10.25    1.500  0.23( 0.16) 0.70      29.0      20.00
      3       34.87   14.30    1.238  0.23( 0.16) 0.70      35.8      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.09    Tc(MIN.) =    10.25
  EFFECTIVE AREA(ACRES) =      28.98   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       35.8
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0218
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.452
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.58      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      35.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.73
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   0.59
  Tc(MIN.) =   10.84
  SUBAREA AREA(ACRES) =     0.58       SUBAREA RUNOFF(CFS) =    0.62
  EFFECTIVE AREA(ACRES) =     29.56     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.23  AREA-AVERAGED Ap =   0.70
  TOTAL AREA(ACRES) =       36.4         PEAK FLOW RATE(CFS) =      35.09
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   7.77
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.84
  RAINFALL INTENSITY(INCH/HR) =   1.45
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =      29.56
  TOTAL STREAM AREA(ACRES) =      36.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      35.09

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   160.00
  ELEVATION DATA: UPSTREAM(FEET) =    388.20  DOWNSTREAM(FEET) =    378.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.378
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.968
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.20      0.30     0.850    36    6.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.31
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.31

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    378.00  DOWNSTREAM(FEET) =    364.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0538
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.688
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.23      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.21
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   1.96
  Tc(MIN.) =    8.33
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.30
  EFFECTIVE AREA(ACRES) =      0.43     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       0.55

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   2.42
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    364.00  DOWNSTREAM(FEET) =    354.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0364
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.488
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.23      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.24
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   2.05
  Tc(MIN.) =   10.38
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.26
  EFFECTIVE AREA(ACRES) =      0.66     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       0.73

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   2.29
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    354.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0346
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.354
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.12      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.33
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   1.86
  Tc(MIN.) =   12.24
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.12
  EFFECTIVE AREA(ACRES) =      0.78     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       0.77

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.15   FLOW VELOCITY(FEET/SEC.) =   2.27
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     44.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    40.00   CHANNEL SLOPE =  0.1500
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.77
  FLOW VELOCITY(FEET/SEC.) =   2.98   FLOW DEPTH(FEET) =   0.03
  TRAVEL TIME(MIN.) =   0.22   Tc(MIN.) =   12.46
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     45.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.46
  RAINFALL INTENSITY(INCH/HR) =   1.34
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       0.78
  TOTAL STREAM AREA(ACRES) =       0.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.77

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.05    9.71    1.547  0.23( 0.16) 0.70      26.7      30.00
      1       35.09   10.84    1.452  0.23( 0.16) 0.70      29.6      20.00
      1       34.87   14.90    1.210  0.23( 0.16) 0.71      36.4      10.00
      2        0.77   12.46    1.340  0.30( 0.25) 0.85       0.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.77    9.71    1.547  0.24( 0.17) 0.70      27.3      30.00
      2       35.83   10.84    1.452  0.23( 0.16) 0.70      30.2      20.00
      3       35.77   12.46    1.340  0.23( 0.16) 0.71      33.1      40.00
      4       35.54   14.90    1.210  0.23( 0.16) 0.71      37.1      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.83    Tc(MIN.) =    10.84
  EFFECTIVE AREA(ACRES) =      30.24   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       37.1
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       37.1  TC(MIN.) =     10.84
  EFFECTIVE AREA(ACRES) =     30.24  AREA-AVERAGED Fm(INCH/HR)=  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap = 0.703
  PEAK FLOW RATE(CFS)   =      35.83

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.77    9.71    1.547  0.24( 0.17) 0.70      27.3      30.00
      2       35.83   10.84    1.452  0.23( 0.16) 0.70      30.2      20.00
      3       35.77   12.46    1.340  0.23( 0.16) 0.71      33.1      40.00
      4       35.54   14.90    1.210  0.23( 0.16) 0.71      37.1      10.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

## B. 25-YEAR STORM

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____________________________________________________________________________
****************************************************************************
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 ************************* DESCRIPTION OF STUDY *************************
* Hydrology Study for Crawford Park                                      *
* Existing Condition                                                     *
* 25-year Storm                                                          *
 ************************************************************************

  FILE NAME: CPEX.DAT
  TIME/DATE OF STUDY: 19:26 11/13/2020
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    750.00
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.475
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.842
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.19      0.25     1.000    77    7.47
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.85
  TOTAL AREA(ACRES) =      1.19   PEAK FLOW RATE(CFS) =      3.85

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    750.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.4615
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.85
  FLOW VELOCITY(FEET/SEC) =   6.28 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.86   Tc(MIN.) =    8.34
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.34
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.612
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.90      0.25     1.000    77
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.24      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    3.46
  EFFECTIVE AREA(ACRES) =      2.33   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       7.06

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  600.00  DOWNSTREAM ELEVATION(FEET) =  503.00
```

```
  STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.64   Tc(MIN.) =    9.98
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.263
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        3.49      0.20     0.700    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    3.49      SUBAREA RUNOFF(CFS) =    9.81
  EFFECTIVE AREA(ACRES) =      5.82    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.82
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      16.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.66
  FLOW VELOCITY(FEET/SEC.) =  7.86   DEPTH*VELOCITY(FT*FT/SEC.) =   2.63
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1335.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  395.00
  STREET LENGTH(FEET) =  1085.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      23.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.64
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.91
  STREET FLOW TRAVEL TIME(MIN.) =   2.37   Tc(MIN.) =   12.34
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.892
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        5.82      0.20     0.700    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    5.82      SUBAREA RUNOFF(CFS) =   14.42
  EFFECTIVE AREA(ACRES) =     11.64    AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      28.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.40
  FLOW VELOCITY(FEET/SEC.) =  7.96   DEPTH*VELOCITY(FT*FT/SEC.) =   3.20
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.79
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.61
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   12.41
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    2465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.41
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.884
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D       10.89      0.20     0.700    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =   10.89      SUBAREA RUNOFF(CFS) =   26.89
  EFFECTIVE AREA(ACRES) =     22.53   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      55.42

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.20
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      55.42
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   12.57
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.57
  RAINFALL INTENSITY(INCH/HR) =   2.86
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =      22.53
  TOTAL STREAM AREA(ACRES) =      22.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      55.42

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    436.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.036
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.976
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        1.17      0.25     0.700    69    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      4.00
  TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      4.00

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  436.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   625.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.93
  STREET FLOW TRAVEL TIME(MIN.) =   1.74   Tc(MIN.) =    8.78
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.507
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        0.65      0.25     0.700    69
  COMMERCIAL                 C        0.30      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.511
  SUBAREA AREA(ACRES) =    0.95      SUBAREA RUNOFF(CFS) =    2.89
  EFFECTIVE AREA(ACRES) =      2.12    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       6.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =   9.72
  FLOW VELOCITY(FEET/SEC.) =  6.17   DEPTH*VELOCITY(FT*FT/SEC.) =   2.07
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   385.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.02
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.40
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    9.09
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1145.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.09
  RAINFALL INTENSITY(INCH/HR) =   3.44
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =       2.12
  TOTAL STREAM AREA(ACRES) =       2.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       55.42   12.57    2.862  0.21( 0.15) 0.73      22.5      10.00
      2        6.40    9.09    3.439  0.25( 0.15) 0.62       2.1      20.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       54.99    9.09    3.439  0.21( 0.15) 0.72      18.4      20.00
      2       60.69   12.57    2.862  0.21( 0.15) 0.72      24.6      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      60.69    Tc(MIN.) =    12.57
  EFFECTIVE AREA(ACRES) =      24.65   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       24.6
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   371.00  DOWNSTREAM(FEET) =   367.00
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.24
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.69
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   12.68
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    2815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.68
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.849
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.33      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        3.00      0.25     0.600    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.33      SUBAREA RUNOFF(CFS) =    8.08
  EFFECTIVE AREA(ACRES) =     27.98   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =       28.0       PEAK FLOW RATE(CFS) =      67.93

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   347.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.60
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      67.93
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   13.11
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    3295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.11
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.795
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        0.50      0.25     0.600    69
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.16      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    4.66      SUBAREA RUNOFF(CFS) =   11.10
  EFFECTIVE AREA(ACRES) =     32.64   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       32.6       PEAK FLOW RATE(CFS) =      77.68

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0286
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.783
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.13      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      77.83
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.15
  AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   0.10
  Tc(MIN.) =   13.21
  SUBAREA AREA(ACRES) =     0.13       SUBAREA RUNOFF(CFS) =    0.30
  EFFECTIVE AREA(ACRES) =     32.77     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.22  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =       32.8         PEAK FLOW RATE(CFS) =      77.68
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.62   FLOW VELOCITY(FEET/SEC.) =  11.13
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.21
  RAINFALL INTENSITY(INCH/HR) =   2.78
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =      32.77
  TOTAL STREAM AREA(ACRES) =      32.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      77.68

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    393.00  DOWNSTREAM(FEET) =    372.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.10      0.20     0.100    75    5.00
  PUBLIC PARK                C        0.30      0.25     0.850    69    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.663
  SUBAREA RUNOFF(CFS) =      1.68
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.68

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    372.00  DOWNSTREAM(FEET) =    361.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0328
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.025
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.33      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.94
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.96
  AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   1.89
  Tc(MIN.) =    6.89
  SUBAREA AREA(ACRES) =     1.33       SUBAREA RUNOFF(CFS) =    4.51
  EFFECTIVE AREA(ACRES) =      1.73     AREA-AVERAGED Fm(INCH/HR) =   0.23
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.81
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       5.90

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.28   FLOW VELOCITY(FEET/SEC.) =   3.33
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    361.00  DOWNSTREAM(FEET) =    350.00
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   263.00   CHANNEL SLOPE =  0.0418
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.702
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.27      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.87
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.00
  AVERAGE FLOW DEPTH(FEET) =   0.30   TRAVEL TIME(MIN.) =   1.10
  Tc(MIN.) =    7.98
  SUBAREA AREA(ACRES) =     1.27       SUBAREA RUNOFF(CFS) =    3.94
  EFFECTIVE AREA(ACRES) =      3.00     AREA-AVERAGED Fm(INCH/HR) =   0.24
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.82
  TOTAL AREA(ACRES) =        3.0         PEAK FLOW RATE(CFS) =       9.34

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   4.21
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     848.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.34
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    8.08
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     928.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.08
  RAINFALL INTENSITY(INCH/HR) =   3.68
  AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.29
  AREA-AVERAGED Ap =  0.82
  EFFECTIVE STREAM AREA(ACRES) =       3.00
  TOTAL STREAM AREA(ACRES) =       3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.34

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       75.47    9.74    3.307  0.22( 0.15) 0.68      26.5      20.00
      1       77.68   13.21    2.783  0.22( 0.15) 0.69      32.8      10.00
      2        9.34    8.08    3.676  0.29( 0.24) 0.82       3.0      30.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       79.26    8.08    3.676  0.23( 0.16) 0.70      25.0      30.00
      2       83.80    9.74    3.307  0.23( 0.16) 0.70      29.5      20.00
      3       84.59   13.21    2.783  0.23( 0.16) 0.70      35.8      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      84.59    Tc(MIN.) =    13.21
  EFFECTIVE AREA(ACRES) =      35.77   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       35.8
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0218
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.732
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.58      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      85.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.57
  AVERAGE FLOW DEPTH(FEET) =   0.71   TRAVEL TIME(MIN.) =   0.43
  Tc(MIN.) =   13.65
  SUBAREA AREA(ACRES) =     0.58       SUBAREA RUNOFF(CFS) =    1.29
  EFFECTIVE AREA(ACRES) =     36.35     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.23  AREA-AVERAGED Ap =   0.71
  TOTAL AREA(ACRES) =       36.4         PEAK FLOW RATE(CFS) =      84.59
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =  10.52
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.65
  RAINFALL INTENSITY(INCH/HR) =   2.73
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23
  AREA-AVERAGED Ap =  0.71
  EFFECTIVE STREAM AREA(ACRES) =      36.35
  TOTAL STREAM AREA(ACRES) =      36.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      84.59

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   160.00
  ELEVATION DATA: UPSTREAM(FEET) =    388.20  DOWNSTREAM(FEET) =    378.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.378
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.203
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.20      0.30     0.850    56    6.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.71
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.71

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    378.00  DOWNSTREAM(FEET) =    364.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0538
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.742
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.23      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.07
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.99
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   1.45
  Tc(MIN.) =    7.83
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.72
  EFFECTIVE AREA(ACRES) =      0.43     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       1.35

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   3.21
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    364.00  DOWNSTREAM(FEET) =    354.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0364
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.389
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.23      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.67
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.05
  AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   1.50
  Tc(MIN.) =    9.33
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.65
  EFFECTIVE AREA(ACRES) =      0.66     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       1.86

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   3.14
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    354.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0346
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.135
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.12      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.02
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.16
  AVERAGE FLOW DEPTH(FEET) =   0.25   TRAVEL TIME(MIN.) =   1.37
  Tc(MIN.) =   10.70
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.31
  EFFECTIVE AREA(ACRES) =      0.78     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       2.02

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   3.16
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     44.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    40.00   CHANNEL SLOPE =  0.1500
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.02
  FLOW VELOCITY(FEET/SEC.) =   4.67   FLOW DEPTH(FEET) =   0.04
  TRAVEL TIME(MIN.) =   0.14   Tc(MIN.) =   10.85
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     45.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.85
  RAINFALL INTENSITY(INCH/HR) =   3.11
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       0.78
  TOTAL STREAM AREA(ACRES) =       0.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.02

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       79.26    8.52    3.566  0.23( 0.16) 0.70      25.6      30.00
      1       83.80   10.18    3.226  0.23( 0.16) 0.70      30.1      20.00
      1       84.59   13.65    2.732  0.23( 0.16) 0.71      36.4      10.00
      2        2.02   10.85    3.112  0.30( 0.25) 0.85       0.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       81.10    8.52    3.566  0.24( 0.17) 0.71      26.2      30.00
      2       85.78   10.18    3.226  0.23( 0.16) 0.70      30.8      20.00
      3       85.98   10.85    3.112  0.23( 0.16) 0.70      32.1      40.00
      4       86.35   13.65    2.732  0.23( 0.16) 0.71      37.1      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      86.35    Tc(MIN.) =    13.65
  EFFECTIVE AREA(ACRES) =      37.13   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =       37.1
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       37.1  TC(MIN.) =     13.65
  EFFECTIVE AREA(ACRES) =     37.13  AREA-AVERAGED Fm(INCH/HR)=  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap = 0.709
  PEAK FLOW RATE(CFS)   =      86.35

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       81.10    8.52    3.566  0.24( 0.17) 0.71      26.2      30.00
      2       85.78   10.18    3.226  0.23( 0.16) 0.70      30.8      20.00
      3       85.98   10.85    3.112  0.23( 0.16) 0.70      32.1      40.00
      4       86.35   13.65    2.732  0.23( 0.16) 0.71      37.1      10.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

## C. 100-YEAR STORM

```
____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Crawford Park                                        *
* Existing Condition                                                       *
* 100-year Storm                                                           *
 ***************************************************************************

  FILE NAME: CPEX.DAT
  TIME/DATE OF STUDY: 19:27 11/13/2020
===========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
===========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
===========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    750.00
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.475
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.914
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.19      0.25     1.000    92    7.47
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      5.00
  TOTAL AREA(ACRES) =      1.19   PEAK FLOW RATE(CFS) =      5.00

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
===========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    750.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.4615
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       5.00
  FLOW VELOCITY(FEET/SEC) =   6.67 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.81   Tc(MIN.) =    8.29
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
===========================================================================
  MAINLINE Tc(MIN.) =    8.29
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.632
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.90      0.25     1.000    92
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.24      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    4.51
  EFFECTIVE AREA(ACRES) =      2.33   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       9.20

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
===========================================================================
  UPSTREAM ELEVATION(FEET) =  600.00  DOWNSTREAM ELEVATION(FEET) =  503.00
```

```
  STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.60
  STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =    9.84
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.198
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        3.49      0.20     0.700    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    3.49      SUBAREA RUNOFF(CFS) =   12.75
  EFFECTIVE AREA(ACRES) =      5.82    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.82
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      21.03

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.90
  FLOW VELOCITY(FEET/SEC.) =  8.38   DEPTH*VELOCITY(FT*FT/SEC.) =   2.99
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1335.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  395.00
  STREET LENGTH(FEET) =  1085.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      30.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    8.13
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.31
  STREET FLOW TRAVEL TIME(MIN.) =   2.22   Tc(MIN.) =   12.06
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.735
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        5.82      0.20     0.700    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    5.82      SUBAREA RUNOFF(CFS) =   18.83
  EFFECTIVE AREA(ACRES) =     11.64    AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      37.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.96
  FLOW VELOCITY(FEET/SEC.) =  8.54   DEPTH*VELOCITY(FT*FT/SEC.) =   3.67
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.66
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.44
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   12.12
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    2465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.12
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.725
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D       10.89      0.20     0.700    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =   10.89      SUBAREA RUNOFF(CFS) =   35.13
  EFFECTIVE AREA(ACRES) =     22.53   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      72.47

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.96
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      72.47
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   12.28
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.28
  RAINFALL INTENSITY(INCH/HR) =   3.70
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =      22.53
  TOTAL STREAM AREA(ACRES) =      22.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      72.47

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    436.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.036
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.087
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        1.17      0.25     0.700    86    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      5.17
  TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      5.17

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  436.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   625.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.12
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.18
  STREET FLOW TRAVEL TIME(MIN.) =   1.64   Tc(MIN.) =    8.67
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.513
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        0.65      0.25     0.700    86
  COMMERCIAL                 C        0.30      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.511
  SUBAREA AREA(ACRES) =    0.95      SUBAREA RUNOFF(CFS) =    3.75
  EFFECTIVE AREA(ACRES) =      2.12    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       8.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.98
  FLOW VELOCITY(FEET/SEC.) =  6.55   DEPTH*VELOCITY(FT*FT/SEC.) =   2.35
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   385.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.92
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.32
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    8.96
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1145.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.96
  RAINFALL INTENSITY(INCH/HR) =   4.43
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =       2.12
  TOTAL STREAM AREA(ACRES) =       2.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.32

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       72.47   12.28    3.698  0.21( 0.15) 0.73      22.5      10.00
      2        8.32    8.96    4.428  0.25( 0.15) 0.62       2.1      20.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       72.12    8.96    4.428  0.21( 0.15) 0.72      18.6      20.00
      2       79.36   12.28    3.698  0.21( 0.15) 0.72      24.6      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      79.36    Tc(MIN.) =    12.28
  EFFECTIVE AREA(ACRES) =      24.65   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       24.6
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   371.00  DOWNSTREAM(FEET) =   367.00
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.42
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      79.36
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   12.38
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    2815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.681
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.33      0.30     0.600    76
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        3.00      0.25     0.600    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.33      SUBAREA RUNOFF(CFS) =   10.57
  EFFECTIVE AREA(ACRES) =     27.98   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =       28.0       PEAK FLOW RATE(CFS) =      88.88

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   347.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.87
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      88.88
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   12.78
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    3295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.78
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.614
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    76
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        0.50      0.25     0.600    86
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.16      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    4.66      SUBAREA RUNOFF(CFS) =   14.53
  EFFECTIVE AREA(ACRES) =     32.64   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       32.6       PEAK FLOW RATE(CFS) =     101.73

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0286
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.599
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.13      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     101.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.23
  AVERAGE FLOW DEPTH(FEET) =   0.73   TRAVEL TIME(MIN.) =   0.10
  Tc(MIN.) =   12.87
  SUBAREA AREA(ACRES) =     0.13       SUBAREA RUNOFF(CFS) =    0.39
  EFFECTIVE AREA(ACRES) =     32.77     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.22  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =       32.8         PEAK FLOW RATE(CFS) =     101.73
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.72   FLOW VELOCITY(FEET/SEC.) =  12.31
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.87
  RAINFALL INTENSITY(INCH/HR) =   3.60
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =      32.77
  TOTAL STREAM AREA(ACRES) =      32.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     101.73

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    393.00  DOWNSTREAM(FEET) =    372.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.10      0.20     0.100    91    5.00
  PUBLIC PARK                C        0.30      0.25     0.850    86    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.663
  SUBAREA RUNOFF(CFS) =      2.17
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      2.17

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    372.00  DOWNSTREAM(FEET) =    361.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0328
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.212
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.33      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.15
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.20
  AVERAGE FLOW DEPTH(FEET) =   0.26   TRAVEL TIME(MIN.) =   1.75
  Tc(MIN.) =    6.75
  SUBAREA AREA(ACRES) =     1.33       SUBAREA RUNOFF(CFS) =    5.93
  EFFECTIVE AREA(ACRES) =      1.73     AREA-AVERAGED Fm(INCH/HR) =   0.23
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.81
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       7.75

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.32   FLOW VELOCITY(FEET/SEC.) =   3.62
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    361.00  DOWNSTREAM(FEET) =    350.00
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   263.00   CHANNEL SLOPE =  0.0418
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.810
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.27      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.32
  AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   1.01
  Tc(MIN.) =    7.76
  SUBAREA AREA(ACRES) =     1.27       SUBAREA RUNOFF(CFS) =    5.21
  EFFECTIVE AREA(ACRES) =      3.00     AREA-AVERAGED Fm(INCH/HR) =   0.24
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.82
  TOTAL AREA(ACRES) =        3.0         PEAK FLOW RATE(CFS) =      12.33

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.39   FLOW VELOCITY(FEET/SEC.) =   4.52
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     848.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.33
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.85
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     928.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.85
  RAINFALL INTENSITY(INCH/HR) =   4.78
  AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.29
  AREA-AVERAGED Ap =  0.82
  EFFECTIVE STREAM AREA(ACRES) =       3.00
  TOTAL STREAM AREA(ACRES) =       3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.33

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       98.93    9.57    4.265  0.22( 0.15) 0.68      26.7      20.00
      1      101.73   12.87    3.599  0.22( 0.15) 0.69      32.8      10.00
      2       12.33    7.85    4.777  0.29( 0.24) 0.82       3.0      30.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      103.61    7.85    4.777  0.23( 0.16) 0.70      24.9      30.00
      2      109.87    9.57    4.265  0.23( 0.16) 0.70      29.7      20.00
      3      110.85   12.87    3.599  0.23( 0.16) 0.70      35.8      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     110.85    Tc(MIN.) =    12.87
  EFFECTIVE AREA(ACRES) =      35.77   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       35.8
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0218
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.537
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.58      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     111.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.59
  AVERAGE FLOW DEPTH(FEET) =   0.83   TRAVEL TIME(MIN.) =   0.40
  Tc(MIN.) =   13.27
  SUBAREA AREA(ACRES) =     0.58       SUBAREA RUNOFF(CFS) =    1.71
  EFFECTIVE AREA(ACRES) =     36.35     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.23  AREA-AVERAGED Ap =   0.71
  TOTAL AREA(ACRES) =       36.4         PEAK FLOW RATE(CFS) =     110.85
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.82   FLOW VELOCITY(FEET/SEC.) =  11.60
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.27
  RAINFALL INTENSITY(INCH/HR) =   3.54
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23
  AREA-AVERAGED Ap =  0.71
  EFFECTIVE STREAM AREA(ACRES) =      36.35
  TOTAL STREAM AREA(ACRES) =      36.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     110.85

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   160.00
  ELEVATION DATA: UPSTREAM(FEET) =    388.20  DOWNSTREAM(FEET) =    378.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.378
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.382
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.20      0.30     0.850    76    6.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.92
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.92

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    378.00  DOWNSTREAM(FEET) =    364.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0538
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.832
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.23      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.28
  AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   1.32
  Tc(MIN.) =    7.70
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.95
  EFFECTIVE AREA(ACRES) =      0.43     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       1.77

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.21   FLOW VELOCITY(FEET/SEC.) =   3.51
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    364.00  DOWNSTREAM(FEET) =    354.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0364
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.396
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.23      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.32
  AVERAGE FLOW DEPTH(FEET) =   0.26   TRAVEL TIME(MIN.) =   1.38
  Tc(MIN.) =    9.08
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.86
  EFFECTIVE AREA(ACRES) =      0.66     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       2.46

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.28   FLOW VELOCITY(FEET/SEC.) =   3.44
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    354.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0346
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.085
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.12      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.67
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.50
  AVERAGE FLOW DEPTH(FEET) =   0.29   TRAVEL TIME(MIN.) =   1.24
  Tc(MIN.) =   10.32
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.41
  EFFECTIVE AREA(ACRES) =      0.78     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       2.69

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.30   FLOW VELOCITY(FEET/SEC.) =   3.44
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     44.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    40.00   CHANNEL SLOPE =  0.1500
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.69
  FLOW VELOCITY(FEET/SEC.) =   5.27   FLOW DEPTH(FEET) =   0.05
  TRAVEL TIME(MIN.) =   0.13   Tc(MIN.) =   10.44
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     45.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.44
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       0.78
  TOTAL STREAM AREA(ACRES) =       0.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.69

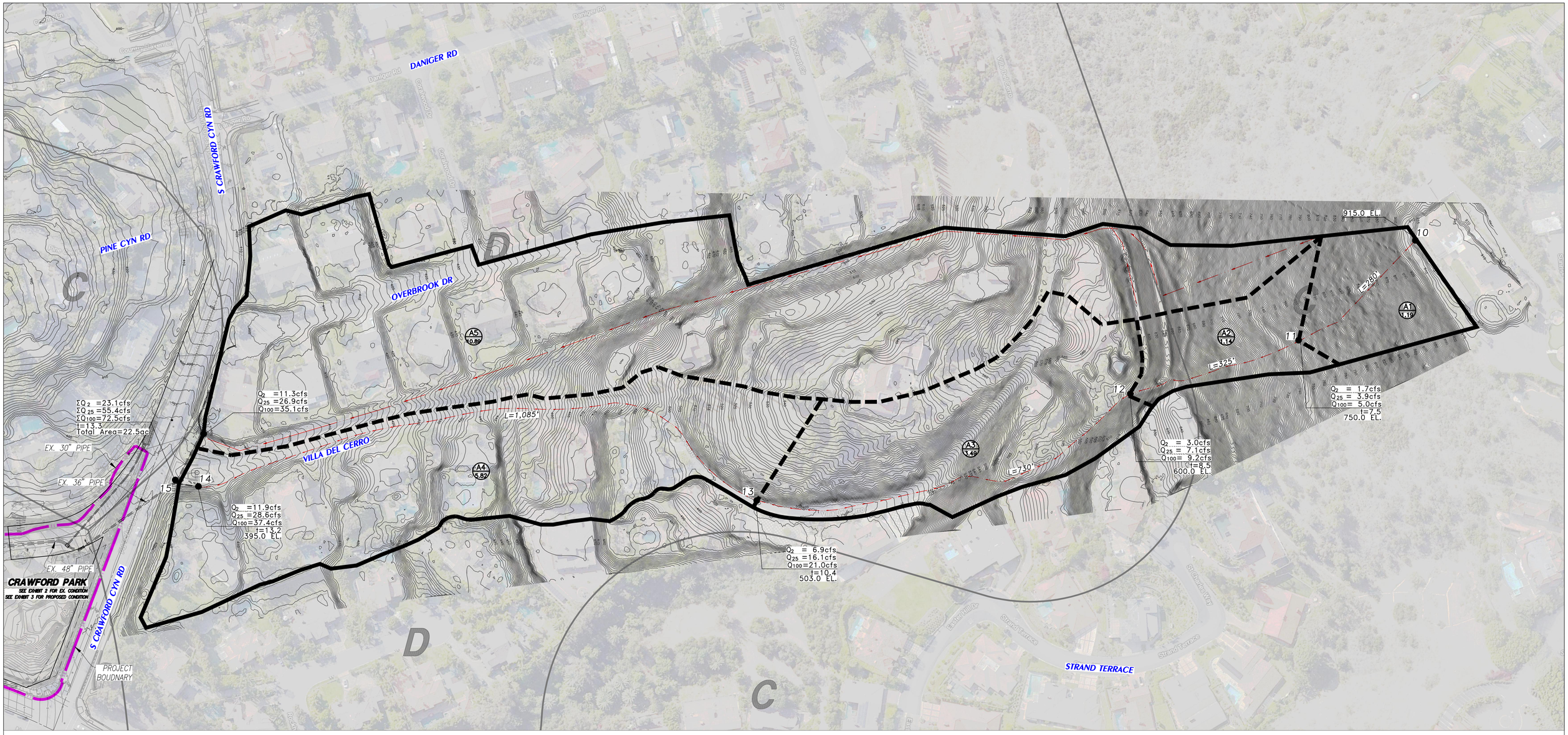
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      103.61    8.26    4.642  0.23( 0.16) 0.70      25.5      30.00
      1      109.87    9.97    4.167  0.23( 0.16) 0.70      30.3      20.00
      1      110.85   13.27    3.537  0.23( 0.16) 0.71      36.4      10.00
      2        2.69   10.44    4.057  0.30( 0.25) 0.85       0.8      40.00

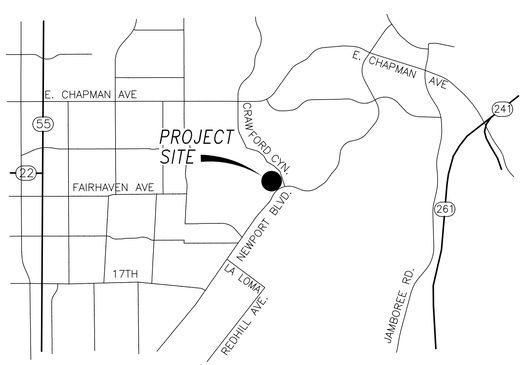
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      106.06    8.26    4.642  0.24( 0.17) 0.71      26.1      30.00
      2      112.51    9.97    4.167  0.23( 0.16) 0.70      31.0      20.00
      3      112.70   10.44    4.057  0.23( 0.16) 0.70      31.9      40.00
      4      113.17   13.27    3.537  0.23( 0.16) 0.71      37.1      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     113.17    Tc(MIN.) =    13.27
  EFFECTIVE AREA(ACRES) =      37.13   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =       37.1
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       37.1  TC(MIN.) =     13.27
  EFFECTIVE AREA(ACRES) =     37.13  AREA-AVERAGED Fm(INCH/HR)=  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap = 0.709
  PEAK FLOW RATE(CFS)   =     113.17

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      106.06    8.26    4.642  0.24( 0.17) 0.71      26.1      30.00
      2      112.51    9.97    4.167  0.23( 0.16) 0.70      31.0      20.00
      3      112.70   10.44    4.057  0.23( 0.16) 0.70      31.9      40.00
      4      113.17   13.27    3.537  0.23( 0.16) 0.71      37.1      10.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```




LOCATION MAP

PREPARED FOR:

OCparks

PREPARED BY:

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

SCALE: 1" =80'

80 40 0 80 160 240

GRAPHIC SCALE 1"= 80'

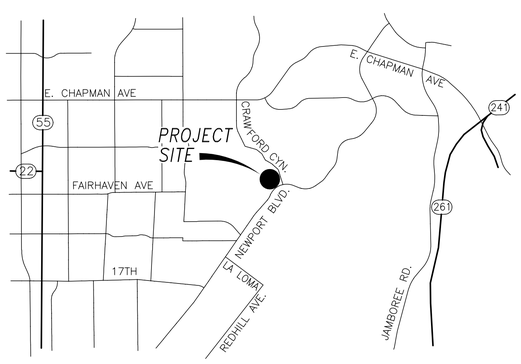
## LEGEND

- PROJECT BOUNDARY
- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- FLOW LINE WITH DIRECTION
- 100 — NODE NUMBER
- A / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q100=9.0cfs t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- ΣQ100=10.0cfs t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- EXISTING STORM DRAIN
- C / D — SOIL GROUP BOUNDARY

# EXHIBIT 1
# OFF-SITE HYDROLOGY MAP
# CRAWFORD PARK
# S. CRAWFORD CANYON RD. & NEWPORT BLVD.
# TUSTIN, CALIFORNIA 92782

HYDROLOGY MAP FOR CRAWFORD PARK – OFF-SITE

PLOTTED BY: Gary Guan DATE: Nov. 13, 2020 08:16:49 PM FILE: F:\1140\Engineering\SY_Hydrology\Crawford Park Existing Hydrology – Offsite.dwg




LOCATION MAP

PREPARED FOR:

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Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

SCALE: 1" =50'

50 25 0 50 100 150

GRAPHIC SCALE 1"= 50'

## LEGEND

- PROJECT BOUNDARY
- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- FLOW LINE WITH DIRECTION
- 100 — NODE NUMBER
- A / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q100=8.0cfs t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- ΣQ100=10.0cfs t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- EXISTING STORM DRAIN
- C / D — SOIL GROUP BOUNDARY

# EXHIBIT 2
# EXISTING CONDITION HYDROLOGY MAP (ONSITE)
# CRAWFORD PARK
# S. CRAWFORD CANYON RD. & NEWPORT BLVD.
# TUSTIN, CALIFORNIA 92782

HYDROLOGY MAP FOR CRAWFORD PARK – ON-SITE

PLOTTED BY: Gary Guan DATE: Nov. 15, 2020 07:28:11 PM FILE: F:\1140\Engineering\SY_Hydrology\Crawford Park Existing Hydrology – Onsite.dwg

# SECTION III
# PROPOSED CONDITION HYDROLOGY CALCULATIONS &MAP

# A. 2-YEAR STORM

```
____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Crawford Park                                        *
* Proposed Condition                                                       *
* 2-year Storm                                                             *
 ****************************************************************************

  FILE NAME: CPPR.DAT
  TIME/DATE OF STUDY: 15:44 11/14/2020
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    750.00
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.475
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.797
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.19      0.25     1.000    59    7.47
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.66
  TOTAL AREA(ACRES) =      1.19   PEAK FLOW RATE(CFS) =      1.66

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    750.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.4615
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.66
  FLOW VELOCITY(FEET/SEC) =   5.24 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.03   Tc(MIN.) =    8.51
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.51
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.668
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.90      0.25     1.000    59
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.24      0.20     1.000    67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    1.47
  EFFECTIVE AREA(ACRES) =      2.33   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       2.98

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  600.00  DOWNSTREAM ELEVATION(FEET) =  503.00
```

```
  STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    4.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.62
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =   10.35
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.491
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        3.49      0.20     0.700    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    3.49      SUBAREA RUNOFF(CFS) =    4.24
  EFFECTIVE AREA(ACRES) =      5.82    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.82
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =       6.85

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   5.91
  FLOW VELOCITY(FEET/SEC.) =  6.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1335.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  395.00
  STREET LENGTH(FEET) =  1085.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.09
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.95
  STREET FLOW TRAVEL TIME(MIN.) =   2.85   Tc(MIN.) =   13.20
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.296
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        5.82      0.20     0.700    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    5.82      SUBAREA RUNOFF(CFS) =    6.06
  EFFECTIVE AREA(ACRES) =     11.64    AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      11.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.91
  FLOW VELOCITY(FEET/SEC.) =  6.59   DEPTH*VELOCITY(FT*FT/SEC.) =   2.12
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.90
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   13.28
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    2465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.28
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.292
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D       10.89      0.20     0.700    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =   10.89      SUBAREA RUNOFF(CFS) =   11.29
  EFFECTIVE AREA(ACRES) =     22.53   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      23.14

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.58
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.14
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   13.49
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.49
  RAINFALL INTENSITY(INCH/HR) =   1.28
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =      22.53
  TOTAL STREAM AREA(ACRES) =      22.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.14

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    436.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.036
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.861
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        1.17      0.25     0.700    50    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  436.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   625.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    5.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.36
  STREET FLOW TRAVEL TIME(MIN.) =   1.99   Tc(MIN.) =    9.03
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.613
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        0.65      0.25     0.700    50
  COMMERCIAL                 C        0.30      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.511
  SUBAREA AREA(ACRES) =    0.95      SUBAREA RUNOFF(CFS) =    1.27
  EFFECTIVE AREA(ACRES) =      2.12    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       2.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   6.03
  FLOW VELOCITY(FEET/SEC.) =  5.37   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   385.00  DOWNSTREAM(FEET) =   374.00
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.41
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.78
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    9.35
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.35
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.581
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                C        0.14      0.25     0.850    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.17
  EFFECTIVE AREA(ACRES) =      2.26   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       2.90

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   374.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.24
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.90
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.41
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.41
  RAINFALL INTENSITY(INCH/HR) =   1.57
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.63
  EFFECTIVE STREAM AREA(ACRES) =       2.26
  TOTAL STREAM AREA(ACRES) =       2.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.90

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.14   13.49    1.281  0.21( 0.15) 0.73      22.5      10.00
      2        2.90    9.41    1.575  0.25( 0.16) 0.63       2.3      20.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.24    9.41    1.575  0.21( 0.15) 0.72      18.0      20.00
      2       25.44   13.49    1.281  0.21( 0.15) 0.72      24.8      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.44    Tc(MIN.) =    13.49
  EFFECTIVE AREA(ACRES) =      24.79   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       24.8
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   371.00  DOWNSTREAM(FEET) =   367.00
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.78
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.44
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   13.62
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    2815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.62
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.274
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.33      0.30     0.600    36
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        3.00      0.25     0.600    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.33      SUBAREA RUNOFF(CFS) =    3.36
  EFFECTIVE AREA(ACRES) =     28.12   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.71
```

```
  TOTAL AREA(ACRES) =       28.1       PEAK FLOW RATE(CFS) =      28.39

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   347.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.83
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.39
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   14.16
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    3295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.16
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.246
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    36
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        0.50      0.25     0.600    50
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.16      0.20     0.600    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    4.66      SUBAREA RUNOFF(CFS) =    4.60
  EFFECTIVE AREA(ACRES) =     32.78   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       32.8       PEAK FLOW RATE(CFS) =      32.28

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     37.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0286
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.238
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.12      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      32.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.16
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   0.14
  Tc(MIN.) =   14.30
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.11
  EFFECTIVE AREA(ACRES) =     32.90     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.22  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =       32.9         PEAK FLOW RATE(CFS) =      32.28
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   8.15
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     37.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.30
  RAINFALL INTENSITY(INCH/HR) =   1.24
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =      32.90
  TOTAL STREAM AREA(ACRES) =      32.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.28

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    393.00  DOWNSTREAM(FEET) =    381.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.378
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.171
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.12      0.20     0.100    57    5.38
  PUBLIC PARK                D        0.14      0.20     0.850    57    8.54
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.504
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    381.00  DOWNSTREAM(FEET) =    374.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.985
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.07      0.30     0.100    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.67
  AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   0.91
  Tc(MIN.) =    6.29
  SUBAREA AREA(ACRES) =     0.07       SUBAREA RUNOFF(CFS) =    0.12
  EFFECTIVE AREA(ACRES) =      0.33     AREA-AVERAGED Fm(INCH/HR) =   0.09
  AREA-AVERAGED Fp(INCH/HR) =   0.21  AREA-AVERAGED Ap =   0.42
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       0.56

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   3.55
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    374.00  DOWNSTREAM(FEET) =    371.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    65.00   CHANNEL SLOPE =  0.0462
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.947
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    36
  PUBLIC PARK                B        0.84      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.770
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.29
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.05
  AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   0.21
  Tc(MIN.) =    6.50
  SUBAREA AREA(ACRES) =     0.94       SUBAREA RUNOFF(CFS) =    1.45
  EFFECTIVE AREA(ACRES) =      1.27     AREA-AVERAGED Fm(INCH/HR) =   0.19
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.68
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       2.00

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   5.50
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    371.00  DOWNSTREAM(FEET) =    367.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    90.00   CHANNEL SLOPE =  0.0444
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.872
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.32      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.28
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   0.46
  Tc(MIN.) =    6.96
  SUBAREA AREA(ACRES) =     0.32       SUBAREA RUNOFF(CFS) =    0.47
  EFFECTIVE AREA(ACRES) =      1.59     AREA-AVERAGED Fm(INCH/HR) =   0.21
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.71
  TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =       2.39

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   3.36
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     34.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    367.00  DOWNSTREAM(FEET) =    357.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   230.00   CHANNEL SLOPE =  0.0430
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.721
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.65      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.81
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.49
  AVERAGE FLOW DEPTH(FEET) =   0.40   TRAVEL TIME(MIN.) =   1.10
  Tc(MIN.) =    8.06
  SUBAREA AREA(ACRES) =     0.65       SUBAREA RUNOFF(CFS) =    0.86
  EFFECTIVE AREA(ACRES) =      2.24     AREA-AVERAGED Fm(INCH/HR) =   0.22
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.75
```

```
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       3.03

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =   3.52
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   357.10  DOWNSTREAM(FEET) =   356.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.03
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    8.33
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     36.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.33
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.689
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.10      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    1.10      SUBAREA RUNOFF(CFS) =    1.42
  EFFECTIVE AREA(ACRES) =      3.34   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.78
  TOTAL AREA(ACRES) =        3.3       PEAK FLOW RATE(CFS) =       4.38

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   356.50  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.38
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.39
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     37.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.39
  RAINFALL INTENSITY(INCH/HR) =   1.68
  AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.78
  EFFECTIVE STREAM AREA(ACRES) =       3.34
  TOTAL STREAM AREA(ACRES) =       3.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       31.83   10.23    1.501  0.22( 0.15) 0.68      26.1      20.00
      1       32.28   14.30    1.238  0.22( 0.15) 0.69      32.9      10.00
      2        4.38    8.39    1.682  0.30( 0.23) 0.78       3.3      30.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       33.98    8.39    1.682  0.23( 0.16) 0.70      24.7      30.00
      2       35.66   10.23    1.501  0.23( 0.16) 0.69      29.4      20.00
      3       35.32   14.30    1.238  0.23( 0.16) 0.70      36.2      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.66    Tc(MIN.) =    10.23
  EFFECTIVE AREA(ACRES) =      29.43   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       36.2
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     37.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0218
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.453
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.41      0.30     0.850    36
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      35.88
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.79
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   0.59
  Tc(MIN.) =   10.82
  SUBAREA AREA(ACRES) =     0.41       SUBAREA RUNOFF(CFS) =    0.44
  EFFECTIVE AREA(ACRES) =     29.84     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.23  AREA-AVERAGED Ap =   0.70
  TOTAL AREA(ACRES) =       36.6         PEAK FLOW RATE(CFS) =      35.66
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   7.75
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.82
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.453
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.22      0.30     0.100    36
  PUBLIC PARK                B        0.26      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.506
  SUBAREA AREA(ACRES) =    0.48      SUBAREA RUNOFF(CFS) =    0.56
  EFFECTIVE AREA(ACRES) =     30.32   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =      35.66
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       37.1  TC(MIN.) =     10.82
  EFFECTIVE AREA(ACRES) =     30.32  AREA-AVERAGED Fm(INCH/HR)=  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap = 0.693
  PEAK FLOW RATE(CFS)   =      35.66

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       33.98    8.99    1.617  0.24( 0.16) 0.70      25.6      30.00
      2       35.66   10.82    1.453  0.23( 0.16) 0.69      30.3      20.00
      3       35.32   14.89    1.210  0.23( 0.16) 0.70      37.1      10.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

## B. 25-YEAR STORM

```
____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Crawford Park                                        *
* Proposed Condition                                                       *
* 25-year Storm                                                            *
 ****************************************************************************

  FILE NAME: CPPR.DAT
  TIME/DATE OF STUDY: 15:45 11/14/2020
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    750.00
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.475
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.842
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.19      0.25     1.000    77    7.47
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.85
  TOTAL AREA(ACRES) =      1.19   PEAK FLOW RATE(CFS) =      3.85

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    750.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.4615
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.85
  FLOW VELOCITY(FEET/SEC) =   6.28 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.86   Tc(MIN.) =    8.34
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.34
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.612
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.90      0.25     1.000    77
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.24      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    3.46
  EFFECTIVE AREA(ACRES) =      2.33   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       7.06

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  600.00  DOWNSTREAM ELEVATION(FEET) =  503.00
```

```
  STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.64   Tc(MIN.) =    9.98
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.263
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        3.49      0.20     0.700    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    3.49      SUBAREA RUNOFF(CFS) =    9.81
  EFFECTIVE AREA(ACRES) =      5.82    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.82
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      16.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.66
  FLOW VELOCITY(FEET/SEC.) =  7.86   DEPTH*VELOCITY(FT*FT/SEC.) =   2.63
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1335.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  395.00
  STREET LENGTH(FEET) =  1085.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      23.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.64
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.91
  STREET FLOW TRAVEL TIME(MIN.) =   2.37   Tc(MIN.) =   12.34
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.892
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        5.82      0.20     0.700    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    5.82      SUBAREA RUNOFF(CFS) =   14.42
  EFFECTIVE AREA(ACRES) =     11.64    AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      28.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.40
  FLOW VELOCITY(FEET/SEC.) =  7.96   DEPTH*VELOCITY(FT*FT/SEC.) =   3.20
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.79
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.61
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   12.41
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    2465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.41
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.884
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D       10.89      0.20     0.700    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =   10.89      SUBAREA RUNOFF(CFS) =   26.89
  EFFECTIVE AREA(ACRES) =     22.53   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      55.42

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.20
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      55.42
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   12.57
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.57
  RAINFALL INTENSITY(INCH/HR) =   2.86
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =      22.53
  TOTAL STREAM AREA(ACRES) =      22.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      55.42

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    436.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.036
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.976
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        1.17      0.25     0.700    69    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      4.00
  TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      4.00

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  436.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   625.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.93
  STREET FLOW TRAVEL TIME(MIN.) =   1.74   Tc(MIN.) =    8.78
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.507
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        0.65      0.25     0.700    69
  COMMERCIAL                 C        0.30      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.511
  SUBAREA AREA(ACRES) =    0.95      SUBAREA RUNOFF(CFS) =    2.89
  EFFECTIVE AREA(ACRES) =      2.12    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       6.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =   9.72
  FLOW VELOCITY(FEET/SEC.) =  6.17   DEPTH*VELOCITY(FT*FT/SEC.) =   2.07
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   385.00  DOWNSTREAM(FEET) =   374.00
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.94
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.40
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    9.03
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.03
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.452
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                C        0.14      0.25     0.850    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.41
  EFFECTIVE AREA(ACRES) =      2.26   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       6.70

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   374.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.02
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.70
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.08
  RAINFALL INTENSITY(INCH/HR) =   3.44
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.63
  EFFECTIVE STREAM AREA(ACRES) =       2.26
  TOTAL STREAM AREA(ACRES) =       2.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.70

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       55.42   12.57    2.862  0.21( 0.15) 0.73      22.5      10.00
      2        6.70    9.08    3.441  0.25( 0.16) 0.63       2.3      20.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       55.27    9.08    3.441  0.21( 0.15) 0.72      18.5      20.00
      2       60.94   12.57    2.862  0.21( 0.15) 0.72      24.8      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      60.94    Tc(MIN.) =    12.57
  EFFECTIVE AREA(ACRES) =      24.79   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       24.8
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   371.00  DOWNSTREAM(FEET) =   367.00
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.25
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.94
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   12.68
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    2815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.68
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.849
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.33      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        3.00      0.25     0.600    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.33      SUBAREA RUNOFF(CFS) =    8.08
  EFFECTIVE AREA(ACRES) =     28.12   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.71
```

```
  TOTAL AREA(ACRES) =       28.1       PEAK FLOW RATE(CFS) =      68.26

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   347.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.61
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.26
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   13.11
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    3295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.11
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.795
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        0.50      0.25     0.600    69
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.16      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    4.66      SUBAREA RUNOFF(CFS) =   11.10
  EFFECTIVE AREA(ACRES) =     32.78   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       32.8       PEAK FLOW RATE(CFS) =      78.01

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     37.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0286
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.783
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.12      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      78.15
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.20
  AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   0.10
  Tc(MIN.) =   13.21
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.27
  EFFECTIVE AREA(ACRES) =     32.90     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.22  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =       32.9         PEAK FLOW RATE(CFS) =      78.01
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.62   FLOW VELOCITY(FEET/SEC.) =  11.18
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     37.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.21
  RAINFALL INTENSITY(INCH/HR) =   2.78
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =      32.90
  TOTAL STREAM AREA(ACRES) =      32.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      78.01

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    393.00  DOWNSTREAM(FEET) =    381.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.378
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.629
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.12      0.20     0.100    75    5.38
  PUBLIC PARK                D        0.14      0.20     0.850    75    8.54
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.504
  SUBAREA RUNOFF(CFS) =      1.06
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.06

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    381.00  DOWNSTREAM(FEET) =    374.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.294
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.07      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.19
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.37
  AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   0.76
  Tc(MIN.) =    6.14
  SUBAREA AREA(ACRES) =     0.07       SUBAREA RUNOFF(CFS) =    0.27
  EFFECTIVE AREA(ACRES) =      0.33     AREA-AVERAGED Fm(INCH/HR) =   0.09
  AREA-AVERAGED Fp(INCH/HR) =   0.21  AREA-AVERAGED Ap =   0.42
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.25

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   4.36
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    374.00  DOWNSTREAM(FEET) =    371.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    65.00   CHANNEL SLOPE =  0.0462
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.226
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.84      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.770
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.94
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.12
  AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =   0.18
  Tc(MIN.) =    6.32
  SUBAREA AREA(ACRES) =     0.94       SUBAREA RUNOFF(CFS) =    3.38
  EFFECTIVE AREA(ACRES) =      1.27     AREA-AVERAGED Fm(INCH/HR) =   0.19
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.68
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       4.61

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   6.77
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    371.00  DOWNSTREAM(FEET) =    367.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    90.00   CHANNEL SLOPE =  0.0444
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.094
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.32      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.16
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.12
  AVERAGE FLOW DEPTH(FEET) =   0.50   TRAVEL TIME(MIN.) =   0.36
  Tc(MIN.) =    6.68
  SUBAREA AREA(ACRES) =     0.32       SUBAREA RUNOFF(CFS) =    1.11
  EFFECTIVE AREA(ACRES) =      1.59     AREA-AVERAGED Fm(INCH/HR) =   0.21
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.71
  TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =       5.56

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.52   FLOW VELOCITY(FEET/SEC.) =   4.18
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     34.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    367.00  DOWNSTREAM(FEET) =    357.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   230.00   CHANNEL SLOPE =  0.0430
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.814
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.65      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.61
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.30
  AVERAGE FLOW DEPTH(FEET) =   0.55   TRAVEL TIME(MIN.) =   0.89
  Tc(MIN.) =    7.57
  SUBAREA AREA(ACRES) =     0.65       SUBAREA RUNOFF(CFS) =    2.08
  EFFECTIVE AREA(ACRES) =      2.24     AREA-AVERAGED Fm(INCH/HR) =   0.22
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.75
```

```
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       7.25

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   4.38
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   357.10  DOWNSTREAM(FEET) =   356.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.25
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    7.79
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     36.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.79
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.753
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.10      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    1.10      SUBAREA RUNOFF(CFS) =    3.46
  EFFECTIVE AREA(ACRES) =      3.34   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.78
  TOTAL AREA(ACRES) =        3.3       PEAK FLOW RATE(CFS) =      10.59

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   356.50  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.59
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.84
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     37.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.84
  RAINFALL INTENSITY(INCH/HR) =   3.74
  AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.78
  EFFECTIVE STREAM AREA(ACRES) =       3.34
  TOTAL STREAM AREA(ACRES) =       3.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.59

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       75.86    9.73    3.309  0.22( 0.15) 0.68      26.6      20.00
      1       78.01   13.21    2.783  0.22( 0.15) 0.69      32.9      10.00
      2       10.59    7.84    3.740  0.30( 0.23) 0.78       3.3      30.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       80.02    7.84    3.740  0.23( 0.16) 0.70      24.8      30.00
      2       85.14    9.73    3.309  0.23( 0.16) 0.69      30.0      20.00
      3       85.71   13.21    2.783  0.23( 0.16) 0.70      36.2      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      85.71    Tc(MIN.) =    13.21
  EFFECTIVE AREA(ACRES) =      36.24   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       36.2
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     37.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0218
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.733
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.41      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      86.17
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.59
  AVERAGE FLOW DEPTH(FEET) =   0.71   TRAVEL TIME(MIN.) =   0.43
  Tc(MIN.) =   13.65
  SUBAREA AREA(ACRES) =     0.41       SUBAREA RUNOFF(CFS) =    0.91
  EFFECTIVE AREA(ACRES) =     36.65     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.23  AREA-AVERAGED Ap =   0.70
  TOTAL AREA(ACRES) =       36.6         PEAK FLOW RATE(CFS) =      85.71
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.71   FLOW VELOCITY(FEET/SEC.) =  10.63
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.65
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.733
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.22      0.30     0.100    56
  PUBLIC PARK                B        0.26      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.506
  SUBAREA AREA(ACRES) =    0.48      SUBAREA RUNOFF(CFS) =    1.11
  EFFECTIVE AREA(ACRES) =     37.13   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =      85.97
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       37.1  TC(MIN.) =     13.65
  EFFECTIVE AREA(ACRES) =     37.13  AREA-AVERAGED Fm(INCH/HR)=  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap = 0.700
  PEAK FLOW RATE(CFS)   =      85.97

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       80.03    8.28    3.626  0.24( 0.16) 0.70      25.7      30.00
      2       85.21   10.16    3.228  0.23( 0.16) 0.69      30.9      20.00
      3       85.97   13.65    2.733  0.23( 0.16) 0.70      37.1      10.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

## C. 100-YEAR STORM

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* Hydrology Study for Crawford Park                                      *
* Proposed Condition                                                     *
* 100-year Storm                                                         *
 ************************************************************************

  FILE NAME: CPPR.DAT
  TIME/DATE OF STUDY: 15:45 11/14/2020
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    750.00
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.475
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.914
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.19      0.25     1.000    92    7.47
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      5.00
  TOTAL AREA(ACRES) =      1.19   PEAK FLOW RATE(CFS) =      5.00

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    750.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.4615
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       5.00
  FLOW VELOCITY(FEET/SEC) =   6.67 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.81   Tc(MIN.) =    8.29
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.29
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.632
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.90      0.25     1.000    92
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.24      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    4.51
  EFFECTIVE AREA(ACRES) =      2.33   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       9.20

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  600.00  DOWNSTREAM ELEVATION(FEET) =  503.00
```

```
  STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.60
  STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =    9.84
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.198
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        3.49      0.20     0.700    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    3.49      SUBAREA RUNOFF(CFS) =   12.75
  EFFECTIVE AREA(ACRES) =      5.82    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.82
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      21.03

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.90
  FLOW VELOCITY(FEET/SEC.) =  8.38   DEPTH*VELOCITY(FT*FT/SEC.) =   2.99
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1335.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  395.00
  STREET LENGTH(FEET) =  1085.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      30.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    8.13
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.31
  STREET FLOW TRAVEL TIME(MIN.) =   2.22   Tc(MIN.) =   12.06
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.735
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        5.82      0.20     0.700    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    5.82      SUBAREA RUNOFF(CFS) =   18.83
  EFFECTIVE AREA(ACRES) =     11.64    AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      37.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.96
  FLOW VELOCITY(FEET/SEC.) =  8.54   DEPTH*VELOCITY(FT*FT/SEC.) =   3.67
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.66
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.44
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   12.12
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    2465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.12
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.725
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D       10.89      0.20     0.700    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =   10.89      SUBAREA RUNOFF(CFS) =   35.13
  EFFECTIVE AREA(ACRES) =     22.53   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      72.47

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.96
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      72.47
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   12.28
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.28
  RAINFALL INTENSITY(INCH/HR) =   3.70
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =      22.53
  TOTAL STREAM AREA(ACRES) =      22.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      72.47

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    436.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.036
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.087
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        1.17      0.25     0.700    86    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      5.17
  TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      5.17

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  436.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   625.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.12
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.18
  STREET FLOW TRAVEL TIME(MIN.) =   1.64   Tc(MIN.) =    8.67
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.513
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        0.65      0.25     0.700    86
  COMMERCIAL                 C        0.30      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.511
  SUBAREA AREA(ACRES) =    0.95      SUBAREA RUNOFF(CFS) =    3.75
  EFFECTIVE AREA(ACRES) =      2.12    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       8.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.98
  FLOW VELOCITY(FEET/SEC.) =  6.55   DEPTH*VELOCITY(FT*FT/SEC.) =   2.35
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   385.00  DOWNSTREAM(FEET) =   374.00
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.83
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.32
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    8.91
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.91
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.444
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                C        0.14      0.25     0.850    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.53
  EFFECTIVE AREA(ACRES) =      2.26   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       8.72

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   374.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.00
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.72
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.95
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.95
  RAINFALL INTENSITY(INCH/HR) =   4.43
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.63
  EFFECTIVE STREAM AREA(ACRES) =       2.26
  TOTAL STREAM AREA(ACRES) =       2.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.72

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       72.47   12.28    3.698  0.21( 0.15) 0.73      22.5      10.00
      2        8.72    8.95    4.431  0.25( 0.16) 0.63       2.3      20.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       72.50    8.95    4.431  0.21( 0.15) 0.72      18.7      20.00
      2       79.69   12.28    3.698  0.21( 0.15) 0.72      24.8      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      79.69    Tc(MIN.) =    12.28
  EFFECTIVE AREA(ACRES) =      24.79   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       24.8
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   371.00  DOWNSTREAM(FEET) =   367.00
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.43
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      79.69
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   12.38
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    2815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.681
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.33      0.30     0.600    76
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        3.00      0.25     0.600    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.33      SUBAREA RUNOFF(CFS) =   10.57
  EFFECTIVE AREA(ACRES) =     28.12   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.71
```

```
  TOTAL AREA(ACRES) =       28.1       PEAK FLOW RATE(CFS) =      89.32

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   347.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.88
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      89.32
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   12.78
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    3295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.78
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.614
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    76
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        0.50      0.25     0.600    86
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.16      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    4.66      SUBAREA RUNOFF(CFS) =   14.53
  EFFECTIVE AREA(ACRES) =     32.78   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       32.8       PEAK FLOW RATE(CFS) =     102.16

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     37.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0286
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.599
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.12      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     102.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.28
  AVERAGE FLOW DEPTH(FEET) =   0.73   TRAVEL TIME(MIN.) =   0.10
  Tc(MIN.) =   12.87
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.36
  EFFECTIVE AREA(ACRES) =     32.90     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.22  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =       32.9         PEAK FLOW RATE(CFS) =     102.16
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.73   FLOW VELOCITY(FEET/SEC.) =  12.26
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     37.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.87
  RAINFALL INTENSITY(INCH/HR) =   3.60
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =      32.90
  TOTAL STREAM AREA(ACRES) =      32.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     102.16

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    393.00  DOWNSTREAM(FEET) =    381.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.378
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.934
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.12      0.20     0.100    91    5.38
  PUBLIC PARK                D        0.14      0.20     0.850    91    8.54
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.504
  SUBAREA RUNOFF(CFS) =      1.36
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.36

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    381.00  DOWNSTREAM(FEET) =    374.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.525
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.07      0.30     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.54
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.67
  AVERAGE FLOW DEPTH(FEET) =   0.26   TRAVEL TIME(MIN.) =   0.71
  Tc(MIN.) =    6.09
  SUBAREA AREA(ACRES) =     0.07       SUBAREA RUNOFF(CFS) =    0.35
  EFFECTIVE AREA(ACRES) =      0.33     AREA-AVERAGED Fm(INCH/HR) =   0.09
  AREA-AVERAGED Fp(INCH/HR) =   0.21  AREA-AVERAGED Ap =   0.42
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.26   FLOW VELOCITY(FEET/SEC.) =   4.70
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    374.00  DOWNSTREAM(FEET) =    371.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    65.00   CHANNEL SLOPE =  0.0462
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.442
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    76
  PUBLIC PARK                B        0.84      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.770
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.82
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.59
  AVERAGE FLOW DEPTH(FEET) =   0.34   TRAVEL TIME(MIN.) =   0.16
  Tc(MIN.) =    6.26
  SUBAREA AREA(ACRES) =     0.94       SUBAREA RUNOFF(CFS) =    4.41
  EFFECTIVE AREA(ACRES) =      1.27     AREA-AVERAGED Fm(INCH/HR) =   0.19
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.68
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       6.00

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =   7.24
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    371.00  DOWNSTREAM(FEET) =    367.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    90.00   CHANNEL SLOPE =  0.0444
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.278
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.32      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.72
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.38
  AVERAGE FLOW DEPTH(FEET) =   0.55   TRAVEL TIME(MIN.) =   0.34
  Tc(MIN.) =    6.60
  SUBAREA AREA(ACRES) =     0.32       SUBAREA RUNOFF(CFS) =    1.45
  EFFECTIVE AREA(ACRES) =      1.59     AREA-AVERAGED Fm(INCH/HR) =   0.21
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.71
  TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =       7.26

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.57   FLOW VELOCITY(FEET/SEC.) =   4.48
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     34.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    367.00  DOWNSTREAM(FEET) =    357.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   230.00   CHANNEL SLOPE =  0.0430
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.930
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.65      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.59
  AVERAGE FLOW DEPTH(FEET) =   0.61   TRAVEL TIME(MIN.) =   0.84
  Tc(MIN.) =    7.43
  SUBAREA AREA(ACRES) =     0.65       SUBAREA RUNOFF(CFS) =    2.73
  EFFECTIVE AREA(ACRES) =      2.24     AREA-AVERAGED Fm(INCH/HR) =   0.22
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.75
```

```
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       9.49

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.64   FLOW VELOCITY(FEET/SEC.) =   4.69
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   357.10  DOWNSTREAM(FEET) =   356.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.19
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.49
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    7.64
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     36.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.64
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.854
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.10      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    1.10      SUBAREA RUNOFF(CFS) =    4.55
  EFFECTIVE AREA(ACRES) =      3.34   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.78
  TOTAL AREA(ACRES) =        3.3       PEAK FLOW RATE(CFS) =      13.90

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   356.50  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.90
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.68
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     37.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.68
  RAINFALL INTENSITY(INCH/HR) =   4.84
  AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.78
  EFFECTIVE STREAM AREA(ACRES) =       3.34
  TOTAL STREAM AREA(ACRES) =       3.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.90

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       99.44    9.56    4.268  0.22( 0.15) 0.68      26.8      20.00
      1      102.16   12.87    3.599  0.22( 0.15) 0.69      32.9      10.00
      2       13.90    7.68    4.838  0.30( 0.23) 0.78       3.3      30.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      104.86    7.68    4.838  0.23( 0.16) 0.70      24.9      30.00
      2      111.62    9.56    4.268  0.23( 0.16) 0.70      30.1      20.00
      3      112.31   12.87    3.599  0.23( 0.16) 0.70      36.2      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     112.31    Tc(MIN.) =    12.87
  EFFECTIVE AREA(ACRES) =      36.24   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       36.2
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     37.00 =    3365.00 FEET.

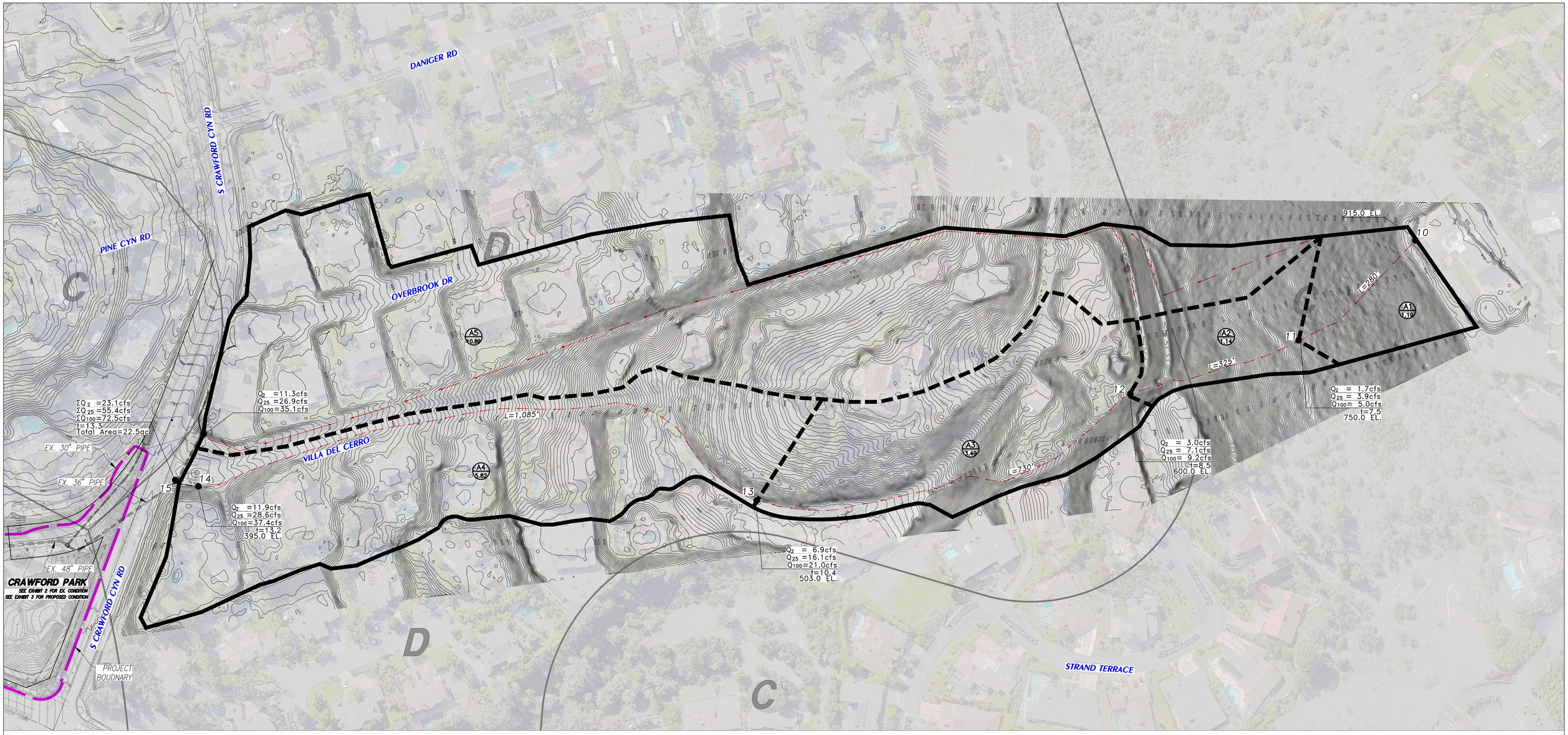
****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0218
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.537
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.41      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

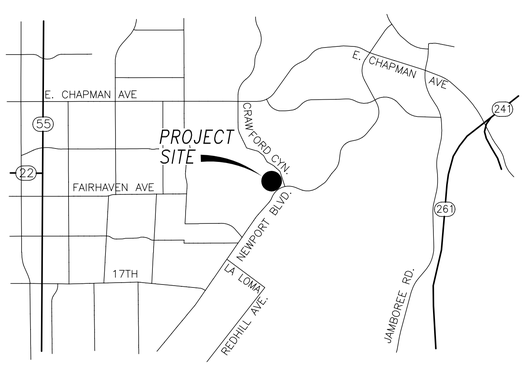
```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     112.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.60
  AVERAGE FLOW DEPTH(FEET) =   0.83   TRAVEL TIME(MIN.) =   0.40
  Tc(MIN.) =   13.27
  SUBAREA AREA(ACRES) =     0.41       SUBAREA RUNOFF(CFS) =    1.21
  EFFECTIVE AREA(ACRES) =     36.65     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.23  AREA-AVERAGED Ap =   0.70
  TOTAL AREA(ACRES) =       36.6         PEAK FLOW RATE(CFS) =     112.31
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.83   FLOW VELOCITY(FEET/SEC.) =  11.63
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.27
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.537
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.22      0.30     0.100    76
  PUBLIC PARK                B        0.26      0.30     0.850    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.506
  SUBAREA AREA(ACRES) =    0.48      SUBAREA RUNOFF(CFS) =    1.46
  EFFECTIVE AREA(ACRES) =     37.13   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =     112.85
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       37.1  TC(MIN.) =     13.27
  EFFECTIVE AREA(ACRES) =     37.13  AREA-AVERAGED Fm(INCH/HR)=  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap = 0.700
  PEAK FLOW RATE(CFS)   =     112.85

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      105.13    8.09    4.698  0.24( 0.16) 0.70      25.8      30.00
      2      111.95    9.95    4.170  0.23( 0.16) 0.69      31.0      20.00
      3      112.85   13.27    3.537  0.23( 0.16) 0.70      37.1      10.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```




LOCATION MAP

PREPARED FOR:

OCparks

PREPARED BY:

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

SCALE: 1" =80'

80 40 0 80 160 240

GRAPHIC SCALE 1"= 80'

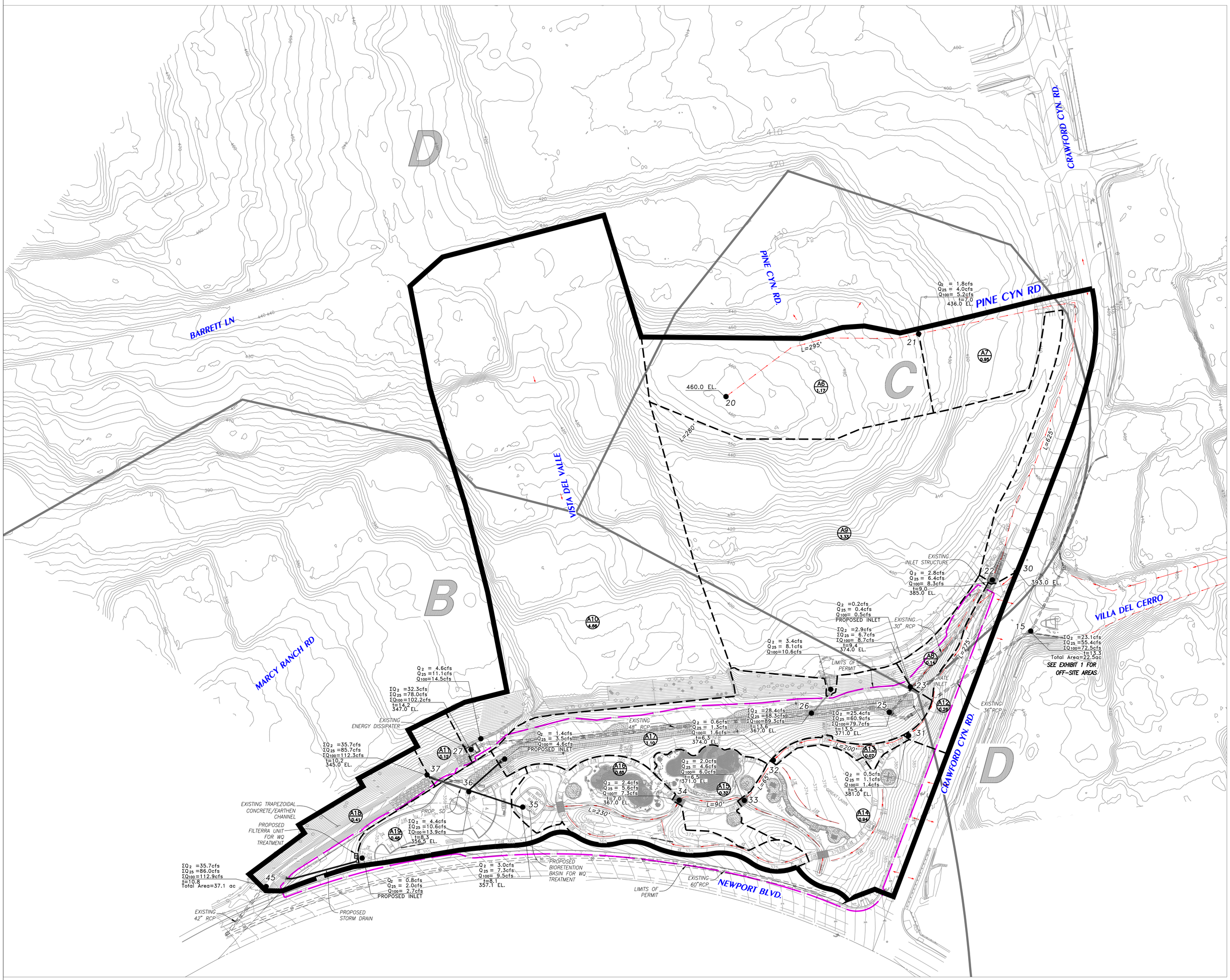
## LEGEND

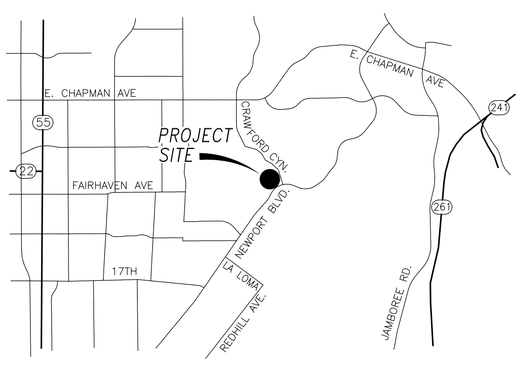
- PROJECT BOUNDARY
- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- FLOW LINE WITH DIRECTION
- 100 — NODE NUMBER
- A / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q100=9.0cfs t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- ΣQ100=10.0cfs t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- EXISTING STORM DRAIN
- C / D — SOIL GROUP BOUNDARY

# EXHIBIT 1
# OFF-SITE HYDROLOGY MAP
# CRAWFORD PARK
# S. CRAWFORD CANYON RD. & NEWPORT BLVD.
# TUSTIN, CALIFORNIA 92782

HYDROLOGY MAP FOR CRAWFORD PARK – OFF-SITE

PLOTTED BY: Gary Guan DATE: Nov. 13, 2020 08:16:49 PM FILE: F:\1140\Engineering\SY_Hydrology\Crawford Park Existing Hydrology – Offsite.dwg




LOCATION MAP

PREPARED FOR:

OCparks

PREPARED BY:

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

SCALE: 1" =50'

50 25 0 50 100 150

GRAPHIC SCALE 1"= 50'

## LEGEND

- PROJECT BOUNDARY
- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- FLOW LINE WITH DIRECTION
- 100 — NODE NUMBER
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- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- C / D — SOIL GROUP BOUNDARY

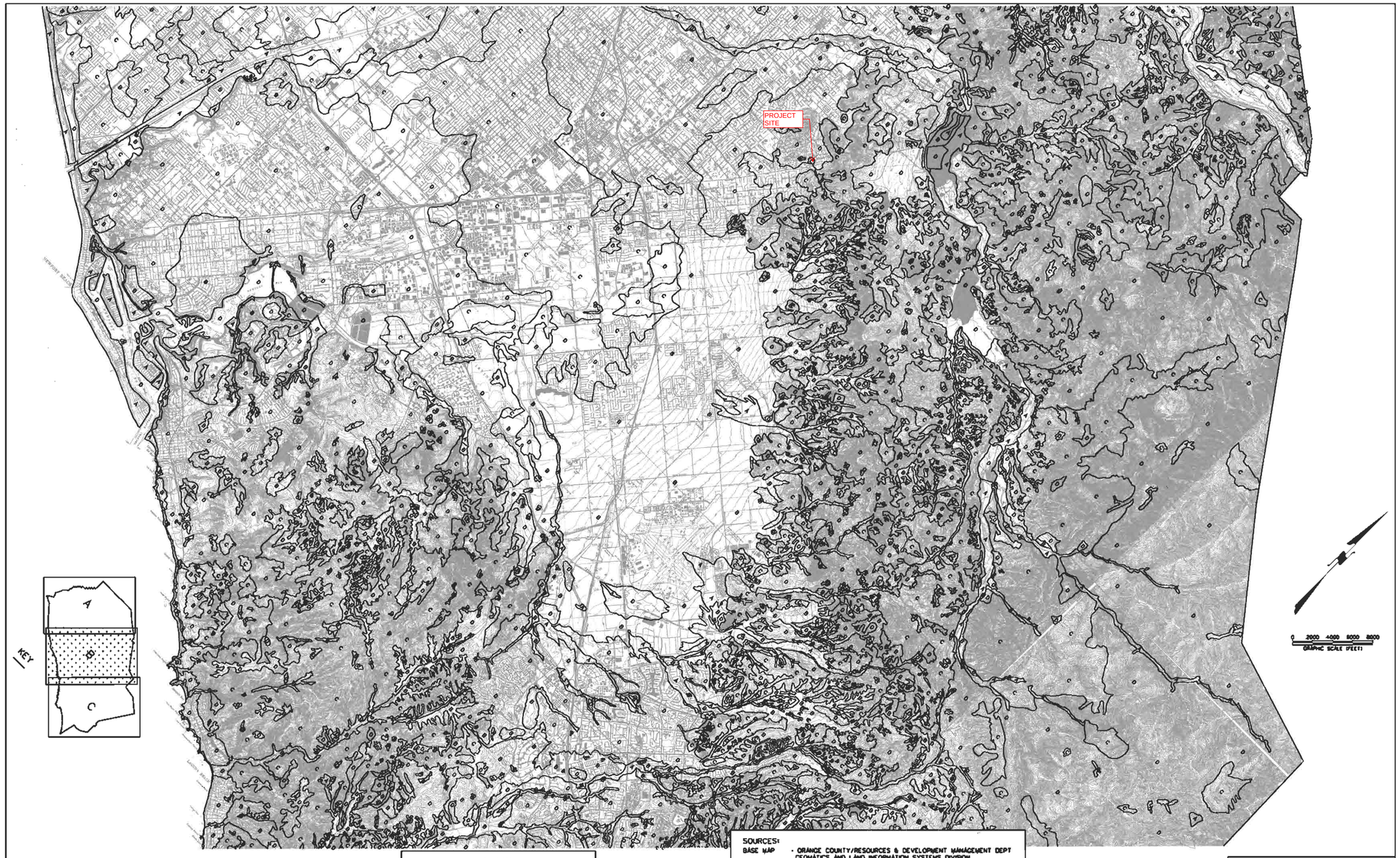
# EXHIBIT 3
# PROPOSED CONDITION HYDROLOGY MAP (ONSITE)
# CRAWFORD PARK
# S. CRAWFORD CANYON RD. & NEWPORT BLVD.
# TUSTIN, CALIFORNIA 92782

HYDROLOGY MAP FOR CRAWFORD PARK – OFF-SITE

PLOTTED BY: Gary Guan DATE: Nov. 16, 2020 09:26:20 AM FILE: F:\1140\Engineering\SY_Hydrology\Crawford Park Proposed Hydrology – Onsite.dwg

# SECTION IV
# REFERENCES

# A. HYDROLOGIC SOIL GROUP MAP




ORANGE COUNTY
HYDROLOGY MANUAL

LEGEND
A B C D HYDROLOGIC SOIL GROUPS
HYDROLOGIC SOIL GROUP BOUNDARY

SOURCES:
BASE MAP - ORANGE COUNTY/RESOURCES & DEVELOPMENT MANAGEMENT DEPT GEOMATICS AND LAND INFORMATION SYSTEMS DIVISION
SOIL GROUPS - SOIL SURVEY OF ORANGE COUNTY AND WESTERN PART OF RIVERSIDE COUNTY, CALIFORNIA, USDA, SOIL CONSERVATION SERVICE, 1978.

HYDROLOGIC CLASSIFICATION OF SOILS
ORANGE COUNTY, CALIFORNIA
PLATE B

## B. CRAWFORD CANYON ROAD DRAINAGE IMPROVEMENTS AND CONSTRUCTION PHASE 1

# OC PUBLIC WORKS

SANTA ANA, CALIFORNIA

SHANE L. SILSBY, DIRECTOR

PLANS FOR CONSTRUCTION OF

# CRAWFORD CANYON ROAD DRAINAGE IMPROVEMENTS AND CONSTRUCTION, PHASE 1

NEAR THE INTERSECTION OF

CRAWFORD CANYON ROAD

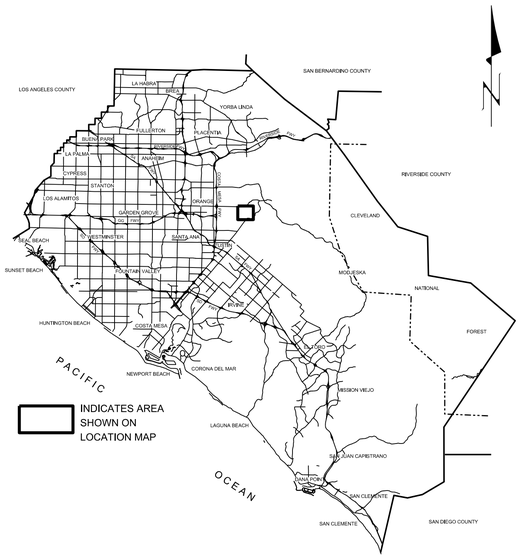
AND

NEWPORT BOULEVARD

DECEMBER 2016

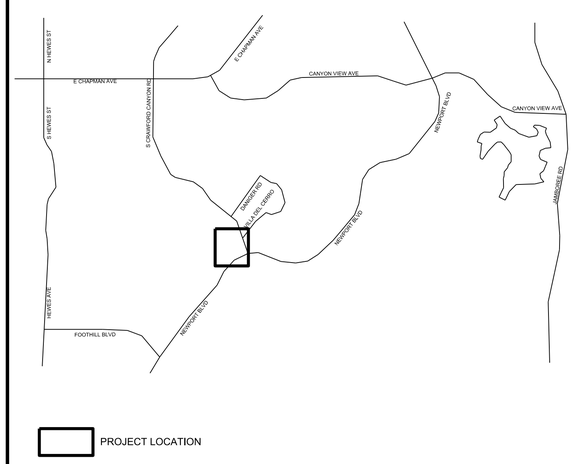
FUNDED BY: COUNTY OF ORANGE ROAD FUNDS

POST-PROJECT OWNERSHIP AND MAINTENANCE RESPONSIBILITY: COUNTY OF ORANGE




VICINITY MAP

(NO SCALE)




LOCATION MAP

(NO SCALE)

INDEX OF SHEETS


| SHEET | DESCRIPTION |
|---|---|
| 1 | TITLE SHEET |
| 2 | TYPICAL SECTIONS & ABBREVIATIONS |
| 3 | PIPE DETAILS |
| 4 | INLET STRUCTURE DETAILS |
| 5 | MISCELLANEOUS DETAILS |
| 6 | PLAN AND PROFILE LINE A STA 10+12.24 TO STA 13+50.00 |
| 7 | PLAN AND PROFILE LINE A STA 13+50.00 TO STA 16+65.56 |
| 8 | PLAN AND PROFILE LINE B STA 10+00.00 TO STA 12+72.00 |


| UTILITY OWNER | PHONE NO. | CONTACT |
|---|---|---|
| SO. CALIF. GAS | RICHARD CLENDINENG | (714) 634-3262 |
| EAST ORANGE COUNTY WATER DIST. | JERRY MENDZER | (714) 501-5596 |
| ORANGE COUNTY SANITATION | RUDY DAVILA | (714) 593-7348 |
| SO. CALIF. EDISON | JILL MONACO | (714) 973-5453 |
| AT&T | RENEE BURGERON | (714) 237-6277 |
| COX COMMUNICATIONS | JIM MCBRYDE | (626) 241-0948 |
| CHARTER | DAVID CISNEROS | (714) 591-4888 |
| CITY OF ORANGE WATER DEPARTMENT | JANETTE PICHAY & ROBERT BAEHNER | (714) 288-2475 |

BENCH MARK:

O.C.S. BM
3A-110-79 ELEV. = 403.068'
3A-89-71 ELEV. = 372.768'

LEVEL YEAR 1979

NGVD 29 1976 ADJ.

BASIS OF BEARINGS:

THE BASIS OF BEARING SHOWN HEREON IS BASED ON THE GRID BEARING BETWEEN O.C.S. HORIZONTAL CONTROL STATIONS G.P.S NO. 3172 BEING N88°48'15"W

OC PUBLIC WORKS

SUBMITTED: _____ DATE
REGINA HU, PE
SENIOR CIVIL ENGINEER
OC PUBLIC WORKS

RECOMMENDED: _____ DATE
NARDY KHAN, PE
DEPUTY DIRECTOR
OC PUBLIC WORKS

APPROVED: _____ DATE
KHALID M. BAZMI, PE
COUNTY ENGINEER / ASSISTANT DIRECTOR
OC PUBLIC WORKS

| NO. | DESCRIPTION | SHT. | APPROVED | DATE |
|---|---|---|---|---|

REVISIONS

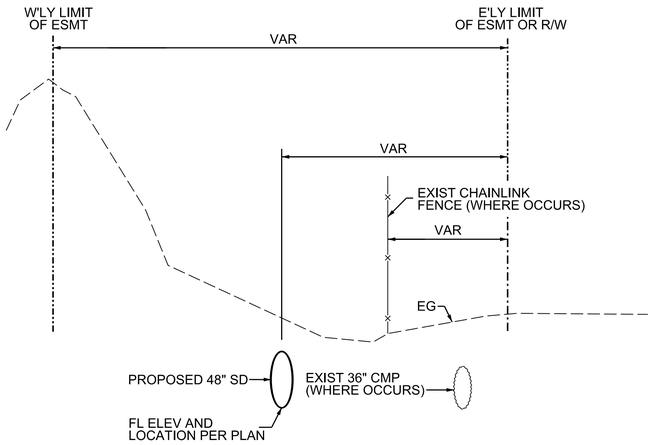
W. O. NO. ER16006

DWG. NO.

SHEET 1 OF 8

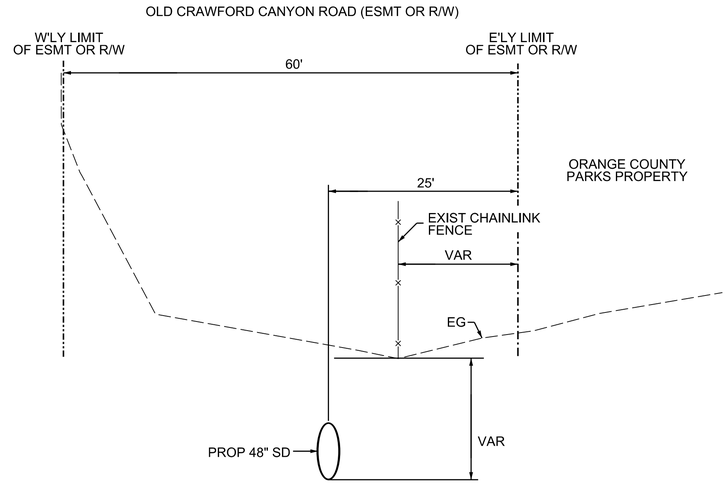
FILE NAME:$FILEL$

DATE PLOTTED : $DATE$



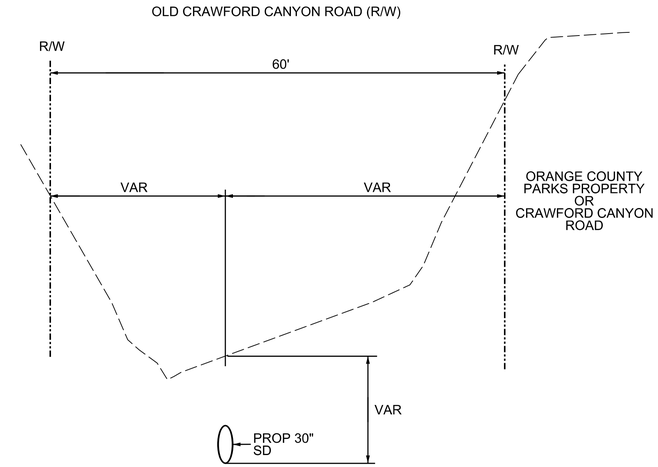

## "LINE A" - STA 10+12 TO STA 11+44

TYPICAL SECTION
SCALE: NOT TO SCALE



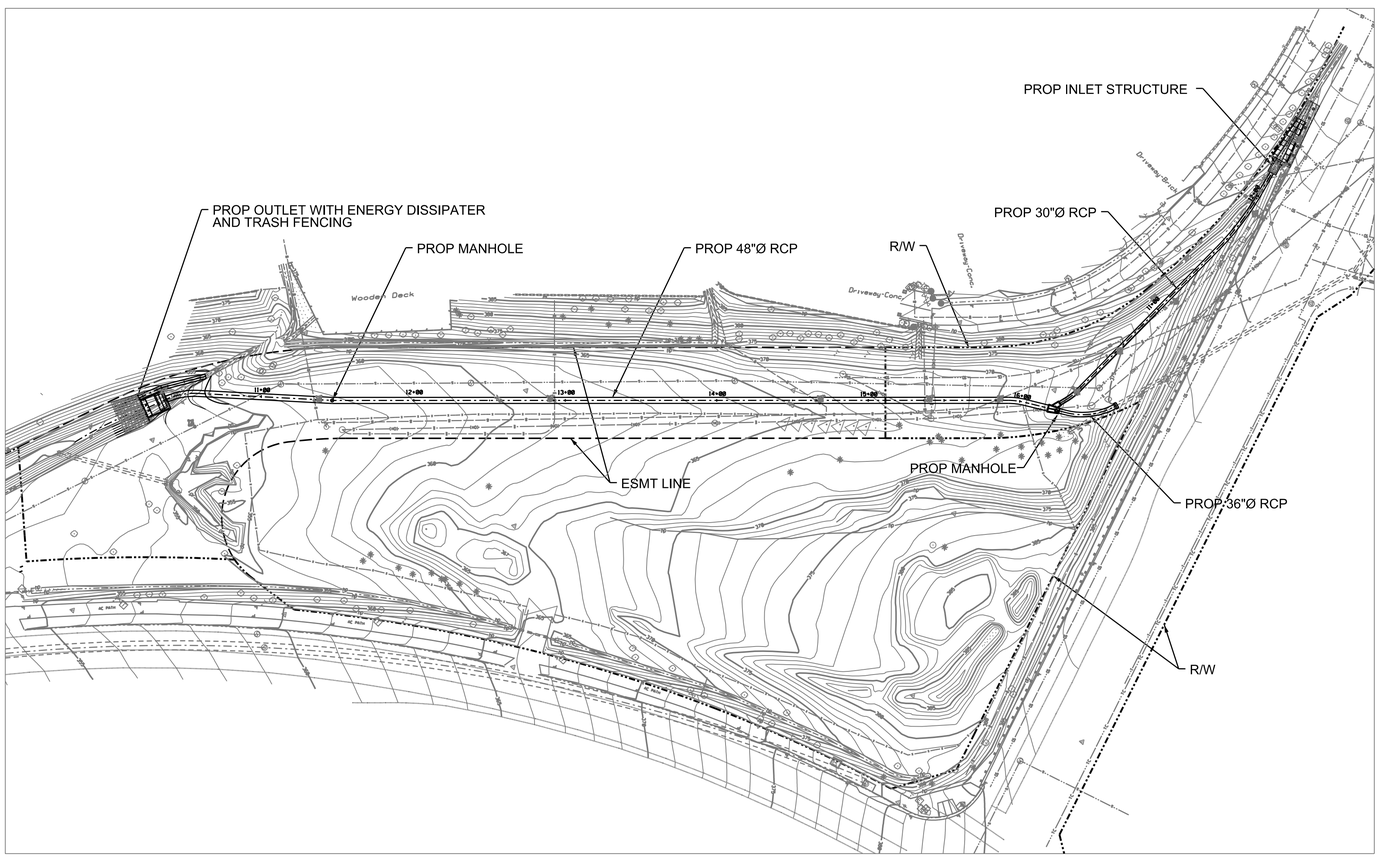

## "LINE A" - STA 11+48 TO STA 15+50

TYPICAL SECTION
SCALE: NOT TO SCALE




## "LINE B" - STA 10+00 TO STA 12+18

TYPICAL SECTION
SCALE: NOT TO SCALE




## OVERALL SITE PLAN

SCALE: 1" = 50'-0"

## LIST OF ABBREVIATIONS

| | | | |
|---|---|---|---|
| " OR IN | INCH | R | RADIUS LENGTH |
| ' OR FT | FOOT | RCP | REINFORCED CONCRETE PIPE |
| / | OF | ROW OR R/W | RIGHT OF WAY |
| ABAN, ABND OR ABAND | ABANDONED UTILITY | RT | RIGHT |
| AC / ASPH | ASPHALT CONCRETE | SS | SANITARY SEWER |
| AV OR AVE | AVENUE | SCE | SOUTHERN CALIFORNIA EDISON |
| BC | BEGINNING OF CURVE | SCH | SCHEDULE |
| BEG | BEGIN | SD | STORM DRAIN (LINE) |
| BOTT | BOTTOM | SPECS | SPECIFICATIONS |
| BP | BEGIN PIPE | STA | STATION STANDARD |
| CB | CATCH BASIN | STD | STANDARD |
| CCP | CONCRETE CYLINDER PIPE | STL | STEEL |
| CIP | CAST IRON PIPE | SWR | SEWER |
| CISP | CAST IRON SOIL PIPE | T/ | TOP OF |
| CFM | CUBIC FEET PER MINUTE | T OR TELE | TELEPHONE |
| CFS | CUBIC FEET PER SECOND | TRANS | TRANSITION |
| CJ | CONSTRUCTION JOINT | TYP | TYPICAL |
| CL | CENTERLINE | VAR | VARIES |
| CML | CEMENT MORTAR LINED | W | WEST OR WIDTH |
| CMU | COLUMN | W/ | WITH |
| CML&C | CONCRETE MASONRY UNIT | W/O | WITHOUT |
| CMP | CEMENT MORTAR LINED & COATED | WTR | WATER(LINE) |
| COL | CORRUGATED METAL PIPE | W'LY | WESTERNLY |
| CONC | CONCRETE | | |
| CONT | CONTINUOUS | | |
| CP | CATHODIC PROTECTION | | |
| CT | CALTRANS | | |
| D | DEGREES | | |
| DI | DRAIN INLET | | |
| DIA | DIAMETER | | |
| DG | DECOMPOSED GRANITE | | |
| DWG | DRAWING | | |
| E | EAST | | |
| EC | END OF CURVE | | |
| EF | EACH FACE | | |
| EG | EXISTING GRADE | | |
| EJ | EXPANSION JOINT | | |
| EL/ELEV | ELEVATION | | |
| ELEC | ELECTRICAL | | |
| EP | END PIPE | | |
| EQ | EQUAL | | |
| ES | EACH SIDE | | |
| ESMT | EASEMENT | | |
| EVC | END OF VERTICAL CURVE | | |
| EW | EACH WAY | | |
| EXIST | EXISTING | | |
| E'LY | EASTERNLY | | |
| FF | FINISHED FLOOR | | |
| FL | FLOW LINE | | |
| FO | FIBER OPTIC (LINE) | | |
| FS | FINISHED SURFACE | | |
| FT | FEET | | |
| G | GAS (LINE) | | |
| GA | GAUGE | | |
| GALV | GALVANIZED | | |
| GPM | GALLON PER MINUTE | | |
| HC | HIGH CONFIDENCE | | |
| INV | INVERT | | |
| L | LENGTH | | |
| LF | LINEAR FEET | | |
| LT | LEFT | | |
| MAT'L | MATERIAL | | |
| MAX | MAXIMUM | | |
| MBGR | METAL BEAM GUARD RAIL | | |
| MH | MANHOLE | | |
| MIN | MINIMUM | | |
| NO | NUMBER | | |
| NTS | NOT TO SCALE | | |
| OCPW | ORANGE COUNTY PUBLIC WORKS | | |
| PIP | PROTECT IN PLACE | | |
| PL | PLATE | | |

X / X — DETAIL NUMBER / SHEET NUMBER

CONC

NATIVE SOIL

WOOD

100%SUBMITTAL

COUNTY OF ORANGE CALIFORNIA

| MARK | DESCRIPTION | DATE | APPR. |
|---|---|---|---|
| | | | |

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

REGISTERED PROFESSIONAL ENGINEER JOSEPH F. LONG C 54329 Exp. 12-31-16 CIVIL STATE OF CALIFORNIA

DATE

DESIGNED BY: DEREK S. PLAZA
DRAWN BY: DCM
CHECKED BY: JFL
DRAWING CODE:
FILE NAME:
PLOT DATE: $DATE$
SCALE: AS SHOWN

COUNTY OF ORANGE
OC PUBLIC WORKS

URS
999 TOWN & COUNTRY RD.
ORANGE, CA 92868
TEL: 714.689.7257

CRAWFORD CANYON ROAD
DRAINAGE IMPROVEMENTS
AND CONSTRUCTION, PHASE 1
NEAR THE INTERSECTION OF
CRAWFORD CANYON ROAD
AND
NEWPORT BOULEVARD

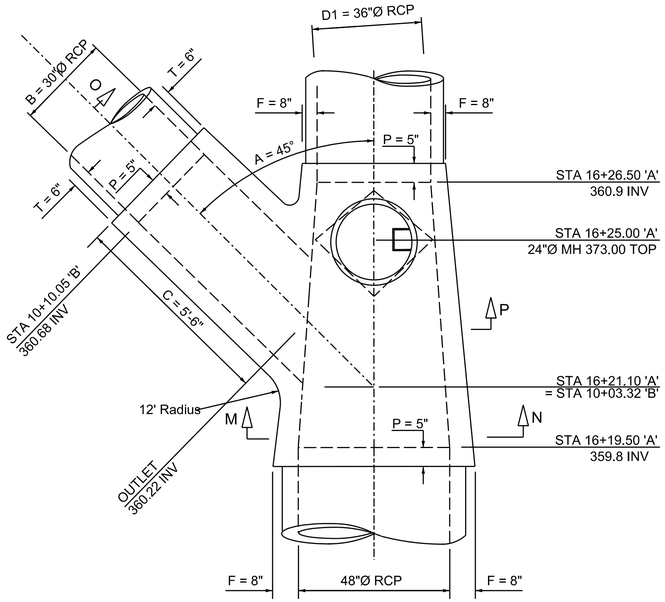
TYPICAL SECTIONS
& ABBREVIATIONS

Sheet
Reference
Number

2

Sheet 2 of 8

FILE NAME:$FILEL$

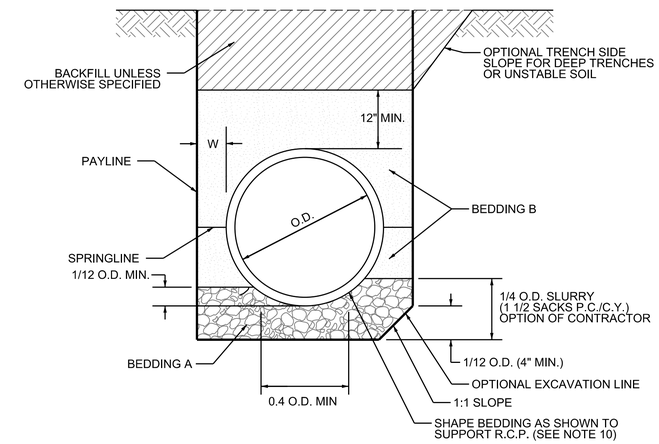



| SPPWC 322-2 DIMENSIONS | |
|---|---|
| DIMENSION | VALUE |
| ∠A | 45° |
| B | 30" |
| C | 5'-6" |
| D1 | 36" |
| D2 | 48" |
| F | 8" |
| P | 5" |

NOTE: FOR INFORMATION NOT SHOWN HEREON, SEE REFERENCE DETAIL SPPWC 322-2 & 322-2 OC

## 1/7 MANHOLE PIPE-TO-PIPE (LARGE SIDE INLET)

SCALE: 1" = 1'-0"




NOTES :

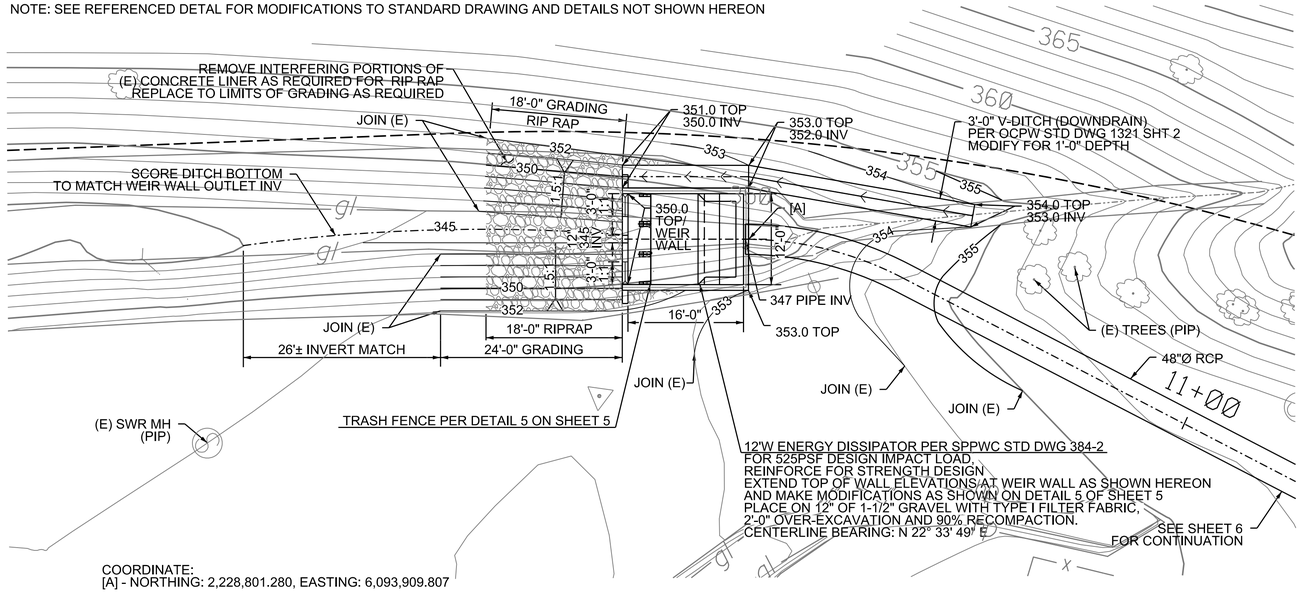
1. BEDDING A SHALL BE COMPOSED OF SAND, NO.3 OR NO.4 CRUSHED ROCK OR GRAVEL PER STD. SPECIFICATIONS OR OTHER GRANULAR MATERIAL AS MAY BE SPECIFIED OR APPROVED BY THE ENGINEER.
2. BEDDING B SHALL BE COMPOSED OF SAND OR OTHER GRANULAR MATERIAL AS MAY BE SPECIFIED OR APPROVED BY THE ENGINEER AND SHALL CONFORM TO SECTION 306-1.2.1 OF THE STD. SPECIFICATIONS.
3. BEDDING B SHALL BE COMPACTED TO A RELATIVE COMPACTION OF NOT LESS THAN 90 PERCENT UNLESS OTHERWISE SPECIFIED.
4. BEDDING B SHALL BE PLACED IN TWO OR MORE LIFTS FOR O.D. GREATER THAN 60 INCHES.
5. BACKFILL SHALL BE PER SECTION 306-1.3 OF THE STD. SPECIFICATIONS.
6. WHERE THE COVER IS 8 FEET OR LESS, "W" MUST BE GREATER THAN OR EQUAL TO 6 INCHES. WHERE THE COVER IS GREATER THAN 8 FEET, "W" MUST BE BETWEEN 6 AND 10 INCHES INCLUSIVE FOR PIPES UP TO AN INCLUDING 96 INCHES IN DIAMETER. FOR PIPES OVER 96 INCHES IN DIAMETER, "W" MUST BE BETWEEN 6 AND 12 INCHES INCLUSIVE.
7. "W" SHALL INCLUDE THE THICKNESS OF ANY SHORING.
8. SHORING SHALL BE A MINIMUM OF 6 INCHES FROM THE PIPE AT SPRINGLINE.
9. AN IMPROVED BEDDING METHOD SHALL BE SUBMITTED TO THE ENGINEER FOR ANY "W" OTHER THAN THAT PERMITTED IN NOTE 6.
10. THE TRENCH BOTTOM SHALL BE SHAPED AS SHOWN, OR THE CONTRACTOR, AT HIS OPTION MAY CHOOSE NOTE TO SCREED BEDDING "A" IN WHICH CASE, THE PIPE SHALL BE BACKFILLED TO A DEPTH OF 1/4 O.D. WITH TRENCH BACKFILL SLURRY AT HIS EXPENSE.
11. THIS BEDDING DETAIL SHALL ONLY BE USED FOR R.C.P. OR AS APPROVED BY ENGINEER.
12. PLASTIC PIPE BEDDING SHALL BE DETAILED ON PLANS.

## 3/6 TYPICAL PIPE TRENCH & BEDDING DETAIL - OCPW STD 1319

SCALE: NOT TO SCALE

| SPPWC STD DWG 384-2 DIMENSIONS (525 PSF DESIGN LOAD) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WIDTH (W) | H | L | a | b | c | d | e | f | g | T1 | T2 | T3 | T4 | T5 | T6 |
| 12'-0" | 9'-0" | 16'-0" | 6'-0" | 4'-6" | 6'-0" | 2'-0" | 1'-0" | 2'-6" | 5'-0" | 9" | 8" | 10" | 8.5" | 9" | 9" |

NOTE: SEE REFERENCED DETAL FOR MODIFICATIONS TO STANDARD DRAWING AND DETAILS NOT SHOWN HEREON

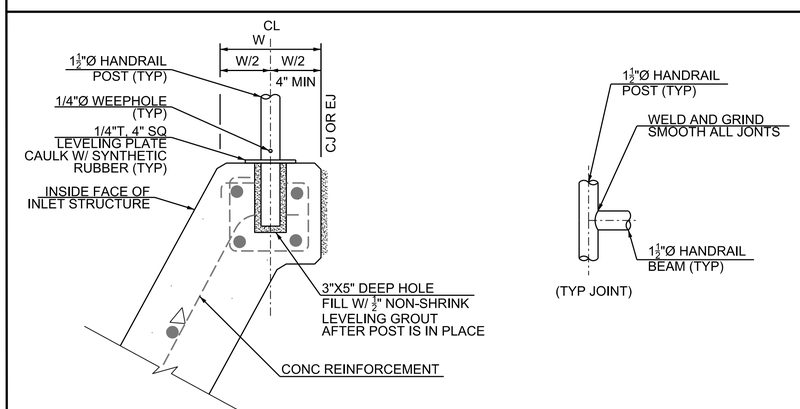



COORDINATE:
[A] - NORTHING: 2,228,801.280, EASTING: 6,093,909.807

NOTES:
RIPRAP SHALL BE CALTRANS 1/4 TON, 3'-0" DEEP MIN, METHOD OF PLACEMENT TO BE DETERMINED BY CONTRACTOR AND APPROVED BY ENGINEER.
RIPRAP SHALL BE PLACED ON TYPE I FILTER FABRIC PER SPECIFICATIONS.

## 2/6 OUTLET ENERGY DISSIPATOR & GRADING PLAN

SCALE: 1" = 5'-0"




NOTE: ALL HANDRAIL METAL IS ALUMINUM

## 4/4 HANDRAIL DETAILS

NOT TO SCALE

THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL

100%SUBMITTAL

| MARK | DESCRIPTION | DATE | APPR. |
|---|---|---|---|

PREPARED UNDER THE RESPONSIBLE CHARGE OF: DATE

REGISTERED PROFESSIONAL ENGINEER JOSEPH F. LONG C 54329 Exp. 12-31-16 CIVIL STATE OF CALIFORNIA

DESIGNED BY: DEREK S. PLAZA
DRAWN BY: DCM
CHECKED BY: JFL
DRAWING CODE:
FILE NAME:
PLOT DATE: $DATE$
SCALE: AS SHOWN

COUNTY OF ORANGE
OC PUBLIC WORKS

URS
999 TOWN & COUNTRY RD.
ORANGE, CA 92868
TEL: 714.689.7257

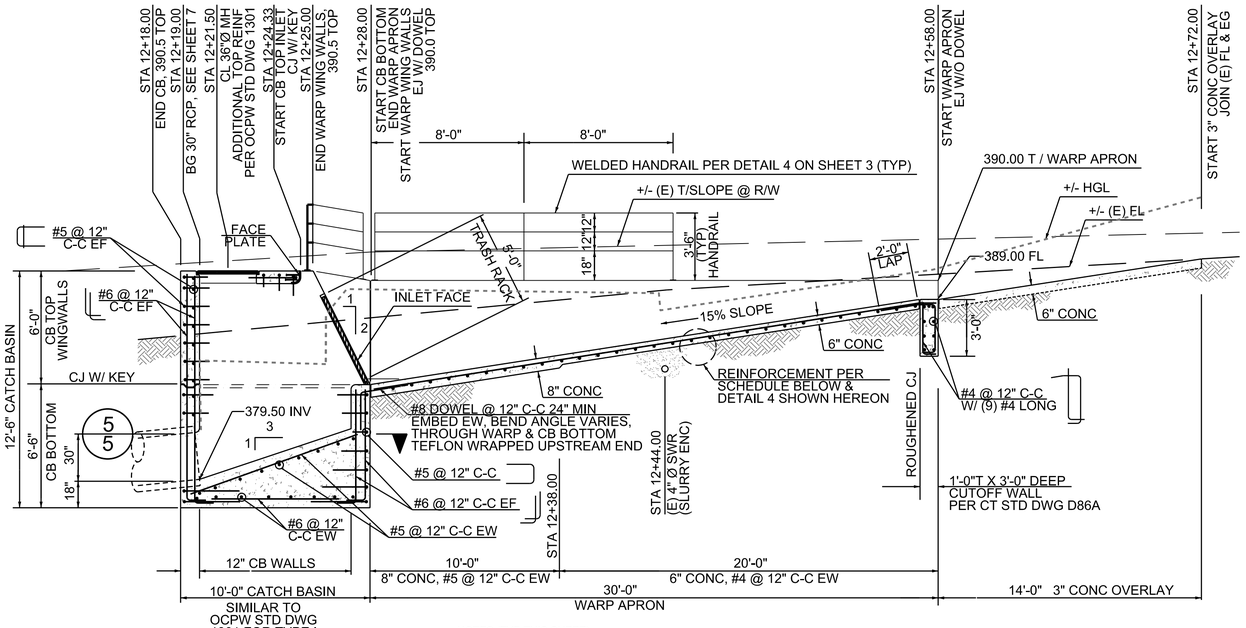
CRAWFORD CANYON ROAD
DRAINAGE IMPROVEMENTS
AND CONSTRUCTION, PHASE 1
NEAR THE INTERSECTION OF
CRAWFORD CANYON ROAD
AND
NEWPORT BOULEVARD

PIPE DETAILS

Sheet Reference Number
3

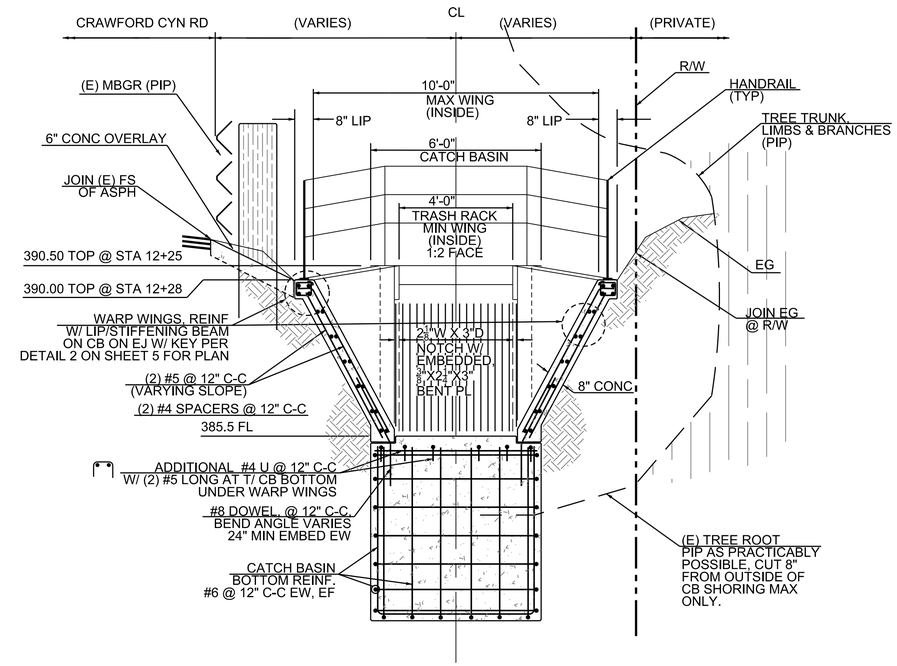
Sheet 3 of 8

FILE NAME:$FILEL$

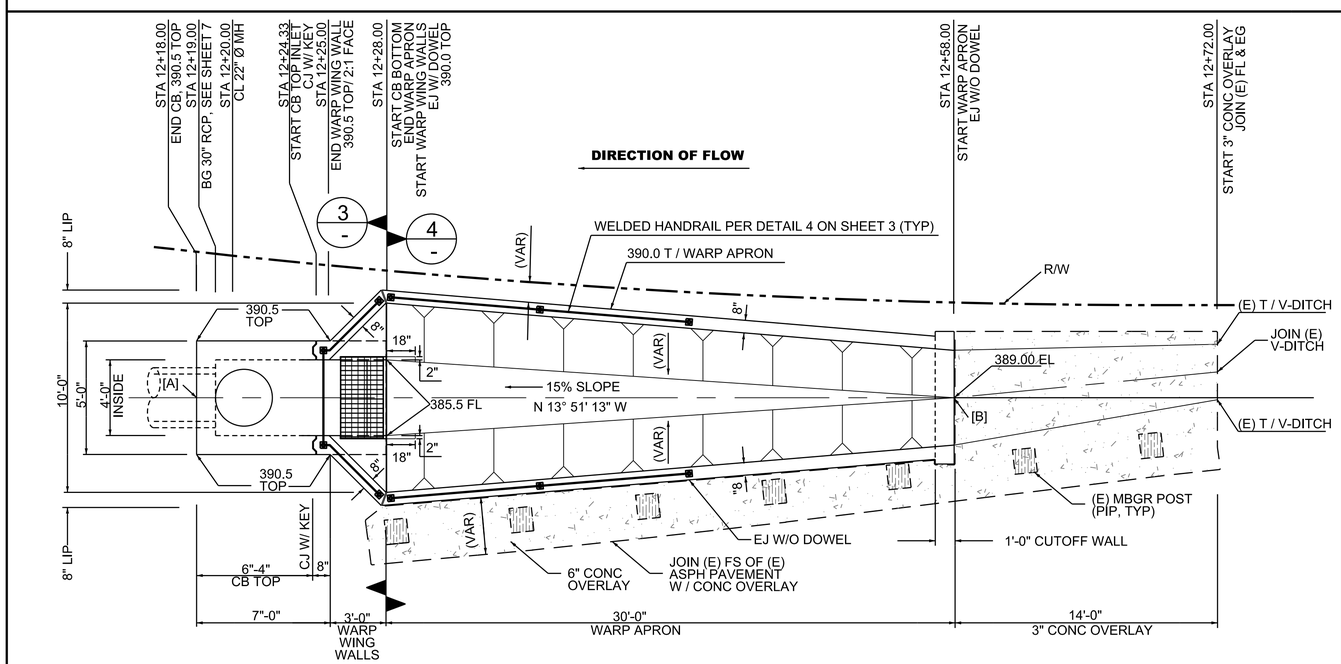



NOTES (TYP THIS SHEET):
- SEE FULL REFERENCED STANDARD DRAWINGS FOR DETAILS NOT SHOWN HEREON.
- ALL CONSTRUCTION JOINTS SHALL BE PER OCPW STD DWG 1318, AND WATERPROOFED WITH WALLS-COAT CURING COMPOUND.
- PROVIDE STEEL TROWEL FINISH ON ALL WATER BEARING SURFACES.
- TRASH RACK (GRATE) SHALL BE PER OCPW STD DWG 1307, PAGE 3, MADE OF 304 SS. EMBED FRAME IN WARP WING WALLS.
- PROVIDE STEPS (NOT SHOWN) IN CATCH BASIN UNDER MANHOLE PER OCPW STD DWG 1307.

1/7 INLET PROFILE THROUGH CENTERLINE
SCALE: 1/4" = 1'-0"

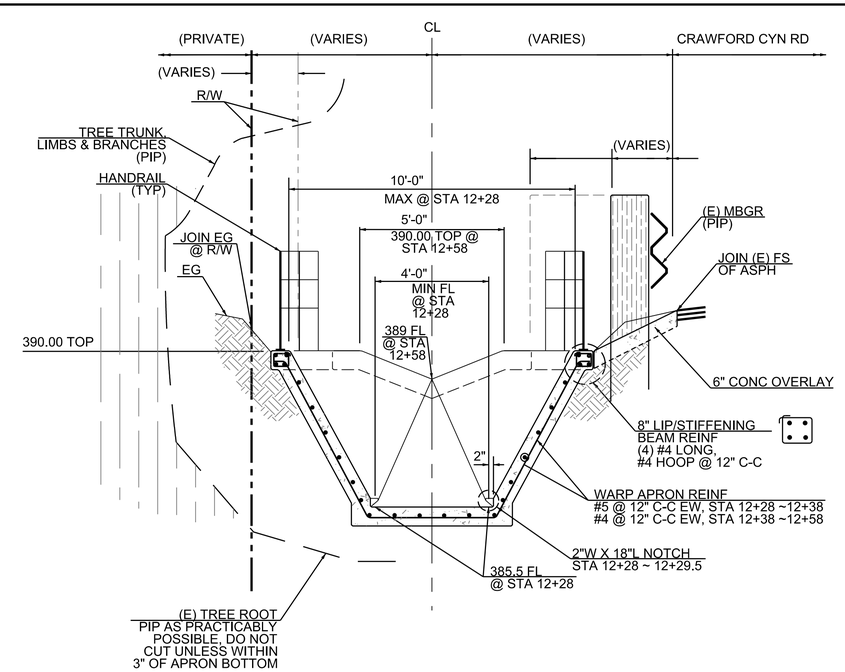



3/- INLET PROFILE (DOWNSTREAM)
SCALE: 3/8" = 1'-0"




COORDINATES:
[A] - NORTHING: 2,229,409.02, EASTING: 6,094,340.60
[B] - NOTRHING: 2,229,447.85, EASTING; 6,094,331.01

2/7 INLET PLAN
SCALE: 1/4" = 1'-0"




100%SUBMITTAL

4/- WARP APRON PROFILE (UPSTREAM)
SCALE: 3/8" = 1'-0"

COUNTY OF ORANGE CALIFORNIA

| MARK | DESCRIPTION | DATE | APPR. |
|---|---|---|---|

PREPARED UNDER THE RESPONSIBLE CHARGE OF: DATE

REGISTERED PROFESSIONAL ENGINEER JOSEPH F. LONG C 54329 Exp. 12-31-16 CIVIL STATE OF CALIFORNIA

DESIGNED BY: DEREK S. PLAZA
DRAWN BY: DCM
CHECKED BY: JFL
DRAWING CODE:
FILE NAME:
PLOT DATE: $DATE$
SCALE: AS SHOWN

COUNTY OF ORANGE OC PUBLIC WORKS

URS
999 TOWN & COUNTRY RD.
ORANGE, CA 92868
TEL: 714.689.7257

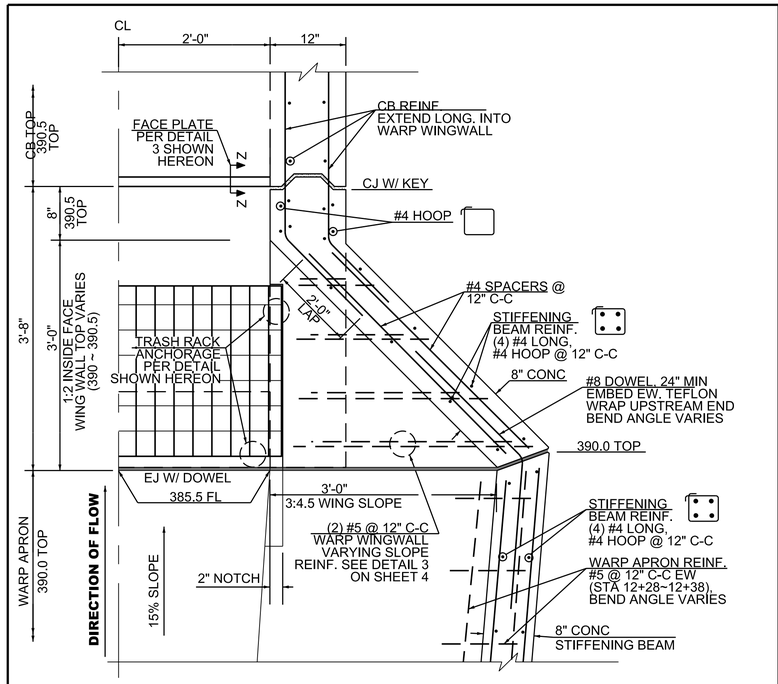
CRAWFORD CANYON ROAD DRAINAGE IMPROVEMENTS AND CONSTRUCTION, PHASE 1 NEAR THE INTERSECTION OF CRAWFORD CANYON ROAD AND NEWPORT BOULEVARD

INLET STRUCTURE DETAILS

Sheet Reference Number
4

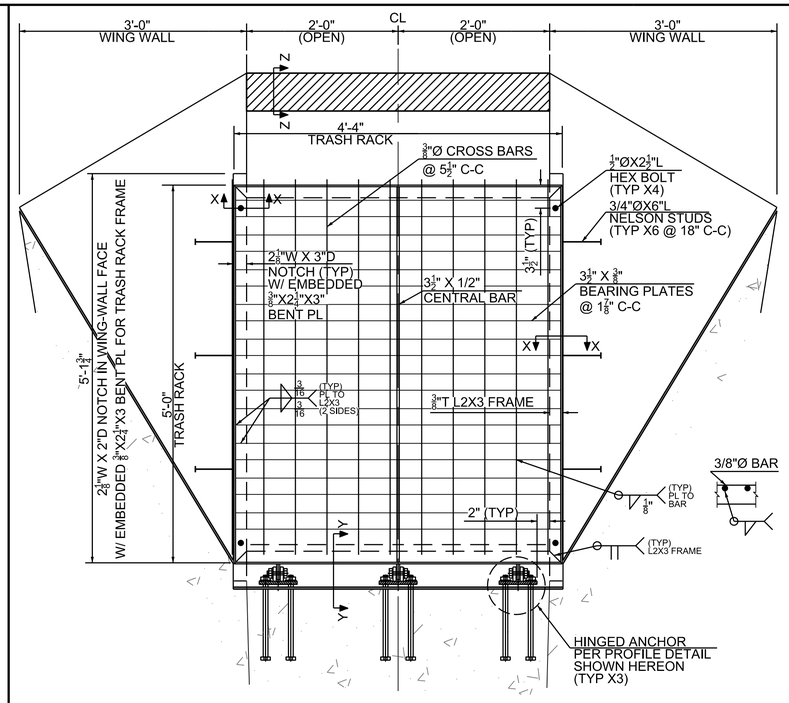
Sheet 4 of 8

FILE NAME:$FILEL$



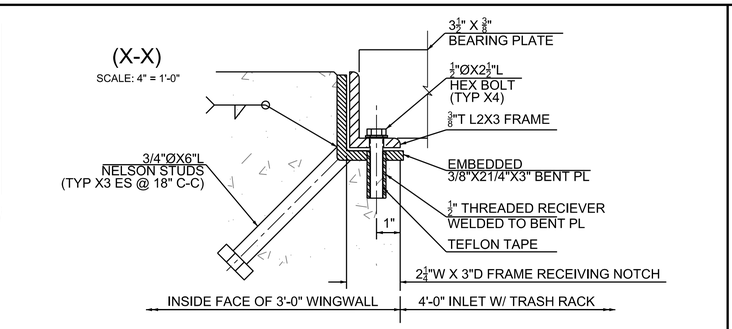

NOTE: THIS DETAIL IS SYMMETRIC ABOUT CENTERLINE, HANDRAIL NOT SHOWN FOR CLARITY

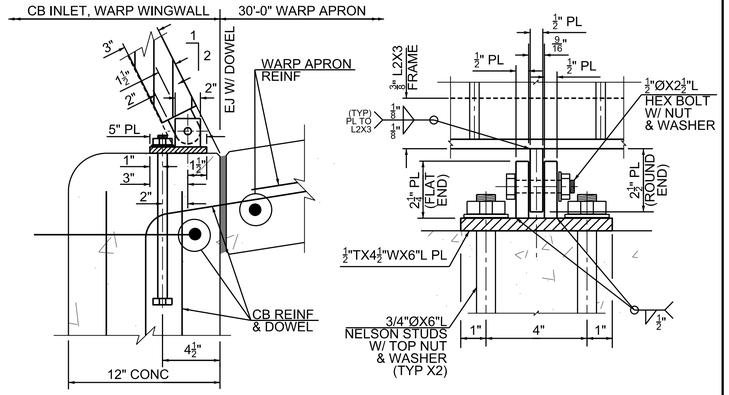
1/3 WARP WINGWALL REINF PLAN
SCALE: 1" = 1'-0"

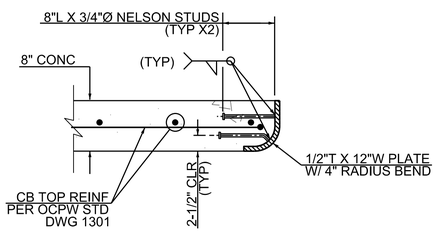



NOTE: TRASH RACK IS SHOWN AT, AND HAS FACE SLOPE OF 1:2

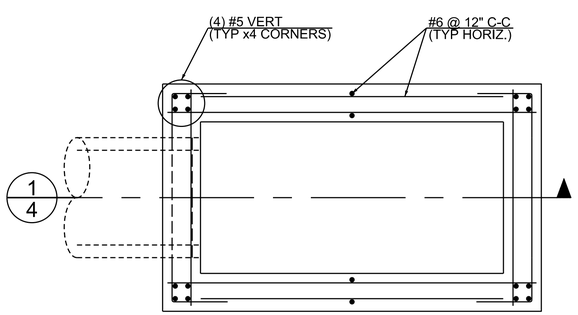
2/- TRASH RACK DETAILS
SCALE: 1" = 1'-0"



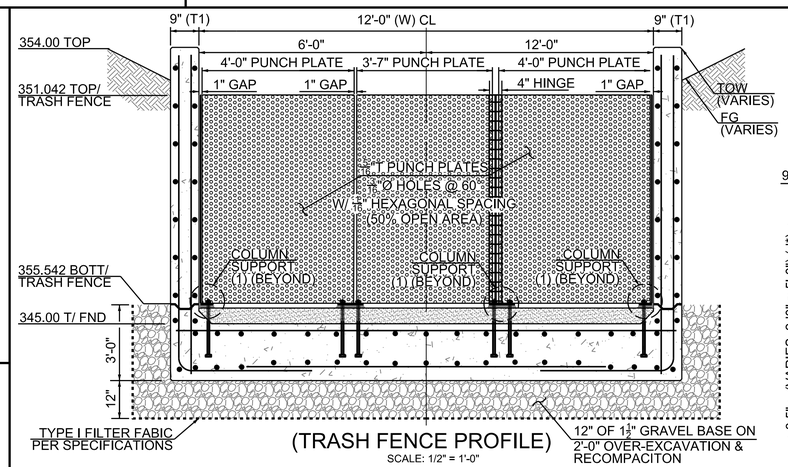



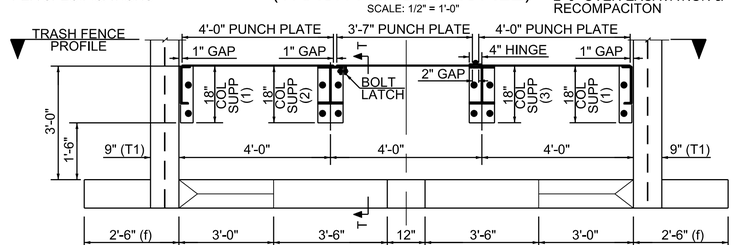

3/- FACEPLATE DETAIL Z-Z
SCALE: 1" = 1'-0"




1/4 4/4 CATCH BASIN BOTTOM REINF PLAN
SCALE: 1/2" = 1'-0"

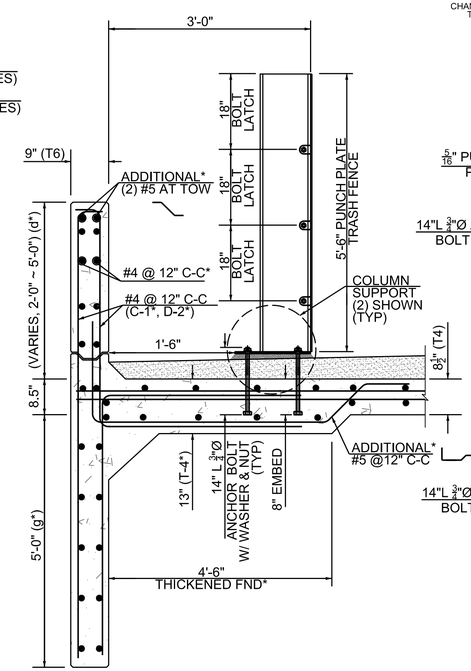



(TRASH FENCE PROFILE)
SCALE: 1/2" = 1'-0"



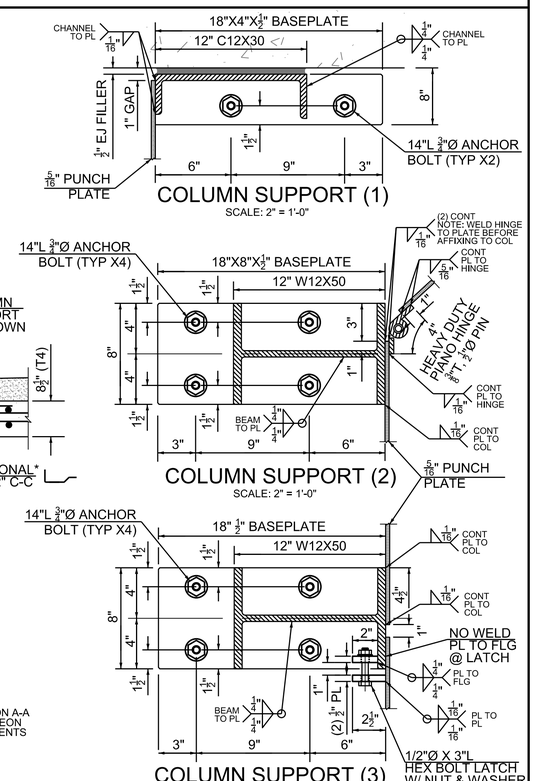

NOTE: DIMENSIONS NOTED (#) ARE IN REFERENCE TO STD DWG 384-2, (*) DENOTES MODIFIED FROM STD
ALL STEEL SHALL BE GALVANIZED. RE-GALVANIZE PAINT ALL MARRED SURFACES AND WELDS AFTER CONSTRUCTION

5/3 TRASH FENCE PLAN
SCALE: 1/2" = 1'-0"




NOTE: SECTION IS MODIFICATION FOR STD DWG 384-2 SECTION A-A
SEE STD DWG FOR REINFORCEMENT NOT CALLED OUT HEREON
SEE PROFILE SHOWN HEREON FOR FOUNDATION REQUIREMENTS

TRASH FENCE SECTION (T-T)
SCALE: 3/8" = 1'-0"




COUNTY OF ORANGE CALIFORNIA

| MARK | DESCRIPTION | DATE | APPR. |
|---|---|---|---|
| | | | |

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

REGISTERED PROFESSIONAL ENGINEER JOSEPH F. LONG C 54329 Exp. 12-31-16 CIVIL STATE OF CALIFORNIA

DATE

DESIGNED BY: DEREK S. PLAZA
DRAWN BY: DCM
CHECKED BY: JFL
DRAWING CODE:
FILE NAME:
PLOT DATE: $DATE$
SCALE: AS SHOWN

COUNTY OF ORANGE
OC PUBLIC WORKS

URS
999 TOWN & COUNTRY RD.
ORANGE, CA 92868
TEL: 714.689.7257

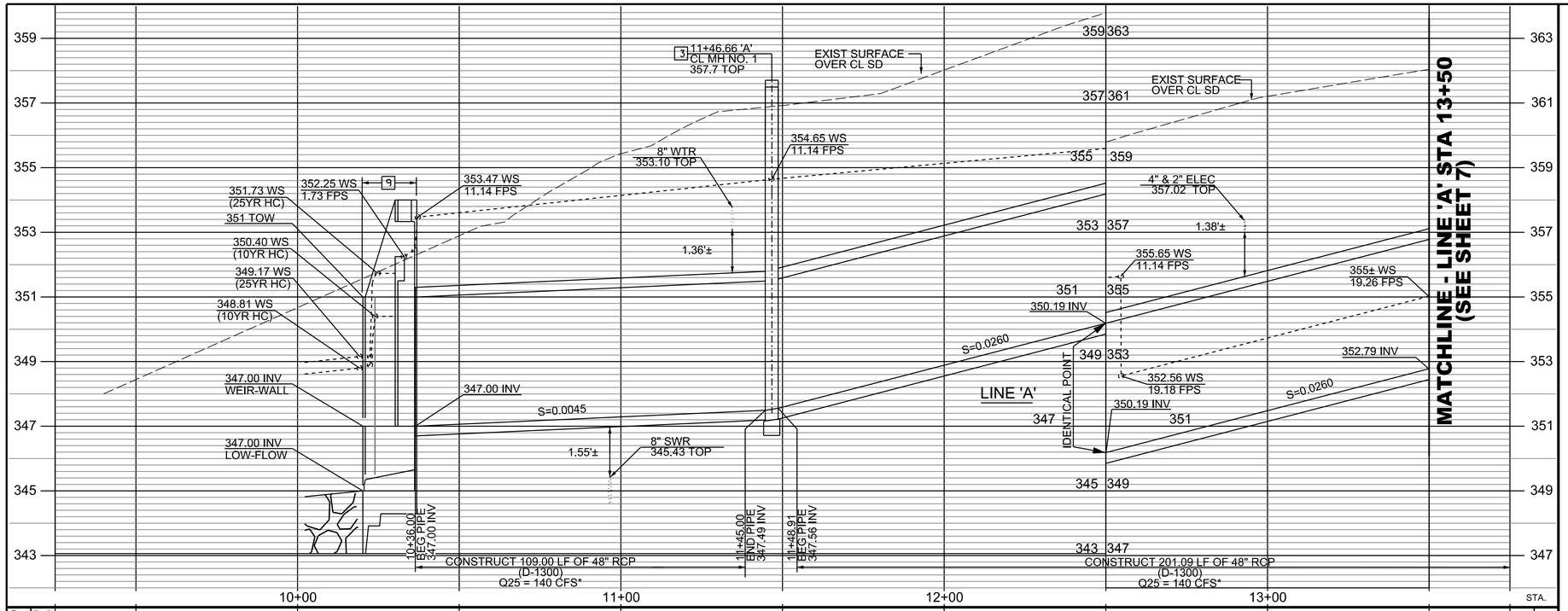
CRAWFORD CANYON ROAD DRAINAGE IMPROVEMENTS AND CONSTRUCTION, PHASE 1 NEAR THE INTERSECTION OF CRAWFORD CANYON ROAD AND NEWPORT BOULEVARD

STANDARD DETAILS

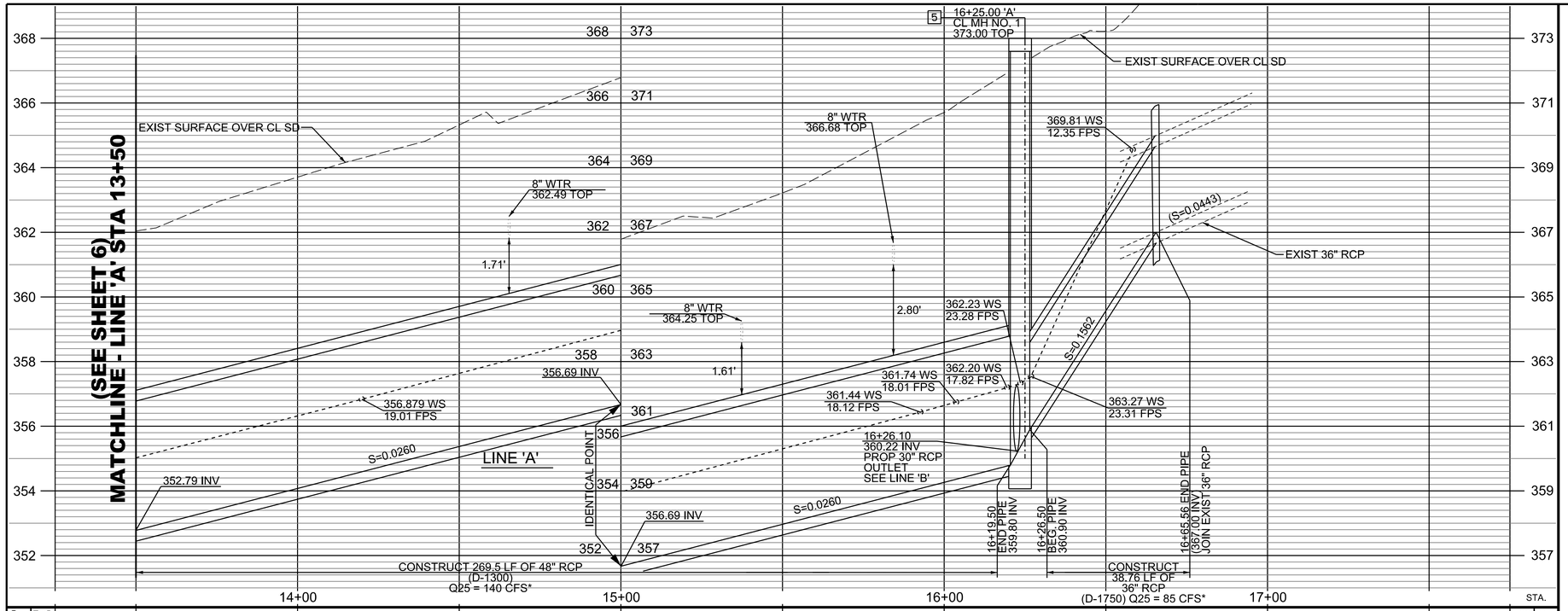
Sheet Reference Number
5

Sheet 5 of 8

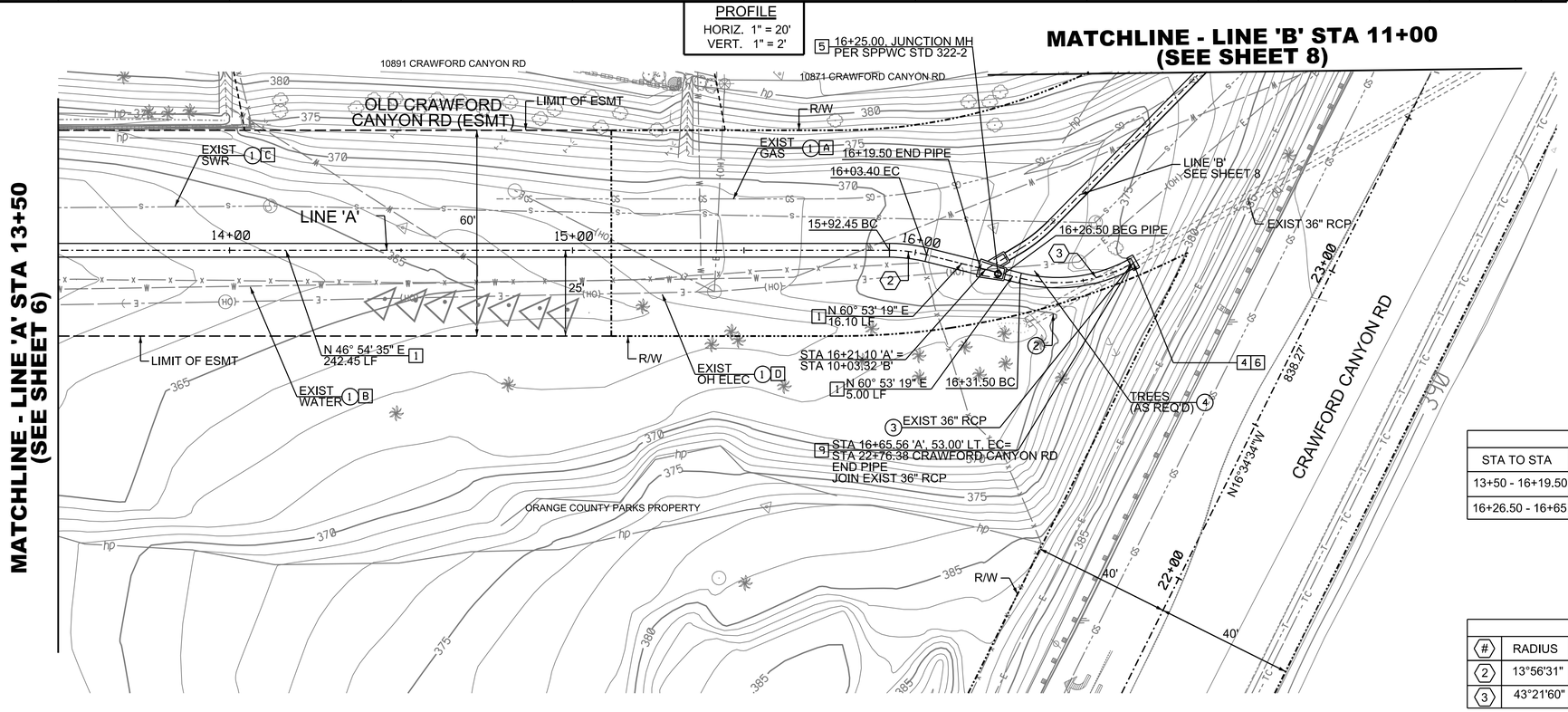
FILE NAME:$FILEL$


11+46.66 'A'
CL MH NO. 1
357.7 TOP
EXIST SURFACE
OVER CL SD
8" WTR
353.10 TOP
354.65 WS
11.14 FPS
353.47 WS
11.14 FPS
352.25 WS
1.73 FPS
351.73 WS
(25YR HC)
351 TOW
350.40 WS
(10YR HC)
349.17 WS
(25YR HC)
348.81 WS
(10YR HC)
347.00 INV
WEIR-WALL
347.00 INV
LOW-FLOW
347.00 INV
S=0.0045
1.36'±
1.55'±
8" SWR
345.43 TOP
10+36.00
BEG PIPE
347.00 INV
11+45.00
END PIPE
347.49 INV
11+48.91
BEG PIPE
347.56 INV
CONSTRUCT 109.00 LF OF 48" RCP
(D-1300)
Q25 = 140 CFS*
4" & 2" ELEC
357.02 TOP
1.38'±
355.65 WS
11.14 FPS
355± WS
19.26 FPS
350.19 INV
S=0.0260
IDENTICAL POINT
LINE 'A'
352.79 INV
352.56 WS
19.18 FPS
350.19 INV
S=0.0260
CONSTRUCT 201.09 LF OF 48" RCP
(D-1300)
Q25 = 140 CFS*
MATCHLINE - LINE 'A' STA 13+50
(SEE SHEET 7)
10+00
11+00
12+00
13+00
STA.

| | | |




PROFILE
HORIZ. 1" = 20'
VERT. 1" = 2'




PLAN
1"=20'

## CONSTRUCTION NOTES

1. CONSTRUCT 48" R.C.P. PER OCPW STD. PLAN 1319 (D-LOAD PER PROFILE), SEE DETAIL 3 ON SHEET 3
4. CONSTRUCT CONCRETE COLLAR PER OCPW STD. NO. 380-4
5. INSTALL 7' PIPE - TO - PIPE MANHOLE (LARGE SIDE INLET) PER OCPW STD. 322-2 WHERE ∠A = 45°, SEE DETAIL 1 ON SHEET 3
6. CONSTRUCT 36" R.C.P. PER OCPW STD. PLAN 1319 (D-LOAD PER PROFILE), SEE DETAIL 3 ON SHEET 3

## DISPOSITION

1. PROTECT IN PLACE
2. REMOVE INTERFERING PORTION
3. ABANDON PORTION
4. REMOVE

| UTILITY | | OWNER |
|---|---|---|
| A | GAS LINE | SO. CAL. GAS |
| B | WATER | EAST ORANGE COUNTY WATER DIST.<br>CITY OF ORANGE WATER DEPARTMENT |
| C | SEWER LINE | ORANGE COUNTY SANITATION DISTRICT |
| D | ELECTRIC LINE | SO. CALIF. EDISON |
| E | TELECOMM LINE | AT&T, COX COMMUNICATIONS, CHARTER |

## NOTES

* VALUES ARE FOR 25HC YR STORM EVENT OBTAINED FROM OCPW HYDROLOGY REPORT NO. F13-3 SIGNED BY EDITHA LLANES (AUGUST 2015)

HYDRAULIC DATA

| STA TO STA | Q25 (CFS) | SECTION | S (FT/FT) | 'n' | Dn (FT) | Vn (F/S) |
|---|---|---|---|---|---|---|
| 13+50 - 16+19.50 | 140 | 48"Ø RCP | 0.026 | 0.013 | 2.24 | 19.30 |
| 16+26.50 - 16+65 | 85 | 36"Ø RCP | 0.1562 | 0.013 | 1.17 | 33.24 |

CURVE DATA

| # | RADIUS | DELTA | LENGTH | TANGENT | BC | EC |
|---|---|---|---|---|---|---|
| 2 | 13°56'31" | 45' | 10.95' | 5.53' | 15+92.45 | 16+03.40 |
| 3 | 43°21'60" | 45' | 34.06' | 17.96' | 16+31.50 | 16+65.56 |

THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL

100%SUBMITTAL

COUNTY OF ORANGE CALIFORNIA

| MARK | DESCRIPTION | DATE | APPR. |
|---|---|---|---|
| | | | |

PREPARED UNDER THE RESPONSIBLE CHARGE OF: | DATE

REGISTERED PROFESSIONAL ENGINEER JOSEPH F. LONG C 54329 Exp. 12-31-16 CIVIL STATE OF CALIFORNIA

DESIGNED BY: DEREK S. PLAZA
DRAWN BY: DCM
CHECKED BY: JFL
DRAWING CODE:
FILE NAME:
PLOT DATE: $DATE$
SCALE: AS SHOWN

COUNTY OF ORANGE
OC PUBLIC WORKS

URS
999 TOWN & COUNTRY RD.
ORANGE, CA 92868
TEL: 714.689.7257

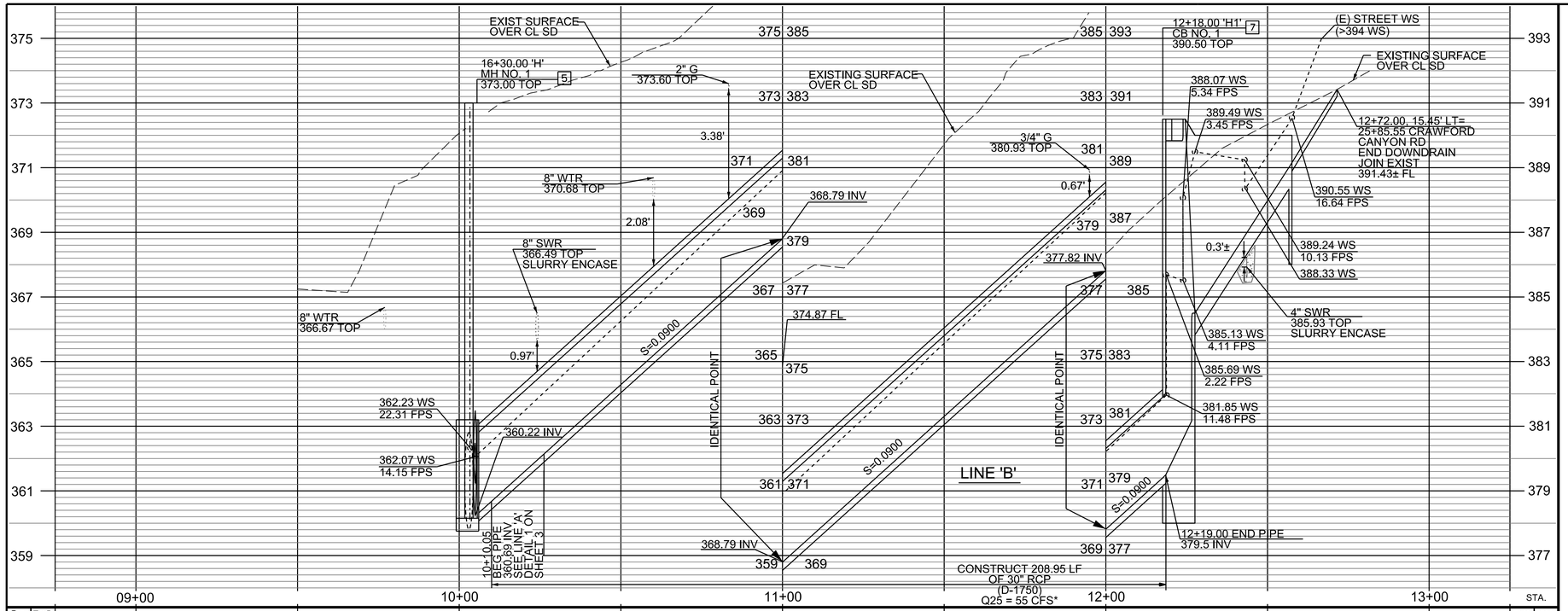
CRAWFORD CANYON ROAD
DRAINAGE IMPROVEMENTS
AND CONSTRUCTION, PHASE 1
NEAR THE INTERSECTION OF
CRAWFORD CANYON ROAD
AND
NEWPORT BOULEVARD

PLAN AND PROFILE

Sheet Reference Number
7



FILE NAME:$FILEL$


EXIST SURFACE OVER CL SD
16+30.00 'H' MH NO. 1 373.00 TOP
2" G 373.60 TOP
EXISTING SURFACE OVER CL SD
12+18.00 'H1' CB NO. 1 390.50 TOP
(E) STREET WS (>394 WS)
EXISTING SURFACE OVER CL SD
388.07 WS 5.34 FPS
389.49 WS 3.45 FPS
12+72.00, 15.45' LT= 25+85.55 CRAWFORD CANYON RD END DOWNDRAIN JOIN EXIST 391.43± FL
3/4" G 380.93 TOP
3.38'
8" WTR 370.68 TOP
0.67'
390.55 WS 16.64 FPS
2.08'
368.79 INV
8" SWR 366.49 TOP SLURRY ENCASE
377.82 INV
0.3'±
389.24 WS 10.13 FPS
388.33 WS
8" WTR 366.67 TOP
374.87 FL
4" SWR 385.93 TOP SLURRY ENCASE
S=0.0900
0.97'
385.13 WS 4.11 FPS
385.69 WS 2.22 FPS
IDENTICAL POINT
IDENTICAL POINT
362.23 WS 22.31 FPS
360.22 INV
381.85 WS 11.48 FPS
362.07 WS 14.15 FPS
S=0.0900
S=0.0900
LINE 'B'
10+10.05 BEG PIPE 360.89 INV SEE LINE 'A' DETAIL 1 ON SHEET 3
368.79 INV
12+19.00 END PIPE 379.5 INV
CONSTRUCT 208.95 LF OF 30" RCP (D-1750) Q25 = 55 CFS*
09+00
10+00
11+00
12+00
13+00
STA.

| Cu. Yds. | Exc. | | |

# Appendix H

## Water Quality Management Plan

ESA

# WATER QUALITY MANAGEMENT PLAN

## "CRAWFORD CANYON PARK"

Project Address:
Northwest of Crawford Canyon Road and Newport Boulevard
County of Orange, California

Prepared For:


13042 Old Myford Road
Irvine, CA 92602
(714) 973-6855


Prepared By:


*Hunsaker & Associates Irvine, Inc.*
3 Hughes
Irvine, CA 92618
(949) 583-1010


WQMP Preparation/Revision Date:
November 17, 2020

W.O. 3644-10X

# WATER QUALITY MANAGEMENT PLAN

## "CRAWFORD CANYON PARK"

Northwest of Crawford Canyon Road and Newport Boulevard
County of Orange, California

WQ XX-XXXX

# COUNTY OF ORANGE/SANTA ANA REGION PRIORITY PROJECT WATER QUALITY MANAGEMENT PLAN (WQMP)

Project Name:

## "CRAWFORD CANYON PARK"

## GRADING PERMIT NO. TBD

Northwest of Crawford Canyon Road and Newport Boulevard
County of Orange, California

Prepared for:

13042 Old Myford Rd
Irvine, CA 92602
(714) 973-6855

Prepared by:

*Hunsaker and Associates Irvine, Inc.*
Three Hughes
Irvine, CA 92618
(949) 583-1010
Contact: Vojta Safranek

Prepared: November 17, 2020

| Project Owner's Certification | | | |
|---|---|---|---|
| Permit/Planning Application No. | N/A | Grading Permit No. | TBD |
| Tract/Parcel Map and Lot(s) No. | N/A | Building Permit No. | N/A |
| Address of Project Site and APN (If no address, specify Tract/Parcel Map and Lot Numbers) | | | West of Crawford Canyon Road and Newport Avenue APN 503-382-04 |

This Water Quality Management Plan (WQMP) has been prepared for OC Parks by Hunsaker and Associates Irvine, Inc. The WQMP is intended to comply with the requirements of the local NPDES Stormwater Program requiring the preparation of the plan.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with the current Orange County Drainage Area Management Plan (DAMP) and the intent of the non-point source NPDES Permit for Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and the incorporated Cities of Orange County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement and amend the WQMP. An appropriate number of approved and signed copies of this document shall be available on the subject site in perpetuity.

| Owner: OC Parks | | | |
|---|---|---|---|
| Name/Title | | | |
| Company | OC Parks | | |
| Address | 13042 Old Myford Road<br>Irvine, CA 92602 | | |
| Email | | | |
| Telephone # | (714) 973-6855 | | |
| I understand my responsibility to implement the provisions of this WQMP including the ongoing operation and maintenance of the best management practices (BMPs) described herein. | | | |
| Signature | | Date | |

| Preparer (Engineer): Vojta Safranek | | | |
|---|---|---|---|
| Title | Project Manager | PE Registration # | |
| Company | Hunsaker & Associates Irvine, Inc. | | |
| Address | 3 Hughes<br>Irvine, CA 92618 | | |
| Email | vsafranek@hunsaker.com | | |
| Telephone # | (949) 583-1010 | | |
| I hereby certify that this Water Quality Management Plan is in compliance with, and meets the requirements set forth in, Order No. R8-2009-0030/NPDES No. CAS618030, of the Santa Ana Regional Water Quality Control Board. | | | |
| Preparer Signature | | Date | |
| Place Stamp Here | | | |

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II.4 POST DEVELOPMENT DRAINAGE CHARACTERISTICS ..... 6
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Attachments

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Attachment B ..... BMP Worksheets/Calculations & BMP Details
Attachment C ..... Hydromodification Analysis (incorporated by reference)
Attachment D ..... Supporting Project Information
Attachment E ..... BMP Maintenance Agreement
Attachment F ..... WQMP Notice of Transfer of Responsibility
Attachment G ..... BMP Operation and Maintenance Plan

# SECTION I PERMIT(S) AND WATER QUALITY CONDITIONS OF APPROVAL OR ISSUANCE

The project's discretionary permit and water quality information are provided in the following:

| PROJECT INFOMATION | | | |
|---|---|---|---|
| Permit/Application No.<br>(If applicable) | N/A | Grading or Building Permit No.<br>(If applicable) | TBD |
| Address of Project Site (or Tract Map and Lot Number if no address) and APN | West of Crawford Canyon Road and Newport Avenue<br>APN 503-382-04 | | |
| **WATER QUALITY CONDITIONS OF APPROVAL OR ISSUANCE** | | | |
| Water Quality Conditions of Approval or Issuance applied to this project. (Please list verbatim.) | This Water Quality Management Plan has been developed in accordance with Section 7.II-1.5 of the Model Water Quality Management Plan and provides the basic framework to address the water quality component for Crawford Canyon Park Project.<br>The project is considered a priority project under the County of Orange Local Implementation Plan and the WQMP Technical Guidance Document (TGD) for North Orange County. Therefore, the project is subject to the requirements of a Water Quality Management Plan (WQMP) to minimize the adverse effects of urbanization on site hydrology, runoff flow rates and pollutant loads.<br>There is currently no applicable s project-specific water quality conditions of approval for this project. | | |
| **CONCEPTUAL WQMP** | | | |
| Was a Conceptual Water Quality Management Plan previously approved for this project? | No. | | |
| **WATERSHED-BASED PLAN CONDITIONS** | | | |
| Provide applicable conditions from watershed-based plans including WIHMPs and TMDLs | The project is located within the San Diego Creek Watershed.<br>Established TMDLs for the project's receiving waters are as follows:<br>Peters Canyon Channel – No TMDL's established;<br>San Diego Creek Reach 1 – Nutrients, Pesticides, Sedimentation/Siltation, Metals;<br>Upper Newport Bay – Indicator Bacteria, Nutrients, Pesticides, Sedimentation/Siltation, Metals; and | | |

| | |
|---|---|
| | Lower Newport Bay – Indicator Bacteria, Nutrients, Pesticides, Metals, Siltation.<br><br>Per the WIHMP for San Diego Creek, the project is subject to hydromodification impacts as it is tributary to natural reaches of downstream San Diego Creek. |

# SECTION II PROJECT DESCRIPTION

## II.1 PROJECT DESCRIPTION

| DESCRIPTION OF PROPOSED PROJECT | | | | |
|---|---|---|---|---|
| Development Category (From Model WQMP, Table 7.11-2; or -3): | This project is considered a priority project under the following categories:<br>*Priority Project, Category 1 – New development projects that create 10,000 square feet or more of impervious surface. This category includes commercial, industrial, residential housing subdivisions, mixed-use, and public projects on private or public property that falls under the planning and building authority or the Permittees.* | | | |
| Project Area (ft2): 168,695 ft2 (3.87 AC)[1] | Number of Dwelling Units: None proposed | | SIC Code: N/A. Project is for a public Park | |
| Project Area | Pervious Surface | | Impervious Surface | |
| | Area (acres or sq ft) | Percentage | Area (acres or sq ft) | Percentage |
| Pre-Project Conditions | 3.5 AC | 90 | 0.37 AC | 10 |
| Post-Project Conditions | 3.0 AC | 78 | 0.87 AC | 22 |
| Drainage Patterns/Connections | In the pre-project condition, onsite project runoff from the western, northern, central and also run-on from the western portion of Crawford Canyon Road sheet flow from east to west to a depressed area downstream (at the southern-central portion of the site), where flows are collected and conveyed to an existing trapezoidal channel located just west of the project site via an existing 36" corrugated metal pipe (CMP). Existing concrete v-ditches located along the southern project boundary adjacent to Newport Blvd also collect and convey flows within the eastern portions of the project site, southerly prior to discharging to the existing trapezoidal channel via a concrete down drain.<br>Runoff is then conveyed downstream in the existing County Facility (F13) prior to discharging southerly to Peters Canyon Channel (OCFCD Facility No. and then southwesterly to San Diego Creek (Reach 1), Newport Bay (Upper and Lower) and the Pacific Ocean. | | | |
| Narrative Project Description:<br>(Use as much space as necessary) | The proposed project, "Crawford Canyon Park" (The Project), consists of an approximately 3.87-acre irregularly shaped parcel located just northwest of the intersection of Crawford Canyon Road and Newport Avenue. Specifically, the site is bound to the north by existing residential homes; to the east by Crawford Canyon Road and existing residential homes beyond; to the south by Newport Boulevard; and to the west by an | | | |

[1] Project gross area based on property/tract limits. Net improvement areas, hydrological boundaries and BMP Drainage Management Areas will differ based on project grading, proposed improvements areas, developed drainage areas and BMP management areas.

| DESCRIPTION OF PROPOSED PROJECT | |
|---|---|
| | existing trapezoidal drainage channel and residential homes beyond.<br><br>The project proposes a park facility consisting of 8-foot wide walks, 5-foot wide trails, picnic tables and benches, exercise stations, pedestrian bridges, various play areas, retaining walls, a new asphalt parking area, a maintenance access road, landscaping areas, a meandering dry creek and supporting infrastructure improvements.<br><br>Project landscaping areas include open space and slope landscaping located throughout the project site, consisting of shrub and groundcover. Total landscaping is anticipated to consist of approximately 78% of the project site, or 3.0 acres.<br><br>Paved project areas include project walkways, decorative pavement, hardscape areas, drainage structures and the project's entrance and parking lot. Total impervious area is anticipated to consist of approximately 22% of the project site, or 0.87 acres.<br><br>No other improvements, such as food service facilities, delivery areas, loading docks, outdoor material storage areas or trash enclosure areas, are proposed for the project.<br><br>Anticipated use onsite will consist primarily of active and passive recreational activities, such as playing, exercising, walking running, sports, lounging, reading and eating.<br><br>Wastes typical of parks and recreational areas are anticipated to be generated daily from the project site. These include food wastes, paper products, plastics, green wastes and recyclable materials. Designated receptacles will be provided within the park for visitor use. The receptacles shall be covered at all times, with collected materials removed on a weekly basis (at minimum), or as needed, by the contracted park maintenance staff for disposal.<br><br>All proposed improvements are shown in the WQMP Site Plan in Section VI of this WQMP. |

## II.2 POTENTIAL STORMWATER POLLUTANTS

Table 2.1, Anticipated and Potential Pollutants Generated by Land Use Type, from the Technical Guidance Document (December 2013) lists the following Pollutants of Concern (POC's) associated with the proposed development:

| POLLUTANTS OF CONCERN | | | |
|---|---|---|---|
| Pollutant | Check One: E=Expected to be of concern N=Not Expected to be of concern | | Additional Information and Comments |
| Suspended Solid/Sediment | E ☒ | N ☐ | Pollutant is a Primary POC. Potential sources of sediment include disturbed or unstabilized landscaping areas and disturbed earth surfaces. |
| Nutrients | E ☒ | N ☐ | Pollutant is Primary POC as downstream water is impaired for Nutrients. Potential sources of nutrients include fertilizers, sediment and trash/debris. |
| Heavy Metals | E ☒ | N ☐ | Pollutant is a Primary POC. Potential sources for the project include automobiles from the project's parking lot area. |
| Pathogens (Bacteria/Virus) | E ☒ | N ☐ | Pollutant is a Primary POC. Potential sources for the project include food wastes, pet wastes, sediment and landscaping areas. |
| Pesticides | E ☒ | N ☐ | Pollutant is a Primary POC. Potential sources of pesticides include landscaping and open space areas. |
| Oil and Grease | E ☒ | N ☐ | Potential sources for the project include automobiles from the project's parking lot area. |
| Toxic Organic Compounds | E ☒ | N ☐ | Pollutant is a Primary POC. Potential sources for the project include automobiles from the project's parking lot area. |
| Trash and Debris | E ☒ | N ☐ | Potential sources of trash and debris include landscaping activities, food wrappers and food wastes. |

## II.3 HYDROLOGIC CONDITIONS OF CONCERN

The purpose of this section is to identify any hydrologic conditions of concern (HCOC) with respect to downstream flooding, erosion potential of natural channels downstream, impacts of increased flows on natural habitat, etc. that may occur as the result of project implementation. As specified in Section 2.3.3 of the Model WQMP, projects must identify and mitigate any HCOCs. An HCOC is a combination of upland hydrologic conditions and stream biological and physical conditions that present a condition of concern for physical and/or biological degradation of streams.

The project resides within the jurisdiction of the Santa Ana RWQCB and is subject to the requirements of the North Orange County WQMP TGD, in which HCOCs are considered to exist if the volume for the 2-year runoff event for post-development condition exceeds pre-development condition by more than 5% or the time of concentration is less than the pre-development condition by greater than 5%.

Is the proposed project potentially susceptible to hydromodification impacts?

☐ No – Show map

☒ Yes – Describe applicable hydrologic conditions of concern below.

The proposed project will increase the amount of impervious area located within the project site by a very small amount, thereby potentially increasing the developed condition runoff volume and rate. Therefore, the project is subject to the hydromodification requirements prescribed in the TGD for North Orange County.

A summary of the analysis is provided in the following table:

| HCOC Analysis Summary (2-year event) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Total Drainage Area [1] | Existing Condition | | | Proposed Condition | | | Δ Acres | Δ $Q_2$ (cfs) | Δ Tc (min) |
| | Acres | $Q_2$ (cfs) | Tc (min) | Acres[3] | $Q_2$ (cfs) | Tc (min) | | | |
| Overall (onsite plus offsite) | 37.1 | 35.8 | 12.46 | 37.1 | 35.7 | 10.82 | 0.0 | -0.1 | -1.64 |

*(1) Consists of onsite runoff and any offsite run-on areas to selected point of compliance (See Node 45 in project hydrology study).*

Based on the project's hydrology analysis for the 2-year storm, the Tc to reach peak runoff for the developed condition is reduced by greater than 5%. Therefore, the project must implement hydromodification control BMPs to address HCOC impacts.

## II.4 POST DEVELOPMENT DRAINAGE CHARACTERISTICS

The project's post-development drainage characteristics are described as follows:

| |
|---|
| In the developed condition, the project consists of 4 drainage areas. |

Runoff from the eastern and central project areas (as well as the western portion of Crawford Canyon Road) is conveyed as sheet flow to a swale (dry creek) and conveyed southwesterly to a basin (bioretention basin) prior to discharging westerly to the existing open channel.

Runoff from the proposed parking lot is conveyed southwesterly as sheet flow and gutter to a catch basin prior to discharging southwesterly to the existing open channel.

Runoff from the sidewalk and landscaping area located at the southernmost portion of the project site is conveyed as sheet flow southwesterly to the existing open channel.

*Low Impact Development*

To satisfy the project's requirements for Low Impact Development (LID) requirements and water quality treatment, water qualify runoff from each of the project's Drainage Management Areas (DMAs) are addressed as follows.

DMA 1 (2.24 acres) – Consists of the eastern and central portions of the project site and western portion of Crawford Road. Runoff is conveyed southwesterly to a bioretention basin for infiltration of runoff.

DMA 2 (0.48 acres) – Consists of the proposed parking lot. Runoff is conveyed southwesterly to a proprietary biotreatment BMP (Filterra Biofiltration Unit or County approved equivalent) for treatment prior to discharge. Due to proximity of this DMA to a downstream retaining wall, infiltration BMPs are not proposed.

DMA 3 (0.07 acres) – Consists of landscaping and approximately 0.02 acres (840 $ft^2$) of sidewalk improvements located in the southernmost portion of the site. Runoff from the sidewalk will be conveyed northwesterly as sheet flow across the landscaping area, utilizing Hydrologic Source Control (HSC) BMP (HSC-2 Impervious Area Dispersion) prior to discharging offsite.

DMA 4 (0.17 acres) – Consists of entirely of landscaping improvements located on the southern perimeter of the site, adjacent to Newport Avenue. Site will be vegetated with native/drought tolerant plant species. Site's intended use is not anticipated to generate pollutants of concern as it consists only of vegetated slopes. HSC BMPs will be employed to address runoff.

DMA 5 (0.84 acres) – Consists of the northwestern and western perimeter of the project site and includes slope areas, open landscaping and decomposed granite areas, a maintenance access road comprised of Grasscrete and a ribbon gutter for runoff conveyance. HSC BMPs will be employed to address runoff.

DMA 6 (0.07 acres) – Consists of southern-western perimeter of the project site, which includes primarily slope areas that sheet flow to the existing channel. Site will be vegetated with native/drought tolerant plant species. Site's intended use is not anticipated to generate pollutants of concern as it consists only of vegetated slopes. HSC BMPs will be employed to address runoff.

The locations and sizes of the proposed BMPs are provided in the WQMP Site Plan (Section 6).

## II.5 PROPERTY OWNERSHIP/MANAGEMENT

The project proponent, OC Parks, shall assume all onsite BMP maintenance, inspection and funding responsibilities. Inspection and maintenance activities are in Section V of this WQMP.

# SECTION III SITE DESCRIPTION

## III.1 PHYSICAL SETTING

General descriptions of the project area are provided below:

| PHYSICAL SETTING | |
|---|---|
| Name of Planned Community/Planning Area (if applicable) | Planning Area – Currently not located within Planning Area.<br>Project Name – "Crawford Canyon Park" |
| Location/Address | No current address.<br>Project is located northwest of the intersection of Crawford Canyon Road and Newport Avenue, County of Orange, California. |
| General Plan Land Use Designation | Existing: 1B Suburban Residential<br>Proposed: Open Space/Park |
| Zoning | Existing: AR (Agriculture Residential)<br>Proposed: Open Space/Park |
| Acreage of Project Site | 3.87 acres |
| Predominant Soil Type | Hydrologic Soil Type B |

## III.2 SITE CHARACTERISTICS

The following table summarizes general characteristics of the project site:

| SITE CHARACTERISTICS | |
|---|---|
| Precipitation Zone | 0.80 in. |
| Topography | The pre-project site is vacant and heavily disturbed, consisting of dirt areas and scattered trees throughout the project site. Generally, the site slopes from the northeast at approximately 392 feet above mean sea level (MSL) to the southwest, at approximately 348 feet above MSL. |
| Drainage Patterns/Connections | In the pre-project condition, onsite project runoff from the western, northern, central and also run-on from the western portion of Crawford Canyon Road sheet flow from east to west to a depressed area downstream (at the southern-central portion of the site), where flows are collected and conveyed to an existing trapezoidal channel located just west of the project site via an existing 36" corrugated metal pipe (CMP). Existing concrete v-ditches located along the southern project boundary adjacent to Newport Blvd also collect and convey flows within the eastern portions of the project site, southerly prior to discharging to the existing trapezoidal channel via a concrete down drain. |

| SITE CHARACTERISTICS | |
|---|---|
| | Runoff is then conveyed downstream in the existing County Facility (F13) prior to discharging southerly to Peters Canyon Channel (OCFCD Facility No. and then southwesterly to San Diego Creek (Reach 1), Newport Bay (Upper and Lower) and the Pacific Ocean. |
| Soil Type, Geology, and Infiltration Properties | Based on the County of Orange Technical Guidance Document (TGD) for Preparation of WQMPs and the geotechnical investigation, onsite soils consist primarily of Hydrologic Group B, characterized as having good infiltration rates when thoroughly wet. These soils are favorable for infiltration.<br><br>Infiltration testing conducted onsite as part of the project's geotechnical investigation (GMU Geotechnical, November 6. 2020) yielded rates ranging from 0.67 inches per hour to 1.35 inches per hour (without safety factor). |
| Hydrogeologic (Groundwater) Conditions | Project site is not located within a shallow groundwater zone, as defined by the TGD. Per the project's geotechnical report, groundwater was not encountered at a maximum exploration depth of 26' below existing grade. |
| Geotechnical Conditions (relevant to infiltration) | Based on the TGD, majority of underlying soils consist primarily of Group "B" soils, which are favorable for infiltration. However, per the geotechnical investigation, artificial fill soils were encountered in majority of the excavations at the site. The fills were encountered to a maximum depth of 5 feet below the existing grade and generally consists of yellow and dark brown, damp to moist, firm to stiff, sandy clays. Alluvium underlay the artificial fill to the maximum depth of the exploratory drill holes. The alluvium consists of brown to dark gray brown to yellow brown, damp to moist, medium dense to very dense, sands and firm to stiff clays. |
| Off-Site Drainage | The project site receives run-on from the western portion of Crawford Canyon Road to the east. In the developed condition, storm water run-on from this area will be conveyed through the project site via onsite storm drain improvements prior to discharging to the existing channel to the southwest. |
| Utility and Infrastructure Information | The project site contains existing storm drain facilities, sewer, electric and water utilities. These facilities will be retained as in pre-project conditions. There are no facilities onsite that would obstruct interfere with the project's LID BMPs. |

## III.3 WATERSHED DESCRIPTION

The following table provides descriptions of the project's receiving waters.

| WATERSHED DESCRIPTION | |
|---|---|
| Receiving Waters | Peters Canyon Channel, San Diego Creek (Reach 1), Upper and Lower Newport Bay. |
| 303(d) Listed Impairments | Peters Canyon Channel – Pesticides, Pathogens, pH<br>San Diego Creek (Reach 1) – Fecal Coliform, Selenium, Toxaphene, Nutrients, Pesticides, Sedimentation/Siltation, Benthic Community Effects, DDT, Malathion, Toxicity<br>Newport Bay (Upper) – Chlordane, Copper, DDT, Indicator Bacteria, Metals, Nutrients, PCBs, Pesticides, Sediment Toxicity, Sedimentation Siltation, Malathion<br>Newport Bay (Lower) – Chlordane, Copper, DDT, Indicator Bacteria, Nutrients, PCBs, Pesticides, Sediment Toxicity |
| Applicable TMDLs | Peters Canyon Channel – None<br>San Diego Creek (Reach 1) – Indicator Bacteria, Nutrients, Pesticides, Sedimentation/Siltation, Metals<br>Newport Bay (Upper) – Indicator Bacteria, Nutrients, Pesticides, Sedimentation/Siltation, Metals, Siltation<br>Newport Bay (Lower) – Indicator Bacteria, Nutrients, Pesticides, Metals, Siltation |
| Pollutants of Concern for the Project | Pollutants of Concern for the project include: Suspended Solids/Sediment, Nutrients, Metals, Pathogens, Pesticides, Oil & Grease, Toxic Organic Compounds and Trash & Debris.<br>Primary Pollutants of Concern for the project include: Suspended Solids/Sediment, Nutrients, Metals, Pathogens, Pesticides and Toxic Organic Compounds. |
| Environmentally Sensitive and Special Biological Significant Areas | The project site is not located within 200 feet of any Areas of Special Biological Significance (ASBS) or designated Environmentally Sensitive Areas (ESAs). |

# SECTION IV BEST MANAGEMENT PRACTICES (BMPS)

## IV. 1 PROJECT PERFORMANCE CRITERIA

The project's performance criteria for HCOCs and LID BMPs are provided in the following table:

| PROJECT PERFORMANCE CRITERIA | | |
|---|---|---|
| Is there an approved WIHMP or equivalent for the project area that includes more stringent LID feasibility criteria or if there are opportunities identified for implanting LID on regional or sub-regional basis? | YES ☐ | NO ☒ |
| If yes, describe WIHMP feasibility criteria or regional/sub-regional LID opportunities. | There is currently no approved WIHMP for San Diego Creek. | |
| If HCOC exists, list applicable hydromodification control performance criteria (Section 7.II-2.4.2.2 in MWQMP) | Post-project runoff discharge volume for the 2-year frequency storm does not exceed that of the predevelopment condition by more than 5% and time of concentration of post-development runoff for the 2-year storm event is not less than that for the predevelopment condition by more than 5%. | |
| List applicable LID performance criteria (Section 7.II-2.4.3 from MWQMP) | • LID BMPs must be designed to retain, on-site, (infiltrate, harvest and use, or evapotranspire) storm water runoff up to 80 percent average annual capture efficiency.<br>• LID BMPs must be designed to:<br>- Retain, onsite, (infiltrate, harvest and use, or evapotranspire) stormwater runoff as feasible up to the Design Capture Volume, and<br>- Recover (i.e., draw down) the storage volume as soon as possible after a storm event, and if necessary<br>- Biotreat, on-site, additional runoff, as feasible, up to 80 percent average annual capture efficiency (cumulative, retention plus biotreatment), and, if necessary<br>- Retain or biotreat, in a regional facility, the remaining runoff up to 80 percent annual capture efficiency (cumulative, retention plus biotreatment, onsite plus offsite), and, if necessary<br>- Fulfill alternative compliance obligations for runoff volume not retained or biotreated up to 80 percent average annual capture efficiency using treatment controls or other alternative approaches as described in Section 7.II-3. | |

| PROJECT PERFORMANCE CRITERIA | |
|---|---|
| List applicable treatment control BMP performance criteria (Section 7.II-3.2.2 from MWQMP) | Not applicable. Project proposes the use of LID BMPs to address the project's design capture volume. |
| Calculate LID design storm capture volume for Project. | DCV = C x D x A x 43560 sf/ac x 1ft/12in<br>Where:<br>DCV = design storm capture volume, cu-ft<br>C = runoff coefficient = (0.75 x imp + 0.15)<br>Imp = impervious fraction of drainage area (ranges from 0 to 1)<br>D = storm depth (inches)<br>A = tributary area (acres)<br>*Imp = 0.70*<br>*D = 0.80 inches (See Attachment D)*<br>*A = 3.87 acres*<br>*DCV[1] = [(0.22*0.75)+0.15](0.80)(3.87)(43560)(1/12)*<br>*=3,540 cu-ft* |

*[1]DCV shown based on project limits. For actual DCV based on DMA limits, see Section IV.2.2.*

## IV.2 SITE DESIGN AND DRAINAGE PLAN

The primary goal of site design principles and techniques is to reduce land development impacts on water quality and downstream hydrologic conditions. Benefits of site design include reductions in the size of downstream BMPs, conveyance systems, pollutant loading and hydromodification impacts.

### *IV.2.1 Site Design BMPs*

The following section describes the site design BMPs that have been incorporated into this project.

*Minimize Impervious Area*

Landscaping and trees will be provided throughout the park to reduce the project's impervious footprint, thereby reducing runoff generated during rain events.

*Maximize Natural Infiltration Capacity*

Project will take advantage of onsite soils to infiltrate runoff wherever feasible. These measures include the use of pervious drainage swales, Grasscrete maintenance access road, decomposed granite and bioretention basin.

*Preserve Existing Drainage Patterns and Time of Concentration*

In the developed condition, runoff from project areas is consistent with pre-project conditions. Changes in the time of concentration and peak flows from pre-project conditions will be controlled via the project's hydromodification controls/detention facilities.

*Disconnect Impervious Areas*

Landscaping will be provided onsite to break up the project's impervious areas.

*Protect Existing Vegetation and Sensitive Areas, and Revegetate Disturbed Areas*

The pre-project site consists of heavily disturbed vegetation. All areas within project limits will be removed and revegetated with native and/or drought tolerant plantings.

*Revegetate Disturbed Areas and Xeriscape Landscaping*

Native and/or tolerant landscaping will be incorporated into site design, consistent with County guidelines, in proposed landscaping areas.

### *IV.2.2 Drainage Management Areas (DMAs)*

Per the TGD, the project site has been divided into Drainage Management Areas (DMAs) to be utilized for defining drainage areas tributary to the project's BMPs. DMA limits have been delineated based on the tributary drainage area for each BMP.

The design capture volume (DCV) utilizing the "Simple Method" described in TGD Section III.1.1 is provided below. Locations of DMAs and associated LID BMPs are provided on the exhibits in Section VI. Calculations and TGD Worksheets are provided in Appendix B of this WQMP.

| DMA | Area (Ac.) | Imp. | C-value | Design Storm Depth (in.) | $DCV_{SIMPLE}$ (cu-ft) |
|---|---|---|---|---|---|
| 1 | 2.24 | 0.247 | 0.335 | 0.8 | 2180.8 |
| 2 | 0.48 | 0.494 | 0.521 | 0.8 | 725.5 |
| 3 | 0.07 | 0.286 | 0.365 | 0.8 | 74.1 |
| 4 | 0.17 | 0 | 0.150 | 0.8 | 74.1 |
| 5 | 0.84 | 0.064 | 0.198 | 0.8 | 488.7 |
| 6 | 0.07 | 0 | 0.150 | 0.8 | 30.5 |
| Total | 3.87 | -- | -- | -- | 3573.7 |

## IV.3 LID BMP Selection and Project Conformance Analysis

Per the TGD, Low Impact Development (LID) BMPs must be incorporated into design features and source controls to reduce project related storm water pollutants. The incorporation of LID BMPs into project design requires evaluation of LID measures in the following treatment hierarchy: infiltration, evapotranspiration, harvest/reuse and biotreatment.

### *IV.3.1 Hydrologic Source Controls (HSC)*

Hydrologic source controls (HSCs) can be considered to be an integration of site design practices and LID BMPs. The goal of HSCs is to reduce runoff volume for a given drainage area without reducing the site's true impervious area.

| Name | Included? |
|---|---|
| Localized on-lot infiltration | ☐ |
| Impervious area dispersion (e.g. roof top disconnection) | ☒ |
| Street trees (canopy interception) | ☐ |

| Name | Included? |
|---|---|
| Residential rain barrels (not actively managed) | ☐ |
| Green roofs/Brown roofs | ☐ |
| Blue roofs | ☐ |
| Impervious area reduction (e.g. permeable pavers, site design) | ☒ |

*HSC-2 Impervious Area Dispersion*

Where feasible, runoff from the project's impervious areas and walkways will be directed to adjacent landscaping areas for filtration, evapotranspiration and incidental infiltration of runoff and volume reduction, prior to discharging to the storm drain system. Although HSC principles will be implemented throughout the project area, it will be solely employed in DMAs 3, 4, 5 and 6 to retain the DCV.

Summary of the project's HSC BMP credits are as follows:

| HSC BMP SUMMARY TABLE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DMA | BMP System | DCV ($ft^3$) | HSC System | Ratio [1] | $D_{HSC}$ | $D_{REM}$ | $DCV_{HSC}$ [2] ($ft^3$) | Latitude/ Longitude |
| 3 | HSC-2 Impervious Area Dispersion | 74.1 | 0.05 acres landscaping to 0.02 acres of walkway | >2:1 | 1.0" | 0.0" | 0.0 | 33.773436°, -117.789594° |
| 4 | | 74.1 | 0.17 acres landscaping to 0 acres of impervious | >2:1 | 1.0" | 0.0" | 0.0 | 33.774438°, -117.788238° |
| 6 | | 30.5 | 0.07 acres of landscaping to 0 acres of impervious | >2:1 | 1.0" | 0.0" | 0.0 | 33.774008°, -117.789376° |
| 5 | INF-6[3] (Grasscrete) | 488.7 | 0.79 acres to 0.05 acres of gutter | >2:1 | 1.0" | 0.0" | 0.0 | 33.774448°, -117.789009° |

*[1] Landscaping area meets or exceeds 2:1 requirement for HSC-2. Full capture of runoff achieved. See Attachment B, Worksheets A and B.*
*[2] Remaining DCV with HSC credit applied.*
*[3] Areas upstream of Grasscrete roadway consists entirely of pervious areas.*

### *IV.3.2 Infiltration BMPs*

Infiltration BMPs are LID BMPs that capture, store and infiltrate storm water runoff. These BMPs are engineered to store a specified volume of water and have no design surface discharge (underdrain or outlet structure) until this volume is exceeded. Examples of infiltration BMPs include infiltration trenches, bioretention without underdrains, drywells, permeable pavement, and underground infiltration galleries.

Based to the project's predominant soil type (Type "B"), the project proposes the use of infiltration BMPs to address pollutants from project-related runoff. Supporting calculations are provided in Attachment B of this WQMP.

| Name | Included? |
|---|---|
| Bioretention without underdrains | ☒ |
| Rain gardens | ☐ |
| Porous landscaping | ☐ |
| Infiltration planters | ☐ |
| Retention swales | ☐ |
| Infiltration trenches | ☐ |
| Infiltration basins | ☐ |
| Drywells | ☐ |
| Subsurface infiltration galleries | ☐ |
| French drains | ☐ |
| Permeable asphalt | ☐ |
| Permeable concrete | ☐ |
| Permeable concrete pavers | ☐ |
| Other: | ☐ |

*BMP Sizing*

The proposed BMPs will be sized accordingly its tributary drainage area, as provided in the following table:

| INFILTRATION DESIGN SUMMARY | | | | | | |
|---|---|---|---|---|---|---|
| DMA | $DCV_{SIMPLE}$ (cu-ft) | BMP | Maximum Ponding Depth (ft) | Minimum Footprint ($ft^2$) | Footprint Provided ($ft^2$) | Latitude/ Longitude |
| 1 | 2180.8 | INF-3 Bioretention | 1.1 *(1)* | 1,983 | 2,001 | 33.774192°, -117.789027° |

*(1) Based on $K_{DES}$ of 0.275 in/hr ($K_{OBS}$ = 0.6 in/hr, FS = 2.18).*

### *IV.3.3 Evapotranspiration, Rainwater Harvesting BMPs*

| Name | Included? |
|---|---|
| EVAPOTRANSPIRATION | |
| All HSCs; *See Section IV.3.1* | ☐ |
| Surface-based infiltration BMPs | ☐ |
| Biotreatment BMPs | ☐ |

| Name | Included? |
|---|---|
| HARVEST & REUSE/ RAINWATER HARVESTING | |
| Above-ground cisterns and basins | ☐ |
| Underground detention | ☐ |

*Evapotranspiration*

Evapotranspiration BMPs are a class of retention BMPs that discharges stored volume predominately to ET, through some infiltration may occur. ET includes both evaporation and transpiration, and ET BMPs may incorporate one or more of these processes. BMPs must be designed to achieve the maximum feasible ET, where required to demonstrate that the maximum amount of water has been retained on-site. Since ET is not the sole process in these BMPs, specific design and sizing criteria have not been developed for ET-based BMPs.

*Harvest and Reuse*

Harvest and Reuse (aka. Rainwater Harvesting) BMPs are LID BMPs that capture and store storm water runoff for later use. These BMPs are engineered to store a specified volume of water and have no design surface discharge until this volume is exceeded. Harvest and use BMPs include both above-ground and below-ground cisterns. Examples of uses for harvested water include irrigation, toilet and urinal flushing, vehicle washing, evaporative cooling, industrial processes and other non-potable uses.

The project does not propose the use of harvesting BMPs, as the project will employ the use of infiltration BMPs to satisfy LID requirements.

### *IV.3.4 Biotreatment BMPs*

Biotreatment BMPs are a class of structural LID BMPs that treat suspended solids and dissolved pollutants in storm water using mechanisms characteristic of biologically active systems. These BMPs are considered treat and release facilities and include treatment mechanisms that employ soil microbes and plants. Additional benefits of these BMPs may include aesthetic enjoyment, recreational use, wildlife habitat and reduction in storm water volume.

| BIOTREATMENT | |
|---|---|
| Name | Included? |
| Bioretention with underdrains (Biofiltration) | ☐ |
| Stormwater planter boxes with underdrains | ☐ |
| Rain gardens with underdrains | ☐ |
| Constructed wetlands | ☐ |
| Vegetated swales | ☐ |
| Vegetated filter strips | ☐ |
| Proprietary vegetated biotreatment systems | ☒ |
| Wet extended detention basin | ☐ |
| Dry extended detention basins | ☐ |
| Other: | ☐ |

The project proposes the use of a proprietary biotreatment BMP (Filterra Biofiltration or approved equivalent) to address runoff from the proposed parking lot area.

| BIOTREATMENT BMP DESIGN SUMMARY | | | | |
|---|---|---|---|---|
| DMA | BMP | $Q_{BMP}$ (cfs) | BMP Unit/Model and capacity | BMP Location (Lat/Long) |
| 2 | BIO-7 Proprietary Biotreatment | 0.065 | Filterra 4x8 (0.074 cfs) | 33.773779°, -117.789302° |

### *IV.3.5 Hydromodification Control BMPs*

The project is subject to hydromodification. The following BMPs will be employed to address project impacts.

| HYDROMODIFICATION CONTROL BMPS | |
|---|---|
| BMP Name | BMP Description |
| Bioretention Basin and/or Upsized Storm Drain System (DMA 1) | The project's main storm drain line will be upsized and/or detention within the bioretention basin will be utilized to detain the difference in runoff for the 2-year storm event (volume and Tc) to mitigate HCOC. |
| Upsized Storm Drain System (DMA 2) | The project's main storm drain line in the parking lot area will be upsized to detain the difference in runoff for the 2-year storm event (volume and Tc) to mitigate HCOC |

### *IV.3.6 Regional/Sub-Regional LID BMPs*

Not applicable to project. Project is not part of any regional or sub-regional BMP programs. Project will employ use of onsite LID BMPs to address project runoff.

### *IV.3.7 Treatment Control BMPs*

Not applicable to project. Project will employ use of onsite LID BMPs to address project runoff.

#### Source Control BMPs

In accordance with the County DAMP and County of Orange Local Implementation Plan (LIP), both structural and non-structural source control BMPs are required for all priority projects unless deemed not applicable based on project characteristics. The following tables summarize the source control BMPs (Non-Structural and Structural) specified in the County DAMP.

The following tables show source control BMPs (routine non-structural and routine structural) included in this project and those that were not included.

### *IV.3.8 Non-Structural Source Control BMPs*

The table below indicates all Non-Structural Source Control BMPs to be utilized in the project. Additional discussions of the selected BMPs are provided in the BMP Inspection and Maintenance Responsibility Matrix provided in Section V of this WQMP.

| NON-STRUCTURAL SOURCE CONTROL BMPS | | | | |
|---|---|---|---|---|
| Identifier | Name | Check One | | If not applicable, state brief reason |
| | | Included | Not Applicable | |
| N1 | Education for Property Owners, Tenants and Occupants | ☐ | ☒ | Not applicable for public park. |
| N2 | Activity Restrictions | ☒ | ☐ | |
| N3 | Common Area Landscape Management | ☒ | ☐ | |
| N4 | BMP Maintenance | ☒ | ☐ | |
| N5 | Title 22 CCR Compliance (How development will comply) | ☐ | ☒ | Proposed facility will not generate waste subject to Title 22 CCR compliance. |
| N6 | Local Industrial Permit Compliance | ☐ | ☒ | Project is not subject to industrial permit. |
| N7 | Spill Contingency Plan | ☐ | ☒ | Proposed facility will not generate waste or store materials subject to the requirements of Chapter 6.95 of the CA Health and Safety Code. |
| N8 | Underground Storage Tank Compliance | ☐ | ☒ | No underground storage tanks proposed for the project. |

| NON-STRUCTURAL SOURCE CONTROL BMPS | | | | |
|---|---|---|---|---|
| Identifier | Name | Check One | | If not applicable, state brief reason |
| | | Included | Not Applicable | |
| N9 | Hazardous Materials Disclosure Compliance | ☐ | ☒ | Proposed facility will not store or generate hazardous materials subject to agency requirements. |
| N10 | Uniform Fire Code Implementation | ☐ | ☒ | Proposed facility does not propose to store toxic or highly toxic compressed gases. |
| N11 | Common Area Litter Control | ☒ | ☐ | |
| N12 | Employee Training | ☒ | ☐ | |
| N13 | Housekeeping of Loading Docks | ☐ | ☒ | None proposed. |
| N14 | Common Area Catch Basin Inspection | ☒ | ☐ | |
| N15 | Street Sweeping Public Streets and Parking Lots | ☐ | ☒ | |
| N16 | Retail Gasoline Outlets | ☐ | ☒ | Not in project scope. |

*N2 – Activity Restrictions*

Activity restrictions to minimize potential impacts to water quality and with the purpose of protecting water quality will be prescribed by the County for facility users and maintenance staff. Restrictions include prohibited activities within park property that have the potential to impact water quality, such as illegal dumping of wastes, proper clean up and disposal of pet wastes, proper disposal of litter and trash, and prohibiting wash down of the park's paved areas.

*N3 – Common Area Landscape Management*

Maintenance activities for landscape areas shall be consistent with County and manufacturer guidelines for fertilizer and pesticide use (OC DAMP Section 5.5). Maintenance includes trimming, weeding and debris removal and vegetation planting and replacement and shall be consistent with the County's Landscape Ordinance. Stockpiled materials during maintenance activities shall be placed away from drain inlets and runoff conveyance devices. Wastes shall be properly disposed of or recycled.

*N4 – BMP Maintenance*

Responsibility for implementation, inspection and maintenance of all BMPs (structural and non-structural) shall be consistent with the BMP Inspection and Maintenance Responsibilities Matrix provided in Section V of this WQMP, with documented records of inspections and maintenance activities completed.

*N11 – Common Area Litter Control*

The County shall implement a trash management and litter control procedures to minimize the potential for runoff pollution. These include the use of regular site patrols, ensuring all litter and trash are properly disposed, adequate capacity in waste receptacles and reporting any violations from facility users to management staff.

*N12 – Employee Training*

All employees, contractors and subcontractors involved for site maintenance shall be trained on the proper use and staging of landscaping and other materials with the potential to impact runoff and proper clean-up of spills and materials.

*N14 – Common Area Catch Basin Inspection*

As required by the TGD, at least 80% of all drainage facilities shall be inspected each year and, if necessary, cleaned and maintained prior to the storm season, no later than October 15th each year; with 100% of all drainage facilities inspected, cleaned and maintained within a two year period. Drainage facilities include catch basins and inlets, detention vaults and the project's LID BMPs.

*N15 – Street Sweeping Public Streets and Parking Lots*

Project parking lot will be vacuum swept on twice per month, consistent with County's sweeping schedule.

Refer to Section V for implementation frequency and maintenance responsibilities.

### *IV.3.9 Structural Source Control BMPs*

The source control BMPs have been selected in the following table to address the anticipated pollutants generated by the proposed project. These BMPs are designed to work in conjunction with the project's LID BMPs to minimize potential impacts to the site's receiving waters.

| STRUCTURAL SOURCE CONTROL BMPS | | | | |
|---|---|---|---|---|
| Identifier | Name | Check One | | If not applicable, state brief reason |
| | | Included | Not Applicable | |
| S1 | Provide storm drain system stenciling and signage | ☒ | ☐ | |
| S2 | Design and construct outdoor material storage areas to reduce pollution introduction | ☐ | ☒ | No outdoor storage areas proposed for park. |
| S3 | Design and construct trash and waste storage areas to reduce pollution introduction | ☐ | ☒ | |
| S4 | Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control | ☒ | ☐ | |
| S5 | Protect slopes and channels and provide energy dissipation | ☒ | ☐ | |
| | Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit) | ☐ | ☒ | Not applicable to SARWQCB. |
| S6 | Dock areas | ☐ | ☒ | None proposed. |
| S7 | Maintenance bays | ☐ | ☒ | No maintenance bays proposed for project. |

| STRUCTURAL SOURCE CONTROL BMPS | | | | |
|---|---|---|---|---|
| Identifier | Name | Check One | | If not applicable, state brief reason |
| | | Included | Not Applicable | |
| S8 | Vehicle wash areas | ☐ | ☒ | No vehicle washing allowed onsite. |
| S9 | Outdoor processing areas | ☐ | ☒ | No outdoor processing of goods required for project. |
| S10 | Equipment wash areas | ☐ | ☒ | No wash areas onsite. |
| S11 | Fueling areas | ☐ | ☒ | No fueling areas in project scope. |
| S12 | Hillside landscaping | ☒ | ☐ | Project is not hillside development with large slopes. |
| S13 | Wash water control for food preparation areas | ☐ | ☒ | Not in project scope. |
| S14 | Community car wash racks | ☐ | ☒ | Not in project scope. |

*S1 – Provide Storm Drain System Stenciling and Signage (CASQA SD-13)*

Storm drain stenciling with a brief message or graphical icons with symbols, prohibiting the dumping of improper materials into the storm drain system shall be placed in highly visible areas adjacent to all storm drain inlets. The BMP is designed to alert and educate facility users of the destination of pollutants discharged into storm drain systems. Legibility of stencils and signs shall be maintained.

*S4 – Efficient Irrigation System & Landscape Design (CASQA SD-10 & SD-12)*

In conjunction with routine landscaping maintenance activities, inspect irrigation for signs of leaks, overspray and repair or adjust accordingly. Adjust system cycle to accommodate seasonal fluctuations in water demand and temperatures. Ensure use of native or drought tolerant/non-invasive plant species to minimize water consumption.

*S5 – Protect Slopes and Channels and Provide Energy Dissipation*

The project's landscaped slopes shall be inspected for adequate vegetation cover, vegetation health and signs of erosion. Dead or dying vegetation shall be replaced as needed. Signs of erosion and concentrated flow areas shall be noted and repaired as needed.

*S12 – Site Design & Landscape Planning (Hillside Landscaping)*

Hillside areas that are disturbed by the project shall be re-vegetated with deep-rooted, drought tolerant plant species selected for erosion control and consistent with County requirements.

## IV.4 ALTERNATIVE COMPLIANCE PLAN (IF APPLICABLE)

The project is able to fully address the design capture volume via onsite LID BMPs. Therefore, an alternative compliance plan is not applicable to this project.

### *IV.4.1 Water Quality Credits*

Not applicable to project. Project will utilize LID BMPs onsite to address storm water.

| DESCRIPTION OF PROPOSED PROJECT | | | | |
|---|---|---|---|---|
| Project Types that Qualify for Water Quality Credits (Select all that apply): | | | | |
| ☐Redevelopment projects that reduce the overall impervious footprint of the project site. | ☐Brownfield redevelopment, meaning redevelopment, expansion, or reuse of real property which may be complicated by the presence or potential presence of hazardous substances, pollutants or contaminants, and which have the potential to contribute to adverse ground or surface WQ if not redeveloped. | | ☐ Higher density development projects which include two distinct categories (credits can only be taken for one category): those with more than seven units per acre of development (lower credit allowance); vertical density developments, for example, those with a Floor to Area Ratio (FAR) of 2 or those having more than 18 units per acre (greater credit allowance). | |
| ☐ Mixed use development, such as a combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that can demonstrate environmental benefits that would not be realized through single use projects (e.g. reduced vehicle trip traffic with the potential to reduce sources of water or air pollution). | | ☐ Transit-oriented developments, such as a mixed use residential or commercial area designed to maximize access to public transportation; similar to above criterion, but where the development center is within one half mile of a mass transit center (e.g. bus, rail, light rail or commuter train station). Such projects would not be able to take credit for both categories, but may have greater credit assigned | | ☐ Redevelopment projects in an established historic district, historic preservation area, or similar significant city area including core City Center areas (to be defined through mapping). |
| ☐Developments with dedication of undeveloped portions to parks, preservation areas and other pervious uses. | ☐ Developments in a city center area. | ☐ Developments in historic districts or historic preservation areas. | ☐ Live-work developments, a variety of developments designed to support residential and vocational needs together – similar to criteria to mixed use development; would not be able to take credit for both categories. | ☐ In-fill projects, the conversion of empty lots and other underused spaces into more beneficially used spaces, such as residential or commercial areas. |
| Calculation of Water Quality Credits (if applicable) | N/A | | | |

### *IV.4.2 Alternative Compliance Plan Information*

Not applicable to project. Project will utilize LID BMPs onsite to address storm water pollutants.

# SECTION V INSPECTION/MAINTENANCE RESPONSIBILITY FOR BMPS

It has been determined that the Owner, OC Parks, shall assume all BMP funding, inspection and maintenance responsibilities for Crawford Canyon Park project.

Contact/Title _____

Company OC Parks

Address 13042 Old Myford Road
Irvine, CA 92602

Email _____

Telephone # (714) 973-6855

The Owner shall verify BMP implementation and ongoing maintenance through inspection, self-certification or other equally effective measure. The certification shall verify that the inspection and maintenance of all BMPs are performed in accordance to the requirements of this WQMP.

The BMP Inspection and Maintenance Responsibility Matrix is provided in the following table. An Operations and Maintenance (O&M) Plan is also included as an attachment to this WQMP.

| BMP INSPECTION/MAINTENANCE | | | |
|---|---|---|---|
| BMP | Responsible Party(s) | Inspection/ Maintenance Activities Required | Minimum Frequency of Activities |
| HYDROLOGIC SOURCE CONTROL BMPs | | | |
| HSC-2 Impervious Area Dispersion | OC Parks | Inspect for standing water and that water infiltrates into underlying soil completely. Remove accumulated sediment or repair eroded areas as needed. | After qualifying storm events of 0.5" or greater and monthly with landscaping maintenance |
| INF-5 Permeable Pavement (Grasscrete) | OC Parks | Inspect for oil spills, dead vegetation, soil level within modules and stability. Remove/repairs as needed based on inspections. Trim vegetation as needed to maintain desired height. | Monthly with landscaping maintenance |
| INFILTRATION BMPs | | | |
| INF-3 Bioretention with no Underdrains | OC Parks | Conduct general inspection and maintenance per routine landscaping maintenance activities. Inspect surface area for debris, trash and vegetation accumulation. Inspect for general plant health. Inspect for sediment, build up on planting surface and in area drain inlet. Inspect for sediment or debris clogging inlet. Inspect for standing water after rain event of 0.5 inches or greater, based (48-hour draw down). Clean/repair items as necessary. | Monthly |

| BMP INSPECTION/MAINTENANCE | | | |
|---|---|---|---|
| BMP | Responsible Party(s) | Inspection/ Maintenance Activities Required | Minimum Frequency of Activities |
| | | Remove vegetation, permeable soil and drain rock. Replace in kind. Repair if necessary. | Every 5 to 7 years, or as needed |
| BIOTREATMENT BMPs | | | |
| BIO-7 Proprietary Biotreatment (Filterra Biofiltration) | OC Parks | Inspect unit for accumulated debris and sediment and plant health; remove trash; trim vegetation. Remove sediment, replace mulch (if included), replace media as needed. | 2-4 weeks during rainy season or after significant events. Frequency to be customized after 1-2 years observation. |
| NON-STRUCTURAL SOURCE CONTROL BMPs | | | |
| N2 Activity Restrictions | OC Parks | Activity restrictions to minimize potential impacts to water quality and with the purpose of protecting water quality will be prescribed by the County for facility users and maintenance staff. Restrictions include prohibited activities within park property that have the potential to impact water quality, such as illegal dumping of wastes, proper clean up and disposal of pet wastes, proper disposal of litter and trash, and prohibiting wash down of the park's paved areas. | Ongoing |
| N3 Common Area Landscape Management | OC Parks | Maintenance shall be consistent with County requirements; any fertilizer and/or pesticide usages shall be consistent with County and manufacturer guidelines for use of fertilizers and pesticides. Maintenance includes mowing, weeding, and debris removal on a weekly basis. Trimming, replanting and replacement of mulch shall be performed on an as-needed basis. Trimmings, clippings, and other waste shall be properly disposed of off-site in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and drain inlets. | Monthly and as needed |

| BMP INSPECTION/MAINTENANCE | | | |
|---|---|---|---|
| BMP | Responsible Party(s) | Inspection/ Maintenance Activities Required | Minimum Frequency of Activities |
| N4 BMP Maintenance | OC Parks | Maintenance of BMPs implemented at the project site shall be performed at the frequency prescribed in this WQMP. Records of inspections and BMP maintenance shall be maintained by the County and documented with the WQMP. | Ongoing |
| N11 Common Area Litter control | OC Parks | Litter patrol, violations investigation, reporting and other litter control activities shall be performed by the County staff as needed and in conjunction with maintenance activities for common areas. | Ongoing patrols. Weekly (minimum) pick up and removal. Monthly inspections with landscaping maintenance. |
| N12 Employee Training | OC Parks | All employees and any contractors will require training to ensure that employees are aware of maintenance activities that may result in pollutants reaching the storm drain. Training will include, but not limited to, spoil clean up procedures, proper waste disposal, housekeeping practices, etc. | Upon hire and annually thereafter |
| N14 Common Area Catch Basin Inspection | OC Parks | Catch basin inlets, area drains, curb-and-gutter systems and other drainage systems shall be inspected prior to October 1st of each year and after large storm events. If necessary, drains shall be cleaned prior to any succeeding rain events. 80% of private facilities shall be inspected and cleaned annually, with 100% of facilities inspected and maintained within a 2-year period. | Annually |
| N15 Street Sweeping | OC Parks | Project streets and parking areas shall be vacuum swept at a minimum, weekly basis, consistent with City schedules. | Twice per month |

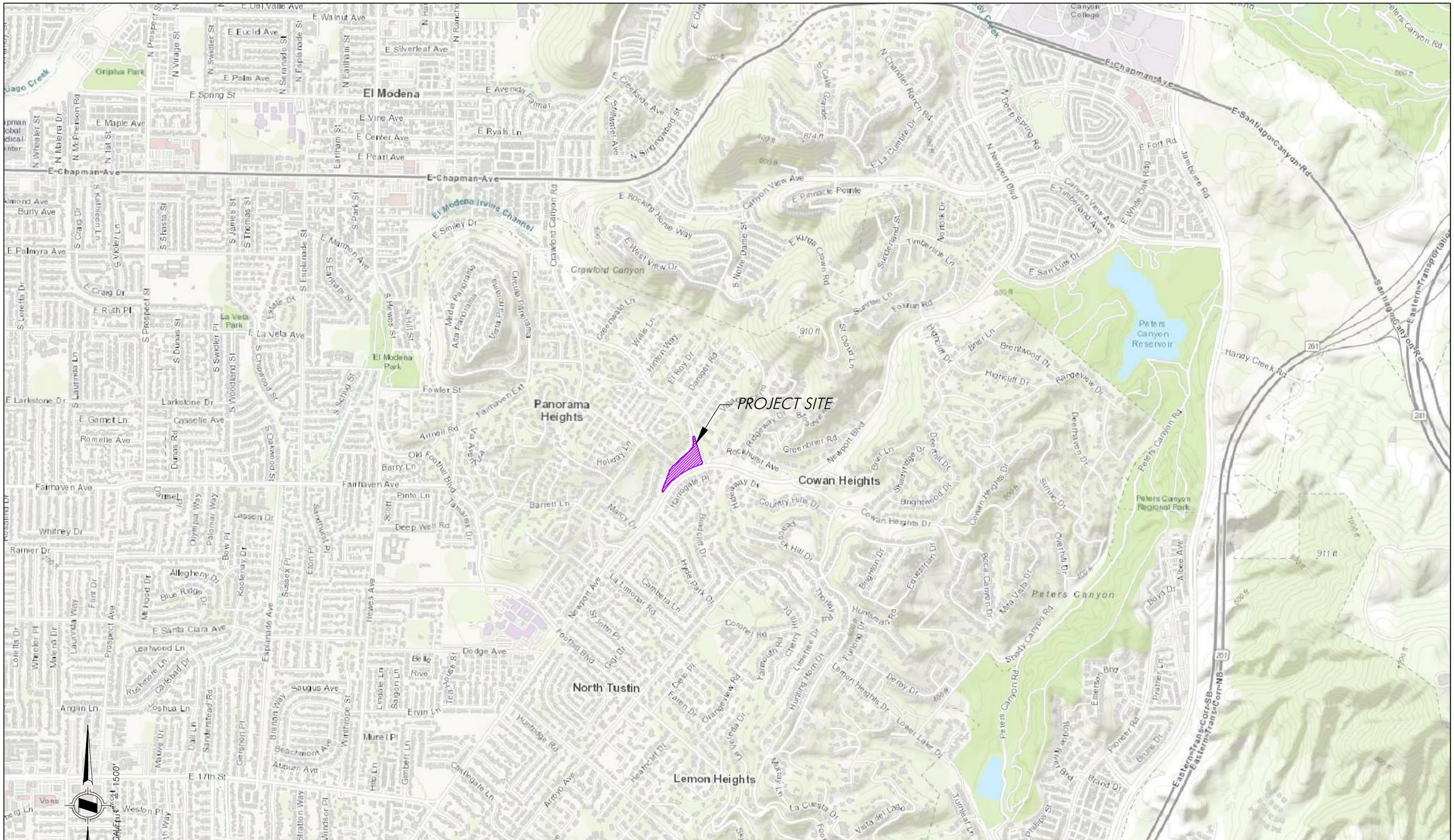
| BMP INSPECTION/MAINTENANCE | | | |
|---|---|---|---|
| BMP | Responsible Party(s) | Inspection/ Maintenance Activities Required | Minimum Frequency of Activities |
| STRUCTURAL SOURCE CONTROL BMPs | | | |
| S1 Provide storm drain system stencilling and signage | OC Parks | As a part of the civil engineering drawings, it will be required by the Developer to stencil on all of the project's catch basins, where applicable in paved areas, the words, "No Dumping - Drains to Ocean." Storm drain stencils shall be inspected for legibility, at minimum, once prior to the storm season, no later than October 1st each year. Those determined to be illegible will be re-stenciled as soon as possible. | Annually |
| S4 Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control | OC Parks | In conjunction with routine maintenance activities, verify that landscape design continues to function properly by adjusting properly to eliminate overspray to hardscape areas, and to verify that irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather, day or night time temperatures based on system specifications and local climate patterns. | Monthly |
| S5 Protect Slopes and Channels | OC Parks | The project's landscaped slopes shall be inspected for adequate vegetation cover, vegetation health and signs of erosion. Dead or dying vegetation shall be replaced as needed. Signs of erosion and concentrated flow areas shall be noted and repaired as needed. | Monthly |
| S12 Site Design and Landscape Planning (Hillside Landscaping) | OC Parks | Hillside areas that are disturbed by the project shall be re-vegetated with deep-rooted, drought tolerant plant species selected for erosion control and consistent with County requirements. | Monthly |

# SECTION VI SITE PLAN AND DRAINAGE PLAN

The exhibits provided in this section are to illustrate the post construction BMPs prescribed within this WQMP. Drainage flow information of the proposed project, such as general surface flow lines, concrete or other surface drainage conveyances, and storm drain facilities are also depicted. All structural source control and LID BMPs are shown as well.

## Exhibits

- Vicinity Map
- WQMP Site Plan Exhibit




| | | | |
|---|---|---|---|
| DRAWN BY: TIH | PREPARED BY: HUNSAKER & ASSOCIATES IRVINE, INC. PLANNING ▪ ENGINEERING ▪ SURVEYING Three Hughes, Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759 | PREPARED FOR: OCparks 13042 OLD MYFORD ROAD IRVINE, CA 92602 (714) 973-6385 | "CRAWFORD CANYON PARK" NORTHWEST OF CRAWFORD CANYON ROAD AND NEWPORT BOULEVARD COUNTY OF ORANGE, CALIFORNIA |
| DATE: 11/13/2020 | | | WQMP VICINITY MAP |
| W.O.: 3644-10 | | | |

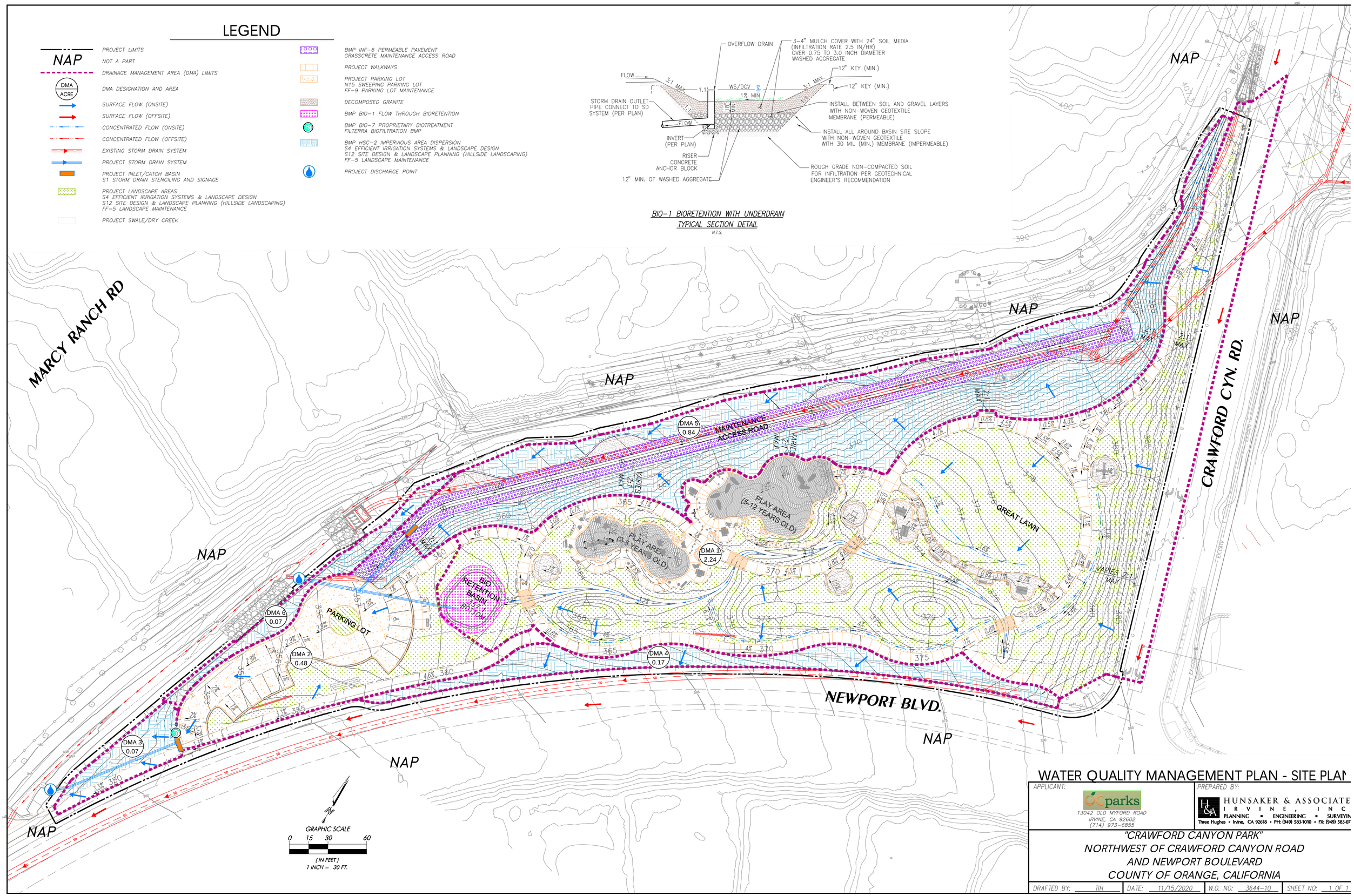
DATE: Nov. 16, 2020 05:14:08 PM FILE: F:\1140\Engineering\SY_WQ\WQMP\Exhibits\WQMP_VIC Crawford.dwg

# LEGEND

- PROJECT LIMITS
- NAP — NOT A PART
- DRAINAGE MANAGEMENT AREA (DMA) LIMITS
- DMA / ACRE — DMA DESIGNATION AND AREA
- SURFACE FLOW (ONSITE)
- SURFACE FLOW (OFFSITE)
- CONCENTRATED FLOW (ONSITE)
- CONCENTRATED FLOW (OFFSITE)
- EXISTING STORM DRAIN SYSTEM
- PROJECT STORM DRAIN SYSTEM
- PROJECT INLET/CATCH BASIN
  S1 STORM DRAIN STENCILING AND SIGNAGE
- PROJECT LANDSCAPE AREAS
  S4 EFFICIENT IRRIGATION SYSTEMS & LANDSCAPE DESIGN
  S12 SITE DESIGN & LANDSCAPE PLANNING (HILLSIDE LANDSCAPING)
  FF-5 LANDSCAPE MAINTENANCE
- PROJECT SWALE/DRY CREEK
- BMP INF-6 PERMEABLE PAVEMENT
  GRASSCRETE MAINTENANCE ACCESS ROAD
- PROJECT WALKWAYS
- PROJECT PARKING LOT
  N15 SWEEPING PARKING LOT
  FF-9 PARKING LOT MAINTENANCE
- DECOMPOSED GRANITE
- BMP BIO-1 FLOW THROUGH BIORETENTION
- BMP BIO-7 PROPRIETARY BIOTREATMENT
  FILTERRA BIOFILTRATION BMP
- BMP HSC-2 IMPERVIOUS AREA DISPERSION
  S4 EFFICIENT IRRIGATION SYSTEMS & LANDSCAPE DESIGN
  S12 SITE DESIGN & LANDSCAPE PLANNING (HILLSIDE LANDSCAPING)
  FF-5 LANDSCAPE MAINTENANCE
- PROJECT DISCHARGE POINT




BIO-1 BIORETENTION WITH UNDERDRAIN
TYPICAL SECTION DETAIL
N.T.S.




## WATER QUALITY MANAGEMENT PLAN - SITE PLAN

APPLICANT:
OCparks
13042 OLD MYFORD ROAD
IRVINE, CA 92602
(714) 973-6855

PREPARED BY:
HUNSAKER & ASSOCIATES IRVINE, INC
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-07

"CRAWFORD CANYON PARK"
NORTHWEST OF CRAWFORD CANYON ROAD
AND NEWPORT BOULEVARD
COUNTY OF ORANGE, CALIFORNIA

| DRAFTED BY: | DATE: | W.O. NO: | SHEET NO: |
|---|---|---|---|
| TIH | 11/15/2020 | 3644-10 | 1 OF 1 |

# SECTION VII EDUCATIONAL MATERIALS INCLUDED

The following table contains a list of applicable educational materials to be included in the project's Final WQMP.

| EDUCATION MATERIALS | | | |
|---|---|---|---|
| Residential Material (http://www.ocwatersheds.com) | Check If Applicable | Business Material (http://www.ocwatersheds.com) | Check If Applicable |
| The Ocean Begins at Your Front Door | ☒ | Tips for the Automotive Industry | ☐ |
| Tips for Car Wash Fund-raisers | ☐ | Tips for Using Concrete and Mortar | ☐ |
| Tips for the Home Mechanic | ☐ | Tips for the Food Service Industry | ☐ |
| Homeowners Guide for Sustainable Water Use | ☐ | Proper Maintenance Practices for Your Business | ☐ |
| Household Tips | ☐ | Other Material | Check If Attached |
| Proper Disposal of Household Hazardous Waste | ☐ | | |
| Recycle at Your Local Used Oil Collection Center (North County) | ☐ | | ☐ |
| Recycle at Your Local Used Oil Collection Center (Central County) | ☐ | | ☐ |
| Recycle at Your Local Used Oil Collection Center (South County) | ☐ | | ☐ |
| Tips for Maintaining a Septic Tank System | ☐ | | ☐ |
| Responsible Pest Control | ☒ | | ☐ |
| Sewer Spill | ☐ | | ☐ |
| Tips for the Home Improvement Projects | ☐ | | ☐ |
| Tips for Horse Care | ☐ | | ☐ |
| Tips for Landscaping and Gardening | ☒ | | ☐ |
| Tips for Pet Care | ☐ | | ☐ |
| Tips for Pool Maintenance | ☐ | | ☐ |
| Tips for Residential Pool, Landscape and Hardscape Drains | ☐ | | ☐ |
| Tips for Projects Using Paint | ☐ | | ☐ |

# Attachment A

# Educational Materials

# Attachment B

# BMP Worksheets/Calculations

# BMP Details

| Table 2.7: Infiltration BMP Feasibility Worksheet | | | |
|---|---|---|---|
| | *Infeasibility Criteria* | *Yes* | *No* |
| 1 | Would Infiltration BMPs pose significant risk for groundwater related concerns? Refer to Appendix VII (Worksheet I) for guidance on groundwater-related infiltration feasibility criteria. | | X |
| Provide basis: **Based on TGD data, there are no restrictions for groundwater infiltration or known plumes within project area.** | | | |
| 2 | Would Infiltration BMPs pose significant risk of increasing risk of geotechnical hazards that cannot be mitigated to an acceptable level? (Yes if the answer to any of the following questions is yes, as established by a geotechnical expert): | | X |
| Provide basis: **Per geotechnical professional, no restrictions on infiltration.** | | | |
| 3 | Would infiltration of the DCV from drainage area violate downstream water rights? | | X |
| Provide basis: **Per County TGD Maps, no restrictions on infiltration due to water rights.** | | | |

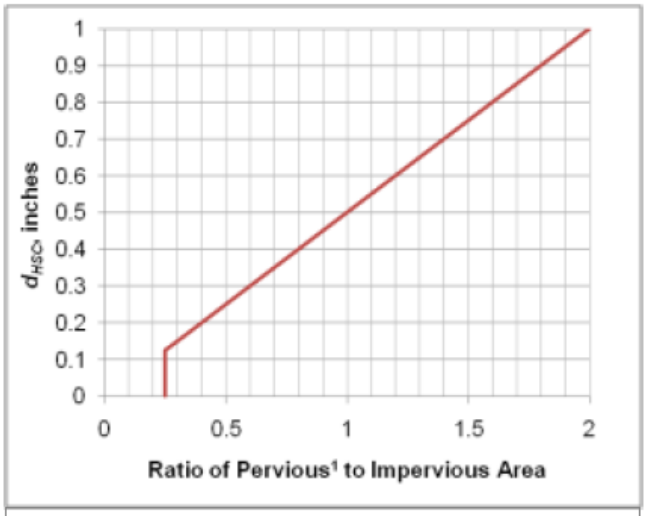
| Table 2.7: Infiltration BMP Feasibility Worksheet (continued) | | | |
|---|---|---|---|
| | *Partial Infeasibility Criteria* | *Yes* | *No* |
| 4 | Is proposed infiltration facility located on HSG D soils or the site geotechnical investigation identifies presence of soil characteristics which support categorization as D soils? | | X |
| Provide basis: **Based on TGD maps, majority of site contains HSG B soils.** | | | |
| 5 | Is measured infiltration rate below proposed facility less than 0.3 inches per hour? This calculation shall be based on the methods described in Appendix VII. | | X |
| Provide basis: **Onsite testing yielded 0.67 in/hr and 1.35 in/hr, which equates to 0.34 in/hr and 0.67 in/hr when FS2 is applied.** | | | |
| 6 | Would reduction of over pre-developed conditions cause impairments to downstream beneficial uses, such as change of seasonality of ephemeral washes or increased discharge of contaminated groundwater to surface waters? | | X |
| Provide citation to applicable study and summarize findings relative to the amount of infiltration that is permissible: **Project discharges to storm channel that is not ephemeral.** | | | |
| 7 | Would an increase in infiltration over pre-developed conditions cause impairments to downstream beneficial uses, such as change of seasonality of ephemeral washes or increased discharge of contaminated groundwater to surface waters? | | X |
| Provide citation to applicable study and summarize findings relative to the amount of infiltration that is permissible: **Based on TGD and County GIS records, no restrictions on infiltration due to ephemeral washes or groundwater concerns.** | | | |

| Table 2.7: Infiltration BMP Feasibility Worksheet (continued) | | |
|---|---|---|
| Infiltration Screening Results (check box corresponding to result): | | |
| 8 | Is there substantial evidence that infiltration from the project would result in a significant increase in I&I to the sanitary sewer that cannot be sufficiently mitigated? (See Appendix XVII)?<br><br>Provide narrative discussion and supporting evidence: **Per TGD and County of Orange GIS data, project is not located in an area where increase in I&I to the sanitary sewer is of concern.** | |
| 9 | If any answer from row 1-3 is yes: infiltration of any volume is not feasible within the DMA or equivalent.<br><br>Provide basis: **Items 1-3 are no.** | |
| 10 | If any answer from row 4-7 is yes, infiltration is permissible but is not presumed to be feasible for the entire DCV. Criteria for designing biotreatment BMPs to achieve the maximum feasible infiltration and ET shall apply.<br><br>Provide basis: **Items 4-7 are no.** | |
| 11 | If all answers to rows 1 through 11 are no, infiltration of the full DCV is potentially feasible, BMPs must be designed to infiltrate the full DCV to the maximum extent practicable.<br><br>Provide basis: **Project will infiltrate.** | |

## Worksheet A: Hydrologic Source Control Calculation Form

| | | | | |
|---|---|---|---|---|
| | Drainage area ID | DMA 3 | | |
| | Total drainage area | 0.07 | acres | |
| | Total drainage area Impervious Area ($IA_{total}$) | 0.020 | acres | |
| HSC ID | HSC Type/ Description/ Reference BMP Fact Sheet | Effect of individual $HSC_i$ per criteria in BMP Fact Sheets (XIV.1) ($d_{HSCi}$)[1] | Impervious Area Tributary to $HSC_i$ ($IA_i$) | $d_i \times IA_i$ |
| Landscape | HSC-2 Impervious area dispersion. Sidewalks to adjacent landscaping areas. Pervious/impervious ratio = 0.05 acres to 0.02 acres | Perv/Imp > 2:1 $d_{hsc}$ = 1.0 | 0.020 | 0.020 |
| | Box 1: | | $\sum d_i \times IA_i =$ | 0.020 |
| | Box 2: | | $IA_{total} =$ | 0.020 |
| | [Box 1]/[Box 2]: | | $d_{HSC\ total} =$ | 1.0" |
| | | | *Percent Capture Provided by HSCs (Table III.1)* | 80% |
| | | | | |
| | Drainage area ID | DMA 4 | | |
| | Total drainage area | 0.17 | acres | |
| | Total drainage area Impervious Area ($IA_{total}$) | 0.0 | acres | |
| HSC ID | HSC Type/ Description/ Reference BMP Fact Sheet | Effect of individual $HSC_i$ per criteria in BMP Fact Sheets (XIV.1) ($d_{HSCi}$)[1] | Impervious Area Tributary to $HSC_i$ ($IA_i$) | $d_i \times IA_i$ |
| Landscape | HSC-2 Impervious area dispersion. Sidewalks to adjacent landscaping areas. Pervious/impervious ratio = 0.17 acres to 0.0 acres | Perv/Imp > 2:1 $d_{hsc}$ = 1.0 | 0.0 | 0.0 |
| | Box 1: | | $\sum d_i \times IA_i =$ | 0.0 |
| | Box 2: | | $IA_{total} =$ | 0.0 |
| | [Box 1]/[Box 2]: | | $d_{HSC\ total} =$ | 1.0" |
| | | | *Percent Capture Provided by HSCs (Table III.1)* | 80% |

| Worksheet A: Hydrologic Source Control Calculation Form | | | | |
|---|---|---|---|---|
| | Drainage area ID | DMA 5 | | |
| | Total drainage area | 0.07 | acres | |
| | Total drainage area Impervious Area ($IA_{total}$) | 0.0 | acres | |
| HSC ID | HSC Type/ Description/ Reference BMP Fact Sheet | Effect of individual $HSC_i$ per criteria in BMP Fact Sheets (XIV.1) ($d_{HSCi}$)[1] | Impervious Area Tributary to $HSC_i$ ($IA_i$) | $d_i \times IA_i$ |
| Landscape | HSC-2 Impervious area dispersion. Sidewalks to adjacent landscaping areas. Pervious/impervious ratio = 0.07 acres to 0.0 acres | Perv/Imp > 2:1 $d_{hsc}$ = 1.0 | 0.0 | 0.0 |
| | Box 1: | $\sum d_i \times IA_i =$ | | 0.0 |
| | Box 2: | $IA_{total} =$ | | 0.0 |
| | [Box 1]/[Box 2]: | $d_{HSC\ total} =$ | | 1.0" |
| | | *Percent Capture Provided by HSCs (Table III.1)* | | 80% |
| | | | | |
| | | | | |
| | Drainage area ID | DMA 6 | | |
| | Total drainage area | 0.84 | acres | |
| | Total drainage area Impervious Area ($IA_{total}$) | 0.05 | acres | |
| HSC ID | HSC Type/ Description/ Reference BMP Fact Sheet | Effect of individual $HSC_i$ per criteria in BMP Fact Sheets (XIV.1) ($d_{HSCi}$)[1] | Impervious Area Tributary to $HSC_i$ ($IA_i$) | $d_i \times IA_i$ |
| Landscape | HSC-2 Impervious area dispersion. Sidewalks to adjacent landscaping areas. Pervious/impervious ratio = 0.79 acres to 0.05 acres | Perv/Imp > 2:1 $d_{hsc}$ = 1.0 | 0.05 | 0.05 |
| | Box 1: | $\sum d_i \times IA_i =$ | | 0.05 |
| | Box 2: | $IA_{total} =$ | | 0.05 |
| | [Box 1]/[Box 2]: | $d_{HSC\ total} =$ | | 1.0" |
| | | *Percent Capture Provided by HSCs (Table III.1)* | | 80% |




[1] Pervious area used in calculation should only include the pervious area receiving flow, not pervious area receiving only direct rainfall or upslope pervious drainage.

**Table III.1: Fraction of Average Long Term Runoff Reduced (Capture Efficiency) by HSCs**

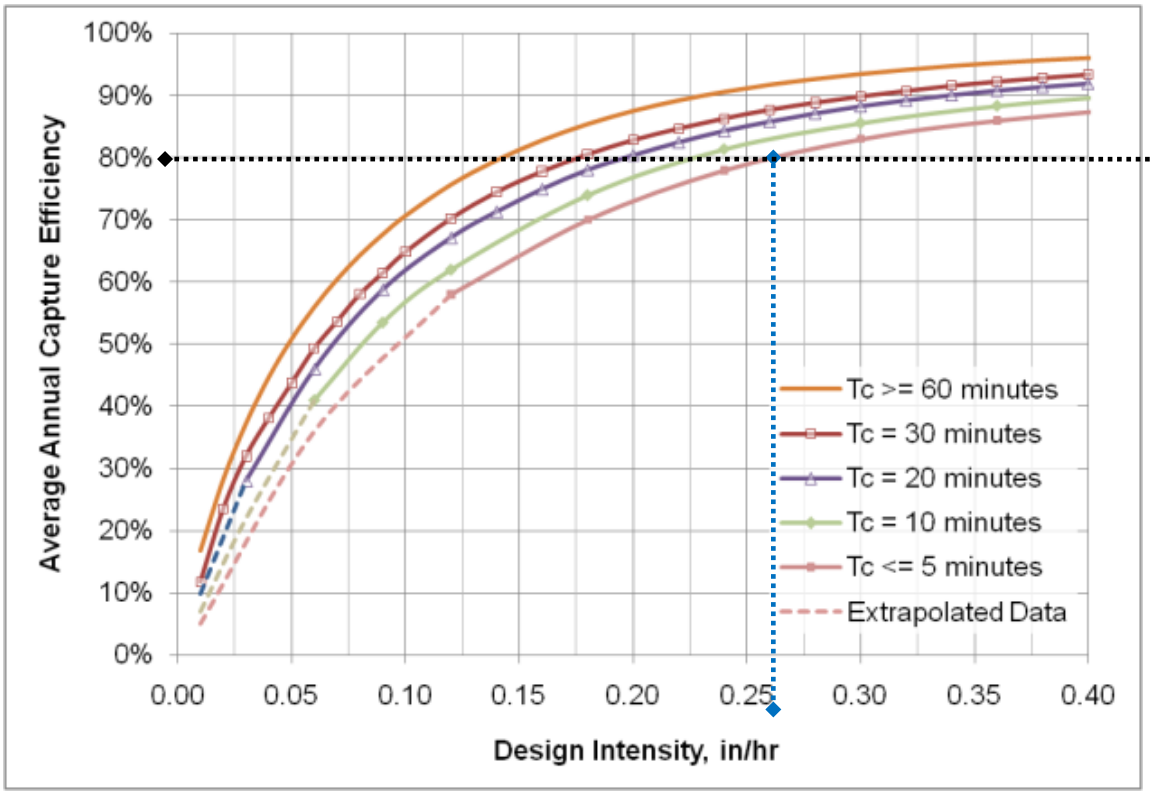
| Cumulative HSC Adjustment to Design Capture Storm Depth ($d_{hsc}$) | Capture Efficiency Achieved Lowland Regions (<1,000 ft) | Capture Efficiency Achieved Mountainous Regions (>1,000 ft) |
|---|---|---|
| <0.05 | 0 | 0% |
| 0.05" | 8% | 7% |
| 0.1" | 20% | 16% |
| 0.2" | 37% | 31% |
| 0.3" | 48% | 42% |
| 0.4" | 57% | 50% |
| 0.5" | 64% | 57% |
| 0.6" | 70% | 63% |
| 0.7" | 75% | 68% |
| 0.8" | 80% | 72% |
| 0.9" | 80% | 76% |
| 1.0" | 80% | 80% |

| Worksheet B: Simple Design Capture Volume Sizing Method – DMAs 1-6 | | | | |
|---|---|---|---|---|
| ***Step 1: Determine the design capture storm depth used for calculating volume*** | | | | |
| 1 | Enter design capture storm depth from Figure III.1, *d* (inches) | d= | 0.80 | inches |
| 2 | Enter the effect of provided HSCs, $d_{HSC}$ (inches) (Worksheet A) | $d_{HSC}$= | 0 | inches |
| 3 | Calculate the remainder of the design capture storm depth, $d_{remainder}$ (inches) (Line 1 – Line 2) | $d_{remainder}$= | 0.95 | inches |
| ***Step 2: Calculate the DCV*** | | | | |
| 1 | Enter Project area tributary to BMP (s), *A* (acres) | A= | See table below | acres |
| 2 | Enter Project Imperviousness, *imp* (unitless) | imp= | | |
| 3 | Calculate runoff coefficient, $C= (0.75 \times imp) + 0.15$ | C= | | |
| 4 | Calculate runoff volume, $V_{design} = (C \times d_{remainder} \times A \times 43560 \times (1/12))$ | $V_{design}$= | | cu-ft |
| ***Step 3: Design BMPs to ensure full retention of the DCV*** | | | | |
| ***Step 3a: Determine design infiltration rate (DMA 1 only)*** | | | | |
| 1 | Enter measured infiltration rate, $K_{measured}$ (in/hr) (Appendix VII) | $K_{measured}$= | 0.6 | In/hr |
| 2 | Enter combined safety factor from Worksheet H, $S_{Preliminary}$ (unitless) | $S_{Preliminary}$= | 2.18 | |
| 3 | Calculate design infiltration rate, $K_{design} = K_{measured} / S_{Preliminary}$ | $K_{design}$= | 0.275 | In/hr |
| ***Step 3b: Determine minimum BMP footprint*** | | | | |
| 4 | Enter drawdown time, *T* (max 48 hours) | T= | 48 | Hours |
| 5 | Calculate max retention depth that can be drawn down within the drawdown time (feet), $D_{max} = K_{design} \times T \times (1/12)$ | $D_{max}$= | 1.1 (13.2 in) | feet |
| 6 | Calculate minimum area required for BMP (sq-ft), $A_{min} = V_{design} / d_{max}$ | $A_{min}$= | 2181/1.1 = 1983 Proposed = 2001 | sq-ft |
| ***Calculations*** | | | | |

| DMA | Area (Ac.) | Imp. | C-value | Design Storm Depth (in.) | $DCV_{SIMPLE}$ (cu-ft) |
|---|---|---|---|---|---|
| 1 | 2.24 | 0.247 | 0.335 | 0.8 | 2180.8 |
| 2 | 0.48 | 0.494 | 0.521 | 0.8 | 725.5 |
| 3 | 0.07 | 0.286 | 0.365 | 0.8 | 74.1 |
| 4 | 0.17 | 0 | 0.150 | 0.8 | 74.1 |
| 5 | 0.84 | 0.064 | 0.198 | 0.8 | 488.7 |
| 6 | 0.07 | 0 | 0.150 | 0.8 | 30.5 |

| Worksheet D: Capture Efficiency Method for Flow-Based BMPs – DMA 2 | | | | |
|---|---|---|---|---|
| ***Step 1: Determine the design capture storm depth used for calculating volume*** | | | | |
| 1 | Enter the time of concentration, $T_c$ (min) (See Appendix IV.2) | $T_c$= | 5 | |
| 2 | Using Figure III.4, determine the design intensity at which the estimated time of concentration ($T_c$) achieves 80% capture efficiency, $I_1$ | $I_1$= | 0.26 | in/hr |
| 3 | Enter the effect depth of provided HSCs upstream, $d_{HSC}$ (inches) (Worksheet A) | $d_{HSC}$= | 0 | inches |
| 4 | Enter capture efficiency corresponding to $d_{HSC}$, $Y_2$ (Worksheet A) | $Y_2$= | 0 | % |
| 5 | Using Figure III.4, determine the design intensity at which the time of concentration ($T_c$) achieves the upstream capture efficiency($Y_2$), $I_2$ | $I_2$= | 0.26 | |
| 6 | Determine the design intensity that must be provided by BMP $I_{design} = I_1 - I_2$ | $I_{design}$= | 0.26 | |
| ***Step 2: Calculate the design flowrate*** | | | | |
| 1 | Enter Project area tributary to BMP (s), *A* (acres) | A= | 0.48 | acres |
| 2 | Enter Project Imperviousness, *imp* (unitless) | imp= | 0.494 | |
| 3 | Calculate runoff coefficient, $C = (0.75 \times imp) + 0.15$ | C= | 0.521 | |
| 4 | Calculate design flow rate, $Q_{design} = (C \times i_{design} \times A)$ | $Q_{design}$= | 0.065 | cfs |
| ***Supporting Calculations*** | | | | |
| Describe system: Runoff from the parking lot will be conveyed as gutter flow to a Filterra Biofiltration BMP (or County approved equivalent) prior to discharging offsite. Filterra sizing required is 8'x4' unit with capacity of 0.074 cfs. | | | | |
| Provide time of concentration assumptions: $T_c$ based on minimum value of 5 minutes. | | | | |

| Worksheet D: Capture Efficiency Method for Flow-Based BMPs – DMA 2 |
|---|
| *Graphical Operations* |



| Worksheet H: Factor of Safety and Design Infiltration Rate Worksheet | | | | | |
|---|---|---|---|---|---|
| Factor Category | | Factor Description | Assigned Weight (w) | Factor Value (v) | Product (p) p = w x v |
| A | Suitability Assessment | Soil assessment methods | 0.25 | 2 | 0.25 |
| | | Predominant soil texture | 0.25 | 2 | 0.25 |
| | | Site soil variability | 0.25 | 2 | 0.50 |
| | | Depth to groundwater / impervious layer | 0.25 | 1 | 0.25 |
| | | Suitability Assessment Safety Factor, $S_A = \Sigma p$ | | | 1.75 |
| B | Design | Tributary area size | 0.25 | 1 | 0.25 |
| | | Level of pretreatment/ expected sediment loads | 0.25 | 1 | 0.25 |
| | | Redundancy | 0.25 | 2 | 0.75 |
| | | Compaction during construction | 0.25 | 1 | 0.25 |
| | | Design Safety Factor, $S_B = \Sigma p$ | | | 1.25 |
| Combined Safety Factor, $S_{TOT} = S_A \times S_B$ | | | | 2.18 | |
| Measured Infiltration Rate, inch/hr, $K_M$ (corrected for test-specific bias) | | | | (0.6 in/hr) / FS 2 = 0.3 in/hr | |
| Design Infiltration Rate, in/hr, $K_{DESIGN} = K_{OBS} / S_{TOT}$ | | | | (0.6 in/hr) / FS 2.18 = 0.275 in/hr | |
| Supporting Data | | | | | |
| Infiltration test conducted at BMP location. Observed rate ($K_{OBS}$) without factors of safety is 0.6 in/hr. | | | | | |

| Worksheet I: Summary of Groundwater-related Feasibility Criteria | | | | |
|---|---|---|---|---|
| 1 | Is project large or small? (as defined by Table VIII.2) circle one | Large | | Small |
| 2 | What is the tributary area to the BMP? | A | 2.24 | acres |
| 3 | What type of BMP is proposed? | Bioretention with no undedrains | | |
| 4 | What is the infiltrating surface area of the proposed BMP? | $A_{BMP}$ | 2001 | sq-ft |
| 5 | What land use activities are present in the tributary area (list all)<br>- Walkways/Hardscape<br>- Landscaping areas | | | |
| 6 | What land use-based risk category is applicable? | L | M | H |
| 7 | If M or H, what pretreatment and source isolation BMPs have been considered and are proposed (describe all): Bioretention media | | | |
| 8 | What minimum separation to mounded seasonally high groundwater applies to the proposed BMP? See Section VIII.2 (circle one) | 5 ft | | 10 ft |
| 9 | Provide rationale for selection of applicable minimum separation to seasonally high mounded groundwater:<br>Based geotechnical investigation onsite, groundwater is greater than 26' deep. | | | |
| 10 | What is separation from the infiltrating surface to seasonally high groundwater? | SHGWT | greater than 20 | ft |
| 11 | What is separation from the infiltrating surface to mounded seasonally high groundwater? | Mounded SHGWT | greater than 20 | ft |
| 12 | Describe assumptions and methods used for mounding analysis:<br>Based geotechnical investigation the project, groundwater is greater than 26' deep. | | | |
| 13 | Is the site within a plume protection boundary (See Figure VIII.2)? | Y | N | N/A |
| 14 | Is the site within a selenium source area or other natural plume area (See Figure VIII.2)? | Y | N | N/A |
| 15 | Is the site within 250 feet of a contaminated site? | Y | N | N/A |
| 16 | If site-specific study has been prepared, provide citation and briefly summarize relevant findings: Determination based off County data provided in TGD and geotechnical study. No issues with infiltration BMPs identified. | | | |
| 17 | Is the site within 100 feet of a water supply well, spring, septic system? | Y | N | N/A |
| 18 | Is infiltration feasible on the site relative to groundwater-related criteria? | Y | N | |

| Worksheet I: Summary of Groundwater-related Feasibility Criteria |
| --- |
| Provide rationale for feasibility determination:<br>Based on soil report and testing conducted onsite, infiltration of runoff is feasible for the project. |

## INF-3: Bioretention with no Underdrain

Bioretention stormwater treatment facilities are landscaped shallow depressions that capture and filter stormwater runoff. These facilities function as a soil and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. The facilities normally consist of a ponding area, mulch layer, planting soils, and plants. As stormwater passes down through the planting soil, pollutants are filtered, adsorbed, and biodegraded by the soil and plants. For areas with low permeability native soils or steep slopes, bioretention areas can be designed with an underdrain system that routes the treated runoff to the storm drain system rather than depending entirely on infiltration.

*Also known as:*

- *Rain gardens*
- *Infiltration planter*

Bioretention
*Source: Geosyntec Consultants*

### *Feasibility Screening Considerations*

- Bioretention with no underdrains shall pass infiltration infeasibility screening criteria to be considered for use.

### *Opportunity Criteria*

- Land use may include commercial, residential, mixed use, institutional, and subdivisions. Bioretention may also be applied in parking lot islands, cul-de-sacs, traffic circles, road shoulders, and road medians.
- Drainage area is ≤ 5 acres, preferrably ≤ 1 acre.
- Area available for infiltration.
- Soils are adequate for infiltration or can be amended to improve infiltration capacity. Site slope is less than 15 percent.

### *OC-Specific Design Criteria and Considerations*

- ☐ Placement of BMPs should observe geotechnical recommendations with respect to geological hazards (e.g. landslides, liquefaction zones, erosion, etc.) and set-backs (e.g., foundations, utilities, roadways, etc.)
- ☐ Depth to mounded seasonally high groundwater shall not be less than 5 feet.
- ☐ If sheet flow is conveyed to the treatment area over stabilized grassed areas, the site must be graded in such a way that minimizes erosive conditions; sheet flow velocities should not exceed 1 foot per second.
- ☐ Ponding depth should not exceed 18 inches; fencing may be required if ponding depth exceeds 6 inches to mitigate the risk of drowning.
- ☐ Planting/storage media shall be based on the recommendations contained in MISC-1: Planting/Storage Media
- ☐ The minimum amended soil depth is 1.5 feet (3 feet is preferred).
- ☐ The maximum drawdown time of the planting soil is 48 hours.

- ☐ Infiltration pathways may need to be restricted due to the close proximity of roads, foundations, or other infrastructure. A geomembrane liner, or other equivalent water proofing, may be placed along the vertical walls to reduce lateral flows. This liner should have a minimum thickness of 30 mils.
- ☐ Plant materials should be tolerant of summer drought, ponding fluctuations, and saturated soil conditions for 48 hours; native plant species and/or hardy cultivars that are not invasive and do not require chemical fertilizers or pesticides should be used to the maximum extent feasible.
- ☐ The bioretention area should be covered with 2-4 inches (average 3 inches) of mulch at startup and an additional placement of 1-2 inches of mulch should be added annually.
- ☐ An optional gravel drainage layer may be installed below planting media to augment storage volume.
- ☐ An overflow device is required at the top of the ponding depth.
- ☐ Dispersed flow or energy dissipation (i.e. splash rocks) for piped inlets should be provided at basin inlet to prevent erosion.

### *Simple Sizing Method for Bioretention with no Underdrain*

If the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1** is used to size a bioretention area with underdrains, the user calculates the DCV and designs the system with geometry required to draw down the DCV in 48 hours. The sizing steps are as follows:

**Step 1: Determine the Bioretention Design Capture Volume**

Calculate the DCV using the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1**.

**Step 2: Determine the 48-hour Ponding Depth**

The depth of effective storage depth that can be drawn down in 48 hours can be calculated using the following equation:

$$d_{48} = K_{DESIGN} \times 4$$

Where:

$d_{48}$ = bioretention 48-hour effective depth, ft

$K_{DESIGN}$ = bioretention design infiltration rate, in/hr (See **Appendix VII**)

This is the maximum effective depth of the basin below the overflow device to achieve drawdown in 48 hours. Effective depth includes ponding water and media/aggregate pore space.

**Step 3: Design System Geometry to Provide $d_{48}$**

Design system geometry such that

$$d_{48} \geq d_{EFFECTIVE} = (d_P + n_M d_M + n_G d_G)$$

Where:

$d_{48}$ = depth of water that can drain in 48 hours

$d_{EFFECTIVE}$ = total effective depth of water stored in bioretention area, ft

$d_P$ = bioretention ponding depth, ft (should be less than or equal to 1.5 ft)

$n_M$ = bioretention media porosity

$d_M$ = bioretention media depth, ft

$n_G$ = bioretention gravel layer porosity; 0.35 may be assumed where other information is not available

$d_G$ = bioretention gravel layer depth, ft

**Step 4: Calculate the Required Infiltrating Area**

The required infiltrating area (i.e. measured at the media surface) can be calculated using the following equation:

$A = DCV / d_{EFFECTIVE}$

Where:

A = required infiltrating area, sq-ft (measured as the media surface area)

DCV = design capture volume, cu-ft (see Step 1)

$d_{EFFECTIVE}$ = total effective depth of water stored in bioretention area, ft (from Step 3)

This does not include the side slopes, access roads, etc. which would increase bioretention footprint.

***Capture Efficiency Method for Bioretention with no Underdrain***

If BMP geometry has already been defined and deviates from the 48 hour drawdown time, the designer can use the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (See **Appendix III.3.2**) to determine the fraction of the DCV that must be provided to manage 80 percent of average annual runoff volume. This method accounts for drawdown time different than 48 hours.

**Step 1: Determine the drawdown time associated with the selected basin geometry**

$DD = (d_{EFFECTIVE} / K_{DESIGN}) \times 12$ in/ft

Where:

DD = time to completely drain infiltration basin ponding depth, hours

$d_{EFFECTIVE} \leq (d_P + n_M d_M + n_G d_G)$

$d_P$ = bioretention ponding depth, ft (should be less than or equal to 1.5 ft)

$n_M$ = bioretention media porosity

$d_M$ = bioretention media depth, ft

$n_G$ = bioretention gravel layer porosity; 0.35 may be assumed where other information is not available

$d_G$ = bioretention gravel layer depth, ft

$K_{DESIGN}$ = basin design infiltration rate, in/hr (See **Appendix VII**)

**Step 2: Determine the Required Adjusted DCV for this Drawdown Time**

Use the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (See **Appendix III.3.2**) to calculate the fraction of the DCV the basin must hold to achieve 80 percent capture of average annual stormwater runoff volume based on the basin drawdown time calculated above.

**Step 4: Check that the Bioretention Effective Depth Drains in no Greater than 96 Hours**

$DD = (d_{EFFECTIVE} / K_{DESIGN}) \times 12$

Where:

DD = time to completely drain bioretention facility, hours

$d_{EFFECTIVE}$ = total effective depth of water stored in bioretention area, ft (from Step 3)

$K_{DESIGN}$ = basin design infiltration rate, in/hr (See **Appendix VII**)

If $DD_{ALL}$ is greater than 96 hours, adjust bioretention media depth and/or gravel layer depth until DD is less than 96 hours. This duration is based on preventing extended periods of saturation from causing plant mortality.

**Step 5: Determine the Basin Infiltrating Area Needed**

The required infiltrating area (i.e. the surface area of the top of the media layer) can be calculated using the following equation:

$$A = DCV / d_{EFFECTIVE}$$

Where:

A = required infiltrating area, sq-ft (measured at the media surface)

DCV = design capture volume, adjusted for drawdown time, cu-ft (see Step 1)

$d_{EFFECTIVE}$ = total effective depth of water stored in bioretention area, ft (from Step 3)

This does not include the side slopes, access roads, etc. which would increase bioretention footprint. If the area required is greater than the selected basin area, adjust surface area or adjust ponding depth and recalculate required area until the required area is achieved.

### *Configuration for Use in a Treatment Train*

- Bioretention areas may be preceeded in a treatment train by HSCs in the drainage area, which would reduce the required volume of the bioretention cell.
- Bioretention areas can be incorporated in a treatment train to provide enhanced water quality treatment and reductions in runoff volume and rate. For example, runoff can be collected from a roadway in a vegetated swale that then flows to a bioretention area. Similarly, bioretention could be used to manage overflow from a cistern.

### *Additional References for Design Guidance*

- CASQA BMP Handbook for New and Redevelopment: **http://www.cabmphandbooks.com/Documents/Development/TC-32.pdf**
- SMC LID Manual (pp 68): **http://www.lowimpactdevelopment.org/guest75/pub/All_Projects/SoCal_LID_Manual/SoCalLID_Manual_FINAL_040910.pdf**
- Los Angeles County Stormwater BMP Design and Maintenance Manual, Chapter 5: **http://dpw.lacounty.gov/DES/design_manuals/StormwaterBMPDesignandMaintenance.pdf**
- San Diego County LID Handbook Appendix 4 (Factsheet 7): **http://www.sdcounty.ca.gov/dplu/docs/LID-Appendices.pdf**
- Los Angeles Unified School District (LAUSD) Stormwater Technical Manual, Chapter 4. **http://www.laschools.org/employee/design/fs-studies-and-reports/download/white_paper_report_material/Storm_Water_Technical_Manual_2009-opt-red.pdf?version_id=76975850**

  County of Los Angeles Low Impact Development Standards Manual, Chapter 5: **http://dpw.lacounty.gov/wmd/LA_County_LID_Manual.pdf**

## HSC-2: Impervious Area Dispersion

Impervious area dispersion refers to the practice of routing runoff from impervious areas, such as rooftops, walkways, and patios onto the surface of adjacent pervious areas. Runoff is dispersed uniformly via splash block or dispersion trench and soaks into the ground as it move slowly across the surface of pervious areas. Minor ponding may occur, but it is not the intent of this practice to actively promote localized on-lot storage (See HSC-1: Localized On-Lot Infiltration).

*Also known as:*

- *Downspout disconnection*
- *Impervious area disconnection*
- *Sheet flow dispersion*

Simple Downspout Dispersion
*Source: toronto.ca/environment/water.htm*

### *Feasibility Screening Considerations*

- Impervious area dispersion can be used where infiltration would otherwise be infeasible, however dispersion depth over landscaped areas should be limited by site-specific conditions to prevent standing water or geotechnical issues.

### *Opportunity Criteria*

- Rooftops and other low traffic impervious surface present in drainage area.
- Soils are adequate for infiltration. If not, soils can be amended to improve capacity to absorb dispersed water (see MISC-2: Amended Soils).
- Significant pervious area present in drainage area with shallow slope
- Overflow from pervious area can be safely managed.

### *OC-Specific Design Criteria and Considerations*

- ☐ Soils should be preserved from their natural condition or restored via soil amendments to meet minimum criteria described in Section .
- ☐ A minimum of 1 part pervious area capable of receiving flow should be provided for every 2 parts of impervious area disconnected.
- ☐ The pervious area receiving flow should have a slope ≤ 2 percent and path lengths of ≥ 20 feet per 1000 sf of impervious area.
- ☐ Dispersion areas should be maintained to remove trash and debris, loose vegetation, and protect any areas of bare soil from erosion.
- ☐ Velocity of dispersed flow should not be greater than 0.5 ft per second to avoid scour.

### *Calculating HSC Retention Volume*

- The retention volume provided by downspout dispersion is a function of the ratio of impervious to pervious area and the condition of soils in the pervious area.
- Determine flow patterns in pervious area and estimate footprint of pervious area receiving dispersed flow. Calculate the ratio of pervious to impervious area.
- Check soil conditions using the soil condition design criteria below; amend if necessary.
- Look up the storm retention depth, $d_{HSC}$ from the chart below.

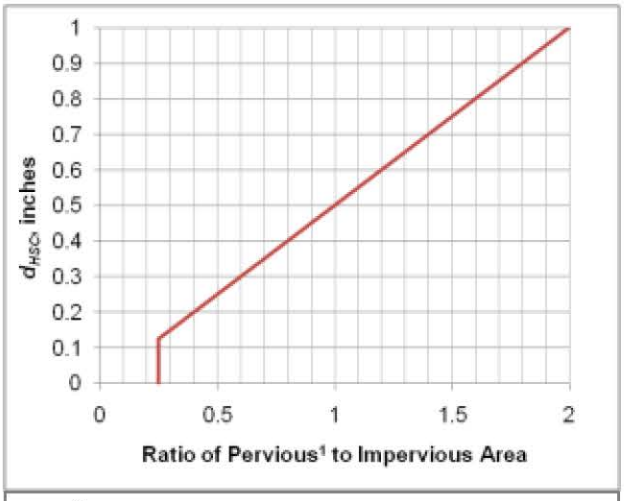
- The max $d_{HSC}$ is equal to the design storm depth for the project site.

### *Soil Condition Design Criteria*

- ☐ Maximum slope of 2 percent
- ☐ Well-established lawn or landscaping
- ☐ Minimum soil amendments per criteria in MISC-2: Amended Soils.

### *Configuration for Use in a Treatment Train*

- Impervious area disconnection is an HSC that may be used as the first element in any treatment train
- The use of impervious area disconnection reduces the sizing requirement for downstream LID and/or treatment control BMPs




[1] Pervious area used in calculation should only include the pervious area receiving flow, not pervious area receiving only direct rainfall or upslope pervious drainage.

### *Additional References for Design Guidance*

- SMC LID Manual (pp 131) http://www.lowimpactdevelopment.org/guest75/pub/All_Projects/SoCal_LID_Manual/SoCalLID_Manual_FINAL_040910.pdf
- City of Portland Bureau of Environmental Services. 2010. How to manage stormwater – Disconnect Downspouts. http://www.portlandonline.com/bes/index.cfm?c=43081&a=177702
- Seattle Public Utility: http://www.cityofseattle.org/util/stellent/groups/public/@spu/@usm/documents/webcontent/spu01_006395.pdf
- Thurston County, Washington State (pp 10): http://www.co.thurston.wa.us/stormwater/manual/docs-faqs/DG-5-Roof-Runoff-Control_Rev11Jan24.pdf

## BIO-7: Proprietary Biotreatment

Proprietary biotreatment devices are devices that are manufactured to mimic natural systems such as bioretention areas by incorporating plants, soil, and microbes engineered to provide treatment at higher flow rates or volumes and with smaller footprints than their natural counterparts. Incoming flows are typically filtered through a planting media (mulch, compost, soil, plants, microbes, etc.) and either infiltrated or collected by an underdrain and delivered to the storm water conveyance system. Tree box filters are an increasingly common type of proprietary biotreatment device that are installed at curb level and filled with a bioretention type soil. For low to moderate flows they operate similarly to bioretention systems and are bypassed during high flows. Tree box filters are highly adaptable solutions that can be used in all types of development and in all types of soils but are especially applicable to dense urban parking lots, street, and roadways.

*Also known as:*

- *Catch basin planter box*
- *Bioretention vault*
- *Tree box filter*

Proprietary biotreatment
*Source: http://www.americastusa.com /index.php/filterra/*

### *Feasibility Screening Considerations*

- Proprietary biotreatment devices that are unlined may cause incidental infiltration. Therefore, an evaluation of site conditions should be conducted to evaluate whether the BMP should include an impermeable liner to avoid infiltration into the subsurface.

### *Opportunity Criteria*

- Drainage areas of 0.25 to 1.0 acres.
- Land use may include commercial, residential, mixed use, institutional, and subdivisions. Proprietary biotreatment facilities may also be applied in parking lot islands, traffic circles, road shoulders, and road medians.
- Must not adversely affect the level of flood protection provided by the drainage system.

### *OC-Specific Design Criteria and Considerations*

- ☐ Frequent maintenance and the use of screens and grates to keep trash out may decrease the likelihood of clogging and prevent obstruction and bypass of incoming flows.
- ☐ Consult proprietors for specific criteria concerning the design and performance.
- ☐ Proprietary biotreatment may include specific media to address pollutants of concern. However, for proprietary device to be considered a biotreatment device the media must be capable of supporting rigorous growth of vegetation.
- ☐ Proprietary systems must be acceptable to the reviewing agency. Reviewing agencies shall have the discretion to request performance information. Reviewing agencies shall have the discretion to deny the use of a proprietary BMP on the grounds of performance, maintenance considerations, or other relevant factors.

☐ In right of way areas, plant selection should not impair traffic lines of site. Local jurisdictions may also limit plant selection in keeping with landscaping themes.

### *Computing Sizing Criteria for Proprietary Biotreatment Device*

- Proprietary biotreatment devices can be volume based or flow-based BMPs.
- Volume-based proprietary devices should be sized using the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1** or the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs described in **Appendix III.3.2**.
- The required design flowrate for flow-based proprietary devices should be computed using the Capture Efficiency Method for Flow-based BMPs described in **Appendix III.3.3)**.

### *Additional References for Design Guidance*

- Los Angeles Unified School District (LAUSD) Stormwater Technical Manual, Chapter 4: **http://www.laschools.org/employee/design/fs-studies-and-reports/download/white_paper_report_material/Storm_Water_Technical_Manual_2009-opt-red.pdf?version_id=76975850**
- Los Angeles County Stormwater BMP Design and Maintenance Manual, Chapter 9: **http://dpw.lacounty.gov/DES/design_manuals/StormwaterBMPDesignandMaintenance.pdf**
- Santa Barbara BMP Guidance Manual, Chapter 6: **http://www.santabarbaraca.gov/NR/rdonlyres/91D1FA75-C185-491E-A882-49EE17789DF8/0/Manual_071008_Final.pdf**

CONTECH®
ENGINEERED SOLUTIONS

# Filterra®
## High Performance Bioretention

# The experts you need to solve your stormwater challenges

**Contech is the leader in stormwater solutions, helping engineers, contractors and owners with infrastructure and land development projects throughout North America.**

With our responsive team of stormwater experts, local regulatory expertise and flexible solutions, Contech is the trusted partner you can count on for stormwater management solutions.

## Your Contech Team

### STORMWATER CONSULTANT

*It's my job to recommend the best solution to meet permitting requirements.*

### STORMWATER DESIGN ENGINEER

*I work with consultants to design the best approved solution to meet your project's needs.*

### REGULATORY MANAGER

*I understand the local stormwater regulations and what solutions will be approved.*

### SALES ENGINEER

*I make sure our solutions meet the needs of the contractor during construction.*

**Contech is your partner in stormwater management solutions**

# Low Impact Development in a Small Footprint – Filterra®

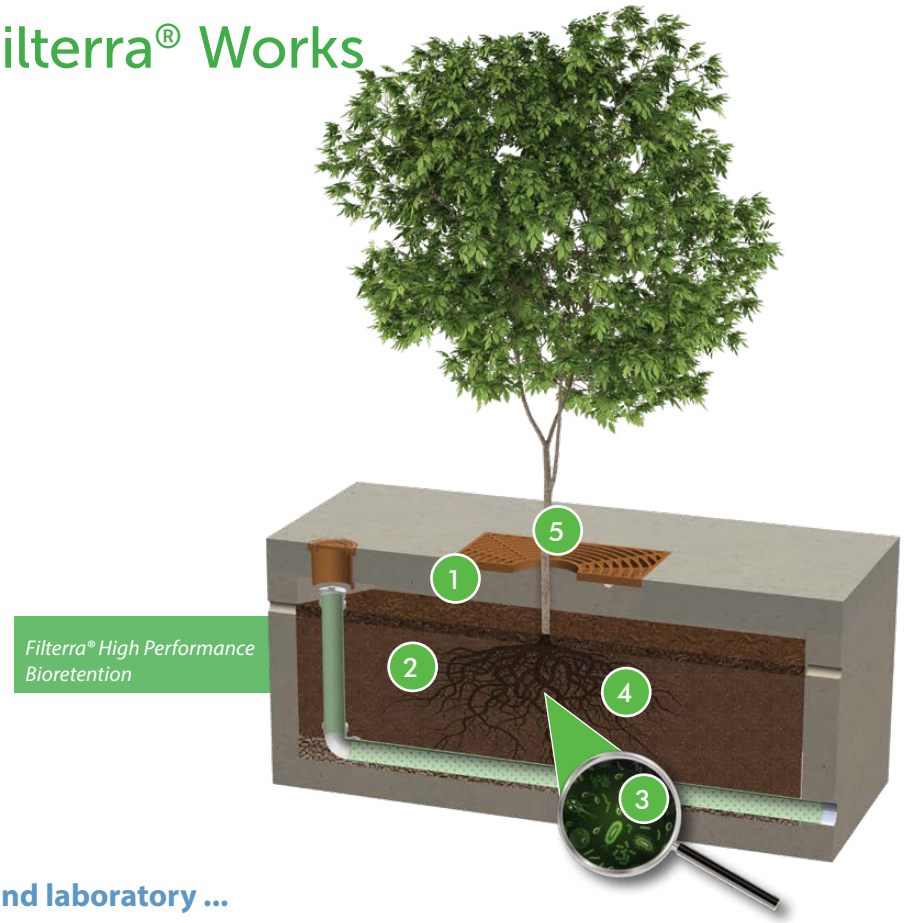
Filterra is an engineered high-performance bioretention system. While it operates similar to traditional bioretention, its high flow media allows for a reduction in footprint of up to 95% versus traditional bioretention practices. Filterra provides a Low Impact Development (LID) solution for tight, highly developed sites such as urban development projects, commercial parking lots, residential streets, and streetscapes. Its small footprint also reduces installation and life cycle costs versus traditional bioretention. Filterra can be configured in many different ways to enhance site aesthetics, integrate with other LID practices, or increase runoff reduction through infiltration below or downstream of the system.

*At the Manchester Stormwater Park seen above, the Filterra systems surrounding the central courtyard allowed for the creation of a community space with parking, sidewalks, and benches in a quaint downtown area. A traditional bioretention system treating the same drainage area would have occupied the entire park area leaving no room for these amenities.*

filterra®
Bioretention Systems

filterra® Bioscape®

# How the Filterra® Works




## Tested in the field and laboratory ...

1. Stormwater enters the Filterra through a pipe, curb inlet, or sheet flow and ponds over the pretreatment mulch layer, capturing heavy sediment and debris. Organics and microorganisms within the mulch trap and degrade metals and hydrocarbons. The mulch also provides water retention for the system's vegetation.

2. Stormwater flows through engineered Filterra media which filters fine pollutants and nutrients. Organic material in the media removes dissolved metals and acts as a food source for root-zone microorganisms. Treated water exits through an underdrain pipe or infiltrates (if designed accordingly).

3. Rootzone microorganisms digest and transform pollutants into forms easily absorbed by plants.

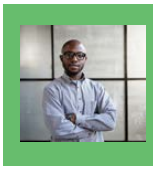
4. Plant roots absorb stormwater and pollutants that were transformed by microorganisms, regenerating the media's pollutant removal capacity. The roots grow, provide a hospitable environment for the rootzone microorganisms and penetrate the media, maintaining hydraulic conductivity.

5. The plant trunk and foliage utilize nutrients such as Nitrogen and Phosphorus for plant health, sequester heavy metals into the biomass, and provide evapotranspiration of residual water within the system.

**Plants and organic material are vital to the long term performance of bioretention systems**

# Filterra® Features and Benefits

| FEATURE | BENEFITS |
|---|---|
| High biofiltration media flow rate (up to 175”/hr+) | Greatly reduced footprint versus traditional bioretention and LID solutions |
| Filterra system is packaged, including all components necessary for system performance | Quality control for easy, fast and successful installation |
| Quick and easy maintenance | Low lifecycle costs |
| Variety of configurations and aesthetic options | Integrates easily into any site or landscape plan |
| Natural stormwater management processes featuring organics and vegetation | Meets Low Impact Development requirements and ensures long-term performance |



**The Filterra system can be configured with many different aesthetic options**

# Select Filterra® Approvals

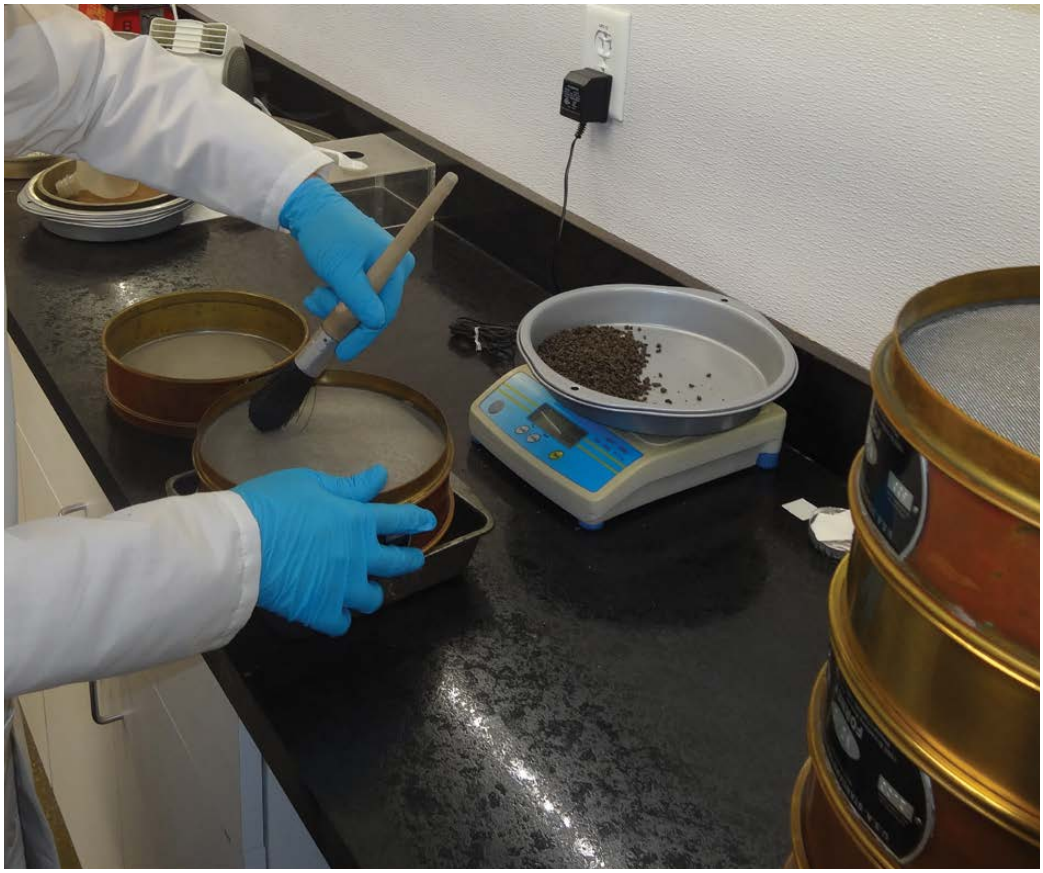
Filterra is approved through numerous local, state and federal verification programs, including:

- New Jersey Department of Environmental Protection (NJ DEP)
- Washington Department of Ecology (GULD) – Basic, Enhanced, Phosphorus, and Oil
- Maryland Department of the Environment - Environmental Site Design (ESD)
- Texas Commission on Environmental Quality (TCEQ)
- Virginia Department of Environmental Quality (VA DEQ)
- Maine Department of Environmental Protection (ME DEP)
- Atlanta, GA Regional Commission
- Los Angeles County, CA - Alternate to Attachment H
- City of Portland, Oregon Bureau of Environmental Services
- North Carolina Department of Environmental Quality (NC DEQ)

# Filterra® Performance Testing Results

## APPLICATION TIPS

- The Filterra system has been tested under industry standard protocols and has proven its pollutant removal performance and system longevity.
- Contech invests significant resources in media blending calibration and product testing to ensure our media meets our strict performance specifications every time.
- Keep regulators and owners happy by selecting a product with predictable and proven maintenance longevity.



| POLLUTANT OF CONCERN | MEDIAN REMOVAL EFFICIENCY | MEDIAN EFFLUENT CONCENTRATION (MG/L) |
|---|---|---|
| Total Suspended Solids (TSS) | 86% | 3.3 |
| Total Phosphorus - TAPE (TP) | 70% | 0.05 |
| Total Nitrogen (TN) | 34% | 0.54 |
| Total Copper (TCu) | 55% | 0.004 |
| Total Dissolved Copper | 43% | 0.003 |
| Total Zinc (TZn) | 56% | 0.04 |
| Total Dissolved Zinc | 54% | 0.1 |
| Total Zinc (TZn) | 56% | 0.04 |
| Total Petroleum Hydrocarbons | 87% | 0.71 |

*Each batch of Filterra® media has been extensively tested to ensure consistent performance every time.*

*Sources:*
*UVA (TARP) Field Study - 2006*
*Herrera (TAPE) Study - 2009*
*Herrera (TAPE) Study - 2014*
*NC State Study - 2015*

*Note: Some jurisdictions recognize higher removal rates. Contact your Contech Stormwater Consultant for performance expectations.*

**Field tested and performance verified**

# Filterra® Maintenance

## Activation and first year of maintenance is included with every system.*

With proper routine maintenance, the engineered media within the Filterra system should last as long as traditional bioretention media. Routine maintenance is included by the manufacturer on all Filterra systems for the first year after activation.* This includes a maximum of 2 visits to remove debris, replace pretreatment mulch, and prune the vegetation.

**Maintenance is low-cost, low-tech and simple:**

- Remove trash, sediment, and mulch
- Replace with a fresh 3" layer of mulch
- No confined space entry or special tools
- Easily performed by landscape contractor or facilities maintenance provider

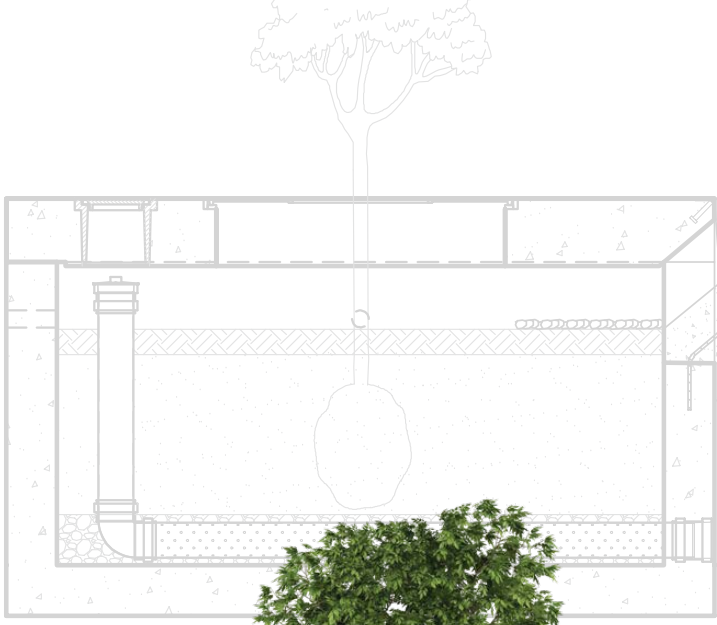
** Some exclusions may apply.*

*Filterra offers high performance bioretention for advanced pollutant removal with easy maintenance.*

*Plant health evaluation and pruning is important to encourage growth.*

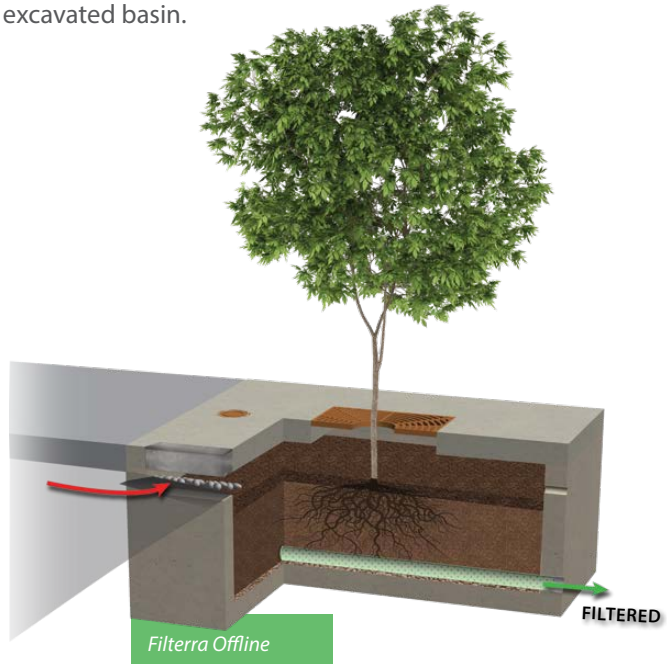
All stormwater treatment systems require maintenance for effective operation.

# Filterra® Configurations

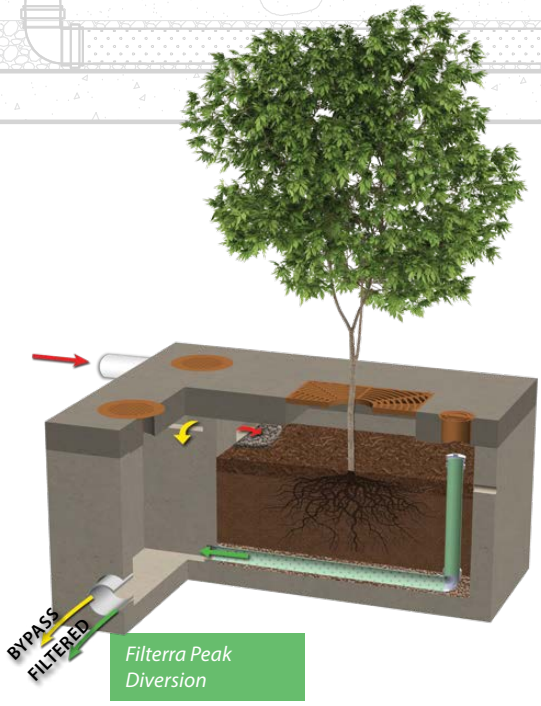


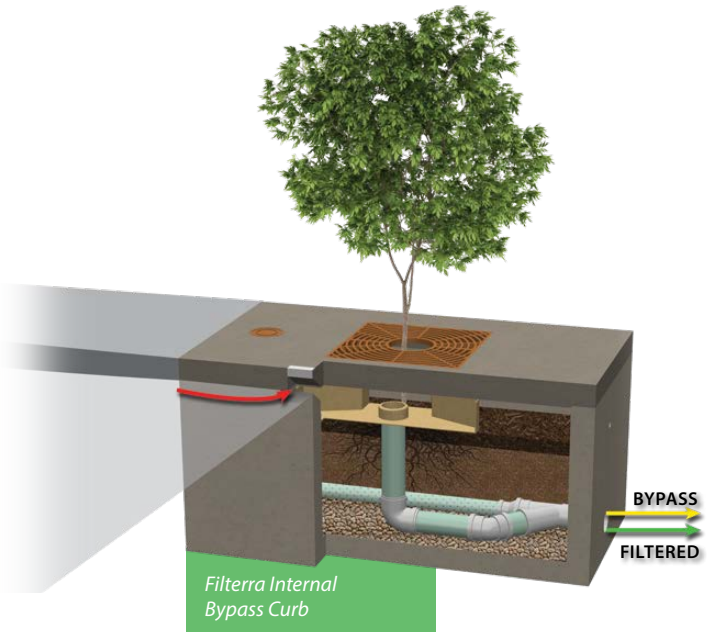
## Multiple system configurations integrate with site hydraulic design and layout ...

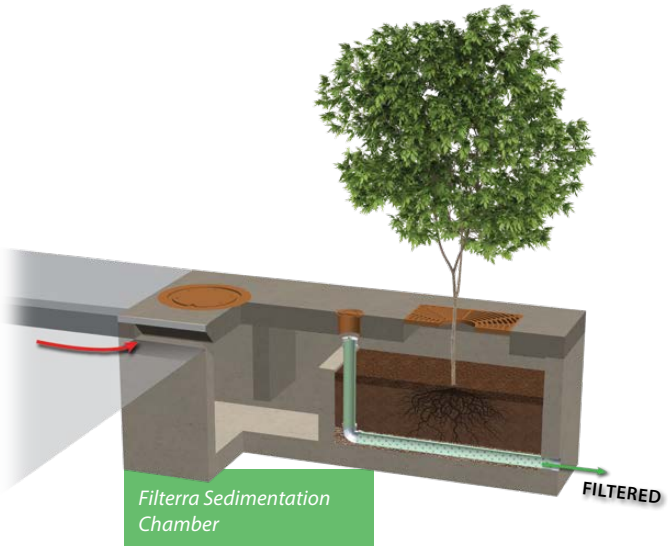
The Filterra is available in a variety of precast configurations as well as Filterra Bioscape, which can be installed directly into an excavated basin.




*Bypass via downstream catch basin.*



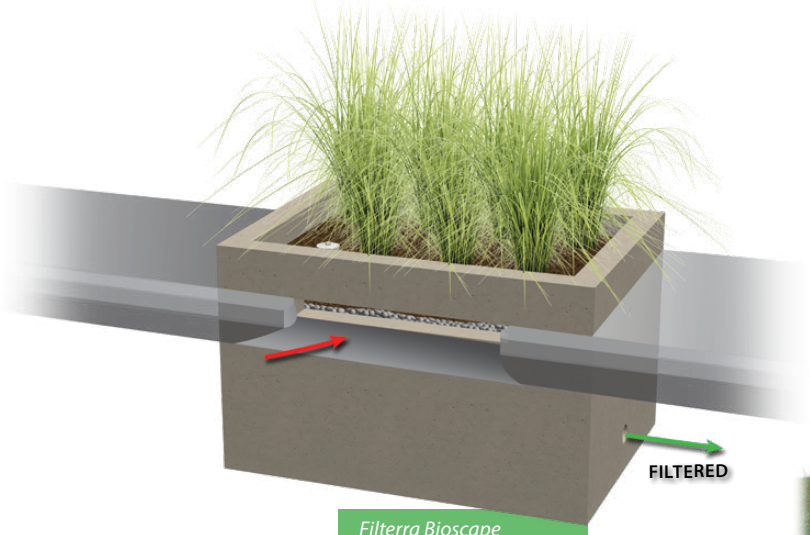

*Bypass via downstream catch basin.*

**Additional configurations available, including offline - pipe, peak diversion - grate, and internal bypass curb-chamber.*

**Multiple configurations allow for easy site integration**

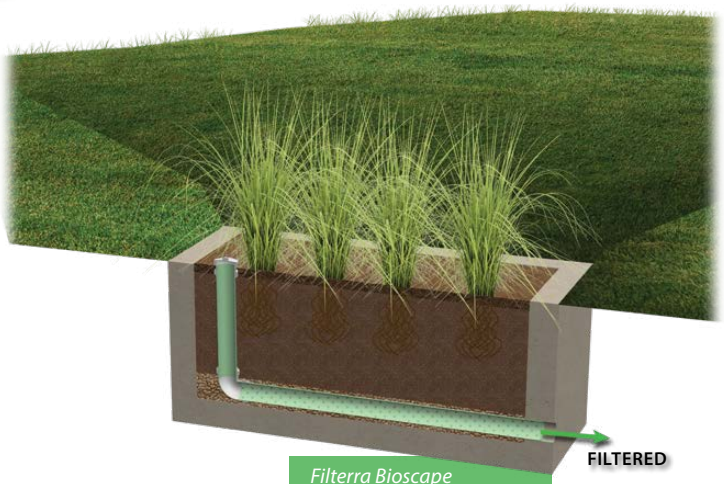
# Filterra® Bioscape® Configurations






*Filterra Bioscape Vault Offline*

*Bypass via downstream catch basin.*




*Filterra Bioscape Vault Basin*

*Bypass via upstream structure. Multiple inlet options.*

*Filterra Bioscape*

*Bypass via upstream structure. Multiple inlet options.*

**Additional configurations available, including bioscape vault offline pipe.*

# Filterra® Aesthetic Options

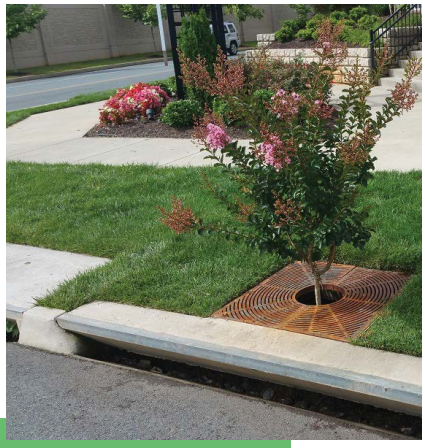


**Multiple aesthetic options to enhance the appearance and integrate with landscaping ...**

*Standard Tree Grate*

*Custom/Decorative Tree Grate*

*Full Grate with Grasses*



*Recessed Top Slab*

*Open Top Planter - Filterra Bioscape*

*Street Tree*

**An aesthetic solution to meet your bioretention needs**

# Filterra® Bioscape®

## Large-scale Filterra that can be customized to your site ...

- Ideal for Filterra systems greater than 300 square feet
- Design with or without containment structure
- Incorporate infiltration directly below the system, where required
- Combine with upstream storage or downstream infiltration
- Use as an alternative to larger regional traditional bioretention systems
- Easily add pretreatment Hydrodynamic Separator for large-scale or heavy pollutant loading applications

# A partner you can rely on

STORMWATER SOLUTIONS

PIPE SOLUTIONS

STRUCTURES SOLUTIONS

Few companies offer the wide range of high-quality stormwater resources you can find with us — state-of-the-art products, decades of expertise, and all the maintenance support you need to operate your system cost-effectively.

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Contech® Engineered Solutions provides innovative, cost-effective site solutions to engineers, contractors, and developers on projects across North America. Our portfolio includes bridges, drainage, erosion control, retaining wall, sanitary sewer and stormwater management products.

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# Attachment C

# Hydromodification Analysis

(Excerpts provided. See project Hydrology Report)

```
____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Crawford Park                                        *
* Existing Condition                                                       *
* 2-year Storm                                                             *
 ****************************************************************************

  FILE NAME: CPEX.DAT
  TIME/DATE OF STUDY: 19:25 11/13/2020
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    750.00
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.475
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.797
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.19      0.25     1.000    59    7.47
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.66
  TOTAL AREA(ACRES) =      1.19   PEAK FLOW RATE(CFS) =      1.66

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    750.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.4615
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.66
  FLOW VELOCITY(FEET/SEC) =   5.24 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.03   Tc(MIN.) =    8.51
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.51
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.668
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.90      0.25     1.000    59
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.24      0.20     1.000    67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    1.47
  EFFECTIVE AREA(ACRES) =      2.33   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       2.98

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  600.00  DOWNSTREAM ELEVATION(FEET) =  503.00
```

```
  STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    4.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.62
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =   10.35
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.491
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        3.49      0.20     0.700    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    3.49      SUBAREA RUNOFF(CFS) =    4.24
  EFFECTIVE AREA(ACRES) =      5.82    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.82
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =       6.85

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   5.91
  FLOW VELOCITY(FEET/SEC.) =  6.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1335.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  395.00
  STREET LENGTH(FEET) =  1085.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.09
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.95
  STREET FLOW TRAVEL TIME(MIN.) =   2.85   Tc(MIN.) =   13.20
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.296
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        5.82      0.20     0.700    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    5.82      SUBAREA RUNOFF(CFS) =    6.06
  EFFECTIVE AREA(ACRES) =     11.64    AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      11.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.91
  FLOW VELOCITY(FEET/SEC.) =  6.59   DEPTH*VELOCITY(FT*FT/SEC.) =   2.12
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.90
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   13.28
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    2465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.28
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.292
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D       10.89      0.20     0.700    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =   10.89      SUBAREA RUNOFF(CFS) =   11.29
  EFFECTIVE AREA(ACRES) =     22.53   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      23.14

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.58
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.14
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   13.49
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.49
  RAINFALL INTENSITY(INCH/HR) =   1.28
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =      22.53
  TOTAL STREAM AREA(ACRES) =      22.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.14

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    436.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.036
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.861
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        1.17      0.25     0.700    50    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  436.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   625.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    5.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.36
  STREET FLOW TRAVEL TIME(MIN.) =   1.99   Tc(MIN.) =    9.03
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.613
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        0.65      0.25     0.700    50
  COMMERCIAL                 C        0.30      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.511
  SUBAREA AREA(ACRES) =    0.95      SUBAREA RUNOFF(CFS) =    1.27
  EFFECTIVE AREA(ACRES) =      2.12    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       2.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   6.03
  FLOW VELOCITY(FEET/SEC.) =  5.37   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   385.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.48
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  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.78
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    9.42
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1145.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.42
  RAINFALL INTENSITY(INCH/HR) =   1.57
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =       2.12
  TOTAL STREAM AREA(ACRES) =       2.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.78

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.14   13.49    1.281  0.21( 0.15) 0.73      22.5      10.00
      2        2.78    9.42    1.573  0.25( 0.15) 0.62       2.1      20.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.14    9.42    1.573  0.21( 0.15) 0.72      17.9      20.00
      2       25.35   13.49    1.281  0.21( 0.15) 0.72      24.6      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.35    Tc(MIN.) =    13.49
  EFFECTIVE AREA(ACRES) =      24.65   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       24.6
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   371.00  DOWNSTREAM(FEET) =   367.00
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.77
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.35
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   13.62
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    2815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.62
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.274
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.33      0.30     0.600    36
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        3.00      0.25     0.600    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.33      SUBAREA RUNOFF(CFS) =    3.36
  EFFECTIVE AREA(ACRES) =     27.98   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =       28.0       PEAK FLOW RATE(CFS) =      28.26

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   347.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.82
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.26
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   14.16
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    3295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.16
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.245
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    36
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        0.50      0.25     0.600    50
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.16      0.20     0.600    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    4.66      SUBAREA RUNOFF(CFS) =    4.60
  EFFECTIVE AREA(ACRES) =     32.64   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       32.6       PEAK FLOW RATE(CFS) =      32.15

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0286
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.238
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.13      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      32.21
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.13
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   0.14
  Tc(MIN.) =   14.30
  SUBAREA AREA(ACRES) =     0.13       SUBAREA RUNOFF(CFS) =    0.12
  EFFECTIVE AREA(ACRES) =     32.77     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.22  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =       32.8         PEAK FLOW RATE(CFS) =      32.15
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   8.11
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.30
  RAINFALL INTENSITY(INCH/HR) =   1.24
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =      32.77
  TOTAL STREAM AREA(ACRES) =      32.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.15

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    393.00  DOWNSTREAM(FEET) =    372.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.10      0.20     0.100    57    5.00
  PUBLIC PARK                C        0.30      0.25     0.850    50    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.663
  SUBAREA RUNOFF(CFS) =      0.76
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      0.76

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    372.00  DOWNSTREAM(FEET) =    361.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0328
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.790
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.33      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.21
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   2.53
  Tc(MIN.) =    7.53
  SUBAREA AREA(ACRES) =     1.33       SUBAREA RUNOFF(CFS) =    1.84
  EFFECTIVE AREA(ACRES) =      1.73     AREA-AVERAGED Fm(INCH/HR) =   0.23
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.81
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       2.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   2.52
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    361.00  DOWNSTREAM(FEET) =    350.00
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   263.00   CHANNEL SLOPE =  0.0418
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.617
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.27      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.01
  AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   1.46
  Tc(MIN.) =    8.98
  SUBAREA AREA(ACRES) =     1.27       SUBAREA RUNOFF(CFS) =    1.56
  EFFECTIVE AREA(ACRES) =      3.00     AREA-AVERAGED Fm(INCH/HR) =   0.24
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.82
  TOTAL AREA(ACRES) =        3.0         PEAK FLOW RATE(CFS) =       3.71

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   3.07
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     848.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.32
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.71
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    9.11
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     928.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.11
  RAINFALL INTENSITY(INCH/HR) =   1.60
  AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.29
  AREA-AVERAGED Ap =  0.82
  EFFECTIVE STREAM AREA(ACRES) =       3.00
  TOTAL STREAM AREA(ACRES) =       3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.71

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       31.66   10.25    1.500  0.22( 0.15) 0.68      26.0      20.00
      1       32.15   14.30    1.238  0.22( 0.15) 0.69      32.8      10.00
      2        3.71    9.11    1.604  0.29( 0.24) 0.82       3.0      30.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.05    9.11    1.604  0.23( 0.16) 0.70      26.1      30.00
      2       35.09   10.25    1.500  0.23( 0.16) 0.70      29.0      20.00
      3       34.87   14.30    1.238  0.23( 0.16) 0.70      35.8      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.09    Tc(MIN.) =    10.25
  EFFECTIVE AREA(ACRES) =      28.98   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       35.8
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0218
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.452
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.58      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      35.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.73
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   0.59
  Tc(MIN.) =   10.84
  SUBAREA AREA(ACRES) =     0.58       SUBAREA RUNOFF(CFS) =    0.62
  EFFECTIVE AREA(ACRES) =     29.56     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.23  AREA-AVERAGED Ap =   0.70
  TOTAL AREA(ACRES) =       36.4         PEAK FLOW RATE(CFS) =      35.09
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   7.77
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.84
  RAINFALL INTENSITY(INCH/HR) =   1.45
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =      29.56
  TOTAL STREAM AREA(ACRES) =      36.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      35.09

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   160.00
  ELEVATION DATA: UPSTREAM(FEET) =    388.20  DOWNSTREAM(FEET) =    378.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.378
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.968
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.20      0.30     0.850    36    6.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.31
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.31

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    378.00  DOWNSTREAM(FEET) =    364.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0538
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.688
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.23      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.21
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   1.96
  Tc(MIN.) =    8.33
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.30
  EFFECTIVE AREA(ACRES) =      0.43     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       0.55

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   2.42
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    364.00  DOWNSTREAM(FEET) =    354.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0364
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.488
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.23      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.24
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   2.05
  Tc(MIN.) =   10.38
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.26
  EFFECTIVE AREA(ACRES) =      0.66     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       0.73

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   2.29
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    354.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0346
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.354
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.12      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.33
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   1.86
  Tc(MIN.) =   12.24
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.12
  EFFECTIVE AREA(ACRES) =      0.78     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.85
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       0.77

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.15   FLOW VELOCITY(FEET/SEC.) =   2.27
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     44.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    40.00   CHANNEL SLOPE =  0.1500
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.77
  FLOW VELOCITY(FEET/SEC.) =   2.98   FLOW DEPTH(FEET) =   0.03
  TRAVEL TIME(MIN.) =   0.22   Tc(MIN.) =   12.46
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     45.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.46
  RAINFALL INTENSITY(INCH/HR) =   1.34
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       0.78
  TOTAL STREAM AREA(ACRES) =       0.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.77

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.05    9.71    1.547  0.23( 0.16) 0.70      26.7      30.00
      1       35.09   10.84    1.452  0.23( 0.16) 0.70      29.6      20.00
      1       34.87   14.90    1.210  0.23( 0.16) 0.71      36.4      10.00
      2        0.77   12.46    1.340  0.30( 0.25) 0.85       0.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.77    9.71    1.547  0.24( 0.17) 0.70      27.3      30.00
      2       35.83   10.84    1.452  0.23( 0.16) 0.70      30.2      20.00
      3       35.77   12.46    1.340  0.23( 0.16) 0.71      33.1      40.00
      4       35.54   14.90    1.210  0.23( 0.16) 0.71      37.1      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.83    Tc(MIN.) =    10.84
  EFFECTIVE AREA(ACRES) =      30.24   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       37.1
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       37.1  TC(MIN.) =     10.84
  EFFECTIVE AREA(ACRES) =     30.24  AREA-AVERAGED Fm(INCH/HR)=  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap = 0.703
  PEAK FLOW RATE(CFS)   =      35.83

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.77    9.71    1.547  0.24( 0.17) 0.70      27.3      30.00
      2       35.83   10.84    1.452  0.23( 0.16) 0.70      30.2      20.00
      3       35.77   12.46    1.340  0.23( 0.16) 0.71      33.1      40.00
      4       35.54   14.90    1.210  0.23( 0.16) 0.71      37.1      10.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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____________________________________________________________________________
****************************************************************************
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 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Crawford Park                                        *
* Proposed Condition                                                       *
* 2-year Storm                                                             *
 ****************************************************************************

  FILE NAME: CPPR.DAT
  TIME/DATE OF STUDY: 15:44 11/14/2020
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    750.00
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.475
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.797
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.19      0.25     1.000    59    7.47
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.66
  TOTAL AREA(ACRES) =      1.19   PEAK FLOW RATE(CFS) =      1.66

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    750.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.4615
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.66
  FLOW VELOCITY(FEET/SEC) =   5.24 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.03   Tc(MIN.) =    8.51
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.51
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.668
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.90      0.25     1.000    59
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.24      0.20     1.000    67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    1.47
  EFFECTIVE AREA(ACRES) =      2.33   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       2.98

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  600.00  DOWNSTREAM ELEVATION(FEET) =  503.00
```

```
  STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    4.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.62
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =   10.35
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.491
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        3.49      0.20     0.700    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    3.49      SUBAREA RUNOFF(CFS) =    4.24
  EFFECTIVE AREA(ACRES) =      5.82    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.82
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =       6.85

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   5.91
  FLOW VELOCITY(FEET/SEC.) =  6.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1335.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  395.00
  STREET LENGTH(FEET) =  1085.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.09
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.95
  STREET FLOW TRAVEL TIME(MIN.) =   2.85   Tc(MIN.) =   13.20
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.296
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        5.82      0.20     0.700    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    5.82      SUBAREA RUNOFF(CFS) =    6.06
  EFFECTIVE AREA(ACRES) =     11.64    AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =       11.6        PEAK FLOW RATE(CFS) =      11.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.91
  FLOW VELOCITY(FEET/SEC.) =  6.59   DEPTH*VELOCITY(FT*FT/SEC.) =   2.12
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.90
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   13.28
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    2465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.28
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.292
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D       10.89      0.20     0.700    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =   10.89      SUBAREA RUNOFF(CFS) =   11.29
  EFFECTIVE AREA(ACRES) =     22.53   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      23.14

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.58
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.14
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   13.49
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.49
  RAINFALL INTENSITY(INCH/HR) =   1.28
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =      22.53
  TOTAL STREAM AREA(ACRES) =      22.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.14

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    436.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.036
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.861
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        1.17      0.25     0.700    50    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  436.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   625.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    5.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.36
  STREET FLOW TRAVEL TIME(MIN.) =   1.99   Tc(MIN.) =    9.03
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.613
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         C        0.65      0.25     0.700    50
  COMMERCIAL                 C        0.30      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.511
  SUBAREA AREA(ACRES) =    0.95      SUBAREA RUNOFF(CFS) =    1.27
  EFFECTIVE AREA(ACRES) =      2.12    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       2.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   6.03
  FLOW VELOCITY(FEET/SEC.) =  5.37   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   385.00  DOWNSTREAM(FEET) =   374.00
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.41
```

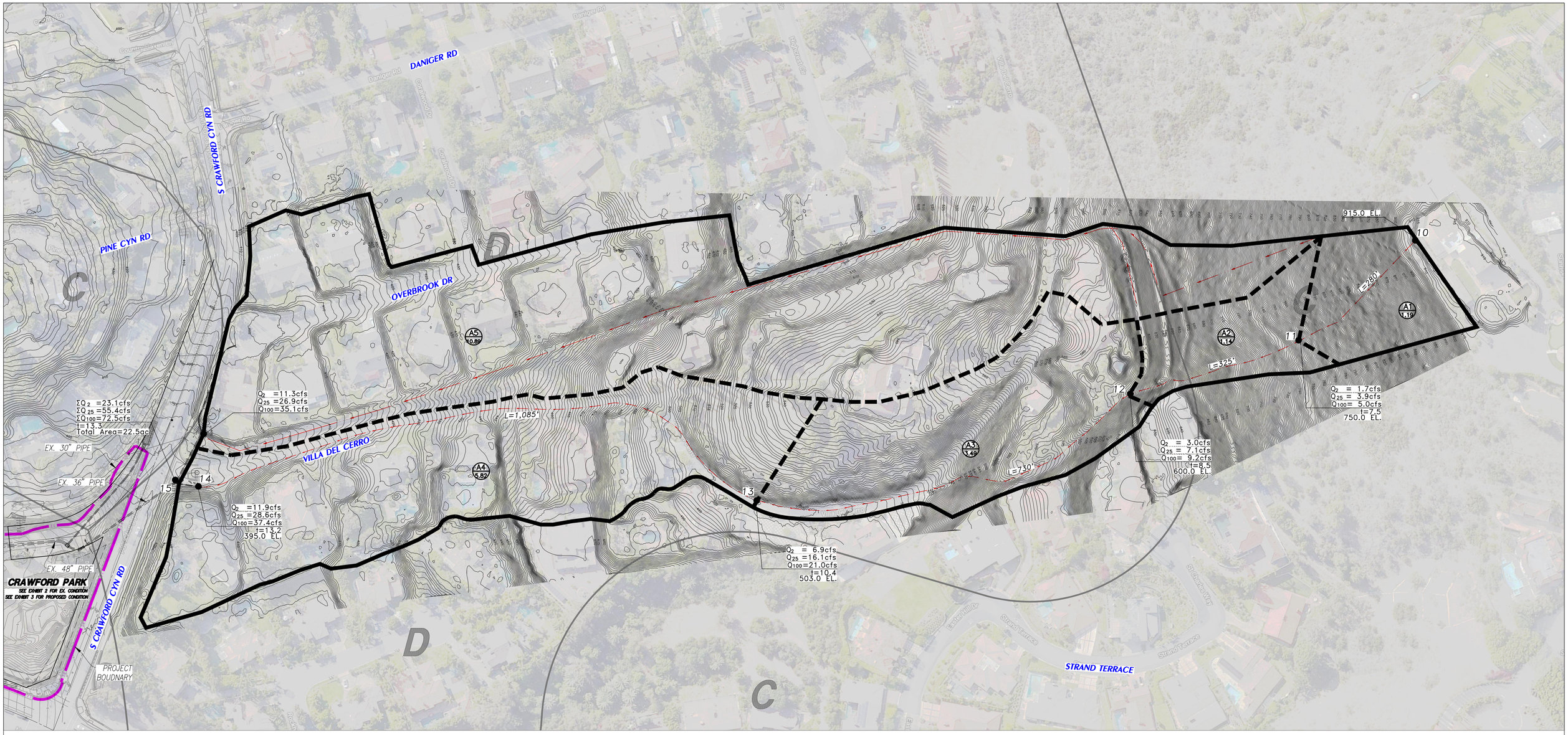
```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.78
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    9.35
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.35
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.581
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                C        0.14      0.25     0.850    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.17
  EFFECTIVE AREA(ACRES) =      2.26   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       2.90

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   374.00  DOWNSTREAM(FEET) =   371.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.24
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.90
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.41
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.41
  RAINFALL INTENSITY(INCH/HR) =   1.57
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.63
  EFFECTIVE STREAM AREA(ACRES) =       2.26
  TOTAL STREAM AREA(ACRES) =       2.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.90

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.14   13.49    1.281  0.21( 0.15) 0.73      22.5      10.00
      2        2.90    9.41    1.575  0.25( 0.16) 0.63       2.3      20.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.24    9.41    1.575  0.21( 0.15) 0.72      18.0      20.00
      2       25.44   13.49    1.281  0.21( 0.15) 0.72      24.8      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.44    Tc(MIN.) =    13.49
  EFFECTIVE AREA(ACRES) =      24.79   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       24.8
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =    2705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   371.00  DOWNSTREAM(FEET) =   367.00
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.78
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.44
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   13.62
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    2815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.62
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.274
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.33      0.30     0.600    36
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        3.00      0.25     0.600    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.33      SUBAREA RUNOFF(CFS) =    3.36
  EFFECTIVE AREA(ACRES) =     28.12   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.71
```

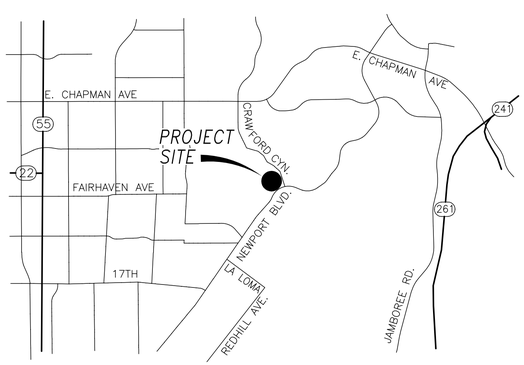
```
  TOTAL AREA(ACRES) =       28.1       PEAK FLOW RATE(CFS) =      28.39

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   347.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.83
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.39
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   14.16
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    3295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.16
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.246
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    36
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       C        0.50      0.25     0.600    50
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.16      0.20     0.600    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    4.66      SUBAREA RUNOFF(CFS) =    4.60
  EFFECTIVE AREA(ACRES) =     32.78   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       32.8       PEAK FLOW RATE(CFS) =      32.28

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     37.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0286
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.238
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.12      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      32.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.16
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   0.14
  Tc(MIN.) =   14.30
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.11
  EFFECTIVE AREA(ACRES) =     32.90     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.22  AREA-AVERAGED Ap =   0.69
  TOTAL AREA(ACRES) =       32.9         PEAK FLOW RATE(CFS) =      32.28
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   8.15
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     37.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.30
  RAINFALL INTENSITY(INCH/HR) =   1.24
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.22
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =      32.90
  TOTAL STREAM AREA(ACRES) =      32.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.28

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    393.00  DOWNSTREAM(FEET) =    381.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.378
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.171
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.12      0.20     0.100    57    5.38
  PUBLIC PARK                D        0.14      0.20     0.850    57    8.54
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.504
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    381.00  DOWNSTREAM(FEET) =    374.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.985
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.07      0.30     0.100    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.67
  AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   0.91
  Tc(MIN.) =    6.29
  SUBAREA AREA(ACRES) =     0.07       SUBAREA RUNOFF(CFS) =    0.12
  EFFECTIVE AREA(ACRES) =      0.33     AREA-AVERAGED Fm(INCH/HR) =   0.09
  AREA-AVERAGED Fp(INCH/HR) =   0.21  AREA-AVERAGED Ap =   0.42
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       0.56

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   3.55
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    374.00  DOWNSTREAM(FEET) =    371.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    65.00   CHANNEL SLOPE =  0.0462
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.947
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    36
  PUBLIC PARK                B        0.84      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.770
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.29
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.05
  AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   0.21
  Tc(MIN.) =    6.50
  SUBAREA AREA(ACRES) =     0.94       SUBAREA RUNOFF(CFS) =    1.45
  EFFECTIVE AREA(ACRES) =      1.27     AREA-AVERAGED Fm(INCH/HR) =   0.19
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.68
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       2.00

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   5.50
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    371.00  DOWNSTREAM(FEET) =    367.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    90.00   CHANNEL SLOPE =  0.0444
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.872
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.32      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.28
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   0.46
  Tc(MIN.) =    6.96
  SUBAREA AREA(ACRES) =     0.32       SUBAREA RUNOFF(CFS) =    0.47
  EFFECTIVE AREA(ACRES) =      1.59     AREA-AVERAGED Fm(INCH/HR) =   0.21
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.71
  TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =       2.39

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   3.36
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     34.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    367.00  DOWNSTREAM(FEET) =    357.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   230.00   CHANNEL SLOPE =  0.0430
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.721
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.65      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.81
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.49
  AVERAGE FLOW DEPTH(FEET) =   0.40   TRAVEL TIME(MIN.) =   1.10
  Tc(MIN.) =    8.06
  SUBAREA AREA(ACRES) =     0.65       SUBAREA RUNOFF(CFS) =    0.86
  EFFECTIVE AREA(ACRES) =      2.24     AREA-AVERAGED Fm(INCH/HR) =   0.22
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   0.75
```

```
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       3.03

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =   3.52
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   357.10  DOWNSTREAM(FEET) =   356.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.03
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    8.33
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     36.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.33
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.689
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.10      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    1.10      SUBAREA RUNOFF(CFS) =    1.42
  EFFECTIVE AREA(ACRES) =      3.34   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.78
  TOTAL AREA(ACRES) =        3.3       PEAK FLOW RATE(CFS) =       4.38

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   356.50  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.38
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.39
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     37.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.39
  RAINFALL INTENSITY(INCH/HR) =   1.68
  AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.78
  EFFECTIVE STREAM AREA(ACRES) =       3.34
  TOTAL STREAM AREA(ACRES) =       3.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       31.83   10.23    1.501  0.22( 0.15) 0.68      26.1      20.00
      1       32.28   14.30    1.238  0.22( 0.15) 0.69      32.9      10.00
      2        4.38    8.39    1.682  0.30( 0.23) 0.78       3.3      30.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       33.98    8.39    1.682  0.23( 0.16) 0.70      24.7      30.00
      2       35.66   10.23    1.501  0.23( 0.16) 0.69      29.4      20.00
      3       35.32   14.30    1.238  0.23( 0.16) 0.70      36.2      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.66    Tc(MIN.) =    10.23
  EFFECTIVE AREA(ACRES) =      29.43   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       36.2
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     37.00 =    3365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     45.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    339.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0218
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.453
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.41      0.30     0.850    36
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      35.88
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.79
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   0.59
  Tc(MIN.) =   10.82
  SUBAREA AREA(ACRES) =     0.41       SUBAREA RUNOFF(CFS) =    0.44
  EFFECTIVE AREA(ACRES) =     29.84     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.23  AREA-AVERAGED Ap =   0.70
  TOTAL AREA(ACRES) =       36.6         PEAK FLOW RATE(CFS) =      35.66
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   7.75
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     45.00 =    3640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.82
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.453
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.22      0.30     0.100    36
  PUBLIC PARK                B        0.26      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.506
  SUBAREA AREA(ACRES) =    0.48      SUBAREA RUNOFF(CFS) =    0.56
  EFFECTIVE AREA(ACRES) =     30.32   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =      35.66
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       37.1  TC(MIN.) =     10.82
  EFFECTIVE AREA(ACRES) =     30.32  AREA-AVERAGED Fm(INCH/HR)=  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap = 0.693
  PEAK FLOW RATE(CFS)   =      35.66

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       33.98    8.99    1.617  0.24( 0.16) 0.70      25.6      30.00
      2       35.66   10.82    1.453  0.23( 0.16) 0.69      30.3      20.00
      3       35.32   14.89    1.210  0.23( 0.16) 0.70      37.1      10.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```




LOCATION MAP

PREPARED FOR:

OCparks

PREPARED BY:

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

SCALE: 1" =80'

80 40 0 80 160 240

GRAPHIC SCALE 1"= 80'

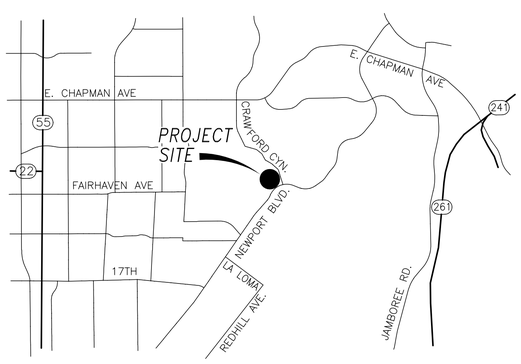
## LEGEND

- PROJECT BOUNDARY
- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- FLOW LINE WITH DIRECTION
- 100 — NODE NUMBER
- A / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q100=9.0cfs t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- ΣQ100=10.0cfs t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- EXISTING STORM DRAIN
- C / D — SOIL GROUP BOUNDARY

# EXHIBIT 1
# OFF-SITE HYDROLOGY MAP
# CRAWFORD PARK
# S. CRAWFORD CANYON RD. & NEWPORT BLVD.
# TUSTIN, CALIFORNIA 92782

HYDROLOGY MAP FOR CRAWFORD PARK – OFF-SITE

PLOTTED BY: Gary Guan DATE: Nov. 13, 2020 08:16:49 PM FILE: F:\1140\Engineering\SY_Hydrology\Crawford Park Existing Hydrology – Offsite.dwg




LOCATION MAP

PREPARED FOR:

OCparks

PREPARED BY:

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

SCALE: 1" =50'

50 25 0 50 100 150

GRAPHIC SCALE 1"= 50'

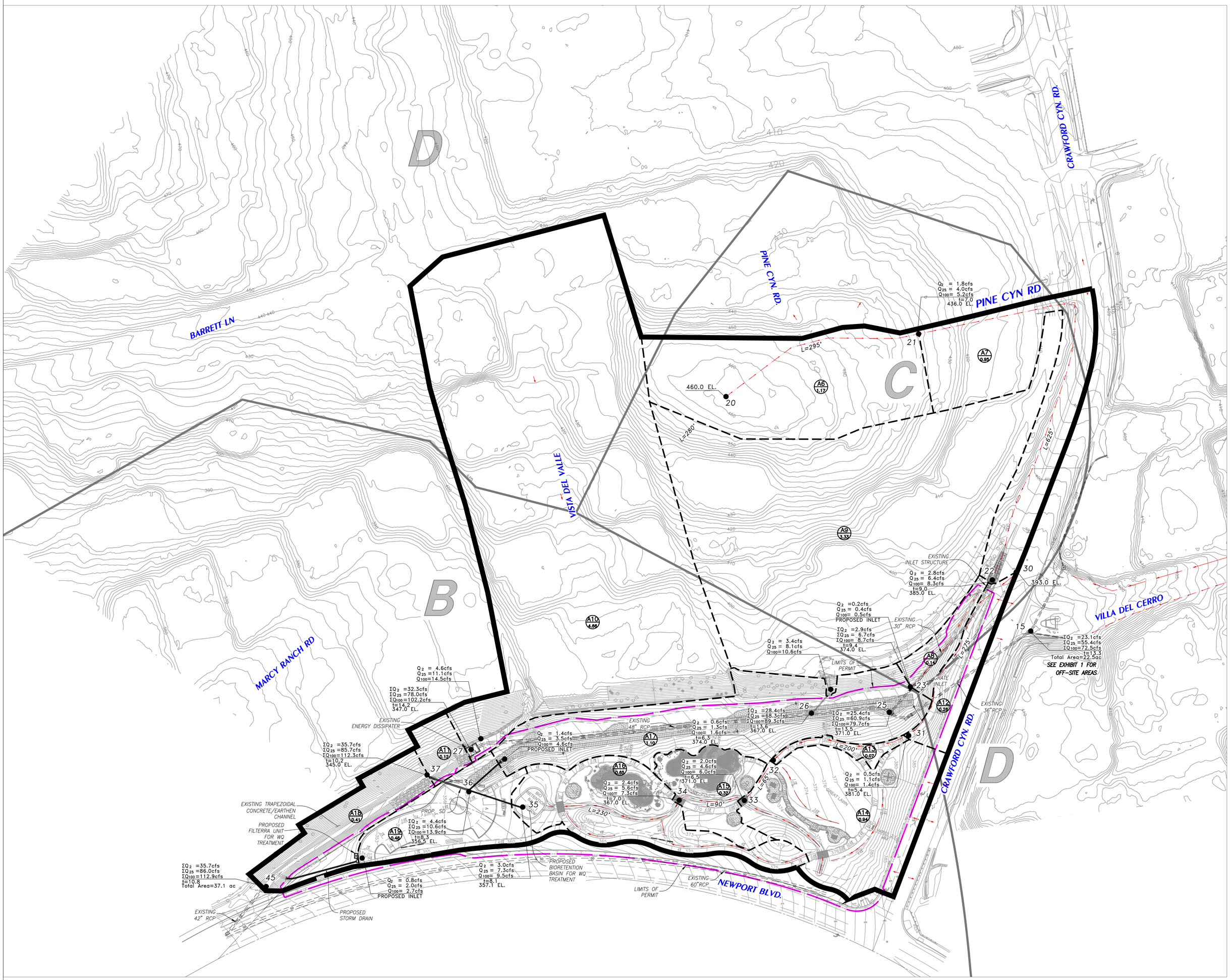
## LEGEND

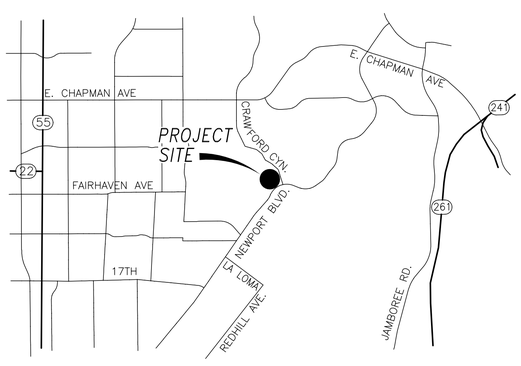
- PROJECT BOUNDARY
- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- FLOW LINE WITH DIRECTION
- 100 — NODE NUMBER
- A / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q100=8.0cfs t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- ΣQ100=10.0cfs t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- EXISTING STORM DRAIN
- C / D — SOIL GROUP BOUNDARY

# EXHIBIT 2
# EXISTING CONDITION HYDROLOGY MAP (ONSITE)
# CRAWFORD PARK
# S. CRAWFORD CANYON RD. & NEWPORT BLVD.
# TUSTIN, CALIFORNIA 92782

HYDROLOGY MAP FOR CRAWFORD PARK – ON-SITE

PLOTTED BY: Gary Guan DATE: Nov. 15, 2020 07:28:11 PM FILE: F:\1140\Engineering\SY_Hydrology\Crawford Park Existing Hydrology – Onsite.dwg




LOCATION MAP

PREPARED FOR:

OCparks

PREPARED BY:

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

SCALE: 1" =50'

50 25 0 50 100 150

GRAPHIC SCALE 1"= 50'

## LEGEND

- PROJECT BOUNDARY
- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- FLOW LINE WITH DIRECTION
- 100 — NODE NUMBER
- A / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q100=8.0cfs t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- ΣQ100=10.0cfs t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION FOR 2-YEAR STORM
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- C / D — SOIL GROUP BOUNDARY

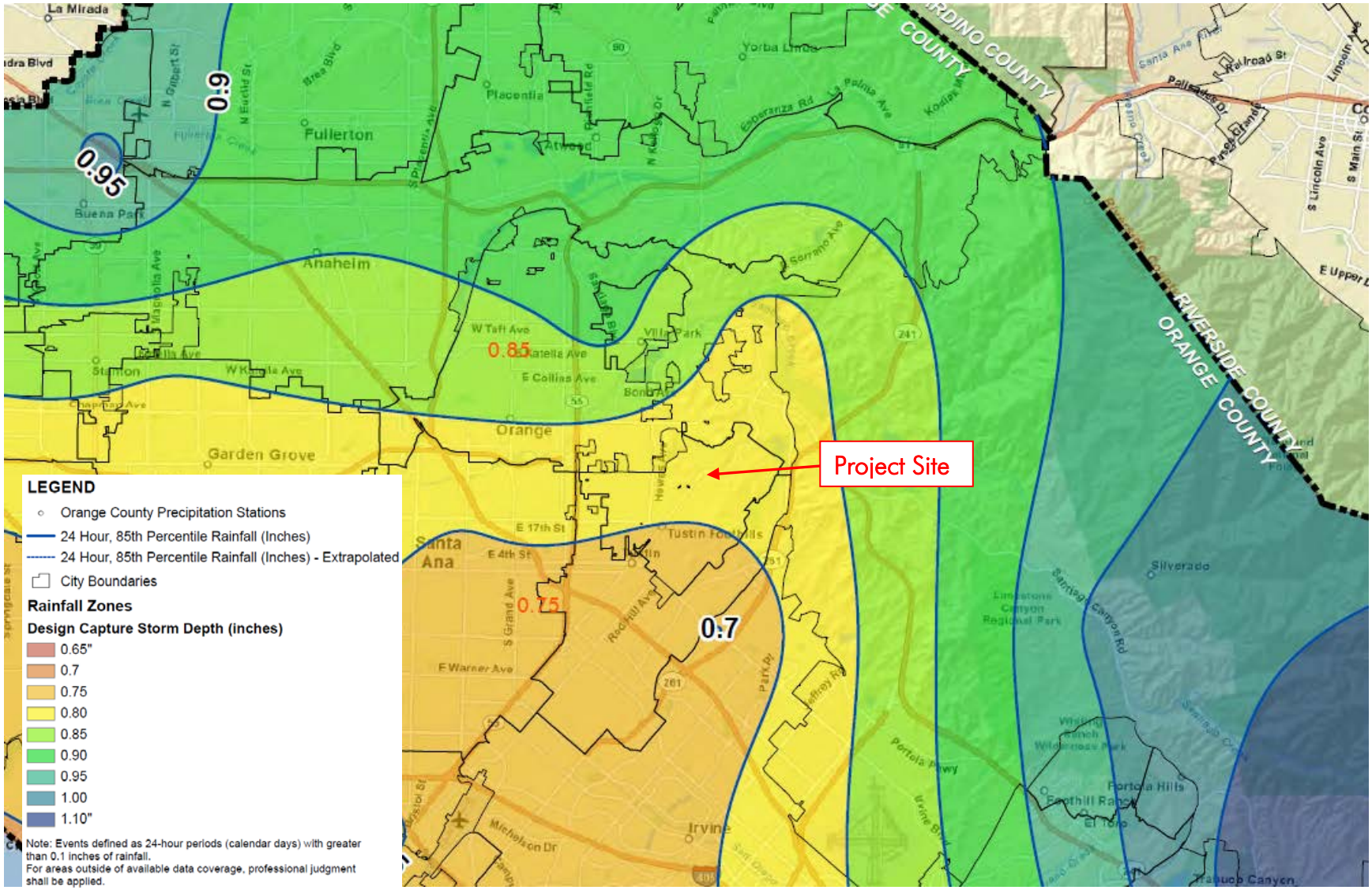
# EXHIBIT 3
# PROPOSED CONDITION HYDROLOGY MAP (ONSITE)
# CRAWFORD PARK
# S. CRAWFORD CANYON RD. & NEWPORT BLVD.
# TUSTIN, CALIFORNIA 92782

HYDROLOGY MAP FOR CRAWFORD PARK – OFF-SITE

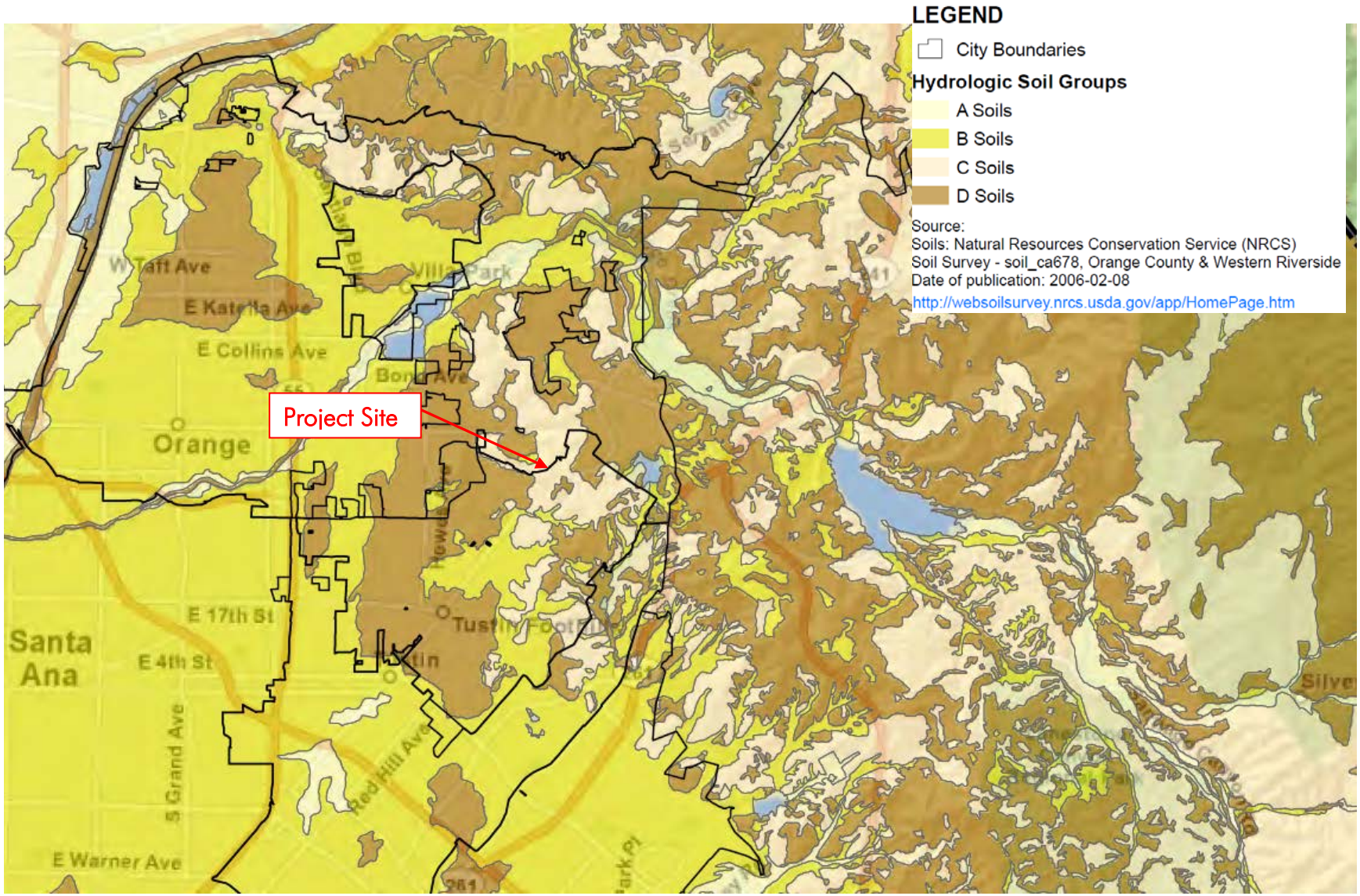
PLOTTED BY: Gary Guan DATE: Nov. 16, 2020 09:26:20 AM FILE: F:\1140\Engineering\SY_Hydrology\Crawford Park Proposed Hydrology – Onsite.dwg

# Attachment D

# Supporting Project Information




Source: County of Orange TGD – Figure XVI-1 Rainfall Zones




Source: County of Orange TGD – Figure XVI-2a NRCS Hydrologic Soils Group Map

# Attachment E

# Operation and Maintenance Plan

# OPERATIONS AND MAINTENANCE (O&M) PLAN
# WATER QUALITY MANAGEMENT PLAN
# FOR
# CRAWFORD CANYON PARK
# COUNTY OF ORANGE, CALIFORNIA

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| Non-Structural Source Control BMPs | | | |
| No | N1. Education for Property Owners, Tenants and Occupants<br>Not applicable to public park project. | | |
| Yes | N2. Activity Restrictions<br>Activity restrictions to minimize potential impacts to water quality and with the purpose of protecting water quality will be prescribed by the County for facility users and maintenance staff. Restrictions include prohibited activities within park property that have the potential to impact water quality, such as illegal dumping of wastes, proper clean up and disposal of pet wastes, proper disposal of litter and trash, and prohibiting wash down of the park's paved areas. | Ongoing | OC Parks |
| Yes | N3. Common Area Landscape Management<br>Maintenance shall be consistent with County requirements; any fertilizer and/or pesticide usages shall be consistent with County and manufacturer guidelines for use of fertilizers and pesticides. Maintenance includes mowing, weeding, and debris removal on a weekly basis. Trimming, replanting and replacement of mulch shall be performed on an as-needed basis. Trimmings, clippings, and other waste shall be properly disposed of off-site in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and drain inlets. | Monthly and as needed | OC Parks |

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| Yes | N4. BMP Maintenance<br>Maintenance of BMPs implemented at the project site shall be performed at the frequency prescribed in this WQMP. Records of inspections and BMP maintenance shall be maintained by the responsible party and documented with the WQMP, and shall be available for review upon request. | Ongoing, as prescribed per WQMP. | OC Parks |
| No | N5. Title 22 CCR Compliance<br>Not applicable to residential projects. | | |
| No | N6. Local Water Quality Permit Compliance<br>Not applicable. No local water quality permits are required for the operation of the project. | | |
| No | N7. Spill Contingency Plan<br>Not applicable to residential projects. | | |
| No | N8. Underground Storage Tank Compliance<br>Not applicable. None onsite. | | |
| No | N9. Hazardous Materials Disclosure Compliance<br>Not applicable to residential projects. | | |
| No | N10. Uniform Fire Code Implementation<br>Not applicable to residential projects. | | |
| Yes | N11. Common Area Litter Control<br>Litter patrol, violations investigation, reporting and other litter control activities shall be performed in conjunction with landscape maintenance activities. | Ongoing patrols. Weekly (minimum) pick up and removal. Monthly inspections with landscaping maintenance. | OC Parks |

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| Yes | **N12. Employee Training**<br>All employees and any contractors will require training to ensure that employees are aware of maintenance activities that may result in pollutants reaching the storm drain. Training will include, but not limited to, spoil clean up procedures, proper waste disposal, housekeeping practices, etc. | Upon hire and annually thereafter | OC Parks |
| No | **N13. Housekeeping of Loading Docks**<br>Not in project scope. | | |
| Yes | **N14. Common Area Catch Basin Inspection**<br>Catch basin inlets, area drains, curb-and-gutter systems and other drainage systems shall be inspected prior to October 1st of each year and after large storm events. If necessary, drains shall be cleaned prior to any succeeding rain events. 80% of private facilities shall be inspected and cleaned annually, with 100% of facilities inspected and maintained within a 2-year period. | Annually | OC Parks |
| Yes | **N15. Street Sweeping Private Streets and Parking Lots**<br>Project streets and parking areas shall be vacuum swept at a minimum, twice per month basis, consistent with County schedules. | Twice per month | OC Parks |
| **Structural Source Control BMPs** | | | |
| Yes | **S1. Provide Storm Drain System Stenciling and Signage**<br>Storm drain stencils shall be inspected for legibility, at minimum, once prior to the storm season, no later than October 1st each year. Those determined to be illegible will be re-stenciled as soon as possible. | Annually | OC Parks |

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| No | **S2. Design Outdoor Hazardous Material Storage Areas to Reduce Pollutant Introduction**<br>Not applicable. No outdoor storage of hazardous materials onsite. | | |
| No | **S3. Design Trash Enclosures to Reduce Pollutant Introduction**<br>Not applicable. None proposed. | | |
| Yes | **S4. Use Efficient Irrigation Systems and Landscape Design**<br>In conjunction with routine maintenance activities, verify that landscape design continues to function properly by adjusting properly to eliminate overspray to hardscape areas, and to verify that irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather, day or night time temperatures based on system specifications and local climate patterns. | Monthly | OC Parks |
| Yes | **S5. Protect Slopes and Channels**<br>The project's landscaped slopes shall be inspected for adequate vegetation cover, vegetation health and signs of erosion. Dead or dying vegetation shall be replaced as needed. Signs of erosion and concentrated flow areas shall be noted and repaired as needed. | Monthly | OC Parks |
| No | **S6. Loading Dock Areas**<br>None proposed | | |
| No | **S7. Maintenance Bays and Docks**<br>Not applicable. None proposed. | | |

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| No | S8. Vehicle Wash Areas<br>Not applicable. None proposed. | | |
| No | S9. Outdoor Processing Areas<br>Not applicable. No outdoor processing onsite. | | |
| No | S10. Equipment Wash Areas<br>Not applicable. No wash areas onsite. | | |
| No | S11. Fueling Areas<br>Not applicable. No fueling areas onsite. | | |
| Yes | S12. Site Design and Landscape Planning (Hillside Landscaping)<br>Hillside areas that are disturbed by the project shall be re-vegetated with deep-rooted, drought tolerant plant species selected for erosion control and consistent with County requirements. | Monthly | OC Parks |
| No | S13. Wash Water Controls for Food Preparation Areas<br>Not applicable. No food service facility proposed. | | |
| No | S14. Community Car Wash Racks<br>Not applicable. No community car wash areas onsite. | | |
| Hydrologic Source Controls | | | |
| HSC BMP #1<br>HSC-2 Impervious Area Dispersion<br>Inspect for standing water and that water infiltrates into underlying soil completely. Remove accumulated sediment or repair eroded areas as needed. | | After qualifying storm events of 0.5" or greater and monthly with landscaping maintenance | OC Parks |

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| HSC BMP #2 | **INF-6 Permeable Pavement (Grasscrete)**<br>Inspect for oil spills, dead vegetation, soil level within modules and stability. Remove/repairs as needed based on inspections. Trim vegetation as needed to maintain desired height. | Monthly with landscaping maintenance | OC Parks |
| **Low Impact Development BMPs** | | | |
| **Infiltration BMP #1** | INF-3 Bioretention with no underdrains<br>Conduct general inspection and maintenance per routine landscaping maintenance activities. Inspect surface area for debris, trash and vegetation accumulation. Inspect for general plant health. Inspect for sediment, build up on planting surface and in area drain inlet. Inspect for sediment or debris clogging inlet. Clean/repair items as necessary. Inspect for standing water after rain event of 0.5 inches or greater, based on 48-hr draw down time.<br><br>Remove vegetation, permeable soil and drain rock. Replace in kind. Check sub-drain pipe and inlet. Repair if necessary. | Monthly<br><br>Every 5 to 7 years, or as needed | OC Parks |
| **Biotreatment BMP #2** | **BIO-7 Proprietary Biotreatment -** Inspect unit for accumulated debris and sediment and plant health; remove trash; trim vegetation. Remove sediment, replace mulch (if included), replace media as needed. | 2-4 weeks during rainy season or after significant events. Frequency to be customized after 1-2 years observation. | OC Parks |

Required Permits

No additional permits are necessary for the operation and maintenane of the proposed BMPs.

Forms to Record BMP Implementation, Maintenance, and Inspection

The form that will be used to record implementation, maintenance, and inspection of BMPs is attached.

Recordkeeping

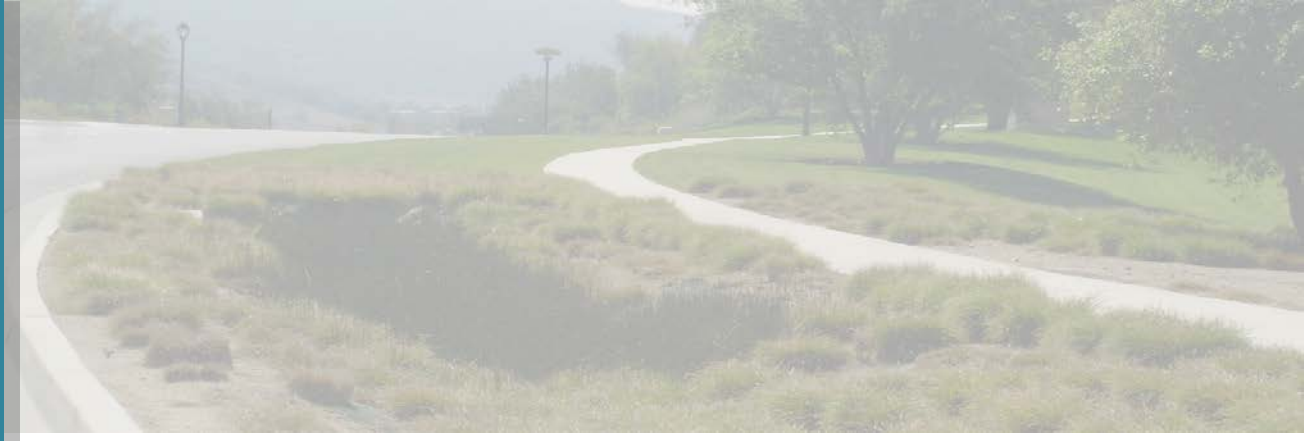
All records must be maintained for at least five (5) years and must be made available for review upon request.

Today's Date: _____

Name of Person Performing Activity (Printed): _____

Signature: _____

| BMP Name (As Shown in O&M Plan) | Brief Description of Implementation, Maintenance, and Inspection Activity Performed |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |



W.O. 3644-10X

# Appendix I
## Noise Modeling

## Roadway Traffic Noise - Existing

| Street | Roadway Segment | Existing Land Uses Located Along Roadway Segment | Traffic Noise Levels (dBA CNEL) Existing (2020) | Existing with Project | Increase over Existing | Significant Impact? |
|---|---|---|---|---|---|---|
| Crawford Canyon Road | n/o Newport Avenue | Residential | 67.8 | 68.2 | 0.3 | No |
| Newport Avenue | at Project Driveway | Residential | 73.5 | 73.8 | 0.3 | No |

# TRAFFIC NOISE ANALYSIS TOOL

**Project:** Crooked Creek
**Scenario:** Existing (2020)
**Source:** Translutions

| Roadway | Segment | Ground Type | Distance from Roadway to Receiver (feet) | Speed (mph) | | | Peak Hour Volume | | | Peak Hour Noise Level (Leq(h) dBA) | Noise Level dBA CNEL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Auto | MT | HT | Auto | MT | HT | | |
| Crawford Canyon Road | n/o Newport Avenue | Hard | 20 | 35 | 35 | 30 | 783 | 16 | 8 | 67.8 | 68.1 |
| Newport Avenue | at Project Driveway | Hard | 30 | 50 | 50 | 45 | 1556 | 32 | 16 | 73.5 | 73.8 |

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

# TRAFFIC NOISE ANALYSIS TOOL

**Project:** Crooked Creek
**Scenario:** Existing (2020) with Project
**Source:** Translutions

| Roadway | Segment | Ground Type | Distance from Roadway to Receiver (feet) | Speed (mph) | | | Peak Hour Volume | | | Peak Hour Noise Level (Leq(h) dBA) | Noise Level dBA CNEL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Auto | MT | HT | Auto | MT | HT | | |
| Crawford Canyon Road | n/o Newport Avenue | Hard | 20 | 35 | 35 | 30 | 786 | 16 | 8 | 67.9 | 68.2 |
| Newport Avenue | at Project Driveway | Hard | 30 | 50 | 50 | 45 | 1567 | 32 | 16 | 73.5 | 73.8 |

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

## Summary

| | |
|---|---|
| **File Name on Meter** | R1 |
| **File Name on PC** | SLM_0004983_LxT_Data_063.01.ldbin |
| **Serial Number** | 0004983 |
| **Model** | SoundTrack LxT® |
| **Firmware Version** | 2.302 |
| **User** | |
| **Location** | Crawford Canyon Park |
| **Job Description** | |
| **Note** | |

## Measurement

| | |
|---|---|
| **Description** | |
| **Start** | 2020-09-10 08:49:44 |
| **Stop** | 2020-09-10 09:04:44 |
| **Duration** | 00:15:00.0 |
| **Run Time** | 00:15:00.0 |
| **Pause** | 00:00:00.0 |
| | |
| **Pre Calibration** | 2020-09-10 08:43:43 |
| **Post Calibration** | None |
| **Calibration Deviation** | --- |

## Overall Settings

| | | | |
|---|---|---|---|
| **RMS Weight** | A Weighting | | |
| **Peak Weight** | A Weighting | | |
| **Detector** | Slow | | |
| **Preamp** | PRMLxT2B | | |
| **Microphone Correction** | Off | | |
| **Integration Method** | Exponential | | |
| **Overload** | 144.5 dB | | |
| | **A** | **C** | **Z** |
| **Under Range Peak** | **100.8** | 97.8 | 102.8 dB |
| **Under Range Limit** | **49.8** | 47.8 | 55.8 dB |
| **Noise Floor** | 36.7 | 37.3 | 44.9 dB |

## Results

| | | |
|---|---|---|
| **LASeq** | 52.2 dB | |
| **LASE** | 81.8 dB | |
| **EAS** | 16.740 µPa²h | |
| **EAS8** | 535.666 µPa²h | |
| **EAS40** | 2.678 mPa²h | |
| **LApeak (max)** | 2020-09-10 08:58:46 | 89.1 dB |
| **LASmax** | 2020-09-10 08:54:57 | 59.8 dB |
| **LASmin** | 2020-09-10 09:01:43 | 41.4 dB |
| **SEA** | -99.9 dB | |
| | | |
| **LAS > 85.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| **LAS > 115.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| **LApeak > 135.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| **LApeak > 137.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| **LApeak > 140.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| | | |
| **LCSeq** | 64.4 dB | |
| **LASeq** | 52.2 dB | |
| **LCSeq - LASeq** | 12.1 dB | |
| **LAIeq** | 59.3 dB | |
| **LAeq** | 52.2 dB | |
| **LAIeq - LAeq** | 7.1 dB | |

| | A | | C | | Z | |
|---|---|---|---|---|---|---|
| | **dB** | **Time Stamp** | **dB** | **Time Stamp** | **dB** | **Time Stamp** |
| **Leq** | 52.2 | | | | | |
| **LS(max)** | 59.8 | 2020/09/10 8:54:57 | | | | |
| **LS(min)** | 41.4 | 2020/09/10 9:01:43 | | | | |
| **LPeak(max)** | 89.1 | 2020/09/10 8:58:46 | | | | |

| | |
|---|---|
| **# Overloads** | 0 |
| **Overload Duration** | 0.0 s |

## Summary

| | |
|---|---|
| **File Name on Meter** | R2 |
| **File Name on PC** | SLM_0004983_LxT_Data_064.01.ldbin |
| **Serial Number** | 0004983 |
| **Model** | SoundTrack LxT® |
| **Firmware Version** | 2.302 |
| **User** | |
| **Location** | Crawford Canyon Park |
| **Job Description** | |
| **Note** | |

## Measurement

| | |
|---|---|
| **Description** | |
| **Start** | 2020-09-10 09:07:57 |
| **Stop** | 2020-09-10 09:22:57 |
| **Duration** | 00:15:00.0 |
| **Run Time** | 00:15:00.0 |
| **Pause** | 00:00:00.0 |
| | |
| **Pre Calibration** | 2020-09-10 08:43:42 |
| **Post Calibration** | None |
| **Calibration Deviation** | --- |

## Overall Settings

| | | | |
|---|---|---|---|
| **RMS Weight** | A Weighting | | |
| **Peak Weight** | A Weighting | | |
| **Detector** | Slow | | |
| **Preamp** | PRMLxT2B | | |
| **Microphone Correction** | Off | | |
| **Integration Method** | Exponential | | |
| **Overload** | 144.5 dB | | |
| | **A** | **C** | **Z** |
| **Under Range Peak** | **100.8** | 97.8 | 102.8 dB |
| **Under Range Limit** | **49.8** | 47.8 | 55.8 dB |
| **Noise Floor** | 36.7 | 37.3 | 44.9 dB |

## Results

| | | |
|---|---|---|
| **LASeq** | 55.6 dB | |
| **LASE** | 85.1 dB | |
| **EAS** | 36.327 µPa²h | |
| **EAS8** | 1.162 mPa²h | |
| **EAS40** | 5.812 mPa²h | |
| **LApeak (max)** | 2020-09-10 09:13:26 | 90.7 dB |
| **LASmax** | 2020-09-10 09:15:05 | 71.6 dB |
| **LASmin** | 2020-09-10 09:20:11 | 43.6 dB |
| **SEA** | -99.9 dB | |
| | | |
| **LAS > 85.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| **LAS > 115.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| **LApeak > 135.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| **LApeak > 137.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| **LApeak > 140.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| | | |
| **LCSeq** | 67.0 dB | |
| **LASeq** | 55.6 dB | |
| **LCSeq - LASeq** | 11.3 dB | |
| **LAIeq** | 59.0 dB | |
| **LAeq** | 55.6 dB | |
| **LAIeq - LAeq** | 3.4 dB | |

| | A | | C | | Z | |
|---|---|---|---|---|---|---|
| | dB | Time Stamp | dB | Time Stamp | dB | Time Stamp |
| **Leq** | 55.6 | | | | | |
| **LS(max)** | 71.6 | 2020/09/10 9:15:05 | | | | |
| **LS(min)** | 43.6 | 2020/09/10 9:20:11 | | | | |
| **LPeak(max)** | 90.7 | 2020/09/10 9:13:26 | | | | |

| | | |
|---|---|---|
| **# Overloads** | 0 | |
| **Overload Duration** | 0.0 s | |

## Dose Settings

| | | |
|---|---|---|
| **Dose Name** | OSHA-1 | OSHA-2 |
| **Exchange Rate** | 5 | 5 dB |
| **Threshold** | 90 | 80 dB |
| **Criterion Level** | 90 | 90 dB |
| **Criterion Duration** | 8 | 8 h |

## Results

| | | |
|---|---|---|
| **Dose** | -99.9 | -99.9 % |
| **Projected Dose** | -99.9 | -99.9 % |
| **TWA (Projected)** | -99.9 | -99.9 dB |
| **TWA (t)** | -99.9 | -99.9 dB |
| **Lep (t)** | 40.6 | 40.6 dB |

## Statistics

| | |
|---|---|
| **LAS5.00** | 59.4 dB |
| **LAS10.00** | 58.3 dB |
| **LAS33.30** | 55.1 dB |
| **LAS50.00** | 53.4 dB |
| **LAS66.60** | 51.5 dB |
| **LAS90.00** | 47.9 dB |

## Summary

| | |
|---|---|
| **File Name on Meter** | R3 |
| **File Name on PC** | SLM_0004983_LxT_Data_065.01.ldbin |
| **Serial Number** | 0004983 |
| **Model** | SoundTrack LxT® |
| **Firmware Version** | 2.302 |
| **User** | |
| **Location** | Crawford Canyon Park |
| **Job Description** | |
| **Note** | |

## Measurement

| | |
|---|---|
| **Description** | |
| **Start** | 2020-09-10 09:24:42 |
| **Stop** | 2020-09-10 09:39:42 |
| **Duration** | 00:15:00.0 |
| **Run Time** | 00:15:00.0 |
| **Pause** | 00:00:00.0 |
| | |
| **Pre Calibration** | 2020-09-10 08:43:42 |
| **Post Calibration** | None |
| **Calibration Deviation** | --- |

## Overall Settings

| | | | |
|---|---|---|---|
| **RMS Weight** | A Weighting | | |
| **Peak Weight** | A Weighting | | |
| **Detector** | Slow | | |
| **Preamp** | PRMLxT2B | | |
| **Microphone Correction** | Off | | |
| **Integration Method** | Exponential | | |
| **Overload** | 144.5 dB | | |
| | **A** | **C** | **Z** |
| **Under Range Peak** | **100.8** | 97.8 | 102.8 dB |
| **Under Range Limit** | **49.8** | 47.8 | 55.8 dB |
| **Noise Floor** | 36.7 | 37.3 | 44.9 dB |

## Results

| | | |
|---|---|---|
| **LASeq** | 68.0 dB | |
| **LASE** | 97.6 dB | |
| **EAS** | 633.370 µPa²h | |
| **EAS8** | 20.268 mPa²h | |
| **EAS40** | 101.339 mPa²h | |
| **LApeak (max)** | 2020-09-10 09:29:52 | 100.1 dB |
| **LASmax** | 2020-09-10 09:32:37 | 85.8 dB |
| **LASmin** | 2020-09-10 09:34:05 | 42.1 dB |
| **SEA** | -99.9 dB | |
| | | |
| **LAS > 85.0 dB (Exceedance Counts / Duration)** | 1 | 1.6 s |
| **LAS > 115.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| **LApeak > 135.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| **LApeak > 137.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| **LApeak > 140.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| | | |
| **LCSeq** | 77.8 dB | |
| **LASeq** | 68.0 dB | |
| **LCSeq - LASeq** | 9.8 dB | |
| **LAIeq** | 70.6 dB | |
| **LAeq** | 68.0 dB | |
| **LAIeq - LAeq** | 2.5 dB | |

| | A | | C | | Z | |
|---|---|---|---|---|---|---|
| | dB | Time Stamp | dB | Time Stamp | dB | Time Stamp |
| **Leq** | 68.0 | | | | | |
| **LS(max)** | 85.8 | 2020/09/10 9:32:37 | | | | |
| **LS(min)** | 42.1 | 2020/09/10 9:34:05 | | | | |
| **LPeak(max)** | 100.1 | 2020/09/10 9:29:52 | | | | |

| | | |
|---|---|---|
| **# Overloads** | 0 | |
| **Overload Duration** | 0.0 s | |

## Dose Settings

| | | |
|---|---|---|
| **Dose Name** | OSHA-1 | OSHA-2 |
| **Exchange Rate** | 5 | 5 dB |
| **Threshold** | 90 | 80 dB |
| **Criterion Level** | 90 | 90 dB |
| **Criterion Duration** | 8 | 8 h |

## Results

| | | |
|---|---|---|
| **Dose** | -99.9 | 0.01 % |
| **Projected Dose** | -99.9 | 0.21 % |
| **TWA (Projected)** | -99.9 | 45.6 dB |
| **TWA (t)** | -99.9 | 20.6 dB |
| **Lep (t)** | 53.0 | 53.0 dB |

## Statistics

| | |
|---|---|
| **LAS5.00** | 74.0 dB |
| **LAS10.00** | 71.8 dB |
| **LAS33.30** | 66.0 dB |
| **LAS50.00** | 62.4 dB |
| **LAS66.60** | 57.2 dB |
| **LAS90.00** | 46.9 dB |

## Summary

| | |
|---|---|
| **File Name on Meter** | R4 |
| **File Name on PC** | SLM_0004983_LxT_Data_066.02.ldbin |
| **Serial Number** | 0004983 |
| **Model** | SoundTrack LxT® |
| **Firmware Version** | 2.302 |
| **User** | |
| **Location** | Crawford Canyon Park |
| **Job Description** | |
| **Note** | |

## Measurement

| | |
|---|---|
| **Description** | |
| **Start** | 2020-09-10 09:47:21 |
| **Stop** | 2020-09-10 10:02:21 |
| **Duration** | 00:15:00.0 |
| **Run Time** | 00:15:00.0 |
| **Pause** | 00:00:00.0 |
| | |
| **Pre Calibration** | 2020-09-10 08:43:42 |
| **Post Calibration** | None |
| **Calibration Deviation** | --- |

## Overall Settings

| | | | |
|---|---|---|---|
| **RMS Weight** | A Weighting | | |
| **Peak Weight** | A Weighting | | |
| **Detector** | Slow | | |
| **Preamp** | PRMLxT2B | | |
| **Microphone Correction** | Off | | |
| **Integration Method** | Exponential | | |
| **Overload** | 144.5 dB | | |
| | **A** | **C** | **Z** |
| **Under Range Peak** | **100.8** | 97.8 | 102.8 dB |
| **Under Range Limit** | **49.8** | 47.8 | 55.8 dB |
| **Noise Floor** | 36.7 | 37.3 | 44.9 dB |

## Results

| | | |
|---|---|---|
| **LASeq** | 61.9 dB | |
| **LASE** | 91.4 dB | |
| **EAS** | 154.100 µPa²h | |
| **EAS8** | 4.931 mPa²h | |
| **EAS40** | 24.656 mPa²h | |
| **LApeak (max)** | 2020-09-10 09:50:49 | 94.2 dB |
| **LASmax** | 2020-09-10 09:48:59 | 79.2 dB |
| **LASmin** | 2020-09-10 09:49:20 | 42.3 dB |
| **SEA** | -99.9 dB | |
| | | |
| **LAS > 85.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| **LAS > 115.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| **LApeak > 135.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| **LApeak > 137.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| **LApeak > 140.0 dB (Exceedance Counts / Duration)** | 0 | 0.0 s |
| | | |
| **LCSeq** | 69.5 dB | |
| **LASeq** | 61.9 dB | |
| **LCSeq - LASeq** | 7.6 dB | |
| **LAIeq** | 64.6 dB | |
| **LAeq** | 61.9 dB | |
| **LAIeq - LAeq** | 2.7 dB | |

| | A | | C | | Z | |
|---|---|---|---|---|---|---|
| | dB | Time Stamp | dB | Time Stamp | dB | Time Stamp |
| Leq | 61.9 | | | | | |
| LS(max) | 79.2 | 2020/09/10 9:48:59 | | | | |
| LS(min) | 42.3 | 2020/09/10 9:49:20 | | | | |
| LPeak(max) | 94.2 | 2020/09/10 9:50:49 | | | | |

| | | |
|---|---|---|
| **# Overloads** | 0 | |
| **Overload Duration** | 0.0 s | |

## Dose Settings

| | | |
|---|---|---|
| **Dose Name** | OSHA-1 | OSHA-2 |
| **Exchange Rate** | 5 | 5 dB |
| **Threshold** | 90 | 80 dB |
| **Criterion Level** | 90 | 90 dB |
| **Criterion Duration** | 8 | 8 h |

## Results

| | | |
|---|---|---|
| **Dose** | -99.9 | -99.9 % |
| **Projected Dose** | -99.9 | -99.9 % |
| **TWA (Projected)** | -99.9 | -99.9 dB |
| **TWA (t)** | -99.9 | -99.9 dB |
| **Lep (t)** | 46.8 | 46.8 dB |

## Statistics

| | |
|---|---|
| **LAS5.00** | 68.6 dB |
| **LAS10.00** | 65.5 dB |
| **LAS33.30** | 57.9 dB |
| **LAS50.00** | 53.9 dB |
| **LAS66.60** | 50.7 dB |
| **LAS90.00** | 46.1 dB |

# Appendix J

## Transportation Analysis Memorandum

ESA

translutions, inc.
17632 Irvine Boulevard, Suite 200,
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Phone (949)656-3131 Fax (949)445-3131
solutions@translutions.com

December 7, 2020

Mr. Brian J. Allee
Managing Associate
Environmental Science Associates
2121 Alton Parkway, Suite 100
Irvine, California 92606

Subject: Crawford Canyon Park, Transportation Analysis

Dear Brian:

Translutions, Inc. (Translutions) is pleased to provide this letter discussing the trip generation, access analysis, and vehicle miles traveled (VMT) analysis for the proposed Crawford Canyon Park. The County is proposing to develop the Crawford Canyon Park (Project), a 2.5-acre neighborhood park located at the northwest corner of Newport Avenue and Crawford Canyon Road in North Tustin. Recreational amenities are anticipated to include walkways, trails, pedestrian bridges, two nature play areas for children, exercise stations, picnic tables, benches, landscape berms and natural rolling lawn areas. The Project would not include barbeques, restroom facilities, or any habitable structures. A paved surface parking lot with 11 vehicular parking spaces would be provided onsite with vehicular access from Newport Avenue. Figure 1 illustrates the site plan.

Source: RJM Design Group

Figure 1 – Site Plan

## PROJECT TRIP GENERATION

The trip generation for the proposed project are based on rates based on rates for Land Use 411 - "Public Park" from the Institute of Transportation Engineers (ITE) *Trip Generation (10th Edition)*. Based on the description in the *Trip Generation*, Public parks are owned and operated by a municipal, county, state, or federal agency. The parks surveyed vary widely as to location, type, and number of facilities, including boating or swimming facilities, beaches, hiking trails, ball fields, soccer fields, campsites, and picnic facilities. The sites surveyed varied from 4 acres to 1,154 acres. Since the trip generation rate varies substantially based on size, the rates used in this evaluation are based on the data for the 4-acre park. Table A shows the trip generation for the proposed project.

Table A - Project Trip Generation

| | | | Peak Hour | | | | | | Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | | PM Peak Hour | | | |
| Land Use | | Units | In | Out | Total | In | Out | Total | |
| Weekday | 2.5 | Acre | 2.655 | 1.845 | 4.500 | 1.925 | 1.575 | 3.500 | 34.000 |
| Inbound/Outbound Splits | | | 59% | 41% | 100% | 55% | 45% | 100% | 50%/50% |
| Weekday Trip Generation | | | 7 | 4 | 11 | 5 | 4 | 9 | 85 |
| Saturday[2] | 2.5 | Acre | | | | 2.475 | 2.025 | 4.500 | 22.750 |
| Inbound/Outbound Splits | | | | | | 55% | 45% | 100% | 50%/50% |
| Saturday Trip Generation | | | | | | 6 | 5 | 11 | 57 |
| Sunday[2] | 2.5 | Acre | | | | 1.950 | 3.050 | 5.000 | 19.500 |
| Inbound/Outbound Splits | | | | | | 39% | 61% | 100% | 50%/50% |
| Sunday Trip Generation | | | | | | 5 | 8 | 13 | 49 |

Notes:

[1] Rates based on 4-acre park for Land Use 411 - "Public Park" from Institute of Transportation Engineers (ITE) Trip Generation (10th Ed.).

[2] Peak hour rates for generator

As seen on Table A, the project is forecast to generate approximately 85 daily trips on weekdays, 57 trips on Saturdays, and 49 trips on Sundays. During the weekday peak hours of adjacent street traffic, the project is forecast to generate approximately 11 trips during the a.m. peak hour and 9 trips during the p.m. peak hour. On weekends, the project is forecast to generate 11 peak hour trips on Saturday and 13 peak hour trips on Sunday.

## ACCESS ANALYSIS

While the trips generated by the project are less than the threshold requiring a traffic study based on County requirements, an evaluation of project access was conducted to evaluate traffic operations. Due to the proximity of the intersection of Crawford Canyon Road/Newport Avenue to the proposed driveway, the analysis also includes the intersection of Crawford Canyon Road/Newport Avenue. This analysis was conducted for weekday peak hours only since traffic on adjacent streets are typically highest on weekday peak hours.

**Project Trips.** Forecast project trips were calculated at the study intersections. The trip distribution for the project was forecast based on the location of the park in relation to residential uses in the area. The trip generation was applied to the trip distribution to obtain project trip assignment.

**Traffic Volumes.** Due to the current pandemic, new traffic counts could not be obtained at the intersections as current traffic counts would be atypical because schools are closed, and many residents are working from home. Therefore, traffic counts at the intersection of Crawford Canyon Road/Newport Avenue from 2014 were obtained from Orange County Transportation Authority (OCTA). A growth rate of 2 percent per annum was applied to these counts to obtain 2020 traffic volumes. Attachment A includes the 2014 traffic counts and calculation of 2020 volumes.

**Traffic Operations and Delay.** The evaluation of the project driveway was conducted based on traffic delay. Delay ranges are generally expressed as levels of service (LOS). There is a strong correlation between delay and safety. Research has shown that accidents increase as LOS worsens, especially at unsignalized intersections. For example, a driver is likely to take unnecessary risks to make a turn after waiting beyond a certain amount of time to make that turn. The Highway Capacity Manual (HCM) accounts for this psychological factor and uses different delay metrics for stop controlled and signalized intersections. Therefore, this analysis was based on HCM methodologies using Synchro software. The County of Orange uses LOS D as the threshold for acceptable operations.

Table B shows the levels of service at the analysis intersections. As seen on Table B, both intersections operate at acceptable levels of service. At the project driveway, there are minimal delays in making turns in and out of the project driveway. Detailed LOS worksheets are included in Attachment B.

Table B: Existing Levels of Service

| | | | | Without Project | | | | With Project | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | |
| | Intersection | LOS Std. | Control | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| 1 . | Project Driveway/Newport Avenue | D | TWSC | Future Intersection | | | | 13.1 | B | 11.4 | B |
| 2 . | Crawford Canyon Road/Newport Avenue | D | Signal | 28.3 | C | 27.3 | C | 28.4 | C | 27.4 | C |

Notes:

* Exceeds LOS Standard

TWSC = Two-Way Stop Control; For TWSC intersections, reported delay is for worst-case movement.

LOS = Level of Service

## VMT SCREENING ANALYSIS

Senate Bill 743 (SB-743), which was codified in Public Resources Code section 21099, was signed by the Governor in 2013 and directed the Governor's Office of Planning and Research (OPR) to identify alternative metrics for evaluating transportation impacts under CEQA. Pursuant to Section 21099, the criteria for determining the significance of transportation impacts must "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." Recently adopted changes to the CEQA Guidelines in response to Section 21099 include a new section (15064.3) that specifies that Vehicle Miles Traveled (VMT) is the most appropriate measure of transportation impacts. A separate Technical Advisory issued by OPR provides additional technical details on calculating VMT and assessing transportation impacts for various types of projects.

The County of Orange has prepared the *Final Draft Guidelines for Evaluating Vehicle Miles Traveled Under CEQA* (Guidelines) for Land Use Projects in September 2020 to address changes to CEQA pursuant to SB-743 to include VMT analysis methodology and thresholds. Based on the Guidelines, once a development application is filed, project screening is conducted as the initial step. If the project meets any one of the screening criteria for VMT, the project may be presumed to create a less than significant impact in the area of transportation and circulation and no further analysis as to this topical environmental area is necessary. The Guidelines include the following screening criteria:

- Project in High-Quality Transit Area (HQTA): The project is within 0.5 mile (mi) of a Transit Priority Area (TPA) or an HQTA, unless the project is inconsistent with the RTP/SCS, has a floor area ratio (FAR) less than 0.75, provides an excessive amount of parking, or reduces the number of affordable residential units. In accordance with SB 743, "Transit priority areas" are defined as "an area within one-half mile of a major transit stop that is existing or planned, if the planned stop is scheduled to be completed within the planning horizon included in a Transportation Improvement Program. A Major Transit Stop means: "a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service of 15 minutes or less during the morning and afternoon peak commute periods." An HQTA or Corridor is a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.
    - *The project does not have high quality transit nearby, and therefore does not qualify.*

- Low VMT Area Project: The project is in low VMT areas. The applicant may submit data from the most recent OCTAM version showing the proposed project is within a low VMT area, which may be used, at the discretion of staff, to screen out the project.
    - *The project does not fall under a low VMT area, and therefore, does not qualify.*

- Small Project: A project generates 500 or fewer average daily trips (ADT).
    - *The project generates less than 500 daily trips, and therefore, qualifies as a Small Project, and therefore, the project impacts are less than significant.*

- Public Facilities: The development of institutional/government and public service uses that support community health, safety or welfare are also screened from subsequent CEQA VMT analysis. The following includes some examples and is not an exhaustive list of public facilities that are screened from subsequent CEQA VMT analysis: police/sheriff stations, fire stations,

community centers, refuse stations, jails, and landfills. These facilities are already part of the community and, as a public service, the VMT is accounted for in the existing regional average.

- *The proposed project is a public facility that supports community health and welfare. Therefore, the project meets the screening criteria and impacts are less than significant.*

## SUMMARY & CONCLUSION

As seen from the above discussion, the project is anticipated to generate approximately 85 daily trips on weekdays, 57 trips on Saturdays, and 49 trips on Sundays. During the weekday peak hours of adjacent street traffic, the project is forecast to generate approximately 11 trips during the a.m. peak hour and 9 trips during the p.m. peak hour. On weekends, the project is forecast to generate 11 peak hour trips on Saturday and 13 peak hour trips on Sunday. The project driveway is expected to operate satisfactorily with minimal delays and the project is unlikely to increase traffic delays at other intersections significantly. In addition, the project is exempt from a VMT analysis based on the thresholds set by the County of Orange *Final Draft Guidelines for Evaluating Vehicle Miles Traveled Under CEQA* based on the size of the project and the fact that the proposed project is a public facility. Therefore, the project's transportation impacts under CEQA are anticipated to be less than significant.

We hope you will find this information helpful. Should you have any questions, please don't hesitate to call me at (949) 656-3131.

Sincerely,

translutions, Inc.

Sandipan Bhattacharjee, P.E., T.E., AICP, ENV SP
Principal

REGISTERED PROFESSIONAL ENGINEER
SANDIPAN BHATTACHARJEE
No. 81872
Exp. 03-31-22
CIVIL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
SANDIPAN BHATTACHARJEE
No. 2847
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TRAFFIC
STATE OF CALIFORNIA

Attachments:
Attachment A – Volume Development & Traffic Counts
Attachment B – Synchro Worksheets

# ATTACHMENT A – VOLUME DEVELOPMENT & TRAFFIC COUNTS

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## Attachment A - Existing Peak Hour Volume Summary

| | AM Peak Hour | | | | | PM Peak Hour | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Yr. 2014 Traffic Volume | 2014-2020 Traffic Growth | 2020 Without Project | Project Trips | Yr. 2020 With Project | Yr. 2014 PCE Volume | 2014-2020 Traffic Growth | 2020 Without Project | Project Trips | Yr. 2020 With Project |
| 1 . Project Driveway/Newport Avenue | | | | | | | | | | |
| NBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NBT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NBR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SBL | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 2 | 2 |
| SBT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SBR | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 2 | 2 |
| EBL | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 2 | 2 |
| EBT | 509 | 61 | 570 | 0 | 570 | 1,004 | 120 | 1,124 | 0 | 1,124 |
| EBR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WBT | 1,265 | 152 | 1,417 | 0 | 1,417 | 630 | 76 | 706 | 0 | 706 |
| WBR | 0 | 0 | 0 | 4 | 4 | 0 | 0 | 0 | 3 | 3 |
| North Leg | | | | | | | | | | |
| Approach | 0 | 0 | 0 | 4 | 4 | 0 | 0 | 0 | 4 | 4 |
| Departure | 0 | 0 | 0 | 7 | 7 | 0 | 0 | 0 | 5 | 5 |
| Total | 0 | 0 | 0 | 11 | 11 | 0 | 0 | 0 | 9 | 9 |
| South Leg | | | | | | | | | | |
| Approach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Departure | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| East Leg | | | | | | | | | | |
| Approach | 1,265 | 152 | 1,417 | 4 | 1,421 | 630 | 76 | 706 | 3 | 709 |
| Departure | 509 | 61 | 570 | 2 | 572 | 1,004 | 120 | 1,124 | 2 | 1,126 |
| Total | 1,774 | 213 | 1,987 | 6 | 1,993 | 1,634 | 196 | 1,830 | 5 | 1,835 |
| West Leg | | | | | | | | | | |
| Approach | 509 | 61 | 570 | 3 | 573 | 1,004 | 120 | 1,124 | 2 | 1,126 |
| Departure | 1,265 | 152 | 1,417 | 2 | 1,419 | 630 | 76 | 706 | 2 | 708 |
| Total | 1,774 | 213 | 1,987 | 5 | 1,992 | 1,634 | 196 | 1,830 | 4 | 1,834 |
| Total Approaches | | | | | | | | | | |
| Approach | 1,774 | 213 | 1,987 | 11 | 1,998 | 1,634 | 196 | 1,830 | 9 | 1,839 |
| Departure | 1,774 | 213 | 1,987 | 11 | 1,998 | 1,634 | 196 | 1,830 | 9 | 1,839 |
| Total | 3,548 | 426 | 3,974 | 22 | 3,996 | 3,268 | 392 | 3,660 | 18 | 3,678 |

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## Attachment A - Existing Peak Hour Volume Summary

| | AM Peak Hour | | | | | PM Peak Hour | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Yr. 2014 Traffic Volume | 2014-2020 Traffic Growth | 2020 Without Project | Project Trips | Yr. 2020 With Project | Yr. 2014 PCE Volume | 2014-2020 Traffic Growth | 2020 Without Project | Project Trips | Yr. 2020 With Project |
| 2 . Crawford Canyon Road/Newport Avenue | | | | | | | | | | |
| NBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NBT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NBR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SBL | 92 | 11 | 103 | 0 | 103 | 85 | 10 | 95 | 0 | 95 |
| SBT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SBR | 463 | 56 | 519 | 2 | 521 | 132 | 16 | 148 | 2 | 150 |
| EBL | 68 | 8 | 76 | 1 | 77 | 355 | 43 | 398 | 1 | 399 |
| EBT | 441 | 53 | 494 | 1 | 495 | 649 | 78 | 727 | 1 | 728 |
| EBR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WBT | 802 | 96 | 898 | 2 | 900 | 498 | 60 | 558 | 2 | 560 |
| WBR | 97 | 12 | 109 | 0 | 109 | 85 | 10 | 95 | 0 | 95 |
| North Leg | | | | | | | | | | |
| Approach | 555 | 67 | 622 | 2 | 624 | 217 | 26 | 243 | 2 | 245 |
| Departure | 165 | 20 | 185 | 1 | 186 | 440 | 53 | 493 | 1 | 494 |
| Total | 720 | 87 | 807 | 3 | 810 | 657 | 79 | 736 | 3 | 739 |
| South Leg | | | | | | | | | | |
| Approach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Departure | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| East Leg | | | | | | | | | | |
| Approach | 899 | 108 | 1,007 | 2 | 1,009 | 583 | 70 | 653 | 2 | 655 |
| Departure | 533 | 64 | 597 | 1 | 598 | 734 | 88 | 822 | 1 | 823 |
| Total | 1,432 | 172 | 1,604 | 3 | 1,607 | 1,317 | 158 | 1,475 | 3 | 1,478 |
| West Leg | | | | | | | | | | |
| Approach | 509 | 61 | 570 | 2 | 572 | 1,004 | 121 | 1,125 | 2 | 1,127 |
| Departure | 1,265 | 152 | 1,417 | 4 | 1,421 | 630 | 76 | 706 | 4 | 710 |
| Total | 1,774 | 213 | 1,987 | 6 | 1,993 | 1,634 | 197 | 1,831 | 6 | 1,837 |
| Total Approaches | | | | | | | | | | |
| Approach | 1,963 | 236 | 2,199 | 6 | 2,205 | 1,804 | 217 | 2,021 | 6 | 2,027 |
| Departure | 1,963 | 236 | 2,199 | 6 | 2,205 | 1,804 | 217 | 2,021 | 6 | 2,027 |
| Total | 3,926 | 472 | 4,398 | 12 | 4,410 | 3,608 | 434 | 4,042 | 12 | 4,054 |

# ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

## *Crawford Canyon Rd and Newport Blvd , County*

| | |
|---|---|
| Date: | 10/9/2014 |
| Day: | Thursday |

| | |
|---|---|
| Project #: | 14-1259-019 |
| Agency: | County |
| Node #: | 6427 |

| | |
|---|---|
| AM Peak Hour | 715 AM |
| NOON Peak Hour | 1215 PM |
| PM Peak Hour | 430 PM |

### Peak Hour Summary

**Southbound Approach** (Crawford Canyon Rd)

| Lanes | 1 | 0 | 1 | | |
|---|---|---|---|---|---|
| AM | 463 | 0 | 92 | 165 | AM |
| NOON | 96 | 0 | 68 | 166 | NOON |
| PM | 132 | 0 | 85 | 440 | PM |

**Eastbound Approach** (Newport Blvd)

| | AM | NOON | PM |
|---|---|---|---|
| | 1265 | 504 | 630 |
| 1 | 68 | 83 | 355 |
| 2 | 441 | 361 | 649 |
| 0 | 0 | 0 | 0 |
| Lanes | AM | NOON | PM |

**Westbound Approach**

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 97 | 83 | 85 | 0 |
| 802 | 408 | 498 | 2 |
| 0 | 0 | 0 | 0 |
| 533 | 429 | 734 | |
| AM | NOON | PM | |

**CONTROL**: Signalized

**Northbound Approach**

| | | | | |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| | | 0 | 0 | 0 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | 6:30 AM | 8:30 AM |
| NOON | 11:30 AM | 1:30 PM |
| PM | 4:30 PM | 6:30 PM |

### Total Ins & Outs

| | North Leg | | |
|---|---|---|---|
| | 555 | 165 | AM |
| | 164 | 166 | NOON |
| | 217 | 440 | PM |

| West Leg | AM | NOON | PM |
|---|---|---|---|
| | 1265 | 504 | 630 |
| | 509 | 444 | 1004 |

| East Leg | AM | NOON | PM |
|---|---|---|---|
| | 899 | 491 | 583 |
| | 533 | 429 | 734 |

| South Leg | | |
|---|---|---|
| AM | 0 | 0 |
| NOON | 0 | 0 |
| PM | 0 | 0 |

### Total Volume Per Leg

| North Leg | |
|---|---|
| 720 | AM |
| 330 | NOON |
| 657 | PM |

| West Leg | AM | NOON | PM |
|---|---|---|---|
| | 1774 | 948 | 1634 |

| East Leg | AM | NOON | PM |
|---|---|---|---|
| | 1432 | 920 | 1317 |

| South Leg | |
|---|---|
| AM | 0 |
| NOON | 0 |
| PM | 0 |

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** 14-1259-019 **Day:** Thursday

**City:** County **Date:** 10/9/2014

**AM**

| **NS/EW Streets:** | Crawford Canyon Rd | | | Crawford Canyon Rd | | | Newport Blvd | | | Newport Blvd | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 0 | |
| 6:30 AM | 0 | 0 | 0 | 11 | 0 | 72 | 5 | 40 | 0 | 0 | 140 | 10 | 278 |
| 6:45 AM | 0 | 0 | 0 | 21 | 0 | 87 | 10 | 75 | 0 | 0 | 117 | 13 | 323 |
| 7:00 AM | 0 | 0 | 0 | 10 | 0 | 111 | 12 | 58 | 0 | 0 | 137 | 13 | 341 |
| 7:15 AM | 0 | 0 | 0 | 14 | 0 | 155 | 11 | 77 | 0 | 0 | 213 | 21 | 491 |
| 7:30 AM | 0 | 0 | 0 | 20 | 0 | 108 | 21 | 111 | 0 | 0 | 221 | 29 | 510 |
| 7:45 AM | 0 | 0 | 0 | 30 | 0 | 67 | 21 | 123 | 0 | 0 | 169 | 31 | 441 |
| 8:00 AM | 0 | 0 | 0 | 28 | 0 | 133 | 15 | 130 | 0 | 0 | 199 | 16 | 521 |
| 8:15 AM | 0 | 0 | 0 | 26 | 0 | 116 | 25 | 124 | 0 | 0 | 175 | 15 | 481 |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| **TOTAL VOLUMES :** | 0 | 0 | 0 | 160 | 0 | 849 | 120 | 738 | 0 | 0 | 1371 | 148 | 3386 |
| **APPROACH %'s :** | #DIV/0! | #DIV/0! | #DIV/0! | 15.86% | 0.00% | 84.14% | 13.99% | 86.01% | 0.00% | 0.00% | 90.26% | 9.74% | |
| **PEAK HR START TIME :** | 715 AM | | | | | | | | | | | | TOTAL |
| **PEAK HR VOL :** | 0 | 0 | 0 | 92 | 0 | 463 | 68 | 441 | 0 | 0 | 802 | 97 | 1963 |
| **PEAK HR FACTOR :** | 0.000 | | | 0.821 | | | 0.878 | | | 0.899 | | | 0.942 |

UTURNS

| NB | SB | EB | WB |
|---|---|---|---|
| 0 | 0 | 0 | 0 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** 14-1259-019 **Day:** Thursday

**City:** County **Date:** 10/9/2014

**PM**

| **NS/EW Streets:** | Crawford Canyon Rd | | | Crawford Canyon Rd | | | Newport Blvd | | | Newport Blvd | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 0 | |
| 4:30 PM | 0 | 0 | 0 | 23 | 0 | 33 | 76 | 176 | 0 | 0 | 128 | 16 | 452 |
| 4:45 PM | 0 | 0 | 0 | 27 | 0 | 30 | 84 | 159 | 0 | 0 | 125 | 19 | 444 |
| 5:00 PM | 0 | 0 | 0 | 17 | 0 | 36 | 93 | 169 | 0 | 0 | 123 | 26 | 464 |
| 5:15 PM | 0 | 0 | 0 | 18 | 0 | 33 | 102 | 145 | 0 | 0 | 122 | 24 | 444 |
| 5:30 PM | 0 | 0 | 0 | 17 | 0 | 46 | 90 | 164 | 0 | 0 | 105 | 17 | 439 |
| 5:45 PM | 0 | 0 | 0 | 19 | 0 | 25 | 85 | 138 | 0 | 0 | 124 | 19 | 410 |
| 6:00 PM | 0 | 0 | 0 | 18 | 0 | 30 | 93 | 172 | 0 | 0 | 107 | 21 | 441 |
| 6:15 PM | 0 | 0 | 0 | 26 | 0 | 36 | 75 | 152 | 0 | 0 | 87 | 20 | 396 |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| **TOTAL VOLUMES :** | 0 | 0 | 0 | 165 | 0 | 269 | 698 | 1275 | 0 | 0 | 921 | 162 | 3490 |
| **APPROACH %'s :** | #DIV/0! | #DIV/0! | #DIV/0! | 38.02% | 0.00% | 61.98% | 35.38% | 64.62% | 0.00% | 0.00% | 85.04% | 14.96% | |
| **PEAK HR START TIME :** | 430 PM | | | | | | | | | | | | TOTAL |
| **PEAK HR VOL :** | 0 | 0 | 0 | 85 | 0 | 132 | 355 | 649 | 0 | 0 | 498 | 85 | 1804 |
| **PEAK HR FACTOR :** | 0.000 | | | 0.952 | | | 0.958 | | | 0.978 | | | 0.972 |

UTURNS

| NB | SB | EB | WB |
|---|---|---|---|
| | | | |
| NB | SB | EB | WB |
| 0 | 0 | 0 | 0 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** 14-1259-019 **Day:** Thursday

**City:** County **Date:** 10/9/2014

**NOON**

| **NS/EW Streets:** | Crawford Canyon Rd | | | Crawford Canyon Rd | | | Newport Blvd | | | Newport Blvd | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 0 | |
| 11:30 AM | 0 | 0 | 0 | 18 | 0 | 34 | 28 | 97 | 0 | 0 | 104 | 19 | 300 |
| 11:45 AM | 0 | 0 | 0 | 22 | 0 | 26 | 17 | 90 | 0 | 0 | 115 | 17 | 287 |
| 12:00 PM | 0 | 0 | 0 | 14 | 0 | 16 | 16 | 78 | 0 | 0 | 84 | 24 | 232 |
| 12:15 PM | 0 | 0 | 0 | 22 | 0 | 28 | 21 | 97 | 0 | 0 | 87 | 18 | 273 |
| 12:30 PM | 0 | 0 | 0 | 15 | 0 | 18 | 23 | 83 | 0 | 0 | 111 | 27 | 277 |
| 12:45 PM | 0 | 0 | 0 | 15 | 0 | 27 | 22 | 92 | 0 | 0 | 99 | 18 | 273 |
| 1:00 PM | 0 | 0 | 0 | 16 | 0 | 23 | 17 | 89 | 0 | 0 | 111 | 20 | 276 |
| 1:15 PM | 0 | 0 | 0 | 24 | 0 | 21 | 29 | 76 | 0 | 0 | 98 | 17 | 265 |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| **TOTAL VOLUMES :** | 0 | 0 | 0 | 146 | 0 | 193 | 173 | 702 | 0 | 0 | 809 | 160 | 2183 |
| **APPROACH %'s :** | #DIV/0! | #DIV/0! | #DIV/0! | 43.07% | 0.00% | 56.93% | 19.77% | 80.23% | 0.00% | 0.00% | 83.49% | 16.51% | |
| **PEAK HR START TIME :** | 1215 PM | | | | | | | | | | | | TOTAL |
| **PEAK HR VOL :** | 0 | 0 | 0 | 68 | 0 | 96 | 83 | 361 | 0 | 0 | 408 | 83 | 1099 |
| **PEAK HR FACTOR :** | 0.000 | | | 0.820 | | | 0.941 | | | 0.889 | | | 0.992 |

UTURNS

| NB | SB | EB | WB |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| NB | SB | EB | WB |
| 0 | 0 | 0 | 0 |

**CONTROL :** Signalized

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

### Pedestrian Count Peak Hour

| | Start: | End: |
|---|---|---|
| AM | 6:30 | 8:30 |
| NOON | 11:30 | 13:30 |
| PM | 16:30 | 18:30 |

PROJECT#: 14-1259-019 Node #: 6427
N/S Street: Crawford Canyon Rd
E/W Street: Newport Ave
DATE: 10/9/2014 DAY: Thursday
CITY: Tustin

| | |
|---|---|
| AM | 1 |
| NOON | 0 |
| PM | 1 |

| | |
|---|---|
| 1 | AM |
| 0 | NOON |
| 1 | PM |

| AM | NOON | PM |
|---|---|---|
| 0 | 0 | 0 |

NORTH LEG

| AM | NOON | PM |
|---|---|---|
| 0 | 0 | 0 |

WEST LEG

EAST LEG

| | | |
|---|---|---|
| 0 | 0 | 0 |
| AM | NOON | PM |

SOUTH LEG

| | | |
|---|---|---|
| 1 | 0 | 0 |
| AM | NOON | PM |

| | |
|---|---|
| AM | 0 |
| NOON | 0 |
| PM | 0 |

| | |
|---|---|
| 0 | AM |
| 0 | NOON |
| 0 | PM |

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

### Bicycle Count Peak Hour

| | Start: | End: |
|---|---|---|
| AM | 6:30 | 8:30 |
| NOON | 11:30 | 13:30 |
| PM | 16:30 | 18:30 |

PROJECT#: 14-1259-019 Node #: 6427
N/S Street: Crawford Canyon Rd
E/W Street: Newport Ave
DATE: 10/9/2014
CITY: Tustin

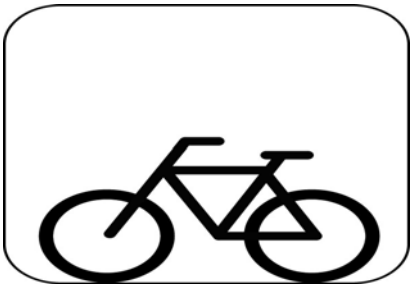
DAY: Thursday

| | | | |
|---|---|---|---|
| AM | 0 | 0 | 0 |
| NOON | 0 | 0 | 1 |
| PM | 1 | 0 | 0 |

NORTH LEG

| AM | NOON | PM |
|---|---|---|
| 0 | 0 | 0 |
| 2 | 0 | 4 |
| 0 | 0 | 0 |

WEST LEG



EAST LEG

| AM | NOON | PM |
|---|---|---|
| 0 | 2 | 0 |
| 4 | 0 | 0 |
| 0 | 0 | 0 |

SOUTH LEG

| | | | |
|---|---|---|---|
| AM | 0 | 0 | 0 |
| NOON | 0 | 0 | 0 |
| PM | 0 | 0 | 0 |

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 14-1259-019 Node #: 6427
N/S Street: Crawford Canyon Rd
E/W Street: Newport Ave
DATE: 10/9/2014 DAY: Thursday
CITY: Tustin

**A M**

*PEDESTRIANS*

| TIME | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 6:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **1** | **1** | **0** | **0** | **1** | **0** | **0** | **0** |

*BIKES*

| TIME | NB | | | SB | | | EB | | | WB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR |
| 6:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 6:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **3** | **0** | **0** | **5** | **0** |

**N O O N**

*PEDESTRIANS*

| TIME | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 11:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

*BIKES*

| TIME | NB | | | SB | | | EB | | | WB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR |
| 11:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 12:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 12:15 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** |

**P M**

*PEDESTRIANS*

| TIME | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:00 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:15 PM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** |

*BIKES*

| TIME | NB | | | SB | | | EB | | | WB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:15 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **0** | **0** | **1** | **0** | **1** | **0** | **4** | **0** | **0** | **0** | **0** |

# ATTACHMENT B – SYNCHRO WORKSHEETS

# Lanes, Volumes, Timings
## 2: Newport Ave & Crawford Canyon Road

12/06/2020

| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 76 | 494 | 898 | 109 | 103 | 519 |
| Future Volume (vph) | 76 | 494 | 898 | 109 | 103 | 519 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 250 | | | 0 | 0 | 0 |
| Storage Lanes | 1 | | | 0 | 1 | 1 |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 |
| Frt | | | 0.984 | | | 0.850 |
| Flt Protected | 0.950 | | | | 0.950 | |
| Satd. Flow (prot) | 1770 | 3539 | 3483 | 0 | 1770 | 1583 |
| Flt Permitted | 0.950 | | | | 0.950 | |
| Satd. Flow (perm) | 1770 | 3539 | 3483 | 0 | 1770 | 1583 |
| Right Turn on Red | | | | Yes | | Yes |
| Satd. Flow (RTOR) | | | 23 | | | 235 |
| Link Speed (mph) | | 30 | 30 | | 30 | |
| Link Distance (ft) | | 572 | 1060 | | 879 | |
| Travel Time (s) | | 13.0 | 24.1 | | 20.0 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 83 | 537 | 976 | 118 | 112 | 564 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 83 | 537 | 1094 | 0 | 112 | 564 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Left | Right | Left | Right |
| Median Width(ft) | | 12 | 12 | | 12 | |
| Link Offset(ft) | | 0 | 0 | | 0 | |
| Crosswalk Width(ft) | | 16 | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | | 9 | 15 | 9 |
| Number of Detectors | 1 | 2 | 2 | | 1 | 1 |
| Detector Template | Left | Thru | Thru | | Left | Right |
| Leading Detector (ft) | 20 | 100 | 100 | | 20 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 6 | | 20 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | 94 | | | |
| Detector 2 Size(ft) | | 6 | 6 | | | |
| Detector 2 Type | | Cl+Ex | Cl+Ex | | | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | 0.0 | 0.0 | | | |
| Turn Type | Prot | NA | NA | | Prot | Perm |
| Protected Phases | 7 | 4 | 8 | | 6 | |
| Permitted Phases | | | | | | 6 |

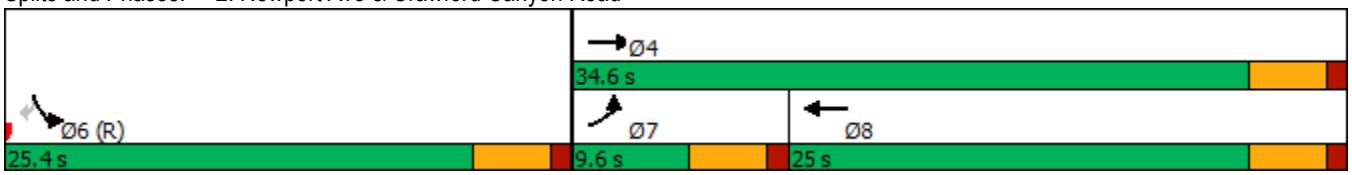
# Lanes, Volumes, Timings
## 2: Newport Ave & Crawford Canyon Road

12/06/2020

| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Detector Phase | 7 | 4 | 8 | | 6 | 6 |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 |
| Minimum Split (s) | 9.5 | 22.5 | 22.5 | | 22.5 | 22.5 |
| Total Split (s) | 9.6 | 34.6 | 25.0 | | 25.4 | 25.4 |
| Total Split (%) | 16.0% | 57.7% | 41.7% | | 42.3% | 42.3% |
| Maximum Green (s) | 5.1 | 30.1 | 20.5 | | 20.9 | 20.9 |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | | 4.5 | 4.5 |
| Lead/Lag | Lead | | Lag | | | |
| Lead-Lag Optimize? | Yes | | Yes | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 |
| Recall Mode | None | None | None | | C-Max | C-Max |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | 7.0 |
| Flash Dont Walk (s) | | 11.0 | 11.0 | | 11.0 | 11.0 |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | 0 |
| Act Effct Green (s) | 5.1 | 28.2 | 20.5 | | 22.8 | 22.8 |
| Actuated g/C Ratio | 0.08 | 0.47 | 0.34 | | 0.38 | 0.38 |
| v/c Ratio | 0.55 | 0.32 | 0.91 | | 0.17 | 0.76 |
| Control Delay | 42.6 | 10.1 | 31.5 | | 14.5 | 18.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Delay | 42.6 | 10.1 | 31.5 | | 14.5 | 18.6 |
| LOS | D | B | C | | B | B |
| Approach Delay | | 14.5 | 31.5 | | 17.9 | |
| Approach LOS | | B | C | | B | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 60 | |
| Actuated Cycle Length: 60 | |
| Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green | |
| Natural Cycle: 60 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.91 | |
| Intersection Signal Delay: 23.2 | Intersection LOS: C |
| Intersection Capacity Utilization 67.9% | ICU Level of Service C |
| Analysis Period (min) 15 | |

Splits and Phases: 2: Newport Ave & Crawford Canyon Road



# HCM 6th Signalized Intersection Summary
## 2: Newport Ave & Crawford Canyon Road

12/06/2020

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 76 | 494 | 898 | 109 | 103 | 519 |
| Future Volume (veh/h) | 76 | 494 | 898 | 109 | 103 | 519 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | No | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 83 | 537 | 976 | 118 | 112 | 564 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 111 | 1684 | 1074 | 130 | 0 | 0 |
| Arrive On Green | 0.06 | 0.47 | 0.34 | 0.34 | 0.00 | 0.00 |
| Sat Flow, veh/h | 1781 | 3647 | 3285 | 386 | 0 | |
| Grp Volume(v), veh/h | 83 | 537 | 543 | 551 | 0.0 | |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1777 | 1801 | | |
| Q Serve(g_s), s | 2.7 | 5.6 | 17.5 | 17.5 | | |
| Cycle Q Clear(g_c), s | 2.7 | 5.6 | 17.5 | 17.5 | | |
| Prop In Lane | 1.00 | | | 0.21 | | |
| Lane Grp Cap(c), veh/h | 111 | 1684 | 598 | 606 | | |
| V/C Ratio(X) | 0.75 | 0.32 | 0.91 | 0.91 | | |
| Avail Cap(c_a), veh/h | 151 | 1783 | 607 | 615 | | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Uniform Delay (d), s/veh | 27.7 | 9.8 | 19.0 | 19.0 | | |
| Incr Delay (d2), s/veh | 12.5 | 0.1 | 17.5 | 17.4 | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | | |
| %ile BackOfQ(50%),veh/ln | 1.5 | 1.9 | 9.3 | 9.4 | | |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 40.2 | 9.9 | 36.5 | 36.4 | | |
| LnGrp LOS | D | A | D | D | | |
| Approach Vol, veh/h | | 620 | 1094 | | | |
| Approach Delay, s/veh | | 13.9 | 36.5 | | | |
| Approach LOS | | B | D | | | |

| Timer - Assigned Phs | 4 | 7 | 8 |
|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 32.9 | 8.2 | 24.7 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 30.1 | 5.1 | 20.5 |
| Max Q Clear Time (g_c+I1), s | 7.6 | 4.7 | 19.5 |
| Green Ext Time (p_c), s | 3.7 | 0.0 | 0.7 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 28.3 |
| HCM 6th LOS | C |

# Lanes, Volumes, Timings
## 2: Newport Ave & Crawford Canyon Road

12/06/2020

| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 398 | 727 | 558 | 95 | 95 | 148 |
| Future Volume (vph) | 398 | 727 | 558 | 95 | 95 | 148 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 250 | | | 0 | 0 | 0 |
| Storage Lanes | 1 | | | 0 | 1 | 1 |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 |
| Frt | | | 0.978 | | | 0.850 |
| Flt Protected | 0.950 | | | | 0.950 | |
| Satd. Flow (prot) | 1770 | 3539 | 3461 | 0 | 1770 | 1583 |
| Flt Permitted | 0.950 | | | | 0.950 | |
| Satd. Flow (perm) | 1770 | 3539 | 3461 | 0 | 1770 | 1583 |
| Right Turn on Red | | | | Yes | | Yes |
| Satd. Flow (RTOR) | | | 26 | | | 161 |
| Link Speed (mph) | | 30 | 30 | | 30 | |
| Link Distance (ft) | | 572 | 1060 | | 879 | |
| Travel Time (s) | | 13.0 | 24.1 | | 20.0 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 433 | 790 | 607 | 103 | 103 | 161 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 433 | 790 | 710 | 0 | 103 | 161 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Left | Right | Left | Right |
| Median Width(ft) | | 12 | 12 | | 12 | |
| Link Offset(ft) | | 0 | 0 | | 0 | |
| Crosswalk Width(ft) | | 16 | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | | 9 | 15 | 9 |
| Number of Detectors | 1 | 2 | 2 | | 1 | 1 |
| Detector Template | Left | Thru | Thru | | Left | Right |
| Leading Detector (ft) | 20 | 100 | 100 | | 20 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 6 | | 20 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | 94 | | | |
| Detector 2 Size(ft) | | 6 | 6 | | | |
| Detector 2 Type | | Cl+Ex | Cl+Ex | | | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | 0.0 | 0.0 | | | |
| Turn Type | Prot | NA | NA | | Prot | Perm |
| Protected Phases | 7 | 4 | 8 | | 6 | |
| Permitted Phases | | | | | | 6 |

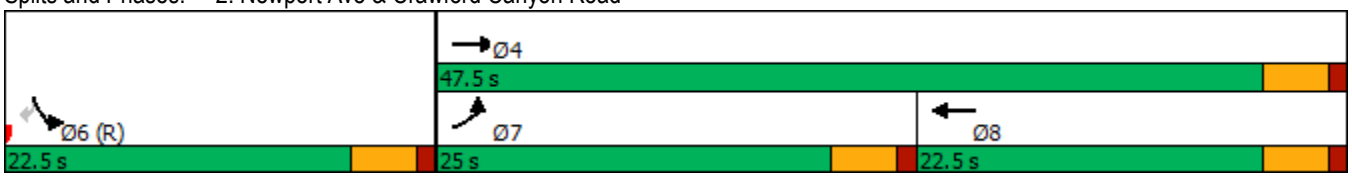
# Lanes, Volumes, Timings
## 2: Newport Ave & Crawford Canyon Road

12/06/2020

| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Detector Phase | 7 | 4 | 8 | | 6 | 6 |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 |
| Minimum Split (s) | 9.5 | 22.5 | 22.5 | | 22.5 | 22.5 |
| Total Split (s) | 25.0 | 47.5 | 22.5 | | 22.5 | 22.5 |
| Total Split (%) | 35.7% | 67.9% | 32.1% | | 32.1% | 32.1% |
| Maximum Green (s) | 20.5 | 43.0 | 18.0 | | 18.0 | 18.0 |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | | 4.5 | 4.5 |
| Lead/Lag | Lead | | Lag | | | |
| Lead-Lag Optimize? | Yes | | Yes | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 |
| Recall Mode | None | None | None | | C-Max | C-Max |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | 7.0 |
| Flash Dont Walk (s) | | 11.0 | 11.0 | | 11.0 | 11.0 |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | 0 |
| Act Effct Green (s) | 19.5 | 41.3 | 17.2 | | 19.7 | 19.7 |
| Actuated g/C Ratio | 0.28 | 0.59 | 0.25 | | 0.28 | 0.28 |
| v/c Ratio | 0.88 | 0.38 | 0.81 | | 0.21 | 0.29 |
| Control Delay | 44.9 | 8.0 | 32.6 | | 21.8 | 5.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Delay | 44.9 | 8.0 | 32.6 | | 21.8 | 5.5 |
| LOS | D | A | C | | C | A |
| Approach Delay | | 21.0 | 32.6 | | 11.9 | |
| Approach LOS | | C | C | | B | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 70 | |
| Actuated Cycle Length: 70 | |
| Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green | |
| Natural Cycle: 70 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.88 | |
| Intersection Signal Delay: 23.7 | Intersection LOS: C |
| Intersection Capacity Utilization 57.0% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 2: Newport Ave & Crawford Canyon Road



# HCM 6th Signalized Intersection Summary
## 2: Newport Ave & Crawford Canyon Road

12/06/2020

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 398 | 727 | 558 | 95 | 95 | 148 |
| Future Volume (veh/h) | 398 | 727 | 558 | 95 | 95 | 148 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | No | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 433 | 790 | 607 | 103 | 103 | 161 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 478 | 2020 | 717 | 121 | 0 | 0 |
| Arrive On Green | 0.27 | 0.57 | 0.24 | 0.24 | 0.00 | 0.00 |
| Sat Flow, veh/h | 1781 | 3647 | 3133 | 515 | 0 | |
| Grp Volume(v), veh/h | 433 | 790 | 354 | 356 | 0.0 | |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1777 | 1778 | | |
| Q Serve(g_s), s | 16.4 | 8.6 | 13.3 | 13.4 | | |
| Cycle Q Clear(g_c), s | 16.4 | 8.6 | 13.3 | 13.4 | | |
| Prop In Lane | 1.00 | | | 0.29 | | |
| Lane Grp Cap(c), veh/h | 478 | 2020 | 419 | 419 | | |
| V/C Ratio(X) | 0.91 | 0.39 | 0.84 | 0.85 | | |
| Avail Cap(c_a), veh/h | 522 | 2183 | 457 | 457 | | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Uniform Delay (d), s/veh | 24.8 | 8.4 | 25.5 | 25.5 | | |
| Incr Delay (d2), s/veh | 18.5 | 0.1 | 12.8 | 13.1 | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | | |
| %ile BackOfQ(50%),veh/ln | 9.0 | 2.8 | 6.8 | 6.8 | | |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 43.3 | 8.5 | 38.3 | 38.6 | | |
| LnGrp LOS | D | A | D | D | | |
| Approach Vol, veh/h | | 1223 | 710 | | | |
| Approach Delay, s/veh | | 20.8 | 38.5 | | | |
| Approach LOS | | C | D | | | |

| Timer - Assigned Phs | 4 | 7 | 8 |
|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 44.3 | 23.3 | 21.0 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 43.0 | 20.5 | 18.0 |
| Max Q Clear Time (g_c+I1), s | 10.6 | 18.4 | 15.4 |
| Green Ext Time (p_c), s | 6.4 | 0.3 | 1.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 27.3 |
| HCM 6th LOS | C |

# Lanes, Volumes, Timings
## 1: Newport Ave & Project Driveway

12/06/2020

| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 3 | 570 | 1417 | 4 | 2 | 2 |
| Future Volume (vph) | 3 | 570 | 1417 | 4 | 2 | 2 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 |
| Frt | | | | | 0.932 | |
| Flt Protected | 0.950 | | | | 0.976 | |
| Satd. Flow (prot) | 1770 | 3539 | 3539 | 0 | 1694 | 0 |
| Flt Permitted | 0.950 | | | | 0.976 | |
| Satd. Flow (perm) | 1770 | 3539 | 3539 | 0 | 1694 | 0 |
| Link Speed (mph) | | 30 | 30 | | 30 | |
| Link Distance (ft) | | 919 | 572 | | 283 | |
| Travel Time (s) | | 20.9 | 13.0 | | 6.4 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 3 | 620 | 1540 | 4 | 2 | 2 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 3 | 620 | 1544 | 0 | 4 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Left | Right | Left | Right |
| Median Width(ft) | | 12 | 12 | | 12 | |
| Link Offset(ft) | | 0 | 0 | | 0 | |
| Crosswalk Width(ft) | | 16 | 16 | | 16 | |
| Two way Left Turn Lane | | | | | Yes | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | | 9 | 15 | 9 |
| Sign Control | | Free | Free | | Stop | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Control Type: Unsignalized | |
| Intersection Capacity Utilization 49.3% | ICU Level of Service A |
| Analysis Period (min) 15 | |

# HCM 6th TWSC
## 1: Newport Ave & Project Driveway

12/06/2020

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 3 | 570 | 1417 | 4 | 2 | 2 |
| Future Vol, veh/h | 3 | 570 | 1417 | 4 | 2 | 2 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 2 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 3 | 620 | 1540 | 4 | 2 | 2 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 1544 | 0 | - | 0 | 1858 | 772 |
| Stage 1 | - | - | - | - | 1542 | - |
| Stage 2 | - | - | - | - | 316 | - |
| Critical Hdwy | 4.14 | - | - | - | 6.84 | 6.94 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.84 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.84 | - |
| Follow-up Hdwy | 2.22 | - | - | - | 3.52 | 3.32 |
| Pot Cap-1 Maneuver | *740 | - | - | - | *228 | *495 |
| Stage 1 | - | - | - | - | *467 | - |
| Stage 2 | - | - | - | - | *712 | - |
| Platoon blocked, % | 1 | - | - | - | 1 | 1 |
| Mov Cap-1 Maneuver | *740 | - | - | - | *228 | *495 |
| Mov Cap-2 Maneuver | - | - | - | - | *410 | - |
| Stage 1 | - | - | - | - | *465 | - |
| Stage 2 | - | - | - | - | *712 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0.1 | 0 | 13.1 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | * 740 | - | - | - | 449 |
| HCM Lane V/C Ratio | 0.004 | - | - | - | 0.01 |
| HCM Control Delay (s) | 9.9 | - | - | - | 13.1 |
| HCM Lane LOS | A | - | - | - | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 |

**Notes**

~: Volume exceeds capacity  $: Delay exceeds 300s  +: Computation Not Defined  *: All major volume in platoon

# Lanes, Volumes, Timings
## 2: Newport Ave & Crawford Canyon Road

12/06/2020

| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 77 | 495 | 900 | 109 | 103 | 521 |
| Future Volume (vph) | 77 | 495 | 900 | 109 | 103 | 521 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 250 | | | 0 | 0 | 0 |
| Storage Lanes | 1 | | | 0 | 1 | 1 |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 |
| Frt | | | 0.984 | | | 0.850 |
| Flt Protected | 0.950 | | | | 0.950 | |
| Satd. Flow (prot) | 1770 | 3539 | 3483 | 0 | 1770 | 1583 |
| Flt Permitted | 0.950 | | | | 0.950 | |
| Satd. Flow (perm) | 1770 | 3539 | 3483 | 0 | 1770 | 1583 |
| Right Turn on Red | | | | Yes | | Yes |
| Satd. Flow (RTOR) | | | 23 | | | 235 |
| Link Speed (mph) | | 30 | 30 | | 30 | |
| Link Distance (ft) | | 572 | 1060 | | 879 | |
| Travel Time (s) | | 13.0 | 24.1 | | 20.0 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 84 | 538 | 978 | 118 | 112 | 566 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 84 | 538 | 1096 | 0 | 112 | 566 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Left | Right | Left | Right |
| Median Width(ft) | | 12 | 12 | | 12 | |
| Link Offset(ft) | | 0 | 0 | | 0 | |
| Crosswalk Width(ft) | | 16 | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | | 9 | 15 | 9 |
| Number of Detectors | 1 | 2 | 2 | | 1 | 1 |
| Detector Template | Left | Thru | Thru | | Left | Right |
| Leading Detector (ft) | 20 | 100 | 100 | | 20 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 6 | | 20 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | 94 | | | |
| Detector 2 Size(ft) | | 6 | 6 | | | |
| Detector 2 Type | | Cl+Ex | Cl+Ex | | | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | 0.0 | 0.0 | | | |
| Turn Type | Prot | NA | NA | | Prot | Perm |
| Protected Phases | 7 | 4 | 8 | | 6 | |
| Permitted Phases | | | | | | 6 |

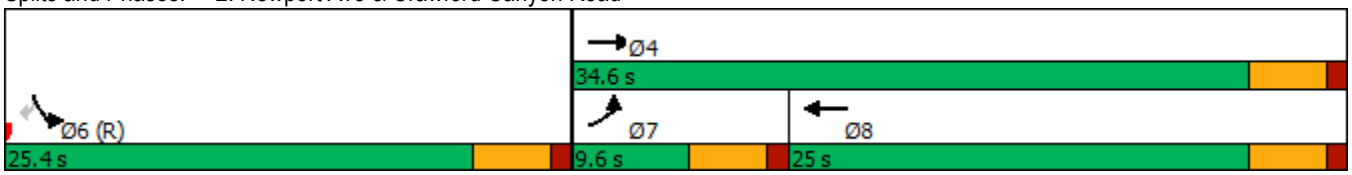
# Lanes, Volumes, Timings
## 2: Newport Ave & Crawford Canyon Road

12/06/2020

| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Detector Phase | 7 | 4 | 8 | | 6 | 6 |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 |
| Minimum Split (s) | 9.5 | 22.5 | 22.5 | | 22.5 | 22.5 |
| Total Split (s) | 9.6 | 34.6 | 25.0 | | 25.4 | 25.4 |
| Total Split (%) | 16.0% | 57.7% | 41.7% | | 42.3% | 42.3% |
| Maximum Green (s) | 5.1 | 30.1 | 20.5 | | 20.9 | 20.9 |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | | 4.5 | 4.5 |
| Lead/Lag | Lead | | Lag | | | |
| Lead-Lag Optimize? | Yes | | Yes | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 |
| Recall Mode | None | None | None | | C-Max | C-Max |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | 7.0 |
| Flash Dont Walk (s) | | 11.0 | 11.0 | | 11.0 | 11.0 |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | 0 |
| Act Effct Green (s) | 5.1 | 28.2 | 20.5 | | 22.8 | 22.8 |
| Actuated g/C Ratio | 0.08 | 0.47 | 0.34 | | 0.38 | 0.38 |
| v/c Ratio | 0.56 | 0.32 | 0.91 | | 0.17 | 0.76 |
| Control Delay | 43.1 | 10.1 | 31.7 | | 14.5 | 18.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Delay | 43.1 | 10.1 | 31.7 | | 14.5 | 18.8 |
| LOS | D | B | C | | B | B |
| Approach Delay | | 14.6 | 31.7 | | 18.0 | |
| Approach LOS | | B | C | | B | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 60 | |
| Actuated Cycle Length: 60 | |
| Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green | |
| Natural Cycle: 60 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.91 | |
| Intersection Signal Delay: 23.4 | Intersection LOS: C |
| Intersection Capacity Utilization 68.1% | ICU Level of Service C |
| Analysis Period (min) 15 | |

Splits and Phases: 2: Newport Ave & Crawford Canyon Road



# HCM 6th Signalized Intersection Summary
## 2: Newport Ave & Crawford Canyon Road

12/06/2020

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 77 | 495 | 900 | 109 | 103 | 521 |
| Future Volume (veh/h) | 77 | 495 | 900 | 109 | 103 | 521 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | No | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 84 | 538 | 978 | 118 | 112 | 566 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 112 | 1686 | 1075 | 130 | 0 | 0 |
| Arrive On Green | 0.06 | 0.47 | 0.34 | 0.34 | 0.00 | 0.00 |
| Sat Flow, veh/h | 1781 | 3647 | 3286 | 385 | 0 | |
| Grp Volume(v), veh/h | 84 | 538 | 544 | 552 | 0.0 | |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1777 | 1801 | | |
| Q Serve(g_s), s | 2.8 | 5.6 | 17.6 | 17.6 | | |
| Cycle Q Clear(g_c), s | 2.8 | 5.6 | 17.6 | 17.6 | | |
| Prop In Lane | 1.00 | | | 0.21 | | |
| Lane Grp Cap(c), veh/h | 112 | 1686 | 598 | 607 | | |
| V/C Ratio(X) | 0.75 | 0.32 | 0.91 | 0.91 | | |
| Avail Cap(c_a), veh/h | 151 | 1783 | 607 | 615 | | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Uniform Delay (d), s/veh | 27.7 | 9.8 | 19.0 | 19.0 | | |
| Incr Delay (d2), s/veh | 13.1 | 0.1 | 17.6 | 17.5 | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | | |
| %ile BackOfQ(50%),veh/ln | 1.5 | 1.9 | 9.3 | 9.4 | | |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 40.8 | 9.9 | 36.7 | 36.6 | | |
| LnGrp LOS | D | A | D | D | | |
| Approach Vol, veh/h | | 622 | 1096 | | | |
| Approach Delay, s/veh | | 14.0 | 36.6 | | | |
| Approach LOS | | B | D | | | |

| Timer - Assigned Phs | 4 | 7 | 8 |
|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 33.0 | 8.3 | 24.7 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 30.1 | 5.1 | 20.5 |
| Max Q Clear Time (g_c+I1), s | 7.6 | 4.8 | 19.6 |
| Green Ext Time (p_c), s | 3.7 | 0.0 | 0.6 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 28.4 |
| HCM 6th LOS | C |

# Lanes, Volumes, Timings
## 1: Newport Ave & Project Driveway

12/06/2020

| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 2 | 1124 | 706 | 3 | 2 | 2 |
| Future Volume (vph) | 2 | 1124 | 706 | 3 | 2 | 2 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 |
| Frt | | | 0.999 | | 0.932 | |
| Flt Protected | 0.950 | | | | 0.976 | |
| Satd. Flow (prot) | 1770 | 3539 | 3536 | 0 | 1694 | 0 |
| Flt Permitted | 0.950 | | | | 0.976 | |
| Satd. Flow (perm) | 1770 | 3539 | 3536 | 0 | 1694 | 0 |
| Link Speed (mph) | | 30 | 30 | | 30 | |
| Link Distance (ft) | | 919 | 572 | | 283 | |
| Travel Time (s) | | 20.9 | 13.0 | | 6.4 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 2 | 1222 | 767 | 3 | 2 | 2 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 2 | 1222 | 770 | 0 | 4 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Left | Right | Left | Right |
| Median Width(ft) | | 12 | 12 | | 12 | |
| Link Offset(ft) | | 0 | 0 | | 0 | |
| Crosswalk Width(ft) | | 16 | 16 | | 16 | |
| Two way Left Turn Lane | | | | | Yes | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | | 9 | 15 | 9 |
| Sign Control | | Free | Free | | Stop | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Control Type: Unsignalized | |
| Intersection Capacity Utilization 41.1% | ICU Level of Service A |
| Analysis Period (min) 15 | |

# HCM 6th TWSC
## 1: Newport Ave & Project Driveway

12/06/2020

| Intersection | |
|---|---|
| Int Delay, s/veh | 0 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 2 | 1124 | 706 | 3 | 2 | 2 |
| Future Vol, veh/h | 2 | 1124 | 706 | 3 | 2 | 2 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 2 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 2 | 1222 | 767 | 3 | 2 | 2 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 770 | 0 | - | 0 | 1384 | 385 |
| Stage 1 | - | - | - | - | 769 | - |
| Stage 2 | - | - | - | - | 615 | - |
| Critical Hdwy | 4.14 | - | - | - | 6.84 | 6.94 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.84 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.84 | - |
| Follow-up Hdwy | 2.22 | - | - | - | 3.52 | 3.32 |
| Pot Cap-1 Maneuver | *1200 | - | - | - | *233 | *802 |
| Stage 1 | - | - | - | - | *757 | - |
| Stage 2 | - | - | - | - | *502 | - |
| Platoon blocked, % | 1 | - | - | - | 1 | 1 |
| Mov Cap-1 Maneuver | *1200 | - | - | - | *232 | *802 |
| Mov Cap-2 Maneuver | - | - | - | - | *438 | - |
| Stage 1 | - | - | - | - | *755 | - |
| Stage 2 | - | - | - | - | *502 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 11.4 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | * 1200 | - | - | - | 567 |
| HCM Lane V/C Ratio | 0.002 | - | - | - | 0.008 |
| HCM Control Delay (s) | 8 | - | - | - | 11.4 |
| HCM Lane LOS | A | - | - | - | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 |

**Notes**

~: Volume exceeds capacity  $: Delay exceeds 300s  +: Computation Not Defined  *: All major volume in platoon

# Lanes, Volumes, Timings
## 2: Newport Ave & Crawford Canyon Road

12/06/2020

| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 399 | 728 | 560 | 95 | 95 | 150 |
| Future Volume (vph) | 399 | 728 | 560 | 95 | 95 | 150 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 250 | | | 0 | 0 | 0 |
| Storage Lanes | 1 | | | 0 | 1 | 1 |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 |
| Frt | | | 0.978 | | | 0.850 |
| Flt Protected | 0.950 | | | | 0.950 | |
| Satd. Flow (prot) | 1770 | 3539 | 3461 | 0 | 1770 | 1583 |
| Flt Permitted | 0.950 | | | | 0.950 | |
| Satd. Flow (perm) | 1770 | 3539 | 3461 | 0 | 1770 | 1583 |
| Right Turn on Red | | | | Yes | | Yes |
| Satd. Flow (RTOR) | | | 26 | | | 163 |
| Link Speed (mph) | | 30 | 30 | | 30 | |
| Link Distance (ft) | | 572 | 1060 | | 879 | |
| Travel Time (s) | | 13.0 | 24.1 | | 20.0 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 434 | 791 | 609 | 103 | 103 | 163 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 434 | 791 | 712 | 0 | 103 | 163 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Left | Right | Left | Right |
| Median Width(ft) | | 12 | 12 | | 12 | |
| Link Offset(ft) | | 0 | 0 | | 0 | |
| Crosswalk Width(ft) | | 16 | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | | 9 | 15 | 9 |
| Number of Detectors | 1 | 2 | 2 | | 1 | 1 |
| Detector Template | Left | Thru | Thru | | Left | Right |
| Leading Detector (ft) | 20 | 100 | 100 | | 20 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 6 | | 20 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | 94 | | | |
| Detector 2 Size(ft) | | 6 | 6 | | | |
| Detector 2 Type | | Cl+Ex | Cl+Ex | | | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | 0.0 | 0.0 | | | |
| Turn Type | Prot | NA | NA | | Prot | Perm |
| Protected Phases | 7 | 4 | 8 | | 6 | |
| Permitted Phases | | | | | | 6 |

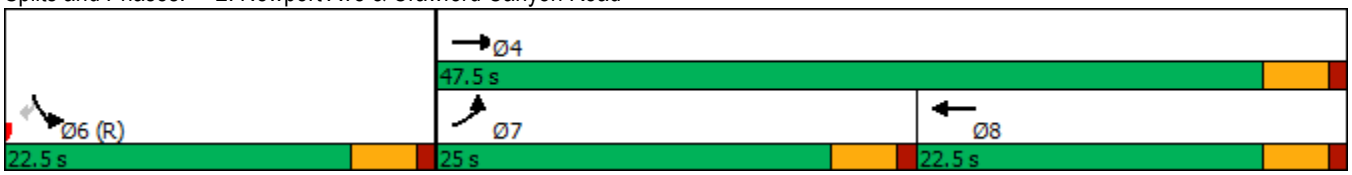
# Lanes, Volumes, Timings
## 2: Newport Ave & Crawford Canyon Road

12/06/2020

| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Detector Phase | 7 | 4 | 8 | | 6 | 6 |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 |
| Minimum Split (s) | 9.5 | 22.5 | 22.5 | | 22.5 | 22.5 |
| Total Split (s) | 25.0 | 47.5 | 22.5 | | 22.5 | 22.5 |
| Total Split (%) | 35.7% | 67.9% | 32.1% | | 32.1% | 32.1% |
| Maximum Green (s) | 20.5 | 43.0 | 18.0 | | 18.0 | 18.0 |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | | 4.5 | 4.5 |
| Lead/Lag | Lead | | Lag | | | |
| Lead-Lag Optimize? | Yes | | Yes | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 |
| Recall Mode | None | None | None | | C-Max | C-Max |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | 7.0 |
| Flash Dont Walk (s) | | 11.0 | 11.0 | | 11.0 | 11.0 |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | 0 |
| Act Effct Green (s) | 19.6 | 41.4 | 17.3 | | 19.6 | 19.6 |
| Actuated g/C Ratio | 0.28 | 0.59 | 0.25 | | 0.28 | 0.28 |
| v/c Ratio | 0.88 | 0.38 | 0.81 | | 0.21 | 0.29 |
| Control Delay | 44.9 | 7.9 | 32.6 | | 21.8 | 5.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Delay | 44.9 | 7.9 | 32.6 | | 21.8 | 5.5 |
| LOS | D | A | C | | C | A |
| Approach Delay | | 21.0 | 32.6 | | 11.8 | |
| Approach LOS | | C | C | | B | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 70 | |
| Actuated Cycle Length: 70 | |
| Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green | |
| Natural Cycle: 70 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.88 | |
| Intersection Signal Delay: 23.7 | Intersection LOS: C |
| Intersection Capacity Utilization 57.1% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 2: Newport Ave & Crawford Canyon Road



# HCM 6th Signalized Intersection Summary
## 2: Newport Ave & Crawford Canyon Road

12/06/2020

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 399 | 728 | 560 | 95 | 95 | 150 |
| Future Volume (veh/h) | 399 | 728 | 560 | 95 | 95 | 150 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | No | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 434 | 791 | 609 | 103 | 103 | 163 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 479 | 2024 | 719 | 121 | 0 | 0 |
| Arrive On Green | 0.27 | 0.57 | 0.24 | 0.24 | 0.00 | 0.00 |
| Sat Flow, veh/h | 1781 | 3647 | 3135 | 513 | 0 | |
| Grp Volume(v), veh/h | 434 | 791 | 355 | 357 | 0.0 | |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1777 | 1778 | | |
| Q Serve(g_s), s | 16.5 | 8.6 | 13.4 | 13.4 | | |
| Cycle Q Clear(g_c), s | 16.5 | 8.6 | 13.4 | 13.4 | | |
| Prop In Lane | 1.00 | | | 0.29 | | |
| Lane Grp Cap(c), veh/h | 479 | 2024 | 420 | 420 | | |
| V/C Ratio(X) | 0.91 | 0.39 | 0.85 | 0.85 | | |
| Avail Cap(c_a), veh/h | 522 | 2183 | 457 | 457 | | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Uniform Delay (d), s/veh | 24.7 | 8.3 | 25.5 | 25.5 | | |
| Incr Delay (d2), s/veh | 18.6 | 0.1 | 12.9 | 13.2 | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | | |
| %ile BackOfQ(50%),veh/ln | 9.0 | 2.8 | 6.8 | 6.9 | | |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 43.3 | 8.5 | 38.4 | 38.7 | | |
| LnGrp LOS | D | A | D | D | | |
| Approach Vol, veh/h | | 1225 | 712 | | | |
| Approach Delay, s/veh | | 20.8 | 38.6 | | | |
| Approach LOS | | C | D | | | |

| Timer - Assigned Phs | 4 | 7 | 8 |
|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 44.4 | 23.3 | 21.0 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 43.0 | 20.5 | 18.0 |
| Max Q Clear Time (g_c+I1), s | 10.6 | 18.5 | 15.4 |
| Green Ext Time (p_c), s | 6.4 | 0.3 | 1.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 27.4 |
| HCM 6th LOS | C |

# Appendix K

## Tribal Cultural Resources

ESA

ORANGE COUNTY
OC Public Works

December 28, 2020

Mr. Andrew Salas, Chairman
Gabrieleño Band of Mission Indians - Kizh Nation
P.O. Box 393
Covina, CA 91723

**VIA CERTIFIED MAIL**

**Subject:** AB 52 Notification for the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

Dear Chief Salas:

Orange County Public Works (OCPW), OC Development Services/Planning provides this notice pursuant to the provisions of Assembly Bill 52 and Section 21080.3.1(d) of the Public Resources Code, requiring formal notification of projects in the geographic area that is traditionally and culturally affiliated with your tribe. Pursuant to Public Resources Code Section 21080.3.1, California Native American tribes have 30 days from receipt of this notification to request consultation with OC Development Services/Planning regarding possible significant effects that implementation of this project may have on Tribal Cultural Resources. However, this deadline may be affected by various Executive Orders issued by the Governor.

The County of Orange (County) is proposing to develop a 2.5-acre neighborhood park and sidewalk extensions with associated roadway improvements (Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project or the Project). The proposed park (Crawford Canyon Park or the Park) is located at the northwest corner of Newport Avenue and Crawford Canyon Road and the proposed sidewalk extension with associated roadway improvements (Sidewalk Extension) is located along Crawford Canyon Road and Newport Avenue in North Tustin, in unincorporated Orange County; refer to **Figure 1**, **Regional Map**, **Figure 2**, **Local Project Vicinity** and **Figure 3**, **Topographic Map**. The Crawford Canyon Park would be located on a vacant 2.5-acre site within an area of existing single-family residences.

Recreational amenities and features of Crawford Canyon Park are anticipated to include a quarter mile walkway, pathways, foot bridges, two playgrounds/natural play areas for children, exercise stations, picnic tables, benches, drinking fountains, a bioswale and bio-retention basin, landscape berms aligned with trees and natural rolling lawn areas; refer to **Figure 4, Crawford Canyon Park Conceptual Site Plan**. The Crawford Canyon Park would not include barbeques or restroom facilities. A paved surface parking lot comprised of nine standard vehicular spaces, two handicap accessible vehicular

County Administration South
601 North Ross Street
Santa Ana, California 92701
P.O. Box 4048
Santa Ana, CA 92702-4048
(714) 667-8800
info@ocpw.ocgov.com
OCPublicWorks.com

spaces, and equipped with bicycle racks would be provided onsite with vehicular access from Newport Avenue. The Crawford Canyon Park would include a vehicular deceleration lane on Newport Avenue prior to entering the proposed parking lot. Pedestrian access would be provided within the parking lot and from sidewalks along Newport Avenue and Crawford Canyon Road. The Crawford Canyon Park is proposing approximately 2,900 cubic yards of cut and 12,900 cubic yards of fill, with a maximum depth of ground disturbance of 2 feet, resulting in approximately 10,000 cubic yards of soil import. The County is proposing to begin construction in summer of 2021 with Crawford Canyon Park opening in spring of 2022.

The proposed improvements of the Sidewalk Extension include approximately 630 feet of sidewalk construction along the north side of Newport Avenue beginning across from Hyde Park Drive proceeding easterly and approximately 815 feet of sidewalk construction along the west side of Crawford Canyon Road from the end of the Park Site to Country Haven Lane; refer to **Figure 5a** and **Figure 5b,** Crawford Canyon Road Sidewalk Extension Conceptual Plan. Additional associated proposed improvements include decomposed granite walkways, pavement reconstruction, driveways, curb ramps, curb/gutter, retaining walls/slough walls, modifying drainage inlets and features, utility relocations and adjustments, and a traffic signal system upgrade at the intersection of Crawford Canyon Road and Newport Avenue. The proposed improvements are to be constructed within the existing road right-of-way. The Sidewalk Extension is anticipated to export up to approximately 280 cubic yards of native soil and import up to approximately 270 cubic yards for structure backfill. If the native soil can be used for wall backfill, then the Sidewalk Extension Site would be balanced. The County is proposing to begin construction of the Sidewalk Extension in summer of 2022 with completion in fall of 2022.

Should you have any questions related to this project, please feel free to contact me by phone at (714) 667-8815 or Cindy Salazar at (714) 667-8870.

Sincerely,

for Brian Kurnow, Land Use Manager
OC Public Works/OC Development Services
601 North Ross Street
Santa Ana, California 92701

Cc: Joanna Chang, OCPW/Development Services, Land Use Manager, Joanna.Chang@ocpw.ocgov.com
Cindy Salazar, OCPW/Development Services, Senior Planner, Cindy.Salazar@ocpw.ocgov.com
Kevin Shannon, OCPW/Development Services, Consultant - Environmental Planner, Kevin.Shannon@ocpw.ocgov.com

Attachment A: Project Maps
Figure 1: Regional Map
Figure 2: Local Project Vicinity
Figure 3: Topographic Map
Figure 4: Crawford Canyon Park Conceptual Site Plan
Figure 5a and Figure 5b: Crawford Canyon Road Sidewalk Extension Conceptual Plan

ORANGE COUNTY
OC Public Works

December 28, 2020

Joyce Stanfield Perry
Juaneño Band of Mission Indians
4955 Paseo Segovia
Irvine, CA 92603

**VIA CERTIFIED MAIL**

**Subject:** AB 52 Notification for the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

Dear Joyce Stanfield Perry:

Orange County Public Works (OCPW), OC Development Services/Planning provides this notice pursuant to the provisions of Assembly Bill 52 and Section 21080.3.1(d) of the Public Resources Code, requiring formal notification of projects in the geographic area that is traditionally and culturally affiliated with your tribe. Pursuant to Public Resources Code Section 21080.3.1, California Native American tribes have 30 days from receipt of this notification to request consultation with OC Development Services/Planning regarding possible significant effects that implementation of this project may have on Tribal Cultural Resources. However, this deadline may be affected by various Executive Orders issued by the Governor.

The County of Orange (County) is proposing to develop a 2.5-acre neighborhood park and sidewalk extensions with associated roadway improvements (Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project or the Project). The proposed park (Crawford Canyon Park or the Park) is located at the northwest corner of Newport Avenue and Crawford Canyon Road and the proposed sidewalk extension with associated roadway improvements (Sidewalk Extension) is located along Crawford Canyon Road and Newport Avenue in North Tustin, in unincorporated Orange County; refer to **Figure 1**, **Regional Map**, **Figure 2**, **Local Project Vicinity** and **Figure 3**, **Topographic Map**. The Crawford Canyon Park would be located on a vacant 2.5-acre site within an area of existing single-family residences.

Recreational amenities and features of Crawford Canyon Park are anticipated to include a quarter mile walkway, pathways, foot bridges, two playgrounds/natural play areas for children, exercise stations, picnic tables, benches, drinking fountains, a bioswale and bio-retention basin, landscape berms aligned with trees and natural rolling lawn areas; refer to **Figure 4, Crawford Canyon Park Conceptual Site Plan**. The Crawford Canyon Park would not include barbeques or restroom facilities. A paved surface parking lot comprised of nine standard vehicular spaces, two handicap accessible vehicular

spaces, and equipped with bicycle racks would be provided onsite with vehicular access from Newport Avenue. The Crawford Canyon Park would include a vehicular deceleration lane on Newport Avenue prior to entering the proposed parking lot. Pedestrian access would be provided within the parking lot and from sidewalks along Newport Avenue and Crawford Canyon Road. The Crawford Canyon Park is proposing approximately 2,900 cubic yards of cut and 12,900 cubic yards of fill, with a maximum depth of ground disturbance of 2 feet, resulting in approximately 10,000 cubic yards of soil import. The County is proposing to begin construction in summer of 2021 with Crawford Canyon Park opening in spring of 2022.

The proposed improvements of the Sidewalk Extension include approximately 630 feet of sidewalk construction along the north side of Newport Avenue beginning across from Hyde Park Drive proceeding easterly and approximately 815 feet of sidewalk construction along the west side of Crawford Canyon Road from the end of the Park Site to Country Haven Lane; refer to **Figure 5a** and **Figure 5b,** Crawford Canyon Road Sidewalk Extension Conceptual Plan. Additional associated proposed improvements include decomposed granite walkways, pavement reconstruction, driveways, curb ramps, curb/gutter, retaining walls/slough walls, modifying drainage inlets and features, utility relocations and adjustments, and a traffic signal system upgrade at the intersection of Crawford Canyon Road and Newport Avenue. The proposed improvements are to be constructed within the existing road right-of-way. The Sidewalk Extension is anticipated to export up to approximately 280 cubic yards of native soil and import up to approximately 270 cubic yards for structure backfill. If the native soil can be used for wall backfill, then the Sidewalk Extension Site would be balanced. The County is proposing to begin construction of the Sidewalk Extension in summer of 2022 with completion in fall of 2022.

Should you have any questions related to this project, please feel free to contact me by phone at (714) 667-8815 or Cindy Salazar at (714) 667-8870.

Sincerely,

for Brian Kurnow, Land Use Manager
OC Public Works/OC Development Services
601 North Ross Street
Santa Ana, California 92701

Cc: Joanna Chang, OCPW/Development Services, Land Use Manager, Joanna.Chang@ocpw.ocgov.com
Cindy Salazar, OCPW/Development Services, Senior Planner, Cindy.Salazar@ocpw.ocgov.com
Kevin Shannon, OCPW/Development Services, Consultant - Environmental Planner, Kevin.Shannon@ocpw.ocgov.com

Attachment A: Project Maps
Figure 1: Regional Map
Figure 2: Local Project Vicinity
Figure 3: Topographic Map
Figure 4: Crawford Canyon Park Conceptual Site Plan
Figure 5a and Figure 5b: Crawford Canyon Road Sidewalk Extension Conceptual Plan

ORANGE COUNTY
OC Public Works

December 28, 2020

Mr. Anthony Morales, Chief
San Gabriel Band of Mission Indians
PO Box 693
San Gabriel, CA 91778

**VIA CERTIFIED MAIL**

**Subject:** AB 52 Notification for the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

Dear Chief Morales:

Orange County Public Works (OCPW), OC Development Services/Planning provides this notice pursuant to the provisions of Assembly Bill 52 and Section 21080.3.1(d) of the Public Resources Code, requiring formal notification of projects in the geographic area that is traditionally and culturally affiliated with your tribe. Pursuant to Public Resources Code Section 21080.3.1, California Native American tribes have 30 days from receipt of this notification to request consultation with OC Development Services/Planning regarding possible significant effects that implementation of this project may have on Tribal Cultural Resources. However, this deadline may be affected by various Executive Orders issued by the Governor.

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601 North Ross Street
Santa Ana, California 92701
P.O. Box 4048
Santa Ana, CA 92702-4048
info@ocpw.ocgov.com
(714) 667-8800
OCPublicWorks.com

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for Brian Kurnow, Land Use Manager
OC Public Works/OC Development Services
601 North Ross Street
Santa Ana, California 92701

Cc: Joanna Chang, OCPW/Development Services, Land Use Manager, Joanna.Chang@ocpw.ocgov.com
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ORANGE COUNTY
OC Public Works

December 28, 2020

Mr. Joseph Ontiveros
Soboba Band of Luiseño Indians
PO Box 487
San Jacinto, CA 92581

**VIA CERTIFIED MAIL**

**Subject:** AB 52 Notification for the Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

Dear Joseph Ontiveros:

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for Brian Kurnow, Land Use Manager
OC Public Works/OC Development Services
601 North Ross Street
Santa Ana, California 92701

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Cindy Salazar, OCPW/Development Services, Senior Planner, Cindy.Salazar@ocpw.ocgov.com
Kevin Shannon, OCPW/Development Services, Consultant - Environmental Planner, Kevin.Shannon@ocpw.ocgov.com

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Figure 1: Regional Map
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SOURCE: ESRI

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

**Figure 1**
Regional Map

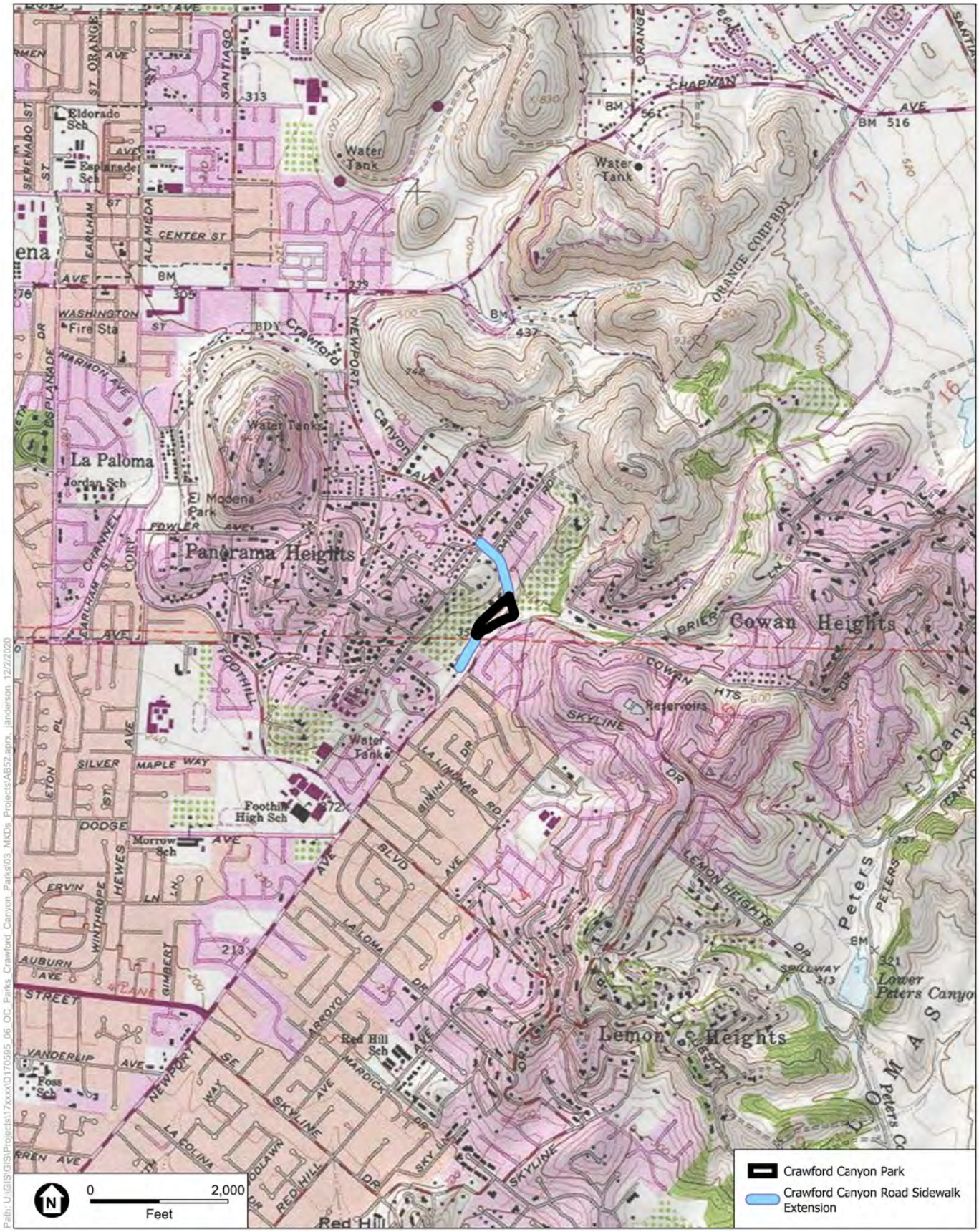
ESA

SOURCE: Mapbox, 2020.

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

**Figure 2**
Local Vicinity Map

ESA




SOURCE: USGS Topographic Series (Orange, CA).

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

**Figure 3**
Topographic Map

ESA

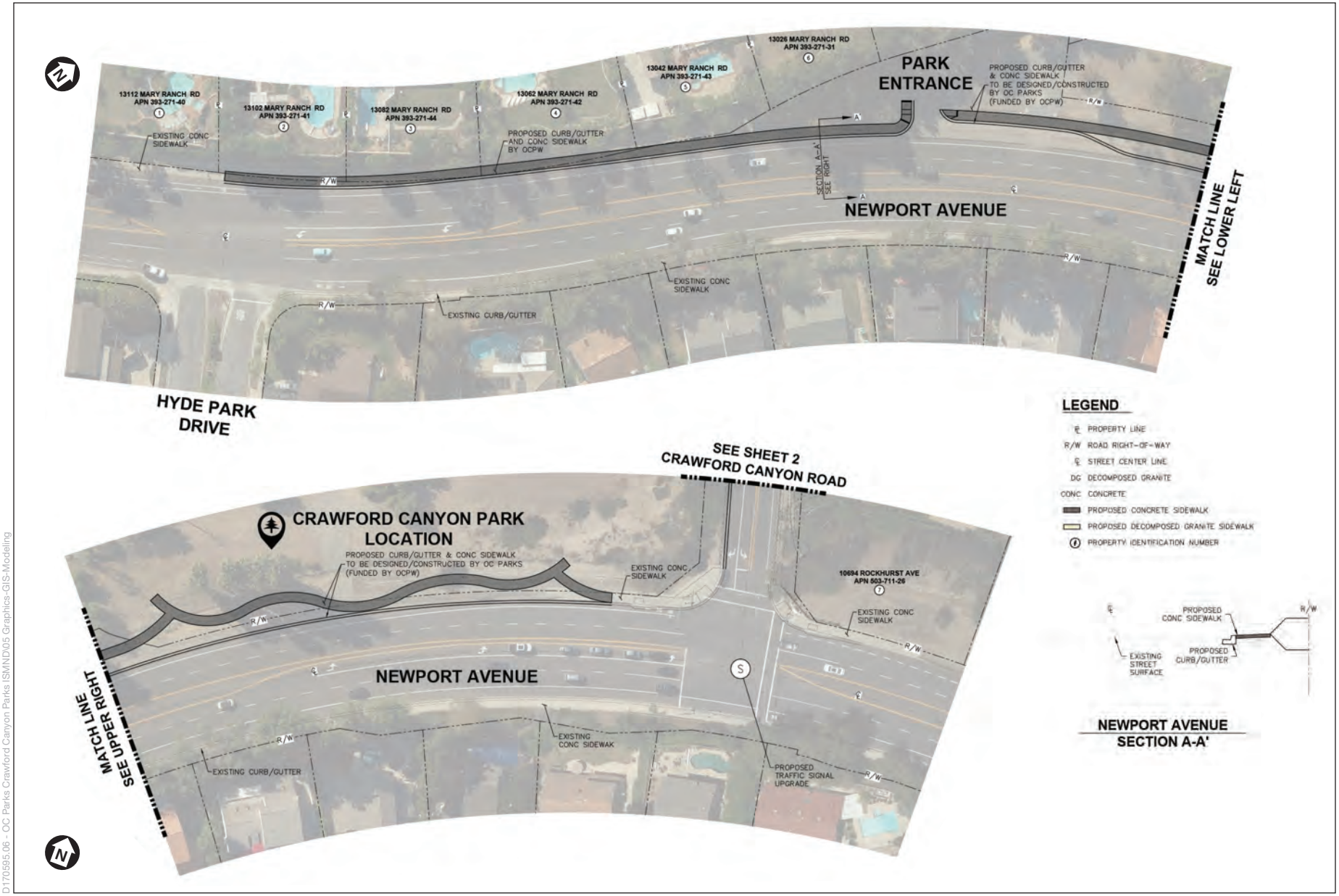
D170595.06 - OC Parks Crawford Canyon Parks ISMND\05 Graphics-GIS-Modeling

SOURCE: RJM Design Group, 2020

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

**Figure 4**
Crawford Canyon Park Conceptual Site Plan

ESA



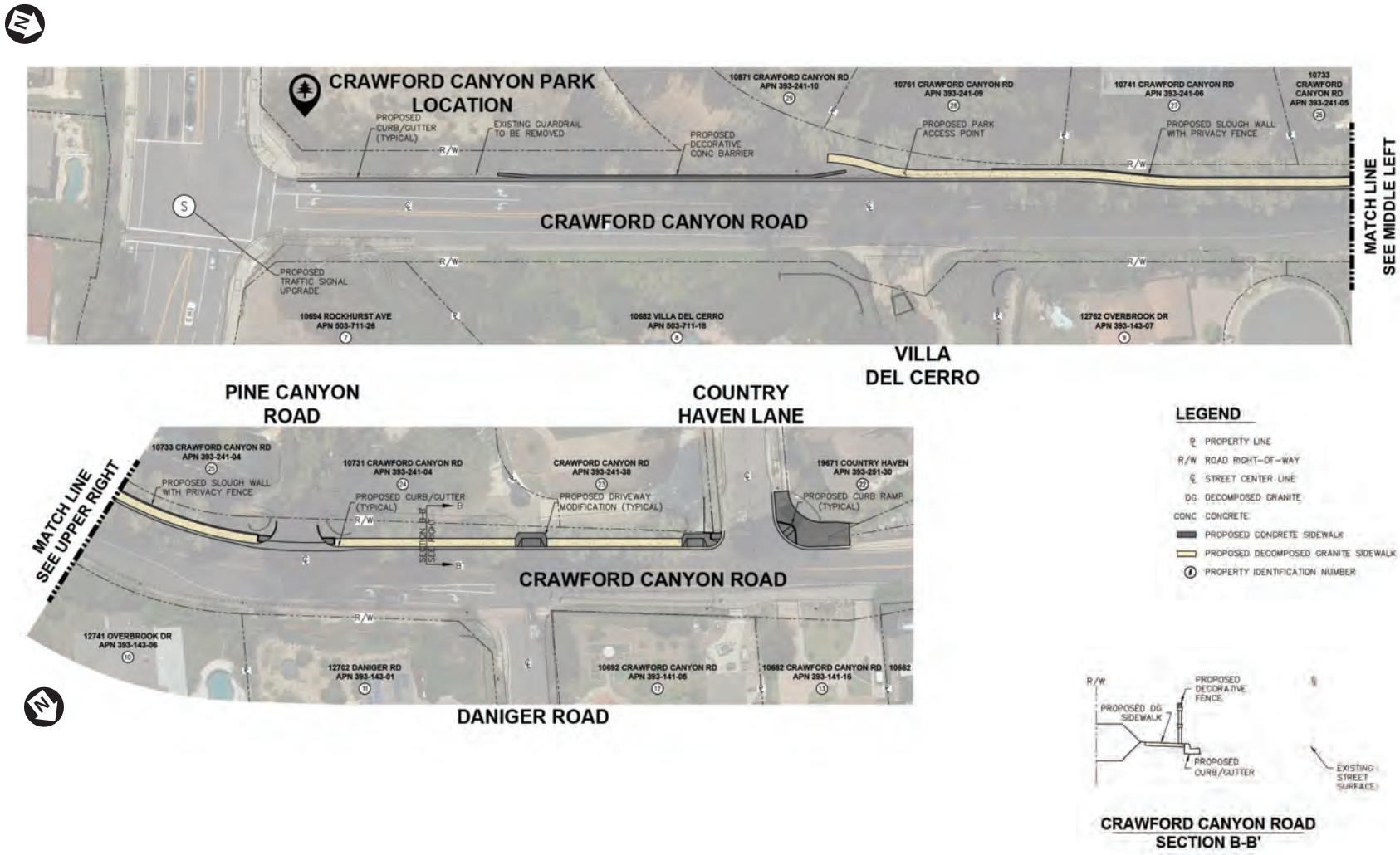

D170595.06 - OC Parks Crawford Canyon Parks ISMND\05 Graphics-GIS-Modeling

SOURCE: County of Orange, 2020

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

**Figure 5a**
Crawford Canyon Road Sidewalk Extension Conceptual Plan

ESA




D170595.06 - OC Parks Crawford Canyon Parks ISMND\05 Graphics-GIS-Modeling

SOURCE: County of Orange, 2020

Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project

**Figure 5b**
Crawford Canyon Road Sidewalk Extension Conceptual Plan

ESA

GABRIELENO BAND OF MISSION INDIANS - KIZH NATION
Historically known as The Gabrielino Tribal Council - San Gabriel Band of Mission Indians
recognized by the State of California as the aboriginal tribe of the Los Angeles basin

January 21, 2021

Project Name: Crawford Canyon Park and Crawford Canyon Road Sidewalk Extension Project City of Orange

Dear Joanna Chang,

Thank you for your letter dated December 28, 2020 regarding AB52 consultation. The above proposed project location is within our Ancestral Tribal Territory; therefore, our Tribal Government requests to schedule a consultation with you as the lead agency, to discuss the project and the surrounding location in further detail.

Please contact us at your earliest convenience. ***Please Note:AB 52, "consultation" shall have the same meaning as provided in SB 18 (Govt. Code Section 65352.4).***

Thank you for your time,

Andrew Salas, Chairman
Gabrieleno Band of Mission Indians – Kizh Nation
1(844)390-0787

Andrew Salas, Chairman | Nadine Salas, Vice-Chairman | Dr. Christina Swindall Martinez, secretary
Albert Perez, treasurer I | Martha Gonzalez Lemos, treasurer II | Richard Gradias, Chairman of the council of Elders

PO Box 393 Covina, CA 91723 admin@gabrielenoindians.org