# ORANGE COUNTY RONALD MCDONALD HOUSE EXPANSION PROJECT

## MITIGATED NEGATIVE DECLARATION NO. 1868-19

*Lead Agency:*

**City of Orange**
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**November 2020**

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# Initial Study

## 1. Project Summary

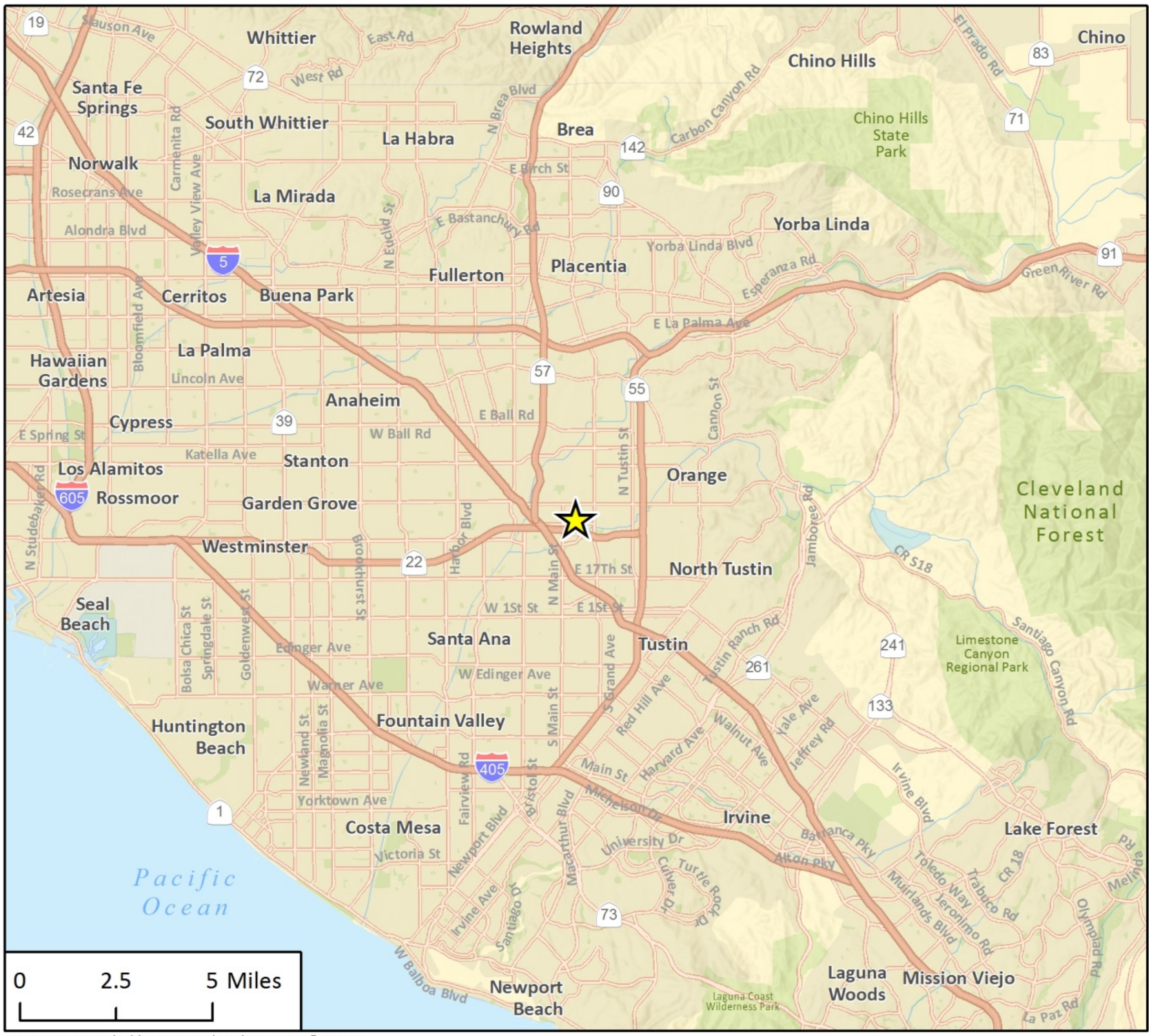
| | |
|---|---|
| **Project Title**<br>Orange County Ronald McDonald House Expansion | **Reference Application Numbers**<br>General Plan Amendment No. 2019-001, Zone Change No. 1298-19, Mitigated Negative Declaration No. 1868-19, Major Site Plan Review No. 0976-19, Variance No. 2251-19, Design Review No. 4977-19, and Administrative Adjustment No. 0274-19 |
| **Lead Agency**<br>City of Orange<br>Community Development Department<br>Planning Division<br>300 East Chapman Avenue<br>Orange, California 92866-1591 | **Contact Person and Phone Number**<br>Marissa Moshier<br>Historic Preservation Planner<br>(714) 744-7243 |
| **Project Proponent and Address**<br>Orange County Ronald McDonald House<br>383 South Batavia Street<br>Orange, California 92868 | **Contact Person and Phone Number**<br>Noel Burcelis<br>Executive Director<br>(714) 639-3600 |

**Project Location**

The project site is located at 383 S. Batavia Street and 802 W. Culver Avenue in the City of Orange, California. The project site includes three parcels identified as Assessor's Parcel No. (APN) 041-121-29, which encompass a lot area of 51,000 square feet (sf)), and one parcel identified as APN 041-140-23, which encompasses a lot area of 9,670 sf. In total, the project site encompasses 60,670 sf. The project site is bordered by S. Batavia Street to the west, followed by single- and multi-family residences and a Convent, single-family residences to the north and east, and an office building with associated surface parking to the south.

| | |
|---|---|
| **Existing General Plan Designation**<br>Low Density Residential 2-6 DU/AC | **Existing Zoning Classification**<br>R-1-6 (Single Family Residential 6,000 sq ft) |

## Figure 1 Regional Location

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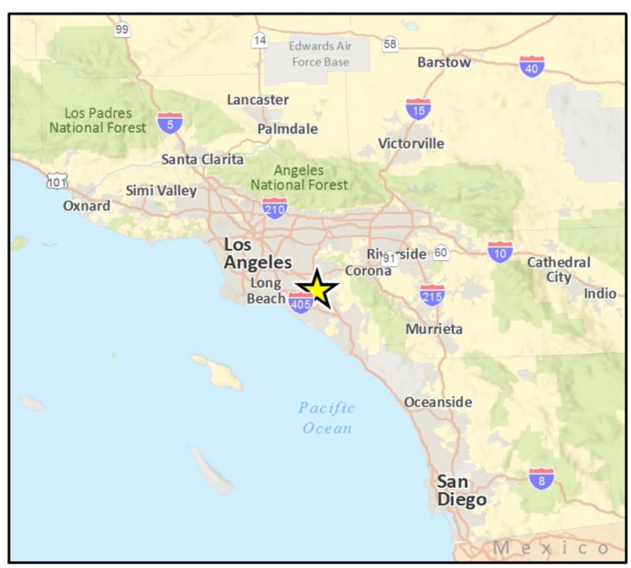


Project Location

N

Fig 1 Regional Location

**Figure 2 Project Location**


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# 2. Existing Setting

## Regional Setting

The project site is located in the City of Orange, California. Figure 1 shows the location of the project site in the region and Figure 2 shows the site in its neighborhood context. Regional access to the project site is provided by State Route 22 (SR-22) from the south, State Route 55 (SR-55) to the east, and State Route 57 (SR-57) to the west.

Existing transit lines in the project vicinity include Orange County Transit Authority (OCTA) bus lines 53, 56 and 453 (OCTA 2018a). The bus stops closest to the project site that provide access to these lines are located 0.2 mile to the south of the project site, along La Veta Avenue.

## Existing Site Conditions

The northern 15,000 sf portion of the project site (APN 041-131-29) is currently occupied by the existing Orange County Ronald McDonald House, which is a 12,580 sf, three-story building that is accessed via a driveway on South Batavia Street. The Orange County Ronald McDonald House is 29 years of age. The southern 36,000 sf portion of the project site includes a gravel surface parking lot associated with the Ronald McDonald House and a children's play area. The southeast portion of the project site (APN 041-140-23) is occupied by a 1,703 sf single-family residential building that is two stories in height and includes a 535 sf detached garage located in the southeast corner of the parcel. The single-family residence is architecturally characterized as a Craftsman Airplane Bungalow. The residence was constructed in 1919 and was relocated to this site from its original location at 431 S. Batavia Street, south of the project site. The detached garage was constructed when the house was relocated. The Orange County Ronald McDonald House and the single-family residence are located within the City's Old Towne Orange Local Historic District and the single-family residence is a contributing structure to the Local Historic District. Figure 3 below provides photographs of the project site.

The project site and just south of the project site along the southern fence line contains 85 mature trees, as identified below and detailed in the Arborist Report included as Appendix G:

- 31 Tristania trees *(Lophostemon confertus*), located along the southern project boundary and neighboring property and along the fence between the existing Ronald McDonald House and the single-family residence
- 30 Orange trees *(Citrus x sinensis*), predominantly located in a grove near the existing playground as well as two near the single-family residence
- 5 California Redwood trees (*Sequoia sempervirens)*, located to the south of the single-family residence
- 4 Crepe Myrtle *(Lagerstroemia indica*) street trees
- 4 Chinese Flame trees *(Koelreuteria bipinnata*), located to the west of the existing Ronald McDonald House and adjacent to the single-family residence
- 3 Purple Leafed Hopbush trees (*Dodonea viscosa cv. Purpurea)*, located behind the single-family residence
- 3 Loquat trees (*Eriobotrya japonica)*, located behind the single-family residence
- 1 Monkeypuzzle tree *(Araucaria araucana)*, located behind the single-family residence
- 1 Date Palm tree (*Phoenix dactylifera)*, located behind the single-family residence

- 1 Carrotwood tree *(Cupaniopsis anacardioides*), located in the northeast corner of the project site near the Ronald McDonald House
- 1 species of Ash tree (*Fraxinus spp.)*, located behind the single-family residence

### Surrounding Land Uses

The project site is located in an urbanized area. Land uses to the west of the project site, across Batavia Street, include the Sisters of St. Joseph campus, which contains multiple buildings including administrative offices, a chapel, conference rooms, housing for the Sisters, and St. Joseph's Hospital of Orange. In addition, the University of San Francisco Orange County Campus and Children's Hospital of Orange County (CHOC) is located to the west of the project site. Land uses to the north and east of the project site (across Culver Avenue), include one- and two-story single-family residences and one-story multi-family residences. Land uses to the south of the project site include one- and two-story commercial buildings and associated surface parking. Properties to the north and east are zoned R-1-6 (Single Family Residential 6,000 sq ft) and have a General Plan land use designation of LDR (Low Density Residential). Properties to the south are zoned O-P (Office Professional) and have a General Plan land use designation of NOP (Neighborhood Office Professional). Properties to the west are zoned P-I (Public Institution) and have a General Plan land use designation of PFI (Public Facilities and Institutions).

# 3. Project Description

The Orange County Ronald McDonald House Expansion project (proposed project) includes an expansion to the existing Orange County Ronald McDonald House to increase the current number of guest rooms from 21 to 44 and to covert an existing single-family residence to an accessory office space. The project includes a lot line adjustment to combine the existing lots into a single parcel.

The 60,670 sf of lot area of the existing Ronald McDonald House, parking lot, play area, and single-family residence is intended to be developed as a single parcel. The expansion would occur on the southern portion of the project site, which is currently occupied by a gravel surface parking lot and a children's play area. The existing Ronald McDonald house building will remain as currently configured. The proposed project would include the addition of 23 guest rooms, which would expand the floor area across the project site by 17,325 sf. Combined with the existing 12,580 sf of floor area of the Ronald McDonald House and 2,697 sf of the single-family residence, the expansion would result in a total of 32,602 sf of floor area and a Floor Area Ratio (FAR) of 0.54:1. The proposed three-story expansion would have a maximum height of 38 feet, 7 inches to top of roof, consistent with the existing structure, and would extend the width of the house fronting Batavia Street by 82 feet, 11.5 inches. The total width of the structure with the expansion would be approximately 128 feet along S. Batavia Street. The architectural design of the expansion would match the design of the existing building.

The addition would be consistent with the Colonial Revival style and materials of the existing Ronald McDonald House building. The front setback of the addition would be 15 feet to the front porch and upper floors and 20 feet to the front wall of the addition to match the setback of the existing building and surrounding neighborhood. The reduction in the required front yard setback from 20 feet to 15 feet requires a Variance.

The addition would include roof forms such as hip and gable that are compatible with the surrounding houses and would introduce historical architectural treatments such as outriggers, decorative trusses and window trims, as shown in the elevation in Figure 6. The project would introduce a more pronounced main entry way off Batavia Street and a front porch with similar colonnades and size as the existing front porch. The windows and doors would be compatible with the existing building's architectural style and exterior siding details, and would add a cement plaster finish similar in appearance to other buildings in the historic district. The addition would be similar to the existing building in terms of height, mass and rooflines.

The proposed project would include a General Plan Amendment and Zone Change of the project site from Low Density Residential 2-6 DU/AC to Public Facilities and Institutions (PFI), and R-1-6 (Single Family Residential 6,000 sf) to Public Institution (P-I), respectively. This would allow for the development of the number of beds in the proposed expansion.

The project would include a change in operational use associated with the single-family residential building from residential to office. The existing single-family residence is located on a 9,670 sf lot with a two-story 1,703 sf house and 535 sf detached garage. No new development or physical modifications to the exterior street view of the single-family residence will occur as a result of the project. An ADA access ramp would be located in the rear of the structure to comply with building code standards but would not be visible from the street. In addition, as shown in Figure 5, the project would relocate the play area to the west of the existing residential structure. The new play area would require surfacing work, but no alterations to the existing single-family residence would occur. The existing house would provide auxiliary office space associated with the Ronald McDonald House, while the detached garage would remain and be utilized as parking space and office storage for the Ronald McDonald House. As shown in the site plan in Figure 5, a gated pathway is proposed for pedestrian access between the two properties.

The project includes a Variance request to reduce the required 20-foot front setback from to 15 feet and to increase the fence height to eight feet along the eastern property line. Table 1 below provides a summary of the existing buildings and the proposed project. Figure 6 and Figure 7 depicts the proposed site plan and building elevations.

**Table 1 Project Details**

| | Existing | Proposed Project | Total |
|---|---|---|---|
| **Lot (APN: 041-121-29) (sf)** | | | |
| Height (stories) | 38'7" (3)<br>43'1" to chimney | 38'7" (3) | 38'7" (3) |
| Floor Area (sf) | 12,580 | 17,325 | 29,905 |
| Guest Rooms | 21 | 23 | 44 |
| Surface Parking (spaces) | 20 | 23 | 43 |
| **Lot (APN: 041-121-23)** | | | |
| Height (stories) | 20'1" (2) | No Change | 20'1" (2) |
| Floor Area (sf) | 2,697 | No Change | 2,697 |

Notes: sf = square feet; ft = feet

## Landscaping

The removal of 49 existing trees and new landscaping would occur as a result of the project. The project would remove the following existing mature trees:

- 2 Chinese Flame trees due to their location near the porch expansion

- 3 Crape Myrtle trees due to their location near the proposed expansion
- 29 Orange trees would be removed due to their decline in health and their location in relation to the proposed expansion and parking lot, the location of the new pathway to the single-family residence, and the location near the storm drain realignment
- 1 Carrotwood tree would be removed due to its location in relation to the proposed addition
- 7 Brisbane Box trees would be removed due to their location of the storm drain realignment, a proposed planter near the Ronald McDonald House, and the entry gate connecting the Ronald McDonald House and the single-family residence
- 3 Purple Leafed Hopbush trees, two of which due to their location near the storm drain realignment and one due to its declining health
- 1 Loquat tree, due to its location near the access ramp and playground
- 1 Redwood tree due to its location near the storm drain realignment
- 1 Date Palm tree due to its location near the storm drain realignment
- 1 Ash tree due to its location near the storm drain realignment

The remainder of the on-site trees detailed above under Existing Site Conditions would remain, and the project would include additional landscaping and the planting of new trees on-site. Figure 4a and Figure 4b shows the proposed landscaping plan, which includes a terraced planter along the front of the Ronald McDonald house and proposed addition, two new Crape Myrtle street trees, Tristania shade trees throughout the parking lot, drought tolerant hedges and landscaping along the southern property line, and a raised planter with drought tolerant planting and Italian Cyprus trees for screening along the eastern property line near the adjacent single-family residences. The project would also include green screen planters along both second-floor balconies. The project includes planting of the following trees to replace the trees being removed:

- 19 Italian Cyprus trees
- 9 Crepe Myrtle trees
- 20 Brisbane Box trees
- 2 Magnolia trees
- 2 Fruitless Olive trees

### Utility Upgrades

The proposed project would also include the relocation of an existing storm drain and transformer on the project site. The storm drain realignment would follow the west and south perimeter of the project site and would ultimately connect to existing storm drains located along Batavia Street and at the intersection of W. Culver Avenue and S. Clark Street. The storm drain realignment would include trenching along the southern project boundary, adjacent to the single-family residence that contributes to the Old Towne Orange Local Historic District. Shoring and trenching would be as close as nine (9) feet from the single-family residence and five (5) feet from the detached garage.

## Parking and Access

Access to the portion of the project site associated with the existing Ronald McDonald House is currently provided from two ingress/egress driveways off S. Batavia Street, located on the northern and southern portion of the project site. As shown in Figure 5, the two existing driveways would be removed and access to the project’s parking and drop off area would be provided from two new driveways off of S. Batavia Street, at the southern portion of the project site. The new parking area would include a one-way ingress driveway and one-way egress driveway as well as 44 marked parking spaces. Deliveries serving both properties would use this parking area. The project includes an Administrative Adjustment as it would provide one less parking space than required.

Access to the portion of the project site currently associated with the existing single-family residence is provided from a driveway off Culver Avenue, fronting the building. The existing garage adjacent to the single-family residence will remain in use as parking space and office storage. No changes to vehicle access on this property are proposed. Deliveries of supplies and mail would be accommodated at the Ronald McDonald House at 383 S. Batavia Street through the proposed driveway off S. Batavia Street. No deliveries to the single-family residence are anticipated. Employees accessing the auxiliary office space associated with the single-family residence would utilize the main parking lot. A pedestrian pathway would connect the main parking lot to the single-family residence and new ADA access ramp, as shown in Figure 5 below.

**Figure 3 Project Site Photographs**

a. View of the existing Ronald McDonald House, looking east from the west side of S. Batavia Street

b. View of the existing Ronald McDonald House, looking east from the east side of S. Batavia Street


c. Looking north from the southern portion of the project site towards exisitng storage units and the Ronald McDonald House

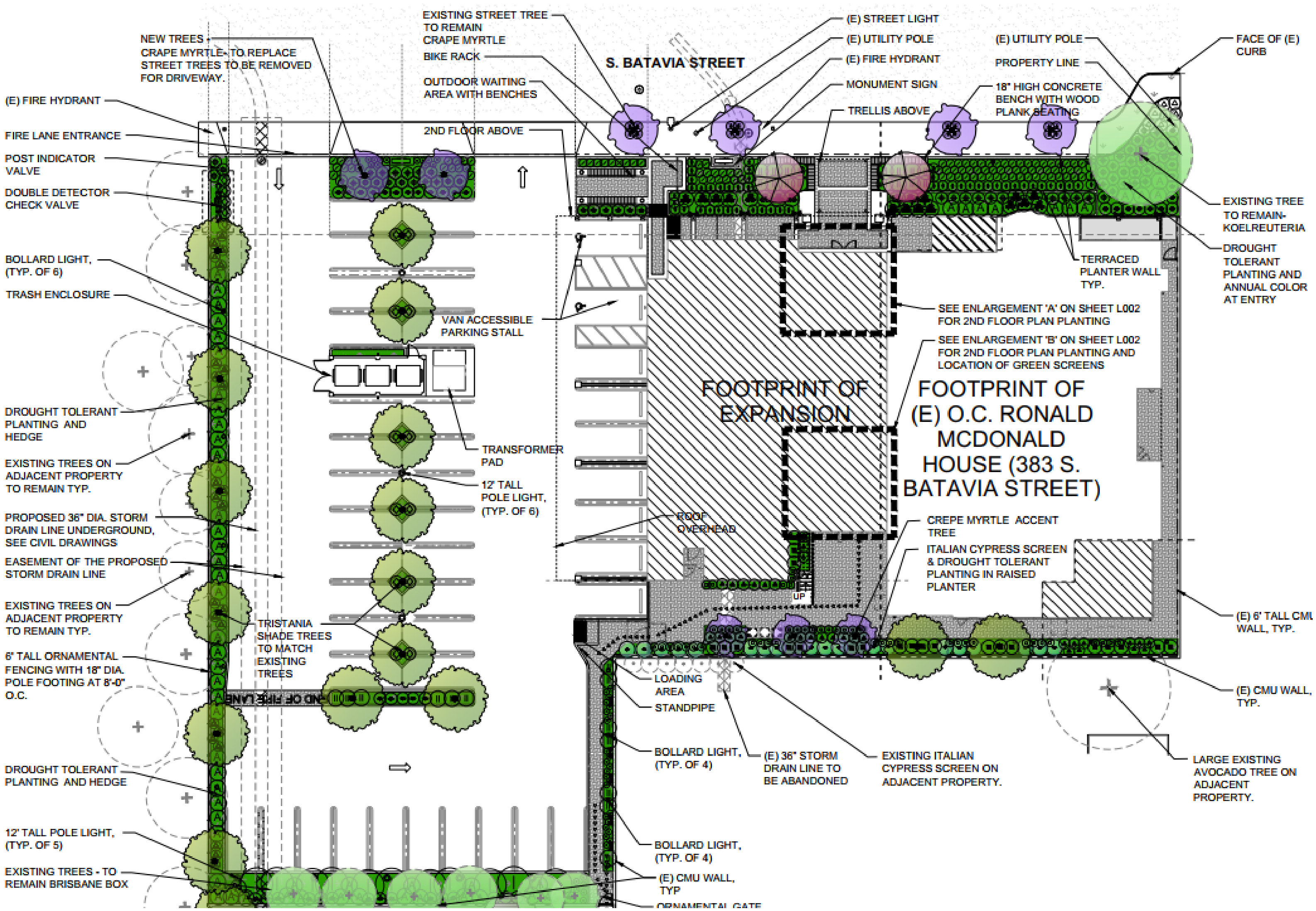

d. View of the existing gravel surface parking lot, looking east from the east side of S. Batavia Street

e. Looking southeast at the existing playground on the project site

f. Looking west at the existing gravel surface parking lot and trees on the project site

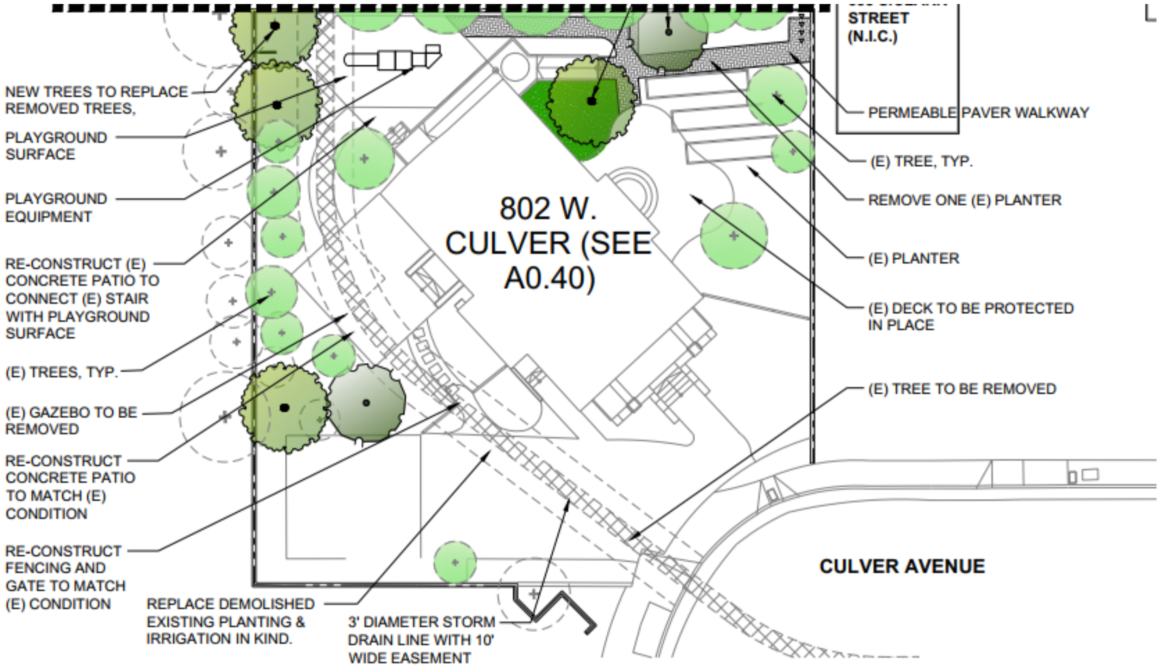
g. Looking west at the existing single-family residence located on the project site

## Figure 4a Landscaping Plan

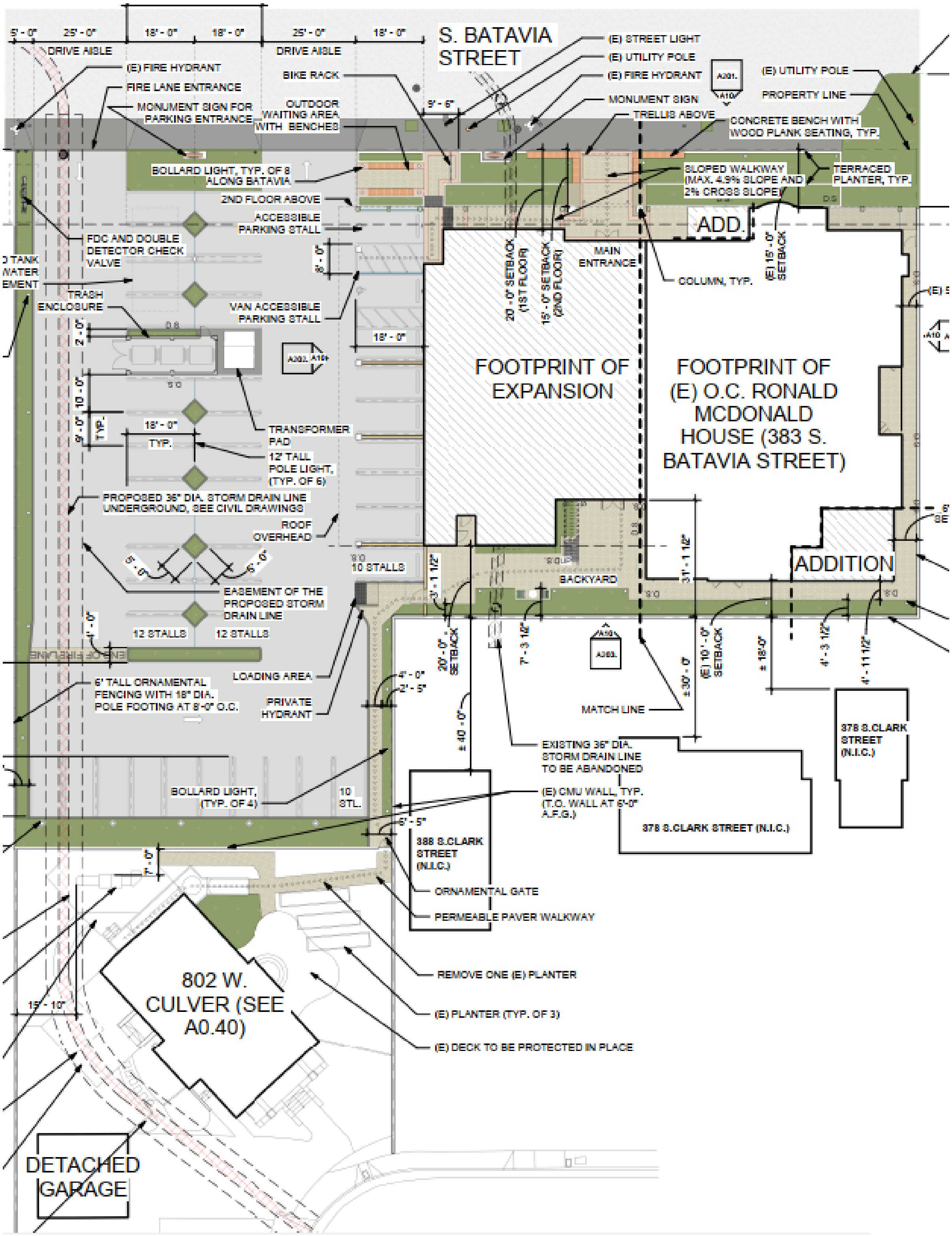



Source: Perkins Eastman Dougherty 2020

**Figure 4b Landscaping Plan Culver Avenue**

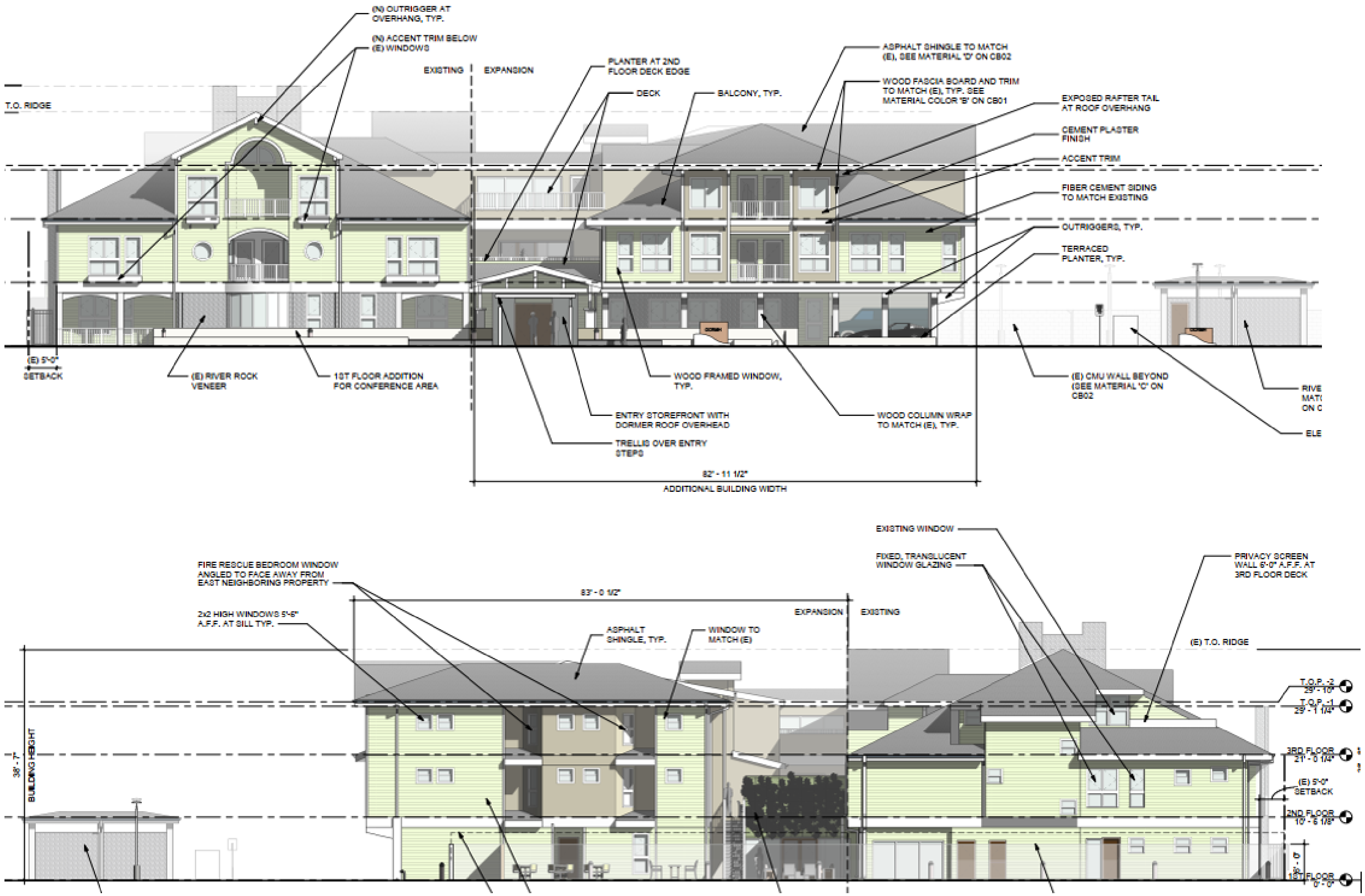


## Figure 5 Site Plan




Source: Perkins Eastman Dougherty 2020

**Figure 6 Building Elevations (West and East)**




Source: Perkins Eastman Dougherty 2020

**Figure 7 Building Perspective**

Source: Perkins Eastman Dougherty 2020

### Construction and Grading

Construction of the project would occur over a period of approximately 11 months from 2021 to 2022, during which the facility will not be in operation. Construction phasing would include site preparation, grading, building construction, asphalt paving, and architectural coating. Site preparation would include the relocation of the storm drain and transformer on the project site, which would occur over a two-month period. The storm drain relocation would require trenching to install a 36-inch storm drain along the southern property boundary and through the eastern parcel with the existing, historic single-family residence to connect into the storm drain in Culver Avenue. Trenching would be as close as nine (9) feet from the existing single-family residence. and five (5) feet from the detached garage. As the existing site is to grade and no excavation is required, no removal or replacement of soil is required. The project would require approximately 285 cubic yards (cy) of soil import from offsite in order to construct the addition. Building construction is estimated to take approximately eight months and paving and architectural coating is expected to take one month. It is anticipated that the facility will be closed during construction.

## 4. Required Approvals

The project would require the following City approvals and entitlements, along with standard building and grading permits:

- **General Plan Amendment** to amend the land use designation to PFI.
- **Zone Change** to amend the zoning designation to PI.
- **Adoption of an Initial Study- Mitigated Negative Declaration** to acknowledge the environmental analysis.
- **Major Site Plan Review** for the proposed site design and layout.

- **Variance** to allow reduction in required front yard setback and increase in fence height at rear property line
- **Design Review** for the building addition design.
- **Tree Removal Permit** for the removal of trees on- and off-site.
- **Lot line Adjustment** to adjust the lot lines to be consistent with the proposed project.
- **Administrative Adjustment** to allow reduction of one parking space.

## 5. Other Public Agencies Whose Approval is Required

The City of Orange is the lead agency with responsibility for approving the proposed project. Approval from other public agencies is not required.

## 6. Scheduled Public Meeting or Hearings

[Pending]

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# Environmental Factors Potentially Affected

This project would potentially affect the environmental factors checked below, involving at least one impact that is “Potentially Significant” or “Potentially Significant Unless Mitigation Incorporated” as indicated by the checklist on the following pages.

| | | |
|---|---|---|
| ☐ Aesthetics | ☐ Agriculture and Forestry Resources | ☐ Air Quality |
| ■ Biological Resources | ■ Cultural Resources | ☐ Energy |
| ■ Geology/Soils | ☐ Greenhouse Gas Emissions | ☐ Hazards & Hazardous Materials |
| ☐ Hydrology/Water Quality | ☐ Land Use/Planning | ☐ Mineral Resources |
| ☐ Noise | ☐ Population/Housing | ☐ Public Services |
| ☐ Recreation | ☐ Transportation | ■ Tribal Cultural Resources |
| ☐ Utilities/Service Systems | ☐ Wildfire | ■ Mandatory Findings of Significance |

# Determination

Based on this initial evaluation:

☐ 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 to the project have been made by 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 potential 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.

| | |
|---|---|
| Signature | Date |
| Printed Name | Title |

## EVALUATION OF ENVIRONMENTAL IMPACTS:

1. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
2. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
3. Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.
4. "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact". The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from earlier analyses may be cross-referenced, as discussed below).
5. Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063 (c)(3)(D). In this case, a brief discussion should identity the following:
    a. Earlier Analysis Used. Identify and state where they are available for review.
    b. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
    c. Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated", describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.
6. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
7. Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
8. This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9. The explanation of each issue should identify:
    a. the significance criteria or threshold, if any, used to evaluate each question; and
    b. the mitigation measure identified, if any, to reduce the impact to less than significance.

# Environmental Checklist

## 1 Aesthetics

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Except as provided in Public Resources Code Section 21099, would the project: | | | | |
| 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 that would adversely affect daytime or nighttime views in the area? | □ | □ | ■ | □ |

*a. Would the project have a substantial adverse effect on a scenic vista?*

A significant impact would occur if a project were to introduce incompatible scenic elements within a field of view containing a scenic vista or substantially block views of a scenic vista. Viewsheds refer to the visual qualities of the geographical area that is defined by the horizon, topography, and other natural features that give an area its visual boundary and context, or by artificial developments that have become prominent visual components of an area.

As seen in Figure NR-4 in the City's General Plan, scenic vistas and viewscape corridors have been identified in the eastern portion of the City, where topography and open space allow far reaching views of undeveloped hillsides, ridgelines, and open space areas (City of Orange 2010d). The project site is located in the southern portion of the City in an already developed and urbanized area. Views in the vicinity of the project Site are largely constrained by structures on adjacent parcels. There are no tall or topographic features on the project Site from which scenic vistas may be obtained or that make up part of the scenic landscape of the surrounding community. At the street level, views are east and west along West La Veta Avenue and West Palmyra Avenue and north and south along S. Batavia Street and S. Clark Street. The project is consistent with the height/massing of the existing

Ronald McDonald House and would not block any identified scenic vistas. No physical changes to the existing single-family house on the southeastern portion of the project site are proposed. The Santiago Creek is located 2,900 feet southwest of the project site and cannot be viewed from the project area. Consequently, there would be no impact.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination After Mitigation:** No Impact

*b. Would the project substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?*

A significant impact would occur if scenic resources would be damaged or removed by a project within a designated scenic highway. The project site is not located within or along a designated scenic highway, corridor, or parkway. The nearest designated scenic highway is State Route 91 (SR 91), which is approximately five miles northeast from the Project Site (Caltrans 2011). The project site is not visible from the designated portion of SR 91. Therefore, the project would not substantially damage scenic resources within a state scenic highway and there would be no impacts.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination After Mitigation:** No Impact

*c. Would the project, 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?*

The proposed project involves expanding the existing Ronald McDonald House on-site to include 23 rooms, which would increase the floor area across the project site by 17,325 sf. The project site is located in an urbanized area within the City of Orange. A Conditional Use Permit (CUP) was approved for the existing Ronald McDonald House structure, to allow for additional height beyond 32 feet. The existing CUP would apply to the proposed project as the expansion would also exceed 32 feet and be up to 38 feet in height. The 38-foot height for the expansion would be consistent with the existing structure's height, which would integrate the addition seamlessly. Also, the proposed addition is located on the southern side of the structure, away from the single-family neighborhood and towards the existing three-story commercial/office buildings. The increase in the overall structures mass along S. Batavia Street would be consistent with the scale of the area and the surrounding neighborhood. Properties south of the project site are comprised of non-contributing medical office and laboratory buildings in the Trico Sycamore Plaza and Batavia Woods Medical Center. These buildings are large in mass, range from one to three stories in height, and are separated by large parking lots.

The project includes a reduction in the required front setback to 15 feet and an increase in fence height over the required six feet for the fence near the residences to the east. The project would require a Variance for the front setback and fence height deviations. A reduced front setback would align the porch and proposed extension with the existing structure. Also, the reduced setback would be consistent with the setback of the residential structures to the north because S. Batavia Street is wider in front of the project site than the residential properties to the north. The increase in fence height along the eastern fence line would provide for improved privacy for the adjacent residences. The two additional feet over the existing 6-foot high block wall would be constructed out of a green-screen type material. Also, the project would place a row of Italian Cypress trees along the wall in this area. The rest of the walls and fences around the project site would be consistent with City standards. Therefore, the Variance required for the reduced setback and increase in fence height would not create aesthetic impacts.

The eastern elevation of the addition would be adjacent to existing single-family residences to the east. The second- and third-floor bedroom windows of the addition which are facing towards the existing residences, would be raised to 5 feet 6 inches above the finished floor and would be reduced in size to two feet by two feet to protect the privacy of existing residences. Larger windows are proposed on the eastern elevation but would be angled away from the adjacent residences to retain privacy. In addition, the second-floor deck would be screened with a metal screen covered with vines and plants and a row of cypress trees would be planted along the eastern property line to further protect the privacy of adjacent residences.

As mentioned, the project is located within the City's Old Towne Orange Local Historic District. The City adopted the *Historic Preservation Design Standards* which applies to properties located in the established Old Towne historic districts. As discussed and detailed in Section 5, *Cultural Resources*, the proposed project would be consistent with the style and materials of the existing Ronald McDonald House building and would therefore comply with the Historic Preservation Design Standards. The proposed building would have the same setback of 15 feet to match the setback of the existing building and surrounding neighborhood; would include roof forms such as hip and gable that are compatible with the surrounding houses and would introduce historical architectural treatments such as outriggers, decorative trusses and window trims; would introduce a more pronounced main entry way off Batavia Street and a front porch with similar colonnades and size as the existing front porch, which would maintain a façade and entrance oriented toward the street; would have windows and doors that would be compatible with the existing building's architectural style and exterior siding details; and would add a cement plaster finish similar in appearance to other buildings in the Historic District.

As discussed in the Project Description, implementation of the project would require the removal of 49 on-site trees, which include

- 2 Chinese Flame trees
- 3 Crape Myrtle
- 29 Orange trees
- 1 Carrotwood tree
- 7 Tristania trees
- 3 Purple Leafed Hopbush trees
- 1 Loquat tree
- 1 Redwood tree
- 1 Date Palm tree
- 1 Ash tree

Chapter 12.28 of the OMC establishes requirements for the planting, removal, and landscape maintenance of trees and shrubs within the parkway of a street. Additionally, Chapter 12.32 of the

OMC establishes a Tree Preservation Program for the City, which requires the preservation of trees on undeveloped and public interest property, and historic trees. The requirements Chapter 12.28.030 of the OMC state that removal of a street tree requires a permit from the Director of Public Works/City Engineer and any work performed must be in accordance with the specifications prepared by the Public Works Director/City Engineer. The proposed project would be required to obtain a tree removal permit and would replace the street trees, as shown in the landscaping plan in Figure 4a and Figure 4b. As discussed in Section 5, *Cultural Resources*, the orange grove with 26 trees is not considered a historical resource. Therefore, the removal of the orange trees and other ornamental trees on-site would not conflict with the Tree Preservation Program because the project site does not contain historical trees, is not undeveloped, or is a public interest property. In addition, as shown in Figure 4a and Figure 4b, the proposed landscaping plan includes new terraced planters, green screen planters, and 52 new on-site trees including parking lot trees, screening trees, and street trees. Pursuant to the City's *Landscape Standards and Specifications*, the project would be required to provide 50 on-site trees. With the existing on-site trees to remain and the addition of proposed trees, a total of 59 trees would be present on the project site following construction. Therefore, the project would be consistent with landscaping requirements. In addition, the landscaping plan would be reviewed by the DRC prior to approval for compliance with landscaping standards.

The project would also be reviewed by the Planning Division in the City's Community Development Department for compliance with site development and zoning standards set to promote scenic quality in the area. Therefore, the project would not conflict with any applicable regulations established to protect scenic quality and impacts would be less than significant.

**Significance Determination:** Less Than Significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination After Mitigation:** Less Than Significant

*d. Would the project create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?*

Spill light occurs when lighting standards such as streetlights, parking lot lighting, exterior building lighting, and landscape lighting are not properly aimed or shielded to direct light to the desired location and light escapes and partially illuminates a surrounding location. Glare is the result of improperly aimed or blocked lighting sources that are visible against a dark background such as the night sky. Glare generally does not result in illumination of off-site locations, but results in a visible source of light viewable from a distance.

Existing sources of light and glare on the project site include a mix of wall-mounted lights, pole-mounted lights, and decorative lighting elements (like landscaping lighting), associated with the existing Ronald McDonald House and single-family residence. The surrounding residential, institutional, and medical uses in the project area also emit daytime and nighttime light and glare from outdoor lighting, windows, and vehicles. The expansion of the Ronald McDonald House would utilize similar building materials such as fiber cement siding as the existing structure, which is not a reflective material. The change in operational use from residential to office at the single-family home would incrementally increase on-site light and glare. However, pursuant to Section 17.12.030 of the City of Orange Municipal Code (OMC), the project would be required to reduce spill light and glare on adjacent residential properties. Building exterior lights would be surface-mounted and directed away or screened from adjacent residential buildings to not shine directly on surrounding premises. Furthermore, the proposed addition is in the southern area of the project site, adjacent to existing medical offices. The medical offices are buffered from the proposed addition by a parking lot and would not be impacted by nighttime lighting from the project. According to the photometric plan prepared for the project, all project light fixtures would be downlit and directed away from adjacent properties. The light spillage to adjacent residential properties would not exceed 0.5 footcandles, pursuant to OMC Section 17.12.030. Therefore, lighting impacts would be less than significant, and no mitigation is required.

**Significance Determination:** Less Than Significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination After Mitigation:** Less Than Significant

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# 2 Agriculture and Forestry Resources

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| (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 Department 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: | | | | |
| a. Convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance (Farmland), as shown on 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 Section 12220(g)); timberland (as defined by Public Resources Code Section 4526); or timberland zoned Timberland Production (as defined by Government Code Section 51104(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 conversion of forest land to non-forest use? | □ | □ | □ | ■ |

*a. Would the project convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance (Farmland), as shown on maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?*

*b. Would the project conflict with existing zoning for agricultural use or a Williamson Act contract?*

*c. Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)); timberland (as defined by Public Resources Code Section 4526); or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?*

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

*e. Would the project 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 conversion of forest land to non-forest use?*

The project site is located in an urbanized area and is surrounded by commercial and residential uses. The existing General Plan land use designation on the project site is Low Density Residential 2-6 DU/AC and the zoning designation is R-1-6 (Single Family Residential 6,000 sf). According to the California Department of Conservation, the project site and surrounding area are not designated as areas of "prime farmland" (DOC 2012, 2016). Therefore, the project would not involve any development that would result in the conversion of designated farmland to non-agricultural use.

Neither the project site nor the surrounding parcels are zoned for forest land or timberland, and there is no timberland production at the project site. Therefore, the proposed project would have no impact on such resources. In addition, the proposed project would have no impact with respect to agricultural zoning or other conversion of designated farmland to non-agricultural use.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** No Impact

# 3 Air Quality

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| (Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.) Would the project: | | | | |
| 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) adversely affecting a substantial number of people? | ☐ | ☐ | ☐ | ■ |

The project site is in the South Coast Air Basin (the Basin), which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). As the local air quality management agency, the SCAQMD is required to monitor air pollutant levels to ensure that state and federal air quality standards are met and, if they are not met, to develop strategies to meet the standards. Depending on whether or not the standards are met or exceeded, the Basin is classified as being in "attainment" or "nonattainment." The health effects associated with criteria pollutants upon which attainment of state and federal air quality standards is measured are described in Table 2.

## Existing Air Quality

The Basin is a non-attainment area for the federal standards for ozone, $PM_{2.5}$, and lead (Los Angeles County only), and the State standards for ozone, $PM_{10}$, and $PM_{2.5}$. This non-attainment status is a result of several factors, the primary ones being the naturally adverse meteorological conditions that limit the dispersion and diffusion of pollutants, the limited capacity of the local airshed to eliminate air pollutants, and the number, type, and density of emission sources within the Basin.

Because the Basin currently exceeds several State and federal ambient air quality standards, the SCAQMD is required to implement strategies to reduce pollutant levels to recognized acceptable standards. To accomplish this requirement, the SCAQMD has adopted an Air Quality Management Plan (AQMP) that provides a strategy for the attainment of state and federal air quality standards.

**Table 2 Health Effects Associated with Criteria Pollutants**

| Pollutant | Adverse Effects |
|---|---|
| Ozone | (1) Short-term exposures: pulmonary function decrements and localized lung edema in humans and animals, risk to public health implied by alterations in pulmonary morphology and host defense in animals; (2) long-term exposures: risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (3) vegetation damage; and (4) property damage. |
| Carbon monoxide (CO) | Reduces oxygen delivery leading to: (1) Aggravation of chest pain (angina pectoris) and other aspects of coronary heart disease; (2) decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (3) impairment of central nervous system functions; and (4) possible increased risk to fetuses. |
| Nitrogen dioxide ($NO_2$) | (1) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (2) risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; and (3) contribution to atmospheric discoloration. |
| Sulfur dioxide ($SO_2$) | (1) Bronchoconstriction accompanied by symptoms that may include wheezing, shortness of breath, and chest tightness during exercise or physical activity in persons with asthma. |
| Suspended particulate matter ($PM_{10}$) | (1) Excess deaths from short-term and long-term exposures; (2) excess seasonal declines in pulmonary function, especially in children; (3) asthma exacerbation and possibly induction; (4) adverse birth outcomes including low birth weight; (5) increased infant mortality; (6) increased respiratory symptoms in children such as cough and bronchitis; and (7) increased hospitalization for both cardiovascular and respiratory disease (including asthma).[a] |
| Suspended particulate matter ($PM_{2.5}$) | (1) Excess deaths from short- and long-term exposures; (2) excess seasonal declines in pulmonary function, especially in children; (3) asthma exacerbation and possibly induction; (4) adverse birth outcomes, including low birth weight; (5) increased infant mortality; (6) increased respiratory symptoms in children, such as cough and bronchitis; and (7) increased hospitalization for both cardiovascular and respiratory disease, including asthma.[1] |

[1] More detailed discussions on the health effects associated with exposure to suspended particulate matter can be found in the following documents: Office of Environmental Health Hazard Assessment, Particulate Matter Health Effects and Standard Recommendations, www.oehha.ca.gov/air/toxic_contaminants/PM10notice.html#may, May 9, 2002; and EPA, Air Quality Criteria for Particulate Matter, October 2004.

Source: U.S. EPA 2016

The SCAQMD operates a network of air quality monitoring stations throughout the Basin. The purpose of the monitoring stations is to measure ambient concentrations of pollutants and determine whether ambient air quality meets the California and federal standards. The monitoring station located closest to the project site is the Anaheim-Pampas Lane, located approximately 5.6 miles southwest of the site. Table 3 indicates the number of days that each standard was exceeded at the Anaheim-Pampas Lane station in 2015, 2016, and 2017.

**Table 3 Ambient Air Quality at the Monitoring Station**

| Pollutant | 2015 | 2016 | 2017 |
|---|---|---|---|
| 8 Hour Ozone (ppm), 8-Hr Average | 0.080 | 0.074 | 0.076 |
| Number of days of Federal exceedances (>0.070 ppm) | 1 | 4 | 4 |
| Ozone (ppm), Worst Hour | 0.100 | 0.103 | 0.090 |
| Number of days of State exceedances (>0.09 ppm) | 1 | 2 | 0 |
| Number of days of Federal exceedances (>0.112 ppm) | 0 | 0 | 0 |
| Nitrogen Dioxide (ppm) - Worst Hour (Federal Measurements) | 0.059 | 0.064 | 0.081 |
| Number of days of State exceedances (>.18 ppm) | 0 | 0 | 0 |
| Number of days of Federal exceedances (0.10 ppm) | 0 | 0 | 0 |
| Particulate Matter 10 microns, $\mu g/m^3$, Worst 24 Hours | 59.0 | 74.0 | 95.7 |
| Number of days above Federal standard (>150 $\mu g/m^3$) | 0 | 0 | 0 |
| Particulate Matter <2.5 microns, $\mu g/m^3$, Worst 24 Hours | 45.8 | 44.4 | 53.9 |
| Number of days above Federal standard (>35 $\mu g/m^3$) | 3 | 1 | 7 |

Source: CARB, 2015, 2016, and 2017 Annual Air Quality Data Summaries available at http://www.arb.ca.gov/adam/topfour/topfour1.php

## Sensitive Receptors

Certain population groups are more sensitive to air pollution than others. Sensitive receptors include children, the elderly, and acutely ill and chronically ill persons, especially those with cardio-respiratory diseases. Sensitive land uses would include those locations where such individuals are concentrated, such as hospitals, schools, residences, and parks with active recreational uses. The closest existing sensitive receptors include the residential uses immediately adjacent to and surrounding the project site, as well as the University of San Francisco Orange County and Sisters of St. Joseph campus across South Batavia Street west of the project site. Additionally, West Orange Elementary School is located 0.3 miles northwest of the project site and St. Joseph Hospital and Children's Hospital of Orange County (CHOC) are located 0.2 miles southeast of the project site.

## Methodology and Thresholds

Project construction would generate temporary emissions and project operation would generate long-term emissions. Construction and operational emissions were estimated using the California Emissions Estimator Model (CalEEMod) version 2016.3.2. Construction activities would generate diesel emissions and dust. Construction equipment that would generate criteria air pollutants includes excavators, graders, dump trucks, and tractors. Some of this equipment would be used during grading activities as well as when structures are constructed. It is assumed that all construction equipment used would be diesel-powered. Construction emissions were calculated by estimating the types and number of pieces of equipment that would be used on-site during each of the construction phases based on CalEEMod defaults for construction equipment and applicant - provided information for construction phase length. Construction emissions were analyzed based on the regional thresholds established by the SCAQMD.

The project would comply with SCAQMD Rule 403, which identifies measures to reduce fugitive dust and is required by enforcement authority SCAQMD, to be implemented at all construction sites located within the Basin. Therefore, the following conditions would be required to reduce fugitive dust in compliance with SCAQMD Rule 403.

- **Minimization of Disturbance**. Construction contractors shall minimize the area disturbed by clearing, grading, earth moving, or excavation operations to the maximum extent feasible to prevent excessive amounts of dust.
- **Soil Treatment.** Construction contractors shall treat all graded and excavated material, exposed soil areas, and active portions of the construction site, including unpaved on-site roadways to minimize fugitive dust. Treatment shall include, but not necessarily be limited to, periodic watering, application of environmentally safe soil stabilization materials, and/or roll compaction as appropriate. Watering shall be done as often as necessary, and at least twice daily, preferably in the late morning and after work is done for the day.
- **Soil Stabilization.** Construction contractors shall monitor all graded and/or excavated inactive areas of the construction site at least weekly for dust stabilization. Soil stabilization methods, such as water and roll compaction, and environmentally safe dust control materials, shall be applied to portions of the construction site that are inactive for over four days. If no further grading or excavation operations are planned for the area, the area shall be seeded and watered until landscape growth is evident, or periodically treated with environmentally safe dust suppressants, to prevent excessive fugitive dust.
- **No Grading During High Winds.** Construction contractors shall stop all clearing, grading, earth moving, and excavation operations during periods of high winds (20 miles per hour or greater, as measured continuously over a one-hour period).
- **Street Sweeping.** Construction contractors shall sweep all on-site driveways and adjacent streets and roads at least once per day, preferably at the end of the day, if visible soil material is carried over to adjacent streets and roads.

The project would also need to comply with SCAQMD Rule 1113 regarding the use of low-volatile organic compound (VOC) architectural coatings, and Rule 402, which states that a person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.[1]

For modeling, it was assumed that exposed areas would be watered twice daily during earthmoving activities to reduce fugitive dust emissions as directed under SCAQMD Rule 403 and would use architectural coatings with a maximum VOC content of 50 g/L, in compliance with SCAQMD Rule 1113.

Operational emissions were also estimated using CalEEMod. Operational emissions include mobile source emissions, energy emissions, and area source emissions. Mobile source emissions are generated by the increase in motor vehicle trips to and from the project site associated with operation of on-site development. Emissions attributed to energy use include electricity and natural gas consumption for space and water heating. Area source emissions are generated by landscape maintenance equipment, consumer products and architectural coating. To determine whether a

[1] SCAQMD rules are enforced by SCAQMD and citizens can report non-compliance. Jurisdictions can also reinstate compliance in their conditions of approval.

significant regional air quality impact would occur, the increase in emissions was compared to the SCAQMD's recommended regional thresholds for operational emissions.

The SCAQMD provides numerical thresholds to analyze the significance of a project's construction and operational emissions to regional air quality. These thresholds are designed such that a project consistent with the thresholds would not have an individual or cumulatively significant impact to the Basin's air quality. These thresholds are listed in Table 4.

**Table 4 SCAQMD Air Quality Significance Thresholds**

| Pollutant | Mass Daily Thresholds | |
|---|---|---|
| | Operation Thresholds (lbs/day) | Construction Thresholds (lbs/day) |
| NOX | 55 | 100 |
| ROG[1] | 55 | 75 |
| $PM_{10}$ | 150 | 150 |
| $PM_{2.5}$ | 55 | 55 |
| SOX | 150 | 150 |
| CO | 550 | 550 |
| Lead | 3 | 3 |

[1] Reactive Organic Gases (ROG) are formed during combustion and evaporation of organic solvents. ROG are also referred to as Volatile Organic Compounds (VOC).

Source: SCAQMD 2015

The SCAQMD has also developed Localized Significance Thresholds (LST). LSTs were devised in response to concerns regarding the exposure of individuals to criteria pollutants in local communities. LSTs represent the maximum emissions from a project that will not cause or contribute to an air quality exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest sensitive receptor, taking into consideration ambient concentrations in each source receptor area (SRA), project size, and distance to the sensitive receptor. However, LSTs only apply to emissions within a fixed stationary location, including idling emissions during both project construction and operation. LSTs have been developed for $NO_X$, CO, $PM_{10}$ and $PM_{2.5}$. LSTs are not applicable to mobile sources such as cars on a roadway (SCAQMD 2008a). As such, LSTs for operational emissions do not apply to on-site development since the majority of emissions would be generated by cars on roadways. The project includes the addition to the existing Ronald McDonald House to provide more room and services, general on-site improvements, and the conversion of a single-family residence to an office use.

The project site is located in Source Receptor Area 17 (SRA-17) and is approximately 1.06 acres in size (SCAQMD 2008b). LSTs are provided for sites that are one, two, and five acres in size, and for receptors at a distance of 82, 164, 328, 656, and 1,640 feet from the project site boundary. LSTs for a one-acre site area were used to determine potential impacts from the proposed project. For receptors located within 82 feet of a project site, SCAQMD's LST Methodology document recommends using the closest modeled distance of 82 feet. LSTs are shown in Table 5 for construction on a one-acre site located in SRA-17 at a receptor distance of 82 feet.

### Table 5 SCAQMD LSTs for Construction Emissions

| Pollutant | Allowable Emissions from a 1-acre Site in SRA-17 for a Receptor 82 Feet Away |
|---|---|
| Gradual conversion of $NO_X$ to $NO_2$ | 81 |
| CO | 485 |
| $PM_{10}$ | 4 |
| $PM_{2.5}$ | 3 |

Source: SCAQMD 2008b

*a. Would the project conflict with or obstruct implementation of the applicable air quality plan?*

A project may be inconsistent with the SCAQMD's Air Quality Management Plan (AQMP) if it would generate population, housing, or employment growth exceeding the forecasts used in the development of the AQMP. The 2016 AQMP relies on local general plans and the SCAG Regional Transportation Plan's (RTP) forecasts of regional population, housing, and employment growth in its own projections for managing air quality in the Basin.

As discussed in Section 13, *Population and Housing,* the addition of 23 rooms would provide temporary accommodations utilized by the families of patients obtaining treatment at nearby medical facilities and would not generate a population increase because the project would not include any long-term residents. The patrons of the facility would stay temporarily similar to a hotel and the facility would house people already staying in the area to visit patients. The project would increase the number of employees by 4 full-time and 5 part-time staff members. This would represent an insignificant population growth and, due to the urban nature of the area, it is anticipated the employees would come from the existing workforce. Therefore, the potential population increase generated by the proposed project would not exceed population forecasts in SCAG's RTP and the project would not conflict with the SCAQMD's AQMP. Impacts would be less than significant.

**Significance Determination:** Less than Significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** Less than Significant

*b. Would the project 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?*

## Construction Emissions

Project construction would generate temporary criteria pollutant emissions. These emissions are associated with fugitive dust and exhaust emissions from heavy construction vehicles, as well as ROGs released during the application of architectural coatings.

Table 6 summarizes the estimated maximum daily emissions of pollutants during construction on the project site. Construction emissions would not exceed SCAQMD regional thresholds. Therefore, impacts to regional and local air quality due to construction emissions would be less than significant.

**Table 6 Construction Emissions (pounds/day)**

| Construction Phase | Estimated Maximum Daily Emissions (lbs/day) | | | | | |
|---|---|---|---|---|---|---|
| | ROG | $NO_x$ | CO | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| 2020 Maximum (lbs/day) | 1.7 | 16.2 | 11.3 | <0.1 | 3.0 | 2.0 |
| 2021 Maximum (lbs/day) | 12.1 | 8.6 | 9.5 | <0.1 | 0.7 | 0.5 |
| SCAQMD Thresholds | 75 | 100 | 550 | 150 | 150 | 55 |
| Threshold Exceeded? | No | No | No | No | No | No |
| Maximum On-site Emissions (lbs/day) | N/A | 15.4 | 10.8 | <0.1 | 2.9 | 1.9 |
| Local Significance Thresholds (LSTs) (on-site only) | N/A | 81 | 485 | N/A | 4 | 3 |
| Threshold Exceeded? | N/A | No | No | N/A | No | No |

See Appendix A for modeling details and CalEEMod results.

Notes: Emissions presented are the highest of the winter and summer modeled emissions. Numbers may not add up due to rounding. Emission data is pulled from "mitigated" results, which include measures that will be implemented during project construction, such as watering of soils during construction as required under SCAQMD Rule 403.

## Operational Emissions

Operational emissions associated with project operation would include emissions associated with vehicle trips (mobile sources); natural gas use (energy sources); and landscape maintenance equipment, consumer products, and architectural coatings associated with on-site operational activities (area sources). As shown in Table 7, operational emissions would not exceed SCAQMD thresholds for any criteria pollutant. Therefore, operational emissions would have a less than significant impact on regional air quality.

### Table 7 Operational Emissions (pounds/day)

| Pollutant | Total Emissions | Significance Threshold | Significant Impact? |
|---|---|---|---|
| ROG | 1.6 | 55 | No |
| $NO_x$ | 1.3 | 55 | No |
| CO | 10.3 | 550 | No |
| $SO_x$ | <0.1 | 150 | No |
| $PM_{10}$ | 1.8 | 150 | No |
| $PM_{2.5}$ | 1.2 | 55 | No |

See Appendix A for CalEEMod worksheets.

As shown in Table 6 and Table 7, project construction and operation emissions would not exceed SCAQMD significance thresholds for criteria pollutants. Therefore, the project would not violate or contribute to a violation of an air quality standard and would not result in a cumulatively considerable net increase of any criteria air pollutant. Impacts would be less than significant.

**Significance Determination:** Less than Significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** Less than Significant

*c. Would the project expose sensitive receptors to substantial pollutant concentrations?*

Certain population groups, such as children, the elderly, and people with health problems, are particularly sensitive to air pollution. Sensitive receptors are defined as land uses that are more likely to be used by these population groups and include health care facilities, retirement homes, school and playground facilities, and residential areas. The nearest sensitive receptors in the project vicinity include the residential uses immediately adjacent to and surrounding the project site, as well as the University of San Francisco Orange County, and institutional uses across South Batavia Street west of the project site.

As discussed above, the project would not generate emissions exceeding SCAQMD regional thresholds or LSTs. In addition, operation of the project would not involve emissions of pollutants such as Toxic Air Contaminants (TACs). Consequently, the project would not adversely affect any sensitive receptors.

Additionally, the California Air Resources Board's (CARB) *Air Quality and Land Use Handbook: A Community Health Perspective* (2005) recommends against siting sensitive receptors within 500 feet of a freeway, urban roads with 100,000 vehicles per day, or rural roads with 50,000 vehicles per day (CARB 2005). The primary concern with respect to heavy-traffic roadway adjacency is the long-term effect of TACs, such as diesel exhaust particulates, on sensitive receptors. The primary source of diesel exhaust particulates is heavy-duty trucks on freeways and high-volume arterial roadways. The nearest freeway is State Route 22, located approximately 0.3 miles west of the project site, which is outside of the 500-foot recommended distance. Other roadways within a 500-foot radius of the project site consist of residential streets that do not carry more than 50,000 vehicles per day. Therefore, the proposed project would not introduce sensitive receptors within 500 feet of a freeway or of an urban road with 100,000 vehicles per day and would not expose sensitive receptors to substantial pollutant concentrations. Impacts would be less than significant.

**Significance Determination:** Less than Significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** Less than Significant

*d. Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?*

The 1993 SCAQMD CEQA Air Quality Handbook identifies land uses associated with odor complaints. Residential uses are not identified as land uses associated with odor complaints in the 1993 SCAQMD CEQA Air Quality Handbook. Therefore, the proposed project would not generate objectionable odors affecting a substantial number of people and no impact would occur.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** No Impact

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# 4 Biological Resources

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| 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, or 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 the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? | ☐ | ☐ | ☐ | ■ |

a. *Would the project 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?*

A significant impact would occur if a project were to remove or modify habitat for any species identified or designated 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 the US Fish and Wildlife Service (USFWS). The project site is located in an urbanized area consisting of single- and multi-family homes and medical uses. Specifically, it is located on parcels developed with a medical care housing facility, parking area, and single-family home where areas have been previously graded and disturbed. The site does not contain suitable habitat for sensitive plant species or foraging habitat for other sensitive species. However, the project site contains ornamental vegetation which provides potentially suitable nesting habitat for migratory birds and raptors which are protected under the federal Migratory Bird Treaty Act (MBTA) and Sections 3503 and 3503.5 of the California Fish and Game Code, which prohibits the take or destruction of migratory birds and raptors and their nests.

The project would remove 49 on-site trees, which include

- 2 Chinese Flame trees
- 3 Crape Myrtle
- 29 Orange trees
- 1 Carrotwood tree
- 7 Tristania trees
- 3 Purple Leafed Hopbush trees
- 1 Loquat tree
- 1 Redwood tree
- 1 Date Palm tree
- 1 Ash tree

Removal of these trees during breeding/nesting season (February 1 to September 1) could potentially affect nesting birds. Therefore, there is the potential for impacts to nesting birds protected by the MBTA and provisions of the Fish and Game Code if work is conducted during avian breeding season. Implementation of Mitigation Measure BIO-1 would require nesting bird avoidance measures if work is conducted during avian breeding season, and would reduce impacts to less than significant.

## Mitigation Measure

### *BIO-1 Nesting Bird Avoidance*

Prior to the commencement of any proposed actions (e.g. site clearing, demolition, grading) during the breeding/nesting season (February 1 to September 1), the project applicant shall retain a qualified biologist to conduct pre-construction surveys for nesting birds in and near the project area to ensure that no nests will be disturbed during project implementation. This survey shall be completed no more than three (3) days prior to the initiation of demolition activities during nesting season.

If active nests are discovered on the project site, the qualified biologist will establish an appropriate buffer zone around the nest using temporary plastic fencing or other suitable materials, such as barricade tape and traffic cones. The biologist, in consultation with the California Department of Fish and Wildlife (CDFW), will determine the extent of a demolition-free buffer zone to be established around the nest, typically 250 feet, to ensure that raptor or migratory bird nests will not be disturbed during project demolition. Once the nest is no longer active and upon final determination by the biologist, the proposed action may proceed within the buffer zone.

Prior to the commencement of construction activities and the issuance of any permits, the City of Orange Community Development Department shall verify that all project construction plans include specific notes regarding the requirements of the MBTA, that preconstruction surveys have been completed and the results reviewed by staff, and that the appropriate buffers (if needed) are noted on the plans.

**Significance Determination:** Less than Significant with Mitigation Incorporated

**Mitigation Measures:** BIO-1

**Significance Determination after Mitigation Measures:** Less than Significant

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

c. *Would the project 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. *Would the project 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?*

The project site and surrounding properties are located in areas which have been developed, paved, or previously graded. According to the U.S. Fish and Wildlife, the nearest federally designated sensitive habitat is located seven miles east near Limestone Canyon Regional Park (USFWS 2019a). There is no riparian or other sensitive natural community on-site. According to the National Wetlands Inventory, there are no nearby federally protected wetlands (USFWS 2019b). Therefore, the project would not impact any sensitive natural communities, riparian habitat, or any State or federally protected wetlands.

A wildlife corridor is an area of open space connecting two or more larger areas of open space. It is generally free of physical barriers such as fences and development and allows for wildlife dispersal between different habitat areas. As mentioned, the surrounding area is predominantly developed. As seen in figure NR-3 in the City's General Plan, there are no Habitat Reserves, Non-Reserve Open Space, or Special Linkage designations in or around the project site (City of Orange 2010d). According to the California Essential Habitat Connectivity Project, the project site and surrounding area are not in an essential connectivity area, a natural landscape block, or within an interstate connection (CDFW 2014). Therefore, the project would not impact an established wildlife corridor or interfere with the movement of native wildlife. No impacts would occur.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination After Mitigation:** No Impact

*e. Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?*

Chapter 12.28 of the OMC establishes requirements for the planting, removal, and landscape maintenance of trees and shrubs within the parkway of a street. The requirements Chapter 12.28 of the OMC state that removal or arrangement for the removal of a street tree requires a permit from the Director of Public Works/City Engineer and any work performed must be in accordance with the specifications prepared by the Public Works Director/City Engineer. The proposed project would obtain and comply with the permit requirements for the removal of street trees, and would replace the street trees, as shown in Figure 3.

Chapter 12.32 requires a tree removal permit that would be reviewed and approved by the Community Services Department. According to the Arborist Report for the project, which analyzed the development footprint and impacts of construction (including storm drain trenching) on existing on-site trees, construction of the proposed project would require the removal of the following mature trees on-site:

- 2 Chinese Flame trees
- 3 Crape Myrtle
- 30 Orange trees
- 1 Carrotwood tree
- 6 Tristania trees
- 3 Purple Leafed Hopbush trees
- 1 Loquat tree
- 1 Redwood tree

All trees on-site are in good health except for the orange grove, where 50 percent of the orange trees show signs of soil borne illness and one Purple Leafed Hopbush tree. The proposed project would obtain and comply with the permit requirements for the removal of on-site trees, consistent with Chapter 12.32.

Additionally, Chapter 12.32 of the OMC establishes a Tree Preservation Program for the City, which requires the preservation of trees on undeveloped and public interest property, and historic trees. The OMC defines a tree as any live plant which has a single trunk measuring 10.5 inches in circumference, measured at a point 24 inches above the ground level (OMC 12.32.020). The primary concern of the Tree Preservation Program is the regulation of large-scale tree removal from undeveloped property and public interest property. Public interest property refers to any property, privately owned or otherwise, whether developed or undeveloped, which has, because of the presence of certain trees of historical value in such property, become property endowed with a public interest. It is unlawful to destroy or remove any tree as defined in Section 12.32.020 from undeveloped or public interest property as defined in Sections 12.32.040 and 12.32.050 without a permit (OMC Chapter 12.32.030). The OMC defines “historical trees” as those which by their origin, size, uniqueness and/or national or regional rarity are now or are likely to be of historical value. Trees so classified may be but are not limited to those on a master list compiled and maintained by the Community Services Department and approved by resolution of the City Council (OMC Chapter 12.32.060).

As discussed in Section 5, *Cultural Resources,* the orange grove with 26 trees does not have historical value. In addition, the Arborist Evaluation found that 50 percent of the orange trees on-site have soil borne illness which has caused the bark to strip away and a decline in their health (Appendix G). No other trees have historical significance. Therefore, removal of trees from the project site would not conflict with Chapter 12.32 of the OMC. In addition, upon project completion, the project would have more trees than currently exist on site. Compliance with Chapter 12.28 and 12.32 of the OMC would ensure that the proposed Project would not conflict with the provisions of the adopted Tree Preservation Ordinance. However, construction activities could impact on-site trees that are not proposed to be removed through harm to the critical root zone or other means. Consequently, there is potential for construction activities to cause additional trees to be removed and could conflict with the Tree Preservation Ordinance. Implementation of Mitigation Measure BIO-2 would require a tree protection barrier be placed around on-site trees not identified for removal during construction activities. The Arborist Report concluded that the Tristania located just off-site along the southern fenceline would not require any protective barriers. Implementation of Mitigation Measure BIO-2 would reduce impacts to less than significant.

## Mitigation Measure

### *BIO-2 Tree Protection Zone*

All on-site trees that are not identified for removal shall have a tree protection barrier placed around them during the duration of construction activities. The barrier shall be at least four (4) feet tall and made of highly visible and permanent material and shall have warning signs posted on or near it for the duration of construction activities. The size of the barrier shall be a one (1) foot radius for every one (1) inch of trunk diameter (measures at 4.5 inches above the ground). The tree protection barrier for the Sequoias, Tristanias, Loquat, and Hopbush species shall be a minimum of 6 feet in diameter. Construction activity shall be prohibited within the protection barrier unless a certified arborist determines in advance certain, limited work that will not harm the long-term preservation of the tree can occur through an on-site condition assessment and a written letter. Documentation of construction activity within the tree protection barrier shall be provided to the City of Orange Planning Division.

**Significance Determination:** Less Than Significant with Mitigation Incorporated

**Mitigation Measures:** BIO-2

**Significance Determination After Mitigation:** Less Than Significant

*f. Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?*

The project site is not located within the boundaries of the Orange County Central and Coastal Sub-Region Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP), which is located generally to the east of the project site. The nearest Orange County Central and Coastal Sub-Region NCCP/HCP reserve area is located five miles to the east near El Modena Open Space. Therefore, the proposed project would have no impact with respect to the NCCP/HCP.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination After Mitigation:** No Impact

# 5 Cultural Resources

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| 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 as defined in §15064.5? | □ | ■ | □ | □ |
| c. Disturb any human remains, including those interred outside of formal cemeteries? | □ | □ | ■ | □ |

Rincon Consultants, Inc. (Rincon) prepared a Cultural Resources Technical Memorandum (memo) for the proposed project (See Appendix B). The purpose of the memo is to document the results of the tasks performed by Rincon, specifically a cultural resources record search, an archaeological field survey, and a historical resources field survey and analysis. This memo is incorporated into the IS-MND (see Appendix B) in compliance with CEQA.

The Orange County Ronald McDonald House property consists of a three-story building, outdoor playground area, a small parking lot, and a small storage shed area. Constructed in 1989, the building is designed in a Colonial Revival-style, and features fiber cement siding that simulates wood, a center gabled-on-hip roof, large single hung windows, which is a window with one moveable part, hung in pairs and bands, and arched porches supported by wood posts. The western façade is also accented with a pair of portal windows and a cobble stone siding wall, located between the two primary entrance doors. A similarly designed porte-cochere extends off the south elevation of the building and features a small storage shed area. The building is 29 years of age and, therefore, not of sufficient age to warrant historic designation.

The property located at 802 West Culver Avenue contains a two-story Craftsman Airplane Bungalow, constructed in 1919, that was moved onto the site in 2004 and is considered a contributor to the City's Old Towne Orange Local Historic District. Four major components comprise the Old Towne Orange Local Historic District: the Plaza Historic District; the Downtown Core; the Spoke Street Corridors; and the Residential Quadrants. There are 1,279 contributing buildings in the Old Towne Orange Local Historic District, and its period of significance spans from 1888 through 1940. Primary architecture styles found in the district include Folk Victorian, Craftsman, Spanish Colonial Revival and Tudor Revival residences, and masonry commercial buildings. Within the boundaries of the Old Towne Orange Local Historic District, a smaller Old Towne Orange Historic District is also listed in the National Register of Historic Places, as is the Plaza Historic District.

The area surrounding the project site includes single-family residences to the north and east and office and medical properties to the south. The two consecutive properties on Batavia Street adjacent to the north are contributors to the Old Towne Orange Local Historic District. There are no additional contributing properties adjacent to the residence at 802 West Culver Avenue. The historic district's boundary concludes at Batavia Street. However, to the west of and across the street from the project site is one potential historic resource, the St. Joseph's Hospital Nursing School (480 South Batavia Street).

The proposed project includes the expansion of the existing 12,580 square foot building to increase the number of guest rooms from 21 to 44. The expansion will extend the footprint of the building along its southern wall, adding an additional 17,600 square feet to the overall structure. The extant porte-cochere would be demolished and replaced along the southern elevation addition as part of the addition. A small addition of approximately 400 square feet would also be made to the rear elevation of the original building, in the north east corner.

The proposed project would require a General Plan Amendment and Zone Change of the project site from Low Density Residential 2-6 DU/AC to Public Facilities and Institutions (PFI), and R-1-6 (Single Family Residential 6,000 sq ft) to Public Institution (P-I), respectively. In addition, the proposed project would include the acquisition of the single-family residence located at 802 West Culver Avenue. The proposed project would include a change in operational use associated with the single-family residential building from residential to office use. No new development or physical modifications to the exterior street view of the single-family residence would occur as a result of the project. An ADA access ramp would be located in the rear of the structure to comply with building code standards but would not be visible from the street

The CEQA Guidelines specify that a "substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (CEQA Guidelines, Section 15064.5). Material impairment occurs when a project alters in an adverse manner or demolishes "those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion" or eligibility for inclusion in the NRHR, CRHR, or local register. In addition, pursuant to CEQA Guidelines Section 15126.2, the "direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects."

Pursuant to the CEQA Guidelines, Section 15378, study of a project under CEQA requires consideration of "the whole of an action, which has the potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment." CEQA Guidelines, Section 15064d further define direct and indirect impacts:

1) A direct physical change in the environment is a physical change in the environment which is caused by and immediately related to the project.
2) An indirect physical change in the environment is a physical change in the environment which is not immediately related to the project, but which is caused indirectly by the project. If a direct physical change in the environment in turn causes another change in the environment, then the other change is an indirect physical change in the environment.
3) An indirect physical change is to be considered only if that change is a reasonably foreseeable impact which may be caused by the project.

*a. Would the project cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?*

The existing Orange County Ronald McDonald House, located at 383 S. Batavia Street (APN 041-121-29) was constructed in 1989 and is 29 years of age; therefore, it is not of sufficient age to warrant historic designation. The project site is located within the boundary of the City's Old Towne Orange Local Historic District; however, the existing building located at 383 S. Batavia Street is not a contributor to the Old Towne Orange Local Historic District, nor is it individually considered a historical resource for the purposes of CEQA. The single-family residence at 802 W. Culver Avenue is considered a contributor to the district and therefore is a historical resource in accordance with CEQA. The proposed project was analyzed for potential impacts to the historic district. This analysis was informed by the City's historic district guidance, outlined in the *Historic Preservation Design Standards* (City of Orange 2018) as well as the National Park Service *Secretary of the Interior's Standards for the Treatment of Historic Properties* (Standards) (Weeks and Grimmer 2017). The City's *Historic Preservation Design Standards* delineate standards for contributing and non-contributing buildings in historic districts, which apply to the Ronald McDonald House expansion project to ensure compatibility with the historic district.

The proposed project would expand the Ronald McDonald House building by 17,325 sf. The new additions would be constructed in the same Colonial-Revival design and feature the same materials, making them compatible with the existing building. The addition at the northeast corner of the building would be two-stories in height, clad with horizontal siding, and topped by a hipped roof, making the rear elevation of the building symmetrical. This addition would not be visible from Batavia Street as it is being built to the rear of the existing building. Although the addition is located on the side of the building that is adjacent to a historic district contributor (375 South Batavia Street), it would not indirectly affect the adjacent property, as the addition would only extend the existing building mass slightly to the east (rear) and would be two stories in height, the same as the existing building, using the same style and materials.

The proposed project is in conformance with the City's Historic Preservation Design Standards for non-contributing buildings in historic districts. The addition would be consistent with the style and materials of the existing Ronald McDonald House building; it will continue the front porch across the façade of the existing building; it would have the same setback to match the setback of the existing building and surrounding neighborhood; it would include roof forms such as hip and gable that are compatible with the surrounding houses and would introduce historical architectural treatments such as outriggers, decorative trusses and window trims; it would introduce a more pronounced main entry way off Batavia Street and a front porch with similar colonnades and size as the existing front porch, which would maintain a façade and entrance oriented toward the street; would have windows and doors that would be compatible with the existing building's architectural style and exterior siding details, and would add a cement plaster finish similar in appearance to other buildings in the Historic District. The addition would be similar to the existing building in terms of height, mass and rooflines.

The proposed addition to the south elevation would increase the massing of the existing structure along Batavia Street, which could impact the historical district and nearby contributors. However, the properties south of the project site are comprised of non-contributing medical office and laboratory buildings in the Trico Sycamore Plaza and Batavia Woods Medical Center. These buildings are large in mass, range from one to three stories in height and are each separated by large parking lots. The addition to the existing building would be consistent with the height, massing and scale of this area. As viewed from the north where the two district contributors are located on Batavia

Street, the proposed addition on the south side of the Ronald McDonald House would be compatible with the existing streetscape as it utilizes the same 15-foot front setback to the porch and 20-foot setback to the building wall, as well as the same architectural style and details (porch, columns, balconies, siding and rooflines) of the existing building. The project would require a Variance for the front setback because a reduced front setback would align the porch and proposed extension with the existing structure. Also, the reduced setback would be consistent with the setback of the residential structures to the north because S. Batavia Street is wider in front of the project site than the residential properties to the north. The addition would be similar in height and massing to the adjacent medical buildings to the south and the Sisters of St. Joseph property to the west across Batavia Street.

Additional Old Towne Local Historic District contributors to the east of the proposed addition off West Culver Avenue would not be adversely affected as the proposed addition is similar in height and massing to the existing Ronald McDonald House. In addition, the addition would use small bedroom windows facing the residences to the east, a privacy screen on the second story eastern balcony, and would plant a row of cypress trees along the eastern property line to reduce privacy impacts to the contributing properties to the east. The project site is also located across the street to the east of the St. Joseph's Hospital Nursing School (480 South Batavia Street), which the City has identified as a historic resource. However, the proposed project would be in keeping with the existing setting of the surrounding area and would not adversely affect the historic significance of the resource. Therefore, the proposed project would not result in direct or indirect impacts to the Old Towne Historic District or the nearby St. Joseph's Hospital Nursing School.

The project site also has remnants of an orange grove are located near the center of the property between the existing Ronald McDonald House and the parking lot to the south. The remaining trees currently surround a playground on the property, as well as some remnants near the existing single-family residence, which could be considered a historical resource. The trees were once associated with the relocated residence at 802 W. Culver Avenue. The existing trees were part of a larger grove that spanned from Batavia Street on the west to past Clark Street on the east and included the adjacent parcel to the south which is currently addressed as 431 S. Batavia Street. Of this once much larger grove, only portions of a few rows remain. The rows that remain have been truncated in length, and several trees were removed in recent years to create a cleared central area where a playground was developed. Because of the removal of the residence once associated with the old orange grove, the removal of the majority of the trees when the property was subdivided for development, the remaining portion of the orchard does not retain sufficient integrity to convey any historical associations it may have had.

None of the trees on the project site have been identified as "historical trees". The OMC defines "historical trees" as those which by their origin, size, uniqueness and/or national or regional rarity are now or are likely to be of historical value. Trees so classified may be but are not limited to those on a master list compiled and maintained by the Community Services Department and approved by resolution of the City Council (OMC Chapter 12.32.060). As previously discussed, the remnant of the orange grove on the project site has been greatly altered through the removal of the residence previously associated with the grove, as well as the removal of the majority of the trees when the property was subdivided and developed, and when the existing Craftsman residence was moved onto the property in 2004. The remaining remnants of the orchard do not retain sufficient integrity to convey any historical associations it may have had.

The proposed project would include the acquisition of the single-family residence located at 802 W. Culver Avenue, which is a contributor to the Old Towne Local Historic District. The existing house would provide auxiliary office space associated with the Ronald McDonald House. No new development or physical modifications to the exterior street view of the single-family residence would occur as a result of the project. An ADA access ramp would be located in the rear of the structure to comply with building code standards but would not be visible from the street. The acquisition of the property and change in use from residential to offices would not directly or indirectly affect the historic district, as only minor exterior alterations in the form of an ADA access ramp are proposed, which would not be visible from the street. The building is located at the southeast edge of the project site and is sited facing to the northeast toward Culver Street. While the rear elevation of the addition to the Ronald McDonald House would be partially visible from the primary view shed of this historic residence, it would not adversely affect any of its character-defining features, which include its two-story massing and multiple gables, broad and low-pitched gabled roofs with widely overhanging eaves, exposed rafter tails and purlins, wooden casings, and entry porch supported by piers. The addition would not further affect the setting in which the existing building on the project site is already visible. Additional district contributors on the north side of West Culver Avenue would not be adversely affected as the proposed addition is similar in height and massing to the existing setting on the south side of West Culver Avenue where two and three-story office buildings are located.

The project involves trenching along the southern edge of the project site and through the 802 W. Culver Avenue property for storm drain realignment. Trenching construction work would require the use of a compact excavator near the single-family residence, which would be as close as nine (9) feet from the foundation and structure of this historical built environment resource and could impact the structure from vibration. As discussed below in Section 13, *Noise,* construction activities would not exceed 0.5 peak particle velocity (PPV), which is the groundborne vibration level that is potentially damaging for historic buildings (Caltrans 2013b). Therefore, construction vibration impacts would be less than significant.

Due to the proximity of construction activities to the single-family residence, there is the potential for direct damage to the structure from construction equipment and construction activities. To ensure the project does not result in any inadvertent damage to the historic single-family residence during the storm drain realignment and establish precautionary measures, the following mitigation measure would be required.

## Mitigation Measure

### *CUL-1 Historic Resource Protection During Construction Activities*

Prior to a contractor beginning the trenching work for the storm drain realignment on the project site, a residence protection barrier shall be placed around the perimeter of the west and south sides of the single-family residence at 802 W. Culver Avenue to designate an avoidance area during the duration of construction activities. The residence protection barrier shall be made of highly visible and permanent material and shall have warning signs posted on or near the barrier. The residence protection barrier shall be at least four (4) feet away from the residence to protect it from inadvertent damage by construction equipment.

**Significance Determination:** Less Than Significant with Mitigation Incorporated

**Mitigation Measures:** Refer to Mitigation Measure CUL-1

**Significance Determination after Mitigation:** Less Than Significant

*b. Would the project cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?*

A search of the California Historical Resources Information System (CHRIS) at the South Central Coastal Information Center (SCCIC) located at the California State University, Fullerton was completed on September 12, 2018. The search was performed to identify all previously conducted cultural resources studies and identified cultural resources within the project site and a 0.5-mile radius surrounding it. The CHRIS search included a review of the National Register of Historic Places (NRHP), the California Register of Historical Resources (CRHR), the Office of Historic Preservation Historic Properties Directory, the California Inventory of Historic Resources, and the Archaeological Determinations of Eligibility list.

The SCCIC records search identified 11 cultural resource studies that have been performed within a 0.5-mile radius of the project site; none of these studies are within or adjacent to the project site. A total of five previously recorded cultural resources have been documented within a 0.5-mile radius of the project site. These resources include two historic buildings (the Parker House [P-30-158759] and the Porter French House [P-30-158710]), two National Register historic districts (the Plaza National Register Historic District [P-30-158679] and the Old Towne Orange National Register Historic District [P-30-159932]), and one historic railroad (the Burlington Northern Santa Fe Railroad [P-30-176663]). Although the SCCIC record search identified no cultural resources within the project site, the Old Towne Orange National Register Historic District is located immediately adjacent to the project site (see Attachment A of the memo provided in Appendix B).

As part of the record search, Rincon also reviewed the City's historic resources inventory (City of Orange 2018). Results of this review indicate that the City established expanded boundaries for the Old Towne Orange Local Historic District that includes properties on the periphery of the National Register District. The Old Towne Orange Local Historic District encompasses an approximately one square mile area of downtown Orange, which includes more than 1,300 properties constructed between 1888 and 1940. The project site lies within the western extent of the Old Town Orange Local Historic District.

Rincon conducted a pedestrian field survey of the project site on September 12, 2018. All accessible areas of the project site were inspected using five-meter transect intervals (Figure 2; Attachment A of the memo provided in Appendix B). Rincon's archaeologist carefully examined all areas of exposed ground surface for artifacts (e.g., flaked stone tools, tool-making debris, stone milling tools, ceramics, fire-affected rock), ecofacts (marine shell and bone), soil discoloration that might indicate the presence of a cultural midden, soil depressions, and features indicative of the former presence of structures or buildings (e.g., standing exterior walls, postholes, foundations) or historic debris (e.g., metal, glass, ceramics). No archaeological resources were identified during the pedestrian field survey.

Based on the findings of the records search and archaeological survey, no archaeological resources were identified on the project site. The findings of the cultural resources study indicate that the proposed project would not result in significant adverse impacts to any of the identified archaeological or historical resources in the vicinity of the project site. Although no archaeological resources are known to exist on the project site, encountering unanticipated archaeological resources during ground disturbance is a possibility and impacts to unknown resources are potentially significant. Mitigation is required to reduce impacts to a less than significant level. The following mitigation measure provides steps to take in the event of an unanticipated discovery during construction. These steps include evaluating whether the resource meets the definition of a historical and/or unique archaeological resource and is therefore significant under CEQA and requiring treatment for any resources identified as significant.

## Mitigation Measure

### *CUL-2 Unanticipated Discovery of Archaeological Resources*

If archaeological resources are encountered during ground-disturbing activities, all work in the immediate vicinity shall be halted, and the City of Orange Community Development Department shall be immediately informed of the discovery. The Qualified Archaeologist required under Mitigation Measure TCR-2 shall be retained by the project applicant to determine if the find is classified as a significant cultural resource pursuant to the CEQA definition of historical (CEQA Guidelines 15064.5[a]) and/or unique archaeological resources (Public Resources Code 21083.2[g]). If the resource is classified as a significant cultural resource, the qualified archaeologist shall make recommendations on the treatment and disposition of the finding. The final recommendations on the treatment and disposition of the find shall be developed in accordance with all applicable provisions of the California Resources Code Section 21083.2 and CEQA Guidelines Sections 15064.5 and 15126.4 and shall be reviewed by the City of Orange Community Development Department prior to implementation. The final recommendations shall be implemented and the City shall be provided with a final report on the treatment and disposition of the finding prior to issuance of a Certificate of Occupancy.

**Significance Determination:** Less than Significant with Mitigation Incorporated

**Mitigation Measures:** Refer to Mitigation Measures CUL 2

**Significance Determination after Mitigation:** Less than Significant

*c. Would the project disturb any human remains, including those interred outside of formal cemeteries?*

The project site is currently developed with the Ronald McDonald House, parking area, playground, and single-family residence; no human remains are known to exist on the project site based on the records search and field survey included in the Cultural Resources Technical Memorandum (Appendix B). However, the discovery of human remains is always a possibility during ground-disturbing activities. If human remains are found, the State of California Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. In the event of an unanticipated discovery of human remains, the County Coroner must be notified immediately. If the human remains are determined to be prehistoric, the Coroner will notify the Native American Heritage Commission, which will determine and notify a most likely descendant (MLD). The MLD shall complete the inspection of the site and provide recommendations for treatment to the landowner within 48 hours of being granted access. With adherence to these existing requirements, impacts to human remains would be less than significant.

**Significance Determination:** Less than Significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination After Mitigation:** Less Than Significant

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# 6 Energy

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation? | □ | □ | ■ | □ |
| b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency? | □ | □ | □ | ■ |

## Electricity and Natural Gas

In 2017, California used 292,039 gigawatt-hours (GWh) of electricity, of which 29 percent were from renewable resources (CEC 2018a). California also consumed approximately 12,500 million U.S. therms (MMthm) of natural gas in 2017 (CEC 2017b). The project site would be provided electricity by Southern California Edison (SCE) and natural gas by Southern California Gas Company (SCG). Table 8 and Table 9 show the electricity and natural gas consumption by sector and total for SCE and SCG. In 2017, SCE provided approximately 28.9 percent of the total electricity used in California. Also in 2017, SCG provided approximately 41.1 percent of the total natural gas usage in California.

**Table 8 Electricity Consumption in the SCE Service Area in 2017**

| Agriculture and Water Pump | Commercial Building | Commercial Other | Industry | Mining and Construction | Residential | Streetlight | Total Usage |
|---|---|---|---|---|---|---|---|
| 2,975.4 | 31,925.3 | 4,283.3 | 13,094 | 2,410.6 | 28,975.0 | 627.9 | 84,291.6 |

Notes: All usage expressed in GWh

Source: CEC 2017a

**Table 9 Natural Gas Consumption in SCG Service Area in 2017**

| Agriculture and Water Pump | Commercial Building | Commercial Other | Industry | Mining and Construction | Residential | Total Usage |
|---|---|---|---|---|---|---|
| 69.4 | 895.9 | 72.1 | 1,716.6 | 229.7 | 2,158.1 | 5,141.8 |

Notes: All usage expressed in MMThm

Source: CEC 2017c

## Petroleum

In 2016, approximately 40 percent of the state's energy consumption was used for transportation activities (EIA 2018). Californians presently consume over 19 billion gallons of motor vehicle fuels per year (CEC 2018b). Though California's population and economy are expected to grow, gasoline demand is projected to decline from roughly 15.8 billion gallons in 2017 to between 12.3 billion and 12.7 billion gallons in 2030, a 20 percent to 22 percent reduction. This decline comes in response to both increasing vehicle electrification and higher fuel economy for new gasoline vehicles (CEC 2018b).

a. *Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?*

## Construction Energy Demand

During project construction, energy would be consumed in the form of petroleum-based fuels used to power off-road construction vehicles and equipment on the project site, construction worker travel to and from the project site, and vehicles used to deliver materials to the site. The project would require site preparation and grading, including hauling material off-site; pavement and asphalt installation; building construction; architectural coating; and landscaping and hardscaping. Construction would occur for approximately one year from 2021 to 2022 and would require minimal grading activities due to the site topography and previous grading of the site.

The total consumption of gasoline and diesel fuel during project construction was estimated using the assumptions and factors from CalEEMod used to estimate construction air emissions (Appendix A). The total consumption of gasoline and diesel fuel during project construction was estimated using the assumptions and factors from CalEEMod, a model used to estimate construction criteria pollutant and GHG emissions. Table 10 presents the estimated construction phase energy consumption, indicating construction equipment, vendor trips, and worker trips would consume about 21,000 gallons of diesel fuel over the project construction period.

**Table 10 Estimated Fuel Consumption during Construction**

| Fuel Type | Gallons of Fuel | MMBtu[4] |
|---|---|---|
| Diesel Fuel (Construction Equipment)[1] | 17,286.9 | 2,203.5 |
| Diesel Fuel (Hauling & Vendor Trips)[2] | 786.6 | 86.4 |
| Other Petroleum Fuel (Worker Trips)[3] | 2,805.3 | 308.0 |
| **Total** | **20,878.8** | **2,597.8** |

[1] Fuel demand rate for construction equipment is derived from the total hours of operation, the equipment's horse power, the equipment's load factor, and the equipment's fuel usage per horse power per hour of operation, which are all taken from CalEEMod outputs (see Appendix A), and from compression-ignition engine brake-specific fuel consumptions factors for engines between 0 to 100 horsepower and greater than 100 horsepower (U.S. EPA 2018). Fuel consumed for all construction equipment is assumed to be diesel fuel.

[2] Fuel demand rate for hauling and vendor trips (cut material imports) is derived from hauling and vendor trip number, hauling and vendor trip length, and hauling and vendor vehicle class from "Trips and VMT" Table contained in Section 3.0, *Construction Detail*, of the CalEEMod results (see Appendix A). The fuel economy for hauling and vendor trip vehicles is derived from the United States Department of Transportation (U.S. DOT 2018). Fuel consumed for all hauling trucks is assumed to be diesel fuel.

[3] The fuel economy for worker trip vehicles is derived from the U.S. Department of Transportation National Transportation Statistics (24 mpg) (DOT 2018). Fuel consumed for all worker trips is assumed to be gasoline fuel.

[4] CaRFG CA-GREET 2.0 fuel specification of 109,786 Btu/gallon used to identify conversion rate for fuel energy consumption for worker trips specified above (California Air Resources Board [CARB] 2015). Low-sulfur Diesel CA-GREET 2.0 fuel specification of 127,464 Btu/gallon used to identify conversion rate for fuel energy consumption for construction equipment specified above (Shremp 2017). Totals may not add up due to rounding.

The construction energy estimates represent a conservative estimate as the construction equipment used in each phase of construction was assumed to be operating every day of construction. Construction equipment would be maintained to applicable standards, and construction activity and associated fuel consumption and energy use would be temporary and typical for construction sites. It is also reasonable to assume contractors would avoid wasteful, inefficient, and unnecessary fuel consumption during construction to reduce construction costs. Therefore, the project would not involve the inefficient, wasteful, and unnecessary use of energy during construction, and the construction-phase impact related to energy consumption would be less than significant.

## Operational Energy Demand

The operation of the project would increase area energy demand from greater electricity, natural gas, and gasoline consumption at a currently undeveloped site. Natural gas and electricity would be used for heating and cooling systems, lighting, appliances, water use, and the overall operation of the project buildings. Gasoline consumption would be attributed to the trips generated from people employed by the house and visitors accessing the site. The estimated number of average daily trips associated with the project from the project's trip generation analysis (see Appendix F) is used to determine the energy consumption associated with fuel use from the operation of the project. The majority of the fuel consumption would be from motor vehicles traveling to and from the project site. According to the CalEEMod calculations, the project would result in just over 400,000 annual VMT (Appendix A). Table 11 shows the estimated total annual fuel consumption of the project using the estimated VMT with the assumed vehicle fleet mix (Appendix A). One gallon of gasoline is equivalent to approximately 109,786 Btu (CARB 2015), while one gallon of diesel is equivalent to approximately 127,460 Btu (Schremp 2017).

### Table 11 Estimated Project Annual Transportation Energy Consumption

| Vehicle Type[1] | Percent of Vehicle Trips[2] | Annual Vehicle Miles Traveled[3] | Average Fuel Economy (miles/gallon)[4] | Total Annual Fuel Consumption (gallons) | Total Fuel Consumption (MBtu)[6] |
|---|---|---|---|---|---|
| Passenger Cars | 55.9 | 223,616 | 24 | 9,317 | 1,023 |
| Light/Medium Trucks | 36.7 | 146,938 | 17.4 | 8,445 | 927 |
| Heavy Trucks/Other | 6.9 | 27,533 | 7.4 | 3,721 | 408 |
| Motorcycles | 0.5 | 1,959 | 43.95 | 45 | 5 |
| **Total** | **100.0** | **400,046** | **–** | **21,527** | **2,363** |

[1] Vehicle classes provided in CalEEMod do not correspond exactly to vehicle classes in DOT fuel consumption data, except for motorcycles. Therefore, it was assumed that passenger cars correspond to the light-duty, short-base vehicle class, light/medium trucks correspond to the light-duty long-base vehicle class, and heavy trucks/other correspond to the single unit, 2-axle 6-tire or more class.

[2] Percent of vehicle trips from Table 4.4 “Fleet Mix” in Air Quality and Greenhouse Gas Impact Study (Appendix A).

[3] Mitigated annual VMT found in Table 4.2 “Trip Summary Information” in Air Quality and Greenhouse Gas Impact Study (Appendix A).

[4] Average Fuel Economy: U.S. Department of Energy, 2018.

[5] U.S. Department of Transportation 2013

[6] CaRFG fuel specification of 109,786 Btu/gallon used to identify conversion rate for fuel energy consumption for vehicle classes specified above (CARB 2015).

Notes: Totals may not add up due to rounding.

Operation of the proposed project would consume approximately 0.115 GWh of electricity per year (Appendix A). As mentioned, the project would be served by SCE, which provided more than 84,000 GWh of electricity in 2017. Therefore, SCE would have sufficient supplies for the project and would not place a significant demand on the electrical supply. Estimated natural gas consumption for the project would be 0.003 MMthm per year (Appendix A). The project’s natural gas demand would be serviced by SCG, which provided 5,142 MMthm per year in 2017; therefore, SCG would have sufficient supplies for the project.

The project would also comply with all standards set in California Building Code (CBC) Title 24, which would minimize the wasteful, inefficient, or unnecessary consumption of energy resources during operation**.** California’s Green Building Standards Code (CALGreen; California Code of Regulations, Title 24, Part 11) requires implementation of energy efficient light fixtures and building materials into the design of new construction projects. Furthermore, the 2019 Building Energy Efficiency Standards (CBC Title 24, Part 6) requires newly constructed buildings to meet energy performance standards set by the Energy Commission. As the name implies, these standards are specifically crafted for new buildings to result in energy efficient performance so that the buildings do not result in wasteful, inefficient, or unnecessary consumption of energy. The standards are updated every three years and each iteration is more energy efficient than the previous standards. For example, according to the CEC, residential buildings meeting 2019 standards will use about 7 percent less energy due to energy efficiency measures versus those built under the 2016 standards; once rooftop solar electricity generation is factored in, homes built under the 2019 standards will use about 53 percent less energy than those under the 2016 standards (CEC 2018c). Furthermore, the project would further reduce its use of nonrenewable energy resources as the electricity generated by renewable resources provided by SCE continues to increase to comply with state requirements through Senate Bill 100, which requires electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 60 percent by 2030, and 100 percent by 2045.

In conclusion, the construction of the project would be temporary and typical of similar projects, and not result in wasteful use energy. The operation of the project would increase the use of electricity on-site. However, the increase would be in conformance with the latest version of California's Green Building Standards Code and Building Energy Efficiency Standards. In addition, SCE and SCG have sufficient supplies to serve the project. Therefore, the operation would not result in wasteful or unnecessary energy consumption.

**Significance Determination:** Less Than Significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination After Mitigation:** Less Than Significant

*b. Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?*

As mentioned under *Local Regulations*, the City of Orange includes climate change and GHG emission reduction goals and policies in the Natural Resources Element of the General Plan. Specifically, the Natural Resource Element includes Goal 2.0, *Protect air, water, and energy resources from pollution and overuse*, and the following related policies:

- Policy 2.3: Reduce the amount of water used for landscaping through the use of native and drought-tolerant plants, proper soil preparation, and efficient irrigation systems as parks and other City facilities are built or renovated.
- Policy 2.6: Encourage sustainable building and site designs for new construction and renovation projects
- Policy 2.8: Encourage development that incorporates pedestrian- and transit-oriented design and landscape elements

The project would predominately use drought -tolerant plants to replace the existing plants and shrubs around the project site boundary, including plants that require medium-water use to very-low water use. By using less water, the project would reduce the energy needed to provide water to the project. Additionally, the project would be constructed in accordance with the CALGreen standards and the 2019 Building Energy Efficiency Standards, which includes a list of mandatory measures that must be incorporated into new or renovated developments. The project would also be located in the vicinity of OCTA bus lines 53, 56, and 453 (OCTA 2018a) and the closest bus stops are located within 0.2 mile of the project site, along La Veta Avenue. In addition, since the use of the project is associated with the nearby hospitals approximately 0.3 miles southwest, many vehicle trips would be between the hospital and project site, and walking would be promoted. This would allow people to arrive at the site without the use of single-occupancy vehicles. Therefore, the project would not conflict with applicable goals of the General Plan, and the project would not conflict with or obstruct a plan for renewable or energy efficiency, and there would be no impacts.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** No Impact

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# 7 Geology and Soils

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Directly or indirectly cause potential adverse effects, including the risk of loss, injury, or death involving: | | | | |
| 1. 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? | ☐ | ☐ | ☐ | ■ |
| 2. Strong seismic ground shaking? | ☐ | ☐ | ■ | ☐ |
| 3. Seismic-related ground failure, including liquefaction? | ☐ | ☐ | ☐ | ■ |
| 4. Landslides? | ☐ | ☐ | ☐ | ■ |
| b. Result in substantial soil erosion or the loss of topsoil? | ☐ | ☐ | ■ | ☐ |
| c. Be located on a geologic unit or soil that is made unstable as a result of the project, and potentially result in on or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse? | ☐ | ☐ | ☐ | ■ |
| d. Be located on expansive soil, as defined in Table 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 wastewater disposal systems where sewers are not available for the disposal of wastewater? | ☐ | ☐ | ☐ | ■ |
| f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? | ☐ | ■ | ☐ | ☐ |

Associated Soils Engineering, Inc. (ASE) prepared a geotechnical investigation for the project site (see Appendix C). The following is based on the information and analysis contained in the geotechnical investigation, which concludes that the construction of the proposed project may be implemented as planned, provided that the ground preparation and foundation design criteria recommended in the geotechnical investigation are incorporated into the project plans and specifications and implemented during construction.

*a.1. Directly or indirectly cause potential adverse effects, including the risk of loss, injury, or death involving 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?*

As concluded in the geotechnical investigation (see Appendix C), the project site is not located within an Alquist-Priolo Earthquake Fault Zone. No known active or potentially active faults are shown crossing the project site on published maps reviewed. No evidence for active faulting was encountered in the exploratory excavations performed during this evaluation. The risk of surface rupture at the project site is considered low.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significant Determination after Mitigation:** No Impact

*a.2. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?*

Southern California is in an active seismic region. Moderate to strong earthquakes can occur on numerous local faults. The California Building Code requires structural design and construction methods which will be employed to minimize adverse effects of seismic ground shaking. As discussed above, no known active or potentially active faults are shown crossing the project site on published maps reviewed. Because the project would comply with the CBC, impacts related to seismically-induced ground shaking would be less than significant and the proposed project would not exacerbate ground shaking conditions.

**Significance Determination:** Less than Significant

**Mitigation Measures:** No Mitigation is Required

**Significant Determination after Mitigation:** Less than Significant

*a.3. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?*

As concluded in the geotechnical investigation (see Appendix C), the project site is not in an area identified as having a potential for soil liquefaction when subject to a Maximum Probably Earthquake (MPE) or Maximum Considered Earthquake (MCE) event. The term "liquefaction" describes a phenomenon in which a saturated cohesionless soil loses strength and acquires a degree of mobility as a result of strong ground shaking during an earthquake. The factors known to influence liquefaction potential include soil type and depth, grain size, relative density, groundwater level, degree of saturation, and both the intensity and duration of ground shaking.

The soils to the maximum explored depth of 28 feet 5 inches generally consist of loose to medium dense granular soils within the upper approximate 13 feet below grade, and medium dense to very dense granular soils below 13 feet depth. During ASE's field exploration, groundwater was not encountered to the maximum explored depth of 28 feet 5 inches below grade in Boring B-2. Per the referenced CGS (1997, revised 2001) historic high groundwater in the vicinity of the Site is greater than 40 feet below grade. According to information available from the State of California Department of Water Resources website, historic high groundwater in a well located approximately 0.3 mile northeast of the Site is approximately 110.4 feet deep.

The likelihood of occurrence of seismically-induced liquefaction at the project site is negligible considering that: 1) groundwater was not encountered in Boring B-2 to a maximum explored depth of 28 feet 5 inches below existing grade, 2) the historic high groundwater in a well in the vicinity of the project site is 110.4 feet below site grade based on ASE's literature and State of California Department of Water Resources website review, 3) the as-graded soil condition of the project site is anticipated to result in the site soils exhibiting dense to very dense consistency in the upper three feet, and 4) the existing site native granular soils are increasingly dense with depth as per encountered in ASE's exploratory borings. Therefore, no impact would occur.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significant Determination after Mitigation:** No Impact

*a.4. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?*

The project site is flat and, as concluded in the geotechnical investigation (see Appendix C), there is no indication that recent landslides or unstable slope conditions exist on or adjacent to the project site that would otherwise result in an obvious landslide hazard to the proposed development or adjacent properties. ASE's also concluded the project site is not located within an area identified as having a potential for earthquake-induced landslides. Due to the lack of significant unretained relief on or adjacent to the project site, the potential for earthquake-induced landslides in the future is considered negligible and therefore, no impact would occur.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significant Determination after Mitigation:** No Impact

*b. Would the project result in substantial soil erosion or the loss of topsoil?*

A significant impact may occur if a project exposes large areas to the erosional effects of wind or water for a protracted period of time. During construction, grading and excavation would expose minimal amounts of soils for a limited time, allowing for possible erosion. However, since the project site is already to grade, substantial erosion would not occur since there would be no removal or replacement of the site. Excavation would be limited to that necessary for the installation of building foundations and utilities. All grading activities require adherence to the Chapter 16 of the OMC, which include grading requirements and standards designed to limit potential impacts to acceptable levels. Additionally, the proposed project would be required to comply with Chapter 7 of the OMC to ensure that during construction, transport of sediments from the site by storm-water runoff and winds would be prevented through the use of appropriate Best Management Practices (BMPs). These BMPs would be detailed in a Storm-water Pollution Prevention Plan (SWPPP), in compliance with the latest National Pollutant Discharge Elimination

System (NPDES) Storm-water Regulations. With implementation of the required construction BMPs, impacts with respect to soil erosion during construction would be less than significant.

**Significance Determination:** Less than Significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** Less than Significant

c. *Would the project be located on a geologic unit or soil that is made unstable as a result of the project, and potentially result in on or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?*

Subsidence is the sudden sinking or gradual downward settling of the earth's surface with little or no horizontal movement. Subsidence is caused by a variety of activities, which include, but are not limited to, withdrawal of groundwater, pumping of oil and gas from underground, the collapse of underground mines, liquefaction, and hydro-compaction. As discussed in the geotechnical investigation (see Appendix C), lateral spreading is a phenomenon associated with seismically-induced soil liquefaction, is a display of lateral displacement of soils due to inertial motion and lack of lateral support during or post liquefaction. It is typically exemplified by the formation of vertical cracks on the surface of liquefied soils, and usually takes place on gently sloping ground or level ground with nearby free surface such as drainage or stream channel. Since the project site has been evaluated to not be susceptible to seismically-induced liquefaction, the potential for the occurrence of liquefaction-induced lateral spreading is deemed unlikely on the project site and, therefore, no impact would occur.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significant Determination after Mitigation:** No Impact

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

As concluded in the geotechnical investigation (see Appendix C), laboratory test results on near surface soil samples indicate a "Very Low" soil expansion potential (i.e., Expansion Index, EI = 13 per ASTM D4829-11 Test Method), as defined in 2016 CBC. As such, no adverse impact arising from undesirable soil expansion is anticipated at the site. As such, impacts would be less than significant.

**Significance Determination:** Less than Significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** Less than Significant

*e. Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?*

The proposed project would be served by the City's existing sewer system and no septic tanks are proposed for the project. Therefore, there is no potential for adverse effects associated with septic tanks or an alternative wastewater disposal system. No impact would occur.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** No Impact

*f. Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?*

As described in Section 5, *Cultural Resources*, the SCCIC records search identified 11 cultural resource studies that have been performed within a 0.5-mile radius of the project site; however, none of these studies are within or adjacent to the project site. A total of five previously recorded cultural resources have been documented within a 0.5-mile radius of the project site. Although there are no known paleontological resources within the project site it is possible that grading could potentially encounter previously unknown paleontological resources. Potential impacts to unique geological features and paleontological resources are therefore potentially significant. Implementation of Mitigation Measure GEO-1 establishes protocols to follow in the event that paleontological resources are discovered during construction, which would reduce impacts to a less than significant level.

## Mitigation Measure

### *GEO-1 Unanticipated Discovery of Paleontological Resources*

In the event a previously unrecorded paleontological resource is encountered during construction, all activity shall cease in the immediate vicinity of the find and the City of Orange Community Development Department shall be immediately informed of the discovery. A qualified paleontologist shall be retained by the project applicant to assess whether the find is classified as a significant paleontological resource. If materials encountered are deemed significant paleontological resources, the paleontologist shall recommend a course of action to further investigate and/or mitigate adverse impacts to those resources that have been encountered and the recommendations shall be implemented. The final report containing site forms, site significance, and mitigation measures shall be submitted to the City of Orange Community Development Department.

**Significance Determination:** Less than Significant with Mitigation Incorporated

**Mitigation Measures:** Refer to Mitigation Measure GEO-1

**Significance Determination after Mitigation:** Less than Significant

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# 8 Greenhouse Gas Emissions

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? | □ | □ | ■ | □ |
| b. Conflict with any applicable plan, policy, or regulation adopted for the purposes of reducing the emissions of greenhouse gases? | □ | □ | ■ | □ |

Climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other substantial changes in climate (such as wind patterns, precipitation, and storms) over an extended period. Climate change is the result of numerous, cumulative sources of greenhouse gases (GHGs) that contribute to the "greenhouse effect," an occurrence that takes place in Earth's atmosphere that regulates the temperature of the planet. The majority of radiation from the sun hits Earth's surface and warms it. The surface, in turn, radiates heat back towards the atmosphere in the form of infrared radiation. Gases and clouds in the atmosphere trap and prevent some of this heat from escaping into space and re-radiate it in all directions. However, anthropogenic activities since the beginning of the industrial revolution (approximately 250 years ago) are adding to the natural greenhouse effect by increasing the gases in the atmosphere that trap heat. Emissions resulting from human activities thereby contribute to an average increase in Earth's temperature.

GHGs occur both naturally and because of human activities, such as fossil fuel burning, methane generated by landfill wastes and raising livestock, deforestation activities, and some agricultural practices. GHGs produced by human activities include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride ($SF_6$). Since 1750, estimated concentrations of $CO_2$, $CH_4$, and $N_2O$ in the atmosphere have increased by 36 percent, 148 percent, and 18 percent, respectively, primarily due to human activity. Potential climate change impacts in California may include loss of snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years (California Energy Commission [CEC] 2009).

In response to climate change, California implemented Assembly Bill (AB) 32, the "California Global Warming Solutions Act of 2006." AB 32 requires achievement by 2020 of a statewide GHG emissions limit equivalent to 1990 emissions (essentially a 15 percent reduction below 2005 emission levels) and the adoption of rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emissions reductions. On September 8, 2016, the governor signed Senate Bill (SB) 32 into law, extending AB 32 by requiring the State to further reduce GHGs to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged). On December 14, 2017, CARB adopted the 2017 Scoping Plan, which provides a framework for achieving the 2030 target. As with the 2013 Scoping Plan Update, the 2017 Scoping Plan does not provide project-level thresholds for land use development. Instead, it recommends local governments adopt policies and locally-appropriate quantitative thresholds consistent with a statewide per capita goal of six metric tons (MT) $CO_2e$ by 2030 and two MT $CO_2e$ by 2050 (CARB 2017).

## Significance Threshold

The vast majority of individual projects do not generate sufficient GHG emissions to directly influence climate change. However, physical changes caused by a project can contribute incrementally to cumulative effects that are significant, even if individual changes resulting from a project are limited. The issue of climate change typically involves an analysis of whether a project's contribution towards an impact would be cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects (CEQA Guidelines, Section 15064[h][1]).

According to the CEQA Guidelines, projects can tier off of a qualified GHG reduction plan, which allows for project-level evaluation of GHG emissions through comparison of the project's consistency with the GHG reduction policies included in a qualified GHG reduction plan. In its white paper, *Beyond Newhall and 2020*, the Association of Environmental Professionals (AEP) considers this the most defensible approach presently available under CEQA to determine the significance of a project's GHG emissions (AEP 2016). The Natural Resources Element of the City of Orange General Plan includes goals related to climate change and GHG emission reduction targets. These provide a framework for reducing GHG emissions, but the City has not adopted a climate action plan (CAP) or other qualified GHG reduction plan designated as the basis for determining the significance of project's GHG impacts under CEQA. Therefore, use of the AEP-recommended approach is not possible for projects in the City of Orange.

In September 2010, the SCAQMD's GHG CEQA Significance Threshold Working Group recommended a tiered approach to determine the significance of residential and commercial projects. The draft tiered approach is outlined in the meeting minutes, dated September 29, 2010 (SCAQMD 2010).

- **Tier 1**. If the project is exempt from further environmental analysis under existing statutory or categorical exemptions, there is a presumption of a less than significant impact with respect to climate change. If not, then the Tier 2 threshold should be considered.
- **Tier 2**. This tier involves determining whether or not the project is consistent with a GHG reduction plan that may be part of a local general plan, for example. The concept embodied in this tier is equivalent to the existing concept of consistency in CEQA Guidelines section 15064(h)(3), 15125(d) or 15152(a). Under this Tier, if the proposed project is consistent with the qualifying local GHG reduction plan, its impact would not be significant. If there is not an adopted plan, then a Tier 3 approach would be appropriate.
- **Tier 3**. This tier establishes a screening significance threshold level to determine significance. The Working Group recommended a threshold of 3,000 MT of $CO_2e$ per year for all projects.
- **Tier 4**. This tier establishes a service population threshold to determine significance. The Working Group recommended a threshold 4.8 MT of $CO_2e$ per year for land use projects.

The project is not exempt (Tier 1), nor is there an applicable GHG reduction plan (Tier 2); therefore, the most appropriate significance threshold to apply to the project is the bright-line threshold of

3,000 MT of $CO_2e$ per year (Tier 3). This threshold was developed to reflect a 90 percent capture rate tied to the 2050 reduction target established in the Governor's Executive Order S-3-05, which sets a GHG reduction target of 90 percent below current levels by 2050. Therefore, if the project exceeds the SCAQMD Working Group's recommended threshold of 3,000 MT of $CO_2e$ per year, impacts would be significant.

## Methodology

The GHG analysis has been conducted using the methodologies recommended by the California Air Pollution Control Officers Association [CAPCOA] (January 2008) CEQA and Climate Change white paper. The analysis focuses on $CO_2$, $N_2O$, and $CH_4$ because these are the GHG emissions that on-site development would generate in the largest quantities. Fluorinated gases, such as HFCs, PFCs, and SF6, were also considered for the analysis. However, the quantity of fluorinated gases would not be substantial since fluorinated gases are primarily associated with industrial processes. Calculations were based on the methodologies discussed in the CAPCOA white paper (January 2008) and included the use of the California Climate Action Registry General Reporting Protocol (January 2009).

Emissions associated with the proposed project were estimated using the CalEEMod version 2016.3.2. Complete CalEEMod results and assumptions can be viewed in Appendix A.

## Construction Emissions

In accordance with SCAQMD Working Group's recommendation, GHG emissions from construction of the project are amortized over a 30-year period (the assumed life of the project) and added to annual operating emissions. Construction of the proposed project would generate temporary GHG emissions primarily due to the operation of construction equipment and truck trips. CalEEMod was used to estimate emissions associated with the construction period based on defaults for development of the proposed land uses. Complete results from CalEEMod and assumptions can be viewed Appendix A.

## Operational Emissions

CalEEMod was used to calculate operational emissions from the proposed project, which include $CO_2$, $N_2O$, and $CH_4$. Emissions from energy use include emissions from electricity and natural gas use. The emissions factors for natural gas combustion are based on EPA's AP-42, (Compilation of Air Pollutant Emissions Factors) and CCAR. Electricity emissions are calculated by multiplying the energy use times the carbon intensity of the utility district per kilowatt hour (CAPCOA 2017).

Emissions associated with area sources, including consumer products, landscape maintenance, and architectural coating were calculated in CalEEMod and utilize standard emission rates from CARB, USEPA, and district supplied emission factor values (CAPCOA 2017).

Emissions from waste generation were also calculated in CalEEMod and are based on the IPCC's methods for quantifying GHG emissions from solid waste using the degradable organic content of waste (CAPCOA 2017). Waste disposal rates by land use and overall composition of municipal solid waste in California was primarily based on data provided by the California Department of Resources Recycling and Recovery (CalRecycle).

Emissions from water and wastewater use calculated in CalEEMod were based on the default electricity intensity from the CEC's 2006 Refining Estimates of Water-Related Energy Use in California using the average values for Southern California.

For mobile sources, $CO_2$ and $CH_4$ emissions from vehicle trips to and from the project site were quantified using CalEEMod. Because CalEEMod does not calculate $N_2O$ emissions from mobile sources, $N_2O$ emissions were quantified using the CCAR General Reporting Protocol (2009) direct emissions factors for mobile combustion (see Appendix A for calculations). The estimate of total daily trips associated with the project was based on CalEEMod defaults. Emission rates for $N_2O$ emissions were based on the vehicle fleet mix output generated by CalEEMod and the emission factors found in the CCAR General Reporting Protocol.

*a. Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?*

The project's proposed construction activities, energy use, daily operational activities, and mobile sources (traffic) would generate quantities of GHG emissions. The project-related construction emissions are confined to a relatively short period of time in relation to the overall life of the proposed project. Therefore, the construction GHG emissions were amortized over a 30-year period to determine the annual construction-related GHG emissions over the life of the project. As shown in Table 12, the combined annual GHG emissions associated with construction of the proposed project would be about 146 MT of $CO_2e$, which translates to about 4.9 of $CO_2e$ MT per year over 30 years.

**Table 12 Estimated Construction GHG Emissions**

| Year | Project Emissions (MT of $CO_2e$) |
|---|---|
| 2020 | 119.6 |
| 2021 | 26.7 |
| **Total** | **146.3** |
| Total Amortized over 30 Years | 4.9 |

See Appendix A for CalEEMod model output.

Table 13 summarizes the project's overall combined emissions, including both operational emissions and the amortized annual construction emissions. The project's overall annual emissions would be approximately 263 MT of $CO_2e$, which would not exceed the project-specific emissions threshold of 3,000 MT of $CO_2e$ per year. Impacts would be less than significant.

**Table 13 Combined Annual Emissions of Greenhouse Gases**

| Emission Source | Annual Emissions ($MT$ of $CO_2e$) |
|---|---|
| Construction (amortized over 30 years) | 4.9 |
| **Operational** | |
| Area | 2.1 |
| Energy | 51.8 |
| Solid Waste | 11.3 |
| Water | 14.0 |
| **Mobile** | |
| $CO_2$ and $CH_4$ | 170.0 |
| $N_2O$ | 8.4 |
| **Total** | **262.5** |

See Appendix A for CalEEMod worksheets.

**Significance Determination:** Less than Significant

**Mitigation Measures:** No Mitigation is Required

**Significance after Mitigation Measure:** Less than Significant

*b. Would the project conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?*

Senate Bill 375, signed in August 2008, directs each of the State's 18 major Metropolitan Planning Organizations (MPO) to prepare a "sustainable communities strategy" (SCS) that contains a growth strategy to meet these emission targets for inclusion in the Regional Transportation Plan (RTP). In April 2016, SCAG adopted the *2016-2040 Regional Transportation Plan/Sustainable Communities Strategy*. SCAG's RTP/SCS includes a commitment to reduce emissions from transportation sources by promoting compact and infill development to comply with SB 375. As mentioned under *Local Regulations*, the City of Orange includes climate change and GHG emission reduction goals and policies in the Natural Resources Element of the General Plan. Specifically, the Natural Resource Element includes Goal 2.0, *Protect air, water, and energy resources from pollution and overuse*, and the following related policies:

- Policy 2.3: Reduce the amount of water used for landscaping through the use of native and drought-tolerant plants, proper soil preparation, and efficient irrigation systems as parks and other City facilities are built or renovated.
- Policy 2.6: Encourage sustainable building and site designs for new construction and renovation projects
- Policy 2.8: Encourage development that incorporates pedestrian- and transit-oriented design and landscape elements

The project would predominately use drought -tolerant plants to replace the existing plants and shrubs around the project site boundary, including plants that require medium-water use to very-low water use. Additionally, the project would be constructed in accordance with the California

Green Building Standards Code (CALGreen; Title 24, Part 11), which includes a list of mandatory measures that must be incorporated into new or renovated developments. The project would also be located in the vicinity of OCTA bus lines 53, 56, and 453 (OCTA 2018a) and the closest bus stops are located within 0.2 mile of the project site, along La Veta Avenue. Therefore, the project would not conflict with applicable goals of the General Plan.

The Southern California Association of Government's RTP/SCS also includes GHG emission reduction goals that apply to the project. Specifically, SCAG's RTP/SCS includes a goal to plan for growth around livable corridors, which seeks to revitalize commercial strips through integrated transportation and land use planning that results in increased economic activity and improved mobility options. The project would be located in a site that is characterized by a mix of institutional, commercial, and residential land uses. Additionally, as mentioned above, the project site is located approximately 0.2 miles from the nearest transit stop, along La Veta Avenue and 1.6 miles from the nearest train station. There are also sidewalks along the southern, eastern, and northern portions of the block, which makes the site more accessible to pedestrians or other forms of active commuters. The proposed project would also be consistent with the goal of promoting infill development because it would allow for the expansion of the Ronald McDonald house in an urbanized area by converting an existing, adjacent surface parking lot into temporary residences for visitors at the nearby hospital.

The 2017 Scoping Plan outlines California's current approach to addressing climate change, which in general, is intended to be implemented at a State level. Nonetheless, local governments can assist in implementing certain Scoping Plan objectives. For example, the project would align with the 2017 Scoping Plan goal of improving public health by increasing the number of units available at the existing Ronald McDonald house for future people to stay at while they or their families receive medical care in the local area. This would reduce the burden of traveling, and thereby the vehicle miles traveled, from far distances to receive the necessary care.

Based on the above, the project would not conflict with the City's General Plan, SCAG's RTP/SCS, CARB's Scoping Plan, or any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. Impacts related to consistency with plans and policies aimed at GHG emissions reduction would be less than significant.

**Significance Determination:** Less than Significant

**Mitigation Measures:** No Mitigation is Required

**Significance after Mitigation Measure:** Less than Significant

# 9 Hazards and Hazardous Materials

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| 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 0.25 mile of an existing or proposed school? | ☐ | ☐ | ■ | ☐ |
| d. Be located on a site that is included on a list of hazardous material 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 in 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? | ☐ | ☐ | ☐ | ■ |

a. *Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?*

b. *Would the project 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?*

Hazardous materials are chemicals that could potentially cause harm during an accidental release or mishap, and are defined as being toxic, corrosive, flammable, reactive, an irritant, or strong sensitizer. Hazardous substances include all chemicals regulated under the United States Department of Transportation "hazardous materials" regulations and the USEPA "hazardous waste" regulations. Hazardous wastes require special handling and disposal because of its potential to damage public health and the environment. The probable frequency and severity of consequences from the routine transport, use, or disposal of hazardous materials is affected by the type of substance, the quantity used or managed, and the nature of the activities and operations.

During the temporary construction period, the project would involve the use of potentially hazardous materials such as vehicle fuels and fluids that could be released should an accidental leak or spill occur. However, standard construction best management practices for the use and handling of such materials would be implemented to avoid or reduce the potential for such conditions to occur. Any use of potentially hazardous materials during construction of the proposed project would comply with all local, state, and federal regulations regarding the handling of potentially hazardous materials. Operation and maintenance of the proposed project would not involve the routine transport, use, or disposal of hazardous materials. Materials used by the proposed project would be similar to those found in common household projects such as surface and floor cleaning products utilized for routine janitorial cleaning procedures. Therefore, impacts would be less than significant.

The County of Orange Health Care Agency Environmental Health Division was designated by the State Secretary for Environmental Protection on January 1, 1996, as the Certified Unified Program Agency (CUPA) for the County of Orange. The CUPA is the local administrative agency that coordinates six programs regulating hazardous materials and hazardous wastes in Orange County. The City of Orange Fire Department (OFD) has joined CUPA as a "participating agency" to form a partnership with the County of Orange's Unified Program. In the City of Orange, the hazardous waste, AST, and CalARP programs are administered by the County of Orange Health Care Agency, while the City administers the other three elements. The Fire Prevention and Hazardous Materials Safety Section of the OFD implements these programs and prioritizes prevention of damage to the environment. Given the availability of these resources and limited use of hazardous materials on the project site, impacts associated with the disposal of hazardous materials and/or the potential release of hazardous materials would be less than significant.

**Significance Determination:** Less than Significant

**Mitigation Measures:** No Mitigation is Required

**Significance after Mitigation Measure:** Less than Significant *c. Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school?*

The schools in the vicinity include Fairhaven Elementary School 1.4 miles southeast of the project site, Yorba Middle School 1.8 miles northeast of the project site, and the Garden Grove High School located 4.24 miles east of the project site. Construction or operation of the project would not generate acutely hazardous materials or wastes, and the limited use of any hazardous materials for residential purposes would be contained, stored, and used in accordance with manufactures' instructions and handled in compliance with applicable standards and regulations. Based on these facts, impacts related to hazardous emissions or the handling of hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school would be less than significant.

**Significance Determination:** Less than Significant

**Mitigation Measures:** No Mitigation is Required

**Significance after Mitigation Measure:** Less than Significant

*d. Would the project be located on a site included on a list of hazardous material 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?*

The following databases and listings compiled pursuant to Government Code Section 65962.5 were checked for known hazardous materials contamination at the project site:

- United States Environmental Protection Agency (USEPA)
- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)/Superfund Enterprise Management System (SEMS)/Envirofacts database search
- State Water Resources Control Board (SWRCB)
- GeoTracker search for leaking underground storage tanks (LUST) and other cleanup sites
- Department of Toxic Substances Control (DTSC)
- EnviroStor database for hazardous waste facilities or known contamination sites
- Cortese List of Hazardous Waste and Substances Sites

The project site is not located on or adjacent to any known hazardous or contaminated sites. The EPA is retiring the CERCLIS database and is replacing it with SEMS. The SEMS database search did not produce any results associated with the project site, indicating that the site is free of known hazards and contaminants (USEPA 2018). A search of the EnviroStor database did not identify Resource Conservation and Recovery Act (RCRA) sites within 0.25 mile of project site (DTSC 2018). In addition, according to GeoTracker, there are no LUST or other clean-up sites within 0.25 mile of the project site (SWRCB 2018). Therefore, the project site is not located on a hazardous site and construction and operation would not affect nearby areas. No impact related to hazardous material sites would occur.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance after Mitigation Measure:** No Impact *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 for people residing or working in the project area?*

The project site is located 7.4 miles directly north of the John Wayne Airport, a general aviation airport. The project location is not within the John Wayne Airport Planning boundary or the runway**.**

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance after Mitigation Measure:** No Impact

*f. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?*

The proposed project is located on the existing project site and would not affect the local circulation system or otherwise physically interfere with an adopted emergency response plan or emergency evacuation plan. The project would comply with the Fire Code in Title 24 of the California Code of Regulations and would be reviewed and approved be the City of Orange Fire Department in order to ensure appropriate emergency access. Therefore, there would be no impacts.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance after Mitigation Measure:** No Impact

*g. Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?*

The project site is in an urban area and is not located in or adjacent a wildland fire hazard area as defined by the Department of Forestry and Fire Protection (CalFire 2007). The project would not increase the potential for wildland fires to occur. No impact would occur.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance after Mitigation Measure:** No Impact

# 10 Hydrology and Water Quality

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| 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 off-site; | □ | □ | ■ | □ |
| (ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; | □ | □ | ■ | □ |
| (iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or | □ | □ | ■ | □ |
| (iv) Impede or redirect flood flows? | □ | □ | ■ | □ |
| 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? | □ | □ | ■ | □ |

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| f. Potentially impact stormwater runoff from construction activities? | ☐ | ☐ | ■ | ☐ |
| g. Potentially impact stormwater runoff from post-construction activities? | ☐ | ☐ | ■ | ☐ |
| h. Result in a potential for discharge of stormwater pollutants from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas, loading docks or other outdoor work areas? | ☐ | ☐ | ■ | ☐ |
| i. Result in the potential for discharge of stormwater to affect the beneficial uses of the receiving waters? | ☐ | ☐ | ■ | ☐ |
| j. Create the potential for significant changes in the flow velocity or volume of stormwater runoff to cause environmental harm? | ☐ | ☐ | ■ | ☐ |
| k. Create significant increases in erosion of the project site or surrounding areas? | ☐ | ☐ | ■ | ☐ |

*a. Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?*

*f. Potentially impact stormwater runoff from construction activities?*

*g. Potentially impact stormwater runoff from post-construction activities?*

Water quality in the City of Orange is regulated by the Santa Ana Regional Water Quality Control Board (RWQCB). In addition, the City's Water Division provides a Consumer Confidence Report test of water quality. As part of Section 402 of the Clean Water Act, the U.S. Environmental Protection Agency (EPA) has established regulations under the National Pollutant Discharge Elimination System (NPDES) program to control direct storm water discharges. In California, the State Water Resources Control Board (SWRCB) administers the NPDES permitting program and is responsible for developing NPDES permitting requirements.

## Construction Impacts

Project construction would involve site preparation and building construction, ground-disturbing activities, and the use of heavy construction equipment. Ground disturbing and other construction activities associated with the project would have the potential to generate soil erosion and increase sediment loads in stormwater runoff resulting from exposed or disturbed soil. Additionally, spills, leakage, or improper handling and storage of substances such as oils, fuels, chemicals, metals, and other substances from vehicles, equipment, and materials used during construction phases could also cause pollutants to be collected in stormwater runoff and impact water quality.

Because the project would result in disturbance of more than one acre, on-site construction activities would be subject to the National Pollutant Discharge Elimination System (NPDES) Statewide General Construction Activity Stormwater permit. For covered projects, the NPDES construction permit requires visual monitoring of stormwater and non-stormwater discharges; sampling, analysis, and monitoring of non-visible pollutants; and compliance with applicable water quality standards established for receiving waters potentially affected by construction discharges. Additionally, construction site operators would be responsible for preparing and implementing a Stormwater Pollution Prevention Plan (SWPPP) that outlines project-specific Best Management Practices (BMPs) to control erosion, sediment release, and otherwise reduce the potential for discharge of pollutants in stormwater. Typical BMPs include:

- Utilizing temporary de-silting basins so surface water flows do not carry significant amounts of on-site soils and contaminants downstream;
- Conducting construction vehicle maintenance in staging areas where appropriate controls have been established so fuels, motor oil, coolant, and other hazardous materials are not deposited into areas where they may enter surface water and groundwater;
- Restricting the use of chemicals which may be transferred to surface waters by stormwater flows or leach to groundwater basins through water percolation into the soil;
- Installation of silt fences, erosion control blankets;
- Proper handling and disposal of wastes, and Installation of anti-tracking pads at site exits to prevent off-site transport of soil materials.

Implementation of construction BMPs would minimize surficial erosion and transport of pollutants, and provide compliance with applicable NPDES requirements, thereby protecting water quality both on- and off-site.

## Operational Impacts

Project operation would generate stormwater from impervious parking lots, rooftops, sidewalks, and paved play areas on the project site. Potential pollutants include automotive chemicals, trash, and sediment. The project site is currently developed with medical guest room facilities, including buildings, parking lots, and hardscaped recreational areas, and an existing single-family residence. The addition to the existing Ronald McDonald House building would replace some of the existing parking lots and hardscaped areas with other impervious surfaces such as structures or parking lots. However, the project would also replace a play area and orange tree grove with asphalt parking areas which would increase impervious surfaces on-site. According to the Water Quality Management Plan (WQMP) and construction plans, the project would increase the amount of impervious surfaces on-site from 38 percent to 87 percent of the Ronald McDonald House area.

The WQMP was prepared to determine necessary BMPs to control on-site stormwater runoff (Appendix D). Existing stormwater is collected through rain gutters and downspouts which outlet onto the surface and flows east to west, where some of the runoff is captured in existing catch basins. The project would include the implementation of an underground stormwater retention system. Stormwater from the Ronald McDonald portion of the project site would be diverted into a trench drain which will drain into a CDS unit for pretreatment before entering the stormwater retention basin. In addition, the proposed planters and landscaped areas would be used as a biofiltration BMP to remove stormwater pollutants and would be constructed pursuant to OC Technical Guidance Document design standards. According to the WQMP, the proposed stormwater retention basin would mitigate e 100 percent of the stormwater runoff from the design storm event, which would be an improvement over the existing conditions (Appendix D). The operation of the single-family residence at 802 W. Culver Avenue would not increase impervious surfaces or impact stormwater runoff on this portion of the project site. The proposed walkway pavers near the proposed office would be constructed out of permeable material. On-site development would also be required to comply with OMC water quality regulations, such as Title 7, Chapter 7.01 Water Quality and Stormwater Discharges. Implementation of the required BMPs during construction and operation of the project would reduce impacts to water quality and stormwater runoff to less than significant.

**Significance Determination:** Less than Significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation Measures:** Less than Significant

b. *Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?*

According to the Orange County Water District Three-Layer Basin Model, the project site is located in a region with a deep aquifer. Between 60-80 percent of the water supply for the City of Orange is drawn from municipal wells drilled into the Santa Ana River Aquifer from the Lower Santa Ana River groundwater basin managed by the Orange County Water District (CO General Plan Natural Resource Element, 2010).

The proposed expansion of the three-story Ronald McDonald House into the adjacent parking lot would increase the amount of impervious surfaced from 62 percent to 73 percent by extending the parking lot into the play area and orange groves. As shown in Figure NR-2 of the City's General Plan, the project site is not located in or near a groundwater recharge facility (City of Orange 2010d). Moreover, the geotechnical investigation included as Appendix C to this MND determined IS-MND revealed that groundwater was not encountered at the project site and that historically high groundwater levels is greater than 40 feet deep in the project area (Appendix C). Therefore, the project would not substantially interfere with groundwater supplies or with groundwater recharge and impacts would be less than significant.

**Significance Determination:** Less than Significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** Less than Significant

*c.(i) Would the project 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 result in substantial erosion or siltation on- or off-site?*

*c.(ii) Would the project substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?*

*c.(iii) Would the project 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 that would create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?*

*c.(iv) Would the project 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 that would impede or redirect flood flows?*

A significant impact may occur if the project results in a substantial alteration of drainage patterns which would result in a substantial increase in erosion or siltation during construction or operation of the project. As discussed in Impact a above, construction activities would be required to implement a SWPPP pursuant to the NPDES State General Permit during grading and construction. The SWPPP would specify BMPs that the project construction contractor would implement prior to and during grading and construction to minimize erosion and siltation impacts on- and off-site. Therefore, construction activities would not impact the drainage pattern of the site or result in flood, erosion, or siltation off-site.

The existing project site is generally flat and does not contain a stream or river which would be altered with the implementation of the project. In addition, as detailed under Impact D, the project site is not located without a flood zone. According to the WQMP included as Appendix D, existing stormwater is collected through rain gutters and downspouts which outlet onto the surface and flows east to west, where some of the runoff is captured in existing catch basins (Appendix D). The project would increase the amount of impervious surfaces on-site from 38 percent to 87 percent by removing the play area and orange tree grove. As detailed under Impact Aa, the project would include the implementation of an underground stormwater retention system. Stormwater from the Ronald McDonald portion of the project site would be diverted into a trench drain, which would drain into a CDS unit for pretreatment before entering the stormwater retention basin. According to the WQMP, the stormwater retention system would allow water to infiltrate into the ground and would mitigate potential runoff pollutants from entering the storm drain system or neighboring properties. The size of the on-site BMPs is sufficient to reduce stormwater runoff and pollutants from the project. Therefore, the project would not substantially alter the drainage pattern of the site or area or substantially increase erosion or siltation on- or off-site. Impacts would be less than significant.

**Significance Determination:** Less than Significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation Measures:** Less than Significant *d. Would the project in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?*

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), the project site is not located in a 100-year flood hazard zone (Map #06059C0161J) (FEMA 2018). A seiche is a phenomenon standing wave inside a water retention facility that occurs when seismic ground shaking induces standing waves (e.g., reservoirs and lakes). Such waves can cause retention structures to fail and flood downstream properties. No unenclosed water retention facilities are in close proximity to the project site. The closest unenclosed body of water is at the Santiago Creek Recharge Basin, which is approximately 1.2 miles east of the project. The risk associated with inundation by seiche waves is, therefore, not considered to be a potentially significant impact. Tsunamis are generated ocean wave trains generally caused by tectonic displacement of the sea floor associated with shallow earthquakes, sea floor landslides, rock falls, and exploding volcanic islands. The proposed project is located approximately 12 miles from the ocean shoreline and is not in a tsunami inundation area (California Emergency Management Agency, California Geological Survey, and the University of Southern California, Tsunami Inundation Map for Emergency Planning). The risk associated with tsunamis is, therefore, not considered a potential hazard. For these reasons, no adverse impacts associated with the release of pollutants due to inundation would occur and there would be no impact.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation Measures:** No Impact

*e. Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?*

As discussed under Impact a, the project would not violate water quality standards or degrade water quality during construction or operation and would not interfere with the Basin Plan. The project site is located within the Orange County Groundwater Basin (Basin 8-1), which currently has a medium priority designation from the California Department of Water Resources (DWR) (DWR 2019). Basins with medium and high priority designations are required to prepare a groundwater sustainability plan or an alternative plan for Special Acts Districts. OCWD is considered a Special Acts District and prepared a Basin 8-1 Alternative to demonstrate the sustainable management of the Basin (OCWD 2017). The proposed project does not involve the extraction or injection of groundwater. As discussed under Section 19, *Utilities and Service Systems*, the project would not significantly increase water use on-site. In addition, the project would not conflict with the provisions in the Basin 8-1 Alternative Plan. Therefore, the project would have a less than significant impact on the Basin Plan and the Alternative Plan.

**Significance Determination:** Less than significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation Measures:** Less than significant

h. *Result in a potential for discharge of stormwater pollutants from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas, loading docks or other outdoor work areas?*

As discussed under Impact a, the implementation of the SWPPP and BMPs during the construction and operation phases of the Proposed Project, respectively, the potential water quality impacts from these construction and operation activities and areas would be reduced to a level of less than significance. The operation of the project involves guest rooms and medical care, and does not include hazardous materials handling or storage areas, vehicle or equipment fueling or maintenance areas, or other uses associated with pollutants which would discharge into stormwater. Therefore, impacts would be less than significant. **Significance Determination:** Less than significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation Measures:** Less than significant

i. *Result in the potential for discharge of stormwater to affect the beneficial uses of the receiving waters?*

The project site is located in the North Orange County Watershed. Stormwater runoff from the project site would makes its way to the Santa Ana River. According to the WQMP, there are no impaired downstream receiving waters due to the location of the project site (Appendix D).

Storm water runoff discharged from the Project Site during construction and post-construction of the project will not detrimentally affect beneficial uses of the Santa Ana River or North Orange County Watershed. With the implementation of construction and post-construction storm water BMPs , the project's storm water runoff is not anticipated to cause or contribute to any water quality exceedances. The development of a site-specific SWPPP and the WQMP, through State and local regulatory requirements, would ensure that construction and post-construction BMPs would be appropriately implemented to protect beneficial uses. Therefore, this impact would be less than significant.

**Significance Determination:** Less than significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation Measures:** Less than significant

j. *Create the potential for significant changes in the flow velocity or volume of stormwater runoff to cause environmental harm?*

As part of the approved 2011 Orange County Model WQMP, there are specific requirements for controlling runoff volumes and flow velocities related to development projects. In particular, a specific requirement includes the evaluation of Hydrologic Conditions of Concern (HCOC's) that identifies if downstream waters are susceptible to impacts related to changes in peak flow rates, velocity, or volume.

Existing stormwater is collected through rain gutters and downspouts which outlet onto the surface and flows east to west, where some of the runoff is captured in existing catch basins. According to the WQMP, the post development conditions would create a HCOC (Appendix D). However, through the implementation of the proposed on-site underground stormwater retention system, full volume of stormwater would be captured on-site and peak flow rates and volumes would not exceed pre-development conditions. The WQMP concluded that the proposed development would mitigate 100 percent of existing and proposed runoff, which would improve the existing conditions. Therefore, impacts to downstream receiving waters would be less than significant.

**Significance Determination:** Less than significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation Measures:** Less than significant

*k. Create significant increases in erosion of the project site or surrounding areas?*

As discussed above under Impact a, erosion of the project site and surrounding area during construction would be controlled through the development of a SWPPP and implementation of BMPs. Upon completion of the project, the project site would be approximately 87 percent impervious. All on-site stormwater would be collected through an on-site stormwater retention basin. Therefore, with the implementation of the project, there would be no significant increases in erosion on the project site or in the surrounding area and impacts would be less than significant.

**Significance Determination:** Less than Significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** Less than Significant

# 11 Land Use and Planning

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Physically divide an established community? | ☐ | ☐ | ☐ | ■ |
| b. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect? | ☐ | ☐ | ■ | ☐ |

*a. Would the project physically divide an established community?*

The proposed project would not disrupt or modify the existing roadway network or disrupt residential neighborhoods in the project site vicinity. The project would involve development on an open lot adjacent to the existing Ronald McDonald House which does not prevent access to any other properties surrounding the project site. In addition, the proposed project would include an operational change from residential to office use at the existing single-family residence located in the southeastern portion of the project site. The existing single-family residence is located on a corner and surrounded by the Ronald McDonald House, existing office uses to the south and east, and a residential neighborhood to the north and east. Changing the use to an office space would not physically divide existing residences from each other beyond current conditions. In addition, potentially disruptive deliveries and visitor parking would not occur at the existing residence, thereby maintaining the residential feel of the neighborhood.

The proposed addition would be located on the southern area of the property, adjacent to the O-P zoning district and the existing office building. As discussed in Section 1, *Aesthetics,* the second- and third-floor bedroom windows facing the adjacent residences to the east would be raised to 5 feet 6 inches above the finished floor and would be reduced in size to two feet by two feet to protect the privacy of existing residences. In addition, the second-floor deck would be screened with a metal screen covered with vines and plants and a row of cypress trees would be planted along the eastern property line to further protect the privacy of adjacent residences. Therefore, implementation of the proposed project would not result in the physical division of any established community.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significant Determination after Mitigation:** No Impact

b. *Would the project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?*

The existing General Plan land use designation on the project site is Low Density Residential 2-6 DU/AC and the zoning designation is R-1-6 (Single Family Residential 6,000 sf). At the time of the approval and construction of the original Ronald McDonald House, the project site was zoned for the density of development that was both implemented at that time and envisioned for future expansion. Subsequent to the original approval, the project site was rezoned as R-1-6.

The project applicant is requesting a General Plan Amendment to change the land use designation of the project site to Public Facilities and Institutions (PFI) and a zone change to Public Institution (P-I) to allow for the expansion of the existing Ronald McDonald House to increase the current number of guest room from 21 guest rooms to 44 and an operational change of an existing single-family residence located on the southeastern portion of the project site from residential to office use. Properties to the north and east are zoned R-1-6 (Single Family Residential 6,000 sq ft) and have a General Plan land use designation of LDR (Low Density Residential). Properties to the south are zoned O-P (Office Professional) and have a General Plan land use designation of NOP (Neighborhood Office Professional). Properties to the west are zoned P-I (Public Institution) and have a General Plan land use designation of PFI (Public Facilities and Institutions). The project area contains a mixture of land uses, and the change of land use and zone change to PFI and P-I on the project site would be consistent with much of the surrounding land uses and existing development.

According to the City's General Plan Land Use Element, Public Facilities and Institutions provide for several types of public, quasi-public, and institutional land uses including schools, colleges, and universities. They also include city and county facilities, hospitals and major utility easements and properties, service organizations and housing related to an institutional use such as dormitories, employee housing, assisted living, convalescent homes, and skilled nursing facilities. Land uses in this category include both privately held open spaces and public lands. The maximum permitted intensity for institutions, such as universities and hospitals, is a 2.0:1 floor-area-ratio (FAR). Combined with the existing 15,000 square feet of floor area, the proposed expansion and office space would result in a total of 32,602 square feet of floor area and a Floor Area Ratio (FAR) of 0.754:1. No new development or physical modifications to the single-family residence are proposed. The General Plan also contains goals and various goals and policies that regulate land use in the City. A consistency analysis of policies that apply to the proposed project was conducted, as shown in Table 14.

### Table 14 General Plan Land Use Consistency Analysis

| Applicable Policies | Consistent? |
|---|---|
| **Land Use Element** | |
| Policy 1.4: Ensure that new development reflects existing design standards, qualities, and features that are in context with nearby development. | **Yes**; the project would be consistent with the existing structure and with the Historic Preservation Design Standards. |
| Policy 1.6: Minimize effects of new development on the privacy and character of surrounding neighborhoods. | **Yes**; the addition would be sited away from existing single-family residences. |
| Policy 5.5: Continue to require consistent, high quality, historically-referenced design within Old Towne**.** | **Yes**; the project would comply with the Historic Preservation Design Standards and would be reviewed by the DRC. |

| Applicable Policies | Consistent? |
|---|---|
| Policy 6.1: Ensure that new development is compatible with the style and design of established structures and the surrounding environment. | **Yes**; the addition is designed to be compatible with and integrate into the existing structure. |
| Policy 6.2: In areas where residential uses abut commercial or industrial land uses, use buffering techniques to improve compatibility. Such techniques include the use of setbacks, screening, soundwalls with pedestrian access, and appearance standards**.** | **Yes**; the project does not further encroach closer to the existing residential uses. The addition is located adjacent to the office space to the south. |
| Policy 6.8: Maximize landscaping along streetscapes and within development projects to enhance public health and environmental benefits. | **Yes**; The project would replace all street and on-site trees with new trees and landscaping. |
| **Natural Resources Element** | |
| Policy 2.13: Control surface runoff water discharges into the stormwater conveyance system to comply with the City's National Pollutant Discharge Elimination System (NPDES) Municipal Permit and other regional permits issued by the Santa Ana Regional Water Quality Control Board. | **Yes**; the project would maintain surface runoff on-site during construction and operation with the implementation of a SWPPP and the BMPs recommended in the WQMP. |
| Policy 2.14: Reduce pollutant runoff from new development by requiring use of the most low development impact practices and effective Best Management Practices (BMPs) currently available. | **Yes**; the project would implement BMPs recommended in the WQMP. |
| Policy 2.15: Minimize the amount of impervious surfaces and associated urban runoff pollutants in new development and significant redevelopment throughout the community. | **Yes**; the project is including impervious pavement for the new parking lot area. |
| Policy 7.1: Preserve the scenic nature of significant ridgelines visible throughout the community. | **Yes**; the project would not block views or impact the scenic ridgelines in the City. |
| **Noise Element** | |
| Policy 1.1: Consider potential excessive noise levels when making land use planning decisions. | **Yes**, the noise analysis shows the existing noise levels would not impact the proposed addition or uses on-site |
| Policy 1.4: Ensure that acceptable noise levels are maintained near noise-sensitive uses. | **Yes**; the noise levels at the outdoor play area and balconies would not exceed 65 dBA Ldn. |
| Policy 1.6: Require an acoustical study for proposed developments in areas where the existing and projected noise level exceeds or would exceed the maximum allowable levels identified in Table N-3. The acoustical study shall be performed in accordance with the requirements set forth within this Noise Element. | **Yes**; noise measurements and analysis were conducted for the proposed project. |
| **Cultural Resources and Historic Preservation Element** | |
| Policy 2.3: Ensure that those qualities that contribute to the historic character of designated Neighborhood Character Areas are retained through application of design guidelines consistent with the local context and key physical attributes of each neighborhood. | **Yes**; the addition is designed to be compatible with the existing structure and with the Historic Preservation Design Guidelines. |
| Policy 4.1: Identify, designate, and protect historically and culturally significant archaeological resources or sites. | **Yes**; the existing orange grove on-site was determined to not be historically significant. |
| **Urban Design Element** | |
| Policy 5.2: Protect the single-family character and enhance the quality of Old Towne Orange's residential areas while accommodating change in the commercial core. | **Yes**; the proposed addition is located away from existing single-family residences and is located along the main roadway adjacent to existing office buildings. |

| Applicable Policies | Consistent? |
|---|---|
| Policy 5.3: Require infill development to be compatible with the scale and appearance of neighboring historic structures and to comply with all applicable historic preservation design and development standards and Secretary of the Interior standards. | **Yes**; the project is compatible with the existing structure and will be reviewed by the DRC for compliance with the Historic Preservation Design Guidelines. |
| Policy 6.1: Encourage consistent high quality design of development projects, and provide development standards that ensure building and site design that is well integrated with infrastructure and circulation systems. | **Yes**; the project contains high quality design features and integrates with the existing structure. The project will also be reviewed by the DRC for compliance with design standards. |

As shown in Table 14, the project is consistent with the applicable land use policies in the General Plan. With approval of the requested discretionary actions, the project would be consistent with the land use and zoning designations and impacts would be less than significant.

**Significance Determination:** Less than significant

**Mitigation Measures:** No Mitigation is Required

**Significant Determination after Mitigation:** Less than significant

# 12 Mineral Resources

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| 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? | ☐ | ☐ | ☐ | ■ |

*a. Would the project 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. Would the project 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?*

The project site is currently developed and is located in an urbanized area and is surrounded by commercial and residential uses. According to the California Department of Conservation, the project site and surrounding area are not located in a Mineral Resource Zone (2 zone) or other known or potential mineral resource area as defined by the California Department of Conservation (DOC 1979). Because there are no known mineral resources or mineral resource extraction on or near the project site and the proposed project does not involve the use or mining of mineral resources, the project would have no impact on the availability or recovery of mineral resources.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** No Impact

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# 13 Noise

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project result in: | | | | |
| 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? | ☐ | ☐ | ☐ | ■ |

## General Noise Background

### *Noise*

Sound is a vibratory disturbance created by a moving or vibrating source, which is capable of being detected by the hearing organs. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment (Caltrans 2013).

Noise levels are commonly measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels so that they are consistent with the human hearing response. Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used to measure earthquake magnitudes. A doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; dividing the energy in half would result in a 3 dB decrease (Crocker 2007).

Human perception of noise has no simple correlation with sound energy: the perception of sound is not linear in terms of dBA or in terms of sound energy. Two sources do not “sound twice as loud” as one source. It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA, increase or decrease (i.e., twice the sound energy); that a change of 5 dBA is readily perceptible (8 times the sound energy); and that an increase (or decrease) of 10 dBA sounds twice (half) as loud ([10.5x the sound energy] Crocker 2007).

Sound changes in both level and frequency spectrum as it travels from the source to the receiver. The most obvious change is the decrease in level as the distance from the source increases. The manner by which noise reduces with distance depends on factors such as the type of sources (e.g., point or line, the path the sound will travel, site conditions, and obstructions). Noise levels from a point source typically attenuate, or drop off, at a rate of 6 dBA per doubling of distance (e.g., construction, industrial machinery, ventilation units). Noise from a line source (e.g., roadway, pipeline, railroad) typically attenuates at about 3 dBA per doubling of distance (Caltrans 2013a). Noise levels may also be reduced by intervening structures; the amount of attenuation provided by this "shielding" depends on the size of the object and the frequencies of the noise levels. Natural terrain features such as hills and dense woods, and man-made features such as buildings and walls, can significantly alter noise levels. Generally, any large structure blocking the line of sight will provide at least a 5-dBA reduction in source noise levels at the receiver (Federal Highway Administration [FHWA] 2011). Structures can substantially reduce exposure to noise as well. The FHWA's guidelines indicate that modern building construction generally provides an exterior-to-interior noise level reduction of 20 to 35 dBA with closed windows.

The impact of noise is not a function of loudness alone. The time of day when noise occurs and the duration of the noise are also important factors of project noise impact. Most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors have been developed. One of the most frequently used noise metrics is the equivalent noise level ($L_{eq}$); it considers both duration and sound power level. $L_{eq}$ is defined as the single steady A-weighted level equivalent to the same amount of energy as that contained in the actual fluctuating levels over time. Typically, $L_{eq}$ is summed over a one-hour period. $L_{max}$ is the highest root mean squared (RMS) sound pressure level within the sampling period, and $L_{min}$ is the lowest RMS sound pressure level within the measuring period (Crocker 2007).

Noise that occurs at night tends to be more disturbing than that occurring during the day. Community noise is usually measured using Day-Night Average Level ($L_{DN}$), which is the 24-hour average noise level with a +10 dBA penalty for noise occurring during nighttime hours (10:00 p.m. to 7:00 a.m.); it is also measured using Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a +5 dBA penalty for noise occurring from 7:00 p.m. to 10:00 p.m. and a +10 dBA penalty for noise occurring from 10:00 p.m. to 7:00 a.m. (Caltrans 2013a). Noise levels described by $L_{DN}$ and CNEL usually differ by about 1 dBA. The relationship between the peak-hour Leq value and the $L_{DN}$/CNEL depends on the distribution of traffic during the day, evening, and night. Quiet suburban areas typically have CNEL noise levels in the range of 40 to 50 dBA, while areas near arterial streets are in the 50 to 60-plus CNEL range. Normal conversational levels are in the 60 to 65-dBA Leq range; ambient noise levels greater than 65 dBA Leq can interrupt conversations (FTA 2018).

Some land uses are more sensitive to ambient noise levels than other uses due to the amount of noise exposure and the types of activities involved. For example, residences, motels, hotels, schools, libraries, churches, nursing homes, auditoriums, museums, cultural facilities, parks, and outdoor recreation areas are more sensitive to noise than commercial and industrial land uses.

### *Vibration*

Vibration is a unique form of noise because its energy is carried through buildings, structures, and the ground, whereas sound is simply carried through the air. Thus, vibration is generally felt rather than heard. Some vibration effects can be caused by noise (e.g., the rattling of windows from passing trucks). This phenomenon is caused by the coupling of the acoustic energy at frequencies that are close to the resonant frequency of the material being vibrated. Typically, ground-borne vibration generated by manmade activities attenuates rapidly as distance from the source of the vibration increases.

## Existing Noise Environment

The existing Ronald McDonald House is located approximately 50 feet east of South Batavia Street between West Palmyra Avenue and West La Veta Avenue. The primary off-site noise sources in the project area are motor vehicles passing through South Batavia Street. Motor vehicle noise is a concern because it is characterized by a high number of individual events that often create sustained noise levels. Ambient noise levels would be expected to be highest during the daytime and nighttime rush hours unless congestion slows speeds substantially.

To determine ambient noise levels in the project site vicinity, two 15-minute sound level measurements were taken using an Extech ANSI Type II sound level meter between 5:03 PM and 5:36 PM on September 11, 2018 (refer to Appendix E for sound measurement data and Figure 8 for noise measurement locations). Noise Measurement (NM) 1 was taken directly west of the project site facing South Batavia Street and Noise Measurement (NM) 2 was taken towards the east boundary of the project site. The location for Noise Measurement 1 was selected because it is the closest collector street to the project site and would likely experience the largest increase in vehicle trips, and, therefore, the largest increase in traffic noise, generated by the proposed project. The location for Noise Measurement 2 was selected to represent the ambient noise level at the nearest noise-sensitive. receptors to the project site within the project site boundaries away from South Batavia Street. Noise measurements were taken on a weekday during the evening peak traffic hour to represent maximum noise levels in the area. Nearby noise sensitive receptors primarily include single-family residences surrounding the project site on South Batavia Street and the University of San Francisco Orange County and Sisters of St. Joseph campus across South Batavia Street east of the project site. See Figure 8 for the locations of sound measurements. As shown in Table 15, ambient noise levels in the project site vicinity ranged from approximately 59 to 66 dBA Leq. Average noise levels are provided in Leq for a 15-minute measurement period (Leq[15]); Lmin and Lmax are also provided.

### Table 15 Noise Measurements

| Measurement Location | Sample Times | Distance to Roadway Centerline | Leq [15] (dBA)[1] |
|---|---|---|---|
| 1. 383 S Batavia St, directly adjacent to road | 5:03 PM – 5:18 PM | 25 feet | 66.4 |
| 2. 383 S Batavia St, adjacent to the eastern boundary wall of the project site | 5:21 PM – 5:36 PM | 45 feet | 58.8 |

See Appendix E for noise monitoring data. See Figure 8for sound measurement locations.

[1] The equivalent noise level (Leq) is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). For this measurement, the Leq was over a 15-minute period (Leq [15]).

Source: Rincon Consultants, field measurements on September 11, 2018 using ANSI Type II Integrating sound level meter

**Figure 8 Sound Level Measurement Locations**


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## Regulatory Setting

### *City of Orange County General Plan*

The City of Orange General Plan Noise Element provides guidance for the control of noise to protect residents, workers, and visitors from potentially adverse noise impacts. Its primary goal is to regulate long-term noise impacts to preserve acceptable noise environments for all types of land uses. The Element defers regulation of temporary, point-source noises such as construction activities to the City's Municipal Code Noise Ordinance. With regard to long-term noise impacts, the Element contains stated goals, policies, and implementation measures designed to guide City decision making with respect to its purpose. Though the following policies and measures would not directly regulate the proposed project's operational noise impacts, adherence to them would ensure the project's consistency with the City's General Plan. Some policies and measures have been omitted for relevance.

**Goal 1.0: Promote a Pattern of Land Uses Compatible with Current and Future Noise Levels**

- Policy 1.1: Consider potential excessive noise levels when making land use planning decisions.
- Policy 1.2: Encourage new development projects to provide sufficient spatial buffers to separate excessive noise generating land uses and noise-sensitive land uses.
- Policy 1.3: Incorporate design features into residential and mixed-use projects that can be used to shield residents from excessive noise.
- Policy 1.4: Ensure that acceptable noise levels are maintained near noise-sensitive areas.
- Policy 1.5: Reduce impacts of high-noise activity centers located near residential areas.
- Policy 1.6: Require an acoustical study for proposed developments in areas where the existing and projected noise level exceeds or would exceed the maximum allowable levels identified in Table N-3. The acoustical study shall be performed in accordance with the requirements set forth within the Noise Element.

**Goal 2.0: Minimize Vehicular Traffic Noise in Residential Areas and near Noise-sensitive Land Uses**

- Policy 2.1: Encourage noise-compatible land uses along existing and future roadways, highways, and freeways.
- Policy 2.2: Encourage coordinated site planning and traffic control measures that minimize traffic noise in noise-sensitive land use areas.
- Policy 2.5: Work toward understanding and reducing traffic noise in residential neighborhoods with a focus on analyzing the effects of traffic noise exposure throughout the City.

**Goal 7.0: Minimize Vehicular Traffic Noise in Residential Areas and near Noise-sensitive Land Uses**

- Policy 7.2: Require developers and contractors to employ noise minimizing techniques during construction and maintenance operations.
- Policy 7.3: Limit the hours of construction and maintenance operations located adjacent to noise-sensitive land uses.

The Noise Element utilizes an adapted noise and land use compatibility matrix based on the State's compatibility guidelines and modified to reflect City standards for residential and other areas. The project is proposing a land use designation and zoning designation change from single-family designations to Public Institution land use and zoning. According to the City of Orange's noise standards, exterior noise up to 65 dBA Ldn and interior noise level up to 45 dBA Ldn is normally acceptable for public institutions (City of Orange General Plan Noise Element 2010).

### *City of Orange County Municipal Code*

Chapter 8.24 of the OMC contains noise control regulations with the City. The OMC exempts construction activities from the chapter's provisions during daytime hours when these activities would occur. Noises associated with the maintenance of property (e.g., landscaping, cleaning, minor repair work) would similarly be exempt during daytime hours. Noise from transportation sources traveling on roadways would be subject to the City's General Plan Noise Element.

#### 8.24.040: Exterior Standards

The OMC lists the following hourly average (Leq) and maximum noise levels at residential properties from stationary noise sources in the City:

- Hourly average (Leq)
  - 55 dBA from 7:00 AM to 10:00 PM
  - 50 dBA from 10:00 PM to 7:00 AM
- Maximum level
  - 70 dBA from 7:00 AM to 10:00 PM
  - 65 dBA from 10:00 PM to 7:00 AM

#### 8.24.050: Exemptions from Chapter Provisions

The following activities are exempt from the provisions of Chapter 8.24:

E. Noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities take place between the hours of 7:00 AM and 8:00 PM on any day except for Sunday or a Federal holiday, or between the hours of 9:00 AM and 8:00 PM on Sunday or a Federal holiday. Noise generated outside of the hours specified are subject to the noise standards identified in Table 8.24.040.

I. Noise sources associated with the maintenance of real property, provided such activities take place between the hours of 7:00 AM and 8:00 PM on any day except Sunday or a Federal holiday, or between the hours of 9:00 AM and 8:00 PM on Sunday or a Federal holiday. Operation of leaf blowers are regulated under OMC Chapter 8.26.

L. Mobile noise sources including but not limited to operational noise from trains, or automobiles or trucks traveling on roadways. Transportation noise as related to noise/land use compatibility is subject to the City's General Plan Noise Element.

As referenced by Section 8.24.050(e), construction activities occurring outside of the provided hours would be regulated by the standards identified in Table 8.24.040 of the OMC.

## Sensitive Land Uses in the Project Vicinity

The noise sensitive receptors closest to the project site include single-family residential uses immediately adjacent to and approximately 50 feet north and 80 feet east of the project site, as well as the University and Sisters of St. Joseph campus across South Batavia Street approximately 60 feet west of the project site. Additionally, the West Orange Elementary School is located approximately

0.3 miles northwest of the project site and St. Joseph Hospital is located 0.2 miles southeast of the project site. Moreover, the existing structure, as a care facility is considered a noise sensitive receptor.

a. *Would the project result in 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?*

## Construction

Construction noise impacts from general construction activities of the project would include noise generated from construction equipment involved in minor grading and building of the project structures. The loudest piece of equipment from this type of construction would be a dozer used during grading. According to the Roadway Construction Noise Model (RCNM), at 50 feet (the approximate average distance of operating construction equipment to the nearest off-site noise sensitive land use, the single-family residences to the east), a dozer would generate a noise level of 77.7 dBA Leq. While nearby residences would experience elevated noise levels from construction activities, the duration would be short term, approximately one year from 2021 to 2022, and an existing, 6-foot high concrete wall separates the proposed project and the nearest residential properties to the east; this wall would further attenuate noise levels. In addition, Section 8.24.050(E) of the OMC exempts construction noise in a residential zone between the hours of 8:00AM – 7:00 PM on weekdays, 9:00 AM – 7:00 PM on Saturdays, and 10:00 AM – 6:00 PM on Sundays. Construction would not occur outside the designated hours and would not occur during regular hours of sleep; therefore, impacts from construction noise would be less than significant.

### *Off-site Noise*

The noise-sensitive receptors nearest to the project site are single-family residences adjacent to the north and east. New sources of noise associated with the project would consist of additional vehicles entering and exiting the proposed residences along South Batavia Street. According to the project Traffic Study, the proposed project would generate 159 daily trips, 14 AM peak hour trips, and 14 PM peak hour trips based on trip generation rates per thousand square feet (Ganddini 2018). The segment of South Batavia Street in front of the project site had approximately 10,000 daily trips in 2018 (OCTA 2018b). Therefore, the project would result in an approximately two percent increase from the current 10,000 daily trips on South Batavia Street. Based on the logarithmic scale, a doubling of sound energy is equivalent to an increase of 3 dBA and in general a 3 dBA change in the ambient noise level is perceptible to humans (FTA 2006). This minor percent increase in traffic would not generate a noise level increase approaching 3 dBA and the change in traffic noise would not be perceptible to nearby noise sensitive receptors.

In addition, the project would not generate substantial operational noise. The addition includes balconies on the second and third levels, which would be utilized by persons staying in the respective rooms. Noise levels for typical conversations are approximately 50-60 dBA (CDC 2019). Therefore, noise from the balconies would not exceed existing ambient noise levels from the adjacent roadway shown in Table 15. In addition, the project would be subject to the exterior noise standards in OMC Section 8.24.040. Project mechanical equipment would be located in the center of the rooftop area in a mechanical well that would be below the sloped roof height. There is an existing playground used by children at the Ronald McDonald House. As shown in Figure 5, the playground is proposed to be relocated behind the proposed new office. The increase in rooms from 21 to 44 could increase the number of children using the proposed playground. However, the proposed playground area is smaller than the existing play area and the playground is further away from the adjacent single-family residence than the existing location of the playground. In addition, Ronald McDonald House would continue to only allow the playground to be utilized during daytime hours and would not conflict with City noise policies. The playground noise would also be attenuated by the 6-foot-tall CMU block wall on the project boundary with adjacent properties. Therefore, the project's operational noise would not exceed OMC standards and impacts would be less than significant.

### *On-site Noise*

This analysis considers a substantial permanent increase in ambient noise levels of 5 dBA CNEL or greater to be significant where the ambient noise level is less than 65 dBA and 3 dBA CNEL or greater when the existing ambient noise level is greater than 65 dBA (City of Orange General Plan Noise Element 2010). According to the City's General Plan noise-sensitive uses generally include residences, hospitals, convalescent and day care facilities, schools, and libraries.

Although CEQA does not require analysis of potential impacts of the environment on a project (*Ballona Wetlands Land Trust et al. v. City of Los Angeles*), the following impact analysis of the ambient environment on the project is provided for informational purposes. As shown in Table 15, the sound level in the immediate vicinity of the project site is approximately 66 dBA Leq. Because the project site is located in an urbanized area, the daily Ldn value would be roughly equal to the peak hourly Leq at the proposed project (SWRCB 1999). Therefore, noise levels at the project site would be approximately 66 dBA Ldn.

According to the City's noise standards described under *Regulatory Setting*, exterior noise up to 65 dBA Ldn is normally acceptable for care facilities. Based on the ambient noise level of about 66 dBA Ldn, the proposed project would be exposed to noise slightly exceeding the normally acceptable range at the project boundary. However, this noise level would be reduced the further in from South Batavia Street that a receptor is located, and noise at the exterior play area, which is being relocated behind the proposed office, would not exceed 65 dBA Ldn as it is located approximately 180 feet from South Batavia Street. Exterior balconies and decks are setback from the street approximately 50 feet, and would not be anticipated to exceed 65 dBA Ldn. Furthermore, the manner in which buildings in California are constructed typically provides a reduction of exterior-to-interior noise levels of approximately 20 to 35 dBA with closed windows (FHWA 2011). Therefore, interior noise levels at the proposed project would not exceed the City's 45 dBA interior noise standard and the project would be consistent with the City's noise land use compatibility standards.

**Significance Determination:** Less than Significant Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** Less than Significant Impact

b. *Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?*

Groundborne vibration is a concern for projects that require heavy construction activity such as blasting, pile-driving, and operating heavy earth-moving equipment. Groundborne vibration can result in a range of impacts, from minor annoyances to people to major shaking that damages buildings. Sensitive receptors for vibration include structures (especially older masonry structures), people (especially residents, the elderly and sick), and vibration-sensitive equipment.

Construction activities known to generate excessive ground-borne vibration, such as pile driving, would not be conducted as part of the project. A possible source of vibration during general project construction activities would be a vibratory roller, which may be used within approximately 100 feet of the nearest off-site residence. Construction activity would occur for approximately one year from 2021 to 2022. A vibratory roller would be used intermittently during a portion of the construction period and would be considered a transient vibration source (one that fades away with time). According to Caltrans, a severe impact to humans from transient vibration sources is 2.0 PPV and 0.5 PPV for historic buildings (Caltrans 2013b). A vibratory roller, which may be used as close as 25 feet to adjacent residential properties, would create approximately 0.210 inch per second peak particle velocity (PPV) at a distance of 25 feet (Caltrans 2013b). This would be lower than what is considered a “severe” impact for humans (0.4 inches per second PPV) and the structural damage impact to older residential structures of 0.5 inches per second PPV. Therefore, although a vibratory roller may be perceptible to nearby human receptors, temporary impacts associated with the roller (and other potential equipment) would not significantly impact adjacent sensitive receptors or the existing single-family residence at 802 W. Culver.

The project would also require trenching to along the southern project site and through the 802 W. Culver property, adjacent to the single-family residence which is a contributor to the Old Towne Orange Historic District. Based on the Caltrans *Transportation and Construction Vibration Guidance Manual* (Caltrans 2013b)*,* the following groundborne vibration levels are potentially damaging for various structures:

- 0.12 peak particle velocity (PPV) for extremely fragile historic buildings
- 0.2 PPV for fragile buildings
- 0.5 PPV for historic and older buildings

The single-family residence has been relocated and updated since its original construction and is not considered a fragile building. Trenching construction work would require the use of a compact excavator near the single-family residence, which would be as close as nine (9) feet from the foundation and structure of this historical built environment resource. Using Caltrans *Transportation and Construction Vibration Guidance Manual*, construction equipment at nine feet from the residence would produce the following vibration levels:

- Large bulldozer: 0.27 PPV
- Driller: 0.27 PPV
- Loaded truck: 0.23 PPV
- Jackhammer: 0.11 PPV
- Small Bulldozer: 0.01 PPV

The compact excavator would be less intensive than all of the above referenced equipment, all of which would not generate vibration levels which would impact the structure. Therefore, construction vibration impacts would be less than significant.

**Significance Determination:** Less than Significant Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** Less than Significant Impact

*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 project site is approximately 7.4 miles north of the John Wayne Airport (SNA). The proposed project is outside of the 65 dBA noise contours of this airport. In addition, the project site is not located in the vicinity of a private airstrip. Therefore, no impact related to noise from public airports or private airstrips would occur.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** No Impact

# 14 Population and Housing

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Induce substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)? | □ | □ | ■ | □ |
| b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere? | □ | □ | ■ | □ |

*a. Would the project induce substantial 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)?*

The proposed project is an expansion of the existing Orange County Ronald McDonald House to increase the current number of guest rooms from 21 to 44. These guest rooms are temporary accommodations utilized by the families of patients obtaining treatment at nearby medical facilities. The proposed project would include a change in operational use associated with the single-family residential building, located on the southeast parcel of the project site, from residential to office use. The existing house would provide auxiliary office space associated with the Ronald McDonald House. With the additional guest rooms, the project would result in an increase in employees by 4 full-time and 5 part-time staff members. This would represent an insignificant population growth and, due to the urban nature of the area, it is anticipated the employees would come from the existing workforce. Therefore, impacts would be less than significant.

**Significance Determination:** Less than significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** Less than significant

*b. Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?*

As discussed above, the proposed project would include a change in operational use associated with the on-site single-family residence. The residence is currently not occupied and the project would remove one housing unit, which would not result in a substantial displacement of housing units or people that would necessitate construction of replacement housing elsewhere. The project would result in a less than significant impact.

**Significance Determination:** Less than significant

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** No Impact

# 15 Public Services

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| a. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the 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: | | | | |
| 1 Fire protection? | ☐ | ☐ | ■ | ☐ |
| 2 Police protection? | ☐ | ☐ | ■ | ☐ |
| 3 Schools? | ☐ | ☐ | ☐ | ■ |
| 4 Parks? | ☐ | ☐ | ☐ | ■ |
| 5 Other public facilities? | ☐ | ☐ | ■ | ☐ |

*a.1. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered fire protection facilities, or the need for new or physically altered fire protection facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives?*

The Orange Fire Department (OFD) provides fire protection and emergency services throughout the City. The OFD provides a wide array of services to the community, including emergency medical service, urban search and rescue, hazardous materials first response, terrorism first response, and fire and life safety inspections. The OFD operates eight fire stations and has a staff of 136, including 124 sworn firefighting personnel, and provides fire paramedic and ambulance service with an integrated paramedic/transportation system. According to the City General Plan Safety Element, paramedic teams are located at eight stations, three of which also provide ambulance service with an average response time of 4 minutes, 47 seconds, and average transport unit response times of 5 minutes, 29 seconds. The OFD has automatic aid agreements with the Cities of Anaheim, Santa Ana, and Garden Grove, and with the Orange County Fire Authority.

The project site is located in the service area of the City of Orange Fire Department. The OFD operates on a “boundary drop” basis, whereby the closest available fire units respond to a call regardless of the jurisdiction from which the call originated. The addition of 23 new guest rooms (short-term housing), and operational change from residential to office use, associated with the single-family residence, would result in an increase in demand for fire protection services. Although the project would incrementally increase demand for additional fire service, a Fire Facility Fee (OMC, Chapter 15.38) is required, and a verbal communication with the Fire Prevention Division has confirmed that the OFD has adequate capabilities to serve the proposed project (OFD 2018). The proposed project would comply with the California Fire Code in effect at the time of the application for the building permit. The proposed project also includes the installation of two fire hydrants on the project site. Therefore, no new or expanded fire protection facilities would be needed and impacts related to fire protection services would be less than significant.

**Significance Determination:** Less than significant

**Mitigation Measures:** No Mitigation is Required

**Significant Determination after Mitigation:** Less than significant

*a.2. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered police protection facilities, or the need for new or physically altered police protection facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives?*

The Orange Police Department (OPD) provides police protection services throughout the City. The OPD has a mutual aid agreement with all law enforcement agencies in Orange County in the event that supplementary assistance is needed. According to the Police Department, OPD has 250 employees that serve the City. The OPD headquarters and main police station is located at 1107 North Batavia Avenue, approximately 1.6 miles directly north of the project site. The estimated response time from the OPD headquarters to the project site is 6 minutes.

The OPD already provides police projection services to the project site. The size and scope of the proposed project, combined with the fact that the use is currently in operation on the existing site, would not substantially increase the need for additional police services or trigger the need for new or physically altered police facilities to serve the project site. A Police Facility Fee (OMC, Chapter 3.13) has been established by the City that, when collected for this project, would offset any incremental demand created. In addition, the OPD would have adequate capabilities to serve the proposed project, based on verbal communication with the OPD Crime Prevention Division (OPD 2018).

To ensure adequate services are provided and to minimize the demands on police services, security and design measures which employ defensible space concepts will be utilized throughout the formation of development and construction plans. These measures incorporate the concepts of Crime Prevention through Environmental Design (CPTED), which involves the placement, and orientation of structures, access and visibility of common areas, placement of doors, windows, addressing, lighting and landscaping. CPTED promotes public safety, physical security and allows citizens the ability to monitor activity. In addition, the project will comply with the requirements established in Chapter 15.52 of the Orange Municipal Code (Building Security Ordinance #6-18). The CPTED measures and Orange Building Security Standards would be incorporated into the project and would further site safety enhancements.

Based on the analysis above, no significant impact related to the provision of police protection service would occur.

**Significance Determination:** Less than significant

**Mitigation Measures:** No Mitigation is Required

**Significant Determination after Mitigation:** Less than significant

*a.3. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered schools, or the need for new or physically altered schools, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios or other performance objectives?*

The project site is located within the Orange Unified School District (OUSD). The schools in the vicinity includes Fairhaven Elementary School 1.4 miles southeast of the project site, Yorba Middle School 1.8 miles northeast of the project site, and the Garden Grove High School located 4.24 miles east of the project site. The proposed project does not include additional residences that would substantially increase the local population and necessitate new schools. Because the proposed project would include temporary housing and associated office space, operation of the project would not generate additional students in the OUSD and no impact would occur.

Additionally, pursuant to the provisions of Government Code Section 65996, a project's impact on school facilities is fully mitigated through payment of the requisite school facility development fees current at the time a building permit is issued. Therefore, with payment of the required fees, potential impacts to school services and facilities associated with implementation of the proposed Project no impact would occur.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required.

**Significant Determination after Mitigation:** No Impact

*a.4. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered parks, or the need for new or physically altered parks, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios or other performance objectives?*

The City owns and has developed 24 parks, which consist of approximately 251 acres of parkland, managed by the Community Services Division. The nearest park to the project site is Santiago Park, which is located in the City of Santa Ana approximately 0.65 mile directly south of the project site at 600 East Memory Lane. The nearest City of Orange park is Hart Park, approximately 0.7 miles southeast of the project site. The project includes the expansion of temporary housing associated with the existing Ronald McDonald House by 23 rooms and changing the use of the on-site single-family residence from residential to office use. The increase in the number of rooms could increase the use of nearby recreational amenities. However, the increase would be insignificant due to the small increase in the number of rooms. In addition, the project would relocate a play area and playground equipment which would offset the need for guests to use recreational facilities in the City. The project would have no direct impact to any existing parks, nor would it add resident population that would increase demand for parks. Therefore, the project would have a less than significant impact.

**Significance Determination:** Less than significant

**Mitigation Measures:** No Mitigation is Required

**Significant Determination after Mitigation:** No Impact

*a.5. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered public facilities, the public of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for other public facilities?*

Development of the proposed project would result in incremental impacts to the City's public services and facilities. Impacts to the storm drain system (discussed in Section 10, *Hydrology and Water Quality*), public parks (discussed in this section and Section 16, Recreation), solid waste disposal, water usage and wastewater disposes (discussed in Section 19, *Utilities and Service Systems*) would be less than significant. As discussed in Section 14, *Populating and Housing,* the proposed guest room expansion and office space would not generate a population increase in the area. Therefore, the proposed project would not generate significant impacts to other public facilities, such as libraries. Impacts to public facilities would be less than significant.

**Significance Determination:** Less than significant

**Mitigation Measures:** No Mitigation is Required

**Significant Determination after Mitigation:** Less than significant

# 16 Recreation

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| a. Would the project 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? | □ | □ | ■ | □ |

*a. Would the project 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?*

The City owns and operates 24 parks, which consist of approximately 251 acres of parkland, managed by the Community Services Department. The nearest parks to the project site are Santiago Park, which is located in the City of Santa Ana, and Hart Park, which are approximately 0.7 miles south and southeast of the project site. The proposed expansion of temporary housing associated with the existing Ronald McDonald House and operational change from residential to office use, associated with the single-family residence, would minimally increase the use of recreational facilities in the area. However, the increase would be minor and the project includes the relocation of a play area and playground equipment, which would be used by on-site guests. Therefore, the project would have a less than significant impact on recreational facilities in the City.

**Significance Determination:** Less than significant

**Mitigation Measures:** No Mitigation is Required

**Significant Determination after Mitigation:** No Impact

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# 17 Transportation

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

*a. Would the project conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?*

The City of Orange *Traffic Impact Analysis Guidelines* were developed to assess the impact of land use proposals on the existing and future circulation system and to ensure that CEQA and CMP laws and guidelines are met (City of Orange 2007). The City's Traffic Guidelines state that a Traffic Impact Analysis shall be required for a proposed project that meets any of the following criteria:

- When the morning or evening peak hour trip generation is expected to exceed 100 vehicle trips from the proposed development.
- Projects on the Arterial Highway System that generate 1,600 Average Daily Trips (ADT).
- Projects that will add 51 or more trips during either morning or evening peak hours to any intersection.
- Any project where variations from the standards and guidelines provided in the City of Orange Traffic Impact Analysis Guidelines are being proposed.

Ganddini Group, Inc. prepared the trip generation analysis for the proposed project (see Appendix F). Trip generation rates were determined for daily trips, morning peak hour inbound and outbound trips, and evening peak hour inbound and outbound trips for the existing and proposed land use. As shown in Table 16, the Ronald McDonald House currently generates approximately 107 daily trips, including 10 trips during the morning peak hour and 10 trips during the evening peak hour.

Rates were derived by Ganddini Group, Inc. by conducting trip count surveys on a Thursday (September 27, 2018), which was determined to be the peak day of the week based upon discussions with Orange County Ronald McDonald House management personnel. Trip counts were taken at the existing Ronald McDonald House driveways, and then the number of trips counted was divided by both the existing square footage and number of bedrooms to determine forecasted trip generation rates per thousand square feet and per bedroom. The trip count survey is provided in Appendix B of the trip analysis (see Appendix F). In addition, the proposed project would include a change in operational use associated with the single-family residence located in the southeast portion of the project site, from residential to office use. The existing house would provide auxiliary office space associated with the Ronald McDonald House, which would be utilized by current employees. Therefore, the change in operational use from residential to office would not generate new vehicle trips. In addition, as shown in Figure 5, the main parking lot would be located in the southern portion of the project site, which is where deliveries, visitors, and most employees would use. The garage and driveway would be utilized for limited parking at the existing single-family residence. A pedestrian pathway would connect the main parking lot to the single-family residence.

## Forecast Trip Generation per Thousand Square Feet

The number of trips forecast to be generated by the proposed project is determined by multiplying the calculated trip generation rates by the land use quantity. Table 16 calculates the proposed trip generation using the calculated rates of trips per thousand square feet of floor space. As shown in Table 17, the proposed project is forecast to generate approximately 266 daily trips, including 24 trips during the morning peak hour and 24 trips during the evening peak hour.

Based on a comparison of trips generated by the proposed project per thousand square feet before and after the proposed expansion, the expansion is forecast to result in a net increase of approximately 159 additional daily trips, including 14 additional trips during the morning peak hour and 14 additional trips during the evening peak hour.

### Table 16 Project Trip Generation per Thousand Square Feet

| | | | Morning Peak Hour | | | Afternoon Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Land Use** | **Quantity** | **Units[1]** | **%In** | **%Out** | **Total** | **%In** | **%Out** | **Total** | **Daily** |
| Existing | 12.580 | TSF | 5 | 5 | 10 | 5 | 5 | 10 | 107 |
| Proposed | 31.220 | TSF | 12 | 12 | 24 | 12 | 12 | 24 | 266 |
| **Total Net New Trips (Proposed – Existing):** | | | **+7** | **+7** | **+14** | **+7** | **+7** | **+14** | **+159** |

[1] TSF = Thousand Square Feet

See Appendix F for Traffic Impact Analysis.

Source: Ganddini Group 2018

## Forecast Trip Generation per Bedroom

Table 17calculates the proposed trip generation using the calculated rates of trips per bedroom. As shown in Table 17, the Ronald McDonald House Expansion is forecast to generate approximately 224 daily trips, including 22 trips during the morning peak hour and 22 trips during the evening peak hour. Based on a comparison of trips generated by the Ronald McDonald House per room before and after the proposed expansion, the expansion is forecast to result in a net increase of approximately 117 additional daily trips, including 12 additional trips during the morning peak hour and 12 additional trips during the evening peak hour.

**Table 17 Project Trip Generation per Bedroom**

| | | | Morning Peak Hour | | | Afternoon Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Land Use** | **Quantity** | **Units[1]** | **%In** | **%Out** | **Total** | **%In** | **%Out** | **Total** | **Daily** |
| Existing | 21 | RM | 5 | 5 | 10 | 5 | 5 | 10 | 107 |
| Proposed | 44 | RM | 11 | 11 | 22 | 11 | 11 | 22 | 224 |
| **Total Net New Trips (Proposed – Existing):** | | | **+6** | **+6** | **+12** | **+6** | **+6** | **+12** | **+117** |

See Appendix F for Traffic Impact Analysis.

[1] RM = Rooms

Source: Ganddini Group 2018

## Trip Distribution

The project trip distribution patterns are based on review of existing volume data, surrounding land uses, and the local and regional roadway facilities in the project site vicinity. Figure 9 shows the forecast directional distribution patterns for the project generated trips.

Based on the above trip generation analyses, the proposed project is forecast to result in a maximum net increase of approximately 159 additional daily trips, including 14 additional trips during the morning peak hour and 14 additional trips during the evening peak hour. Pursuant to the City's Traffic Guidelines, the proposed project would not exceed 100 AM or PM peak hour vehicle trips. Therefore, the project would not conflict with a City policy regarding circulation and impacts would therefore be less than significant.

## Orange County Congestion Management Program (CMP)

The Orange County Congestion Management Program (CMP) requires a Traffic Impact Analysis (TIA) for all proposed developments generating 2,400 or more daily trips. For developments that will directly access a CMP Highway System link, the threshold for requiring a TIA should be reduced to 1,600 or more trips per day (OCTA 2017). As discussed above, the proposed project is forecast to result in a maximum net increase of approximately 159 additional daily trips, including 14 additional trips during the morning peak hour and 14 additional trips during the evening peak hour. Additionally, the proposed project would not directly access a CMP Highway System link. Therefore, it would not generate traffic exceeding CMP thresholds or otherwise conflict with the CMP. Impacts would be less than significant.

## Transit

The proposed project would be limited to site-specific improvements and would not damage the performance or safety of any public transit, bikeway or pedestrian facilities. Sidewalks are provided along all key roadways in the project site vicinity, including S. Batavia Street, with the exception of a small segment located just north of the project site. There are pedestrian crosswalks at intersections in the project site vicinity. The proposed project would maintain all sidewalks and crosswalks as currently configured. There are currently no bicycle facilities adjacent to the project site and no facilities are proposed according to the Circulation and Mobility Element (City of Orange 2015). Operation of the project would not impact the roadway width or any future proposed bicycle facilities.

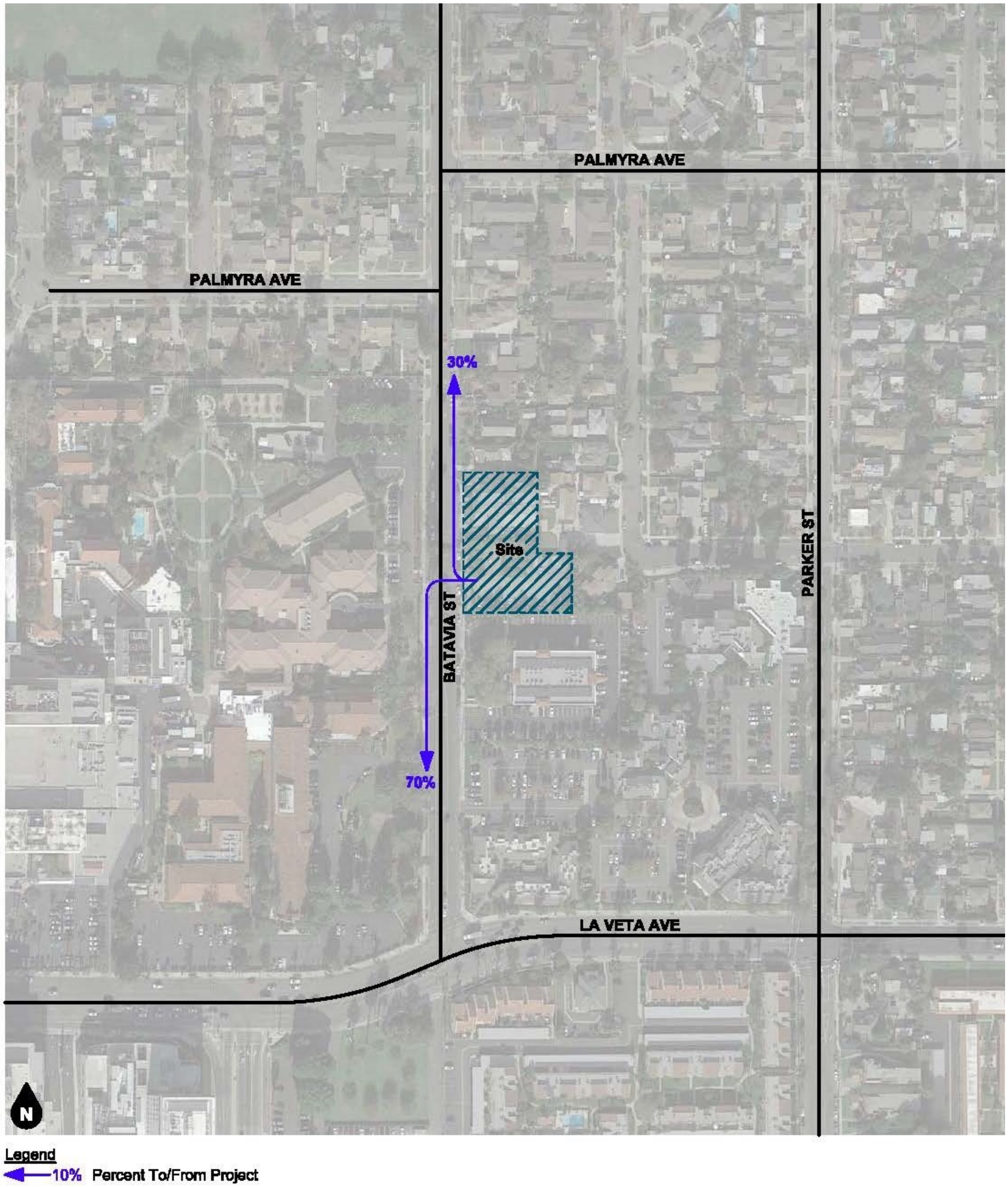
As discussed in the Project Description, the project site vicinity is served by OCTA operated bus lines. There would be no impacts from construction of the proposed project on emergency access, public transit, bicycle, or pedestrian facilities.

**Significance Determination:** Less than Significant Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** Less than Significant Impact

## Figure 9 Project Trip Distribution




Source: Ganddini Group 2018

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

CEQA Guidelines Section 15064.3(b) identifies appropriate criteria for evaluating transportation impacts. It states that land use projects with vehicle miles traveled (VMT) exceeding an applicable threshold of significance may indicate a significant impact, and that projects that decrease VMT compared to existing conditions should be presumed to have a less than significant transportation impact. In accordance with CEQA Guidelines Section 15064.3(c), the City of Orange, as the lead agency, has determined the proposed project is exempt from VMT analysis due to the location of the project site and proposed use as a locally serving hotel. However, a qualitative analysis is included below.

The proposed project would be infill development, which generally generates lower VMT than "greenfield" development (new development in rural or agricultural areas on the periphery of communities, or lands otherwise not previously planned for development). FI aZone ChangeP-I The proposed project would also be consistent with the goal of promoting infill development because it would allow for the expansion of the Ronald McDonald house in an urbanized area by converting an existing, adjacent surface parking lot into temporary residences for patients and visitors at the nearby hospital.

As discussed in Section 8, *Greenhouse Gas Emissions*, checklist item (b), the project would be located on a site that is characterized by a mix of institutional, commercial, and residential land uses. Additionally, as mentioned above, the project site is located approximately 0.2 miles from the nearest transit stop, along La Veta Avenue. Furthermore, the project site is located 1.6 miles from the nearest train station. There are also sidewalks surrounding the project site, which makes the site more accessible to pedestrians or other forms of active commuters. For these reasons, the proposed project would not conflict with or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b), and there would be no impact.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significant Determination after Mitigation:** No Impact

c. *Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible use (e.g., farm equipment)?*

No roads would be permanently closed as a result of construction or operation of the proposed project. Access to the project site is currently provided from S. Batavia Street via an ingress/egress driveway located on the southern portion of the project site and a driveway associated with single-family residence. Under the proposed project, the current driveway would be replaced by an ingress driveway and an egress driveway located in the southern portion of the project site, which would provide access to S. Batavia Street (see Figure 5 Site Plan, of the *Project Description*). During construction, the proposed project may result in the closure of the sidewalk fronting S. Batavia Street and lane closure along S. Batavia Street. However, construction would be temporary and the project would be required to obtain an encroachment permit by the Director of Public Works. The encroachment permit would require compliance with all applicable safety standards and a traffic control plan if construction would impact traffic. The proposed project would not result in inadequate emergency access or introduce any design features or incompatible uses, such as sharp curves or dangerous intersections, that would substantially increase hazards at the site and no impact would occur.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** No Impact

*d. Would the project result in inadequate emergency access?*

The proposed project would be subject to the Orange Fire Department review and acceptance of site plans and structures prior to occupancy to ensure that required fire protection safety features, including adequate driveway access to buildings and adequate emergency access, are implemented. In addition, the project does not include any permanent street closures or changes in traffic flow that would conflict with emergency or evacuations routes identified in the City's Safety Element (City of Orange 2010). Therefore, no impacts to emergency access would occur.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** No Impact

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# 18 Tribal Cultural Resources

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in a 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: | | | | |
| 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), or | ☐ | ■ | ☐ | ☐ |
| 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 Cod Section 2024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significant of the resource to a California Native American tribe. | ☐ | ■ | ☐ | ☐ |

PRC Section 21074 (a)(1)(A) and (B) defines tribal cultural resources as “sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe” and is:

1. 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), or
2. 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 these criteria, the lead agency shall consider the significance of the resource to a California Native American tribe.

Enacted on March 1, 2005, Senate Bill (SB) 18 (California Government Code Sections 65352.3 and 65352.4) requires cities and counties to notify and consult with California Native American tribal groups and individuals regarding proposed local land use planning decisions for the purpose of protecting traditional tribal cultural places (sacred sites), prior to adopting or amending a General Plan or designating land as open space. Tribal groups or individuals have 90 days to request consultation following the initial contact.

As of July 1, 2015, California Assembly Bill 52 of 2014 (AB 52) was enacted and expands CEQA by defining a new resource category, "tribal cultural resources." AB 52 establishes that "A project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment" (PRC Section 21084.2). It further states that the lead agency shall establish measures to avoid impacts that would alter the significant characteristics of a tribal cultural resource, when feasible (PRC Section 21084.3).

AB 52 also establishes a formal consultation process for California tribes regarding those resources. The consultation process must be completed before a CEQA document can be certified. Under AB 52, lead agencies are required to "begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project." Native American tribes to be included in the process are those that have requested notice of projects proposed within the jurisdiction of the lead agency.

In January 2020, the City of Orange distributed SB 18 and AB 52 consultation letters for the proposed project, including project information and a map, to 17 of the tribes and tribal representatives listed by NAHC as having an interest in area projects. Only the Gabrieleno Band of Mission Indians – Kizh Nation (Gabrieleno) requested government-to-government consultation. The City responded to the request and opened consultation with the Gabrieleno Band of Mission Indians – Kizh Nation.

a. *Would the project cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code 21074 that is 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. *Would the project cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code 21074 that is 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 2024.1?*

In consultation with the Gabrieleno Band of Mission Indians – Kizh Nation, the Coty was informed that the project site is located near historic tribal villages, sacred water courses, and major traditional trade routes. Therefore, the project site and surrounding area has a potential for undiscovered tribal cultural resources. As discussed in Section 5, *Cultural Resources*, based on the findings of the records search and archaeological and historical resources field surveys (see Appendix B), no known cultural resources were identified on the project site. However, grading and ground-disturbing activities during project construction could impact currently unknown subsurface cultural resources of tribal or Native American importance.

The City and the consulting tribes agreed that compliance with Mitigation Measures CR-2 detailed in Section 5, *Cultural Resources* and with Mitigation Measures TCR-1 through TCR-5 would ensure that impacts to tribal cultural resources would be less than significant.

## Mitigation Measure

### *TCR-1 Native American Monitor*

The Project Applicant shall be required to retain and compensate for the services of a Qualified Archaeologist and a Tribal Monitor who is both ancestrally affiliated with the project area and contracted from one of the tribal groups who have consulted with the City under AB 52 for the project and is listed under the Native American Heritage Commission's (NAHC) Tribal Contact list for the area of the project location. This list is provided by the NAHC. The Tribal Monitor shall be retained by the Lead Agency or owner of the project to be on site to monitor all project-related, ground-disturbing construction activities (i.e., boring, grading, excavation, potholing, trenching, etc.) and shall be associated with one of the NAHC recognized Tribal governments which have commented on the project shall provide the Native American monitor. The Tribal Monitor will only be present on-site during the construction phases that involve ground disturbing activities. Ground disturbing activities may include, but are not limited to, pavement removal, pot-holing or auguring, grubbing, tree removals, boring, grading, excavation, drilling, and trenching, within the project area. The Tribal Monitor shall complete daily monitoring logs that will provide descriptions of the day's activities, including construction activities, locations, soil, and any cultural materials identified. The on-site monitoring shall end when the project site grading and excavation activities are completed. The on-site monitoring shall end when the project site grading and excavation activities are completed or when the Tribal Monitor and Qualified Archaeologist indicate that the site has low potential for impacting tribal cultural resources.

#### *TCR-2 Professional Standards*

Archaeological and Native American monitoring and excavation during construction projects will be consistent with current professional standards. All feasible care to avoid any unnecessary disturbance, physical modification, or separation of human remains and associated funerary objects shall be taken. Principal personnel must meet or exceed the Secretary of Interior's Professional Qualification Standards for archaeology (defined at 36 CFR Part 61). The Qualified Archaeologist shall ensure that all other personnel are appropriately trained and qualified/

#### *TCR-3 Unanticipated Discovery of Tribal Cultural Resources*

Upon discovery of any tribal cultural resources or archaeological resources, construction activities in the immediate vicinity of the find shall cease until the find can be assessed. All tribal cultural and archaeological resources unearthed by project construction activities shall be evaluated by the Qualified Archaeologist and Tribal Monitor. If the resources are Native American in origin, the Gabrieleño Band of Mission Indians-Kizh Nation shall coordinate with the landowner regarding treatment and curation of these resources. Typically, the Tribe will request preservation in place or recovery for educational purposes. Work may continue on other parts of the project while evaluation and, if necessary, additional protective mitigation takes place (CEQA Guidelines Section15064.5 [f]). If the resource is determined not to be a tribal cultural resource, then measures required under Mitigation Measure CUL-2 shall occur.

#### *TCR-4 Unanticipated Discovery of Human Remains*

Native American human remains are defined in PRC 5097.98 (d)(1) as an inhumation or cremation, and in any state of decomposition or skeletal completeness. Funerary objects, called associated grave goods in PRC 5097.98, are also to be treated according to this statute. Health and Safety Code 7050.5 dictates that any discoveries of human skeletal material shall be immediately reported to the County Coroner and excavation halted until the coroner has determined the nature of the remains. If the coroner recognizes the human remains to be those of a Native American or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the NAHC and PRC 5097.98 shall be followed.

### *TCR-5 Resource Assessment and Continuation of Work*

Upon discovery of human remains, the Tribal Monitor shall immediately divert work at minimum of 150 feet and place an exclusion zone around the discovery location. The Tribal Monitor will then notify the Tribe, the Qualified Archaeologist, and the construction manager who will call the coroner. Construction activities shall continue to be diverted while the coroner determines whether the remains are human and subsequently Native American and until treatment measures detailed under Mitigation Measure TCR-5 are agreed upon. The discovery shall be kept confidential and secure to prevent any further disturbance. If the finds are determined to be Native American, the coroner will notify the NAHC as mandated by state law who will then appoint a Most Likely Descendent (MLD).

### *TCR-6 Kizh-Gabrieleno Procedures*

If the Gabrieleno Band of Mission Indians – Kizh Nation is designated MLD, the Koo-nas-gna Burial Policy shall be implemented. To the Tribe, the term “human remains” encompasses more than human bones. In ancient as well as historic times, Tribal Traditions included, but were not limited to, the preparation of the soil for burial, the burial of funerary objects with the deceased, and the ceremonial burning of human remains. The prepared soil and cremation soils are to be treated in the same manner as bone fragments that remain intact. Associated funerary objects are objects that, as part of the death rite or ceremony of a culture, are reasonably believed to have been placed with individual human remains either at the time of death or later; other items made exclusively for burial purposes or to contain human remains can also be considered as associated funerary objects.

### *TCR-7 Treatment and Disposition of Tribal Cultural Resources*

Prior to the continuation of ground disturbing activities, the treatment and curation of the human remains shall be determined and agreed upon by the MLD established by the NAHC for the project. In the case where discovered human remains cannot be fully documented and recovered on the same day, the remains shall be covered with a protective casing to prevent further damage or looting of the remains. If the Gabrieleno Band of Mission Indians – Kizh Nation is designated MLD, the following shall be required: The remains shall be covered with muslin cloth and a steel plate that can be moved by heavy equipment placed over the excavation opening to protect the remains. If this type of steel plate is not available, a 24-hour guard should be posted outside of working hours. The Tribe will make every effort to recommend diverting the project and keeping the remains in situ and protected. If the project cannot be diverted, it may be determined that burials will be removed. The Gabrieleno Band of Mission Indians – Kizh Nation shall work closely with the Qualified Archaeologist to ensure that the excavation is treated carefully, ethically and respectfully. If data recovery is approved by the Gabrieleno Band of Mission Indians – Kizh Nation, documentation shall be taken which includes at a minimum detailed descriptive notes and sketches. Additional types of documentation shall be approved by the Gabrieleno Band of Mission Indians – Kizh Nation for data recovery purposes. Cremations shall either be removed in bulk or by means as necessary to ensure completely recovery of all material. If the discovery of human remains includes four or more burials, the location is considered a cemetery and a separate treatment plan shall be created. Once complete, a final report of all activities shall be submitted to the Tribe and the NAHC.

Each occurrence of human remains and associated funerary objects shall be stored in accordance with methods agreed upon between the MLD and the landowner.

**Significance Determination:** Potentially Significant Impact

**Mitigation Measures:** Refer to Mitigation Measures TCR-1 through TCR-7 and Mitigation Measures CUL 1 and CUL 2

**Significance Determination after Mitigation:** Less than Significant Impact

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# 19 Utilities and Service Systems

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water 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? | ☐ | ☐ | ■ | ☐ |

*a. Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?*

*c. Would the project 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?*

## Water

According to CalEEMod (Appendix A), the expansion of 23 guest rooms and change in operational use associated with the single-family home to office use, would demand approximately 8,219 gallons of water per day, which equates to 9.2 acre feet per year (AFY). As discussed in Section 13, *Population and Housing*, the proposed project would not directly generate population growth. The proposed project would use water for drinking, sanitation, fire protection, heating, cooling, utility systems, cleaning, restrooms, showers, laundry, and landscape irrigation. The proposed project would account for 0.6 percent of the City's projected water demand increase of 1,500 AFY by year 2040. In addition, the project would comply with the California Green Building Standard Code (CalGreen), which would require low-flow water fixtures and water efficient landscaping. Therefore, the proposed project water demand could be accommodated within planned water supplies as the demand forecast accounts for future development. Water supplies for the proposed project would be adequate and impacts would be less than significant.

## Wastewater

The City of Orange relies on the Orange County Sanitation District (OCSD) for the regional collection and treatment of domestic, commercial, and industrial sewage (City of Orange 2010b). OCSD operates two wastewater treatment facilities, which include Reclamation Plant No. 1 in Fountain Valley and Treatment Plant No. 2 in Huntington Beach, and numerous pump stations and sewer lines that cross its service area (City of Orange 2010a). The 2015-16 estimated average daily flow of wastewater received for Plant No. 1 was 117 million gallons per day (MGD) and 67 MGD for Plant 2 (OCSD 2018). Reclamation Plant No.1 has a design capacity of 108 MGD and Treatment Plant No. 2 has a design capacity of 168 MGD (City of Orange 2010a). Combined, these two facilities have capacity to treat 276 MGD, and on average, treat 184 MGD. Together these two facilities have capacity to treat an additional 92 MGD of wastewater.

According to CalEEMod (Appendix A), the expansion of 23 guest rooms would demand approximately 8,219 gallons of water per day. Assuming that wastewater generation is 80 percent of total water demand, the proposed project would generate approximately 6,575 gallons of wastewater per day. The project's estimated wastewater would be about 0.007 percent of the remaining capacity of 92 MGD available at the OCSD. As such, the estimated wastewater generation would not constrain the two facilities. Impacts related to wastewater treatment would be less than significant.

## Electric Power, Natural Gas, Telecommunications

The project site is located in the existing developed area of the City of Orange, which has existing infrastructure for electric power, natural gas, and telecommunications services. The proposed project would be infill development consistent with long-range plans for the area (see Section 11, *Land Use and Planning*). The proposed project would not cause substantial unplanned population growth (see Section 14, *Population and Housing*), and would not result in wasteful or inefficient use or energy (see Section 6, *Energy*), nor would the project require or result in the construction of new electric power, natural gas, or telecommunication facilities or expansion of existing facilities. As such, although the proposed project would create an incremental increase in demands on these facilities, this impact would be less than significant.

**Significance Determination:** Less than Significant Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** Less than Significant Impact

*c. Would the project require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?*

The proposed project includes the relocation of an existing storm drain that traverses the project site. The storm drain realignment would follow the west and south perimeter of the project site and would ultimately connect to existing storm drains located along both Batavia Street and at the intersection of W. Culver Avenue and S. Clark Street. The environmental impacts of the storm drain realignment are included within this MND. As discussed in Section 9, *Hydrology and Water Quality*, the project would implement a number of stormwater BMPs during construction and operation of the project. The project would implement permeable pavement in the proposed parking lot area, catch basin planters, and downspouts from building roofs which outlets into various planters. Implementation of these BMPs would improve the existing stormwater runoff on site, as concluded in the WQMP (Appendix D). Therefore, the existing stormwater facilities would have sufficient capacity for stormwater runoff from the project site and impacts would be less than significant.
**Significance Determination:** Less than Significant Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** Less than Significant Impact

*b. Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?*

The City of Orange is served by the East Orange County Water District, Golden State Water Company, Irvine Ranch Water District, and Serrano Water District (SWD) (City of Orange 2010a). The City obtains approximately 75 percent of its water from City-owned wells and purchases approximately 25 percent from the Metropolitan Water District (MWD) and the Municipal Water District of Orange County (MWDOC). The City’s 2015 potable water demand was 28,643 acre feet per year (AFY) and was met through locally pumped groundwater, purchased imported water from MWDOC, and surface water purchased from SWD (City of Orange 2016).

The City of Orange’s 2015 Urban Water Management Plan (UWMP) provides water supply planning for a 25-year planning period in five-year increments and identifies water supplies needed to meet existing and future demands. Demand projections were developed by MWDOC for each agency within their service area based on available data as well as land use, population and economic growth. According to the 2015 UWMP, water demand for the City is projected to increase 5.6 percent from 28,000 AFY in 2020 to 29,500 AFY in 2040. As concluded in the 2015 UWMP, and shown in Table 18, the City’s total projected water supplies available during normal, single dry, and multiple dry years from 2020 through 2040 would meet the City’s projected water demands.

The Statewide Water Conservation Act of 2009 (Senate Bill X7-7), effective November 2009, requires a 20% reduction in per capita urban water use by 2020. The legislation requires urban water users to develop consistent water use targets and to use those targets in their UWMPs. SB X7-7 also requires certain agricultural water supplies to implement a variety of water conservation and management practices and to submit Agricultural Water Management Plans. Additionally, as a response to statewide drought, Governor Jerry Brown issued an Executive Order (EO) on April 1, 2015, requiring local agencies to reduce water usage by urban water suppliers by 25%. Further, the project would comply with applicable CalGreen regulations and OMC Chapter 7.01, Water Conservation and Water Supply Shortage, which would require water conservation features in the building and landscaping of the project.

**Table 18 Water Supply and Demand in Single and Multiple Dry Years (AF)**

| Year-Type | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|
| **Normal Year** | | | | | |
| Total Supplies | 28,000 | 29,500 | 29,500 | 29,500 | 29,500 |
| Total Demands | 28,000 | 29,500 | 29,500 | 29,500 | 29,500 |
| Surplus | 0 | 0 | 0 | 0 | 0 |
| **Single Dry Year** | | | | | |
| Total Supplies | 29,680 | 31,270 | 31,270 | 31,270 | 31,270 |
| Total Demands | 29,680 | 31,270 | 31,270 | 31,270 | 31,270 |
| Surplus | 0 | 0 | 0 | 0 | 0 |
| **Multiple Dry Year 1st, 2nd, and 3rd Year Supply** | | | | | |
| Total Supplies | 29,680 | 31,270 | 31,270 | 31,270 | 31,270 |
| Total Demands | 29,680 | 31,270 | 31,270 | 31,270 | 31,270 |
| Surplus | 0 | 0 | 0 | 0 | 0 |

Units in acre-feet (AF)
Source: City of Orange 2016

According to CalEEMod (Appendix A), the expansion of 23 guest rooms would demand approximately 8,219 gallons of water per day, which equates to 9.2 AFY. As discussed in Section 13, *Population and Housing*, the proposed project would not directly generate population growth. The proposed project would use water for drinking, sanitation, fire protection, heating, cooling, utility systems, cleaning, restrooms, showers, laundry, and landscape irrigation. The proposed project would account for 0.6 percent of the City’s projected water demand increase of 1,500 AFY by year 2040. Therefore, the proposed project water demand could be accommodated within planned water supplies as the demand forecast accounts for future development. Water supplies for the proposed project would be adequate and impacts would be less than significant.

**Significance Determination:** Less than Significant Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** Less than Significant Impact

*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. Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?*

The proposed project has two components (construction and operation) that would result in the generation of solid waste. For purposes of this analysis, the estimated operational waste is used to determine the net increase in solid waste from the proposed project. Construction of the proposed project would generate waste during site preparation and from building materials. The project would recycle all construction waste in compliance with CalGreen.

Collection of solid waste within the City of Orange is contracted to CR&R Incorporated. CR&R Incorporated collects solid waste, green waste (grass clippings, tree and shrub clippings), and items for recycling.

Waste collected within the City is taken to the following three landfills: Olinda Alpha Landfill in Brea, Frank R. Bowerman Landfill in Irvine, and Prima Deshecha Landfill in San Juan Capistrano. Solid waste from Orange is not restricted to any specific landfill; therefore, solid waste collected within the City may be disposed of at any of these landfills (City of Orange 2010a).

Table 19 summarizes the permitted daily throughput, estimated average waste quantities disposed, remaining capacity, and closure date for the three landfills serving the City. Combined, the three landfills serving the project site have an estimated remaining daily capacity of 9,541 tons per day.

**Table 19 Solid Waste Disposal Facilities**

| Facility | Permitted Daily Disposal (tons/day) | Average Daily Waste Quantities Disposed (tons/day) | Estimated Remaining Daily Capacity (tons/day) | Remaining Capacity and Life |
|---|---|---|---|---|
| Olinda Alpha Sanitary Landfill | 8,000 | 6,891 | 1,109 | 19 million tons and 8 years |
| Frank R. Bowerman Landfill | 11,500 | 6,865 | 4,653 | 107 million tons and 36 years |
| Prima Deshecha Landfill | 4,000 | 248 | 3,752 | 78 million tons and 85 years |

Source: County of Los Angeles 2017

According to CalEEMod (Appendix A), the proposed project would generate a net increase of 0.06 tons of solid waste per day. This estimate is conservative since it does not factor in any recycling or waste diversion programs. An estimated 0.06 tons of solid waste generated by the project would be approximately 0.0006 percent of the remaining daily capacity of 9,541 tons per day at the three landfills listed in Table 19. The proposed project would participate in local recycling programs and would thereby comply with federal, State, and local statutes and regulations related to solid waste, such as AB 939 and the City's adopted Source Reduction Recycling Element, which is in compliance with State requirements. In addition, as shown in Table 19 there is adequate remaining daily landfill capacity in the region to accommodate project-generated waste. Impacts related to solid waste and waste facilities would be less than significant.

**Significance Determination:** Less than Significant Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** Less than Significant Impact

# 20 Wildfire

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project: | | | | |
| 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 downslopes or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes? | ☐ | ☐ | ☐ | ■ |

*a. If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project substantially impair an adopted emergency response plan or emergency evacuation plan?*

*b. If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project 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. If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project 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. *If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project expose people or structures to significant risks, including downslopes or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?*

The project site is not located in the State Responsibility Area (SRA) or located within or nearby a Very High Fire Hazard Severity Zone (Calfire 2007; Calfire 2011). Therefore, the project would have no impacts on wildfire risk.

**Significance Determination:** No Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** No Impact

# 21 Mandatory Findings of Significance

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Does the project: | | | | |
| a. 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. 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. Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? | □ | □ | ■ | □ |

*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?*

As discussed in Section 4, *Biological Resources*, the project are does not include any mapped essential habitat connectivity areas in the immediate vicinity of the project site. In addition, regional wildlife movement is restricted given the built-out nature of the project area surroundings, and no native resident or migratory fish or wildlife species, established native resident or migratory wildlife corridors, or native wildlife nursery sites exist on the project site. However, the site currently contains mature trees which may provide nesting habitat for birds. Therefore, Mitigation Measure BIO-1 would require a pre-construction nesting bird survey should construction occur during the breeding and nesting season to avoid potential impacts to on-site nesting birds. Furthermore, as discussed in Section 5, *Cultural Resources*, and Section 17, *Tribal Cultural Resources*, based on the findings of the records search and archaeological and historical resources surveys (see Appendix B), no known cultural resources were identified within the project site. Moreover, the results of the historical resource analysis determined that the proposed project would not result in direct or indirect impacts to the Old Towne Historic District, the nearby St. Joseph's Hospital Nursing School, or other historic district contributors such as the single-family residence at 802 W. Culver Avenue. The trenching along the southern edge of the project site for storm drain realignment would not require heavy construction equipment which produces vibration levels that would be a concern for the single-family residence. Mitigation Measure CR-1 would ensure construction activities maintain adequate distance from the structure. Taken together, the findings of the cultural resources study indicate that the proposed project would not result in significant adverse impacts to any of the identified archaeological or historical resources in the vicinity of the project site. The proposed project would have a less than significant impact on unanticipated cultural resources, paleontological resources, and tribal cultural resources with implementation of Mitigation Measures CUL-1 and CUL-2 and GEO-1, which would require adherence to existing local, State and federal regulations and specific monitoring procedures related to the discovery of any unanticipated cultural resources, paleontological resources, tribal cultural resources, and human remains during construction activity.

**Significance Determination:** Potentially Significant Impact

**Mitigation Measures:** Refer to Mitigation Measures BIO-1, CUL-1 and CUL-2, and GEO-1

**Significance Determination after Mitigation:** Less than Significant Impact

*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)?*

The project would incrementally contribute to cumulative impacts for surrounding projects and cumulative development in the City. Cumulative impacts of several resource areas have been addressed in the individual resource sections, including Air Quality, Greenhouse Gases, Energy, Noise, Solid Waste, Transportation, and Water Supply (See CEQA Guidelines Section 15064(h)(3)), and would be less than significant. Other issues (e.g., geology, hazards, and hazardous materials) are by their nature project specific and impacts at one location do not add to impacts at other locations or create additive impacts. As such, cumulative impacts would be less than significant (not cumulatively considerable). In addition, the project would not result in significant impacts to aesthetics, agricultural resources, hydrology and water quality, land use and planning, mineral resources, population and housing, public services, recreation, and utilities. Therefore, the project would not significantly contribute to cumulative impacts in these environmental topics.

Potentially significant impacts of the project were identified in biological resources, cultural resources, geology and soils, and tribal cultural resources. With implementation of mitigation measures for these topics, the project would not result in significant impacts or contribute to cumulative impacts. In the absence of significant impacts, the incremental accumulation of effects would not be cumulatively considerable and impacts would not be substantial. Therefore, impacts related to cumulative impacts would be less than significant with mitigation incorporated.

**Significance Determination:** Less than Significant Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** Less than Significant Impact

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

In general, impacts to human beings are associated with air quality, hazards and hazardous materials, and noise impacts. As detailed in analyses for air quality, hazards and hazardous materials, and noise, the proposed project would not result, either directly or indirectly, in adverse hazards related to air quality, hazardous materials or noise. The South Coast Air Basin is currently designated as a non-attainment area for ozone, $PM_{10}$, $PM_{2.5}$, and lead. Construction of the proposed project would contribute to air pollutant emissions on a short-term basis, but project-related construction emissions were modeled as part of this Initial Study and found to be below applicable thresholds (see Section 3). As discussed in Section 3, *Air Quality*, checklist item (b) operational emissions of the proposed project would also be below applicable thresholds. The project would not create objectionable odors affecting a substantial number of people or expose sensitive receptors to substantial pollutant concentrations. Compliance with applicable rules, regulations, and recommended mitigation measures would reduce potential impacts on human beings to a less than significant level.

**Significance Determination:** Less than Significant Impact

**Mitigation Measures:** No Mitigation is Required

**Significance Determination after Mitigation:** Less than Significant Impact

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# References

## Bibliography


California Air Pollution Control Officers Association (CAPCOA). 2008. CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act. Accessed October 2018. http://www.capcoa.org/wp-content/uploads/2012/ 03/CAPCOA-White-Paper.pdf

California Air Resources Board (ARB). 2005. Air Quality and Land Use Handbook: A Community Health Perspective. Accessed October 2018. https://www.arb.ca.gov/ch/handbook.pdf

______. 2014, 2015 & 2016. iADAM: Air Quality Data Statistics, Top 4 Measurements and Days Above the Standard. http://www.arb.ca.gov/adam/topfour/topfour1.php

______. 2015. CA-Greet 2.0. September 29, 2015 https://www.arb.ca.gov/fuels/lcfs/ca-greet/ca-greet.htm. Accessed September 2018.

California Climate Action Registry (CCAR). 2009. General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1. Accessed October 2018. https://sfenvironment.org/sites/default/files/fliers/files/ccar_grp_3-1_january2009_sfe-web.pdf)

California Department of Conservation (DOC). 1979. Mineral Land Classification Map. Accessed May 2018. ftp://ftp.consrv.ca.gov/pub/dmg/pubs/sr/SR_143/PartIII/Plate_3-19.pdf

______. 2012. State of California Williamson Act Contract Land. Accessed October 2018. ftp://ftp.consrv.ca.gov/pub/dlrp/wa/2012%20Statewide%20Map/WA_2012_11x17.pdf

______. 2016. Orange County Important Farmland Map. Accessed October 2018. ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP/pdf/2016/ora16.pdf

California Department of Fish & Wildlife. NCCP Plan Summary (NCCP/HCP). Accessed October 2018. https://www.wildlife.ca.gov/Conservation/Planning/NCCP/Plans/Orange-Coastal

California Department of Forestry and Fire Protection (Cal Fire). 2007. Very Fire Hazard Severity Zones Map in SRA. Accessed October 2018. http://frap.fire.ca.gov/webdata/maps/orange/fhszs_map.30.pdf

______. 2011. Very Fire Hazard Severity Zones Map in LRA. Accessed May 2019 at http://frap.fire.ca.gov/webdata/maps/orange/fhszl_map.30.jpg

California Department of Transportation (Caltrans). 2011. California Scenic Highway Mapping System. Accessed May 2019 at http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/

______. 2013a. *Technical Noise Supplement to the Traffic Noise Analysis Protocol*. (CT-HWANP-RT-13-069.25.2) September. Available at: http://www.dot.ca.gov/hq/env/noise/pub/TeNS_Sept_2013B.pdf

______. 2013b. *Transportation and Construction Vibration Guidance Manual*. (CT-HWANP-RT-13-069.25.3) September. Available at: http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf

California Department of Water Resources (DWR). 2019. Basin Prioritization. Accessed May 2019 at https://water.ca.gov/Programs/Groundwater-Management/Basin-Prioritization

California Emissions Estimator Model (CalEEMod). 2016. User's Guide Version 2016.3.2. Accessed October 2018. http://www.aqmd.gov/docs/ default-source/caleemod/user's-guide---october-2017.pdf?sfvrsn=6)

California Energy Center (CEC). 2017a. Electricity Consumption by Entity. http://ecdms.energy.ca.gov/elecbyutil.aspx. Accessed January 2019.

______. 2017b. Gas Consumption by County. http://ecdms.energy.ca.gov/gasbycounty.aspx. Accessed January 2019.

______. 2017c. Gas Consumption by Entity. http://ecdms.energy.ca.gov/gasbyutil.aspx. Accessed January 2019.

______. 2018a. Total System Electric Generation. https://www.energy.ca.gov/almanac/electricity_data/total_system_power.html. Accessed January 2019.

______. 2018b. Revised Transportation Energy Demand Forecast 2018-2030. https://efiling.energy.ca.gov/getdocument.aspx?tn=221893. Accessed January 2019.

California Geological Survey (CGS). 2002. California Geomorphic Provinces, Note 36.

Caltrans. 2013. Transportation and Construction Vibration Guidance Manual. Accessed October 2018. http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf

Centers for Disease Control (CDC). 2019. What Noises Cause Hearing Loss? https://www.cdc.gov/nceh/hearing_loss/what_noises_cause_hearing_loss.html. Accessed September 2020.

City of Orange. 2010a. Program Environmental Impact Report General Plan, Infrastructure. Accessed September 2018 at https://www.cityoforange.org/DocumentCenter/View/584/General-Plan-Environmental-Impact-Report-EIR-PDF

______. 2010b. General Plan, Infrastructure. Accessed September 2018 at https://www.cityoforange.org/DocumentCenter/View/568/General-Plan----Infrastructure-PDF

______. 2010c. General Plan, Public Safety. Accessed October 2018 at http://www.cityoforange.org/DocumentCenter/View/573/General-Plan---Public-Safety-PDF

______. 2010d. General Plan, Natural Resources. Accessed May 2019 at https://www.cityoforange.org/DocumentCenter/View/571/General-Plan---Natural-Resources-Element-PDF

______. 2015. General Plan, Circulation and Mobility Element. Accessed September 2020 at: https://www.cityoforange.org/DocumentCenter/View/562/General-Plan---Circulation-and-Mobility-Element-PDF

______. 2016. 2015 Urban Water Management Plan. Accessed September 2018 at http://www.cityoforange.org/Archive/ViewFile/Item/171

______. 2007. City of Orange Traffic Impact Analysis Guidelines. Accessed October 2018 at https://www.cityoforange.org/DocumentCenter/View/2552/TIA-Guidelines_Signed?bidId=

______. 2018. Municipal Code. Accessed October 2018 at https://library.municode.com/ca/orange/codes/code_of_ordinances?nodeId=16539

County of Los Angeles. Department of Public Works. 2017. Countywide Integrated Waste Management Plan 2016 Annual Report. Accessed September 2018. https://dpw.lacounty.gov/epd/swims/ShowDoc.aspx?id=6530&hp=yes&type=PDF

Crocker, Malcolm J. (Editor). 2007. *Handbook of Noise and Vibration Control Book*, ISBN: 978-0-471-39599-7, Wiley-VCH, October.

Department of Toxic Substances Control (DTSC). 2018. EnviroStor. Accessed October 2018. http://www.envirostor.dtsc.ca.gov/public/map/?myaddress=2121+Hanscom+Drive++

Federal Highway Administration (FHWA). 2011. Highway Traffic Noise: Analysis and Abatement Guidance. December.

Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment*. November. Available at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

Orange County Sanitation District (OCSD). 2018. Regional Sewer Service. Accessed September 2018 at https://www.ocsd.com/services/regional-sewer-service

Orange County Transportation Authority (OCTA). 2017. 2017 Orange County Congestion Management Program. Accessed October 2018 at https://www.octa.net/pdf/2017%20Final%20CMP.pdf

______. 2018a. North County System Map. Accessed October 2018 athttp://www.octa.net/ebusbook/routePdf/NorthCounty.pdf

______. 2018b. 2018 Traffic Flow Map, Orange County, California. September 4.

Orange County Water District (OCWD). 2017. Basin 8-1 Alternative. January 1, 2017.

Orange Fire Department (OFD). 2018. Personal communication with Orange Fire Station on October 13, 2018.

Orange Police Department (OPD). 2018. Orange Police Department. 2018. Personal Communication with Orange Police Station on October 13, 2018.

Federal Emergency Management Agency (FEMA). 2018. FEMA Flood Map Service Center: Search By Address. Accessed October 2018. https://msc.fema.gov/portal/search?AddressQuery=2121%20Hanscom%20Drive%2C%20South%20Pasadena#searchresultsanchor

Moshier, Marissa. 2018. Historic Preservation Planner, Community Development Department, City of Orange. Personal communication via email regarding related projects with Jennifer Kelley, Senior Environmental Planner, Rincon Consultants, Inc. October 18, 2018.

Schremp, Gordon. 2017. Senior Fuels Specialist, California Energy Commission. Personal communication via phone and email regarding fuel consumption data by county with Lance Park, Associate Planner, Rincon Consultants, Inc. August 22, 2017.

South Coast Air Quality Management District (SCAQMD). 1993. CEQA Air Quality Handbook.

______. 2008a. Final Localized Significance Threshold Methodology. Accessed October 2018. http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf

______. 2008b. Appendix C. Mass Rate LST Look Up Table. October 2009. Accessed October 2018. http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/appendix-c-mass-rate-lst-look-up-tables.pdf?sfvrsn=2

______. 2010. Greenhouse Gas CEQA Significance Threshold Stakeholder Working Group Meeting #15: "Proposed Tier 3 Quantitative Thresholds – Option 1". Accessed October 2018. http://www.aqmd.gov/ceqa/handbook/GHG/2010/sept28mtg/ghgmtg15-web.pdf

______. 2015. SCAQMD Air Quality Significance Thresholds. Accessed October 2018. http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf

______. 2017. 2016 AQMP. Accessed October 2018. http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/final2016aqmp.pdf

Southern California Association of Governments (SCAG). 2016. 2016-2040 RTP/SCS Final Growth Forecasts by Jurisdictions. http://www.scag.ca.gov/Documents/2016_2040RTPSCS_FinalGrowthForecastbyJurisdiction.pdf. Accessed September 2020.

United States Department of Transportation. 2018. National Transportation Statistics. https://www.bts.gov/sites/bts.dot.gov/files/docs/browse-statistical-products-and-data/national-transportation-statistics/223001/ntsentire2018q4.pdf. Accessed January 2019.

United States Energy Information Administration (EIA). 2018. Table F30: Total Energy Consumption, Price, and Expenditure Estimates, 2016. State Energy Data 2016: Updates by Energy Source. Washington, DC.

United States Environmental Protection Agency. 2018. *Exhaust and Crankcase Emission Factors for Nonroad Compression-Ignition Engines in MOVES2014b*. July 2018. https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100UXEN.pdf. Accessed January 2019.

U.S. Fish and Wildlife Service. 2019a. Environmental Conservation Online System (ECOS). Accessed May 2019 at https://ecos.fws.gov/ecp/report/table/critical-habitat.html. Accessed December 2018.

______. 2019b. National Wetlands Mapper. Accessed May 2019 at https://www.fws.gov/wetlands/data/Mapper.html.

# List of Preparers

Rincon Consultants, Inc. prepared this IS-MND under contract to the City of Orange. Persons involved in data gathering analysis, project management, and quality control are listed below.

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# Appendix A

Air Quality/Greenhouse Gas Emissions Modeling Results

# Ronald McDonald House Expansion - Revised

**South Coast Air Basin, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 1.70 | 1000sqft | 0.23 | 1,700.00 | 0 |
| Congregate Care (Assisted Living) | 23.00 | Dwelling Unit | 0.80 | 31,220.00 | 66 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 31 |
| **Climate Zone** | 8 | | | **Operational Year** | 2021 |
| **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 - as per proj plans

Construction Phase - Information provided by client

Off-road Equipment -

Off-road Equipment - Construction would occur on 0.83 acre lot of existng RM house

Off-road Equipment - Construction would occur on 0.83 acre lot of existng RM house

Off-road Equipment - Construction would occur on 0.83 acre lot of existng RM house

Off-road Equipment -

Trips and VMT -

Grading - as per default

Architectural Coating -

Vehicle Trips - traffic study/trip gen; office trips accounted for in project TIA

Woodstoves - No fireplaces

Area Coating - VOC update/ SCAQMD rule

Construction Off-road Equipment Mitigation -

Area Mitigation - '

Energy Mitigation -

Fleet Mix -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstructionPhase | NumDays | 10.00 | 19.00 |
| tblConstructionPhase | NumDays | 200.00 | 165.00 |
| tblConstructionPhase | NumDays | 4.00 | 11.00 |
| tblConstructionPhase | NumDays | 10.00 | 19.00 |
| tblConstructionPhase | NumDays | 2.00 | 43.00 |
| tblFireplaces | NumberGas | 19.55 | 0.00 |
| tblFireplaces | NumberNoFireplace | 2.30 | 23.00 |
| tblFireplaces | NumberWood | 1.15 | 0.00 |
| tblGrading | MaterialImported | 0.00 | 198.00 |
| tblGrading | MaterialImported | 0.00 | 285.00 |
| tblLandUse | LandUseSquareFeet | 23,000.00 | 31,220.00 |
| tblLandUse | LotAcreage | 0.04 | 0.23 |
| tblLandUse | LotAcreage | 1.44 | 0.80 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 4.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblVehicleTrips | ST_TR | 2.20 | 5.09 |
| tblVehicleTrips | ST_TR | 2.46 | 0.00 |
| tblVehicleTrips | SU_TR | 2.44 | 5.09 |
| tblVehicleTrips | SU_TR | 1.05 | 0.00 |
| tblVehicleTrips | WD_TR | 2.74 | 5.09 |
| tblVehicleTrips | WD_TR | 11.03 | 0.00 |

## 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 | | | | | |
| 2020 | 0.0928 | 0.9558 | 0.6915 | 1.3400e-003 | 0.0532 | 0.0487 | 0.1019 | 0.0194 | 0.0449 | 0.0643 | 0.0000 | 118.8133 | 118.8133 | 0.0318 | 0.0000 | 119.6081 |
| 2021 | 0.1248 | 0.1726 | 0.1711 | 3.1000e-004 | 4.4500e-003 | 9.1200e-003 | 0.0136 | 1.1900e-003 | 8.5000e-003 | 9.6800e-003 | 0.0000 | 26.5827 | 26.5827 | 6.3900e-003 | 0.0000 | 26.7424 |
| **Maximum** | **0.1248** | **0.9558** | **0.6915** | **1.3400e-003** | **0.0532** | **0.0487** | **0.1019** | **0.0194** | **0.0449** | **0.0643** | **0.0000** | **118.8133** | **118.8133** | **0.0318** | **0.0000** | **119.6081** |

**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 | | | | | |
| 2020 | 0.0928 | 0.9558 | 0.6915 | 1.3400e-003 | 0.0332 | 0.0487 | 0.0819 | 0.0112 | 0.0449 | 0.0561 | 0.0000 | 118.8131 | 118.8131 | 0.0318 | 0.0000 | 119.6080 |
| 2021 | 0.1248 | 0.1726 | 0.1711 | 3.1000e-004 | 4.4500e-003 | 9.1200e-003 | 0.0136 | 1.1900e-003 | 8.5000e-003 | 9.6800e-003 | 0.0000 | 26.5827 | 26.5827 | 6.3900e-003 | 0.0000 | 26.7424 |
| **Maximum** | **0.1248** | **0.9558** | **0.6915** | **1.3400e-003** | **0.0332** | **0.0487** | **0.0819** | **0.0112** | **0.0449** | **0.0561** | **0.0000** | **118.8131** | **118.8131** | **0.0318** | **0.0000** | **119.6080** |

| | **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** | **34.60** | **0.00** | **17.27** | **39.74** | **0.00** | **11.07** | **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 | 4-1-2020 | 6-30-2020 | 0.3550 | 0.3550 |
| 2 | 7-1-2020 | 9-30-2020 | 0.3441 | 0.3441 |
| 3 | 10-1-2020 | 12-31-2020 | 0.3445 | 0.3445 |
| 4 | 1-1-2021 | 3-31-2021 | 0.3044 | 0.3044 |
| | | Highest | 0.3550 | 0.3550 |

## 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 | 0.1445 | 3.8900e-003 | 0.3082 | 2.4000e-004 | | 0.0128 | 0.0128 | | 0.0128 | 0.0128 | 1.5392 | 0.3875 | 1.9267 | 7.5700e-003 | 0.0000 | 2.1160 |
| Energy | 1.5000e-003 | 0.0129 | 5.7900e-003 | 8.0000e-005 | | 1.0400e-003 | 1.0400e-003 | | 1.0400e-003 | 1.0400e-003 | 0.0000 | 51.5648 | 51.5648 | 1.8000e-003 | 5.9000e-004 | 51.7844 |
| Mobile | 0.0369 | 0.1998 | 0.5095 | 1.8400e-003 | 0.1519 | 1.5000e-003 | 0.1534 | 0.0407 | 1.4000e-003 | 0.0421 | 0.0000 | 169.7471 | 169.7471 | 8.3300e-003 | 0.0000 | 169.9552 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 4.5815 | 0.0000 | 4.5815 | 0.2708 | 0.0000 | 11.3505 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.5713 | 11.4704 | 12.0417 | 0.0592 | 1.4800e-003 | 13.9625 |
| **Total** | **0.1828** | **0.2166** | **0.8235** | **2.1600e-003** | **0.1519** | **0.0154** | **0.1673** | **0.0407** | **0.0153** | **0.0560** | **6.6920** | **233.1698** | **239.8618** | **0.3476** | **2.0700e-003** | **249.1686** |

## 2.2 Overall Operational

**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 | 0.1445 | 3.8900e-003 | 0.3082 | 2.4000e-004 | | 0.0128 | 0.0128 | | 0.0128 | 0.0128 | 1.5392 | 0.3875 | 1.9267 | 7.5700e-003 | 0.0000 | 2.1160 |
| Energy | 1.5000e-003 | 0.0129 | 5.7900e-003 | 8.0000e-005 | | 1.0400e-003 | 1.0400e-003 | | 1.0400e-003 | 1.0400e-003 | 0.0000 | 51.5648 | 51.5648 | 1.8000e-003 | 5.9000e-004 | 51.7844 |
| Mobile | 0.0369 | 0.1998 | 0.5095 | 1.8400e-003 | 0.1519 | 1.5000e-003 | 0.1534 | 0.0407 | 1.4000e-003 | 0.0421 | 0.0000 | 169.7471 | 169.7471 | 8.3300e-003 | 0.0000 | 169.9552 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 4.5815 | 0.0000 | 4.5815 | 0.2708 | 0.0000 | 11.3505 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.5713 | 11.4704 | 12.0417 | 0.0592 | 1.4800e-003 | 13.9625 |
| **Total** | **0.1828** | **0.2166** | **0.8235** | **2.1600e-003** | **0.1519** | **0.0154** | **0.1673** | **0.0407** | **0.0153** | **0.0560** | **6.6920** | **233.1698** | **239.8618** | **0.3476** | **2.0700e-003** | **249.1686** |

| | 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 | 4/1/2020 | 5/31/2020 | 5 | 43 | |
| 2 | Grading | Grading | 6/1/2020 | 6/15/2020 | 5 | 11 | |
| 3 | Building Construction | Building Construction | 6/16/2020 | 2/1/2021 | 5 | 165 | |
| 4 | Paving | Paving | 2/2/2021 | 2/28/2021 | 5 | 19 | |
| 5 | Architectural Coating | Architectural Coating | 2/2/2021 | 2/28/2021 | 5 | 19 | |

**Acres of Grading (Site Preparation Phase): 21.5**

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

**Acres of Paving: 0**

**Residential Indoor: 63,221; Residential Outdoor: 21,074; Non-Residential Indoor: 2,550; Non-Residential Outdoor: 850; Striped Parking Area: 0 (Architectural Coating – sqft)**

**<u>OffRoad Equipment</u>**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Site Preparation | Graders | 1 | 8.00 | 187 | 0.41 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Grading | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Grading | Rubber Tired Dozers | 1 | 6.00 | 247 | 0.40 |
| Grading | Tractors/Loaders/Backhoes | 2 | 7.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 6.00 | 231 | 0.29 |
| Building Construction | Forklifts | 2 | 6.00 | 89 | 0.20 |
| Building Construction | Tractors/Loaders/Backhoes | 2 | 6.00 | 97 | 0.37 |
| Paving | Cement and Mortar Mixers | 4 | 6.00 | 9 | 0.56 |
| Paving | Pavers | 1 | 6.00 | 130 | 0.42 |
| Paving | Rollers | 1 | 7.00 | 80 | 0.38 |
| Paving | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**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 | 2 | 5.00 | 0.00 | 28.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 4 | 10.00 | 0.00 | 25.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 5 | 17.00 | 3.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 3.00 | 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 - 2020

### 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 | | | | | 0.0114 | 0.0000 | 0.0114 | 1.2300e-003 | 0.0000 | 1.2300e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0147 | 0.1813 | 0.0880 | 2.1000e-004 | | 7.2100e-003 | 7.2100e-003 | | 6.6300e-003 | 6.6300e-003 | 0.0000 | 18.4022 | 18.4022 | 5.9500e-003 | 0.0000 | 18.5510 |
| **Total** | **0.0147** | **0.1813** | **0.0880** | **2.1000e-004** | **0.0114** | **7.2100e-003** | **0.0186** | **1.2300e-003** | **6.6300e-003** | **7.8600e-003** | **0.0000** | **18.4022** | **18.4022** | **5.9500e-003** | **0.0000** | **18.5510** |

### 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 | 1.1000e-004 | 4.0300e-003 | 8.4000e-004 | 1.0000e-005 | 2.4000e-004 | 1.0000e-005 | 2.5000e-004 | 7.0000e-005 | 1.0000e-005 | 8.0000e-005 | 0.0000 | 1.0622 | 1.0622 | 8.0000e-005 | 0.0000 | 1.0642 |
| 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 | 4.8000e-004 | 3.7000e-004 | 4.0800e-003 | 1.0000e-005 | 1.1800e-003 | 1.0000e-005 | 1.1900e-003 | 3.1000e-004 | 1.0000e-005 | 3.2000e-004 | 0.0000 | 1.0628 | 1.0628 | 3.0000e-005 | 0.0000 | 1.0635 |
| **Total** | **5.9000e-004** | **4.4000e-003** | **4.9200e-003** | **2.0000e-005** | **1.4200e-003** | **2.0000e-005** | **1.4400e-003** | **3.8000e-004** | **2.0000e-005** | **4.0000e-004** | **0.0000** | **2.1250** | **2.1250** | **1.1000e-004** | **0.0000** | **2.1277** |

## 3.2 Site Preparation - 2020

### 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 | | | | | 5.1300e-003 | 0.0000 | 5.1300e-003 | 5.5000e-004 | 0.0000 | 5.5000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0147 | 0.1813 | 0.0880 | 2.1000e-004 | | 7.2100e-003 | 7.2100e-003 | | 6.6300e-003 | 6.6300e-003 | 0.0000 | 18.4022 | 18.4022 | 5.9500e-003 | 0.0000 | 18.5510 |
| **Total** | **0.0147** | **0.1813** | **0.0880** | **2.1000e-004** | **5.1300e-003** | **7.2100e-003** | **0.0123** | **5.5000e-004** | **6.6300e-003** | **7.1800e-003** | **0.0000** | **18.4022** | **18.4022** | **5.9500e-003** | **0.0000** | **18.5510** |

### 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 | 1.1000e-004 | 4.0300e-003 | 8.4000e-004 | 1.0000e-005 | 2.4000e-004 | 1.0000e-005 | 2.5000e-004 | 7.0000e-005 | 1.0000e-005 | 8.0000e-005 | 0.0000 | 1.0622 | 1.0622 | 8.0000e-005 | 0.0000 | 1.0642 |
| 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 | 4.8000e-004 | 3.7000e-004 | 4.0800e-003 | 1.0000e-005 | 1.1800e-003 | 1.0000e-005 | 1.1900e-003 | 3.1000e-004 | 1.0000e-005 | 3.2000e-004 | 0.0000 | 1.0628 | 1.0628 | 3.0000e-005 | 0.0000 | 1.0635 |
| **Total** | **5.9000e-004** | **4.4000e-003** | **4.9200e-003** | **2.0000e-005** | **1.4200e-003** | **2.0000e-005** | **1.4400e-003** | **3.8000e-004** | **2.0000e-005** | **4.0000e-004** | **0.0000** | **2.1250** | **2.1250** | **1.1000e-004** | **0.0000** | **2.1277** |

## 3.3 Grading - 2020

**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 | | | | | 0.0249 | 0.0000 | 0.0249 | 0.0137 | 0.0000 | 0.0137 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 8.7700e-003 | 0.0852 | 0.0593 | 1.0000e-004 | | 4.6600e-003 | 4.6600e-003 | | 4.3700e-003 | 4.3700e-003 | 0.0000 | 8.6794 | 8.6794 | 2.0400e-003 | 0.0000 | 8.7303 |
| **Total** | **8.7700e-003** | **0.0852** | **0.0593** | **1.0000e-004** | **0.0249** | **4.6600e-003** | **0.0295** | **0.0137** | **4.3700e-003** | **0.0180** | **0.0000** | **8.6794** | **8.6794** | **2.0400e-003** | **0.0000** | **8.7303** |

**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 | 1.0000e-004 | 3.6000e-003 | 7.5000e-004 | 1.0000e-005 | 2.1000e-004 | 1.0000e-005 | 2.3000e-004 | 6.0000e-005 | 1.0000e-005 | 7.0000e-005 | 0.0000 | 0.9484 | 0.9484 | 7.0000e-005 | 0.0000 | 0.9501 |
| 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 | 2.4000e-004 | 1.9000e-004 | 2.0900e-003 | 1.0000e-005 | 6.0000e-004 | 0.0000 | 6.1000e-004 | 1.6000e-004 | 0.0000 | 1.6000e-004 | 0.0000 | 0.5438 | 0.5438 | 2.0000e-005 | 0.0000 | 0.5441 |
| **Total** | **3.4000e-004** | **3.7900e-003** | **2.8400e-003** | **2.0000e-005** | **8.1000e-004** | **1.0000e-005** | **8.4000e-004** | **2.2000e-004** | **1.0000e-005** | **2.3000e-004** | **0.0000** | **1.4922** | **1.4922** | **9.0000e-005** | **0.0000** | **1.4943** |

## 3.3 Grading - 2020

### 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 | | | | | 0.0112 | 0.0000 | 0.0112 | 6.1500e-003 | 0.0000 | 6.1500e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 8.7700e-003 | 0.0852 | 0.0593 | 1.0000e-004 | | 4.6600e-003 | 4.6600e-003 | | 4.3700e-003 | 4.3700e-003 | 0.0000 | 8.6793 | 8.6793 | 2.0400e-003 | 0.0000 | 8.7303 |
| **Total** | **8.7700e-003** | **0.0852** | **0.0593** | **1.0000e-004** | **0.0112** | **4.6600e-003** | **0.0158** | **6.1500e-003** | **4.3700e-003** | **0.0105** | **0.0000** | **8.6793** | **8.6793** | **2.0400e-003** | **0.0000** | **8.7303** |

### 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 | 1.0000e-004 | 3.6000e-003 | 7.5000e-004 | 1.0000e-005 | 2.1000e-004 | 1.0000e-005 | 2.3000e-004 | 6.0000e-005 | 1.0000e-005 | 7.0000e-005 | 0.0000 | 0.9484 | 0.9484 | 7.0000e-005 | 0.0000 | 0.9501 |
| 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 | 2.4000e-004 | 1.9000e-004 | 2.0900e-003 | 1.0000e-005 | 6.0000e-004 | 0.0000 | 6.1000e-004 | 1.6000e-004 | 0.0000 | 1.6000e-004 | 0.0000 | 0.5438 | 0.5438 | 2.0000e-005 | 0.0000 | 0.5441 |
| **Total** | **3.4000e-004** | **3.7900e-003** | **2.8400e-003** | **2.0000e-005** | **8.1000e-004** | **1.0000e-005** | **8.4000e-004** | **2.2000e-004** | **1.0000e-005** | **2.3000e-004** | **0.0000** | **1.4922** | **1.4922** | **9.0000e-005** | **0.0000** | **1.4943** |

## 3.4 Building Construction - 2020

**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 | 0.0622 | 0.6541 | 0.4845 | 8.1000e-004 | | 0.0366 | 0.0366 | | 0.0336 | 0.0336 | 0.0000 | 70.8501 | 70.8501 | 0.0229 | 0.0000 | 71.4229 |
| **Total** | **0.0622** | **0.6541** | **0.4845** | **8.1000e-004** | | **0.0366** | **0.0366** | | **0.0336** | **0.0336** | **0.0000** | **70.8501** | **70.8501** | **0.0229** | **0.0000** | **71.4229** |

**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 | 7.3000e-004 | 0.0230 | 5.8000e-003 | 5.0000e-005 | 1.3500e-003 | 1.1000e-004 | 1.4600e-003 | 3.9000e-004 | 1.1000e-004 | 5.0000e-004 | 0.0000 | 5.2477 | 5.2477 | 3.5000e-004 | 0.0000 | 5.2564 |
| Worker | 5.4100e-003 | 4.1700e-003 | 0.0461 | 1.3000e-004 | 0.0133 | 1.0000e-004 | 0.0134 | 3.5400e-003 | 1.0000e-004 | 3.6400e-003 | 0.0000 | 12.0168 | 12.0168 | 3.5000e-004 | 0.0000 | 12.0254 |
| **Total** | **6.1400e-003** | **0.0272** | **0.0519** | **1.8000e-004** | **0.0147** | **2.1000e-004** | **0.0149** | **3.9300e-003** | **2.1000e-004** | **4.1400e-003** | **0.0000** | **17.2645** | **17.2645** | **7.0000e-004** | **0.0000** | **17.2819** |

## 3.4 Building Construction - 2020

### 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 | 0.0622 | 0.6541 | 0.4845 | 8.1000e-004 | | 0.0366 | 0.0366 | | 0.0336 | 0.0336 | 0.0000 | 70.8500 | 70.8500 | 0.0229 | 0.0000 | 71.4228 |
| **Total** | **0.0622** | **0.6541** | **0.4845** | **8.1000e-004** | | **0.0366** | **0.0366** | | **0.0336** | **0.0336** | **0.0000** | **70.8500** | **70.8500** | **0.0229** | **0.0000** | **71.4228** |

### 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 | 7.3000e-004 | 0.0230 | 5.8000e-003 | 5.0000e-005 | 1.3500e-003 | 1.1000e-004 | 1.4600e-003 | 3.9000e-004 | 1.1000e-004 | 5.0000e-004 | 0.0000 | 5.2477 | 5.2477 | 3.5000e-004 | 0.0000 | 5.2564 |
| Worker | 5.4100e-003 | 4.1700e-003 | 0.0461 | 1.3000e-004 | 0.0133 | 1.0000e-004 | 0.0134 | 3.5400e-003 | 1.0000e-004 | 3.6400e-003 | 0.0000 | 12.0168 | 12.0168 | 3.5000e-004 | 0.0000 | 12.0254 |
| **Total** | **6.1400e-003** | **0.0272** | **0.0519** | **1.8000e-004** | **0.0147** | **2.1000e-004** | **0.0149** | **3.9300e-003** | **2.1000e-004** | **4.1400e-003** | **0.0000** | **17.2645** | **17.2645** | **7.0000e-004** | **0.0000** | **17.2819** |

## 3.4 Building 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 | 8.6300e-003 | 0.0907 | 0.0729 | 1.2000e-004 | | 4.8500e-003 | 4.8500e-003 | | 4.4600e-003 | 4.4600e-003 | 0.0000 | 10.9016 | 10.9016 | 3.5300e-003 | 0.0000 | 10.9897 |
| **Total** | **8.6300e-003** | **0.0907** | **0.0729** | **1.2000e-004** | | **4.8500e-003** | **4.8500e-003** | | **4.4600e-003** | **4.4600e-003** | **0.0000** | **10.9016** | **10.9016** | **3.5300e-003** | **0.0000** | **10.9897** |

**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 | 9.0000e-005 | 3.2100e-003 | 8.1000e-004 | 1.0000e-005 | 2.1000e-004 | 1.0000e-005 | 2.1000e-004 | 6.0000e-005 | 1.0000e-005 | 7.0000e-005 | 0.0000 | 0.8013 | 0.8013 | 5.0000e-005 | 0.0000 | 0.8026 |
| Worker | 7.8000e-004 | 5.8000e-004 | 6.5300e-003 | 2.0000e-005 | 2.0500e-003 | 2.0000e-005 | 2.0700e-003 | 5.4000e-004 | 1.0000e-005 | 5.6000e-004 | 0.0000 | 1.7889 | 1.7889 | 5.0000e-005 | 0.0000 | 1.7901 |
| **Total** | **8.7000e-004** | **3.7900e-003** | **7.3400e-003** | **3.0000e-005** | **2.2600e-003** | **3.0000e-005** | **2.2800e-003** | **6.0000e-004** | **2.0000e-005** | **6.3000e-004** | **0.0000** | **2.5902** | **2.5902** | **1.0000e-004** | **0.0000** | **2.5927** |

## 3.4 Building Construction - 2021

### 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 | 8.6300e-003 | 0.0907 | 0.0729 | 1.2000e-004 | | 4.8500e-003 | 4.8500e-003 | | 4.4600e-003 | 4.4600e-003 | 0.0000 | 10.9016 | 10.9016 | 3.5300e-003 | 0.0000 | 10.9897 |
| **Total** | **8.6300e-003** | **0.0907** | **0.0729** | **1.2000e-004** | | **4.8500e-003** | **4.8500e-003** | | **4.4600e-003** | **4.4600e-003** | **0.0000** | **10.9016** | **10.9016** | **3.5300e-003** | **0.0000** | **10.9897** |

### 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 | 9.0000e-005 | 3.2100e-003 | 8.1000e-004 | 1.0000e-005 | 2.1000e-004 | 1.0000e-005 | 2.1000e-004 | 6.0000e-005 | 1.0000e-005 | 7.0000e-005 | 0.0000 | 0.8013 | 0.8013 | 5.0000e-005 | 0.0000 | 0.8026 |
| Worker | 7.8000e-004 | 5.8000e-004 | 6.5300e-003 | 2.0000e-005 | 2.0500e-003 | 2.0000e-005 | 2.0700e-003 | 5.4000e-004 | 1.0000e-005 | 5.6000e-004 | 0.0000 | 1.7889 | 1.7889 | 5.0000e-005 | 0.0000 | 1.7901 |
| **Total** | **8.7000e-004** | **3.7900e-003** | **7.3400e-003** | **3.0000e-005** | **2.2600e-003** | **3.0000e-005** | **2.2800e-003** | **6.0000e-004** | **2.0000e-005** | **6.3000e-004** | **0.0000** | **2.5902** | **2.5902** | **1.0000e-004** | **0.0000** | **2.5927** |

## 3.5 Paving - 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 | 6.7800e-003 | 0.0630 | 0.0666 | 1.1000e-004 | | 3.3400e-003 | 3.3400e-003 | | 3.1100e-003 | 3.1100e-003 | 0.0000 | 8.7568 | 8.7568 | 2.5500e-003 | 0.0000 | 8.8204 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.7800e-003** | **0.0630** | **0.0666** | **1.1000e-004** | | **3.3400e-003** | **3.3400e-003** | | **3.1100e-003** | **3.1100e-003** | **0.0000** | **8.7568** | **8.7568** | **2.5500e-003** | **0.0000** | **8.8204** |

**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 | 7.1000e-004 | 5.3000e-004 | 5.9700e-003 | 2.0000e-005 | 1.8800e-003 | 1.0000e-005 | 1.8900e-003 | 5.0000e-004 | 1.0000e-005 | 5.1000e-004 | 0.0000 | 1.6359 | 1.6359 | 4.0000e-005 | 0.0000 | 1.6370 |
| **Total** | **7.1000e-004** | **5.3000e-004** | **5.9700e-003** | **2.0000e-005** | **1.8800e-003** | **1.0000e-005** | **1.8900e-003** | **5.0000e-004** | **1.0000e-005** | **5.1000e-004** | **0.0000** | **1.6359** | **1.6359** | **4.0000e-005** | **0.0000** | **1.6370** |

### 3.5 Paving - 2021

**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 | 6.7800e-003 | 0.0630 | 0.0666 | 1.1000e-004 | | 3.3400e-003 | 3.3400e-003 | | 3.1100e-003 | 3.1100e-003 | 0.0000 | 8.7568 | 8.7568 | 2.5500e-003 | 0.0000 | 8.8204 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.7800e-003** | **0.0630** | **0.0666** | **1.1000e-004** | | **3.3400e-003** | **3.3400e-003** | | **3.1100e-003** | **3.1100e-003** | **0.0000** | **8.7568** | **8.7568** | **2.5500e-003** | **0.0000** | **8.8204** |

**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 | 7.1000e-004 | 5.3000e-004 | 5.9700e-003 | 2.0000e-005 | 1.8800e-003 | 1.0000e-005 | 1.8900e-003 | 5.0000e-004 | 1.0000e-005 | 5.1000e-004 | 0.0000 | 1.6359 | 1.6359 | 4.0000e-005 | 0.0000 | 1.6370 |
| **Total** | **7.1000e-004** | **5.3000e-004** | **5.9700e-003** | **2.0000e-005** | **1.8800e-003** | **1.0000e-005** | **1.8900e-003** | **5.0000e-004** | **1.0000e-005** | **5.1000e-004** | **0.0000** | **1.6359** | **1.6359** | **4.0000e-005** | **0.0000** | **1.6370** |

### 3.6 Architectural Coating - 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 | | | | | |
| Archit. Coating | 0.1056 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.0800e-003 | 0.0145 | 0.0173 | 3.0000e-005 | | 8.9000e-004 | 8.9000e-004 | | 8.9000e-004 | 8.9000e-004 | 0.0000 | 2.4256 | 2.4256 | 1.7000e-004 | 0.0000 | 2.4298 |
| **Total** | **0.1076** | **0.0145** | **0.0173** | **3.0000e-005** | | **8.9000e-004** | **8.9000e-004** | | **8.9000e-004** | **8.9000e-004** | **0.0000** | **2.4256** | **2.4256** | **1.7000e-004** | **0.0000** | **2.4298** |

**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 | 1.2000e-004 | 9.0000e-005 | 9.9000e-004 | 0.0000 | 3.1000e-004 | 0.0000 | 3.2000e-004 | 8.0000e-005 | 0.0000 | 9.0000e-005 | 0.0000 | 0.2727 | 0.2727 | 1.0000e-005 | 0.0000 | 0.2728 |
| **Total** | **1.2000e-004** | **9.0000e-005** | **9.9000e-004** | **0.0000** | **3.1000e-004** | **0.0000** | **3.2000e-004** | **8.0000e-005** | **0.0000** | **9.0000e-005** | **0.0000** | **0.2727** | **0.2727** | **1.0000e-005** | **0.0000** | **0.2728** |

### 3.6 Architectural Coating - 2021

**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 | | | | | |
| Archit. Coating | 0.1056 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.0800e-003 | 0.0145 | 0.0173 | 3.0000e-005 | | 8.9000e-004 | 8.9000e-004 | | 8.9000e-004 | 8.9000e-004 | 0.0000 | 2.4256 | 2.4256 | 1.7000e-004 | 0.0000 | 2.4298 |
| **Total** | **0.1076** | **0.0145** | **0.0173** | **3.0000e-005** | | **8.9000e-004** | **8.9000e-004** | | **8.9000e-004** | **8.9000e-004** | **0.0000** | **2.4256** | **2.4256** | **1.7000e-004** | **0.0000** | **2.4298** |

**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 | 1.2000e-004 | 9.0000e-005 | 9.9000e-004 | 0.0000 | 3.1000e-004 | 0.0000 | 3.2000e-004 | 8.0000e-005 | 0.0000 | 9.0000e-005 | 0.0000 | 0.2727 | 0.2727 | 1.0000e-005 | 0.0000 | 0.2728 |
| **Total** | **1.2000e-004** | **9.0000e-005** | **9.9000e-004** | **0.0000** | **3.1000e-004** | **0.0000** | **3.2000e-004** | **8.0000e-005** | **0.0000** | **9.0000e-005** | **0.0000** | **0.2727** | **0.2727** | **1.0000e-005** | **0.0000** | **0.2728** |

## 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 | 0.0369 | 0.1998 | 0.5095 | 1.8400e-003 | 0.1519 | 1.5000e-003 | 0.1534 | 0.0407 | 1.4000e-003 | 0.0421 | 0.0000 | 169.7471 | 169.7471 | 8.3300e-003 | 0.0000 | 169.9552 |
| Unmitigated | 0.0369 | 0.1998 | 0.5095 | 1.8400e-003 | 0.1519 | 1.5000e-003 | 0.1534 | 0.0407 | 1.4000e-003 | 0.0421 | 0.0000 | 169.7471 | 169.7471 | 8.3300e-003 | 0.0000 | 169.9552 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Congregate Care (Assisted Living) | 117.07 | 117.07 | 117.07 | 400,046 | 400,046 |
| General Office Building | 0.00 | 0.00 | 0.00 | | |
| Total | 117.07 | 117.07 | 117.07 | 400,046 | 400,046 |

## 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 |
| Congregate Care (Assisted | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Congregate Care (Assisted Living) | 0.551391 | 0.043400 | 0.201050 | 0.120272 | 0.016162 | 0.005864 | 0.021029 | 0.030512 | 0.002059 | 0.001866 | 0.004766 | 0.000706 | 0.000924 |
| General Office Building | 0.551391 | 0.043400 | 0.201050 | 0.120272 | 0.016162 | 0.005864 | 0.021029 | 0.030512 | 0.002059 | 0.001866 | 0.004766 | 0.000706 | 0.000924 |

## 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 | 36.7099 | 36.7099 | 1.5200e-003 | 3.1000e-004 | 36.8413 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 36.7099 | 36.7099 | 1.5200e-003 | 3.1000e-004 | 36.8413 |
| NaturalGas Mitigated | 1.5000e-003 | 0.0129 | 5.7900e-003 | 8.0000e-005 | | 1.0400e-003 | 1.0400e-003 | | 1.0400e-003 | 1.0400e-003 | 0.0000 | 14.8549 | 14.8549 | 2.8000e-004 | 2.7000e-004 | 14.9431 |
| NaturalGas Unmitigated | 1.5000e-003 | 0.0129 | 5.7900e-003 | 8.0000e-005 | | 1.0400e-003 | 1.0400e-003 | | 1.0400e-003 | 1.0400e-003 | 0.0000 | 14.8549 | 14.8549 | 2.8000e-004 | 2.7000e-004 | 14.9431 |

## 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 | | | | | |
| Congregate Care (Assisted Living) | 262832 | 1.4200e-003 | 0.0121 | 5.1500e-003 | 8.0000e-005 | | 9.8000e-004 | 9.8000e-004 | | 9.8000e-004 | 9.8000e-004 | 0.0000 | 14.0257 | 14.0257 | 2.7000e-004 | 2.6000e-004 | 14.1090 |
| General Office Building | 15538 | 8.0000e-005 | 7.6000e-004 | 6.4000e-004 | 0.0000 | | 6.0000e-005 | 6.0000e-005 | | 6.0000e-005 | 6.0000e-005 | 0.0000 | 0.8292 | 0.8292 | 2.0000e-005 | 2.0000e-005 | 0.8341 |
| **Total** | | **1.5000e-003** | **0.0129** | **5.7900e-003** | **8.0000e-005** | | **1.0400e-003** | **1.0400e-003** | | **1.0400e-003** | **1.0400e-003** | **0.0000** | **14.8549** | **14.8549** | **2.9000e-004** | **2.8000e-004** | **14.9431** |

**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 | | | | | |
| Congregate Care (Assisted Living) | 262832 | 1.4200e-003 | 0.0121 | 5.1500e-003 | 8.0000e-005 | | 9.8000e-004 | 9.8000e-004 | | 9.8000e-004 | 9.8000e-004 | 0.0000 | 14.0257 | 14.0257 | 2.7000e-004 | 2.6000e-004 | 14.1090 |
| General Office Building | 15538 | 8.0000e-005 | 7.6000e-004 | 6.4000e-004 | 0.0000 | | 6.0000e-005 | 6.0000e-005 | | 6.0000e-005 | 6.0000e-005 | 0.0000 | 0.8292 | 0.8292 | 2.0000e-005 | 2.0000e-005 | 0.8341 |
| **Total** | | **1.5000e-003** | **0.0129** | **5.7900e-003** | **8.0000e-005** | | **1.0400e-003** | **1.0400e-003** | | **1.0400e-003** | **1.0400e-003** | **0.0000** | **14.8549** | **14.8549** | **2.9000e-004** | **2.8000e-004** | **14.9431** |

### 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Congregate Care (Assisted Living) | 91431.9 | 29.1322 | 1.2000e-003 | 2.5000e-004 | 29.2364 |
| General Office Building | 23783 | 7.5778 | 3.1000e-004 | 6.0000e-005 | 7.6049 |
| **Total** | | **36.7099** | **1.5100e-003** | **3.1000e-004** | **36.8413** |

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Congregate Care (Assisted Living) | 91431.9 | 29.1322 | 1.2000e-003 | 2.5000e-004 | 29.2364 |
| General Office Building | 23783 | 7.5778 | 3.1000e-004 | 6.0000e-005 | 7.6049 |
| **Total** | | **36.7099** | **1.5100e-003** | **3.1000e-004** | **36.8413** |

## 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 | 0.1445 | 3.8900e-003 | 0.3082 | 2.4000e-004 | | 0.0128 | 0.0128 | | 0.0128 | 0.0128 | 1.5392 | 0.3875 | 1.9267 | 7.5700e-003 | 0.0000 | 2.1160 |
| Unmitigated | 0.1445 | 3.8900e-003 | 0.3082 | 2.4000e-004 | | 0.0128 | 0.0128 | | 0.0128 | 0.0128 | 1.5392 | 0.3875 | 1.9267 | 7.5700e-003 | 0.0000 | 2.1160 |

## 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 | 0.0106 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.1190 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 7.7600e-003 | 1.1500e-003 | 0.0705 | 2.3000e-004 | | 0.0115 | 0.0115 | | 0.0115 | 0.0115 | 1.5392 | 0.0000 | 1.5392 | 7.2000e-003 | 0.0000 | 1.7191 |
| Landscaping | 7.2000e-003 | 2.7400e-003 | 0.2377 | 1.0000e-005 | | 1.3100e-003 | 1.3100e-003 | | 1.3100e-003 | 1.3100e-003 | 0.0000 | 0.3875 | 0.3875 | 3.8000e-004 | 0.0000 | 0.3969 |
| **Total** | **0.1445** | **3.8900e-003** | **0.3082** | **2.4000e-004** | | **0.0128** | **0.0128** | | **0.0128** | **0.0128** | **1.5392** | **0.3875** | **1.9267** | **7.5800e-003** | **0.0000** | **2.1160** |

## 6.2 Area by SubCategory

**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 | 0.0106 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.1190 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 7.7600e-003 | 1.1500e-003 | 0.0705 | 2.3000e-004 | | 0.0115 | 0.0115 | | 0.0115 | 0.0115 | 1.5392 | 0.0000 | 1.5392 | 7.2000e-003 | 0.0000 | 1.7191 |
| Landscaping | 7.2000e-003 | 2.7400e-003 | 0.2377 | 1.0000e-005 | | 1.3100e-003 | 1.3100e-003 | | 1.3100e-003 | 1.3100e-003 | 0.0000 | 0.3875 | 0.3875 | 3.8000e-004 | 0.0000 | 0.3969 |
| **Total** | **0.1445** | **3.8900e-003** | **0.3082** | **2.4000e-004** | | **0.0128** | **0.0128** | | **0.0128** | **0.0128** | **1.5392** | **0.3875** | **1.9267** | **7.5800e-003** | **0.0000** | **2.1160** |

# 7.0 Water Detail

## 7.1 Mitigation Measures Water

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 12.0417 | 0.0592 | 1.4800e-003 | 13.9625 |
| Unmitigated | 12.0417 | 0.0592 | 1.4800e-003 | 13.9625 |

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Congregate Care (Assisted Living) | 1.49854 / 0.944733 | 10.0368 | 0.0492 | 1.2300e-003 | 11.6353 |
| General Office Building | 0.302147 / 0.185187 | 2.0049 | 9.9200e-003 | 2.5000e-004 | 2.3272 |
| **Total** | | **12.0417** | **0.0591** | **1.4800e-003** | **13.9625** |

### 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Congregate Care (Assisted Living) | 1.49854 / 0.944733 | 10.0368 | 0.0492 | 1.2300e-003 | 11.6353 |
| General Office Building | 0.302147 / 0.185187 | 2.0049 | 9.9200e-003 | 2.5000e-004 | 2.3272 |
| **Total** | | **12.0417** | **0.0591** | **1.4800e-003** | **13.9625** |

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 4.5815 | 0.2708 | 0.0000 | 11.3505 |
| Unmitigated | 4.5815 | 0.2708 | 0.0000 | 11.3505 |

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Congregate Care (Assisted Living) | 20.99 | 4.2608 | 0.2518 | 0.0000 | 10.5559 |
| General Office Building | 1.58 | 0.3207 | 0.0190 | 0.0000 | 0.7946 |
| **Total** | | **4.5815** | **0.2708** | **0.0000** | **11.3505** |

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Congregate Care (Assisted Living) | 20.99 | 4.2608 | 0.2518 | 0.0000 | 10.5559 |
| General Office Building | 1.58 | 0.3207 | 0.0190 | 0.0000 | 0.7946 |
| **Total** | | **4.5815** | **0.2708** | **0.0000** | **11.3505** |

# 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

# Ronald McDonald House Expansion - Revised

**South Coast Air Basin, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 1.70 | 1000sqft | 0.23 | 1,700.00 | 0 |
| Congregate Care (Assisted Living) | 23.00 | Dwelling Unit | 0.80 | 31,220.00 | 66 |

### 1.2 Other Project Characteristics

**Urbanization** Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 31

**Climate Zone** 8 **Operational Year** 2021

**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 - as per proj plans

Construction Phase - Information provided by client

Off-road Equipment -

Off-road Equipment - Construction would occur on 0.83 acre lot of existng RM house

Off-road Equipment - Construction would occur on 0.83 acre lot of existng RM house

Off-road Equipment - Construction would occur on 0.83 acre lot of existng RM house

Off-road Equipment -

Trips and VMT -

Grading - as per default

Architectural Coating -

Vehicle Trips - traffic study/trip gen; office trips accounted for in project TIA

Woodstoves - No fireplaces

Area Coating - VOC update/ SCAQMD rule

Construction Off-road Equipment Mitigation -

Area Mitigation - '

Energy Mitigation -

Fleet Mix -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstructionPhase | NumDays | 10.00 | 19.00 |
| tblConstructionPhase | NumDays | 200.00 | 165.00 |
| tblConstructionPhase | NumDays | 4.00 | 11.00 |
| tblConstructionPhase | NumDays | 10.00 | 19.00 |
| tblConstructionPhase | NumDays | 2.00 | 43.00 |
| tblFireplaces | NumberGas | 19.55 | 0.00 |
| tblFireplaces | NumberNoFireplace | 2.30 | 23.00 |
| tblFireplaces | NumberWood | 1.15 | 0.00 |
| tblGrading | MaterialImported | 0.00 | 198.00 |
| tblGrading | MaterialImported | 0.00 | 285.00 |
| tblLandUse | LandUseSquareFeet | 23,000.00 | 31,220.00 |
| tblLandUse | LotAcreage | 0.04 | 0.23 |
| tblLandUse | LotAcreage | 1.44 | 0.80 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 4.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblVehicleTrips | ST_TR | 2.20 | 5.09 |
| tblVehicleTrips | ST_TR | 2.46 | 0.00 |
| tblVehicleTrips | SU_TR | 2.44 | 5.09 |
| tblVehicleTrips | SU_TR | 1.05 | 0.00 |
| tblVehicleTrips | WD_TR | 2.74 | 5.09 |
| tblVehicleTrips | WD_TR | 11.03 | 0.00 |

## 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 | | | | | |
| 2020 | 1.6623 | 16.1566 | 11.2850 | 0.0209 | 4.6701 | 0.8503 | 5.5204 | 2.5235 | 0.7982 | 3.3217 | 0.0000 | 2,034.986 2 | 2,034.986 2 | 0.4256 | 0.0000 | 2,045.626 5 |
| 2021 | 12.1410 | 8.5870 | 9.5406 | 0.0162 | 0.2347 | 0.4475 | 0.6823 | 0.0623 | 0.4227 | 0.4850 | 0.0000 | 1,515.532 2 | 1,515.532 2 | 0.3634 | 0.0000 | 1,523.545 1 |
| **Maximum** | **12.1410** | **16.1566** | **11.2850** | **0.0209** | **4.6701** | **0.8503** | **5.5204** | **2.5235** | **0.7982** | **3.3217** | **0.0000** | **2,034.986 2** | **2,034.986 2** | **0.4256** | **0.0000** | **2,045.626 5** |

**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 | | | | | |
| 2020 | 1.6623 | 16.1566 | 11.2850 | 0.0209 | 2.1849 | 0.8503 | 3.0351 | 1.1579 | 0.7982 | 1.9560 | 0.0000 | 2,034.986 2 | 2,034.986 2 | 0.4256 | 0.0000 | 2,045.626 5 |
| 2021 | 12.1410 | 8.5870 | 9.5406 | 0.0162 | 0.2347 | 0.4475 | 0.6823 | 0.0623 | 0.4227 | 0.4850 | 0.0000 | 1,515.532 2 | 1,515.532 2 | 0.3634 | 0.0000 | 1,523.545 1 |
| **Maximum** | **12.1410** | **16.1566** | **11.2850** | **0.0209** | **2.1849** | **0.8503** | **3.0351** | **1.1579** | **0.7982** | **1.9560** | **0.0000** | **2,034.986 2** | **2,034.986 2** | **0.4256** | **0.0000** | **2,045.626 5** |

| | **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** | **50.67** | **0.00** | **40.07** | **52.81** | **0.00** | **35.88** | **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 | 1.3880 | 0.1139 | 7.5392 | 0.0185 | | 0.9301 | 0.9301 | | 0.9301 | 0.9301 | 135.7377 | 3.4171 | 139.1548 | 0.6379 | 0.0000 | 155.1012 |
| Energy | 8.2200e-003 | 0.0705 | 0.0317 | 4.5000e-004 | | 5.6800e-003 | 5.6800e-003 | | 5.6800e-003 | 5.6800e-003 | | 89.7243 | 89.7243 | 1.7200e-003 | 1.6400e-003 | 90.2575 |
| Mobile | 0.2076 | 1.0778 | 2.7578 | 9.9700e-003 | 0.8502 | 8.2800e-003 | 0.8585 | 0.2275 | 7.7300e-003 | 0.2352 | | 1,014.5910 | 1,014.5910 | 0.0507 | | 1,015.8579 |
| **Total** | **1.6039** | **1.2622** | **10.3287** | **0.0289** | **0.8502** | **0.9441** | **1.7943** | **0.2275** | **0.9435** | **1.1710** | **135.7377** | **1,107.7323** | **1,243.4700** | **0.6903** | **1.6400e-003** | **1,261.2166** |

**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 | 1.3880 | 0.1139 | 7.5392 | 0.0185 | | 0.9301 | 0.9301 | | 0.9301 | 0.9301 | 135.7377 | 3.4171 | 139.1548 | 0.6379 | 0.0000 | 155.1012 |
| Energy | 8.2200e-003 | 0.0705 | 0.0317 | 4.5000e-004 | | 5.6800e-003 | 5.6800e-003 | | 5.6800e-003 | 5.6800e-003 | | 89.7243 | 89.7243 | 1.7200e-003 | 1.6400e-003 | 90.2575 |
| Mobile | 0.2076 | 1.0778 | 2.7578 | 9.9700e-003 | 0.8502 | 8.2800e-003 | 0.8585 | 0.2275 | 7.7300e-003 | 0.2352 | | 1,014.5910 | 1,014.5910 | 0.0507 | | 1,015.8579 |
| **Total** | **1.6039** | **1.2622** | **10.3287** | **0.0289** | **0.8502** | **0.9441** | **1.7943** | **0.2275** | **0.9435** | **1.1710** | **135.7377** | **1,107.7323** | **1,243.4700** | **0.6903** | **1.6400e-003** | **1,261.2166** |

| | 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 | 4/1/2020 | 5/31/2020 | 5 | 43 | |
| 2 | Grading | Grading | 6/1/2020 | 6/15/2020 | 5 | 11 | |
| 3 | Building Construction | Building Construction | 6/16/2020 | 2/1/2021 | 5 | 165 | |
| 4 | Paving | Paving | 2/2/2021 | 2/28/2021 | 5 | 19 | |
| 5 | Architectural Coating | Architectural Coating | 2/2/2021 | 2/28/2021 | 5 | 19 | |

**Acres of Grading (Site Preparation Phase): 21.5**

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

**Acres of Paving: 0**

**Residential Indoor: 63,221; Residential Outdoor: 21,074; Non-Residential Indoor: 2,550; Non-Residential Outdoor: 850; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Site Preparation | Graders | 1 | 8.00 | 187 | 0.41 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Grading | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Grading | Rubber Tired Dozers | 1 | 6.00 | 247 | 0.40 |
| Grading | Tractors/Loaders/Backhoes | 2 | 7.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 6.00 | 231 | 0.29 |
| Building Construction | Forklifts | 2 | 6.00 | 89 | 0.20 |
| Building Construction | Tractors/Loaders/Backhoes | 2 | 6.00 | 97 | 0.37 |
| Paving | Cement and Mortar Mixers | 4 | 6.00 | 9 | 0.56 |
| Paving | Pavers | 1 | 6.00 | 130 | 0.42 |
| Paving | Rollers | 1 | 7.00 | 80 | 0.38 |
| Paving | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**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 | 2 | 5.00 | 0.00 | 28.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 4 | 10.00 | 0.00 | 25.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 5 | 17.00 | 3.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 3.00 | 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 - 2020

**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 | 0.6853 | 8.4307 | 4.0942 | 9.7400e-003 | | 0.3353 | 0.3353 | | 0.3085 | 0.3085 | | 943.4872 | 943.4872 | 0.3051 | | 951.1158 |
| **Total** | **0.6853** | **8.4307** | **4.0942** | **9.7400e-003** | **0.5303** | **0.3353** | **0.8656** | **0.0573** | **0.3085** | **0.3658** | | **943.4872** | **943.4872** | **0.3051** | | **951.1158** |

**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 | 5.3200e-003 | 0.1838 | 0.0403 | 5.0000e-004 | 0.0114 | 6.0000e-004 | 0.0120 | 3.1200e-003 | 5.7000e-004 | 3.6900e-003 | | 53.9171 | 53.9171 | 4.0300e-003 | | 54.0178 |
| 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 | 0.0247 | 0.0167 | 0.1848 | 5.4000e-004 | 0.0559 | 4.3000e-004 | 0.0563 | 0.0148 | 3.9000e-004 | 0.0152 | | 53.6426 | 53.6426 | 1.5400e-003 | | 53.6812 |
| **Total** | **0.0300** | **0.2005** | **0.2251** | **1.0400e-003** | **0.0673** | **1.0300e-003** | **0.0683** | **0.0179** | **9.6000e-004** | **0.0189** | | **107.5597** | **107.5597** | **5.5700e-003** | | **107.6990** |

## 3.2 Site Preparation - 2020

### 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 | | | | | 0.2386 | 0.0000 | 0.2386 | 0.0258 | 0.0000 | 0.0258 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.6853 | 8.4307 | 4.0942 | 9.7400e-003 | | 0.3353 | 0.3353 | | 0.3085 | 0.3085 | 0.0000 | 943.4872 | 943.4872 | 0.3051 | | 951.1158 |
| **Total** | **0.6853** | **8.4307** | **4.0942** | **9.7400e-003** | **0.2386** | **0.3353** | **0.5740** | **0.0258** | **0.3085** | **0.3343** | **0.0000** | **943.4872** | **943.4872** | **0.3051** | | **951.1158** |

### 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 | 5.3200e-003 | 0.1838 | 0.0403 | 5.0000e-004 | 0.0114 | 6.0000e-004 | 0.0120 | 3.1200e-003 | 5.7000e-004 | 3.6900e-003 | | 53.9171 | 53.9171 | 4.0300e-003 | | 54.0178 |
| 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 | 0.0247 | 0.0167 | 0.1848 | 5.4000e-004 | 0.0559 | 4.3000e-004 | 0.0563 | 0.0148 | 3.9000e-004 | 0.0152 | | 53.6426 | 53.6426 | 1.5400e-003 | | 53.6812 |
| **Total** | **0.0300** | **0.2005** | **0.2251** | **1.0400e-003** | **0.0673** | **1.0300e-003** | **0.0683** | **0.0179** | **9.6000e-004** | **0.0189** | | **107.5597** | **107.5597** | **5.5700e-003** | | **107.6990** |

## 3.3 Grading - 2020

**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 | | | | | 4.5186 | 0.0000 | 4.5186 | 2.4830 | 0.0000 | 2.4830 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.5944 | 15.4818 | 10.7747 | 0.0181 | | 0.8473 | 0.8473 | | 0.7954 | 0.7954 | | 1,739.516 4 | 1,739.516 4 | 0.4085 | | 1,749.727 9 |
| **Total** | **1.5944** | **15.4818** | **10.7747** | **0.0181** | **4.5186** | **0.8473** | **5.3659** | **2.4830** | **0.7954** | **3.2784** | | **1,739.516 4** | **1,739.516 4** | **0.4085** | | **1,749.727 9** |

**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 | 0.0186 | 0.6415 | 0.1406 | 1.7300e-003 | 0.0397 | 2.0800e-003 | 0.0418 | 0.0109 | 1.9900e-003 | 0.0129 | | 188.1847 | 188.1847 | 0.0141 | | 188.5363 |
| 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 | 0.0493 | 0.0333 | 0.3696 | 1.0800e-003 | 0.1118 | 8.5000e-004 | 0.1126 | 0.0296 | 7.9000e-004 | 0.0304 | | 107.2851 | 107.2851 | 3.0900e-003 | | 107.3623 |
| **Total** | **0.0679** | **0.6748** | **0.5102** | **2.8100e-003** | **0.1515** | **2.9300e-003** | **0.1544** | **0.0405** | **2.7800e-003** | **0.0433** | | **295.4698** | **295.4698** | **0.0172** | | **295.8986** |

## 3.3 Grading - 2020

**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 | | | | | 2.0334 | 0.0000 | 2.0334 | 1.1173 | 0.0000 | 1.1173 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.5944 | 15.4818 | 10.7747 | 0.0181 | | 0.8473 | 0.8473 | | 0.7954 | 0.7954 | 0.0000 | 1,739.5164 | 1,739.5164 | 0.4085 | | 1,749.7279 |
| **Total** | **1.5944** | **15.4818** | **10.7747** | **0.0181** | **2.0334** | **0.8473** | **2.8807** | **1.1173** | **0.7954** | **1.9127** | **0.0000** | **1,739.5164** | **1,739.5164** | **0.4085** | | **1,749.7279** |

**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 | 0.0186 | 0.6415 | 0.1406 | 1.7300e-003 | 0.0397 | 2.0800e-003 | 0.0418 | 0.0109 | 1.9900e-003 | 0.0129 | | 188.1847 | 188.1847 | 0.0141 | | 188.5363 |
| 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 | 0.0493 | 0.0333 | 0.3696 | 1.0800e-003 | 0.1118 | 8.5000e-004 | 0.1126 | 0.0296 | 7.9000e-004 | 0.0304 | | 107.2851 | 107.2851 | 3.0900e-003 | | 107.3623 |
| **Total** | **0.0679** | **0.6748** | **0.5102** | **2.8100e-003** | **0.1515** | **2.9300e-003** | **0.1544** | **0.0405** | **2.7800e-003** | **0.0433** | | **295.4698** | **295.4698** | **0.0172** | | **295.8986** |

## 3.4 Building Construction - 2020

### 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 | 0.8703 | 9.1476 | 6.7765 | 0.0113 | | 0.5114 | 0.5114 | | 0.4705 | 0.4705 | | 1,092.291 2 | 1,092.291 2 | 0.3533 | | 1,101.123 0 |
| **Total** | **0.8703** | **9.1476** | **6.7765** | **0.0113** | | **0.5114** | **0.5114** | | **0.4705** | **0.4705** | | **1,092.291 2** | **1,092.291 2** | **0.3533** | | **1,101.123 0** |

### 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 | 0.0104 | 0.3159 | 0.0852 | 7.4000e-004 | 0.0192 | 1.5900e-003 | 0.0208 | 5.5300e-003 | 1.5200e-003 | 7.0500e-003 | | 79.6132 | 79.6132 | 5.6000e-003 | | 79.7532 |
| Worker | 0.0839 | 0.0566 | 0.6283 | 1.8300e-003 | 0.1900 | 1.4500e-003 | 0.1915 | 0.0504 | 1.3400e-003 | 0.0517 | | 182.3847 | 182.3847 | 5.2500e-003 | | 182.5160 |
| **Total** | **0.0943** | **0.3725** | **0.7135** | **2.5700e-003** | **0.2092** | **3.0400e-003** | **0.2123** | **0.0559** | **2.8600e-003** | **0.0588** | | **261.9979** | **261.9979** | **0.0109** | | **262.2691** |

## 3.4 Building Construction - 2020

### 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 | 0.8703 | 9.1476 | 6.7765 | 0.0113 | | 0.5114 | 0.5114 | | 0.4705 | 0.4705 | 0.0000 | 1,092.291 2 | 1,092.291 2 | 0.3533 | | 1,101.123 0 |
| **Total** | **0.8703** | **9.1476** | **6.7765** | **0.0113** | | **0.5114** | **0.5114** | | **0.4705** | **0.4705** | **0.0000** | **1,092.291 2** | **1,092.291 2** | **0.3533** | | **1,101.123 0** |

### 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 | 0.0104 | 0.3159 | 0.0852 | 7.4000e-004 | 0.0192 | 1.5900e-003 | 0.0208 | 5.5300e-003 | 1.5200e-003 | 7.0500e-003 | | 79.6132 | 79.6132 | 5.6000e-003 | | 79.7532 |
| Worker | 0.0839 | 0.0566 | 0.6283 | 1.8300e-003 | 0.1900 | 1.4500e-003 | 0.1915 | 0.0504 | 1.3400e-003 | 0.0517 | | 182.3847 | 182.3847 | 5.2500e-003 | | 182.5160 |
| **Total** | **0.0943** | **0.3725** | **0.7135** | **2.5700e-003** | **0.2092** | **3.0400e-003** | **0.2123** | **0.0559** | **2.8600e-003** | **0.0588** | | **261.9979** | **261.9979** | **0.0109** | | **262.2691** |

## 3.4 Building 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 | 0.7846 | 8.2494 | 6.6293 | 0.0113 | | 0.4409 | 0.4409 | | 0.4056 | 0.4056 | | 1,092.4504 | 1,092.4504 | 0.3533 | | 1,101.2834 |
| **Total** | **0.7846** | **8.2494** | **6.6293** | **0.0113** | | **0.4409** | **0.4409** | | **0.4056** | **0.4056** | | **1,092.4504** | **1,092.4504** | **0.3533** | | **1,101.2834** |

**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 | 8.8700e-003 | 0.2866 | 0.0776 | 7.4000e-004 | 0.0192 | 6.1000e-004 | 0.0198 | 5.5300e-003 | 5.8000e-004 | 6.1000e-003 | | 79.0121 | 79.0121 | 5.3700e-003 | | 79.1463 |
| Worker | 0.0784 | 0.0510 | 0.5778 | 1.7700e-003 | 0.1900 | 1.4100e-003 | 0.1914 | 0.0504 | 1.3000e-003 | 0.0517 | | 176.4857 | 176.4857 | 4.7500e-003 | | 176.6044 |
| **Total** | **0.0873** | **0.3376** | **0.6553** | **2.5100e-003** | **0.2092** | **2.0200e-003** | **0.2112** | **0.0559** | **1.8800e-003** | **0.0578** | | **255.4978** | **255.4978** | **0.0101** | | **255.7507** |

## 3.4 Building Construction - 2021

**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 | 0.7846 | 8.2494 | 6.6293 | 0.0113 | | 0.4409 | 0.4409 | | 0.4056 | 0.4056 | 0.0000 | 1,092.4504 | 1,092.4504 | 0.3533 | | 1,101.2834 |
| **Total** | **0.7846** | **8.2494** | **6.6293** | **0.0113** | | **0.4409** | **0.4409** | | **0.4056** | **0.4056** | **0.0000** | **1,092.4504** | **1,092.4504** | **0.3533** | | **1,101.2834** |

**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 | 8.8700e-003 | 0.2866 | 0.0776 | 7.4000e-004 | 0.0192 | 6.1000e-004 | 0.0198 | 5.5300e-003 | 5.8000e-004 | 6.1000e-003 | | 79.0121 | 79.0121 | 5.3700e-003 | | 79.1463 |
| Worker | 0.0784 | 0.0510 | 0.5778 | 1.7700e-003 | 0.1900 | 1.4100e-003 | 0.1914 | 0.0504 | 1.3000e-003 | 0.0517 | | 176.4857 | 176.4857 | 4.7500e-003 | | 176.6044 |
| **Total** | **0.0873** | **0.3376** | **0.6553** | **2.5100e-003** | **0.2092** | **2.0200e-003** | **0.2112** | **0.0559** | **1.8800e-003** | **0.0578** | | **255.4978** | **255.4978** | **0.0101** | | **255.7507** |

## 3.5 Paving - 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 | 0.7140 | 6.6304 | 7.0093 | 0.0111 | | 0.3517 | 0.3517 | | 0.3270 | 0.3270 | | 1,016.0724 | 1,016.0724 | 0.2953 | | 1,023.4559 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.7140** | **6.6304** | **7.0093** | **0.0111** | | **0.3517** | **0.3517** | | **0.3270** | **0.3270** | | **1,016.0724** | **1,016.0724** | **0.2953** | | **1,023.4559** |

### 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 | 0.0830 | 0.0540 | 0.6118 | 1.8800e-003 | 0.2012 | 1.4900e-003 | 0.2027 | 0.0534 | 1.3700e-003 | 0.0547 | | 186.8672 | 186.8672 | 5.0300e-003 | | 186.9929 |
| **Total** | **0.0830** | **0.0540** | **0.6118** | **1.8800e-003** | **0.2012** | **1.4900e-003** | **0.2027** | **0.0534** | **1.3700e-003** | **0.0547** | | **186.8672** | **186.8672** | **5.0300e-003** | | **186.9929** |

### 3.5 Paving - 2021

**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 | 0.7140 | 6.6304 | 7.0093 | 0.0111 | | 0.3517 | 0.3517 | | 0.3270 | 0.3270 | 0.0000 | 1,016.0724 | 1,016.0724 | 0.2953 | | 1,023.4559 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.7140** | **6.6304** | **7.0093** | **0.0111** | | **0.3517** | **0.3517** | | **0.3270** | **0.3270** | **0.0000** | **1,016.0724** | **1,016.0724** | **0.2953** | | **1,023.4559** |

**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 | 0.0830 | 0.0540 | 0.6118 | 1.8800e-003 | 0.2012 | 1.4900e-003 | 0.2027 | 0.0534 | 1.3700e-003 | 0.0547 | | 186.8672 | 186.8672 | 5.0300e-003 | | 186.9929 |
| **Total** | **0.0830** | **0.0540** | **0.6118** | **1.8800e-003** | **0.2012** | **1.4900e-003** | **0.2027** | **0.0534** | **1.3700e-003** | **0.0547** | | **186.8672** | **186.8672** | **5.0300e-003** | | **186.9929** |

## 3.6 Architectural Coating - 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 | | | | | |
| Archit. Coating | 11.1112 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.2189 | 1.5268 | 1.8176 | 2.9700e-003 | | 0.0941 | 0.0941 | | 0.0941 | 0.0941 | | 281.4481 | 281.4481 | 0.0193 | | 281.9309 |
| **Total** | **11.3301** | **1.5268** | **1.8176** | **2.9700e-003** | | **0.0941** | **0.0941** | | **0.0941** | **0.0941** | | **281.4481** | **281.4481** | **0.0193** | | **281.9309** |

**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 | 0.0138 | 8.9900e-003 | 0.1020 | 3.1000e-004 | 0.0335 | 2.5000e-004 | 0.0338 | 8.8900e-003 | 2.3000e-004 | 9.1200e-003 | | 31.1445 | 31.1445 | 8.4000e-004 | | 31.1655 |
| **Total** | **0.0138** | **8.9900e-003** | **0.1020** | **3.1000e-004** | **0.0335** | **2.5000e-004** | **0.0338** | **8.8900e-003** | **2.3000e-004** | **9.1200e-003** | | **31.1445** | **31.1445** | **8.4000e-004** | | **31.1655** |

## 3.6 Architectural Coating - 2021

**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 | | | | | |
| Archit. Coating | 11.1112 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.2189 | 1.5268 | 1.8176 | 2.9700e-003 | | 0.0941 | 0.0941 | | 0.0941 | 0.0941 | 0.0000 | 281.4481 | 281.4481 | 0.0193 | | 281.9309 |
| **Total** | **11.3301** | **1.5268** | **1.8176** | **2.9700e-003** | | **0.0941** | **0.0941** | | **0.0941** | **0.0941** | **0.0000** | **281.4481** | **281.4481** | **0.0193** | | **281.9309** |

**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 | 0.0138 | 8.9900e-003 | 0.1020 | 3.1000e-004 | 0.0335 | 2.5000e-004 | 0.0338 | 8.8900e-003 | 2.3000e-004 | 9.1200e-003 | | 31.1445 | 31.1445 | 8.4000e-004 | | 31.1655 |
| **Total** | **0.0138** | **8.9900e-003** | **0.1020** | **3.1000e-004** | **0.0335** | **2.5000e-004** | **0.0338** | **8.8900e-003** | **2.3000e-004** | **9.1200e-003** | | **31.1445** | **31.1445** | **8.4000e-004** | | **31.1655** |

# 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 | 0.2076 | 1.0778 | 2.7578 | 9.9700e-003 | 0.8502 | 8.2800e-003 | 0.8585 | 0.2275 | 7.7300e-003 | 0.2352 | | 1,014.5910 | 1,014.5910 | 0.0507 | | 1,015.8579 |
| Unmitigated | 0.2076 | 1.0778 | 2.7578 | 9.9700e-003 | 0.8502 | 8.2800e-003 | 0.8585 | 0.2275 | 7.7300e-003 | 0.2352 | | 1,014.5910 | 1,014.5910 | 0.0507 | | 1,015.8579 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Congregate Care (Assisted Living) | 117.07 | 117.07 | 117.07 | 400,046 | 400,046 |
| General Office Building | 0.00 | 0.00 | 0.00 | | |
| Total | 117.07 | 117.07 | 117.07 | 400,046 | 400,046 |

## 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 |
| Congregate Care (Assisted | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Congregate Care (Assisted Living) | 0.551391 | 0.043400 | 0.201050 | 0.120272 | 0.016162 | 0.005864 | 0.021029 | 0.030512 | 0.002059 | 0.001866 | 0.004766 | 0.000706 | 0.000924 |
| General Office Building | 0.551391 | 0.043400 | 0.201050 | 0.120272 | 0.016162 | 0.005864 | 0.021029 | 0.030512 | 0.002059 | 0.001866 | 0.004766 | 0.000706 | 0.000924 |

## 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 | 8.2200e-003 | 0.0705 | 0.0317 | 4.5000e-004 | | 5.6800e-003 | 5.6800e-003 | | 5.6800e-003 | 5.6800e-003 | | 89.7243 | 89.7243 | 1.7200e-003 | 1.6400e-003 | 90.2575 |
| NaturalGas Unmitigated | 8.2200e-003 | 0.0705 | 0.0317 | 4.5000e-004 | | 5.6800e-003 | 5.6800e-003 | | 5.6800e-003 | 5.6800e-003 | | 89.7243 | 89.7243 | 1.7200e-003 | 1.6400e-003 | 90.2575 |

## 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 | | | | | |
| Congregate Care (Assisted Living) | 720.087 | 7.7700e-003 | 0.0664 | 0.0282 | 4.2000e-004 | | 5.3700e-003 | 5.3700e-003 | | 5.3700e-003 | 5.3700e-003 | | 84.7161 | 84.7161 | 1.6200e-003 | 1.5500e-003 | 85.2195 |
| General Office Building | 42.5699 | 4.6000e-004 | 4.1700e-003 | 3.5100e-003 | 3.0000e-005 | | 3.2000e-004 | 3.2000e-004 | | 3.2000e-004 | 3.2000e-004 | | 5.0082 | 5.0082 | 1.0000e-004 | 9.0000e-005 | 5.0380 |
| **Total** | | **8.2300e-003** | **0.0705** | **0.0318** | **4.5000e-004** | | **5.6900e-003** | **5.6900e-003** | | **5.6900e-003** | **5.6900e-003** | | **89.7243** | **89.7243** | **1.7200e-003** | **1.6400e-003** | **90.2575** |

**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 | | | | | |
| Congregate Care (Assisted Living) | 0.720087 | 7.7700e-003 | 0.0664 | 0.0282 | 4.2000e-004 | | 5.3700e-003 | 5.3700e-003 | | 5.3700e-003 | 5.3700e-003 | | 84.7161 | 84.7161 | 1.6200e-003 | 1.5500e-003 | 85.2195 |
| General Office Building | 0.0425699 | 4.6000e-004 | 4.1700e-003 | 3.5100e-003 | 3.0000e-005 | | 3.2000e-004 | 3.2000e-004 | | 3.2000e-004 | 3.2000e-004 | | 5.0082 | 5.0082 | 1.0000e-004 | 9.0000e-005 | 5.0380 |
| **Total** | | **8.2300e-003** | **0.0705** | **0.0318** | **4.5000e-004** | | **5.6900e-003** | **5.6900e-003** | | **5.6900e-003** | **5.6900e-003** | | **89.7243** | **89.7243** | **1.7200e-003** | **1.6400e-003** | **90.2575** |

# 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 | 1.3880 | 0.1139 | 7.5392 | 0.0185 | | 0.9301 | 0.9301 | | 0.9301 | 0.9301 | 135.7377 | 3.4171 | 139.1548 | 0.6379 | 0.0000 | 155.1012 |
| Unmitigated | 1.3880 | 0.1139 | 7.5392 | 0.0185 | | 0.9301 | 0.9301 | | 0.9301 | 0.9301 | 135.7377 | 3.4171 | 139.1548 | 0.6379 | 0.0000 | 155.1012 |

## 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 | 0.0578 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 0.6518 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.6208 | 0.0920 | 5.6373 | 0.0184 | | 0.9196 | 0.9196 | | 0.9196 | 0.9196 | 135.7377 | 0.0000 | 135.7377 | 0.6346 | 0.0000 | 151.6013 |
| Landscaping | 0.0576 | 0.0220 | 1.9018 | 1.0000e-004 | | 0.0105 | 0.0105 | | 0.0105 | 0.0105 | | 3.4171 | 3.4171 | 3.3100e-003 | | 3.4999 |
| **Total** | **1.3880** | **0.1139** | **7.5392** | **0.0185** | | **0.9301** | **0.9301** | | **0.9301** | **0.9301** | **135.7377** | **3.4171** | **139.1548** | **0.6379** | **0.0000** | **155.1012** |

### 6.2 Area by SubCategory

**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 | 0.0578 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 0.6518 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.6208 | 0.0920 | 5.6373 | 0.0184 | | 0.9196 | 0.9196 | | 0.9196 | 0.9196 | 135.7377 | 0.0000 | 135.7377 | 0.6346 | 0.0000 | 151.6013 |
| Landscaping | 0.0576 | 0.0220 | 1.9018 | 1.0000e-004 | | 0.0105 | 0.0105 | | 0.0105 | 0.0105 | | 3.4171 | 3.4171 | 3.3100e-003 | | 3.4999 |
| **Total** | **1.3880** | **0.1139** | **7.5392** | **0.0185** | | **0.9301** | **0.9301** | | **0.9301** | **0.9301** | **135.7377** | **3.4171** | **139.1548** | **0.6379** | **0.0000** | **155.1012** |

## 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

## Greenhouse Gas Emission Worksheet

***N20 Mobile Emissions*** Ronald McDonald House Expansion

**From CalEEMod v.2016.3.2 Vehicle Fleet Mix Output:**

Annual VMT: 400,046

| Vehicle Type | Percent Type | CH4 Emission Factor (g/mile)* | CH4 Emission (g/mile)** | N2O Emission Factor (g/mile)* | N2O Emission (g/mile)** |
|---|---|---|---|---|---|
| Light Auto | 55.1% | 0.04 | 0.02204 | 0.04 | 0.02204 |
| Light Truck < 3750 lbs | 4.3% | 0.05 | 0.00215 | 0.06 | 0.00258 |
| Light Truck 3751-5750 lbs | 20.1% | 0.05 | 0.01005 | 0.06 | 0.01206 |
| Med Truck 5751-8500 lbs | 12.0% | 0.12 | 0.0144 | 0.2 | 0.024 |
| Lite-Heavy Truck 8501-10,000 lbs | 1.6% | 0.12 | 0.00192 | 0.2 | 0.0032 |
| Lite-Heavy Truck 10,001-14,000 lbs | 0.6% | 0.09 | 0.00054 | 0.125 | 0.00075 |
| Med-Heavy Truck 14,001-33,000 lbs | 2.1% | 0.06 | 0.00126 | 0.05 | 0.00105 |
| Heavy-Heavy Truck 33,001-60,000 lbs | 3.1% | 0.06 | 0.00186 | 0.05 | 0.00155 |
| Other Bus | 0.2% | 0.06 | 0.00012 | 0.05 | 0.0001 |
| Urban Bus | 0.2% | 0.06 | 0.00012 | 0.05 | 0.0001 |
| Motorcycle | 0.5% | 0.09 | 0.00045 | 0.01 | 0.00005 |
| School Bus | 0.1% | 0.06 | 0.000042 | 0.05 | 0.000035 |
| Motor Home | 0.1% | 0.09 | 0.00009 | 0.125 | 0.000125 |
| **Total** | **100.0%** | | **0.055042** | | **0.06764** |

**Total Emissions (metric tons) =**
**Emission Factor by Vehicle Mix (g/mi) x Annual VMT(mi) x 0.000001 metric tons/g**

**Conversion to Carbon Dioxide Equivalency (CO2e) Units based on Global Warming Potential (GWP)**

| | | |
|---|---|---|
| CH4 | 21 | GWP |
| N2O | 310 | GWP |
| 1 ton (short, US) = | 0.90718474 | metric ton |

**Annual Mobile Emissions:**

| | Total Emissions | | Total CO2e units | |
|---|---|---|---|---|
| N20 Emissions: | 0.0271 | metric tons N2O | **8.39** | metric tons CO2e |
| | | ***Project Total:*** | ***8.39*** | ***metric tons CO2e*** |

**References**

* from Table C.4: Methane and Nitrous Oxide Emission Factors for Mobile Sources by Vehicle and Fuel Type (g/mile).
in California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009.
Assume Model year 2000-present, gasoline fueled.

** Source: California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009.

*** CalEEMod v.2016.3.2 results for mobile sources.

# Appendix B

Cultural Resource Technical Memorandum

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September 4, 2019
Rincon Project No: 18-05893

Noel Burcelis, MSW
Executive Director
Orange County Ronald McDonald House
383 South Batavia Street
Orange, California 92868

**Subject: Cultural Resources Technical Memorandum for the Orange County Ronald McDonald House Expansion Project, Orange County, California**

Dear Noel Burcelis:

Rincon Consultants, Inc. (Rincon) was retained by Orange County Ronald McDonald House to perform cultural resource services to comply with a request from the City of Orange for the Ronald McDonald House Expansion Project (project). The purpose of this technical memorandum (memo) is to document the results of the tasks performed by Rincon, specifically a cultural resources record search, an archaeological field survey, and a historical resources field survey and analysis. This memo is part of the preparation of an Initial Study-Mitigated Negative Declaration (IS-MND) in compliance with the California Environmental Quality Act (CEQA). The City of Orange (City) is the lead agency under CEQA.

# Project Site

The project site is located at 383 S. Batavia Street and 802 W. Culver Avenue in the City of Orange, California. The project site includes three parcels identified as Assessor's Parcel No. (APN) 041-121-29, which encompasses a lot area of 0.83 acres (36,000 square feet (sf)) and one parcel identified as APN 041-140-23, which encompasses a lot area of 0.23 (9,876 sf) (project site). The project site is bordered by S. Batavia Street to the west, followed by a large complex associated with the Sisters of St. Joseph's of Orange across the street, single-family residences to the north and east, and office buildings with associated surface parking to the south and southeast (Figure 1; Attachment A).

The project includes an expansion to the existing Orange County Ronald McDonald House to increase the current number of guest rooms from 21 to 44. The entire 36,000 square feet of lot area is intended to be developed as a single parcel. The expansion would occur on the southern portion of the project site, which is currently occupied by a gravel surface parking lot and a children's play area surrounded by trees. The architectural design of the expansion would match the design of the existing building.

The proposed project would include the acquisition of the single-family residence located on an adjacent parcel to the east at 802 W. Culver Avenue. The existing house would provide auxiliary office space associated with the Ronald McDonald House. No new development or exterior alterations to the single-family residence are proposed.

The proposed project would also include the relocation of an existing storm drain and transformer on the project site. The storm drain realignment would follow the west and south perimeter of the project site, through the 802 W. Culver Avenue parcel, and would ultimately connect to existing storm drains located along both Batavia Street and at the intersection of W. Culver Avenue and S. Clark Street.

## Cultural Resources Records Search

A search of the California Historical Resources Information System (CHRIS) at the South Central Coastal Information Center (SCCIC) located at the California State University, Fullerton was completed on September 12, 2018. The search was performed to identify all previously conducted cultural resources studies and identified cultural resources within the project site and a 0.5-mile radius surrounding it. The CHRIS search included a review of the National Register of Historic Places (NRHP), the California Register of Historical Resources (CRHR), the Office of Historic Preservation Historic Properties Directory, the California Inventory of Historic Resources, and the Archaeological Determinations of Eligibility list.

The SCCIC records search identified 11 cultural resource studies that have been performed within a 0.5-mile radius of the project site; none of these studies are within or adjacent to the project site. A total of five previously recorded cultural resources have been documented within a 0.5-mile radius of the project site. These resources include two historic buildings (the Parker House [P-30-158759] and the Porter French House [P-30-158710]), two National Register historic districts (the Plaza National Register Historic District [P-30-158679] and the Old Towne Orange National Register Historic District [P-30-159932]), and one historic railroad (the Burlington Northern Santa Fe Railroad [P-30-176663]). Although the SCCIC record search identified no cultural resources within the project site, the Old Towne Orange National Register Historic District is located immediately adjacent to the project site (see Attachment A).

As part of the record search, Rincon also reviewed the City's historic resources inventory (City of Orange 2018a). Results of this review indicate that the City established expanded boundaries for the Old Towne Orange Local Historic District that includes properties on the periphery of the National Register District. The Old Towne Orange Local Historic District encompasses an approximately one square mile area of downtown Orange, and includes 1,279 contributing properties constructed between 1888 and 1940. Primary architecture styles found in the district include Folk Victorian, Craftsman, Spanish Colonial Revival and Tudor Revival residences, and masonry commercial buildings. The project site lies within the western extent of the Old Town Orange Local Historic District.

## Archaeological Field Survey

Rincon Archaeologist Tricia J. Dodds, M.A., RPA, conducted a pedestrian field survey of the project site on September 12, 2018. All accessible areas of the project site were inspected by Ms. Dodds who walked the area using five meter transect intervals (Figure 2; Attachment A). Approximately 90 percent of the project site has been previously developed by the existing Ronald McDonald House and its associated paved and gravel parking lots, playground, manicured grass lawn, and citrus grove (Figures 3 and 4; Attachment A). Rincon's archaeologist carefully examined all areas of exposed ground surface for artifacts (e.g., flaked stone tools, tool-making debris, stone milling tools, ceramics, fire-affected rock), ecofacts (marine shell and bone), soil discoloration that might indicate the presence of a cultural midden, soil depressions, and features indicative of the former presence of structures or buildings (e.g., standing exterior walls, postholes, foundations) or historic debris (e.g., metal, glass, ceramics). Ms. Dodds observed modern trash, including plastic bottles, newspapers, and cigarette butts. No archaeological resources were identified during the pedestrian field survey.

# Historical Resource Field Survey and Analysis

Rincon Architectural Historian Rachel Perzel, M.A., conducted a pedestrian field survey of the project site and vicinity on September 13, 2018. Photographs were taken of the site and surrounding properties to document the overall setting.

The Orange County Ronald McDonald House was constructed in 1989. The building is a three-story structure designed in a Colonial Revival-style, and features fiber cement siding that simulates wood, a center gabled-on-hip roof, large 1/1 windows hung in pairs and bands, and arched porches supported by wood posts. The western façade is also accented with a pair of portal windows and a cobble stone siding wall, located between the two primary entrance doors. A similarly-designed porte-cochere extends off the south elevation of the building and features a small storage shed area. The property also includes a large adjacent southern lot which is used as a playground and parking.

The project area contains two properties containing built environment resources; the Orange County Ronald McDonald House and a single-family residence located at 802 W. Culver Avenue. Both properties are located within the boundary of the City's Old Towne Orange Local Historic District. Specifically, the project site is situated along the western edge of the local historic district, which concludes along the eastern edge of Batavia Street. Although portions of the district were listed in the NRHP in 1997, the NRHP boundary includes a portion of the north side of Culver Avenue, but excludes the southern side of the street where the single-family residence at 802 W. Culver Avenue is located. Therefore, the subject property is located only within the City's locally-designated district boundary. The Orange County Ronald McDonald House is 29 years of age and, therefore, not of sufficient age to warrant historic designation and is not a historic district contributor. The property at 802 W. Culver Avenue contains a two-story Craftsman Airplane Bungalow, constructed in 1919, that was moved onto the site in 2004 and is considered a contributor to the City's Old Towne Orange Local Historic District.

The area surrounding the project site includes single-family residences to the north and east, and office and medical properties to the south. The two consecutive properties on Batavia Street adjacent to the north are contributors to the Old Towne Orange Local Historic District. There are no contributing historic resources adjacent to the residence at 802 W. Culver Avenue. The historic district boundary does not extend to the west, past Batavia Street; however, the project site is located across the street from one potential historic resource, the St. Joseph's Hospital Nursing School (480 South Batavia Street).

The proposed project includes the expansion of the existing 12,580 square foot building to increase the number of guest rooms from 21 to 44. The expansion will extend the footprint of the building along its southern wall, adding and additional 17,600 square feet to the overall structure. The extant porte-cochere would be demolished and replaced along the southern elevation addition as part of the addition. A small addition of approximately 400 square feet would also be made to the rear elevation of the original building, in the north east corner. The proposed project would include the acquisition of the single-family residence located at 802 W. Culver Avenue. The existing house would provide auxiliary office space associated with the Ronald McDonald House. No new development or exterior alterations to the single-family residence are proposed.

The existing Orange County Ronald McDonald House, located at 383 S. Batavia Street (APN 041-121-29) was constructed in 1989 and is 29 years of age; therefore, it is not of sufficient age to warrant historic designation. It is not a contributor to the Old Towne Orange Local Historic District, nor is it individually considered a historical resource for the purposes of CEQA. Remnants of an orange grove are located near the center of the property between the existing Ronald McDonald House and the parking lot to the south. The remaining trees currently surround a playground on the property. As evidenced by historic and recent aerial photographs, the trees were once associated with a residence that was previously located where the present parking lot now exists. The existing trees were part of a larger grove that spanned from Batavia Street on the west to past Clark Street on the east, and included the adjacent parcel to the south which is currently addressed as 431 S. Batavia Street. Of this once much larger grove, only portions of a few rows remain. The rows that remain have been truncated in length, and several trees were removed in recent years to create a cleared central area where a playground was developed (UCSB Map & Imagery Lab 1930, 1938, 1952, 1974; Google Earth 2003, 2005, 2016, 2017; NETRonline 2004). Because of the removal of the residence once associated with the old orange grove, and the removal of the majority of the tree rows for the subdivision and development of the property and the relocation of the existing Craftsman residence, the remaining portion of the orchard does not retain sufficient integrity to convey any historical associations it may have had.

The project is located within the boundary of the City's Old Towne Orange Local Historic District. Although the existing Ronald McDonald House is not a district contributor, the property at 802 W. Culver Avenue is considered a contributor and therefore is a historical resource in accordance with CEQA. The proposed project was analyzed for potential impacts to the historic district. This analysis was informed by the City's historic district guidance, outlined in the *Historic Preservation Design Standards* (City of Orange 2018b) as well as the National Park Service *Secretary of the Interior's Standards for the Treatment of Historic Properties* (Standards) (Weeks and Grimmer 2017). The City's *Historic Preservation Design Standards* delineate standards for contributing and non-contributing buildings in historic districts, which apply to the Ronald McDonald House expansion project to ensure compatibility with the historic district.

The CEQA Guidelines specify that "substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (CEQA Guidelines, Section 15064.5). Material impairment occurs when a project alters in an adverse manner or demolishes "those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion" or eligibility for inclusion in the NRHR, CRHR, or local register. In addition, pursuant to CEQA Guidelines Section 15126.2, the "direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects."

Of particular relevance to this study's analysis of indirect impacts to historic resources are the following guides and requirements. Pursuant to CEQA Guidelines, Section 15378, study of a project under CEQA requires consideration of "the whole of an action, which has the potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment." CEQA Guidelines, Section15064d further define direct and indirect impacts:

1. A direct physical change in the environment is a physical change in the environment which is caused by and immediately related to the project.
2. An indirect physical change in the environment is a physical change in the environment which is not immediately related to the project, but which is caused indirectly by the project. If a direct physical change in the environment in turn causes another change in the environment, then the other change is an indirect physical change in the environment.
3. An indirect physical change is to be considered only if that change is a reasonably foreseeable impact which may be caused by the project.

The proposed project would expand the Ronald McDonald House building by 18,000 square feet; 400 square feet at the rear northeast corner of the existing building and an additional 17,600 square feet along the southern elevation. The new additions would be constructed in the same Colonial-Revival design and feature the same materials, making them compatible with the existing building. The 400 square foot addition at the northeast corner of the building would be two-stories in height, clad with horizontal siding, and topped by a hipped roof, making the rear elevation of the building symmetrical. This addition would not be visible from Batavia Street as it is being built to the rear of the existing building. Although the addition would be located on the side of the building that is adjacent to a historic district contributor (375 South Batavia Street), it would not indirectly affect the adjacent property, as the addition would only extend the existing building mass slightly to the east (rear) and would be constructed two stories in height, the same as the existing building, using the same style and materials.

The 17,600 square foot addition against the south elevation would increase the massing of the existing structure; however, this addition would not significantly affect the historic district or any of its contributors. The properties south of the project site and the location of the addition are comprised of non-contributing medical office and laboratory buildings in the Trico Sycamore Plaza and Batavia Woods Medical Center. These buildings are large in mass, range from one to three stories in height and are each separated by large parking lots. The addition to the existing building would be consistent with the height, massing and scale of this area. As viewed from the north where the two district contributors are located on Batavia Street, the proposed addition on the south side of the Ronald McDonald House would be compatible with the existing streetscape as it utilizes the same architectural style and details (porch, columns, balconies, siding and rooflines) of the existing building. The addition would be similar in height and massing to the adjacent medical buildings to the south and the Sisters of St. Joseph property to the west across Batavia Street.

The proposed project would include the acquisition of the single-family residence located at 802 W. Culver Avenue, which is a contributor to the Old Towne Local Historic District. The existing house would provide auxiliary office space associated with the Ronald McDonald House. No new development or exterior alterations to the single-family residence are proposed. The acquisition of the property and change in use from residential to offices would not directly or indirectly affect the historic district, as no exterior alterations to the building are proposed. The building is situated at the southeastern edge of the project site, and is sited facing to the northeast toward Culver Street. While the rear elevation of the addition to the Ronald McDonald House would be partially visible from the primary view shed of this historic residence, it would not adversely affect any of its character-defining features, which include its two-story massing and multiple gables, broad and low-pitched gabled roofs with widely overhanging eaves, exposed rafter tails and purlins, wooden casings, and entry porch supported by piers. The addition would not further affect the setting in which the existing building on the project site is already visible. Additional district contributors on the north side of West Culver Avenue would not be adversely affected as the proposed addition is similar in height and massing to the existing setting on the south side of West Culver Avenue where two and three-story office buildings are located.

The proposed project is in conformance with the City's Historic Preservation Design Standards for non-contributing buildings in historic districts. The addition will be consistent with the style and materials of the existing Ronald McDonald House building; it will continue the front porch across the façade of the existing building; maintain a façade and entrance oriented toward the street; have windows and doors compatible with the existing building's predominant architectural style; and use exterior siding and wood details similar in appearance to other buildings in the historic district. The addition would be similar to the existing building in terms of height, mass and rooflines, and would not have a significant difference in setback compared to the existing building. Its dimensions would be similar to those of surrounding properties such as the medical and laboratory buildings to the south and Sisters of St. Joseph property to the west.

The project also involves trenching along the southern edge of the project site and through the 802 W. Culver Avenue property for storm drain realignment. This work would not require heavy construction equipment which produces vibration levels that would be a concern for the historic building.

None of the trees on the project site are known to have been identified as "historical trees". The Orange Municipal Code (OMC) defines "historical trees" as those which by their origin, size, uniqueness and/or national or regional rarity are now or are likely to be of historical value. Trees so classified may be but are not limited to those on a master list compiled and maintained by the Community Services Department and approved by resolution of the City Council (OMC Chapter 12.32.060). As previously discussed, the remnant of the orange grove on the project site has been greatly altered through the removal of the residence previously associated with the grove, as well as the removal of the majority of the trees when the property was subdivided for development, the existing Craftsman residence was moved onto the property, and the playground was constructed. The remaining remnants of the orchard do not retain sufficient integrity to convey any historical associations it may have had.

The project site is also located across the street to the east of the St. Joseph's Hospital Nursing School (480 South Batavia Street), which the City has identified as a potential historic resource. However, the proposed project would be in keeping with the existing setting of the surrounding area and would not adversely affect the historic significance of the resource. Therefore, the proposed project would not result in direct or indirect impacts to the Old Towne Historic District or the nearby St. Joseph's Hospital Nursing School.

## Findings and Recommendations

Based on the results of this cultural resources study, Rincon recommends a finding of ***less than significant impact to archaeological and historical resources with mitigation incorporated*** for the purposes of CEQA.

Although no archaeological resources have been documented on the project site, encountering unanticipated archaeological resources during ground disturbance is a possibility and impacts to unknown resources are potentially significant. Mitigation is required to reduce impacts to a less than significant level. The following mitigation measure provides steps to take in the event of an unanticipated discovery during construction. These steps include evaluating whether the resource meets the definition of a historical and/or unique archaeological resource and is therefore significant under CEQA, and requiring treatment for any resources identified as significant.

MM-1 Unanticipated Discovery of Archaeological Resources

If archaeological resources are encountered during ground-disturbing activities, all work in the immediate vicinity shall be halted, and the City of Orange Community Development Department shall be immediately informed of the discovery. An archaeologist meeting the Secretary of the Interior's Professional Qualification Standards for Archaeology as defined at 36 CFR Part 61, Appendix A (Professional Archaeologist) shall be retained by the project applicant to determine if the find is classified as a significant cultural resource pursuant to the CEQA definition of historical (CEQA Guidelines 15064.5[a]) and/or unique archaeological resources (Public Resources Code 21083.2[g]). If the resource is classified as a significant cultural resource, the qualified archaeologist shall make recommendations on the treatment and disposition of the finding. The final recommendations on the treatment and disposition of the finding shall be developed in accordance with all applicable provisions of the California Resources Code Section 21083.2 and CEQA Guidelines Sections 15064.5 and 15126.4 and shall be reviewed by the City of Orange Community Development Department prior to implementation. The final recommendations shall be implemented and the City shall be provided with a final report on the treatment and disposition of the finding prior to issuance of a Certificate of Occupancy.

No human remains are known to exist on the project site; however, the discovery of human remains is always a possibility during ground-disturbing activities. If human remains are found, the State of California Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. In the event of an unanticipated discovery of human remains, the County Coroner must be notified immediately. If the human remains are determined to be prehistoric, the Coroner will notify the Native American Heritage Commission, which will determine and notify a most likely descendant (MLD). The MLD shall complete the inspection of the site and provide recommendations for treatment to the landowner within 48 hours of being granted access. With adherence to these existing regulations, impacts to human remains would be less than significant.

The project site contains one historical built environment resource, the residence at 802 W. Culver Avenue, which is a contributor to the Old Towne Local Historic District. No new development or exterior alterations to the residence are proposed as part of the project. However, the project includes realignment of a storm drain on the project site, which will involve trenching through the 802 W. Culver Avenue property. While the project would not result in direct or indirect impacts to the residence on the property, the Old Towne Local Historic District or the nearby St. Joseph's Hospital Nursing School, to ensure the project does not result in any inadvertent damage to the historic single-family residence during the storm drain realignment, the following mitigation measure will be implemented.

MM-2 Historic Resource Protection During Construction Activities

Prior to a contractor beginning the trenching work for the storm drain realignment on the project site, stakes with flags shall be erected around the perimeter of the west and south sides of the single-family residence at 802 W. Culver Avenue to designate an avoidance area at least four (4) feet away from the residence to protect it from inadvertent damage by construction equipment.

Please do not hesitate to contact Rincon with any questions regarding this cultural resources study.

Sincerely,

**Rincon Consultants, Inc.**

| | |
|---|---|
| Tricia Dodds, M.A., RPA | Tiffany Clark, Ph.D., RPA |
| Archaeologist | Archaeological Resources Project Manager and Principal Investigator |

Joe Power, AICP CEP
Senior Principal/Vice President

Shannon Carmack, B.A.
Architectural Historian/Principal

## Attachments

Figure 1 Project Location Map
Figure 2 Project Site Map
Figure 3 West Side of Project Area, Showing the Ronald McDonald House (View South)
Figure 4 Project Overview, Showing the Ronald McDonald House (View Southeast)
Figure 5 Project Overview, Showing 302 W. Culver Avenue (View Southwest)
Resource List
Report List

# References

City of Orange

2018a Old Town District. https://www.cityoforange.org/262/Old-Towne-District, accessed October 9, 2018.

2018b Historic Preservation Design Standards. Adopted by Orange City Council December 12, 2018.

Google Earth

2003 Aerial photograph of project site and vicinity. Accessed August 27, 2019.

2005 Aerial photograph of project site and vicinity. Accessed August 27, 2019.

2016 Aerial photograph of project site and vicinity. Accessed August 27, 2019.

2017 Aerial photograph of project site and vicinity. Accessed August 27, 2019.

National Park Service

1983 Archaeological and Historic Preservation: Secretary of the Interior's Standards and Guidelines*.* Electronic document, online at http://www.nps.gov/history/local-law-Arch_Standards.htm, accessed December 6, 2011.

NETRonline

2004 Aerial photograph of project site and vicinity. Accessed August 27, 2019 at HistoricAerials.com

University of California Santa Barbara (UCSB) Map & Imagery Lab

1930 Flight C-1780, Frame B-1. Aerial photograph of project site and vicinity. Accessed August 27, 2019 at http://mil.library.ucsb.edu/ap_indexes/FrameFinder/

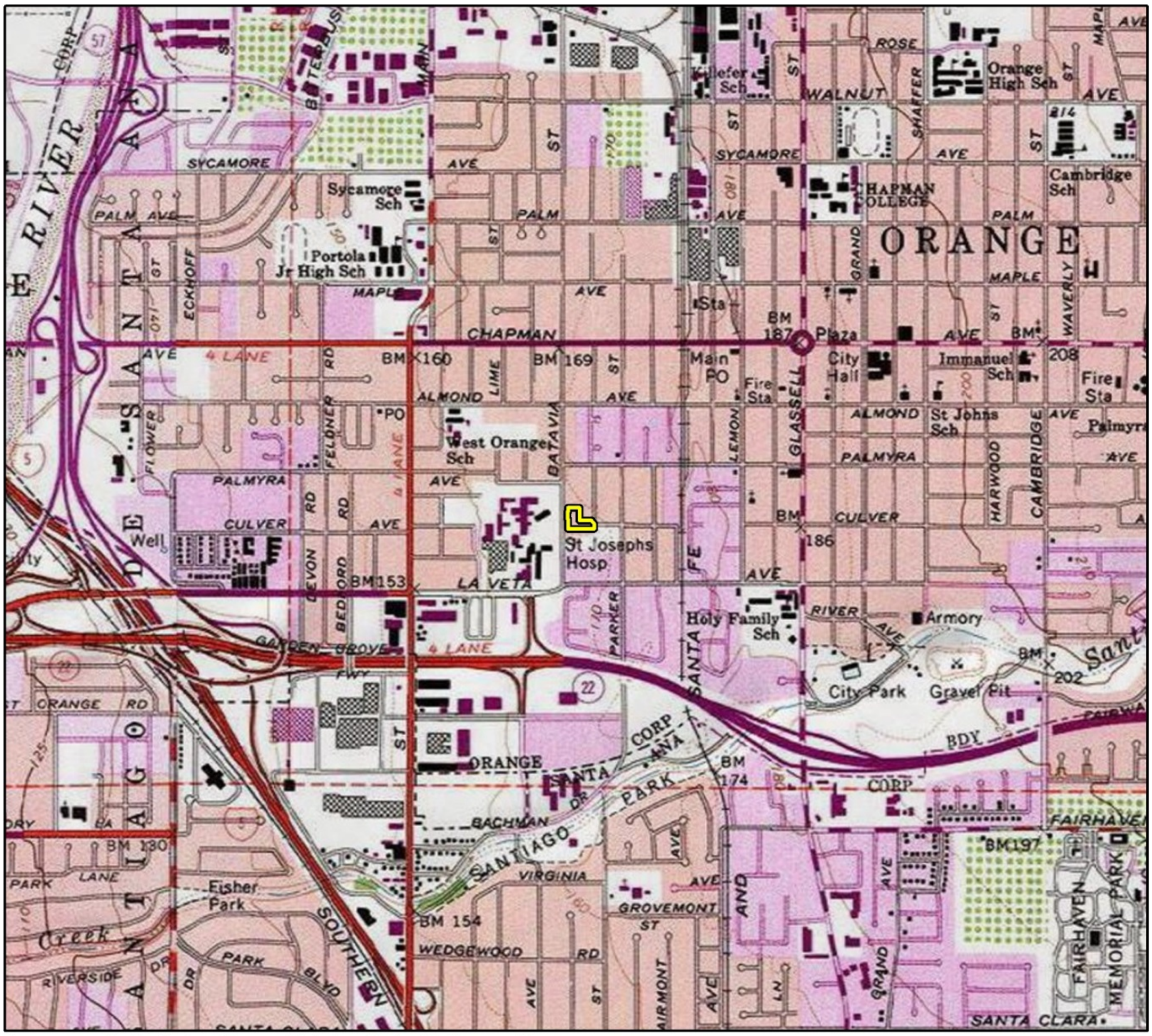
1938 Flight C-5029, Frame 68. Aerial photograph of project site and vicinity. Accessed August 27, 2019 at http://mil.library.ucsb.edu/ap_indexes/FrameFinder/

1952 Flight AXK-1953, Frame 5K-86. Aerial photograph of project site and vicinity. Accessed August 27, 2019 at http://mil.library.ucsb.edu/ap_indexes/FrameFinder/

1974 Flight TG-7400, Frame 13-20. Aerial photograph of project site and vicinity. Accessed August 27, 2019 at http://mil.library.ucsb.edu/ap_indexes/FrameFinder/

# Attachments

## Figure 1 Project Location Map



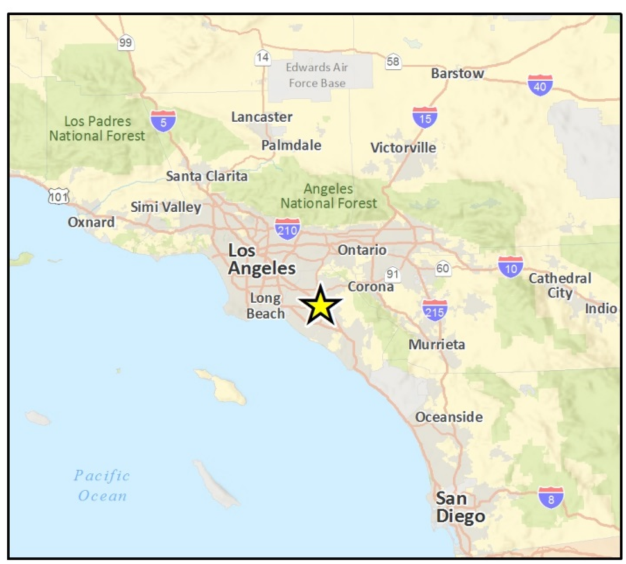

*Imagery provided by National Geographic Society, Esri and its licensors © 2019. Orange Quadrangle. T04S R09W S31. The topographic representation depicted in this map may not portray all of the features currently found in the vicinity today and/or features depicted in this map may have changed since the original topographic map was assembled.*

Project Location

0 1,000 2,000

Feet

N




CltFig 1 Proj Locn Map

**Figure 2 Project Site Map**


*Imagery provided by Google and its licensors © 2018.*

CRFig 2 Project Site Map

**Figure 3 West Side of Project Area, Showing the Ronald McDonald House (View South)**

**Figure 4 Project Overview, Showing the Ronald McDonald House (View Southeast)**

**Figure 5 Project Overview, Showing 302 W. Culver Avenue (View Southwest)**

# Resource List

**Ronald McDonald Expansion**

| Primary No. | Trinomial | Other IDs | Type | Age | Attribute codes | Recorded by | Reports |
|---|---|---|---|---|---|---|---|
| P-30-158679 | | OHP Property Number - 038045; Resource Name - The Plaza Historic District; Other - Downtown Orange; Other - zip 92866 | District | Historic | HP06 (1-3 story commercial building); HP30 (Trees/vegetation); HP31 (Urban open space); HP95 (Concrete Construction); HP99 (Brick Costruction) | 1982 (Paul Clark, Frederick Buss, Orange Community Historical Society) | |
| P-30-158710 | | OHP Property Number - 038076; Resource Name - Porter-French House; Other - zip 92868 | Building | Historic | HP02 (Single family property) | 1993 (Diann Marsh) | |
| P-30-158759 | | OHP Property Number - 038125; Resource Name - Parker House | Building | Historic | HP02 (Single family property) | 1988 (Diann Marsh) | |
| P-30-159932 | | OHP Property Number - 039299; Resource Name - Old Towne Orange Historic District; Other - zip 92866 | District | Historic | HP02 (Single family property); HP03 (Multiple family property); HP06 (1-3 story commercial building); HP14 (Government building); HP16 (Religious building) | 1997 (Steven McHarris, Old Towne Preservation Association) | |

## Resource List

**Ronald McDonald Expansion**

| Primary No. | Trinomial | Other IDs | Type | Age | Attribute codes | Recorded by | Reports |
|---|---|---|---|---|---|---|---|
| P-30-176663 | | OHP Property Number - 144278; Resource Name - Atchison, Topeka & Santa Fe RR, Burlington Northern Santa Fe RR; Other - Burlington Northern Santa Fe; Other - Metrolink Railroad; Voided - 30-176664; Other - CRM TECH 789-50H & 951-1H; Other - California Southern Railroad | Structure | Historic | HP37 (Highway/trail) - Railroad; HP39 (Other) | 2002 (D. Ballester, CRM Tech); 2002 ( Bai Tang and Josh Smallwood, CRM Tech); 2007 (S. McCormick); 2012 (MK Meiser, AECOM); 2016 | LA-07871, LA-08158, OR-03383, OR-03517, OR-03519, OR-03551, OR-03555, OR-03573, OR-03747, OR-03797, OR-03822, OR-03835, OR-03864, OR-03866, OR-03905, OR-03910, OR-03916, OR-03919, OR-03929, OR-03942, OR-03983, OR-04020, OR-04045, OR-04058, OR-04074, OR-04096, OR-04131, OR-04154, OR-04156, OR-04169, OR-04182, OR-04186, OR-04217, OR-04229, OR-04257, OR-04290, OR-04292, OR-04331, OR-04367, OR-04374, OR-04385, OR-04404, OR-04457 |

# Report List

**Ronald McDonald Expansion**

| Report No. | Other IDs | Year | Author(s) | Title | Affiliation | Resources |
|---|---|---|---|---|---|---|
| OR-00526 | | 1980 | Douglas, Ronald D. | Archaeological Survey Report Continental Center, Orange, Ca | Archaeological Planning Collaborative | |
| OR-01980 | Cellular - | 1999 | Duke, Curt | Cultural Resource Assessment for Pacific Bell Mobile Services Facility Cm 231-01, County of Orange, California | LSA Associates, Inc. | |
| OR-02560 | Cellular - | 2002 | Chakurian, Anthony | Request for SHPO Review of FCC Undertaking - 170 South Olive Street, Orange, California | GeoTrans, Inc. | |
| OR-02618 | | 1997 | Donovan, James | Planning Report, Re: Old Towne Brewing Co. (j.r. Guerin Brewing Co., L..l..c.) | J. R. Guerin Brewing co., L.L.C. | |
| OR-02717 | Cellular - | 2002 | Duke, Curt | Cultural Resource Assessment Cingular Wireless Facility No. Sc 050-02 Orange County, California | LSA Associates, Inc. | |
| OR-02730 | | 2002 | Robinson, Mark C. | Santa Ana Second Main Track Project: Revised Archaeological Survey Letter Report for Proposed Santiago Creek Railroad Bridge | Applied EarthWorks, Inc. | |
| OR-02973 | | 2004 | Smith, David M. and Christopher E. Drover | An Evaluation of CA-ORA-1511: a Prehistoric Site Discovered During Grading Monitoring at Crystal Cove Orange County, California | The Keith Companies Archaeological Division | 30-001511 |
| OR-03095 | Cellular - | 2005 | Fulton, Terri | Cultural Resource Assessment At&t Wireless Services Facility No. 13078b Orange County, California | LSA Associates, Inc. | |
| OR-03371 | | 2000 | Ritchie, Michael | Determination of Effect State Route 22/west Orange County Connnection | Caltrans District 12 | 19-000392, 19-001352 |
| OR-03373 | | 2006 | Arrington, Cindy and Nancy Sikes | Cultural Resources Final Report of Monitoring and Findings for the Qwest Network Construction Project State of California: Volumes I and Ii | SWCA Environmental Consultants, Inc. | |
| OR-03890 | | 2000 | Slauson, Dana | Historic Property Survey Report and Historic Property Survey Report - Reduced Build Alternative Addendum | Greenwood and Associates; Parsons Brinckerhoff Quade & Douglas, Inc. | 30-157430, 30-161847, 30-177022, 30-177023, 30-177024, 30-177025, 30-177026, 30-177027, 30-177028, 30-177029, 30-177030, 30-177031, 30-177032, 30-177033, 30-177034 |

# Appendix C

Geotechnical Investigation

SOILS ENGINEERING, INC.
Consulting Geotechnical Engineers

# REPORT OF GEOTECHNICAL INVESTIGATION

**Proposed New Ronald McDonald House Structure**
**Orange County Ronald McDonald House**
**383 South Batavia Street**
**City of Orange, California**

***Prepared For:***

**Orange County Ronald McDonald House**
**383 South Batavia Street**
**Orange, California 92868**

**Project No. 6827.18** **September 24, 2018**

2860 Walnut Avenue, Signal Hill CA 90755 * Tel: (562) 426-7990 * Fax: (562) 426-1842

SOILS ENGINEERING, INC.
Consulting Geotechnical Engineers

September 24, 2018
Project No. 6827.18

**ORANGE COUNTY RONALD MCDONALD HOUSE**
383 South Batavia Street
Orange, California 92868

Attention: Ms. Noel Burcelis, MSW
Executive Director

Subject: **Report of Geotechnical Investigation**
Proposed New Ronald McDonald House Structure
Orange County Ronald McDonald House
383 South Batavia Street, City of Orange, California

Gentlemen:

Presented herewith is the Report of Geotechnical Investigation (the Soils Report) prepared by Associated Soils Engineering, Inc. (ASE) for the proposed new Ronald McDonald House structure (the Building) to be located at 383 South Batavia Street, in the City of Orange, California (the Site). This work was conducted in accordance with ASE's Proposal No. P18-128, dated August 10, 2018, and your subsequent authorization.

The subject geotechnical investigation was planned and performed based on the relevant development information provided by your office. Provided information included a Topographic Survey Plan, Sheet No. SV-1.0, prepared by JMC$^2$ Civil Engineering & Surveying, dated June 21, 2018, on which were shown the existing on-site development and the surrounding site conditions.

The purpose of this study was to evaluate the subsurface soils conditions at the Site, followed by assessment of site geologic/seismic hazards, performance of engineering analyses, and formulation/assembly of recommendations for the geotechnical design and construction pertinent to the Building. ASE's study has concluded that construction of the Building is geotechnically feasible provided that the recommendations and design guidelines with respect to ground preparation and foundation construction presented in the Soils Report are incorporated in the project plans and design, and implemented during construction. This Soils Report also presents 1) the findings of the geotechnical field investigation, 2) the summary of potential geological/seismic hazard assessment, 3) the results of laboratory tests performed, and 4) the results of field percolation testing.

We at ASE appreciate the opportunity to provide our professional services on this important project, and look forward to assisting you during construction of the Building.

2860 Walnut Avenue, Signal Hill CA 90755 * Tel: (562) 426-7990 * Fax: (562) 426-1842

If you have any questions or require additional information, please contact the undersigned.

Respectfully submitted,
**ASSOCIATED SOILS ENGINEERING, INC.**

Gary L. Martin
Project Engineer

Lawrence J.D. Chang, P.E, G.E.
Geotechnical Engineer, RGE 2881

Edward C. (Ted) Riddell, P.G.
Engineering Geologist, CEG 1775

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Exp. 6/30/19
GEOTECHNICAL
STATE OF CALIFORNIA

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## 1.0 INTRODUCTION

This Soils Report presents the results of ASE's geotechnical investigation for the proposed new Ronald McDonald House structure (the Building) to be located adjacent to and immediately south of the existing Orange County (O.C.) Ronald McDonald House facility at 383 South Batavia Street, in the City of Orange, California (the Site). The approximate location of the Site is shown on the Site Location Map (Figure 1). The purpose of this investigation was to evaluate the general subsurface soil conditions at the Site and provide geotechnical recommendations for the design and construction of the Building. This Soils Report summarizes the data collected and the results of ASE's engineering evaluations/analyses, which provide the basis for the formulation of relevant geotechnical conclusions and recommendations.

### 1.1 Project Outline

The following provided project information is understood to be applicable at the time of preparing this Soils Report.

1.1.1 Building/Development Scope:

Based on the information provided, ASE understands that the Building will consist of two to three-story high frame, stucco and masonry construction, with finish grades near existing site grades (± one foot). Other appurtenant improvements are to include new asphaltic concrete (AC) or Portland cement concrete (PCC) paved parking on property to the south, as well as associated utility connections, landscaping and hardscaping.

1.1.2 Structural Loading for Geotechnical Analyses:

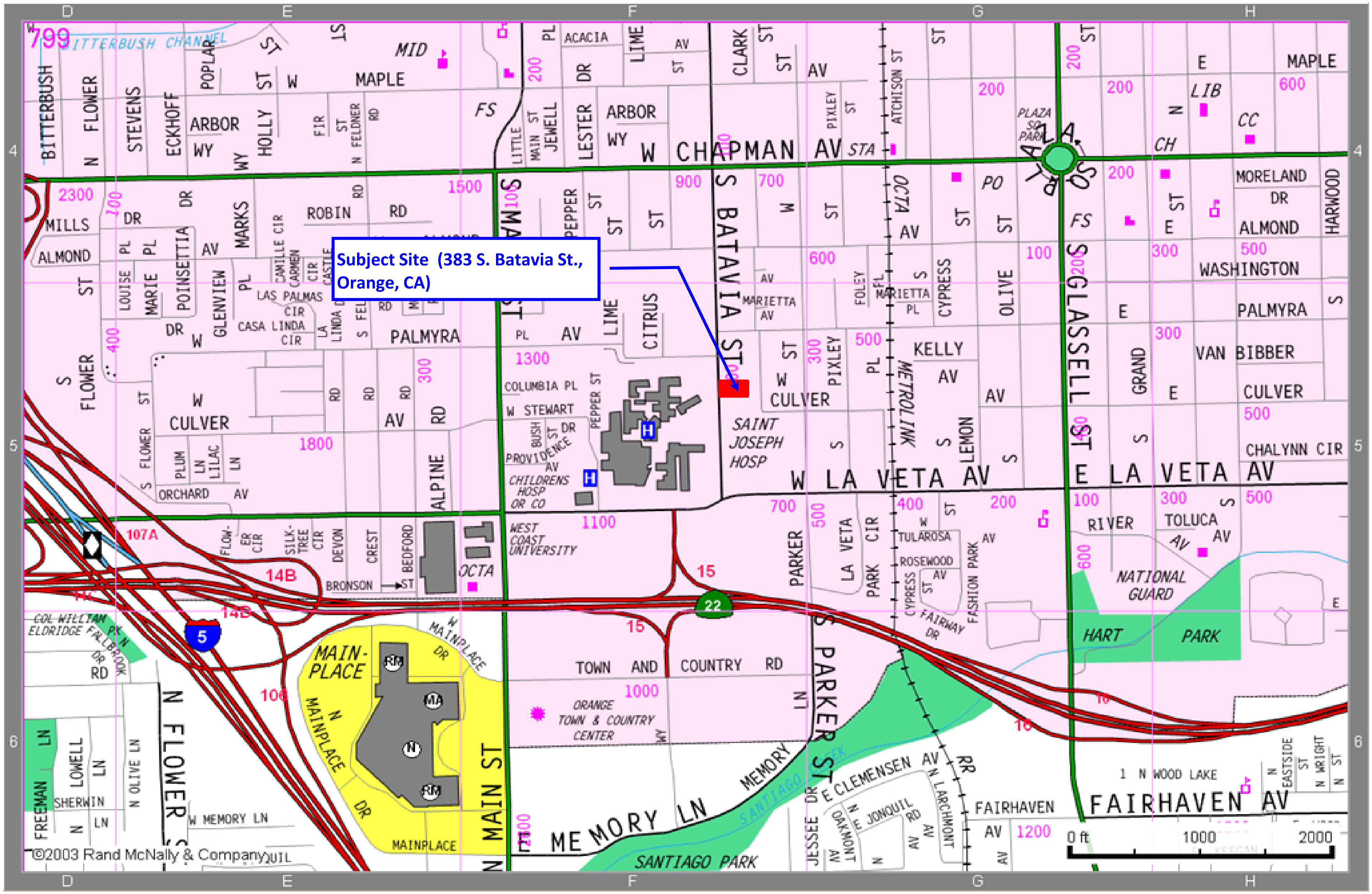
In the absence of structural loading information, ASE assumed that the Building will be supported by isolated pad footings and continuous spread footings, with maximum concentrated column load (D + L) on the order of 80 kips, and with a maximum line load (D + L) not exceeding 4,000 pounds per linear foot. Tolerable total and differential settlements resulted from the aforementioned structural loadings on the order of one (1) inch and 1/3 inch over any 30-foot span, respectively, have also been assumed by ASE.

### 1.2 Scope of Exploration

In accomplishing the subject investigation, ASE's staff had performed the following geotechnical tasks:

A. Review of available background information, including in-house geotechnical data, geotechnical literature, geologic maps, seismic hazard maps, and literature relevant to the subject Site.

B. A geotechnical site reconnaissance to observe the general surficial soil conditions at the Site and to select and mark boring locations, followed by notification to Underground Service Alert of the planned boring locations 72 hours prior to field exploration.




**Associated Soils Engineering, Inc.**

2860 Walnut Avenue

Signal Hill, CA 90755

Tel (562) 426-7990 Fax (562) 426-1842

SOILS ENGINEERING, INC.
Consulting Geotechnical Engineers

# Site Location Map

| | |
|---|---|
| Proj. Name: | Prop. New Bldg. at O.C. Ronald McDonald House<br>383 S. Batavia St., Orange, CA |
| Proj. No.: | 6827.18 |
| Date: | September, 2018 |

**Figure 1**

C. Field exploration consisting of drilling six (6) exploratory borings to depths ranging from 5 feet 6 inches to 28 feet 5 inches below respective existing grades. ASE staff logged and sampled representative soils encountered in each exploratory boring. Locations of the exploratory borings on site are shown on the Boring Location Plan, Plate A, in Appendix A.

D. Field percolation testing at three (3) pre-selected test locations to measure infiltration rate of site soils as part of the requirements for the planning and design of on-site stormwater BMP system.

E. Laboratory testing on retrieved representative soil samples for classification and for determination of pertinent engineering properties.

F. Engineering analyses of data obtained from site investigation and laboratory testing including:

- Evaluation of general subsurface conditions and description of types, distribution, and engineering characteristics of subsurface materials.
- Assessment of geologic/seismic hazards based on the pertinent criteria required by the California Geological Survey (CGS).
- Determination of the seismic design parameters in accordance with Chapters 16 and 18 of the California Building Code, 2016 Edition (2016 CBC).
- Evaluation of the suitability of on-site soils for foundation support and establishment of qualification criteria for on-site or imported fill material, together with recommendations for site grading and subgrade preparation for the Building.
- Recommendations for subgrade preparation and design parameters for slab-on-grade, flatwork, and AC and Portland cement concrete (PCC) pavement support.
- Recommendations for design of shallow footing foundations, including allowable soils bearing capacity, estimated settlement, and lateral resistance.
- Recommendations for temporary excavation and shoring.
- Evaluation of the corrosion and expansion potential of the on-site materials.
- Calculation of percolation rates of site soils for stormwater BMP facility planning and design.

G. Preparation of this Soils Report presenting the work performed and data acquired, as well as summarizing our conclusions and geotechnical recommendations for the design and construction of foundation supporting the Building and calculation of design percolation rates for stormwater BMP facility planning and design.

*Please note that ASE's geotechnical investigation did not include any evaluation or assessment of hazardous or toxic materials which may or may not exist on or beneath the site. ASE does not consult in the field of potential site contamination/mitigation.*

## 2.0 SITE AND SUBSURFACE CONDITIONS

### 2.1 Location, Boundary Conditions and Existing Development

The Building is to be located at the O.C. Ronald McDonald House at 383 South Batavia Street, in the City of Orange, California.

The Site is bound to the north by the existing three-story O.C. Ronald McDonald House building. South Batavia Street is west of the Site, with an assisted living facility beyond. A small grove of orange trees and a playground for the O.C. Ronald McDonald House are south of the Site, with the gravel covered parking area beyond. Single-story single and multi-family residential developments are east of the Site, and north of the O.C. Ronald McDonald House.

The Site is presently generally uniform and is the location of the existing O. C. Ronald McDonald House. The Building location encroaches on the existing PCC paved parking area south of the existing Ronald McDonald House. Existing PCC pavement visually appears to be in good condition. A roof structure spans over a portion of the parking area connecting the existing building to a trash bin enclosure.

### 2.2 Subsurface Conditions

2.2.1 Artificial Fill (af):

Artificial fill was observed in four (4) of ASE's exploratory borings, i.e. Borings B-2 through B-5, to approximate depths ranging from a minimum of 1.5 feet (Boring B-2) to a maximum of 4.5 feet (Boring B-5) below respective existing grades. The encountered artificial fill generally consists of silty sands, silty sands with clay, sands, and sandy silts with clay, with glass and concrete pieces, and has been classified as "undocumented fill" and evaluated accordingly due to the lack of documentation substantiating prior compaction effort.

2.2.2 Younger Alluvium and Floodplain Deposits (Qyfa):

Native site soils were encountered in ASE's borings beneath the pavement section and artificial fill (Borings B-2 through B-5) to the maximum explored depth of approximately 28 feet 5 inches in Boring B-2. Per Reference 5, the younger alluvium/floodplain deposits are characterized as unconsolidated deposits comprising mainly of sand, silt, clay and gravel. In specific, on-site alluvial/floodplain soils consist of interbedded silty sands, sands, sands with gravel, sands with silt and gravel, silty sands with gravel, silty sands with clay, clayey sands, and clayey sands with gravel, and are generally in a dry to moist condition.

Blow counts recorded from advancing Standard Penetration Test (SPT) sampler and Modified California barrel sampler empirically indicate that the granular, sandy strata of on-site alluvial soils are in a loose to very dense condition.

More detailed descriptions of soils encountered and conditions observed during the subsurface exploration are shown in the Field Logs of Borings ("B" Plates) in Appendix A, together with information of soil classifications, depths and types of soil samples, blow counts, field dry densities and moisture contents, and corresponding laboratory tests performed.

The subsurface soils descriptions presented above have been interpreted from conditions exposed during the field investigation and/or information inferred from the reviewed geologic literature. As such, it is likely that not all of the subsurface conditions at the Site could be captured or represented. It is therefore essential that the Geotechnical Consultant's engineer or geologist be on site during grading and foundation construction such that information/recommendations deciphered during preliminary geotechnical investigation phase could be verified and, if necessary, amended as appropriate.

### 2.3 Groundwater and Caving

During field exploration, groundwater was not encountered to the maximum explored depth of 28 feet 5 inches in Boring B-2. Published data in Seismic Hazard Zone Report 011 for the Orange 7.5-Minute Quadrangle, Orange County, California by CGS (1997, revised 2001) indicates that the historic high groundwater contour in the vicinity of the Site is greater than 40 feet deep. A search on Google Earth indicates that the subject Site is approximately 172 feet above Mean Sea Level (MSL).

Information available from the State of California Department of Water Resources website (www.water.ca.gov/waterdatalibrary/groundwater/hydrographs) indicates that the historic high groundwater level in Well No. 04S09W31B001S, close to the Site at the northwest corner of West Almond Avenue and North Pixley Street, was 110.4 feet below ground surface elevation on May 5, 1969. The ground surface elevation of the well is 180.7 feet above MSL, or 8.7 feet higher than Site grade. The depth to groundwater for the most recent reading in this well (taken November 1, 1978) was 138 feet below grade.

Generally, seasonal and long-term fluctuations in the groundwater may occur as a result of variations in subsurface conditions, rainfall, run-off conditions and other factors. Therefore, deviations from the limited observations made in ASE's exploratory borings cannot be ruled out. Also the use of hollow-stem augers during drilling precluded observation of potential caving conditions which may have otherwise occurred in an uncased hole. Caving and/or sloughing were not measured during the extraction of auger stem at the completion of boring operations. However, caving and/or soil sloughing may be likely in excavations greater in dimension than ASE's exploratory borings.

### 2.4 Utilities

No overhead or underground utilities were encountered within the area of ASE's on-site investigation. However, underground and overhead lines are present which service the site adjacent structures, and are along site bordering streets. Other utilities, though not known at the time of this report preparation, may be present on site, and should be located and incorporated into site development plans accordingly.

## 3.0 GEOLOGY

### 3.1 Regional Geologic Setting

The Site is located in the Central Block of the Los Angeles Basin. The Los Angeles Basin is a large northwest trending synclinal depression at the southern end of the Transverse Ranges and at the north end of the Peninsula Range geomorphic Provinces of California. The Central Block is bounded by the active Newport-Inglewood Fault Zone (located 10.5 miles (16.9 km) southwest of the Site) and the active Whittier Fault Zone (approximately 9.5 miles (15.3 km) northeast of the Site).

### 3.2 Geologic and Soil Units

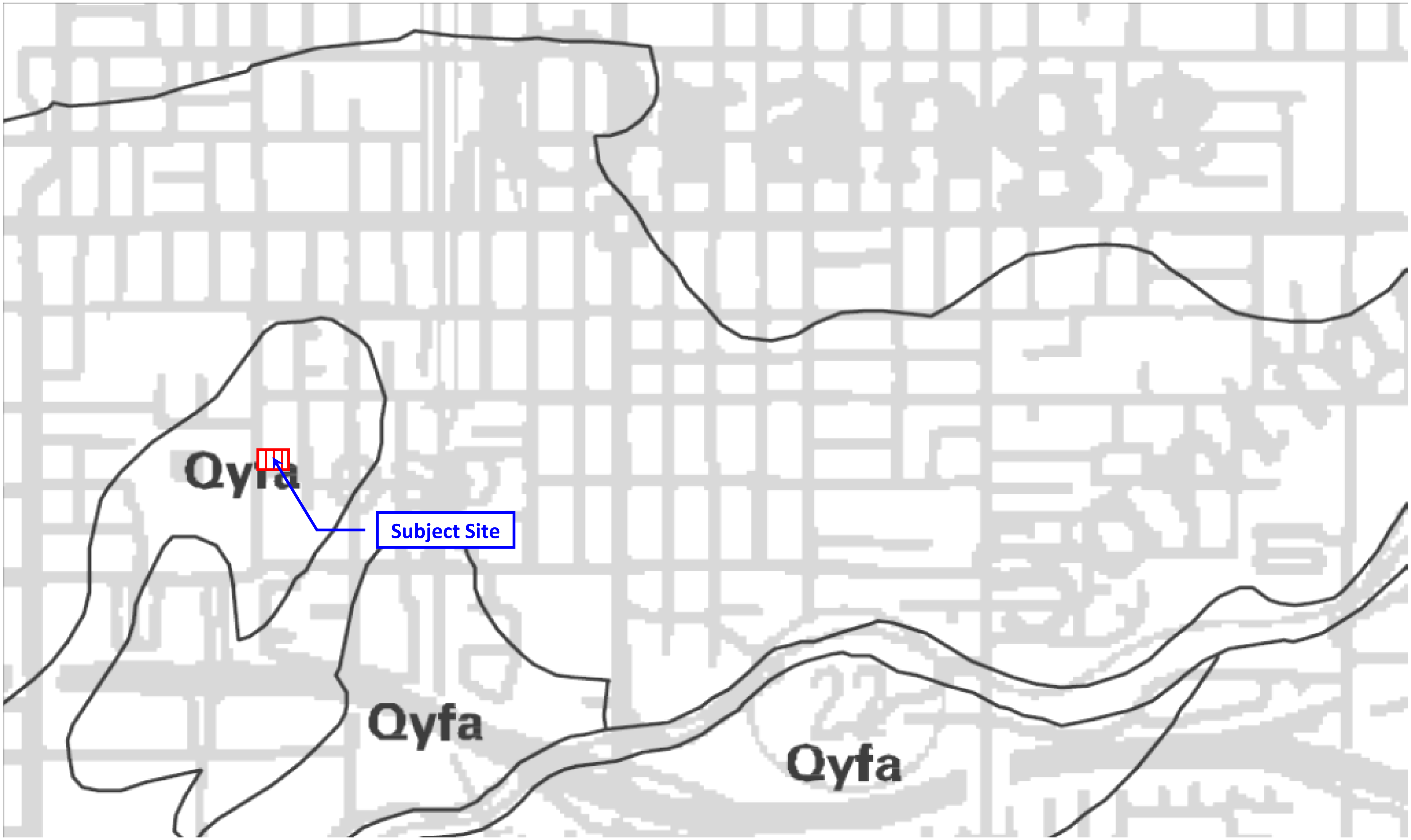
Native site soils consisting of Holocene to latest Pleistocene-age younger alluvium/floodplain deposits (Qyfa) were encountered beneath the pavement section and surficial fill in ASE's borings. Per Reference 5, the younger alluvium/floodplain deposits are associated with deposition of the Santa Ana River and Santiago Creek alluvial systems. Soils within the unit were found to predominantly consist of sand, silt, clay and gravel. In specific, on-site alluvial soils consist of interbedded silty sands, sands, sands with gravel, sands with silt and gravel, silty sands with gravel, silty sands with clay, clayey sands, and clayey sands with gravel. Figure 2, Local Geologic Map, excerpt from CGS (1991, revised 2001; Reference 5), shows geologic material distribution in the vicinity of the Site.

## 4.0 FAULTING AND SEISMICITY

Orange, like the rest of southern California, is located within a seismically active region as a result of being located near the active margin between the North American and Pacific tectonic plates. The principal source of seismic activity is movement along the northwest-trending regional faults such as the San Andreas, San Jacinto, Newport-Inglewood and Whittier-Elsinore fault zones.

By the definition of CGS, an active fault is one which has had surface displacement within the Holocene Epoch (roughly the last 11,000 years). The CGS has defined a potentially active fault as any fault which has been active during the Quaternary Period (approximately the last 1,600,000 years). These definitions are used in delineating Earthquake Fault Zones as mandated by the Alquist-Priolo Geologic Hazard Zones Act of 1972 and as subsequently revised in 1997 as the Alquist-Priolo Earthquake Fault Zoning Act and Earthquake Fault Zones. The intent of the act is to require fault investigations on sites located within Special Studies Zones to preclude new construction of certain inhabited structures across the trace of active faults.

The Site is not located within the Alquist-Priolo Earthquake Fault Zone. No evidence of active or potentially active faulting was observed during our investigation. Several sources were researched for information




*(Reprint of the Quaternary Geologic Map of the Orange 7.5- Minute Quadrangles, California Division of Mines and Geology, Seismic Hazard Zone Report 011, 1997)*

| LEGEND | | |
|---|---|---|
| | [site symbol] | Approximate Site Location |
| | $Q_{yfa}$ | Holocene-age younger alluvial fan deposits consisting mainly of sand with lesser silty sand, silt, clay & gravel |

**Associated Soils Engineering, Inc.**

**2860 Walnut Avenue**
**Signal Hill, CA 90755**
**Tel (562) 426-7990 Fax (562) 426-1842**

| | | | |
|---|---|---|---|
| Project: | **Prop. New Bldg. at O.C. Ronald McDonald House 383 S. Batavia St., Orange, CA** | | |
| **Figure 2** | **Local Geologic Map** | | |
| Proj. No.: | **6827.18** | Date: | **September, 2018** |

pertaining to site seismicity. The majority of data was obtained from the program, EQFAULT, by Blake (2000) that allows for an estimation of peak horizontal ground acceleration (PGA) using a data file of approximately 150 digitized California faults. This program compiles information including the dominant type of faulting within a particular region, the maximum earthquake magnitude each fault is capable of generating, the estimated slip-rate for each fault, and the approximate location of the fault trace. Printouts of the results of the fault search for the Site are shown as Plates I-1 and I-2 in Appendix B. Regional Fault Map, Plate J-1 in Appendix B, shows the major active faults in Southern California near the Site.

### 4.1 Deterministic Analysis

The Site is likely to be subject to strong seismic ground shaking during the life of the project. Based on the referenced literature and deterministic analysis performed with the EQFAULT software, the San Joaquin Hills Fault, approximately 6.5 mile (10.4 km) from the Site, would probably generate the most severe site ground motions. A Maximum Probable Earthquake (MPE), i.e. the maximum earthquake that is considered likely to occur during a 100-year time interval, of 6.6 Mw (moment magnitude as per USGS) has been assessed along the San Joaquin Hills Fault. As shown on Plate I-2 in Appendix B, estimated PGA resulting from a MPE event on the San Joaquin Hills Fault is on the order of 0.353g should this event occur at the fault’s closest approach to the Site. Other nearby active faults include the Whittier Fault and the Puente Hills Blind Thrust Fault, located approximately 9.5 miles (15.3 km) and 10.4 miles (16.8 km) away, respectively. In sum, approximately 41 active or potentially active faults have been found within 62 miles (100 km) of the Site.

### 4.2 Probabilistic Analysis

The seismicity of the Site was evaluated utilizing probabilistic analysis available from CGS (www.quake.ca.gov/gmaps/PSHA/psha_interpolator.html). The Maximum Probable Earthquake (MPE) and the Maximum Considered Earthquake (MCE) that carry 10 percent and 2 percent exceedance probabilities, respectively, in 50 years have been considered. Based on a typical damping ratio of 5% and $V_s^{30}$ value of 280 m/sec, derived from the “Set Site Parameters for Web Services”’’ function as part of the “Hazard Spectrum Calculator (Local)” application available from the “OPENSHA” website, three spectral acceleration values representing peak ground acceleration (PGA), spectral acceleration for structural period of 0.2 second (Sa – 0.2 sec; typical of low-rise buildings) and spectral acceleration for structural period of 1.0 second (Sa – 1.0 sec; typical of multi-story buildings) have been analyzed and are tabulated below.

| **Seismic Acceleration Values from CGS’s Ground Motion Interpolator (2008)** | | | | | | |
|---|---|---|---|---|---|---|
| **Latitude** | **Longitude** | **$V_s^{30}$ (m/sec)** | **Scenario** | **Acceleration (g)** | | |
| | | | | **PGA** | **Sa – 0.2 sec** | **Sa – 1.0 sec** |
| N 33.7825° | W 117.8615° | 280 | **MPE [1]** | 0.376 | 0.835 | 0.448 |
| | | | **MCE [2]** | 0.600 | 1.321 | 0.745 |

1. MPE scenario carries a 10% exceedance probability in 50 years.
2. MCE scenario carries a 2% exceedance probability in 50 years.

### 4.3 2016 CBC Seismic Design Parameters

The earthquake design requirements listed in 2016 CBC and other governing standards account for faults classified as "active", in accordance with the most recent fault listing as per the United States Geological Survey (USGS) or the CGS. The seismic design of the proposed structures should be implemented in accordance with the applicable provisions stipulated in 2016 CBC unless otherwise specified by the governing authority having jurisdiction over the project.

The 2016 CBC seismic design criteria for the Site based on a Site Class of "D", a Risk Category II and a scenario of Risk-Targeted Maximum Considered Earthquake ($MCE_R$) that carries a 2% exceedance probability in 50 years had been determined utilizing the U.S. Seismic Design Maps web-application available from the Seismic Design Maps and Tools webpage on the website of Earthquake Hazard Program of USGS (http://earthquake.usgs.gov/hazards/designmaps/usdesign.php). Summaries of the seismic coefficients for the Site are tabulated below.

| 2016 CBC SEISMIC DESIGN PARAMETERS | | | | | |
|---|---|---|---|---|---|
| **Site Latitude:** | N 33.7825° | **Site Longitude:** | W 117.8615° | **Risk Category** [a] | II |
| **Seismic Parameter** | | | | **Recommended Value** | |
| **Site Class** [b] | | | | D | |
| **Soil Profile Name** [b] | | | | Stiff Soil Profile | |
| **Site Coefficient, Fa** [c] | | | | 1.0 | |
| **Site Coefficient, Fv** [d] | | | | 1.5 | |
| **0.2-Second Spectral Response Acceleration, $S_S$** [e] | | | | 1.487g | |
| **1.0-Second Spectral Response Acceleration, $S_1$** [f] | | | | 0.543g | |
| **Adjusted 0.2-Second Spectral Response Acceleration, $S_{MS}$** [g] | | | | 1.487g | |
| **Adjusted 1.0-Second Spectral Response Acceleration, $S_{M1}$** [h] | | | | 0.814g | |
| **Design 0.2-Second Spectral Response Acceleration, $S_{DS}$** [i] | | | | 0.991g | |
| **Design 1.0-Second Spectral Response Acceleration, $S_{D1}$** [j] | | | | 0.543g | |
| **Long -Period Transition Period, $T_L$** [k] | | | | 8 sec | |
| **Mapped $MCE_G$ Geometric Mean Peak Ground Acceleration, PGA** [l] | | | | 0.531g | |
| **Site Coefficient, $F_{PGA}$** [m] | | | | 1.0 | |
| **$MCE_G$ Peak Ground Acceleration adjusted for Site Class Effect, $PGA_M$** [n] | | | | 0.531g | |
| **Risk Category** | | **I or II or III** | | **IV** | |
| **Seismic Design Category based on $SD_S$** [o] | | D | | D | |
| **Seismic Design Category based on $SD_1$** [p] | | D | | D | |

a Per 2016 CBC Table 1604.5
b Per 2016 CBC Section 1613.3.2
c Per 2016 CBC Table 1613.3.3(1)
d Per 2016 CBC Table 1613.3.3(2)
e Per 2016 CBC Figure 1613.3.1(1)
f Per 2016 CBC Figure 1613.3.1(2)
g Per 2016 CBC Equation 16-37
h Per 2016 CBC Equation 16-38
i Per 2016 CBC Equation 16-39
j Per 2016 CBC Equation 16-40
k Per ASCE 7-10 Figure 22-12
l Per ASCE 7-10 Figure 22-7
m Per ASCE 7-10 Table 11.8-1
n Per ASCE 7-10 Equation 11.8-1 = PGA x $F_{PGA}$
o Per 2016 CBC Table 1613.3.5(1)
p Per 2016 CBC Table 1613.3.5(2)

Please note that conformance to the 2016 CBC seismic design criteria does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not take place during the occurrence of a $MCE_R$ event. The primary goal of seismic design is to protect life and not to avoid all damage, since such design may be economically prohibitive. Following a major earthquake, a building may be damaged beyond repair, yet not collapse. The Structural Consultant should review the pertinent parameters to evaluate the seismic design.

## 5.0 GEOLOGIC HAZARDS

### 5.1 Surface Fault Rupture and Ground Shaking

The Site is not located within an Alquist-Priolo Earthquake Fault Zone. No known active or potentially active faults are shown crossing the Site on published maps reviewed. No evidence for active faulting was encountered in the exploratory excavations performed during this evaluation. The risk of surface rupture at the Site is considered very low.

Being in close proximity to several known active and potentially active faults, severe ground shaking should be expected during the life of the proposed development.

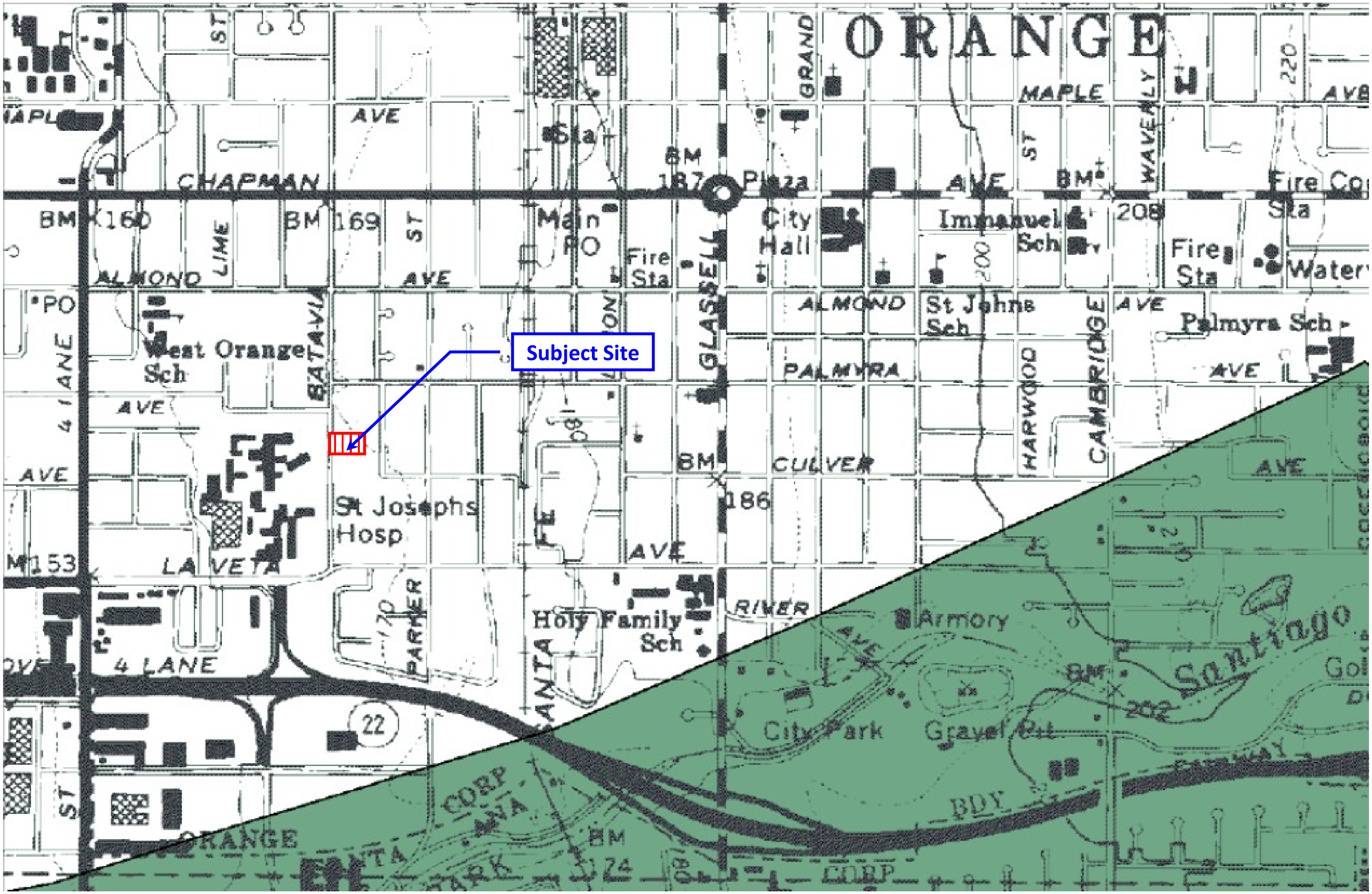
### 5.2 Seismic Hazards

5.2.1 Liquefaction:

As evidenced in Figure 3, Local Seismic Hazard Map, the Site is not within an area identified as having a potential for soil liquefaction when subject to a MPE or MCE event. The term "liquefaction" describes a phenomenon in which a saturated cohesionless soil loses strength and acquires a degree of mobility as a result of strong ground shaking during an earthquake. The factors known to influence liquefaction potential include soil type and depth, grain size, relative density, groundwater level, degree of saturation, and both the intensity and duration of ground shaking.

The soils to the maximum explored depth of 28 feet 5 inches generally consist of loose to medium dense granular soils within the upper approximate 13 feet below grade, and medium dense to very dense granular soils below 13 feet depth. During ASE's field exploration, groundwater was not encountered to the maximum explored depth of 28 feet 5 inches below grade in Boring B-2. Per the referenced CGS (1997, revised 2001) historic high groundwater in the vicinity of the Site is greater than 40 feet below grade. According to the information available from the State of California Department of Water Resources website, historic high groundwater in a well located approximately 0.3 mile northeast of the Site is approximately 110.4 feet deep.

Considering that: 1) groundwater was not encountered in Boring B-2 to a maximum explored depth of 28 feet 5 inches below existing grade, 2) historic high groundwater in a well in the vicinity of the Site is 110.4 feet below site grade based on ASE's literature and State website review, 3) the as-graded soil condition of the Site is anticipated to result in the site soils exhibiting dense to very




*(Partial Extract of the State of California Seismic Hazard Zones Orange Quadrangle Official Map dated April 15, 1998)*

**LEGEND**

- Approximate Site Location
- Potential Landslide Hazard Area
- Potential Liquefaction Hazard Area

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Consulting Geotechnical Engineers

**Associated Soils Engineering, Inc.**

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| | |
|---|---|
| Project: | **Prop. New Bldg. at O.C. Ronald McDonald House 383 S. Batavia St., Orange, CA** |
| **Figure 3** | **Local Seismic Hazard Map** |
| Proj. No.: | **6827.18** |
| Date: | **September, 2018** |

dense consistency in the upper three (3) feet, and 4) the existing site native granular soils are increasing denser with depth as per encountered in ASE's exploratory borings, the likelihood of occurrence of seismically-induced liquefaction at the Site is deemed negligible.

5.2.2 Seismic Settlements:

Ground accelerations emitted from a seismic event can cause densification of loose soils both above and below the groundwater table that may result in settlements on ground surface due to volumetric compression of soil mass. This phenomenon is often referred to as seismic settlement and commonly takes place in relatively clean sands, as well as soils with low plasticity and less fines.

Although the earth materials on site consist of loose to very dense silty sands and sands that are considered non-liquefiable due to deep groundwater beneath the Site, they may still undergo seismically-induced volumetric densification above groundwater level during the MPE.

Settlement of on-site granular soils above the 40-feet deep plus historic high groundwater as a result of seismically-induced densification (i.e. "dry" seismic settlement) is anticipated to be less than 1/2 inch. Such magnitude of "dry" seismic settlement is expected to affect relatively large area such that the differential settlement over short distance is likely to be very small.

5.2.3 Earthquake-Induced Landslides:

There is no indication that recent landslides or unstable slope conditions exist on or adjacent to the project Site that would otherwise result in an obvious landslide hazard to the proposed development or adjacent properties.

ASE's review of the same geohazard map that was based upon for the production of Figure 3 indicates that the Site is not located within an area identified as having a potential for earthquake-induced landslides. Due to the lack of significant unretained relief on or adjacent to the Site, the potential for earthquake induced landslides in the future is considered nil.

5.2.4 Lateral Spreading:

Lateral spreading, a phenomenon associated with seismically-induced soil liquefaction, is a display of lateral displacement of soils due to inertial motion and lack of lateral support during or post liquefaction. It is typically exemplified by the formation of vertical cracks on the surface of liquefied soils, and usually takes place on gently sloping ground or level ground with nearby free surface such as drainage or stream channel. Since the Site has been evaluated in Section 5.2.1 above not to be susceptible to seismically-induced liquefaction, the potential for the occurrence of liquefaction-induced lateral spreading is deemed unlikely on the Site.

5.2.5 Hydroconsolidation:

Laboratory test results indicate a low hydroconsolidation potential, as well as low to moderate compressibility, in near surface site soils at present condition upon moisture inundation. However, hydroconsolidation potential and compressibility of existing subgrade soils at shallow depth will be minimized upon completion of remedial grading as per recommended in Section 6.2 below. For areas on site that are covered with AC pavement or concrete flatwork, or if interceptor systems are installed beneath planter or turf areas to minimize infiltration of moisture into or divert water away from foundation subgrade soils, the potential impact from hydroconsolidation in these areas should be further reduced.

5.2.6 Tsunamis and Seiches:

Due to the elevation of the Site and absence of nearby waterfront, hazard from tsunami is considered very low.

Seiches are rhythmic movements of water within a lake or other enclosed or semi-enclosed body of water, generally caused by earthquakes. Since no lakes or other enclosed bodies of water lie on or near the Site, the hazard from seiches is not present at the Site.

5.2.7 Flood Hazards:

The Site was located on the ESRII/FEMA Hazard Awareness site. The Site is not located within the limits of the 100 year flood plain per FEMA Flood Insurance Rate Map (Map No. 06059C0161J, map revised December 3, 2009), and is located outside an area of 0.2-percent-annual-chance flood.

## 6.0 GEOTECHNICAL CONSIDERATIONS AND RECOMMENDATIONS

Based on the results of field exploration, laboratory testing, and engineering analysis, it is ASE's geotechnical opinion that the construction of the Building may be implemented as planned, provided that the ground preparation and foundation design criteria recommended herein are incorporated into the project plans and specifications and implemented during construction.

The flowing major geotechnical factors are deemed to affect the design and construction of the Building:

1. Soil disturbances as a result of site demolition, clearing and excavation operations.
2. Presence of loose, low density soils within the intended foundation bearing stratum.
3. Presence of undocumented fill soils in some areas of the Site.
4. Excavation and construction of new footings or flatworks located adjacent to or near existing building foundation that might undermine stability. Therefore it is of essential importance that the embedment depth of any new footing planned next to the existing footing be the same as the

embedment depth of the existing footing. This will ensure that: a) no soils beneath the existing footing would be undermined resulting in the bearing support to the existing footing being compromised, and b) no undesirable surcharge would be imposed on the existing footing from an adjoining new footing.

In consideration of the above factors, it is ASE's opinion that overexcavation and backfilling with properly compacted fill in the building pad area of the Building, as recommended herein, will be essential to reduce unfavorable foundation and slab displacement caused by static settlements of underlying soils, and to provide satisfactory bearing stratum for the Building. The grading recommendations provided herein should be reviewed when final grading plans become available. It is assumed that the finish grades will be close to existing site grades (± one foot).

Conventional shallow foundations comprising continuous spread footings and isolated pad footings bearing on properly compacted fill, together with slab-on-grade, may be considered for structural support.

### 6.1 Site Preparation

6.1.1 Existing Improvements:

Prior to grading operations, it will be necessary to remove designated existing improvements, including any remaining buried obstructions, which may be in the areas of proposed construction. Structure removal should include foundations. Concrete flatwork and asphalt pavement should also be removed from the areas of proposed construction. Concrete and asphalt fragments from site demolition operations should be disposed of off-site.

6.1.2 Surface Vegetation:

Surface vegetation should be stripped from areas of proposed construction. Stripping should penetrate six (6) inches into surface soils. Any soil contaminated with organic matter (such as root systems or strippings mixed into the soil) should be disposed of off-site or set aside for future use in non-structural landscaped areas. Removal of trees and shrubs should include rootballs and attendant root systems.

6.1.3 Underground Utilities:

Any underground utilities to be abandoned within the zone of proposed construction should be cut off a minimum of five (5) feet from the area of the new structure. The ends of cut-off lines should be plugged a minimum of five (5) feet with lean concrete exhibiting minimum shrinkage characteristics to prevent water migration to or from hollow lines. Capping of lines may also be required should the plug be subject to any line pressure.

Alternatively, deep hollow lines may be left in place provided they are filled with lean concrete or 2-sack control density fill (slurry fill). No filled line should be permitted closer than two (2) feet from the bottom of future footings, unless it has been evaluated and approved by the Geotechnical Consultant. However, local ordinances relative to abandonment of underground utilities, if more restrictive, will supersede the above minimum requirements.

## 6.2 Site Grading

In view of minimizing the potential adverse effects associated with the development of excessive total or differential settlement/heave underneath the Building, as well as to ensure uniform bearing competency for the foundations and slabs, preparation of on-site soils are recommended in the following sections.

6.2.1 Undocumented Fill/Disturbed Native Soils:

All undocumented fill soil, as discussed in Section 2.3.1 above, encountered during site grading in the area of the Building, as well as any native soils disturbed during demolition and clearing operations, should be excavated full depth under the observation and confirmation by the Geotechnical Consultant. Lateral extent of overexcavation beyond Building perimeters, where possible, should be to a minimum distance equal to the depth of undocumented fill/disturbed soil encountered or three (3) feet, whichever is greater.

For other secondary improvements such as free-standing walls or hardscape, the lateral extent of removal should be to a minimum distance equal to the depth of undocumented fill/disturbed soils encountered or one (1) foot, whichever is greater.

The exposed excavation bottom should be scarified/reworked to a minimum one (1) foot depth and recompacted to at least 90 percent relative compaction with a minimum moisture content of one (1) percentage point <u>above</u> optimum moisture content, prior to backfilling with approved soils as specified in Section 6.2.7. <u>Unless otherwise stated, the measurement of relative compaction in this report should always refer to ASTM D1557-12 Test Method.</u>

6.2.2 Expansive Soils:

Laboratory test results on near surface soil samples indicate a “Very Low” soil expansion potential (i.e. Expansion Index, EI = 13 per ASTM D4829-11 Test Method), as defined in 2016 CBC. As such, no adverse impact arising from undesirable soil expansion is anticipated at the Site. Nonetheless, it may be desirable that the soil expansion potential be re-evaluated through additional testing during or after rough grading operations and interior overexcavation to verify the design adequacy of foundation or slab-on-grade against the re-tested soil expansion potential as heterogeneity within soil mass is not uncommon.

6.2.3 Remedial Grading:

To provide acceptable support for the Building foundations and slabs, it is recommended that on-site soils within the footprint of the Building be overexcavated and removed uniformly to a minimum depth of three (3) feet below existing grade, or one (1) foot below the bottom of the lowest footing, whichever is lower, and replaced with properly compacted fill such that the building foundations and slabs are supported on a re-engineered, compacted fill layer. The excavation bottoms should be near uniform. The overexcavation should extend laterally to a minimum distance of five (5) feet beyond Building perimeters, where possible.

Soils exposed at excavation bottoms to a depth of one (1) foot should be scarified, reworked and recompacted to exhibit a minimum 90 percent relative compaction with a minimum moisture content of one (1) percentage point above the optimum moisture content prior to receiving fill placement. The exposed excavation bottom should be observed, tested, and approved by the Geotechnical Consultant prior to placing compacted fill. In case of the presence of localized loose soils, the overexcavation needs to be deepened accordingly to delete the loose soil condition. However, this deepened overexcavation may be terminated when the exposed native, undisturbed soils exhibit a natural relative compaction greater than 85 percent, subject to the testing and inspection by the representative from the Geotechnical Consultant.

The Geotechnical Consultant should be provided with appropriate foundation details and staking during grading to verify that depths and/or locations of the recommended overexcavation are adequate. For areas on site that grading recommendations stipulated in both Sections 6.2.1 and 6.2.3 apply, the more stringent grading criteria between the two sections should govern.

The depth of overexcavation should be reviewed by the Geotechnical Consultant during the actual construction. Any subsurface obstruction, buried structural elements, and unsuitable material encountered during grading, should be immediately brought to the attention of the Geotechnical Consultant for proper exposure, removal and processing, as recommended.

6.2.4 Temporary Excavation:

Excavations of site soils 4 feet or deeper should be temporarily shored or sloped in accordance with Cal OSHA requirements.

a) Temporary Sloping:

In areas where excavations deeper than 4 feet are not adjacent to existing structures of public right-of-ways, sloping procedures may be utilized for temporary excavations. It is recommended that temporary slopes in both fill and native soils be graded no steeper than

1.5:1 (H:V) for excavations up to 10 feet in depth. The above temporary slope criteria is based on level soils conditions behind temporary slopes with no surcharge loading (structures, traffic) within a lateral distance behind the top of slope equivalent to the slope height.

It is recommended that excavated soils be placed a minimum lateral distance from top of slope equal to the height of slope. A minimum setback distance equivalent to the slope height should be maintained between the top of slope and heavy excavation/grading equipment. Should running sand conditions be experienced during excavation operations, flattening of cut slope faces, or other special procedures may be required to achieve stable, temporary slopes.

Soil conditions should be reviewed by the Geotechnical Consultant as excavation progresses to verify acceptability of temporary slopes. Final temporary cut slope design will be dependent upon the soil conditions encountered, construction procedures and schedule.

b) Temporary Shoring:

Temporary shoring will be required for those excavations where temporary sloping as specified above is not feasible.

Temporary cantilever shoring, if used, should be designed to resist an active earth pressure of 37 pounds per cubic foot (pcf) equivalent fluid pressure (EFP) for level soil conditions behind shoring. In addition, a minimum uniform lateral pressure of 100 pounds per square foot (psf) in the upper ten (10) feet of shoring should be incorporated in the design when normal traffic is permitted within ten (10) feet of the shoring. The resultant lateral deflection of shoring and surficial settlement immediately behind shoring are estimated to be on the order of one (1) to one and one half (1 ½) percent of the shored excavation depth. Should this ground deformation be intolerable to the existing structure, ASE should be consulted for more detailed analysis and further recommendations.

The design shoring should also include surcharge loading effects of existing structures and anticipated traffic, including delivery and construction equipment, when loading is within a distance from the shoring equal to the depth of excavation.

c) Slot Cutting:

Slot cuts, or cuts in sections, may be considered when excavation occurs adjacent to existing site structures or incurs encroachment into neighboring properties and/or public right-of-way. It is intended to allow the proceeding of site excavation without compromising greatly the overall stability of existing structures, neighboring properties and/or public right-of-way.

Based on the scale of subgrade soil exposure, the slot cutting on-site could be accomplished in a procedure hereby termed "A-B slot cutting". This procedure involves overexcavating and recompacting the earth in all "A" sections, then followed by the same earth works in all "B" sections. Due to the relative delicate nature of the slot cutting procedure, it is essential that the Geotechnical Consultant be on-site to observe/evaluate the following: 1) slots have been excavated per the approved plans and specifications (widths and depths); 2) no signs of instability take place with the site or neighboring structures/features/right-of-way; and 3) soil compaction is performed in compliance with the requirements of this Soils Report and the applicable Grading Code.

It is estimated by ASE that the temporary vertical slot cuts facilitating site grading and/or excavation should be limited to no more than 5 feet deep and 6 feet long per section. Please note that no additional surcharge loading (structures, traffic) should be exerted behind the opened cut slots within 5 feet measured laterally from the face of vertical cut. Temporary blockade of vehicle parking or traffic movement along the sections of the existing neighboring structure/features behind the opened cut slots should be planned ahead. Time is of particular essence to the safe and successful implementation of the recommended slot cutting.

Should running soil or localized caving condition be experienced during slot cutting excavation operations, pending pertinent remedial measures to be recommended by the Geotechnical Consultant, the cut area should be backfilled immediately to prevent unfavorable movement of neighboring structures/right-of-way. Soil conditions should be reviewed and evaluated by the Geotechnical Consultant as excavation progresses.

6.2.5 Exterior Slab-on-Grade/Concrete Flatwork/Hardscape/Pavement Support:

For the purpose of reducing future unsightly and uneven movements and cracks of any newly re-constructed exterior slab-on-grade, concrete flatwork, hardscape, or pavement, it is recommended that the upper eighteen (18) inches of subgrade soils below the bottom of and eighteen (18) inches laterally beyond the footprint of exterior concrete slab-on-grade/concrete flatwork/hardscape/pavement should be overexcavated and recompacted to at least 90 percent relative compaction with a minimum moisture content of one (1) percentage point above optimum moisture content. Prior to placement of the compacted fill layer, the upper six (6) inches of exposed native subgrade should be reworked to at least 90 percent relative compaction and moisture conditioned to at least one (1) percentage point above optimum moisture content. From geotechnical viewpoint, new landscape area with only softscape is not subject to subgrade preparation and remedial grading requirements mentioned in Sections 6.2.1, 6.2.3 and 6.2.5.

6.2.6 Suitable Soils and Imported Soils:

Unless otherwise noted, any soil re-used or imported as fill for the completion of subgrade preparation should be exhibiting a relatively uniform gradation, free of debris, particles greater than 4 inches in maximum dimension, organic matter or other deleterious materials.

Unless otherwise approved by the Geotechnical Consultant, the fill materials should also comply with the following soil corrosivity criteria with respect to the desired concrete and reinforcement protection.

| Corrosivity Criteria for Select Fill and General Fill | | | |
|---|---|---|---|
| **Soluble Sulfate (% by weight) (1)** | **Soluble Chloride (ppm) (2)** | **Resistivity Value (ohm-cm) (3)** | **pH-Value (4)** |
| ≤ 0.1 | ≤ 500 | ≥ 2000 | 7.0 ~ 8.8 |

(1) California Test Method 417. (2) California Test Method 422. (3) ASTM G187-12a Test Method. (4) California Test Method 532.

Imported fill soils or base materials should be examined by a representative of this office, and tested as necessary for evaluating their suitability for use as fill prior to being hauled to the Site. Final acceptance of any imported soil will be based upon review and testing of the soil actually delivered to the Site. All blended soils to be used as fill must be tested and approved by the Geotechnical Consultant prior to being used for fill placement.

6.2.7 Backfilling and Compaction Requirements:

Existing site soils at their present state and composition, unless indicated otherwise, are considered suitable for re-use as fill during site grading provided they are: 1) free of debris, particles greater than 4 inches in maximum dimension, organic matter or other deleterious materials, 2) are not environmentally contaminated, and 3) adequately moisture conditioned to permit achieving the required compaction. No nesting of large particles (2 to 4-inch size) should be permitted during backfilling operations.

On-site soils, blended soils and import materials approved for use as fill should be placed in horizontal lifts not exceeding 8 inches in loose thickness, moisture conditioned to a minimum of one (1) percentage point above optimum moisture content and compacted to a minimum 90 percent relative compaction per ASTM D1557-12 Test Method, unless otherwise stated.

6.2.8 Shrinking and Subsidence:

The volume change of excavated on-site materials upon excavation and placement as engineered fill will vary with soil type, depth, location and compactive effort. However, for planning purposes, a shrinkage factor on the order of ten (10) percent should be considered for earthwork calculations.

Subsidence due to scarification and recompaction of the exposed ground surfaces within removal areas has been estimated to be approximately on the order of one (1) inch.

6.2.9 Tests and Observations:

All subgrade preparation, compaction, and backfill operations should be performed under the observation of and testing by the Geotechnical Consultant's field representative. An adequate number of field tests should be taken to ensure compliance with this report and local ordinances.

If it is determined during grading that site soils require overexcavation to greater depths for obtaining proper support for the proposed structures, this additional work should be performed in accordance with the recommendations of the Geotechnical Consultant.

## 6.3 Foundation Design

It is ASE's opinion that conventional continuous spread footings and isolated pad footings bearing on approved compacted fill soils may be used to provide foundation support for the Building, provided that the site preparation recommendations presented in Section 6.2 above are incorporated in project planning and design, and implemented during site construction. Presented below are the recommended geotechnical design and construction criteria for shallow footing foundation and slab-on-grade.

6.3.1 Conventional Shallow Footing Foundation:

a) Minimum Footing Dimension and Reinforcement:

In order to mobilize sufficient soils bearing capacity supporting the new footings for the planned Building construction, it is recommended that the following tabulated minimum footing embedments, widths and reinforcements for various footing types be considered.

<table>
<tr><th colspan="7"><u>Minimum</u> Footing Dimension & Reinforcement</th></tr>
<tr><th rowspan="2">Structure Height</th><th colspan="3">Continuous Spread Footing/Strip Footing</th><th colspan="3">Isolated Pad Footing</th></tr>
<tr><th>Depth (1) (in)</th><th>Width (in)</th><th>Reinforcement (2)</th><th>Depth (1) (in)</th><th>Width (in)</th><th>Reinforcement (2)</th></tr>
<tr><td>2-Story</td><td>18</td><td>15</td><td rowspan="2">Two #4 bars – one near the top and one near the bottom</td><td>18</td><td>24 square</td><td rowspan="2">Two #4 bars – one near the top and one near the bottom, applied bi-axially</td></tr>
<tr><td>3-Story</td><td>24</td><td>18</td><td>24</td><td>30 square</td></tr>
</table>

(1) Footing embedment measured from the nearest adjacent lowest soils grade.
(2) Based strictly from geotechnical point of view.

Foundation design details such as concrete strength, reinforcements, etc. should be established by the Structural Consultant.

b) Allowable Soils Bearing Capacity:

For footings complying with the minimum dimension requirements stipulated in Section 6.3.1 a) above, the allowable soils bearing capacities, inclusive of both dead and live loads, should be as per tabulated below:

| Structure Height | Allowable Soils Bearing Capacity (psf) | | Increase per 12-inch Increment in Footing Width (psf) | Increase per 12-inch Increment in Footing Depth (psf) | Maximum Composite Ceiling Value (psf) |
|---|---|---|---|---|---|
| | Continuous Spread Footing/Strip Footing | Isolated Pad Footing | | | |
| 2-Story | 2,500 | 2,500 | 200 | 500 | 4,000 |
| 3-Story | 2,700 | 2,700 | | | |

The above allowable bearing capacities may be increased by one-third (1/3) when subject to short-term, transient loading induced by wind or seismic activities.

For any new footings that are within a lateral distance from any existing building footing equal to the depth of the new footing, the reduction factors tabulated below should be applied to the corresponding allowable soils bearing capacity values.

| Lateral Distance between New Footing and Existing Building Footing expressed in Fraction of the New Footing Depth, Z | ≥ 1 x Z | 1/2 x Z | 0 |
|---|---|---|---|
| Reduction Factor To Allowable Soils Bearing Capacity [a] | 1.0 | 0.75 | 0.5 |

a. Interpolation may be used for deriving reduction factor for other distance value.

c) Lateral Resistance:

Resistance to lateral loads can be assumed to be provided by passive lateral earth pressure and by friction acting on structural components in permanent contact with the subgrade soils.

For site preparation implemented as per recommended in the above Section 6.2, lateral resistance on the sides of foundations may be computed using a passive lateral earth pressure of 250 pcf EFP for footings embedded into approved compacted fill soils, subject to a maximum of 2,500 psf. An ultimate coefficient of friction on the order of 0.4 may also be used for structural dead load acting between the footing bottom and the supporting soils.

For any new footing that is within a lateral distance from any existing building footing equal to two (2) times the depth of the new footing, the following tabulated reduction factors should be applied to the corresponding passive lateral earth pressure values for the sides of the new footing that are facing the existing building footing.

| Lateral Distance between New Footing and Existing Building Footing expressed in Fraction of the New Footing Depth, Z | ≥ 2 x Z | 1 x Z | 0 |
|---|---|---|---|
| Reduction Factor To Passive Lateral Earth Pressure [a] | 1.0 | 0.5 | 0 |

a. Interpolation may be used for deriving reduction factor for other distance value.

The above passive lateral earth pressure may be used in conjunction with the ultimate coefficient of friction in calculating composite lateral resistance, provided the passive lateral earth pressure value is reduced by one-third (1/3). The composite lateral resistance may be increased by one-third (1/3) under transient wind or seismic loading.

d) Settlements:

Total static settlements resulting from compression of subgrade soils for conventional footings designed and constructed in accordance with the above criteria, and supporting maximum assumed dead plus live (D+L) column and wall loads mentioned in Section 1.1.2 above, are not anticipated to exceed <u>two-third (2/3) inch</u>, upon implementation of site preparation as per recommended in Section 6.2 above. A static differential settlement on the order of <u>one-third (1/3) inch</u> over a distance of <u>30 feet</u> is anticipated between similarly loaded adjacent isolated pad footings, as well as for continuous wall footings over a distance of approximately <u>30 feet</u>.

Please be reminded that the Geotechnical Consultant should be contracted for further evaluation and recommendations, as necessary, should final design structural loads exceed the maximum loads assumed in the above analyses by more than ten (10) percent.

6.3.2 Retaining Walls:

Cantilevered retaining walls should be designed for an “active” lateral earth pressure value tabulated on the next page for approved granular backfill soils and level backfill conditions, whereas an “At-rest” lateral earth pressure value for approved granular backfill and level backfill conditions tabulated on the next page should be used for top-restrained retaining walls. Should site silty soils be used as backfill behind retaining walls and prolonged moisture inundation behind retaining walls is anticipated, then added lateral earth pressure accounting for soils expansion should be considered. In this regard, it is recommended that cantilevered and top-restrained retaining walls should be designed for lateral earth pressure equivalent to the “at-rest” and “passive” states tabulated below for site soils, respectively. Retaining walls subject to uniform surcharge loads should be designed for an additional uniform lateral pressure equal to one-third (1/3) and one-half (1/2) of the anticipated surcharge pressure over the full retained height of the retaining wall (measuring from the top of wall to the heel of wall footing) for cantilevered and top-restrained wall fixity conditions, respectively, as shown in Figure 4, Nearby Building Surcharge Consideration and Retaining Wall Drainage Details. Appropriate back drainage should be provided to avoid excessive build-up of hydrostatic wall pressures.

Any retaining wall with a retained height exceeding <u>six (6)</u> feet should additionally be designed to resist seismic lateral earth pressure. It is our understanding that walls in excess of 6 feet in height are not currently planned for this Site. The Geotechnical Consultant should be consulted if this condition exists, or if the local governing agency requires the retaining wall to be designed for seismic lateral earth pressure regardless of the retained height. Footings should be reinforced as recommended to by Structural Consultant.

The Geotechnical Consultant should be on-site during temporary back cut and retaining wall construction to inspect and evaluate the stability of cuts and, if necessary, to provide additional remedial or mitigative recommendations.

| Retaining Wall Design Parameter | Value |
|---|---|
| **Allowable Soils Bearing Capacity** | 2,500 psf (1)(2) |
| **Active Pressure [granular backfill/site soils: level]** | 37 pcf EFP (3) |
| **At-rest Pressure [granular backfill/site soils: level]** | 57 pcf EFP (3) |
| **Passive Pressure (per foot of depth)** | 250 pcf (4) |
| **Coefficient of Friction** | 0.4 (4) |
| **Minimum Footing Depth** | 18 inches |
| **Minimum Footing Width** | 15 inches |
| **Minimum Reinforcement** | Two No. 4 rebar - 1 near top and 1 near bottom |

(1) Based on compliance with earthwork recommendations per Section 6.2 of this Soils Report.

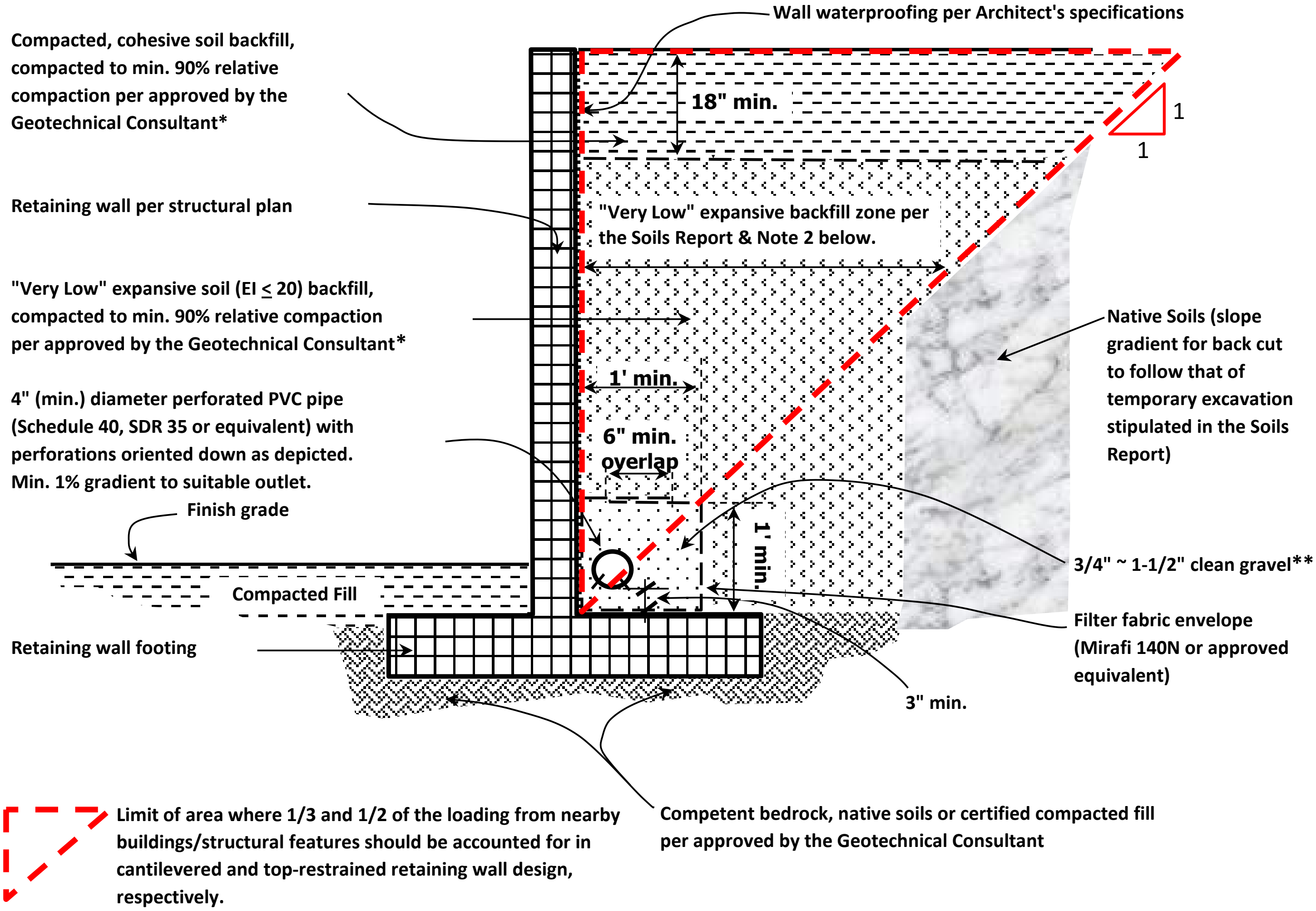
(2) Allowable soils bearing capacity increase for larger retaining wall footings should be as per Section 6.3.1b).

(3) Design values assuming a drained condition with "Very Low" expansive materials (EI ≤ 20) within the backfill zone and no surcharge loading conditions.

(4) Passive lateral resistance may be combined with frictional resistance provided the passive lateral earth pressure is reduced by 1/3. See Section 6.3.1c.

Preferably, the backfill should consist of approved "Very Low" expansive (EI ≤ 20) material, and should be compacted to a minimum relative compaction of 90 percent. In order to be able to utilize the active or at-rest lateral earth pressure values for granular soil backfill as listed in the following table, the extent of the "Very Low" expansive (EI ≤ 20) backfill zone should be as per the red-dotted triangular wedge depicted in Figure 4. Flooding or jetting of backfill should not be permitted. Granular backfill should be capped with 18 inches (minimum) of relatively impervious fill such as native site soils to seal the backfill and prevent saturation. Figure 4 illustrates the general configuration and requirements for retaining wall drainage. Should any conflict noticed between recommendations stated in this report and those shown in Figure 4, the fore should govern. Other retaining wall drainage alternatives such as CONTECH C-Drain system or MIRADRAIN may be considered but should first be reviewed and approved by the Geotechnical Consultant prior to implementation.

Should the space behind the new retaining wall be too tight to implement the above recommended backfill effort, as an alternative, 2-sack control density fill (slurry fill) may be used in lieu of regular soil backfill, provided that the integrity and functionality of wall backdrain is protected and maintained.




| SPECIFICATIONS FOR CALTRANS CLASS II PERMEABLE MATERIAL | |
|---|---|
| U.S. STANDARD SIEVE SIZE | % PASSING |
| 1" | 100 |
| 3/4" | 90 ~ 100 |
| 3/8" | 40 ~ 100 |
| No. 4 | 25 ~ 40 |
| No. 8 | 18 ~ 33 |
| No. 30 | 5 ~ 15 |
| No. 50 | 0 ~ 7 |
| No. 200 | 0 ~ 3 |
| Sand Equivalent > 75 | |

* Based on ASTM D-1557-02

** If Caltrans Class II permeable material (see gradation to left) is used in place of 3/4" ~ 1-1/2" gravel, filter fabric may be deleted. Caltrans Class 2 permeable material should be compacted to minimum 90 percent relative compaction. Unless otherwise specified, a minimum of 1 cubic foot of gravel should be used for each 1 foot run of drain.

Note 1: Composite drainage products such as Contech C-Drain, Miradrain or J-Drain may be used as alternative to gravel or Class II. Installation should be performed in accordance with manufacturer's specifications.

Note2: Min. Extent of " Very Low" expansion backfill zone should be as per indicated by the red-dotted wedge area behind retaining wall.

**Schematic Not To Scale**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Consulting Geotechnical Engineers

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| | | | |
|---|---|---|---|
| Project: | Prop. New Bldg. at O.C. Ronald McDonald House<br>383 S. Batavia St., Orange, CA | | |
| **Figure 4** | **Nearby Building Surcharge Consideration & Retaining Wall Drainage Details** | | |
| Proj. No.: | **6827.18** | Date: | **September, 2018** |

It should be noted that the use of heavy compaction equipment in close proximity to retaining structures can result in wall pressures exceeding design values and corresponding wall movement greater than that normally associated with the development of active or at-rest conditions. In this regard, the contractor should take appropriate precautions during the backfill placement.

6.3.3 Footing/Foundation Observation:

All footing/foundation excavations should be observed by the Geotechnical Consultant's representative to verify minimum embedment depths and competency of bearing soils. Such observations should be made prior to placement of any reinforcing steel or concrete.

## 6.4 Slabs-On-Grade

Concrete floor slabs in the Building and exterior concrete flatwork/hardscape should be supported on properly compacted soils as recommended in the Site Grading section (i.e. Section 6.2) of this report. The slab subgrade soils should also be proof-rolled just prior to construction to provide a firm, unyielding surface, especially if the subgrade has been disturbed or loosened by the passage of construction traffic. Final compaction and testing of slab subgrade should be performed just prior to placement of concrete.

For structural design of concrete slabs, a modulus of subgrade reaction ("k-value") on the order of 150 pounds per square inch per inch ("psi/in") and an allowable bearing capacity of 900 psf may be used for slab constructed on recompacted site soils. Interior and exterior slabs should be properly designed and reinforced for the construction and service loading conditions. To minimize slab distress, geotechnically, it would be prudent to provide a minimum actual slab thickness of four (4) inches with minimum reinforcement consisting of number 3 reinforcing bars spaced maximum 24 inches on centers each way for slabs constructed on site soils. The structural details, such as slab thickness, concrete strength, amount and type of reinforcements, joint spacing, etc., should be established by the Structural Consultant in accordance with pertinent sections in 2016 CBC.

The entirety of any new slabs within the Building should be underlain by an impermeable vapor barrier (minimum 15-mil-thick visqueen) per 2016 CRC Section R506.2.3. A minimum 12-inch overlap between visqueen sheets should be ensured during placement. All visqueen sheets should be puncture free prior to slab construction, and should be sandwiched top and bottom by two (2) inches of clean sand (Sand Equivalent, SE, ≥ 30 per ASTM D 2419-14 Test Method). The concrete slab shall consist of a concrete mix design which will address bleeding, shrinking and curling.

Exterior slabs should be properly jointed to limit the number of concrete shrinkage cracks. For long/thin sections, such as sidewalks, expansion or control joints should be provided at spacing intervals equal to the width of the section. Slabs between 5 and 10 feet in minimum dimension should have a control joint at centerline. Slabs greater than 10 feet in minimum dimension should have joints such that unjointed sections do not exceed 10 feet in maximum dimension. Where flatwork adjoins structures, it is recommended that a foam joint or similar expansion material be utilized. Joint depth and spacing should conform to the ACI recommendations. It is, however, cautioned that uneven heaving of exterior slabs may develop in the future when prolonged irrigation or seepage permeates the subgrade soil, especially in areas that expansive soil pockets exist due to inadequate control or inspection of earthwork construction.

### 6.5 Asphaltic Concrete (AC) Flexural Pavement Design

The finish grade at the subject Site is anticipated to be underlain by compacted structural fill consisting of site soils. For preliminary pavement design purposes, a laboratory tested R-Value of 30 has been utilized considering the site soils as subgrade soils. Three (3) traffic indices ("TI") of 4.5, 5.5 and 7.0, together with the tested R-Value, have been utilized for the development of preliminary recommendations for the pavement sections. Analyses performed in accordance with the current edition of the Caltrans Highway Design Manual, and assuming compliance with site preparation recommendations, it is recommended that the AC pavement structural sections tabulated below be considered. However, please be reminded that the following preliminary pavement section recommendations have been established based purely on procedures stipulated in Caltrans Manual. Governing authority should be consulted for minimum pavement section requirements and, if more stringent than that recommended by ASE, be complied with.

| **Traffic Index (TI)** | **Pavement Section Alternatives** | | **Remark** |
|---|---|---|---|
| | **AC** (1) (inches) | **AB** (2) (inches) | |
| 4.5 | 3.0 | 4.5 | For auto parking stalls. |
| 5.5 | 3.0 | 7.5 | For auto circulation aisles. |
| | 4.0 | 5.0 | |
| 7.0 | 4.0 | 9.5 | For fire lanes and truck access ways/entry and exits. |
| | 5.0 | 7.5 | |

(1) Asphaltic Concrete.
(2) CAB or CMB, Greenbook sections 200-2.2 and 200-2.4, respectively, compacted to at least 95% relative compaction.

It is recommended that R-Value testing be performed on representative soil samples after rough grading operations on the upper 2 feet to confirm/modify applicability of the above pavement sections.

The aggregate base should conform to the Crushed Aggregate Base (CAB) per Section 200-2.2 of the Greenbook requirements. The base course should be compacted to a minimum relative compaction of 95% at a minimum of one (1) percentage point above the optimum moisture content. Field testing should be used to verify compaction, aggregate gradation, and compacted thickness.

The asphalt concrete pavement should be compacted to 95% of the unit weight as tested in accordance with the Hveem procedure. The asphalt concrete material shall conform to Type III, Class C2 or C3, of the Greenbook. All subgrade and aggregate base materials should be proof-rolled by heavy rubber tire equipment to verify that the subgrade and base grade are in a non-yielding condition. If the paved areas are to be used during construction, or if the type and frequency of traffic is greater than assumed in the design, the pavement section should be re-evaluated for the anticipated traffic.

## 6.6 Portland Cement Concrete (PCC) Pavements

The concrete pavement sections tabulated below are based on load safety factors of 1.0 and 1.1, and a modulus of subgrade reaction ("k" Value) of 150 pounds per cubic inch for site soils compacted as subgrade material, and the design procedures presented in the Portland Cement Association bulletin "Thickness Design for Concrete Highway and Street Pavements" (EB109.01P), 1984. A design service life of 20 years was assumed for the design of the Portland cement concrete pavement section.

The Structural Consultant should establish the design details of the concrete pavement section, including reinforcements, concrete strength, and joint and load transfer requirements.

| Concrete Flexural Strength (psi) (1) | Pavement Thickness (in) (2), (4) | Pavement Thickness (in) (3), (4) |
|---|---|---|
| 600 | 6.0 | 6.5 |
| 650 | 5.5 | 6.0 |

(1) Represents 90-day flexural strength. Based on Figure 10 of Reference 24, concrete with 28-day unconfined compressive strength values of 4000 to 4500 psi typically correlates to 90-day flexural strength values of 600 and 650 psi, respectively.
(2) Load Safety Factor = 1.0 (Auto Parking Stalls)
(3) Load Safety Factor = 1.1 (Fire Lanes/Truck Traffic Areas/Entry and Exits)
(4) Assumes no PCC shoulder or curb.

It is recommended that edges of concrete pavements which are not adjacent to existing buildings, or are adjacent to planter areas, be downturned a minimum of 12 inches or be constructed with curbing to prevent water infiltration to subgrade soils. If edges are downturned or curbing is constructed, the above pavement thicknesses should be decreased by 1/2 inch.

The upper one (1) foot of exposed subgrade soils beneath concrete pavements should be compacted to a minimum 95 percent relative compaction with minimum moisture content of one (1) percentage point above optimum moisture content. Subgrade soils should exhibit a firm, unyielding surface in addition to the recommended compaction. Final compaction and testing of pavement subgrade should be performed just prior to placement of aggregate base and/or concreting. Other pertinent subgrade preparation measures stipulated in the "Thickness Design for Concrete Highway and Street Pavements" (EB109.01P), 1984, or required by the jurisdictional municipal authorities should be followed accordingly.

## 6.7 Site Drainage

Per Section 1804.4 of 2016 CBC, a minimum 5% descending gradient away from the Building for a minimum distance of 10 feet should be incorporated for earth grade placed adjacent to the foundation. This descending gradient may be reduced to 2% for any impervious areas, such as concrete paved walkways, within the 10-foot zone. For areas where the 10-foot drainage distance is not attainable, alternative measure such as concrete-lined swales having a minimum 2% gradient may be adopted to divert the water away from the Building, provided that a minimum 5% gradient is maintained in the distance between the building footprint and the diversion measure such as swales. For more specific site drainage guidelines, the Project Civil Consultant should refer to the pertinent sections in 2016 CBC.

Any planter areas to be placed adjacent to structure perimeters should be provided with solid bottoms and a drainage pipe, to divert water away from foundation and slab subgrade soils. Excessive moisture variations in site soils could result in significant volume changes and movement.

### 6.8 Soil Corrosivity Evaluation

Soils corrosivity tests were performed on a representative sample of site soil. These tests are meant to determine the corrosive potential of on-site soils to proposed concrete foundations/flatwork and underground metal conduit. The soils corrosivity test results are presented in Appendix A.

#### 6.8.1 Concrete Corrosion:

Disintegration of concrete may be attributed to the chemical reaction of soils sulfates and hydrated lime and calcium aluminate with the cement. The severity of the reaction resulting in expansion and disruption of the cement is primarily a function of the concentration of soluble sulfates and the water-cement ratio of the concrete.

A soluble sulfate content of 0.017% by weight has been recorded from testing per California Test Method (CTM) 417 conducted on on-site soils, as indicated in Appendix A. As per Table 4.2.1 of ACI 318-14, soils exhibiting soluble content less than 0.1% by weight are classified as having "Not Applicable" sulfate exposure and "S0" sulfate exposure category. As such, for structural features to be in direct contact with on-site soils, the special geotechnical requirements on the type of Portland cement or water cement ratio for the tested "S0" sulfate exposure category as per stipulated in Table 4.3.1 of ACI 318-14 should be considered.

#### 6.8.2 Metal Corrosion:

In the evaluation of soil corrosivity to metal, the hydrogen ion concentrates (pH) and the electrical resistivity of the site and backfill soils are the principal variables in determining the service life of ferrous metal conduit. The pH of soil and water is a measure of acidity or alkalinity, while the resistivity is a measure of the soils resistance to the flow of electrical current.

Currently available design charts indicate that corrosion rates decrease with increasing resistivities and increasing alkalinities. It can also be noted that for alkaline soils, the corrosion rate is more influenced by resistivity than by pH.

The resistivity value of 1,480 ohm-cm per ASTM G187-12a Test Method coupled with a pH-value of 8.29 per CTM 643 classifies the on-site soils tested to be corrosive to buried ferrous metals. Based on CTM 643, the year to perforation for 18-gauge steel in contact with soils of similar resistivity and pH-value is approximately 29 years for the corrosive on-site soils. In lieu of additional testing, alternative piping materials, i.e. plastic piping, may be used instead of metal if longer service life is desired or required for utility pipes and fittings in direct contact with on-site soils. These resistivity values of on-site soils may also have implications to other building materials and depths of embedment for steel reinforcement, etc. Thus, it might be desirable that a qualified corrosion consultant be engaged to review the building plans.

A soluble chloride content of 39 ppm was recorded in our laboratory tests per CTM 422. Per Caltrans guidelines and specifications (References 21 and 22), soils exhibiting soluble chloride contents exceeding 500 ppm are considered “corrosive”. The soils are thus classified as “non-corrosive” per Caltrans criterion. In addition, special measure in terms of rebar protection against chloride corrosion under Exposure Class “C0” stipulated in Tables 4.2.1 and 4.3.1 of ACI 318-14 may be required as a result of the soluble chloride content tested. However, the compliance with the corrosivity criteria stipulated in Section 6.2.8 above will ensure that no other particular reinforcement protection measure will be needed for slab-on-grade in contact with import fill.

## 6.9 Utility Trenches

All trenches should be backfilled with approved fill material compacted to relative compaction of not less than 90 percent per ASTM D1557-12 Test Method. Care should be taken during backfilling to prevent utility line damage.

The on-site soils may be used for backfilling utility trenches from one (1) foot above the top of pipe to the surface, provided the material is free of organic matter and deleterious substances. Any soft and/or loose materials or fill encountered at pipe invert should be removed and replaced with properly compacted fill or adequate bedding material.

On-site soils are not considered suitable for bedding or shading of utilities. Imported soils for pipe bedding should consist of non-expansive granular soils. Bedding materials should consist of sand with a Sand Equivalent value (ASTM Test Method D2419-14) not less than 30.

If sandy soils are used for trench backfill, the backfill should be topped with a minimum 2-foot thick cap of compacted fine-grained, cohesive soil. Also, a minimum 10-foot length of trench at the entrance and exit points of buildings should be backfilled with fine-grained soils to serve as a plug to prevent water migration into structure foundation support zones.

The walls of temporary construction trenches may not be stable when excavated nearly vertical due to the potential for caving. Shoring of excavation walls or flattening of slopes will be required if excavation depths greater than 4 feet are necessary.

Trenches should be located so as not to impair the bearing capacity of soils or cause settlement under foundations. As a guide, trenches parallel to foundations should be clear of a 45-degree plane extending outward and downward from the edge of the foundations. All work associated with trenches, excavations and shoring must conform to the State of California Safety Code.

### 6.10 Plan Review, Observations and Testing

Once foundation and grading plans are completed, they should be forwarded to the Geotechnical Consultant for review of conformance with the intent of these recommendations and criteria presented in the pertinent sections of this report.

All excavations should be observed by a representative of this office to verify minimum embedment depths, competency of bearing soils and that the excavations are free of loose and disturbed materials. Such observations should be made prior to placement of any fill, reinforcing steel or concrete. All grading and fill compaction should be performed under the observation of and testing by a Geotechnical Consultant or his representative.

## 7.0 FIELD PERCOLATION TEST DATA

Initial seepage rates obtained during the "Reading Time Interval Test" in Borings B-4 and B-6 after overnight pre-soaking indicated the time interval between readings should be 30 minutes maximum, i.e. the “Normal Soil” category, whereas initial seepage rates in Boring B-5 after overnight pre-soaking indicated the time interval between readings should be 10 minutes maximum, i.e. the “Sandy Soil” category. The percolation tests were therefore performed using the normal soil method (i.e. six hour test maximum) for Borings B-4 and B-6, and the sandy soil method (i.e. one hour test maximum) for Boring B-5, in accordance with the Orange County Technical Guidance Document Appendices (Appendix VII) procedures modified to test the cross sectional zone of typical soils within the level of anticipated storm water infiltration (e.g. approximately 1 foot to 5 feet below existing grades for Borings B-4 and B-6, and approximately 5 feet to 10 feet below existing grade for Boring B-5).

Field percolation testing was conducted on September 6, 2018. Stabilized field percolation test data indicates preadjusted percolation test rates ranging from a minimum of 1.54 to a maximum of 40.0 minutes per inch (mpi) for clean water at the locations of Borings B-5 and B-4, respectively. Field percolation test data is presented on the attached Plates H-1 through H-3 in Appendix A.

Tabulated below are the results of percolation testing conducted at the locations of Borings B-4 through B-6, including the infiltration rate derived from the Porchet Method of Percolation Rate Conversion procedures outlined in Appendix VII of the Technical Guidelines Document Appendices.

| | Percolation Test Rate | Infiltration Rate* |
|---|---|---|
| **Boring No.** | **(Minutes/Inch)** | **(Inches/Hour)** |
| B-4 | 40.0 | 0.03 |
| B-5 | 1.54 | 0.72 |
| B-6 | 7.5 | 0.165 |

*Infiltration Rate derived from Porchet Method Conversion from Percolation Rate using a Factor of Safety of 2

The rate presented above is anticipated to be the fastest rate that can be absorbed by the site soils at the boring locations. However, with time and depending on the degree of saturation of soils and other factors, the percolation rate may reduce which is typical for sewage disposal or stormwater dispersal fields.

Please be informed that during installation of on-site storm water dispersal system, the following factors should be noted:

- The degree of compactive effort in the upper 1 to 1.5 feet of soils above any filter material should be between 90 and 92 percent relative compaction. As any greater compactive efforts in the soil strata of water retention system construction may cause the percolation rates to reduce substantially, it is not advisable to impose significant structural loading in these areas, from a geotechnical viewpoint.
- The rate of water transmission from the filter material to the soil will be limited the porosity characteristics of the fabric wrap around the filter material.

## 8.0 CLOSURE

This report has been prepared for the exclusive use of **Orange County Ronald McDonald House** and its design consultants for use in the design and construction of the proposed new Building adjacent to the existing Ronald McDonald House building. The report has not been prepared for use by other parties, and may not contain sufficient information for purposes of other parties.

The Client or its representatives are responsible for ensuring the information and recommendations contained in this report are brought to the attention of the project engineers and architects, incorporated into the project plans, and implemented by project contractors. This report should be reflected on project grading plans as a part of the project specifications.

ASE requests and recommends proper notification from the Client should any of the following occur:

1. Final plans for site development indicate utilization of areas not originally proposed for construction.
2. Structural loading conditions vary from those utilized for evaluation and preparation of this report.

3. The Site is not developed within 12 months following the date of this report.

If changes or delays do occur, this office should be notified and provided with finalized plans of site development for our review to enable us to provide the necessary recommendations for additional work and/or updating of the report. Any charges for such review and necessary recommendations would be at the prevailing rate at the time of performing review work.

The findings contained in this report are based upon our evaluation and interpretation of the information obtained from the limited number of test borings and the results of laboratory testing and engineering analysis. As part of the engineering analysis it has been assumed, and is expected, that the geotechnical conditions existing across the area of study are similar to those encountered in the test excavations. However, no warranty is expressed or implied as to the conditions at locations or depths other than those excavated. Should conditions encountered during construction differ significantly from those described in this report, this office should be contacted immediately for recommendations prior to continuation of work.

Our findings and recommendations were obtained in accordance with generally accepted current professional principles and local practice in geotechnical engineering and reflect our best professional judgment. We make no other warranty, either express or implied.

These recommendations are, however, dependent on the aforementioned assumption of uniformity and upon proper quality control of engineered fill and foundations. Geotechnical observations and testing should be provided on a continuous basis during grading at the site to confirm preliminary design assumptions and to verify conformance with the intent of our recommendations. If parties other than ASE are engaged to provide geotechnical services during construction, they must be informed that they will be required to assume complete responsibility for the geotechnical phase of the project by either concurring with the recommendations in this report or providing alternative recommendations.

This concludes our scope of services as indicated in ASE's proposal dated August 10, 2018, however, our report is subject to review by the controlling authorities for the project. Any further geotechnical services that may be required of our office to respond to questions/comments of the controlling authorities after their review of the report will be performed on a time-and-expense basis as per our current fee schedule. We would not proceed with any response to report review comments/questions without authorization from your office.

We at ASE appreciate your business and are prepared to assist you with construction-related services.

## APPENDIX A

The following Appendix contains the substantiating data and laboratory test results to complement the engineering evaluations and recommendations contained in the report.

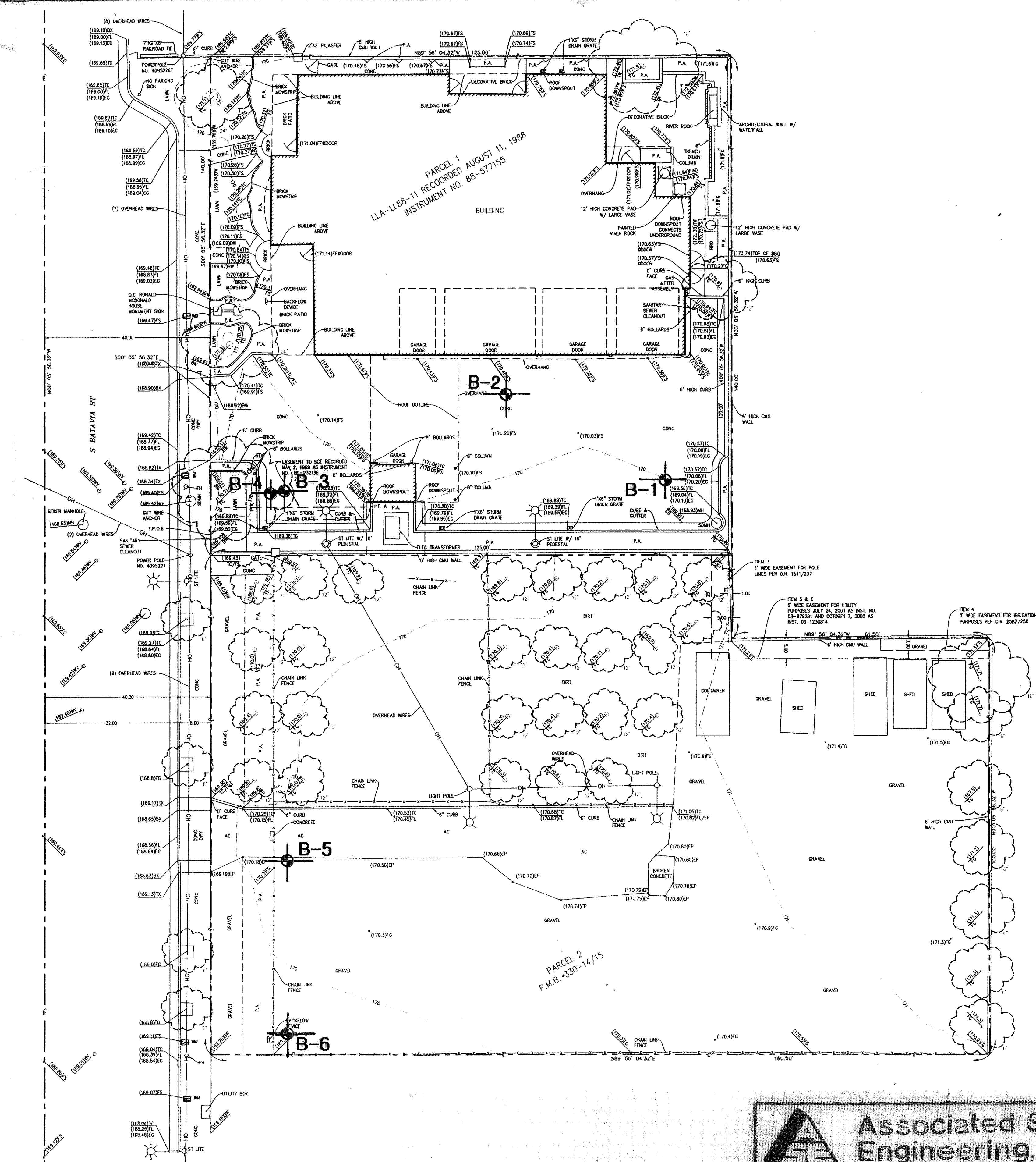
### Site Exploration

On September 5, 2018, field explorations were performed by drilling six (6) test borings at the approximate locations indicated on the attached Boring Location Plan, Plate A. The exploratory borings were drilled by Choice Drilling, Inc. utilizing a track mounted, CME75 rotary drilling rig equipped with 8-inch diameter continuous flight, hollow-stem rotary augers. The borings extended to depths of 5 feet 6 inches to 28 feet 5 inches from the existing grades.

Continuous observations of the materials encountered in the borings were recorded in the field. The soils were classified in the field by visual and textural examination and these classifications were supplemented by obtaining bulk soil samples for future examination in the laboratory. Relatively undisturbed samples of soils were extracted in a Modified California barrel sampler lined with 2.416-inch diameter by one-inch high rings and tipped with tapered cutting shoe. Additional samples were obtained in a Standard Penetration sampler in accordance with specification outlined in ASTM D1586-11 Test Method. All samples were secured in moisture-resistant bags immediately after retrieval from exploratory boring to minimize the loss of field moisture, followed by timely transportation to ASE's laboratory for ensuing testing. Upon completion of exploration, the borings were backfilled with excavated materials and compacted by tamping, with existing pavement cores replaced in hole and secured with rapid set cement.

Description of the soils encountered, depth of samples, field density and moisture content of tested samples, respective laboratory tests performed, as well as Standard Penetration Test ("N" Valves) and Modified California barrel sampler blow counts are presented in the attached Field Logs of Borings ("B" Plates).

| | |
|---|---|
| Plate A | Boring Location Plan |
| Plates B-1 through B-6 | Field Logs of Borings |




SOURCE:TOPOGRAPHIC SURVEY,Sheet No. SV-1.0,prepared by JMC² Civil Engineering & Surveying, dated 6/21/2018.

| Associated Soils Engineering, Inc. | BORING LOCATION PLAN | Project# 6827.18 | Plate A |
|---|---|---|---|

ASSOCIATED SOILS ENGINEERING, INC.

# FIELD LOG OF BORING B-1



Project: *Orange County Ronald McDonald House Addition-Orange*

Location: *383 South Batavia Street* | Project No. *6827.18*

| | | | |
|---|---|---|---|
| Dates(s) Drilled: | **9/5/2018** | Logged By: | **Gary L. Martin** |
| Drilled By: | **Choice Drilling,Inc.** | Total Depth: | **23 Feet 6 Inches** |
| Rig Make/Model: | **CME 75** | Hammer Type: | **Automatic** |
| Drilling Method: | **Hollow-stem Auger** | Hammer Weight/Drop: | **140 Lb./±30 In.** |
| Hole Diameter: | **8 Inches** | Surface Elevation: | **N/A** |

Comments: Groundwater not encountered. Backfill not determined.

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.) | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | WELL COMPLETION | OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | | | CONCRETE PAVEMENT: 7.5" (wire mesh 6-5/8" to 6-3/4" from surface) | | | | R-VALUE |
| | | | SC | CLAYEY SAND: Dark brown,moist,fine-grained sand | | | | |
| | | 10(Ring) | SM | SILTY SAND: Yellowish brown,damp to moist,fine-grained sand,trace clay,with some gravel | 113.4 | 7.5 | | |
| | | | SM | SILTY SAND: Yellowish brown,moist,fine-grained sand,with some gravel | | | | |
| 5 | 5 | 16(Ring) | | | 109.9 | 9.3 | | |
| 10 | 10 | 16(Ring) | SM | same as above | 111.0 | 12.4 | | CONSOL |
| | | | SM | SILTY SAND WITH CLAY: Yellowish brown,moist,fine-grained sand,with gravel | | | | |
| | | | SM | SILTY SAND WITH GRAVEL: Brown with gray,dry to damp,fine to coarse-grained sand,trace clay | | | | |
| 15 | 15 | 28/6" (Ring) | | | 130.9 | 2.9 | | |

ASSOCIATED SOILS ENGINEERING, INC.

# FIELD LOG OF BORING B - 1



Project: *Orange County Ronald McDonald House Addition-Orange*

Location: *383 South Batavia Street* | Project No. *6827.18*

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS: BULK | SAMPLE INTERVALS: DRIVE | SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.) | LITHOLOGY | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | WELL COMPLETION | OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 34/6" (Ring) | | SP | SAND WITH GRAVEL: Light yellowish brown with gray,dry,fine to medium-grained sand | 132.0 | 2.1 | | |
| | | | | | | | with gravel/rock layer at 17.5 feet | | | | |
| 20 | 20 | | | 27(Ring) | | | #no recovery | # | # | | |
| | | | | 28(SPT) | | SM | SILTY SAND WITH GRAVEL: Yellowish brown with brownish yellow and gray,damp,fine to coarse-grained sand | | 5.0 | | |
| | | | | | | | NOTE:Gravel/rock layer encountered at 23.5 feet. Unable to penetrate deeper without damaging equipment. Boring terminated. | | | | |
| 25 | 25 | | | | | | | | | | |

# FIELD LOG OF BORING B-2



ASSOCIATED SOILS ENGINEERING, INC.

| | |
|---|---|
| Project: | *Orange County Ronald McDonald House Addition-Orange* |
| Location: | *383 South Batavia Street* |
| Project No. | *6827.18* |

| | | | |
|---|---|---|---|
| Dates(s) Drilled: | **9/5/2018** | Logged By: | **Gary L. Martin** |
| Drilled By: | **Choice Drilling,Inc.** | Total Depth: | **28 Feet 5 Inches** |
| Rig Make/Model: | **CME 75** | Hammer Type: | **Automatic** |
| Drilling Method: | **Hollow-stem Auger** | Hammer Weight/Drop: | **140 Lb./±30 In.** |
| Hole Diameter: | **8 Inches** | Surface Elevation: | **N/A** |

Comments: Groundwater not encountered. Backfill not determined.

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS TYPE, "N" or (Blows/ft.) | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | WELL COMPLETION | OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | | | CONCRETE PAVEMENT: 7-3/8" (wire mesh 6-1/2" from surface) | | | | |
| | | | SM | | | | | |
| | | | SM | SILTY SAND: FILL-Brown to olive brown,moist,fine to medium-grained sand,trace clay,with glass piece | | | | |
| | | 7(Ring) | SM | | 107.5 | 9.9 | | CONSOL,SHEAR |
| | | | | SILTY SAND WITH GRAVEL: NATIVE-Yellowish brown,moist,fine to medium-grained sand | | | | |
| | | | | SILTY SAND: Brown to yellowish brown,moist,fine-grained sand,trace clay and gravel | | | | |
| 5 | 5 | 16(Ring) | SM | same as above,less clay @ 5 ft. | 101.8 | 9.9 | | |
| | | | SM | SILTY SAND: Brown,moist,fine-grained sand | | | | |
| 10 | 10 | 9/6"(Ring) | | | 107.8 | 12.4 | | |
| | | 11/6" (Ring) | SP | SAND: Light yellowish brown with light gray,damp,fine to medium-grained sand,trace gravel<br>*insufficient sample for density | * | 4.3 | | |
| | | | SP | SAND WITH GRAVEL: Light yellowish brown with gray,dry,fine to medium-grained sand | | | | |
| 15 | 15 | 48(Ring) | | #no recovery | # | # | | |

# FIELD LOG OF BORING B - 2



ASSOCIATED SOILS ENGINEERING, INC.

**Project:** *Orange County Ronald McDonald House Addition-Orange*

**Location:** *383 South Batavia Street*

**Project No.** *6827.18*

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.) | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | WELL COMPLETION | OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| | | | SP | SAND WITH GRAVEL: Light yellowish brown with gray,dry,fine to medium-grained sand<br>with gravel/rock layer at 17 feet | | | | |
| 20 | 20 | 16(Ring) | SM | SILTY SAND WITH GRAVEL: Brown to dark brown,moist,fine to medium-grained sand,trace clay | # | # | | |
| | | 106/10.5" (Ring) | | #no recovery @ 20 ft.<br>+disturbed sample,unable to determine density | + | 10.1 | | |
| | | | SP | SAND WITH GRAVEL: Light yellowish brown with gray,moist,fine to coarse-grained sand,with layer Yellowish Brown Clayey Fine to Coarse Sand (SC) | | | | |
| 25 | 25 | 76(SPT) | | | | 9.3 | | |
| | | 55/5" (Ring) | SC | CLAYEY SAND WITH GRAVEL: Brown,damp,fine to medium-grained sand<br>+disturbed sample,unable to determine density | + | 6.5 | | |
| 30 | 30 | | | NOTE:Gravel/rock layer encountered at 28 feet 5 inches. Unable to penetrate deeper without damaging equipment. Boring terminated. | | | | |

# FIELD LOG OF BORING B-3



ASSOCIATED SOILS ENGINEERING, INC.

| | |
|---|---|
| Project: | *Orange County Ronald McDonald House Addition-Orange* |
| Location: | *383 South Batavia Street* |
| Project No. | *6827.18* |

| | | | |
|---|---|---|---|
| Dates(s) Drilled: | **9/5/2018** | Logged By: | **Gary L. Martin** |
| Drilled By: | **Choice Drilling,Inc.** | Total Depth: | **26 Feet 6 Inches** |
| Rig Make/Model: | **CME 75** | Hammer Type: | **Automatic** |
| Drilling Method: | **Hollow-stem Auger** | Hammer Weight/Drop: | **140 Lb./±30 In.** |
| Hole Diameter: | **8 Inches** | Surface Elevation: | **N/A** |

Comments: Groundwater not encountered. Backfill not determined.

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.) | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | WELL COMPLETION | OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | | | CONCRETE PAVEMENT: 7.5" (wire mesh 6.25" to 6.5" from surface) | | | | |
| | | | SM | SILTY SAND: FILL-Brown,moist,fine-grained sand,trace clay and gravel,with concrete pieces | | | | MAX DENSITY, EXPANSION, REMOLD SHEAR, CORROSIVITY TESTS |
| | | N/A | | | 122.0 | 9.6 | | |
| | | | SM | SILTY SAND: NATIVE-Yellowish brown,moist,fine-grained sand,trace clay | | | | |
| 5 | 5 | 9(Ring) | | | 107.1 | 10.5 | | CONSOL,SHEAR |
| | | | SP-SM | SAND WITH SILT AND GRAVEL: Light yellowish brown with gray and dark gray,dry,fine to medium-grained sand | | | | |
| 10 | 10 | 17/6" (Ring) | | | 123.7 | 2.0 | | |
| | | 19/6" (Ring) | SP | SAND WITH GRAVEL: Pale yellow to light yellowish brown,with gray,dry,fine to medium-grained sand,with some coarse sand | 101.6 | 2.1 | | |
| | | | SP-SM | SAND WITH SILT AND GRAVEL: Light olive brown,dry to damp,fine to coarse-grained sand | | | | |
| 15 | 15 | 66(Ring) | | | 128.3 | 3.8 | | CONSOL |
| | | | | with gravel/rock layer at 16 feet | | | | |

## FIELD LOG OF BORING B - 3



ASSOCIATED SOILS ENGINEERING, INC.

| Project: | Orange County Ronald McDonald House Addition-Orange | |
|---|---|---|
| Location: | 383 South Batavia Street | Project No. 6827.18 |

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.) | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | WELL COMPLETION | OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| | | 23(Ring) | SP | SAND: Light yellowish brown with gray,dry to damp,fine to medium-grained sand,trace gravel,with layer Yellowish Brown Silty Clay (CL) at 19.5 feet | 109.9 | 2.6 | | |
| 20 | 20 | | | | | | | |
| | | | SP | SAND WITH GRAVEL: Light yellowish brown,dry to damp,fine to medium-grained sand | | | | |
| 25 | 25 | 57(SPT) | SC | CLAYEY SAND WITH GRAVEL: Dark yellowish brown with light olive brown,damp,fine to coarse-grained sand | | 6.0 | | |

ASSOCIATED SOILS ENGINEERING, INC.

# FIELD LOG OF BORING B-4

Sheet 1 of 1

| | |
|---|---|
| Project: | *Orange County Ronald McDonald House Addition-Orange* |
| Location: | *383 South Batavia Street* |
| Project No. | *6827.18* |

| | | | |
|---|---|---|---|
| Dates(s) Drilled: | **9/5/2018** | Logged By: | **Gary L. Martin** |
| Drilled By: | **Choice Drilling,Inc.** | Total Depth: | **5 Feet 6 Inches** |
| Rig Make/Model: | **CME 75** | Hammer Type: | **Automatic** |
| Drilling Method: | **Hollow-stem Auger** | Hammer Weight/Drop: | **140 Lb./±30 In.** |
| Hole Diameter: | **8 Inches** | Surface Elevation: | **N/A** |

Comments: Groundwater not encountered. Backfill not determined.

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.) | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | OTHER TESTS |
|---|---|---|---|---|---|---|---|
| 0 | 0 | | | CONCRETE PAVEMENT: 7.0" (wire mesh 2-3/4",3-1/8",3-3/4" & 4-3/8" from surface) | | | |
| | | 9/6"(Ring) | SM | SILTY SAND WITH CLAY: FILL-Dark brown,moist,fine-grained sand,trace gravel | 119.4 | 11.2 | |
| | | 15/6" (Ring) | SM | SILTY SAND: FILL-Dark brown,damp,fine to coarse-grained sand,with some gravel,with concrete piece | 132.7 | 5.7 | |
| | | 4(SPT) | SM | SILTY SAND: NATIVE-Brown to dark brown,moist,fine-grained sand,trace clay | | 11.7 | |
| 5 | 5 | | | | | | |

NOTE:Boring backfilled to 5 feet 3 inch (5' 3") depth with site soils. Five feet three inch (5' 3") length of 6-inch I.D. slotted PVC pipe (one piece) placed in boring with the annular area backfilled with pea gravel to surface. Two (2) inches of pea gravel placed at bottom of pipe. Percolation test performed after overnight presoaking.

ASSOCIATED SOILS ENGINEERING, INC.

# FIELD LOG OF BORING B-5



| | |
|---|---|
| Project: | *Orange County Ronald McDonald House Addition-Orange* |
| Location: *383 South Batavia Street* | Project No. *6827.18* |

| | | | |
|---|---|---|---|
| Dates(s) Drilled: | **9/5/2018** | Logged By: | **Gary L. Martin** |
| Drilled By: | **Choice Drilling,Inc.** | Total Depth: | **10 Feet 1 Inch** |
| Rig Make/Model: | **CME 75** | Hammer Type: | **Automatic** |
| Drilling Method: | **Hollow-stem Auger** | Hammer Weight/Drop: | **140 Lb./±30 In.** |
| Hole Diameter: | **8 Inches** | Surface Elevation: | **N/A** |

Comments: Groundwater not encountered. Backfill not determined.

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.) | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | OTHER TESTS |
|---|---|---|---|---|---|---|---|
| 0 | 0 | | GP | GRAVEL: Gray and light gray,dry (4.0") | | | |
| | | | SM | SILTY SAND: FILL-Light yellowish brown,damp,fine-grained sand | | | |
| | | | SP-SM | SAND: FILL-Pale brown,dry,fine-grained sand,trace silt | | | |
| | | 5/6"(Ring) | | | 120.5 | 2.6 | |
| | | 4/6"(Ring) | ML | SANDY SILT WITH CLAY: FILL-Brown,moist,fine-grained sand,trace gravel | 110.9 | 13.0 | |
| | | | SM | SILTY SAND: NATIVE-Yellowish brown,damp to moist,fine-grained sand | | | |
| 5 | 5 | 11(Ring) | | | 110.9 | 7.5 | |
| | | 8(SPT) | SM | same as above | | 7.5 | |
| 10 | 10 | | | | | | |

NOTE:Ten feet one inch (10' 1") length of 6-inch I.D. slotted PVC pipe (two pieces:upper 5 feet 1 inch solid,lower 5 feet slotted) placed in boring with the annular area backfilled with pea gravel to surface. Five and one-half (5.5) inches of pea gravel placed at bottom of pipe. Percolation test performed after overnight presoaking.

SOILS ENGINEERING, INC.

# FIELD LOG OF BORING B-6

Sheet 1 of 1

| | |
|---|---|
| Project: | *Orange County Ronald McDonald House Addition-Orange* |
| Location: | *383 South Batavia Street* |
| Project No. | *6827.18* |

| | | | |
|---|---|---|---|
| Dates(s) Drilled: | **9/5/2018** | Logged By: | **Gary L. Martin** |
| Drilled By: | **Choice Drilling,Inc.** | Total Depth: | **5 Feet 7 Inches** |
| Rig Make/Model: | **CME 75** | Hammer Type: | **Automatic** |
| Drilling Method: | **Hollow-stem Auger** | Hammer Weight/Drop: | **140 Lb./±30 In.** |
| Hole Diameter: | **8 Inches** | Surface Elevation: | **N/A** |

Comments: Groundwater not encountered. Backfill not determined.

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS: BULK | SAMPLE INTERVALS: DRIVE | SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.) | LITHOLOGY | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | WELL COMPLETION | OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | | | | | GP SM | GRAVEL: Light gray,dry (2.0") | | | | |
| | | | | 20(Ring) | | | SILTY SAND: Yellowish brown,damp to moist,fine-grained sand,trace gravel | 116.8 | 7.5 | | |
| | | | | 6(SPT) | | SM | same as above | | 7.0 | | |
| 5 | 5 | | | | | | | | | | |
| | | | | | | | NOTE:Boring backfilled to 5 feet 3 inch (5' 3") depth with site soils. Five feet three inch (5' 3") length of 6-inch I.D. slotted PVC pipe (one piece) placed in boring with the annular area backfilled with pea gravel to surface. Two and one-half (2.5) inches of pea gravel placed at bottom of pipe. Percolation test performed after overnight presoaking. | | | | |

## Laboratory Tests

After samples were visually classified in the laboratory, a testing program that would provide sufficient data for our evaluation was established.

- Moisture Content and Density Tests

The undisturbed soil retained within the rings of the Modified California barrel sampler was tested in the laboratory to determine in-place dry density and moisture content. Test results are presented on the Field Logs of Borings, Plates B-1 through B-6.

- Consolidation and Direct Shear Tests

Consolidation (ASTM D2435-11 Test Method) and direct shear (ASTM D3080-11 Test Method) tests were performed on selected relatively undisturbed and remolded samples to determine the settlement characteristics and shear strength parameters of various soil samples, respectively. The results of these tests are shown graphically on the appended "C" and "D" Plates.

- Soil Corrosivity

Tests of soluble sulfate and chloride contents were performed in accordance with California Test Methods 417 and 422, respectively, to assess the degree of corrosivity of the subgrade soils with regard to concrete and normal grade steel. Resistivity and pH-value tests were performed in accordance with the latest edition of ASTM G187-12a Test Method and California Test Method 643, respectively, to assess the degree of corrosivity of the subgrade soils with regard to ferrous metal piping. The test results are presented below.

| Sample ID | Sulfate Content [1] (%)/ Degree of Severity | Chloride Content [2] (ppm) / Degree of Severity | Resistivity [3] (OHM-cm)/ Degree of Corrosivity | Ph-Value[3] |
|---|---|---|---|---|
| B-3 @ 0.67'-5' | 0.017/Not Applicable | 39/Not Applicable | 1,480/Corrosive | 8.29 |

(1) California Test Method 417. (2) California Test Method 422. (3) ASTM G187-12a Test Method. (4) California Test Method 643.

- Maximum Dry Density/Optimum Moisture Content Test

A maximum density test was conducted in accordance with ASTM D1557-12 Test Method, Method A, using 5 equal layers, 25 blows each layer, 10-pound hammer, 18 inch drop in a 1/30 cubic foot mold. The results are as follows:

| Sample ID | Maximum Dry Density (pcf) | Optimum Moisture Content (%) | Material Classification |
|---|---|---|---|
| B-3 @ 0.67'-5' | 133.5 | 8.0 | SM |

**Laboratory Tests** – continued

- Expansion Test

An expansion test was performed on a soil sample to determine the swell characteristics. The expansion test was conducted in accordance with ASTM D4829-11 test procedures. The expansion sample was remolded to approximately 90 percent relative compaction at near optimum moisture content subjected to 144 pounds per square foot surcharge load and were saturated.

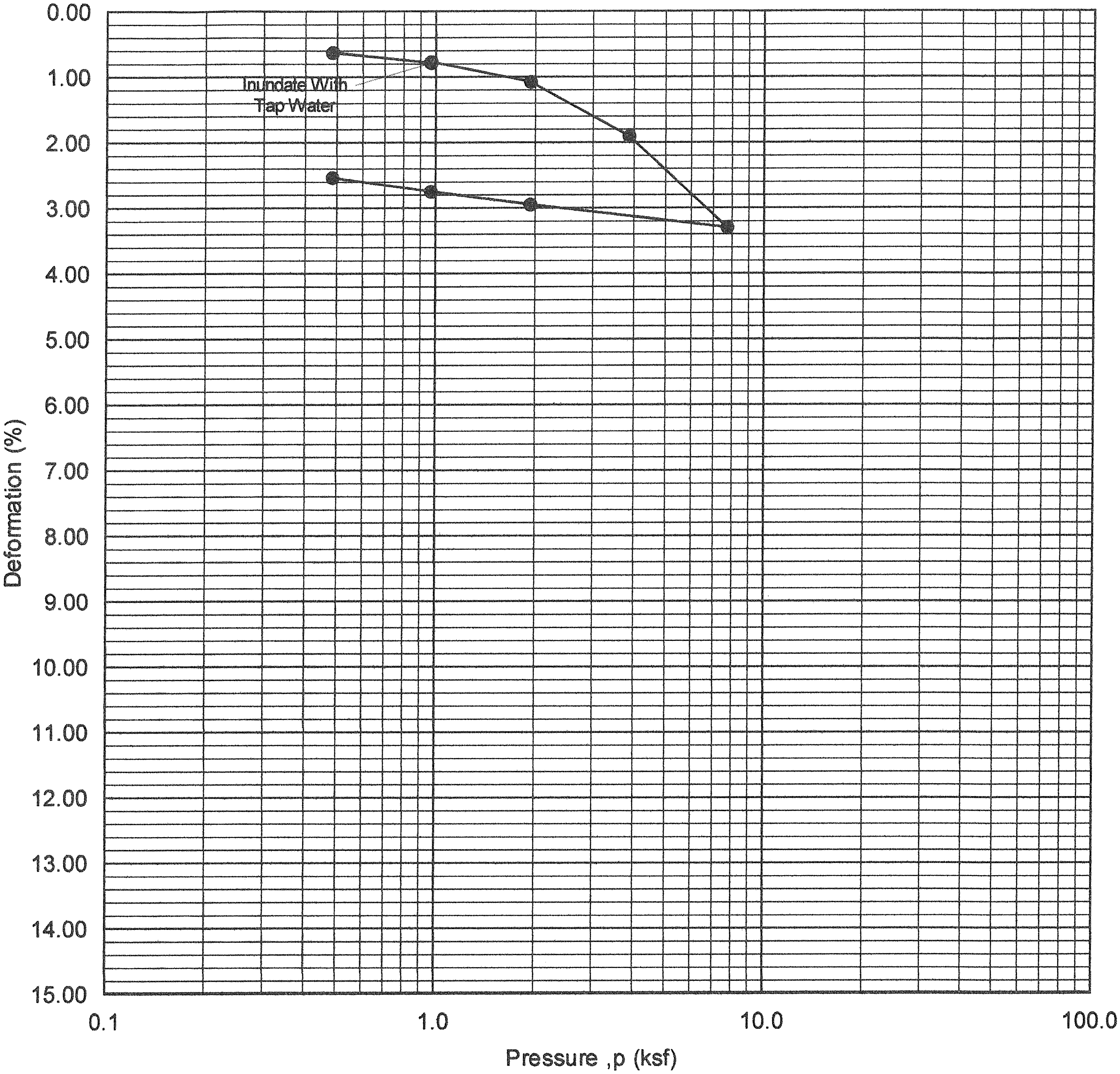
| Sample ID | Molded Dry Density (pcf) | Molded Moisture Content (%) | % Saturation | Expansion Index (EI) | Expansion Classification |
|---|---|---|---|---|---|
| B-3 @ 0.67'-5' | 119.9 | 7.7 | 51.1 | 13 | Very Low |

- "R" Value Analysis

The following "R" Value Stabilometer results were obtained in accordance with California 301 test procedures.

| Stabilometer Results | Trial #1 | Trial #2 | Trial #3 |
|---|---|---|---|
| Dry Density as molded, pcf | 128.9 | 128.0 | 127.0 |
| Moisture content as molded, % | 9.2 | 9.8 | 10.2 |
| Expansion Pressure, dial reading $10^4$ | 9 | 5 | 3 |
| Exudation Pressure, psi | 405 | 275 | 135 |
| Stabilometer "R" Value | 51 | 26 | 14 |
| Classification: Yellowish Brown Silty Fine Sand with trace Clay | | | |
| Source: Boring B-1 @ 0.67'-5' | | | |
| "R" Value equilibrium (300 psi Exudation Pressure)= 30 | | | |

| | |
|---|---|
| Plates C-1 through C-4 | Uni-axial Consolidation Test Results |
| Plates D-1 through D-3 | Direct Shear Test Results |
| Plates H-1 through H-3 | Field Percolation Data Sheets |

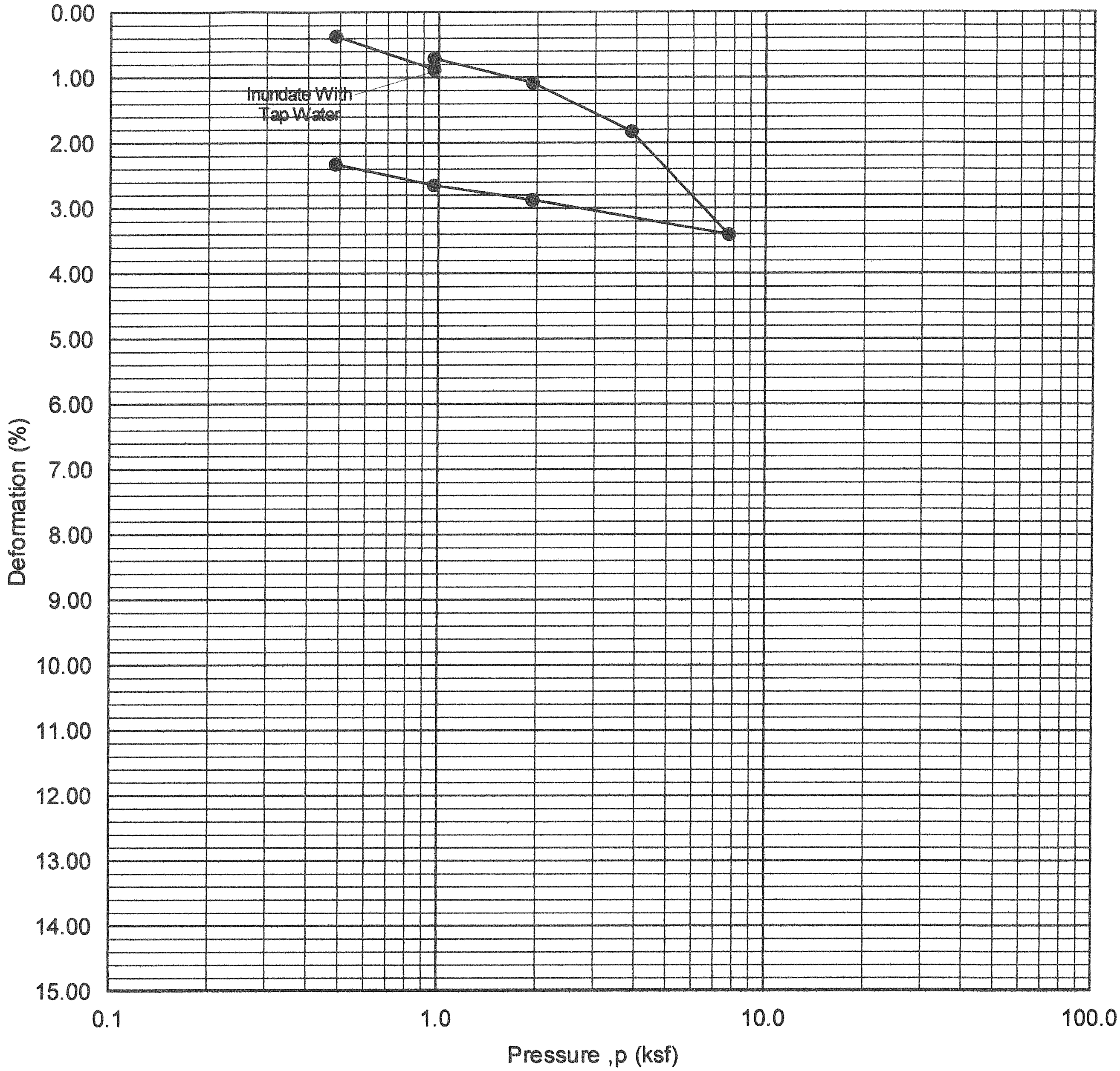



Boring No. : B-1
Depth (ft.) : 10.0
Sample Type: Silty Fine Sand with some Gravel

Dry Density (pcf) = 111.0
Moisture (%) = 12.4

| Project Name:O. C. Ronald McDonald House-383 S. Batavia Street | Project No.: 6827.18 |
|---|---|
| ASSOCIATED SOILS ENGINEERING, INC. | ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435) |

**PLATE C-1**

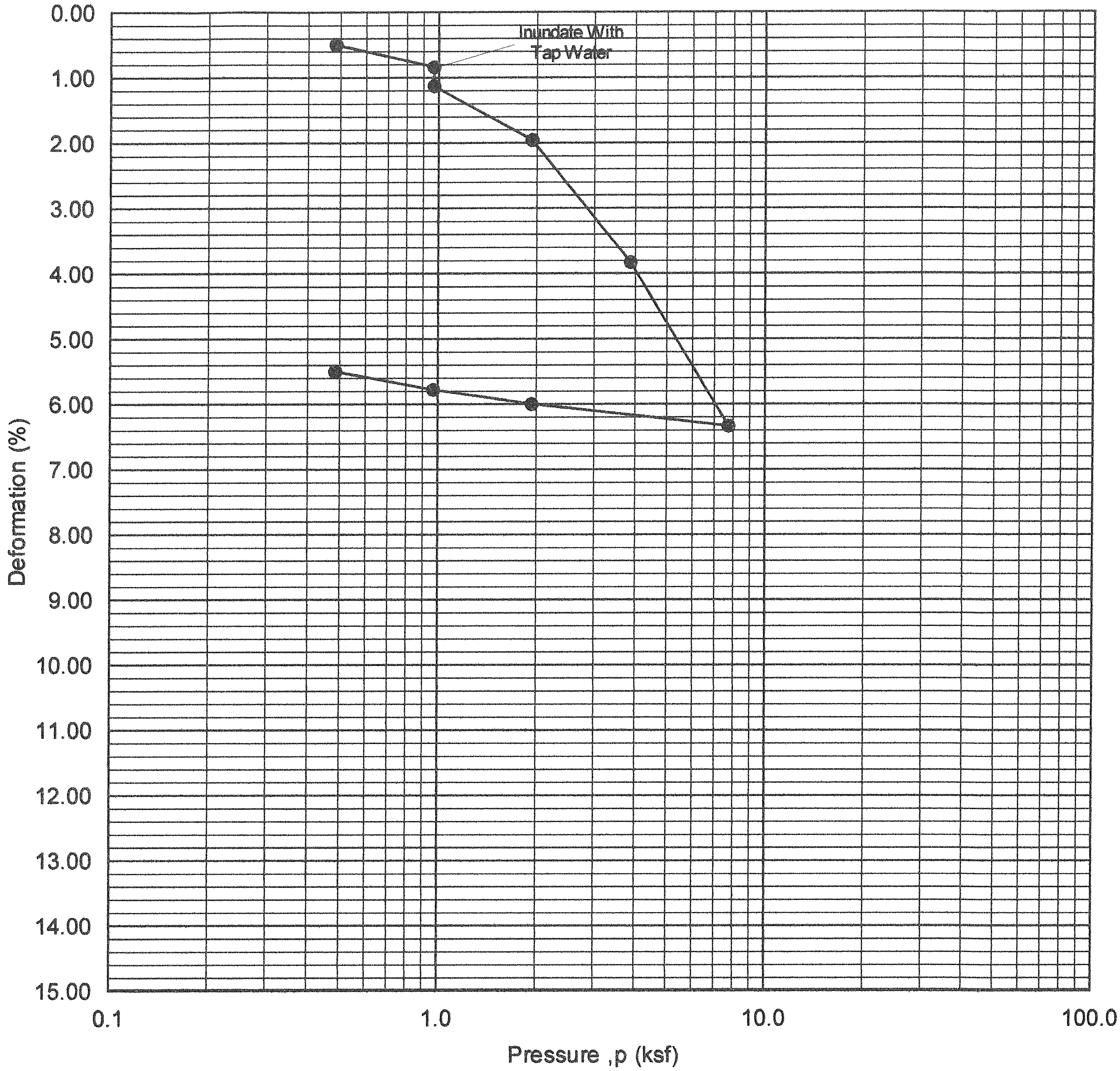



Boring No. : B-2
Depth (ft.) : 2.0
Sample Type: Silty Fine Sand with trace Clay and Gravel

Dry Density (pcf) = 107.5
Moisture (%) = 9.9

| Project Name:O. C. Ronald McDonald House-383 S. Batavia Street | Project No.: 6827.18 |
|---|---|
| ASSOCIATED SOILS ENGINEERING, INC. | ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435) |

**PLATE C-2**

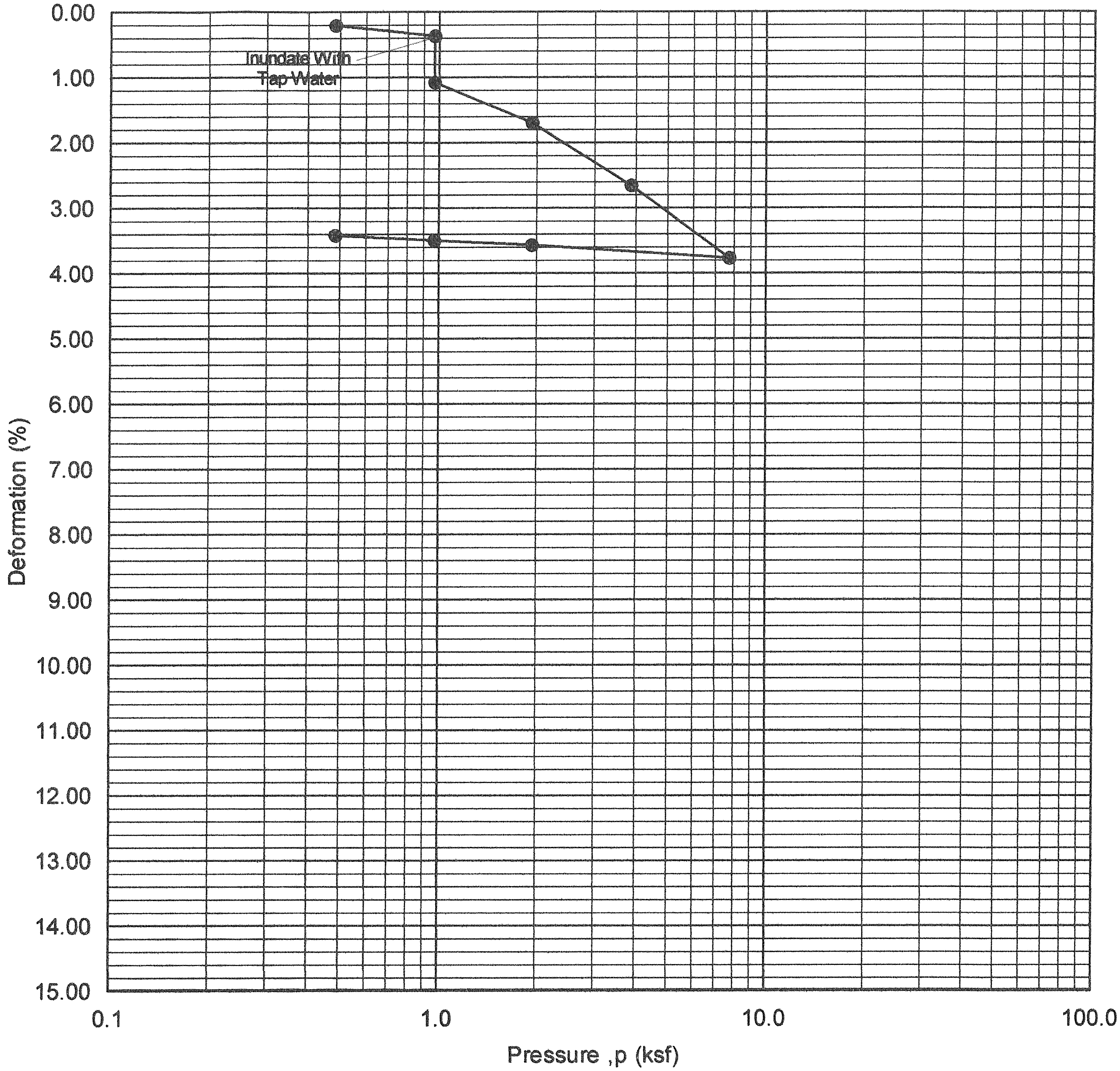



Boring No. : B-3
Depth (ft.) : 5.0
Sample Type: Silty Fine Sand with trace Clay

Dry Density (pcf) = 107.1
Moisture (%) = 10.5

| Project Name:O. C. Ronald McDonald House-383 S. Batavia Street | Project No.: 6827.18 |
|---|---|
| ASSOCIATED SOILS ENGINEERING, INC. | ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435) |

**PLATE C-3**

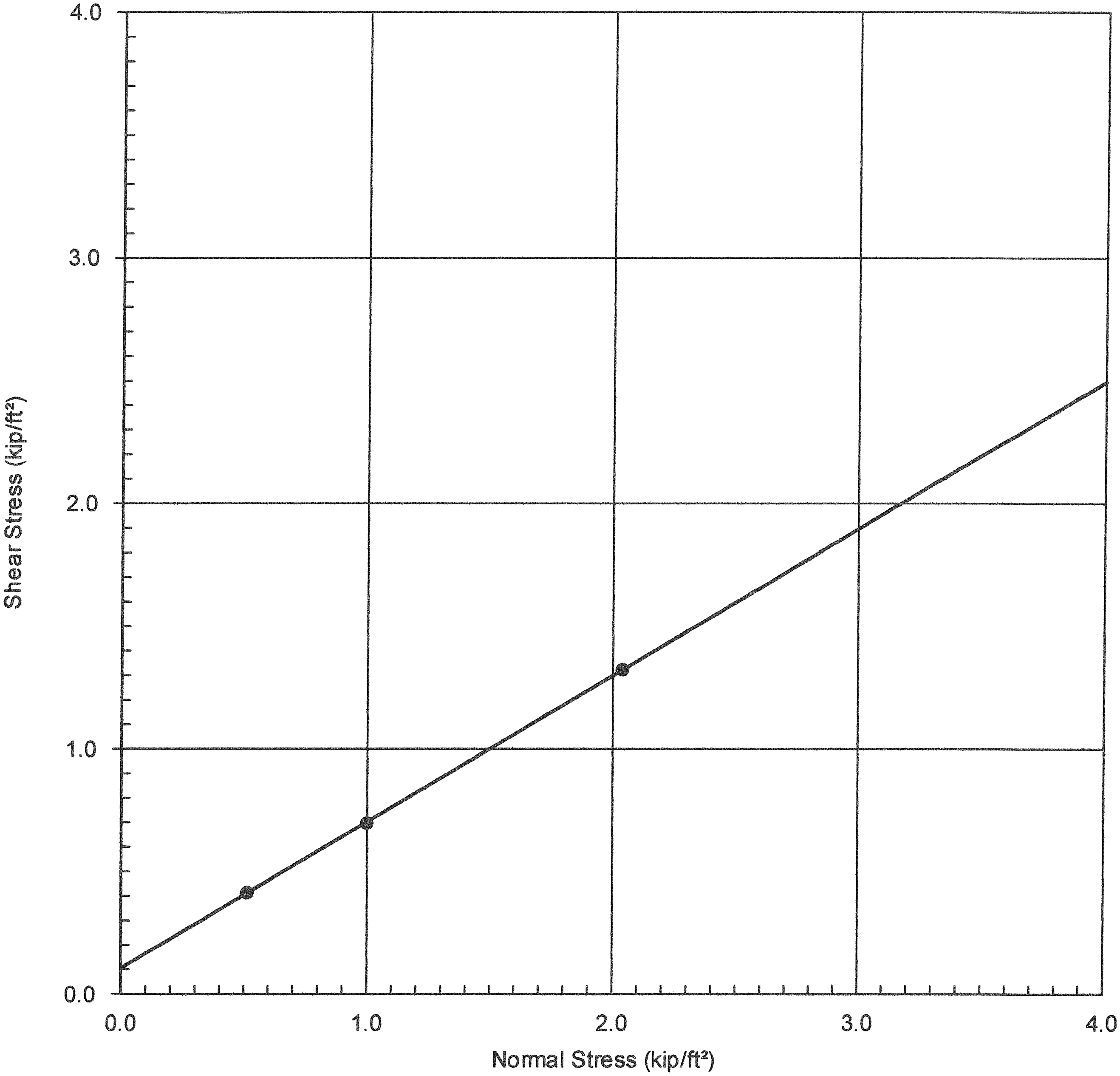



Boring No. : B-3
Depth (ft.) : 15.0
Sample Type: Fine to Coarse Sand with Silt and Gravel

Dry Density (pcf) = 128.3
Moisture (%) = 3.8

| | |
|---|---|
| Project Name:O. C. Ronald McDonald House-383 S. Batavia Street | Project No.: 6827.18 |
| ASSOCIATED SOILS ENGINEERING, INC. | ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435) |

**PLATE C-4**

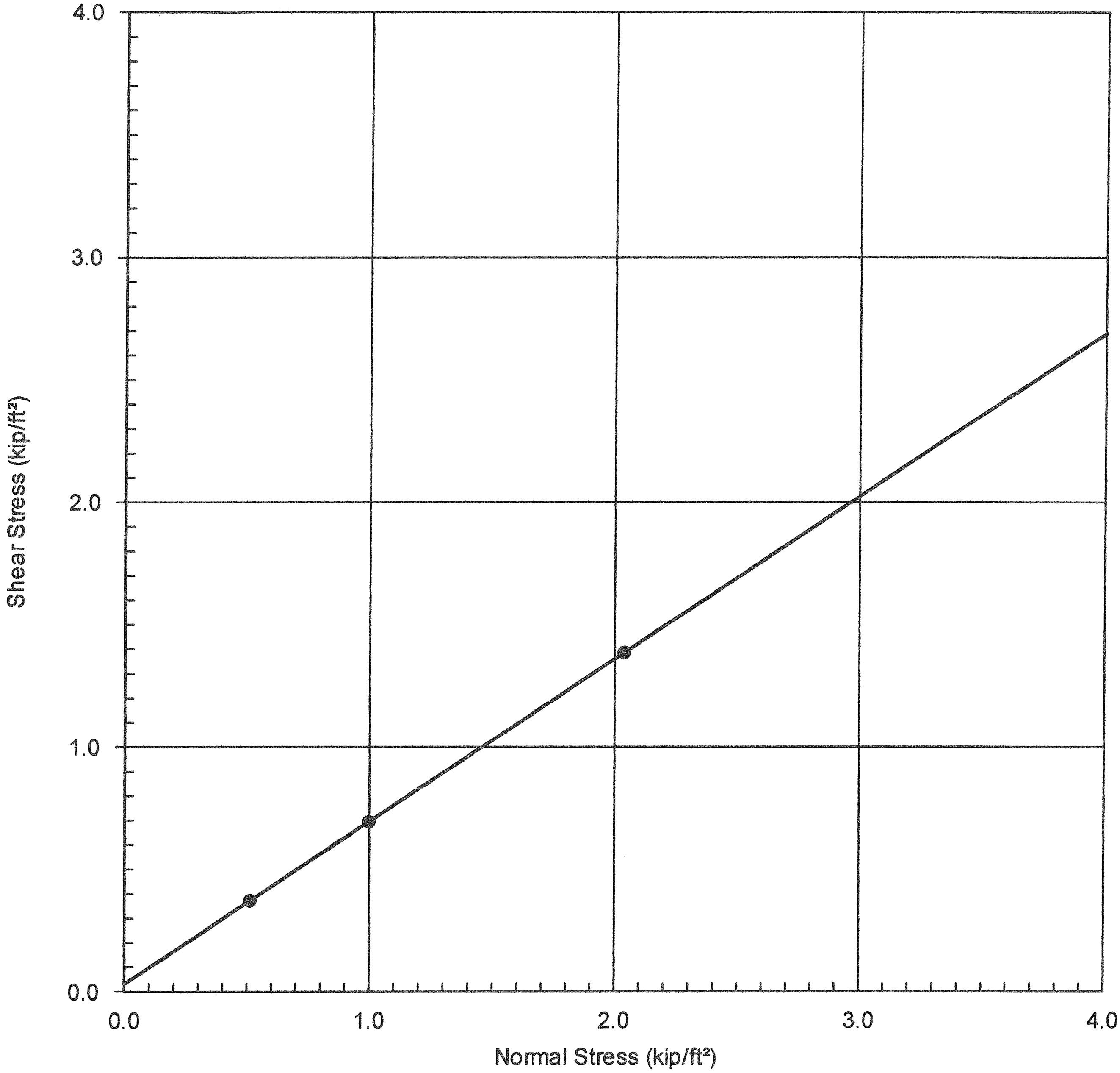



Boring No. : B-2
Depth (ft.) : 2.0
Sample Type : Relatively Undisturbed
Soil Type : Silty Fine Sand with trace Clay and Gravel

Cohesion(C) = 105 psf
Friction ($\phi$) = 30.5°
Dry Density (pcf) = 117.5
Moisture (%) = 9.9

| | |
|---|---|
| Project Name:O. C. Ronald McDonald House-383 S. Batavia St.,Orange | Project No.: 6827.18 |
| ASSOCIATED SOILS ENGINEERING, INC. | DIRECT SHEAR TEST RESULTS (ASTM D 3080) |

**PLATE D-1**

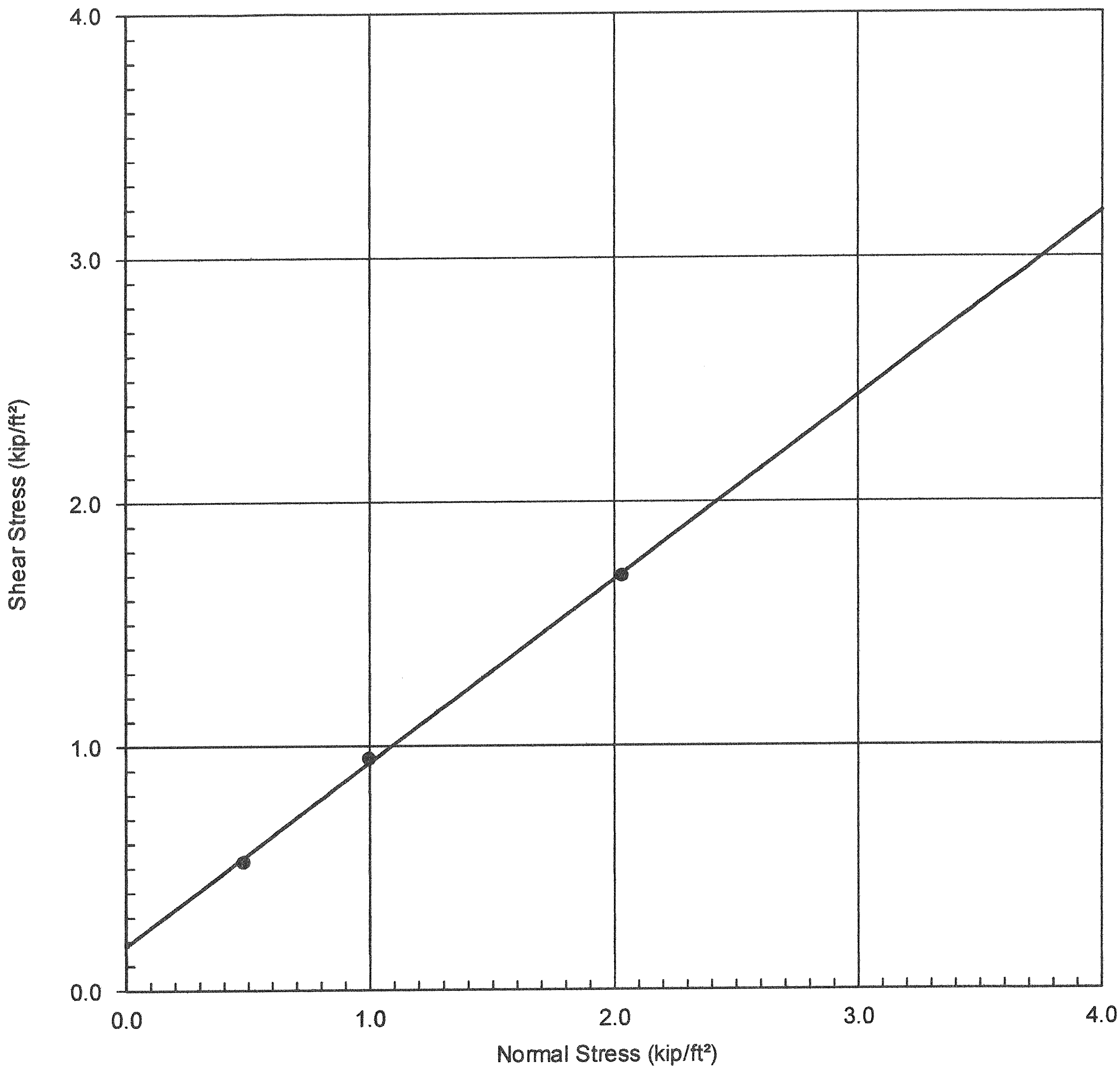



Boring No. : B-3
Depth (ft.) : 5.0
Sample Type : Relatively Undisturbed
Soil Type : Silty Fine Sand with trace Clay

Cohesion(C) = 30 psf
Friction ($\phi$) = 33.5°
Dry Density (pcf) = 107.1
Moisture (%) = 10.5

| Project Name:O. C. Ronald McDonald House-383 S. Batavia St.,Orange | Project No.: 6827.18 |
|---|---|
| ASSOCIATED SOILS ENGINEERING, INC. | DIRECT SHEAR TEST RESULTS (ASTM D 3080) |

**PLATE D-2**




Boring No. : B-3
Depth (ft.) : 0.67-5.0
Sample Type : Remolded (90% of Maximum Density)
Soil Type : Silty Fine Sand with trace Clay and Gravel

Cohesion(C) = 180 psf
Friction ($\phi$) = 36.5°
Dry Density (pcf) = 120.2
Moisture (%) = 8.0

| Project Name:O. C. Ronald McDonald House-383 S. Batavia St.,Orange | Project No.: 6827.18 |
|---|---|
| ASSOCIATED SOILS ENGINEERING, INC. | DIRECT SHEAR TEST RESULTS (ASTM D 3080) |

**PLATE D-3**

## PERCOLATION DATA SHEET

Project: Ronald McDonald House of Orange County Job No.: 6827.18

383 South Batavia Street, Orange, California

Test Hole No.: B-4 Date Excavated: 9/5/2018 Depth of Test Hole: 5' 3"

Soil Classification: Silty Fine Sand with trace Clay

Check for Sandy Soil Criteria Tested By: Grant Zike Date: 9/6/2018

Presoak: √ Actual Percolation Tested By: Grant Zike Date: 9/6/2018

(2.0" Gravel on Bottom)

## SANDY SOIL CRITERIA TEST

| Trial No. | Time | Time Interval (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) |
|---|---|---|---|---|---|
| 1 | 7:10<br>7:35 | 25 | -12.25 | -13.0 | 0.75 |

## USE NORMAL SANDY (CIRCLE ONE) SOIL CRITERIA

| Time | Time Interval (Min.) | Total Elapsed Time (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) | Percolation Rate (Min./Inches) |
|---|---|---|---|---|---|---|
| 7:10<br>7:40 | 30 | 30 | -12.25 | -13.0 | 0.75 | 40.0 |
| 7:42<br>8:12 | 30 | 60 | -12.0 | -13.0 | 1.0 | 30.0 |
| 8:17<br>8:47 | 30 | 90 | -12.5 | -13.25 | 0.75 | 40.0 |
| 8:47<br>9:17 | 30 | 120 | -11.75 | -12.5 | 0.75 | 40.0 |
| 9:17<br>9:47 | 30 | 150 | -12.0 | -13.0 | 1.0 | 30.0 |
| 9:47<br>10:17 | 30 | 180 | -12.5 | -13.0 | 0.5 | 60.0 |
| 10:17<br>10:47 | 30 | 210 | -11.75 | -12.75 | 1.0 | 30.0 |
| 10:48<br>11:18 | 30 | 240 | -12.0 | -12.75 | 0.75 | 40.0 |
| 11:18<br>11:48 | 30 | 270 | -11.75 | -12.5 | 0.75 | 40.0 |
| 11:49<br>12:19 | 30 | 300 | -12.0 | -13.0 | 1.0 | 30.0 |
| 12:20<br>12:50 | 30 | 330 | -12.25 | -13.25 | 1.0 | 30.0 |
| 12:51<br>13:21 | 30 | 360 | -12.0 | -12.75 | 0.75 | 40.0 |

**PLATE H-1**

## PERCOLATION DATA SHEET

Project: Ronald McDonald House of Orange County Job No.: 6827.18

383 South Batavia Street, Orange, California

Test Hole No.: B-5 Date Excavated: 9/5/2018 Depth of Test Hole: 10’ 1"

Soil Classification: Silty Fine Sand

Check for Sandy Soil Criteria Tested By: Grant Zike Date: 9/6/2018

Presoak: √ Actual Percolation Tested By: Grant Zike Date: 9/6/2018

(5.5” Gravel on Bottom)

## SANDY SOIL CRITERIA TEST

| Trial No. | Time | Time Interval (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) |
|---|---|---|---|---|---|
| 1 | 7:15<br>7:40 | 25 | -13.5 | -28.75 | 15.25 |
| 2 | 7:45<br>8:10 | 25 | -12.75 | -28.25 | 15.5 |

## USE NORMAL SANDY (CIRCLE ONE) SOIL CRITERIA

| Time | Time Interval (Min.) | Total Elapsed Time (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) | Percolation Rate (Min./Inches) |
|---|---|---|---|---|---|---|
| 8:15<br>8:25 | 10 | 10 | -12.75 | -19.5 | 6.75 | 1.48 |
| 8:27<br>8:37 | 10 | 20 | -13.0 | -20.0 | 7.0 | 1.43 |
| 8:40<br>8:50 | 10 | 30 | -12.5 | -19.25 | 6.75 | 1.48 |
| 8:53<br>9:03 | 10 | 40 | -12.25 | -19.5 | 7.25 | 1.38 |
| 9:05<br>9:15 | 10 | 50 | -12.0 | -18.5 | 6.5 | 1.54 |
| 9:18<br>9:28 | 10 | 60 | -12.25 | -19.75 | 7.5 | 1.33 |

**PLATE H-2**

## PERCOLATION DATA SHEET

Project: Ronald McDonald House of Orange County Job No.: 6827.18

383 South Batavia Street, Orange, California

Test Hole No.: B-6 Date Excavated: 9/5/2018 Depth of Test Hole: 5' 3"

Soil Classification: Silty Fine Sand

Check for Sandy Soil Criteria Tested By: Grant Zike Date: 9/6/2018

Presoak: √ Actual Percolation Tested By: Grant Zike Date: 9/6/2018

(2.5" Gravel on Bottom)

## SANDY SOIL CRITERIA TEST

| Trial No. | Time | Time Interval (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) |
|---|---|---|---|---|---|
| 1 | 7:19<br>7:44 | 25 | -11.75 | -15.5 | 3.75 |

## USE NORMAL SANDY (CIRCLE ONE) SOIL CRITERIA

| Time | Time Interval (Min.) | Total Elapsed Time (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) | Percolation Rate (Min./Inches) |
|---|---|---|---|---|---|---|
| 7:19<br>7:49 | 30 | 30 | -11.75 | -15.75 | 4.0 | 7.5 |
| 7:52<br>8:22 | 30 | 60 | -12.0 | -16.5 | 4.5 | 6.67 |
| 8:29<br>8:59 | 30 | 90 | -12.75 | -17.0 | 4.25 | 7.06 |
| 9:01<br>9:31 | 30 | 120 | -11.75 | -15.5 | 3.75 | 8.0 |
| 9:33<br>10:03 | 30 | 150 | -11.5 | -15.5 | 4.0 | 7.5 |
| 10:04<br>10:34 | 30 | 180 | -12.0 | -16.25 | 4.25 | 7.06 |
| 10:35<br>11:05 | 30 | 210 | -11.75 | -15.75 | 4.0 | 7.5 |
| 11:06<br>11:36 | 30 | 240 | -11.5 | -15.25 | 3.75 | 8.0 |
| 11:37<br>12:07 | 30 | 270 | -12.0 | -16.25 | 4.25 | 7.06 |
| 12:08<br>12:38 | 30 | 300 | -12.25 | -16.25 | 4.0 | 7.5 |
| 12:39<br>13:09 | 30 | 330 | -12.5 | -16.75 | 4.25 | 7.06 |
| 13:10<br>13:40 | 30 | 360 | -12.0 | -16.0 | 4.0 | 7.5 |

**PLATE H-3**

## APPENDIX B - SITE FAULTING AND SEISMIC HAZARD DATA

Plates I-1 and I-2 Results of EQFUALT Search

```
*************************
*                       *
*    E Q F A U L T      *
*                       *
*    Version 3.00       *
*                       *
*************************
```

DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 6827.18

DATE: 08-28-2018

JOB NAME: Propsed Ronald McDonald House Project
383 South Batavia Street,Orange,CA
CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\Cgsflte.dat

SITE COORDINATES:
SITE LATITUDE: 33.7825
SITE LONGITUDE: 117.8615

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 20) Sadigh et al. (1997) Horiz. - Soil
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: clodis
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\Cgsflte.dat

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS



PLATE I–1

| ABBREVIATED FAULT NAME | APPROXIMATE DISTANCE mi (km) | ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw) | PEAK SITE ACCEL. g | EST. SITE INTENSITY MOD.MERC. |
|---|---|---|---|---|
| SAN JOAQUIN HILLS | 6.5( 10.4) | 6.6 | 0.353 | IX |
| WHITTIER | 9.5( 15.3) | 6.8 | 0.230 | IX |
| PUENTE HILLS BLIND THRUST | 10.4( 16.8) | 7.1 | 0.313 | IX |
| NEWPORT-INGLEWOOD (L.A.Basin) | 10.5( 16.9) | 7.1 | 0.243 | IX |
| NEWPORT-INGLEWOOD (Offshore) | 13.6( 21.9) | 7.1 | 0.200 | VIII |
| ELSINORE (GLEN IVY) | 13.8( 22.2) | 6.8 | 0.171 | VIII |
| CHINO-CENTRAL AVE. (Elsinore) | 14.0( 22.6) | 6.7 | 0.205 | VIII |
| SAN JOSE | 17.8( 28.6) | 6.4 | 0.134 | VIII |
| PALOS VERDES | 21.1( 33.9) | 7.3 | 0.152 | VIII |
| UPPER ELYSIAN PARK BLIND THRUST | 24.1( 38.8) | 6.4 | 0.095 | VII |
| SIERRA MADRE | 24.2( 39.0) | 7.2 | 0.161 | VIII |
| CUCAMONGA | 24.9( 40.0) | 6.9 | 0.130 | VIII |
| RAYMOND | 27.0( 43.5) | 6.5 | 0.090 | VII |
| CLAMSHELL-SAWPIT | 28.4( 45.7) | 6.5 | 0.085 | VII |
| VERDUGO | 29.4( 47.3) | 6.9 | 0.108 | VII |
| ELSINORE (TEMECULA) | 31.0( 49.9) | 6.8 | 0.073 | VII |
| HOLLYWOOD | 31.4( 50.6) | 6.4 | 0.068 | VI |
| CORONADO BANK | 35.7( 57.5) | 7.6 | 0.107 | VII |
| SAN JACINTO-SAN BERNARDINO | 36.9( 59.4) | 6.7 | 0.055 | VI |
| SANTA MONICA | 37.4( 60.2) | 6.6 | 0.064 | VI |
| SAN JACINTO-SAN JACINTO VALLEY | 39.5( 63.6) | 6.9 | 0.059 | VI |
| SAN ANDREAS - SB-Coach. M-1b-2 | 40.8( 65.6) | 7.7 | 0.099 | VII |
| SAN ANDREAS - Cho-Moj M-1b-1 | 40.8( 65.6) | 7.8 | 0.105 | VII |
| SAN ANDREAS - SB-Coach. M-2b | 40.8( 65.6) | 7.7 | 0.099 | VII |
| SAN ANDREAS - 1857 Rupture M-2a | 40.8( 65.6) | 7.8 | 0.105 | VII |
| SAN ANDREAS - Mojave M-1c-3 | 40.8( 65.6) | 7.4 | 0.081 | VII |
| SAN ANDREAS - San Bernardino M-1 | 40.8( 65.6) | 7.5 | 0.086 | VII |
| SAN ANDREAS - Whole M-1a | 40.8( 65.6) | 8.0 | 0.119 | VII |
| MALIBU COAST | 42.2( 67.9) | 6.7 | 0.059 | VI |
| SIERRA MADRE (San Fernando) | 42.3( 68.1) | 6.7 | 0.059 | VI |
| CLEGHORN | 43.1( 69.3) | 6.5 | 0.038 | V |
| SAN GABRIEL | 44.1( 71.0) | 7.2 | 0.064 | VI |
| NORTHRIDGE (E. Oak Ridge) | 45.5( 73.3) | 7.0 | 0.068 | VI |
| ANACAPA-DUME | 49.8( 80.2) | 7.5 | 0.087 | VII |
| NORTH FRONTAL FAULT ZONE (West) | 49.9( 80.3) | 7.2 | 0.070 | VI |
| ROSE CANYON | 52.1( 83.8) | 7.2 | 0.052 | VI |
| SANTA SUSANA | 52.2( 84.0) | 6.7 | 0.045 | VI |
| SAN JACINTO-ANZA | 54.3( 87.4) | 7.2 | 0.049 | VI |
| ELSINORE (JULIAN) | 56.2( 90.5) | 7.1 | 0.043 | VI |
| HOLSER | 58.0( 93.3) | 6.5 | 0.033 | V |

DETERMINISTIC SITE PARAMETERS

Page 2

| ABBREVIATED FAULT NAME | APPROXIMATE DISTANCE mi (km) | ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw) | PEAK SITE ACCEL. g | EST. SITE INTENSITY MOD.MERC. |
|---|---|---|---|---|
| SIMI-SANTA ROSA | 59.6( 95.9) | 7.0 | 0.047 | VI |

******************************************************************************

-END OF SEARCH- 41 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE SAN JOAQUIN HILLS FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 6.5 MILES (10.4 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.3527 g

PLATE I-2

## APPENDIX C - LIST OF REFERENCES


1. Blake, T.F., 2000, EQFAULT, A Computer Program for the Deterministic Predication of Peak Horizontal Acceleration from Digitized California Faults.

2. Blake, Thomas F., 2000, FRISKP (V4.0), A Computer Program for the Probabilistic Seismic Hazard Analysis.

3. Guidelines for Evaluating and Mitigating Seismic Hazards in California, 2008, Special Publication 117A, California Geological Survey.

4. California Geological Survey, 1998, Seismic Hazard Zones Official Map, Orange Quadrangle, released April 15.

5. California Geological Survey, 1997 (revised 2001), Seismic Hazard Zone Report 011, Seismic Hazard Zone Report for the Orange 7.5-Minute Quadrangle, Orange County, California.

6. California Building Code, 2016 Edition: Sacramento, CA, California Building Standards Commission, 2 Volumes.

7. Legg, M.R., Borrero, J.C., and Synolakis, C.E., 2003, Evaluation of Tsunami Risk to Southern California Coastal Cities, The 2002 NEHRP Professional Fellowship Report, PF 2002-11, Earthquake Engineering Research Institute.

8. Soil Mechanics Design Manual 7.1 (NAVFAC DM-7.1), 1982, Department of the Navy, Naval Facilities Engineering Command, p. 347.

9. Foundation and Earth Structures Design Manual 7.2 (NAVFAC DM-7.2), 1982, Department of the Navy, Naval Facilities Engineering Command.

10. Stewart, J.P., Whang, D.H., Moyneur, M., and Duku, P., 2004, Seismic Compression of As-Compacted Fill Soils with Variable Level of Fines Content and Fines Plasticity, CUREE Publication No. EDA-05, 101p.

11. Tokimatsu, A.M. and Seed, H.B., 1987, Evaluation of Settlements in Sands Due to Earthquake Shaking, Journal of Geotechnical Engineering, ASCE, Vol. 113, No. 8, p. 861-878.

12. 2008 Interactive Deaggregations, Hazards Program, United States Geological Survey, website: http:/eqint.cr.usgs.gov/deaggint/2008/dndez.php.

13. Krinitzsky, Ellis L., Gould, James P. and Edinger, Peter H., 1993, Fundamentals of Earthquake Resistant Construction, John Wiley & Sons, Inc.

14. Settlement Analysis, 1994, Technical Engineering and Design Guides as adapted from the US Army Corps of Engineers, No. 9, published by American Society of Civil Engineers, New York, NY, p. 136.

15. Minimum Design Loads for Building and Other Structures, 2010, American Society of Civil Engineers, ASCE Standard 7-10, 608p.

16. Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary, 2008, published by American Concrete Institute, Farmington Hill, MI, 465p.

17. Civil Engineering Pavements, Design Manual 5.4 (DM 5.4), 1979, Department of the Navy, Naval Facilities Engineering Command, 60 pp.

18. California Division of Mines and Geology (now California Geological Survey), Revised 1994, Fault Rupture Hazard Zones in California, Special Publication 42.

19. California Division of Mines and Geology (now California Geological Survey), 1998, Map of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada, Published February.

20. Federal Emergency Management Agency, 2009, National Flood Insurance Program, Flood Insurance Rate Map, Orange County, California and Incorporated Areas, Panel 161 of 539, Map Number 06059C0161J, effective date December 3.

21. Corrosion Guidelines, Version 2.0, November 2012, Published by California Department of Transportation (Caltrans), 44p.

22. Bridge Design Specifications, September 2003, Published by California Department of Transportation (Caltrans).

23. Winterkorn, H.F., and Fang, H.Y., 1976, Foundation Engineering Handbook: New York, NY, Van Nostrand Reinhold, 751p.

24. Peterson, M.D., Bryant, W.A., Cramer, C.H., Cao, T., Reichle, M., Frankel, A.D., Lienkaemper, J.J., McCrory, P.A., and Schwartz, D.P., 1996, Probabilistic Seismic Hazard Assessment for the State of California, California Department of Conservation, Division of Mines and Geology, Open-File Report 96-706.

# Appendix D

Water Quality Management Plan

# PRELIMINARY PRIORITY
# WATER QUALITY MANAGEMENT PLAN
# (WQMP)

**For:**

**Orange County Ronald McDonald House**
**383 South Batavia Street**
**Orange, CA 92868**

**Prepared for:**
**Noel Burcelis, MSW**

**Prepared by:**

**JMC-2 Engineering**
**411 N.Harbor Blvd, Suite 201**
**San Pedro, Ca 90731**
**310.241.6550**

**Prepared: 10/06/2018**
**Revised: 6/01/2020**

______________________________ ______________________
**Public Works Director** **Date**

______________________________ ______________________
**City Engineer** **Date**

**OWNER'S CERTIFICATION**

**WATER QUALITY MANAGEMENT PLAN**

**FOR**

**(Orange County Ronald McDonald House)**

This Water Quality Management Plan (WQMP) for the [] has been prepared for [**Orange County Ronald McDonald House)**]. This WQMP is intended to comply with the requirements of the City of Orange's [APN #: 041-131-29 Conditional Use Permit # tbd, and/or Site Development Permit/Application # tbd ] requiring the preparation of a Water Quality Management 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 City of Orange Local Implementation Plan (LIP), and the intent of NPDES Permit and Waste Discharge Requirements for the City of Orange, County of Orange, Orange County Flood Control District and the incorporated Cities of Orange County within the Santa Ana Region.

This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party having responsibility for implementing portions of this WQMP. Maintenance requirements within Section V and Appendix D will be adhered to with particular emphasis on maintaining the BMPs described within Sections IV and V. The Owner's Annual Self Certification Statement along with a BMP maintenance implementation table will be submitted by June 30$^{th}$ every year following project completion. At least one copy of the approved WQMP shall be available on the subject property in perpetuity.

Once the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement and amend the WQMP. The City of Orange will be notified of the change of ownership and the new owner will submit a new certification.

Signature: ______________________________ Date: ___________

Name: Noel Burcelis

Title: Executive Director

Company: Ronald McDonald Hose Orange County

Address: 383 S. Batavia St. Orange, CA 92868

Telephone Number: (714) 639-3600

**Notice of Transfer of Responsibility**

**Water Quality Management Plan (WQMP)**

WQMP Number – As assigned by the City of Orange:________________

Submission of this Notice of Transfer of Responsibility constitutes notice to the City that responsibility for the Water Quality Management Plan (WQMP) for the subject property identified below, and implementation of that plan, is being transferred from the Previous Owner (and his/her agent) of the site (or portion thereof) to the New Owner, as further described below.

**I. Owner/ Responsible Party Information**

Company/ Individual: RONALD MCDONALD HOUSE, ORANGE CITY.

Contact Person: NOEL BURCELIS

Street Address: 383 S. BATAVIA ST. Title: EXECUTIVE DIRECTOR

City ORANGE State CA Zip 92868 Phone: (714)-639-3600

**II. Information about Site Relevant to WQMP**

Name of Project: ORANGE COUNTY RONALD MCDONAL HOUSE

Title of WQMP applicable to site: RONALD MCDONAL HOUSE

Street Address of the site: 383 S. BATAVIA ST.

Date of Transfer of Responsibility: ________________

**III. New Owner (Upon Transfer)/ Responsible Party Information**

Company/ Individual:____________________ Contact Person:____________________

Street Address:____________________ Title:____________________

City __________ State___ Zip__________ Phone:________________

## Table of Contents



**Appendices**



**List of Tables**

## I. Discretionary Permit Number(s), Water Quality Condition Number(s) and Conditions of Approval

PARCEL 2 OF PARCEL MAP NO. 2002-162, IN THE CITY OF ORANGE, COUNTY OF ORANGE, STATE OF CALIFORNIA, AS SHOWN ON MAP FILED IN BOOK 330, PAGES 14 AND 15 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY. APN: 041-131-29

GPS Coordinates: Latitude – 33.782776, Longitude -117.861368

Water Quality Conditions (WQMP conditions listed below)

A complete copy of the signed Conditions of Approval, Resolution Number __________ dated __________ are included as Appendix A

Water Quality Conditions of Approval:

1. Prior to the issuance of any grading permits the applicant shall submit a Priority Project WQMP for review and approval to the Public Works Department that:
   a. Prioritizes the use of Low Impact Development principles as follows: preserves natural features; minimizes runoff and reduces impervious surfaces; and utilizes infiltration of runoff as the method of pollutant treatment. Infiltration BMPs to be considered include the use of permeable materials such as concrete and concrete pavers, infiltration trenches, infiltration planters, and other infiltration BMPs as applicable,
   b. Incorporates the applicable Routine Source and Structural Control BMPs as defined in the Drainage Area Management Plan (DAMP),
   c. Maintains the hydrologic characteristics of the site by matching time of concentration, runoff, velocity, volume and hydrograph for a 2-year storm event,
   d. Minimizes the potential increase in downstream erosion and avoids downstream impacts to physical structures, aquatic and riparian habitat,
   e. Generally describes the long-term operation and maintenance requirements for structural and Treatment Control BMPs,
   f. Identifies the entity or employees that will be responsible for long-term operation, maintenance, repair and or replacement of the structural and Treatment Control BMPs and the training that qualifies them to operate and maintain the BMPs,
   g. Describes the mechanism for funding the long-term operation and maintenance of all structural and Treatment Control BMPs,
   h. Includes a copy of the forms to be used in conducting maintenance and inspection activities,
   I. Meets recordkeeping requirements (forms to be kept for 5 years).
   j. Includes a copy of the form to be submitted annually by the project owner to the Public Works Department that certifies that the project's structural and treatment BMPs are being inspected and maintained in accordance with the project's WQMP.

2. Prior to the issuance of certificates for use of occupancy, the applicant shall demonstrate the following to the public works Department:
    a. That all structural and treatment control best management practices (BMPs) described in the Project WQMP have been constructed and installed in conformance with the approved plans and specifications,
    b. That the applicant is prepared to implement all non-structural BMPs described in the Project WQMP,
    c. That an adequate number of copies of the project's approved final Project WQMP are available for the future occupiers.
3. Prior to the issuance of certificates for use of occupancy or final signoff by the Public Works Department, the applicant shall demonstrate to the satisfaction of Public Works, that the preparer of the WQMP has reviewed the BMP maintenance requirements in Section V of the WQMP with the responsible person and that a copy of the WQMP has been provided to that person. A certification letter from the WQMP preparer may be used to satisfy this condition.
4. Prior to issuance of building permits, the applicant shall review the approved Water Quality Management Plan (WQMP) and grading plan to ensure the structure's downspouts or drainage outlet locations are consistent with those documents. Copies of the building or architectural plans specifically showing the downspouts and Drainage outlets shall be submitted to the Public Works Department for review.
5. The project applicant shall maintain all structural, treatment and low impact development BMPs at the frequency specified in the approved WQMP. Upon transfer of ownership or management responsibilities for the project site, the applicant shall notify the City of Orange Public Works Department of the new person(s) or entity responsible for maintenance of the BMPs.
6. For those food service establishment projects installing Grease Interceptors: Prior to issuance of building permits the applicant shall identify the location of the Grease interceptor and provide evidence to the Building Official that the design meets and is consistent with the City's latest adopted building codes.

## II. Project Description

Planning Area: (Location): Single Family Residential (R-1-6)

Project Site Area (ac): 0.83

Project Disturbed Area (ac): 0.83

Percent Change in Impermeable Surfaces: decrease of 48.75%

SIC Code: 8399: Social Services, Not Elsewhere classified

Project Description

The proposed improvements include removal of existing trees & shrubs and construction of building expansion from 5,785 sq.ft to a total of 11,073 sq.ft and a concrete parking lot.

The proposed improvements consist of landscape area of 4,832.00 sq.ft, concrete parking lot area of 11,809.80 sq.ft, roof area of 16,085.00 sq.ft and new pavers area (side walk) of 3,428.00 sq.ft.

The entire lot is drain to the CDS unit for pretreatment prior to the CUDO Per Oldcastle draining system and infiltrate into the ground. Overflow pipe will discharge to proposed 36” storm drain line.

The existing 36in RCP will be routed between W. Culver Ave. & S. Batavia St. to accommodate for the new building expansion.

Project Purpose and Activities

The building belongs to the Orange County Ronald McDonald foundation and the space will be used to provide temporary shelter to families whom kids are being treated at the hospital. Food preparation are included in the facilities.

Potential Storm Water Pollutants

Potential pollutants include suspended solid/sediments, nutrients, pathogens (bacteria/virus) pesticides, oil & grease and trash & debris. Due to the limited amount of landscaping and the use of efficient irrigation methods, pollutants typically associated with landscaped areas (nutrients, pesticides, sediments, and oxygen demanding substances) are not anticipated in significant quantities.

Hydrologic Conditions of Concern

Pre-development:
V2-yr = 1,048.50 cu-ft
Tc-2yr = 5.75 min
Q2-yr = 0.09 cfs

Post-development:
V2-yr = 1,928.26 cu-ft
Tc-2yr = 6.35 min
Q2-yr = 0.17 cfs

V2-yr Post-development is more than V2-yr Pre-development by more than 5%.
Tc-2yr Post-development is more than Tc-2yr Pre-development by more than 5%.
Q2-yr Post-development is more than Q2-yr Pre-development by more than 5%.
HCOC exists. Full DCV will be retained on-site to mitigate HCOC.

Refer to Calculation

Ref. Appendix F for TC calculation

## Worksheet D: Capture Efficiency Method for Flow-Based BMPs

| | | | | |
|---|---|---|---|---|
| ***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**) | $T_c$= | 5.75 | min |
| 2 | Using **Figure III.4**, determine the design intensity at which the estimated time of concentration ($T_c$) achieves 80% capture efficiency, $I_1$ | $I_1$= | 0.252 | in/hr |
| 3 | Enter the effect depth of provided HSCs upstream, $d_{HSC}$ (inches) (**Worksheet A**) | $d_{HSC}$= | 0.0 | |
| 4 | Enter capture efficiency corresponding to $d_{HSC}$, $Y_2$ (**Worksheet A**) | $Y_2$= | 0.0 | |
| 5 | Using **Figure III.4**, determine the design intensity at which the time of concentration ($T_c$) achieves the upstream capture efficiency($Y_2$), $I_2$ | $I_2$= | 0.0 | |
| 6 | Determine the design intensity that must be provided by BMP, $I_{design}= I_1 - I_2$ | $I_{design}$= | 0.252 | in/hr |
| ***Step 2: Calculate the design flowrate*** | | | | |
| 1 | Enter Project area tributary to BMP (s), *A* (acres) | A= | 0.83 | acres |
| 2 | Enter Project Imperviousness, *imp* (unitless) | imp= | 0.38 | |
| 3 | Calculate runoff coefficient, $C= (0.75 \times imp) + 0.15$ | C= | 0.435 | |
| 4 | Calculate design flowrate, $Q_{design}= (C \times i_{design} \times A)$ | $Q_{design}$= | 0.09 | cfs |
| ***Supporting Calculations*** | | | | |
| Describe system: | | | | |
| Provide time of concentration assumptions: | | | | |

Ref. Appendix F for TC calculation

**Worksheet D: Capture Efficiency Method for Flow-Based BMPs**

| | | | | |
|---|---|---|---|---|
| ***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**) | $T_c$= | 6.35 | min |
| 2 | Using **Figure III.4**, determine the design intensity at which the estimated time of concentration ($T_c$) achieves 80% capture efficiency, $I_1$ | $I_1$= | 0.248 | in/hr |
| 3 | Enter the effect depth of provided HSCs upstream, $d_{HSC}$ (inches) (**Worksheet A**) | $d_{HSC}$= | 0.0 | |
| 4 | Enter capture efficiency corresponding to $d_{HSC}$, $Y_2$ (**Worksheet A**) | $Y_2$= | 0.0 | |
| 5 | Using **Figure III.4**, determine the design intensity at which the time of concentration ($T_c$) achieves the upstream capture efficiency($Y_2$), $I_2$ | $I_2$= | 0.0 | |
| 6 | Determine the design intensity that must be provided by BMP, $I_{design}= I_1 - I_2$ | $I_{design}$= | 0.248 | in/hr |
| ***Step 2: Calculate the design flowrate*** | | | | |
| 1 | Enter Project area tributary to BMP (s), *A* (acres) | A= | 0.83 | acres |
| 2 | Enter Project Imperviousness, *imp* (unitless) | imp= | 0.87 | |
| 3 | Calculate runoff coefficient, $C = (0.75 \times imp) + 0.15$ | C= | 0.435 | |
| 4 | Calculate design flowrate, $Q_{design} = (C \times i_{design} \times A)$ | $Q_{design}$= | 0.17 | cfs |
| ***Supporting Calculations*** | | | | |
| Describe system: | | | | |
| Provide time of concentration assumptions: | | | | |

Post Development Drainage Characteristics

The On-site stormwater runoff from this project will be sheet flow into the trench drain and drains to the CDS unit for pretreatment to entering the on-site CUDO Per Oldcastle and will infiltrate into the ground. The overflow drains to the proposed 36” RCP which will drain to existing storm drain line.

The project is divided into four major drainage areas:1.) roof of 0.37ac. 2.) concrete parking surface of 0.27ac. 3.) new pavers area (sidewalk) of 0.08ac. 4.) Landscape of 0.11ac. The roof area, concrete parking surfaces, landscape area and new pavers area (sidewalk) are combined into one major area in the DCV calculation.

Commercial Projects
N/A

Residential Projects
N/A

Site Ownership and any Easements
The site will be owned and operated by Ronald McDonalds House, Orange City, Orange, CA 92868, (714) 639-3600.

The existing easements for the project site are listed below:

1. Easement to SCE recorded May 2, 1989 as instrument no. 89-232138 (will be Quitclaim)
2. 1ft wide easement for pole lines per O.R. 1541/237
3. 3ft wide easement for irrigation purposes per O.R. 2582/258
4. 5ft wide easement for utility purposes July 24, 2003 as INST. No. 03-879281 and October 7, 2003 as INST. 03-1230814.
5. 10ft wide easement for 36” Storm Drain line (will be Quitclaim).

Potential easements for the project site are listed below:
1. 15ft wide easement for 36” storm drain line
2. SCE easement for Elec. Transformer

## III. Site Description

**Reference Location Map:** See Section VI for Location Map (google Map)

**Site Address:** 383 S Batavia St, Orange 92868

**Zoning:** Single Family Residential (R-1-6)

**Predominant Soil type:** B

**Pre-project percent pervious:** 62.0% **Post-project percent pervious:** 55.42%

**Pre-project percent impervious:** 38.0% **Post-project percent impervious:** 44.58%

**<u>Site Characteristics</u>**

The existing site consists of a parking lot (±18,000 SF) and the surrounding landscaping (±4,356 SF) and building (±14,000 SF). The existing site consist of impervious area and pervious area. The drainage conditions are as follows: 1.) Storm Water runoff get collected by a series of rain gutters and downspouts that outlet into the surface.
2.) Surface water sheet flows from east to west to the street and some existing catch basins.

| Project Area | Pervious | | Impervious | | **Total** |
|---|---|---|---|---|---|
| | Area (acres or sq ft) | Percentage | Area (acres or sq ft) | Percentage | Drainage Area |
| Pre-Project Conditions | .51 acres | 62.0% | 0.32 acres | 38.0% | 0.83 acres |
| Post-Project Conditions | .11 acres | 13.25% | 0.72 acres | 86.75% | 0.83 acres |

**<u>Watershed Characteristics</u>**

Watershed: Santa Ana River Watershed

Downstream Receiving Waters: City storm drain system, Santiago Creek Reach 1, Santa Ana River Reach 2 and Reach 1, Pacific Ocean

Water Quality Impairments (if applicable): Reach 2 was 303d listed for Indicator Bacteria in 2010 and was subsequently de-listed in 2016

Identify hydromodification susceptibility: This project is located within an area of potential erosion, habitat and physical structure susceptibility.

## IV. Best Management Practices

As pre-treatment devices prior to discharge into the CUDO Per Oldcastle (BMP Selection), CDS unit for pretreatment is installed to remove trash and debris that would otherwise reduce the lifespan of the CUDO Per Oldcastle.
CUDO Per Oldcastle were chosen over other BMPs because it is highly effective when it comes to infiltration. CUDO Per Oldcastle will allow water to infiltrate into the ground. The overflow drains to the proposed 36” RCP which will drain to existing storm drain line.

### IV.1 Site Design and Drainage Characteristics

**Table 1**

**Site Design BMPs**

| Technique | Included? | | If no, state justification. |
|---|---|---|---|
| | Yes | No | |
| Minimize Directly Connected Impervious Areas (DCIAs) (C-Factor Reduction) | | x | Landscape area are to small to minimize directly connected impervious |
| Create Reduced or “Zero Discharge” Areas (Runoff Volume Reduction)[1] | | x | Infiltration and only storage tank |
| Minimize Impervious Area/Maximize Permeability (C-Factor Reduction)[2] | | x | Count for future building expansion |
| Conserve Natural Areas (C-Factor Reduction) | | x | N/A |

1 Detention and retention areas incorporated into landscape design provide areas for retaining and detaining stormwater flows, resulting in lower runoff rates and reductions in volume due to limited infiltration and evaporation. Such Site Design BMPs may reduce the size of Treatment Control BMPs.

2 The “C Factor” is a representation of the ability of a surface to produce runoff. Surfaces that produce higher volumes of runoff are represented by higher C Factors. By incorporating more pervious, lower C Factor surfaces into a development, lower volumes of runoff will be produced. Lower volumes and rates of runoff translate directly to lowering treatment requirements.

## IV.2 Source Control BMPs

### IV.2.1 Routine Non-Structural BMPs

**Table 2**

**Routine Non-Structural BMPs**

| BMP No. | Name | Check One | | If not applicable, state brief reason. |
|---|---|---|---|---|
| | | Included | Not Applicable | |
| N1 | Education for Property Owners, Tenants and Occupants | x | | |
| N2 | Activity Restriction | x | | |
| N3 | Common Area Landscape Management | x | | |
| N4 | BMP Maintenance | x | | |
| N5 | Title 22 CCR Compliance | | x | Hazardous materials will not be used, handled, or stored on the site |
| N6 | Local Water Quality Permit Compliance | | x | This BMP is not applicable. The City of Orange does not issue water quality permits. |
| N7 | Spill Contingency Plan | | x | There are no hazardous waste disposal and therefore no need for Spill Contingency Plan |
| N8 | Underground Storage Tank Compliance | x | | |
| N9 | Hazardous Materials Disclosure Compliance | | x | There are no hazardous waste disposal for the proposed site. |
| N10 | Uniform Fire Code Implementation | | x | There are no hazardous waste material storage for the proposed site. |
| N11 | Common Area Litter Control | x | | |
| N12 | Employee Training | x | | |
| N13 | Housekeeping of Loading Docks | | x | Loading docks are not proposed for the site |
| N14 | Common Area Catch Basin Inspection | x | | |
| N15 | Street Sweeping Private Streets and Parking Lots | x | | |

N1. Education of Property Owners, Tenants and Occupants.

Proper education of onsite occupants will help to reduce all potential and anticipated pollutants from the site. Practical information shall be provided by the property owner to the employees on general good housekeeping BMPs and other practices that contribute to protection of storm water quality. Prior to sell of land, the current property owner will provide a copy of the WQMP to the future property owner. This WQMP shall be provided with emphasis placed on the materials included in, but not limited to, Sections IV, V, VI and VII of this report.

For additional information, see BMP SC-10, Non-Stormwater Discharges, included in Section VII and the BMP Maintenance Responsibility/Frequency Matrix in Section V. Education Materials to be used include, but are not limited to, SC-10, Non-Stormwater Discharges, SC-34, Building & Grounds Maintenance, and City of Orange LIP Section A-5. Signage will be posted along the above ground infiltration basin highlighting the use of the basin for reducing the pollutants in stormwater runoff and noting that non-stormwater liquids discharge is prohibited.

N2. Activity Restrictions.

Onsite activities shall be restricted to those currently granted by the City of Orange Municipal Code and not prohibited within this WQMP. Some general activity restrictions that shall be adhered to are:

- No discharges of fertilizer, pesticides, and wastes to streets or storm drains
- No blowing or sweeping of debris into streets or storm drains
- No hosing down of paved surfaces
- No vehicle fueling, washing, or maintenance

In addition, onsite activities shall be limited to the requirements of this WQMP as described herein. Adhering to appropriate activity restrictions will help to reduce all anticipated and potential pollutants from the site.

N3. Common Area Landscape Management.

All maintenance shall be consistent with the *City of Orange Water Quality Ordinance*. Proper landscape maintenance practices will help to reduce or eliminate pollution from pesticides, nutrients, trash/debris, and sediments. General guidelines include the following: Plant vegetation that reduces water, fertilizer, herbicide, and pesticide use. Waste shall be disposed of by composting or at a permitted landfill and shall not be raked or blown into the street, gutter, or storm drains. Irrigation systems shall be inspected monthly for poorly aligned sprinkler heads, broken sprinkler heads, and leaks. Detected problems shall be repaired as soon as they are observed. Avoid over-watering of vegetation. If excessive runoff is observed, automatic timers shall be adjusted. Note that the actual irrigation schedule and levels may vary based on soil type, maturity of vegetation, exposure, and seasonal conditions. If fertilizer is spilled on a paved surface it should be swept up immediately and placed in its container. Water shall not be used to clean fertilizer spills unless necessary and only after the area has been thoroughly cleaned using dry cleaning methods. Pesticides, herbicides, and fertilizers shall not be applied within 48 hours prior to rain or if wind speeds exceed 5 mph. Pesticides shall be applied only as a last resort and after other pest mitigation efforts have been attempted. Non-pesticide mitigation measures include cultural tactics (modifying routine landscape activities, adjusting the amount of irrigation applied to the area, etc.), mechanical tactics (mulching and manual removal of weeds and larger pests such as snails), environmental/ physical tactics (netting, etc.), and biological tactics (using living organisms such as lady bugs and herbivores to control pests). Storage of pesticides shall be away from living areas and in a covered area that is not subject to temperature extremes. For additional information, see BMP SC-41, Building & Grounds Maintenance, SC-73, Landscape Maintenance, and BMP SD-10, Site Design and Landscape Planning, included in Section VII and the BMP Maintenance Responsibility/Frequency Matrix in Section V. Also refer to Water Quality Guidelines for Landscaping and Gardening included in Section VII and the City of Orange LIP Section A-5.

N4. BMP Maintenance.

Selected BMPs will be maintained to ensure proper operation and daily function as applicable. See the BMP Maintenance Responsibility/Frequency Matrix in Section V for details. Appropriate BMP Maintenance practices will help to reduce all pollutants from the site.

N8. Underground storage tank compliance.

State and Local regulations require that stormwater storage systems be maintained and serviced on a recurring basis. The purpose of maintaining a clean and obstruction free CUDO system is to ensure the system performs the intended function of the primary design. Trash and debris, floatables, gross pollutants and sediment can build up in the CUDO leading to clogging of the native soil interface or blockage of the inlet or outlet pipes. This can cause the system to function improperly by limiting storage volume, limiting the design percolation rates or impeding flow in and out of the system. Downstream and upstream, areas could run the risk of flooding and deleterious environmental impact.

N11. Common Area Litter Control.

Ronald McDonald House shall implement trash management and litter control procedures aimed at reducing pollution of storm water runoff due to trash and debris. Ronald McDonald House will contract with a maintenance firm to provide regularly scheduled landscape maintenance and parking lot maintenance that will include litter removal, emptying of trash receptacles, and picking up of grass and plant clippings. For additional information, see BMP SC-41, Building & Grounds Maintenance, included in Section VII. Also see the BMP Maintenance Responsibility/Frequency Matrix in Section V.

N12. Employee Training.

Ensuring that employees are properly trained will help to reduce all anticipated and potential pollutants from the site. All new employees will be trained on how to minimize impacts to water quality. The educational materials provided in Section VII will be reviewed. For additional information, see the BMP

Maintenance Responsibility/Frequency Matrix in Section V.

N14. Common Area Catch Basin Inspection.

Proper maintenance of the onsite catch basins will help to reduce the amount of trash/debris and silt/sediment in runoff. The onsite catch basins shall be inspected and cleared of any trash or debris in or around the opening prior to the rainy season (by October 1st). Thereafter, inspections will be conducted every four months. Also see the Maintenance Responsibility/ Frequency Matrix in Section V.

N15. Street Sweeping Private Streets and Parking Lots.

Proper sweeping of the private streets and parking lots will help to reduce the amount of trash and debris. The private streets and parking lots shall be inspected and sweep of any trash or debris in or around the opening prior to the rainy season. Thereafter, inspections will be conducted every four months. Also see Maintenance Responsibility/Frequency Matrix in Section V.
Thereafter, inspections will be conducted every four

### IV.2.2 Routine Structural BMPs

**Table 3**

**Routine Structural BMPs**

| Name | Check One | | If not applicable, state brief reason |
|---|---|---|---|
| | Included | Not Applicable | |
| Provide storm drain system stenciling and signage- "No Dumping – Drains to Ocean" | x | | |
| Design and construct outdoor material storage areas to reduce pollution introduction | | x | No materials will be stored outdoors |
| Design and construct trash and waste storage areas to reduce pollution introduction | x | | |
| Use efficient irrigation systems & landscape design | x | | |
| Protect slopes and channels and provide energy dissipation | | x | Slopes are not a feature of the site and energy dissipation is not necessary |
| Incorporate requirements applicable to individual project features | | x | Requirements applicable to individual priority project categories (item "a-i" below) do not apply to the site |
| a. Dock areas | | x | Loading docks are not proposed for the site |
| b. Maintenance bays | | x | Maintenance bays are not proposed for the site |
| c. Vehicle or community wash areas | | x | No vehicle washing allowed on the site |
| d. Outdoor processing areas | | x | No outdoor processing allowed on the site |
| e. Equipment wash areas | | x | No equipment washing allowed on the site |
| f. Fueling areas | | x | Fueling areas not proposed for the site |
| g. Hillside landscaping | | x | Hillsides are not a feature of the site |
| h. Wash water control for food preparation areas | | x | All food preparation will be conducted indoors. |

S1 Provide Storm Drain Stenciling and Signage.

The proposed catch basins/stormwater inlets will be stenciled with the phrase "No Dumping – Drains to Ocean" where the inlets are sufficient size to fit stenciling on. Storm drain signage will help to reduce illegal dumping of pollutants. The storm drain signage shall be inspected once per year for legibility and re-stenciled as necessary. See BMP SD-13, Storm Drain

Signage, in Section VII and the BMP Maintenance Responsibility/Frequency Matrix in Section V.

S3 Design and construct trash and waste storage areas to reduce pollution introduction

The proposed project will contain a specific trash storage area that is designed as a covered structure and will be graded to drain stormwater runoff away from the enclosure (limiting the potential for stormwater to run over the trash area and pick up pollutants. Property owner will be responsible to maintain the trash enclosure area per BMP requirements in this WQMP.

S4 Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control.

All landscape maintenance shall be consistent with the City of Orange Water Quality Ordinance. Efficient irrigation practices will help to reduce pollution due to pesticides, nutrients, and sediments. General guidelines include the following: Plant vegetation that reduces water, fertilizer, herbicide, and pesticide use. Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. See BMP SC-41, Building and Grounds Maintenance, in Section VII and the BMP Maintenance Responsibility/Frequency Matrix in Section V. Also refer to the City of Orange LIP Section A-5.

## IV.3 Low Impact Development BMP Selection

### IV.3.1 Hydrologic Source Controls

See Section 4.2 of Technical Guidance Document for additional information.

**Table 4**

**Hydrologic Source Control BMPs**

| Name | Check If Used |
|---|---|
| Localized on-lot infiltration | ☐ |
| Impervious area dispersion (e.g. roof top disconnection) | ☐ |
| Street trees (canopy interception) | ☐ |
| Residential rain barrels (not actively managed) | ☐ |
| Green roofs/Brown roofs | ☐ |
| Blue roofs | ☐ |
| Other: Cudo per Oldcastle | ☒ |

Other: Cudo per Oldcastle

The entire lot is drain to the CDS unit for pretreatment prior to the CUDO Per Oldcastle draining system and infiltrate into the ground. Overflow pipe will discharge to proposed 36" storm drain line.

### IV.3.2 Infiltration BMPs

CUDO per Oldcastle is being selected for underground infiltration BMPs

### IV.3.3 Evapotranspiration, Rainwater Harvesting BMPs

Not use on this project.

### IV.3.4 Biotreatment BMPs

**Table 7**
**Biotreatment BMPs**

| | |
|---|---|
| Bioretention with underdrains | ☐ |
| Storm water 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: CDS Pretreament Unit | ☒ |
| Other: | ☐ |

Other: CDS Pretreatment Unit

CDS unit for Pretreatment has a high removal efficiency for trash and debris. CDS Unit has medium removal efficiency for oils and grease and suspended soils/sediment/turbidity, and low removal efficiency for nitrogen compounds, and phosphorous.

### IV.3.5 Hydromodification Control BMPs

HCOC exists. Full DCV will be retained on-site to mitigate HCOC.

### IV.3.6 Regional/Sub-Regional LID BMPs

Not a part of this project.

### IV.3.7 Treatment Control BMPs

Not used on this project.

### IV. 4 Water Quality Credits

Not used on this project.

### IV.5 Alternative Compliance Plan

Not used on this project.

### IV.5 Alternative Compliance Plan
Not used on this project.

### IV.6 Vector Control
Not used on this project.

### IV.7 Drainage Management Area (DMA)
Describe each DMA used in project, the BMPs in each DMA and the area treated.

| DMA Number | BMPs | Area Treated |
|---|---|---|
| 1 | Cudo per Oldcastle | 16,085.00 sq.ft (0.37 ac.) |
| 2 | Cudo per Oldcastle | 11,809.80 sq.ft (0.27 ac.) |
| 3 | Cudo per Oldcastle | 3,428.00 sq.ft (0.08 ac.) |
| 4 | Cudo per Oldcastle | 4,832.00 sq.ft (0.11 ac.) |
| Total Area | | 36,154.80 sq.ft (0.83 ac.) |

Total Project Area= 36,154.80
The proposed BMPs will account for roof area, concrete parking lot, landscape area and new pavers.

IV.8 Calculations:

See attached Calculations

**Worksheet B: Simple Design Capture Volume Sizing Method** (Pre-Project Conditions)

| | | | | |
|---|---|---|---|---|
| ***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) | $d_{HSC}$= | 0.0 | inches |
| 3 | Calculate the remainder of the design capture storm depth, $d_{remainder}$ (inches) (Line 1 – Line 2) | $d_{remainder}$= | 0.80 | inches |
| ***Step 2: Calculate the DCV*** | | | | |
| 1 | Enter Project area tributary to BMP (s), *A* (acres) | A= | 0.83 | acres |
| 2 | Enter Project Imperviousness, *imp* (unitless) | imp= | 0.38 | |
| 3 | Calculate runoff coefficient, $C= (0.75 \times imp) + 0.15$ | C= | 0.45 | |
| 4 | Calculate runoff volume, $V_{design}= (C \times d_{remainder} \times A \times 43560 \times (1/12))$ | $V_{design}$= | 1,048.50 | cu-ft |
| ***Step 3: Design BMPs to ensure full retention of the DCV*** | | | | |
| **Step 3a: Determine design infiltration rate** | | | | |
| 1 | Enter measured infiltration rate, $K_{observed}$[1] (in/hr) (**Appendix VII**) | $K_{observed}$= | | In/hr |
| 2 | Enter combined safety factor from Worksheet H, $S_{total}$ (unitless) | $S_{total}$= | | |
| 3 | Calculate design infiltration rate, $K_{design} = K_{observed} / S_{total}$ | $K_{design}$= | | In/hr |
| **Step 3b: Determine minimum BMP footprint** | | | | |
| 4 | Enter drawdown time, *T* (max 48 hours) | T= | | Hours |
| 5 | Calculate max retention depth that can be drawn down within the drawdown time (feet), $D_{max} = K_{design} \times T \times (1/12)$ | $D_{max}$= | | feet |
| 6 | Calculate minimum area required for BMP (sq-ft), $A_{min} = V_{design} / d_{max}$ | $A_{min}$= | | sq-ft |

[1] $K_{observed}$ is the vertical infiltration measured in the field, before applying a factor of safety. If field testing measures a rate that is different than the vertical infiltration rate (for example, three-dimensional borehole percolation rate), then this rate must be adjusted by an acceptable method (for example, Porchet method) to yield the field estimate of vertical infiltration rate, $K_{observed}$. See Appendix VII.

**Worksheet B: Simple Design Capture Volume Sizing Method** (Post-Project Conditions)

| | | | | |
|---|---|---|---|---|
| ***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) | $d_{HSC}$= | 0.0 | inches |
| 3 | Calculate the remainder of the design capture storm depth, $d_{remainder}$ (inches) (Line 1 – Line 2) | $d_{remainder}$= | 0.80 | inches |
| ***Step 2: Calculate the DCV*** | | | | |
| 1 | Enter Project area tributary to BMP (s), *A* (acres) | A= | 0.83 | acres |
| 2 | Enter Project Imperviousness, *imp* (unitless) | imp= | 0.87 | |
| 3 | Calculate runoff coefficient, $C = (0.75 \times imp) + 0.15$ | C= | 0.80 | |
| 4 | Calculate runoff volume, $V_{design} = (C \times d_{remainder} \times A \times 43560 \times (1/12))$ | $V_{design}$= | 1,928.26 | cu-ft |
| ***Step 3: Design BMPs to ensure full retention of the DCV*** | | | | |
| **Step 3a: Determine design infiltration rate** | | | | |
| 1 | Enter measured infiltration rate, $K_{observed}$[1] (in/hr) (Appendix VII) | $K_{observed}$= | | In/hr |
| 2 | Enter combined safety factor from Worksheet H, $S_{total}$ (unitless) | $S_{total}$= | | |
| 3 | Calculate design infiltration rate, $K_{design} = K_{observed} / S_{total}$ | $K_{design}$= | | In/hr |
| **Step 3b: Determine minimum BMP footprint** | | | | |
| 4 | Enter drawdown time, *T* (max 48 hours) | T= | | Hours |
| 5 | Calculate max retention depth that can be drawn down within the drawdown time (feet), $D_{max} = K_{design} \times T \times (1/12)$ | $D_{max}$= | | feet |
| 6 | Calculate minimum area required for BMP (sq-ft), $A_{min} = V_{design} / d_{max}$ | $A_{min}$= | | sq-ft |

[1] $K_{observed}$ is the vertical infiltration measured in the field, before applying a factor of safety. If field testing measures a rate that is different than the vertical infiltration rate (for example, three-dimensional borehole percolation rate), then this rate must be adjusted by an acceptable method (for example, Porchet method) to yield the field estimate of vertical infiltration rate, $K_{observed}$. See Appendix VII.

## V. Implementation, Maintenance and Inspection Responsibility for BMPs (O&M Plan)

Responsible Party Information

Name: Noel Burcelis
Title: Executive Director
Company: Ronald McDonald House, Orange County
Phone Number: (714) 639-3680

Table 8 - Frequency Inspection Matrix

| BMP | Responsible Party | *Maintenance Activity | *Inspection/Maintenance Frequency |
|---|---|---|---|
| Source Control BMPs (Structural and Non-structural) | | | |
| **N1**<br><br>Education of Property Owners and employees. | **Ronald McDonald House Orange County**<br>383 S. Batavia St.<br>Orange, CA 92868<br>(714) 639-3680<br>Contact: Noel Burcelis | Education of current employees/owner(s) shall be done within 4 weeks of startup with each new onsite employee/owner(s) being given a water quality orientation using this WQMP as reference within two weeks of hire date. | Ongoing with refresh instruction given on an annual basis. |
| **N2**<br><br>Activity Restrictions | **Ronald McDonald House Orange County**<br>383 S. Batavia St.<br>Orange, CA 92868<br>(714) 639-3680<br>Contact: Noel Burcelis | There shall be no discharges of fertilizer, pesticides, or wastes to streets or storm drains. There shall be no blowing or sweeping of debris into storm drain. All debris shall be collected and relocated to an approved landfill. In addition, onsite activities shall be limited to the requirements of this WQMP as described herein. | Daily |
| **N3**<br><br>Common Area Landscape Management | **Ronald McDonald House Orange County**<br>383 S. Batavia St.<br>Orange, CA 92868<br>(714) 639-3680<br>Contact: Noel Burcelis | Landscape maintenance will consist of trimming and replanting of vegetation, repair and maintenance of irrigation systems, and appropriate use of fertilizers and pesticides. See section IV. | Landscape maintenance shall be performed on a weekly basis. Irrigation systems shall be inspected monthly for leaks. Leaks shall be repaired as soon as they are observed. |
| **N8**<br><br>Underground Storage Tank | **Ronald McDonald House Orange County**<br>383 S. Batavia St.<br>Orange, CA 92868<br>(714) 639-3680<br>Contact: Noel Burcelis | Cleanout of the CUDO system should be considered if there is sediment buildup of two or more inches at over 50% of the inspection ports. | OSHA Confined Space Entry Training is a prerequisite for entrance into a system. In the state of California personnel should be CalOSHA certified. |
| **N11**<br><br>Common Area Litter Control | **Ronald McDonald House Orange County**<br>383 S. Batavia St.<br>Orange, CA 92868<br>(714) 639-3680<br>Contact: Noel Burcelis | The Owner will contract with a maintenance firm to provide weekly landscape maintenance and parking lot maintenance that will include litter removal and picking up grass and plant clippings. | Weekly |

| | | | |
|---|---|---|---|
| | | During routine maintenance all trash and debris will be picked up and placed in waste receptacles. | |
| **N12**<br><br>Employee Training | **Ronald McDonald House Orange County**<br>383 S. Batavia St.<br>Orange, CA 92868<br>(714) 639-3680<br>Contact: Noel Burcelis | Education of current employees shall be done within 4 weeks of startup with each new onsite employee being given a water quality orientation using this WQMP as reference within two weeks of hire date. | Ongoing with refresh instruction given on an annual basis. |
| **N14**<br><br>Common area Catch Basin Inspection | **Ronald McDonald House Orange County**<br>383 S. Batavia St.<br>Orange, CA 92868<br>(714) 639-3680<br>Contact: Noel Burcelis | Inspect area in around catch basins for trash/debris and clean as necessary | Once prior to the rainy season (by Oct. 1st) and every four months thereafter |
| **N15**<br><br>Street Sweeping Private Streets and Parking Lots | **Ronald McDonald House Orange County**<br>383 S. Batavia St.<br>Orange, CA 92868<br>(714) 639-3680<br>Contact: Noel Burcelis | The private streets and parking lots shall be inspected and sweep of any trash or debris | Inspect for trash on a weekly basis. |
| S1<br><br>Trash Enclosure/Storage | **Ronald McDonald House Orange County**<br>383 S. Batavia St.<br>Orange, CA 92868<br>(714) 639-3680<br>Contact: Noel Burcelis | Inspect area within trash enclosure for collection of trash/debris and remove. Inspect trash enclosure cover and sides for holes or structural damage that may allow stormwater to enter structure. Repair as required. | Inspect for trash on a weekly basis. Inspect for holes/damage. |
| S3<br><br>Efficient Irrigation | **Ronald McDonald House Orange County**<br>383 S. Batavia St.<br>Orange, CA 92868<br>(714) 639-3680<br>Contact: Noel Burcelis | Inspect irrigation equipment. Check water sensors and adjust irrigation heads and timing monthly. See Section IV and Appendix B. | Monthly |
| S4<br><br>Catch Basin Stencils | **Ronald McDonald House Orange County**<br>383 S. Batavia St.<br>Orange, CA 92868<br>(714) 639-3680<br>Contact: Noel Burcelis | Inspect for legibility and re-stencil when needed | Annual |
| Low Impact Development and Treatment BMPs | | | |
| Cudo & Oldcastle | **Ronald McDonald House Orange County**<br>383 S. Batavia St.<br>Orange, CA 92868<br>(714) 639-3680<br>Contact: Noel Burcelis | Cleaning shall be performed if sediment buildup is two inches or more over 75% of the system floor. In the event of a spill of a foreign substance, cleanout of the system should be considered. | Per manufacturer's (Cudo & Oldcastle) recommendations found in Appendix D. |
| CDS Pretreatment Unit | **Ronald McDonald House Orange County**<br>383 S. Batavia St.<br>Orange, CA 92868<br>(714) 639-3680<br>Contact: Noel Burcelis | Inspect CDS Pretreatment Unit and replace per manufacturer's (CDS Pretreatment Unit) recommendations found in Appendix D. | Per manufacturer's (CDS Pretreatment Unit) recommendations found in Appendix D. |

*Attach in appendix additional inspection, maintenance and operations information if required.

### Regulatory Permits

A state stormwater construction permit (WDID) will not be required as this project is less than 1 acre.

### Funding

Ronald McDonald House, Orange County will be responsible for the funding of all onsite BMPs through its operating budget.

## OWNER SELF CERTIFICATION STATEMENT

As the owner representative of the OC Ronald Mc Donald Residence for which a Water Quality Management Plan (WQMP) was approved by the City, I hereby certify under penalty of law that all Best Management Practices contained within the approved Project WQMP have been maintained and inspected in accordance with the schedule and frequency outlined in the approved WQMP Maintenance Table.

The maintenance activities and inspections conducted are shown in the attached table and have been performed by qualified and knowledgeable individuals. Structural Treatment BMPs have been inspected and certified by a licensed professional engineer.

To the best of my knowledge, the information submitted is true and accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and citations for violating water quality regulations.

Signed: ______________________________________

Name: Noel Burcelis

Title: Executive Director

Company: Ronald McDonald House, Orange County

Address: 383 S. Batavia St. Orange, Ca 92868

Telephone Number: (714) 639-3680

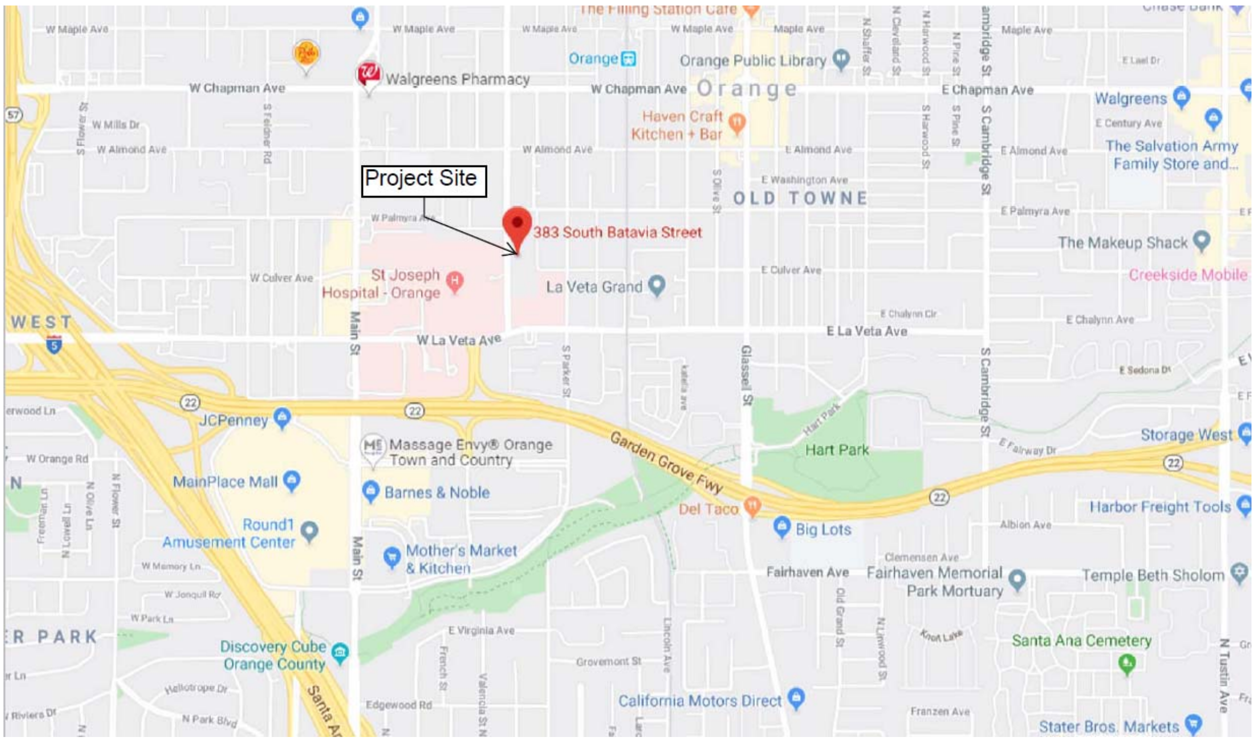
Date: ______________________

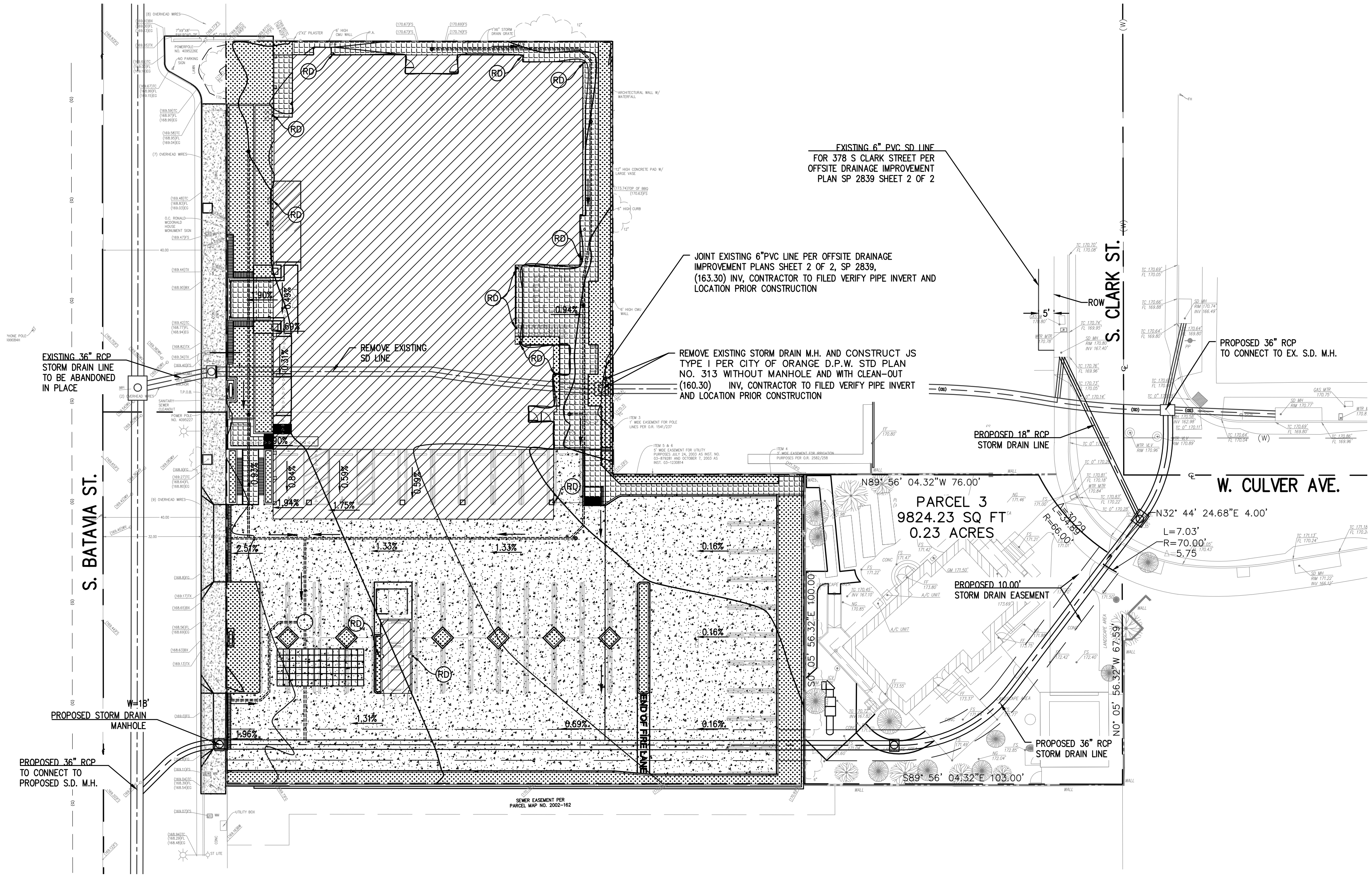
BMP Implementation Tracking Table

| BMP | Activity | Completion Dates or Frequency | Initial |
|---|---|---|---|
| Source Control BMPs (Structural and Nonstructural) | | | |
| Education of Property Owners and employees. | Education of employees and water quality orientation using this WQMP as reference. | | |
| Activity Restrictions | Restrictions on fertilizer, pesticides, or waste discharges. No blowing/sweeping of debris into storm drain. | | |
| Common Area landscape Management | Trimming, replanting vegetation, repair and maintenance of irrigation systems, and appropriate use of fertilizers/pesticides. | | |
| Underground Storage Tank | See manufacture for activity | | |
| Common Area Litter Control | Maintenance firm to provide weekly landscaping/parking lot maintenance including litter removal, picking up plant clippings and trash/debris. | | |
| Employee Training | Education of employees and water quality orientation using this WQMP as reference. | | |
| Common area Catch Basin Inspection | Inspect area in/around catch basin for trash/debris and clean as necessary | | |
| Street Sweeping Private Streets and Parking Lots | Inspect for trash on a weekly basis. | | |
| Trash Enclosure/Storage | Inspect area in trash enclosure and remove any trash/debris. Inspect cover and sides for structural damage and repair as required. | | |
| Efficient Irrigation | Inspect irrigation equipment. Check water sensors and adjust irrigation heads and timing monthly. | | |
| Catch Basin Stencils | Inspect for legibility and re-stencil when needed. | | |
| Low Impact Development and Treatment BMPs | | | |
| Cudo & Oldcastle | OSHA Confined Space Entry Training is a prerequisite for entrance into a system. In the state of California personnel should be CalOSHA certified. | | |
| CDS Pretreatment Unit | Inspect CDS Pretreatment Unit and replace per manufacturer's recommendations. | | |

* This sheet is to be submitted annually with the Owner Self Certification Statement.
** Structural Treatment BMPs should be certified by a Licensed Professional Engineer.

# VI. Location Map, Site Plan, and BMP Details





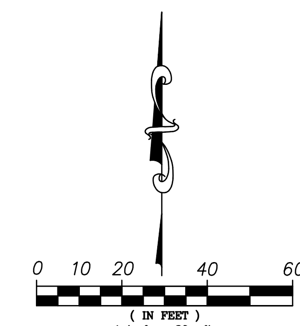

| BMP/DMA BREAKDOWN | DESCRIPTION | AREA TREATED (sq.ft) |
|---|---|---|
| BMP TYPE | CDS PRETREATMENT UNIT/ CUDO PER OLDCASTLE | |
| DMA: #1 | ROOF (EXISTING)<br>ROOF (PROPOSED) | 5,970<br>10,115 (INCLUDES OVERHANG) |
| BMP TYPE | CDS PRETREATMENT UNIT/ CUDO PER OLDCASTLE | |
| DMA: #2 | CONCRETE PARKING LOT | 11,809.80 |
| BMP TYPE | CDS PRETREATMENT UNIT/ CUDO PER OLDCASTLE | |
| DAM: #3 | NEW PAVERS AREA | 3,428.00 |
| BMP TYPE | CDS PRETREATMENT UNIT/ CUDO PER OLDCASTLE | |
| DMA: #4 | LANDSCAPE | 4,832 |
| TOTAL DMA AREAS | | 36,154.80 |
| TOTAL DCV REQUIRED | | 2,048.77 cu.ft |
| TOTAL VOLUME PROVIDED | | 1,760 cu.ft |

## LEGEND:

- DRAINAGE PATTERN
- CUDO PER OLDCASTLE UNDERGROUND WATER TANK
- CDS PRETREATMENT UNIT
- DRAIN PIPE
- ATRIUM GRATE
- TRENCH DRAIN
- ROOF DRAIN
- DRAINAGE AREA

WQMP GENERAL NOTES:

1) STENCIL AT ALL DRAINAGE INLETS (I.E. CATCH BASINS, TRENCH DRAINS). STENCIL PER DETAIL 1, HEREON.
2) REFER TO CIVIL, PLUMBING, AND LANDSCAPE FOR DETAILED DESIGN COMPONENTS.
3) ALL DOWNSPOUTS TO DRAIN TO RETENTION SYSTEM, PER PLAN.
4) ANY CHANGES (TYPES, SIZES OR LOCATION) TO APPROVED WQMP BEST MANAGEMENT PRACTICES(BMPS) MUST OBTAIN WRITTEN APPROVAL FROM CITY OF ORANGE.
5) TRASH ENCLOSURES LOCATED WITHIN THE BUILDING, PER PLAN.
6) INLET ELEVATIONS TO THE BMPS TO BE DETERMINED AND VERIFIED BY CONTRACTOR.




REVISIONS: | NO. | BY: | DATE:

PLANS PREPARED BY

JMC2
Civil Engineering & Surveying
John M. Cruikshank Consultants, Inc.
411 N. Harbor Blvd, Suite 201
San Pedro, CA 90731
P: 310.241.6550
www.jmc-2.com

PROJECT
383 S BATAVIA STREET
ORANGE, CA 92868

SHEET TITLE
WQMP SITE MAP

| | |
|---|---|
| PROJECT NO. | 20180034 |
| SCALE | 1"=20' |
| DATE | 08/20/2020 |
| DESIGNED BY | VR |
| DRAWN BY | VR |
| CHECKED BY | KA |
| SHEET NO. | |

FILE NAME: F:\383 S Batavia St\Sheets\20180034_C-9.0_LID_Exhibit, SAVE DATE:8/20/2020, PLOT DATE:8/24/2020

## VII. Educational Materials

Refer to the City's website www.cityoforange.org or the Orange County Stormwater Program (ocwatersheds.com) for a library of materials available. Attach *only* the educational materials specifically applicable to the project.

| 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) | ☐ | SC-10, Non-Stormwater Discharges | ☒ |
| Recycle at Your Local Used Oil Collection Center (Central County) | ☐ | SC-11, Spill Prevention, Control, & Clean-up | ☒ |
| Recycle at Your Local Used Oil Collection Center (South County) | ☐ | SC-34, Waste Handling & Disposal | ☒ |
| Tips for Maintaining a Septic Tank System | ☐ | SC-41, Building & Grounds Maintenance | ☒ |
| Responsible Pest Control | ☐ | SD-13 Sorm Drain Signage | ☒ |
| Sewer Spill Response | ☒ | | ☐ |
| 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 | ☐ | | ☐ |

# Appendix A:

## Conditions of Approval

Resolution Number____________ dated__________

# Appendix B:

# Educational Material

# The Ocean Begins at Your Front Door

PROJECT
Pollution
PREVENTION

Follow these simple steps to help reduce water pollution:

## Household Activities

- Do not rinse spills with water. Use dry cleanup methods such as applying cat litter or another absorbent material, sweep and dispose of in the trash. Take items such as used or excess batteries, oven cleaners, automotive fluids, painting products and cathode ray tubes, like TVs and computer monitors, to a Household Hazardous Waste Collection Center (HHWCC).
- For a HHWCC near you call (714) 834-6752 or visit www.oclandfills.com.
- Do not hose down your driveway, sidewalk or patio to the street, gutter or storm drain. Sweep up debris and dispose of it in the trash.

## Automotive

- Take your vehicle to a commercial car wash whenever possible. If you wash your vehicle at home, choose soaps, cleaners, or detergents labeled non-toxic, phosphate- free or biodegradable. Vegetable and citrus-based products are typically safest for the environment.
- Do not allow washwater from vehicle washing to drain into the street, gutter or storm drain. Excess washwater should be disposed of in the sanitary sewer (through a sink or toilet) or onto an absorbent surface like your lawn.
- Monitor your vehicles for leaks and place a pan under leaks. Keep your vehicles well maintained to stop and prevent leaks.
- Never pour oil or antifreeze in the street, gutter or storm drain. Recycle these substances at a service station, a waste oil collection center or used oil recycling center. For the nearest Used Oil Collection Center call 1-800-CLEANUP or visit www.1800cleanup.org.

## Pool Maintenance

- Pool and spa water must be dechlorinated and free of excess acid, alkali or color to be allowed in the street, gutter or storm drain.
- When it is not raining, drain dechlorinated pool and spa water directly into the sanitary sewer.
- Some cities may have ordinances that do not allow pool water to be disposed of in the storm drain. Check with your city.

## Landscape and Gardening

- Do not over-water. Water your lawn and garden by hand to control the amount of water you use or set irrigation systems to reflect seasonal water needs. If water flows off your yard onto your driveway or sidewalk, your system is over-watering. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of waste by composting, hauling it to a permitted landfill, or as green waste through your city's recycling program.
- Follow directions on pesticides and fertilizer, (measure, do not estimate amounts) and do not use if rain is predicted within 48 hours.
- Take unwanted pesticides to a HHWCC to be recycled. For locations and hours of HHWCC, call (714) 834-6752 or visit www.oclandfills.com.

## Trash

- Place trash and litter that cannot be recycled in securely covered trash cans.
- Whenever possible, buy recycled products.
- Remember: Reduce, Reuse, Recycle.

## Pet Care

- Always pick up after your pet. Flush waste down the toilet or dispose of it in the trash. Pet waste, if left outdoors, can wash into the street, gutter or storm drain.
- If possible, bathe your pets indoors. If you must bathe your pet outside, wash it on your lawn or another absorbent/permeable surface to keep the washwater from entering the street, gutter or storm drain.
- Follow directions for use of pet care products and dispose of any unused products at a HHWCC.

## Common Pollutants

### Home Maintenance

- Detergents, cleaners and solvents
- Oil and latex paint
- Swimming pool chemicals
- Outdoor trash and litter

### Lawn and Garden

- Pet and animal waste
- Pesticides
- Clippings, leaves and soil
- Fertilizer

### Automobile

- Oil and grease
- Radiator fluids and antifreeze
- Cleaning chemicals
- Brake pad dust

# *For More Information*

## Orange County Stormwater Program

**California Environmental Protection Agency**
www.calepa.ca.gov

- **Air Resources Board**
  www.arb.ca.gov
- **Department of Pesticide Regulation**
  www.cdpr.ca.gov
- **Department of Toxic Substances Control**
  www.dtsc.ca.gov
- **Integrated Waste Management Board**
  www.ciwmb.ca.gov
- **Office of Environmental Health Hazard Assessment**
  www.oehha.ca.gov
- **State Water Resources Control Board**
  www.waterboards.ca.gov

**Earth 911 -** Community-Specific Environmental Information 1-800-cleanup or visit www.1800cleanup.org

**Health Care Agency's Ocean and Bay Water Closure and Posting Hotline**
(714) 433-6400 or visit www.ocbeachinfo.com

**Integrated Waste Management Dept. of Orange County** (714) 834-6752 or visit www.oclandfills.com for information on household hazardous waste collection centers, recycling centers and solid waste collection

**O.C. Agriculture Commissioner**
(714) 447-7100 or visit www.ocagcomm.com

**Stormwater Best Management Practice Handbook**
Visit www.cabmphandbooks.com

**UC Master Gardener Hotline**
(714) 708-1646 or visit www.uccemg.com

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The Orange County Stormwater Program has created and moderates an electronic mailing list to facilitate communications, take questions and exchange ideas among its users about issues and topics related to stormwater and urban runoff and the implementation of program elements. To join the list, please send an email to ocstormwaterinfo-join@list.ocwatersheds.com

| | | |
|---|---|---|
| Aliso Viejo | (949) | 425-2535 |
| Anaheim Public Works Operations | (714) | 765-6860 |
| Brea Engineering | (714) | 990-7666 |
| Buena Park Public Works | (714) | 562-3655 |
| Costa Mesa Public Services | (714) | 754-5323 |
| Cypress Public Works | (714) | 229-6740 |
| Dana Point Public Works | (949) | 248-3584 |
| Fountain Valley Public Works | (714) | 593-4441 |
| Fullerton Engineering Dept. | (714) | 738-6853 |
| Garden Grove Public Works | (714) | 741-5956 |
| Huntington Beach Public Works | (714) | 536-5431 |
| Irvine Public Works | (949) | 724-6315 |
| La Habra Public Services | (562) | 905-9792 |
| La Palma Public Works | (714) | 690-3310 |
| Laguna Beach Water Quality | (949) | 497-0378 |
| Laguna Hills Public Services | (949) | 707-2650 |
| Laguna Niguel Public Works | (949) | 362-4337 |
| Laguna Woods Public Works | (949) | 639-0500 |
| Lake Forest Public Works | (949) | 461-3480 |
| Los Alamitos Community Dev. | (562) | 431-3538 |
| Mission Viejo Public Works | (949) | 470-3056 |
| Newport Beach, Code & Water Quality Enforcement | (949) | 644-3215 |
| Orange Public Works | (714) | 532-6480 |
| Placentia Public Works | (714) | 993-8245 |
| Rancho Santa Margarita | (949) | 635-1800 |
| San Clemente Environmental Programs | (949) | 361-6143 |
| San Juan Capistrano Engineering | (949) | 234-4413 |
| Santa Ana Public Works | (714) | 647-3380 |
| Seal Beach Engineering | (562) | 431-2527 x317 |
| Stanton Public Works | (714) | 379-9222 x204 |
| Tustin Public Works/Engineering | (714) | 573-3150 |
| Villa Park Engineering | (714) | 998-1500 |
| Westminster Public Works/Engineering | (714) | 898-3311 x446 |
| Yorba Linda Engineering | (714) | 961-7138 |
| Orange County Stormwater Program | (877) | 897-7455 |

Orange County 24-Hour
Water Pollution Problem Reporting Hotline
1-877-89-SPILL (1-877-897-7455)

On-line Water Pollution Problem Reporting Form
w w w . o c w a t e r s h e d s . c o m

Printed on Recycled Paper

# The Ocean Begins at Your Front Door


***Never allow pollutants to enter the street, gutter or storm drain!***

Follow these simple steps to help reduce water pollution:

## *Household Activities*

- Do not rinse spills with water. Use dry cleanup methods such as applying cat litter or another absorbent material, sweep and dispose of in trash. Take items such as used or excess batteries, oven cleaners, automotive fluids, painting products, and cathode ray tubes, like TVs and computer monitors, to a Household Hazardous Waste collection center.
- For a household hazardous waste collection center near you call (714) 834-6752 or visit www.oclandfills.com.
- Do not hose down your driveway, sidewalk or patio to the street, gutter or storm drain. Sweep up debris and dispose of in trash.

## *Automotive*

- Take your vehicle to a commercial car wash whenever possible. If you wash your vehicle at home, choose soaps, cleaners, or detergents labeled non-toxic, phosphate free or biodegradable. Vegetable and citrus-based products are typically safest for the environment.
- Do not allow washwater from vehicle washing into the street, gutter or storm drain. Excess washwater should be disposed of in the sanitary sewer (through a sink or toilet) or onto an absorbent surface like your lawn.
- Monitor vehicle for leaks and place a pan under leaks. Keep your vehicles well maintained to stop and prevent leaks.
- Never pour oil or antifreeze in the street, gutter or storm drain. Recycle these substances at a service station, a waste oil collection center or used oil recycling center. For the nearest Used Oil Collection Center call 1-800-CLEANUP or visit www.1800cleanup.org.

## *Pool Maintenance*

- Pool and spa water must be dechlorinated and be free of excess acid, alkali or color to be allowed in the street, gutter or storm drain.
- Whenever possible, drain dechlorinated pool and spa water directly into the sanitary sewer but only when it is not raining.
- Some cities may have ordinances that do not allow pool water to be disposed into the storm drain. Check with your city.

## *Landscape and Gardening*

- Do not over-water. Water your lawn and garden by hand to control the amount of water you use or set irrigation systems to reflect seasonal water needs. If water flows off your yard onto your driveway or sidewalk, your system is over-watering. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead dispose of waste by composting, hauling it to a permitted landfill, or as green waste through your city's recycling program.
- Follow directions on pesticides and fertilizer, (measure, do not estimate amounts) and do not use if rain is predicted with 48 hours.
- Take unwanted pesticides to a Household Hazardous Waste Collection Center to be recycled. For locations and hours of Household Hazardous Waste Collection Centers call 714-834-6752 or visit www.oclandfills.com.

## *Trash*

- Place trash and litter that cannot be recycled in securely covered trash cans.
- Whenever possible, buy recycled products.
- Remember: Reduce, Reuse, Recycle

## *Pet Care*

- Always pick up after your pet. Flush waste down the toilet or dispose in the trash. Pet waste, if left outdoors, can wash into the street, gutter or storm drain.
- If possible, bathe your pets indoors. If you must bathe your pet outside, wash it on your lawn or another absorbent/permeable surface to keep the washwater from entering the street, gutter or storm drain.
- Follow directions for use of pet care products and dispose of any unused products at a Household Hazardous Waste Collection Center.

## *Common Pollutants*

### *Home Maintenance*

- Detergents, cleaners and solvents
- Oil and latex paint
- Swimming pool chemicals
- Outdoor trash and litter

### *Lawn and Garden*

- Pet and animal waste
- Pesticides
- Clippings, leaves and soil
- Fertilizer

### *Automobile*

- Oil and grease
- Radiator fluids and antifreeze
- Cleaning chemicals
- Brake pad dust

# The Pollution Solution

Several residential activities can result in water pollution. Among these activities are car washing and hosing off driveways and sidewalks. Both activities can waste water and result in excess runoff. Water conservation methods described in this pamphlet can prevent considerable amounts of runoff and conserve water. By taking your car to a commercial car wash and by sweeping driveways and sidewalks, you can further prevent the transport of pollutants to Orange County waterways. Here are some of the common pollutants for which you can be part of the solution:

1 Pesticides and Fertilizer

- Pollution: The same pesticides that are designed to be toxic to pests can have an equally lethal impact on our marine life. The same fertilizer that promotes plant growth in lawns and gardens can also create nuisance algae blooms, which remove oxygen from the water and clog waterways when it decomposes.
- Solution: Never use pesticides or fertilizer within 48 hours of an anticipated rainstorm. Use only as much as is directed on the label and keep it off driveways and sidewalks.

2 Dirt and Sediment

- Pollution: Dirt or sediment can impede the flow of the stormwater and negatively impact stream habitat as it travels through waterways and deposits downstream. Pollutants can attach to sediment, which can then be transported through our waterways.
- Solution: Protect dirt stockpiles by covering them with tarps or secure plastic sheets to prevent wind or rain from allowing dirt or sediment to enter the storm drain system.

3 Metals

- Pollution: Metals and other toxins present in car wash water can harm important plankton, which forms the base of the aquatic food chain.
- Solution: Take your car to a commercial car wash where the wash water is captured and treated at a local wastewater treatment plant.

*DID YOU KNOW?*

*Did you know that most of the pollution found in our waterways is not from a single source, but from a "non-point" source meaning the accumulation of pollution from residents and businesses throughout the community.*

4 Pet Waste

- Pollution: Pet waste carries bacteria through our watersheds and eventually will be washed out to the ocean. This can pose a health risk to swimmers and surfers.
- Solution: Pick up after your pets!

5 Trash and Debris

- Pollution: Trash and debris can enter waterways by wind, littering and careless maintenance of trash receptacles. Street sweeping collects some of this trash; however, much of what isn't captured ends up in our storm drain system where it flows untreated out to the ocean.
- Solution: Don't litter and make sure trash containers are properly covered. It is far more expensive to clean up the litter and trash that ends up in our waterways than it is to prevent it in the first place. Come out to one of Orange County's many locations for Coastal and Inner-Coastal Cleanup Day, which is held in September.

6 Motor Oil / Vehicle Fluids

- Pollution: Oil and petroleum products from our vehicles are toxic to people, wildlife and plants.

- Solution: Fix any leaks from your vehicle and keep the maintenance up on your car. Use absorbent material such as cat litter on oil spills, then sweep it up and dispose of it in the trash. Recycle used motor oil at a local Household Hazardous Waste Collection Center.

## A TEAM EFFORT

The Orange County Stormwater Program has teamed with the Municipal Water District of Orange County (MWDOC) and the University of California Cooperative Extension Program (UCCE) to develop this pamphlet.

Low Impact Development (LID) and sustainable water use prevents water pollution and conserves water for drinking and reuse. Reducing your water use and the amount of water flowing from your home protects the environment and saves you money.

## Thank you for making water protection a priority!

For more information, please visit


Orange County Stormwater Program
www.ocwatersheds.com/publiced/

Municipal Water District of Orange County
www.mwdoc.com

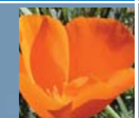
University of California Master Gardeners of Orange County
www.uccemg.com

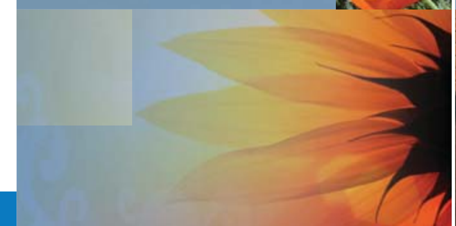
UC Cooperative Extension OC Water Quality and Water Resources
www.ucanr.org/sites/urbanwatermgmt/

To report a spill, call the Orange County 24-Hour Water Pollution Prevention Reporting Hotline at 1-877-89-SPILL \ (1-877-897-7455)

Special Thanks to
The City of Los Angeles Stormwater Program for the use of its artwork

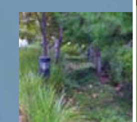
The Metropolitan Water District of Southern California for the use of the California-Friendly Plant and Native Habitat photos





# Homeowners Guide for Sustainable Water Use

Low Impact Development, Water Conservation & Pollution Prevention



The Ocean Begins at Your Front Door

# RUNOFF, RAINWATER AND REUSE

### Where Does Water Runoff Go?

Stormwater, or water from rainfall events, and runoff from outdoor water use such as sprinklers and hoses flows from homes directly into catch basins and the storm drain system. After entering the storm drain, the water flows untreated into streams, rivers, bays and ultimately the Pacific Ocean. Runoff can come from lawns, gardens, driveways, sidewalks and roofs. As it flows over hard, impervious surfaces, it picks up pollutants. Some pollutants carried by the water runoff include trash, pet waste, pesticides, fertilizer, motor oil and more.

### Water Conservation

Pollution not only impairs the water quality for habitat and recreation, it can also reduce the water available for reuse. Runoff allowed to soak into the ground is cleaned as it percolates through the soil, replenishing depleted groundwater supplies. Groundwater provides at least 50% of the total water for drinking and other indoor household activities in north and central Orange County. When land is covered with roads, parking lots, homes, etc., there is less land to take in the water and more hard surfaces over which the water can flow.

In Orange County, 60-70% of water used by residents and businesses goes to irrigation and other outdoor uses. Reusing rainwater to irrigate our lawn not only reduces the impact of water pollution from runoff, but it also is a great way to conserve our precious water resources and replenish our groundwater basin.

### What is Low Impact Development (LID)?

Low Impact Development (LID) is a method of development that seeks to maintain the natural hydrologic character of an area. LID provides a more sustainable and pollution-preventative approach to water management.

New water quality regulations require implementation of LID in larger new developments and encourage implementation of LID and other sustainable practices in existing residential areas. Implementing modifications to your lawn or garden can reduce pollution in our environment, conserve water and reduce your water bill.

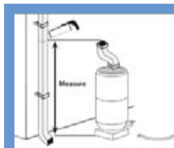
Permeable pavement allows water runoff to infiltrate through the soil and prevents most pollutants from reaching the storm drain system.

## OPTIONS FOR RAINWATER HARVESTING AND REUSE

Rainwater harvesting is a great way to save money, prevent pollution and reduce potable water use. To harvest your rainwater, simply redirect the runoff from roofs and downspouts to rain barrels. Rain gardens are another option; these reduce runoff as well as encourage infiltration.

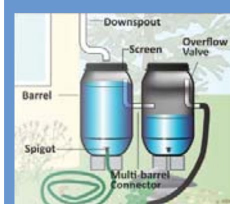
### Downspout Disconnection/Redirection

Disconnecting downspouts from pipes running to the gutter prevents runoff from transporting pollutants to the storm drain. Once disconnected, downspouts can be redirected to rain gardens or other vegetated areas, or be connected to a rain barrel.




### Rain Barrels

Rain barrels capture rainwater flow from roofs for reuse in landscape irrigation. Capacity of rain barrels needed for your home will depend on the amount of roof area and rainfall received. When purchasing your rain barrel, make sure it includes a screen, a spigot to siphon water for use, an overflow tube to allow for excess water to run out and a connector if you wish to connect multiple barrels to add capacity of water storage.




Mosquito growth prevention is very important when installing a rain barrel. The best way to prevent mosquito breeding is to eliminate entry points by ensuring all openings are sealed tightly. If these methods are unsuccessful, products are available to kill mosquito larvae, but that are harmless to animals and humans. Regular application of these products is essential. Please visit the Orange County Vector Control website for more information at www.ocvcd.org/mosquitoes3.php.

### Rain Gardens

Rain gardens allow runoff to be directed from your roof downspout into a landscaped area. Vegetation and rocks in the garden will slow the flow of water to allow for infiltration into the soil. Plants and soil particles will absorb pollutants from the roof runoff. By utilizing a native plant palate, rain gardens can be maintained all year with minimal additional irrigation. These plants are adapted to the semi-arid climate of Southern California, require less water and can reduce your water bill.

Before modifying your yard to install a rain garden, please consult your local building and/or planning departments to ensure your garden plan follows pertinent building codes and ordinances. Besides codes and ordinances, some home owner associations also have guidelines for yard modifications. If your property is in hill areas or includes engineered slopes, please seek professional advice before proceeding with changes.


For information on how to disconnect a downspout or to install and maintain a rain barrel or rain garden at your home, please see the Los Angeles Rainwater Harvesting Program, A Homeowner's "How-To" Guide, November 2009 at www.larainwaterharvesting.org/

## OTHER WATER CONSERVATION AND POLLUTION PREVENTION TECHNIQUES

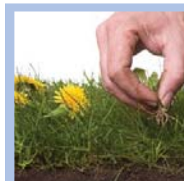
### Native Vegetation and Maintenance

"California Friendly" plants or native vegetation can significantly reduce water use. These plants often require far less fertilizers and pesticides, which are two significant pollutants found in Orange County waterways. Replacing water "thirsty" plants and grass types with water efficient natives is a great way to save water and reduce the need for potentially harmful pesticides and fertilizer.

Please see the California Friendly Garden Guide produced by the Metropolitan Water District of Southern California and associated Southern California Water Agencies for a catalog of California friendly plants and other garden resources at www.bewaterwise.com/Gardensoft.

### Weed Free Yards

Weeds are water thieves. They often reproduce quickly and rob your yard of both water and nutrients. Weed your yard by hand if possible. If you use herbicides to control the weeds, use only the amount recommended on the label and never use it if rain is forecast within the next 48 hours.



### Soil Amendments

Soil amendments such as green waste (e.g. grass clippings, compost, etc.) can be a significant source of nutrients and can help keep the soil near the roots of plants moist. However, they can cause algal booms if they get into our waterways, which reduces the amount of oxygen in the water and impacts most aquatic organisms. It is important to apply soil amendments more than 48 hours prior to predicted rainfall.

## IRRIGATE EFFICIENTLY

Water runoff from sprinklers left on too long will carry pollutants into our waterways.

### Smart Irrigation Controllers

Smart Irrigation Controllers have internal clocks as well as sensors that will turn off the sprinklers in response to environmental changes. If it is raining, too windy or too cold, the smart irrigation control sprinklers will automatically shut off.

Check with your local water agency for available rebates on irrigation controllers and smart timers.

- Aim your sprinklers at your lawn, not the sidewalk – By simply adjusting the direction of your sprinklers you can save water, prevent water pollution from runoff, keep your lawn healthy and save money.
- Set a timer for your sprinklers – lawns absorb the water they need to stay healthy within a few minutes of turning on the sprinklers. Time your sprinklers; when water begins running off your lawn, you can turn them off. Your timer can be set to water your lawn for this duration every time.
- Water at Sunrise – Watering early in the morning will reduce water loss due to evaporation. Additionally, winds tend to die down in the early morning so the water will get to the lawn as intended.
- Water by hand – Instead of using sprinklers, consider watering your yard by hand. Hand-watering ensures that all plants get the proper amount of water and you will prevent any water runoff, which wastes water and carries pollutants into our waterways.
- Fix leaks - Nationwide, households waste one trillion gallons of water a year to leaks – that is enough water to serve the entire state of Texas for a year. If your garden hose is leaking, replace the nylon or rubber hose washer and ensure a tight connection. Fix broken sprinklers immediately.

*Do your part to prevent water pollution in our creeks, rivers, bays and ocean.*

Clean beaches and healthy creeks, rivers, bays, and ocean are important to Orange County. However, many common household activities can lead to water pollution if you're not careful.

**REMEMBER THE WATER IN YOUR STORM DRAIN IS NOT TREATED BEFORE IT ENTERS OUR WATERWAYS**

Litter, oil, chemicals and other substances that are left on your yard or driveway can be blown or washed into storm drains that flow to the ocean. Over-watering your lawn and washing your car can also flush materials into the storm drains. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated.

You would never pour soap, fertilizers or oil into the ocean, so don't let them enter streets, gutters or storm drains. Follow the easy tips in this brochure to help prevent water pollution.

**The tips contained in this brochure provide useful information to help prevent water pollution while performing everyday household activities.**

**For more information, or to report a spill during normal business hours, please call the City of Orange Public Works Department at (714) 532-6480 or visit www.cityoforange.org.**

**To report a spill after normal business hours or on weekends, please call the City of Orange 24-Hour Water Pollution Problem Reporting Hotline at (714) 538-1961.**

**For emergencies, dial 911.**

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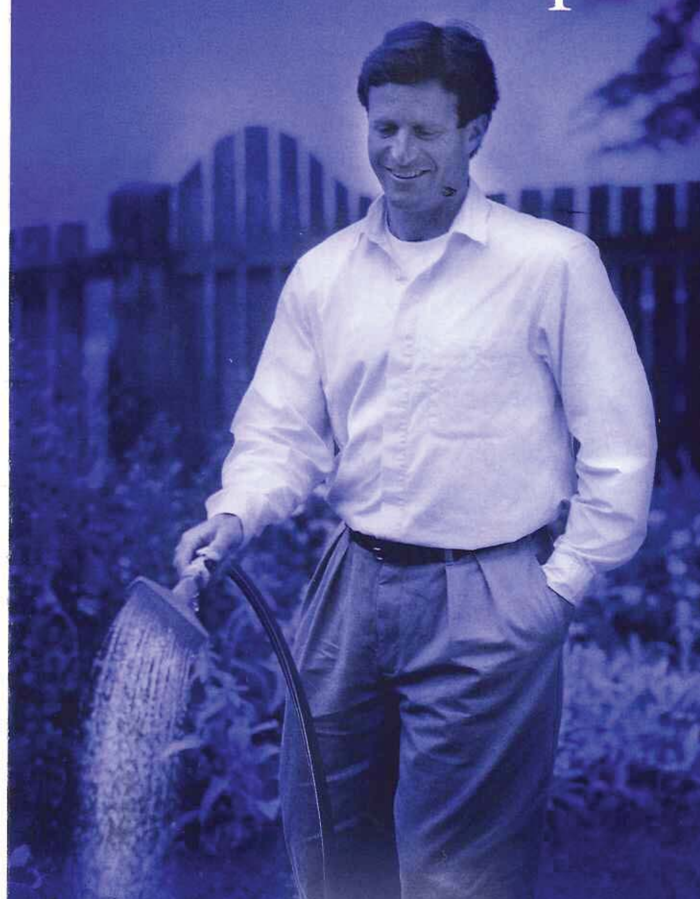
Help Prevent Ocean Pollution:

# Household Tips



The Ocean Begins at Your Front Door

PROJECT POLLUTION PREVENTION

# Pollution Prevention

## *Household Activities*

- **Do not rinse spills with water!** Sweep outdoor spills and dispose of in the trash. For wet spills like oil, apply cat litter or another absorbent material, then sweep and bring to a household hazardous waste collection center (HHWCC).
- Securely cover trash cans.
- Take household hazardous waste to a household hazardous waste collection center.
- Store household hazardous waste in closed, labeled containers inside or under a cover.
- Do not hose down your driveway, sidewalk or patio. Sweep up debris and dispose of in trash.
- Always pick up after your pet. Flush waste down the toilet or dispose of in the trash.
- Bathe pets indoors or have them professionally groomed.

### *Household Hazardous Wastes include:*

- **Batteries**
- **Paint thinners, paint strippers and removers**
- **Adhesives**
- **Drain openers**
- **Oven cleaners**
- **Wood and metal cleaners and polishes**
- **Herbicides and pesticides**
- **Fungicides/wood preservatives**
- **Automotive fluids and products**
- **Grease and rust solvents**
- **Thermometers and other products containing mercury**
- **Fluorescent lamps**
- **Cathode ray tubes, e.g. TVs, computer monitors**
- **Pool and spa chemicals**

## *Gardening Activities*

- Follow directions on pesticides and fertilizers, (measure, do not estimate amounts) and do not use if rain is predicted within 48 hours.
- Water your lawn and garden by hand to control the amount of water you use. Set irrigation systems to reflect seasonal water needs. If water flows off your yard and onto your driveway or sidewalk, your system is over-watering.
- Mulch clippings or leave them on the lawn. If necessary, dispose in a green waste container.
- Cultivate your garden often to control weeds.

## *Washing and Maintaining Your Car*

- Take your car to a commercial car wash whenever possible.
- Choose soaps, cleaners, or detergents labeled "non-toxic," "phosphate free" or "biodegradable." Vegetable and citrus-based products are typically safest for the environment, **but even these should not be allowed into the storm drain.**
- Shake floor mats into a trash can or vacuum to clean.
- Do not use acid-based wheel cleaners and "hose off" engine degreasers at home. They can be used at a commercial facility, which can properly process the washwater.
- **Do not dump washwater onto your driveway, sidewalk, street, gutter or storm drain.** Excess washwater should be disposed of in the sanitary sewers (through a sink, or toilet) or onto an absorbent surface like your lawn.
- Use a nozzle to turn off water when not actively washing down automobile.
- Monitor vehicles for leaks and place pans under leaks. Keep your car well maintained to stop and prevent leaks.
- Use cat litter or other absorbents and sweep to remove any materials deposited by vehicles. Contain sweepings and dispose of at a HHWCC.
- Perform automobile repair and maintenance under a covered area and use drip pans or plastic sheeting to keep spills and waste material from reaching storm drains.
- **Never pour oil or antifreeze in the street, gutter or storm drains.** Recycle these substances at a service station, HHWCC, or used oil recycling center. For the nearest Used Oil Collection Center call 1-800-CLEANUP or visit www.ciwmb.ca.gov/UsedOil.

*For locations and hours of Household Hazardous Waste Collection Centers in Anaheim, Huntington Beach, Irvine and San Juan Capistrano, call (714)834-6752 or visit www.oclandfills.com.*

***Do your part to prevent water pollution in our creeks, rivers, bays and ocean.***

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, not properly disposing of household hazardous waste can lead to water pollution. Batteries, electronics, paint, oil, gardening chemicals, cleaners and other hazardous materials cannot be thrown in the trash. They also must never be poured or thrown into yards, sidewalks, driveways, gutters or streets. Rain or other water could wash the materials into the storm drain and eventually into our waterways and the ocean. In addition, hazardous waste must not be poured in the sanitary sewers (sinks and toilets).

***NEVER DISPOSE OF HOUSEHOLD HAZARDOUS WASTE IN THE TRASH, STREET, GUTTER, STORM DRAIN OR SEWER.***

For more information,
please call the
**Orange County Stormwater Program**
at **1-877-89-SPILL** (1-877-897-7455)
or visit
**www.ocwatersheds.com**

**To Report Illegal Dumping of Household Hazardous Waste call 1-800-69-TOXIC**

To report a spill,
call the
**Orange County 24-Hour Water Pollution Problem Reporting Hotline**
**1-877-89-SPILL** (1-877-897-7455).

**For emergencies, dial 911.**

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Help Prevent Ocean Pollution:

# Proper Disposal of Household Hazardous Waste

**The Ocean Begins at Your Front Door**

PROJECT POLLUTION PREVENTION

**ORANGE COUNTY**

# Pollution Prevention

Leftover household products that contain corrosive, toxic, ignitable, or reactive ingredients are considered to be "household hazardous waste" or "HHW." HHW can be found throughout your home, including the bathroom, kitchen, laundry room and garage.

*WHEN POSSIBLE, USE NON-HAZARDOUS OR LESS-HAZARDOUS PRODUCTS.*

Disposal of HHW down the drain, on the ground, into storm drains, or in the trash is illegal and unsafe.

Proper disposal of HHW is actually easy. Simply drop them off at a Household Hazardous Waste Collection Center (HHWCC) for free disposal and recycling. Many materials including anti-freeze, latex-based paint, motor oil and batteries can be recycled. Some centers have a "Stop & Swap" program that lets you take partially used home, garden, and automobile products free of charge. There are four HHWCCs in Orange County:

**Anaheim**:..................1071 N. Blue Gum St
**Huntington Beach**:.........17121 Nichols St
**Irvine**:........................... 6411 Oak Canyon
**San Juan Capistrano**:... 32250 La Pata Ave

Centers are open Tuesday-Saturday, 9 a.m.-3 p.m. Centers are closed on rainy days and major holidays. For more information, call **(714) 834-6752** or visit **www.oclandfills.com.**

## *Common household hazardous wastes*

- Batteries
- Paint and paint products
- Adhesives
- Drain openers
- Household cleaning products
- Wood and metal cleaners and polishes
- Pesticides
- Fungicides/wood preservatives
- Automotive products (antifreeze, motor oil, fluids)
- Grease and rust solvents
- Fluorescent lamps
- Mercury (thermometers & thermostats)
- All forms of electronic waste including computers and microwaves
- Pool & spa chemicals
- Cleaners
- Medications
- Propane (camping & BBQ)
- Mercury-containing lamps
- Television & monitors (CRTs, flatscreens)

## *Tips for household hazardous waste*

- Never dispose of HHW in the trash, street, gutter, storm drain or sewer.
- Keep these materials in closed, labeled containers and store materials indoors or under a cover.
- When possible, use non-hazardous products.
- Reuse products whenever possible or share with family and friends.
- Purchase only as much of a product as you'll need. Empty containers may be disposed of in the trash.
- HHW can be harmful to humans, pets and the environment. Report emergencies to 911.

# Sewage Spill Regulatory Requirements

Allowing sewage to discharge to a gutter or storm drain may subject you to penalties and/or out-of-pocket costs to reimburse cities or public agencies for clean-up efforts.

Here are the pertinent codes, fines, and agency contact information that apply.

### Orange County Stormwater Program
24 Hour Water Pollution Reporting Hotline
**1-877-89-SPILL** (1-877-897-7455)

- County and city water quality ordinances prohibit discharges containing pollutants.

### Orange County Health Care Agency Environmental Health
(714) 433-6419

**California Health and Safety Code,** Sections 5410-5416

- No person shall discharge raw or treated sewage or other waste in a manner that results in contamination, pollution or a nuisance.
- Any person who causes or permits a sewage discharge to any state waters:
  - must immediately notify the local health agency of the discharge.
  - shall reimburse the local health agency for services that protect the public's health and safety (water-contact receiving waters).
  - who fails to provide the required notice to the local health agency is guilty of a misdemeanor and shall be punished by a fine (between $500–$1,000) and/or imprisonment for less than one year.

### Regional Water Quality Control Board
**Santa Ana Region** (951) 782-4130
**San Diego Region** (858) 467-2952

- Requires the prevention, mitigation, response to and reporting of sewage spills.

### California Office of Emergency Services
(800) 852-7550

**California Water Code,** Article 4, Chapter 4, Sections 13268-13271
**California Code of Regulations,** Title 23, Division 3, Chapter 9.2, Article 2, Sections 2250-2260

- Any person who causes or permits sewage in excess of 1,000 gallons to be discharged to state waters **shall immediately notify the Office of Emergency Services.**
- Any person who fails to provide the notice required by this section is **guilty of a misdemeanor** and shall be punished by a fine (less than $20,000) and/or imprisonment for not more than one year.

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# Sewage Spill
## Reference Guide

***Your Responsibilities as a Private Property Owner***

**Residences**
**Businesses**
**Homeowner/Condominium Associations**
**Federal and State Complexes**
**Military Facilities**

Orange County Sanitation District

Health Care Agency
Environmental Health

PROJECT Pollution PREVENTION

www.ocwatersheds.com

This brochure was designed courtesy of the Orange County Sanitation District (OCSD).
For additional information, call (714) 962-2411, or visit their website at www.ocsd.com

# What is a Sewage Spill?

Sewage spills occur when the wastewater being transported via underground pipes overflows through a manhole, cleanout or broken pipe. Sewage spills can cause health hazards, damage to homes and businesses, and threaten the environment, local waterways and beaches.

## Common Causes of Sewage Spills

**Grease** builds up inside and eventually blocks sewer pipes. Grease gets into the sewer from food establishments, household drains, as well as from poorly maintained commercial grease traps and interceptors.

**Structure problems** caused by tree roots in the lines, broken/cracked pipes, missing or broken cleanout caps or undersized sewers can cause blockages.

**Infiltration and inflow (I/I)** impacts pipe capacity and is caused when groundwater or rainwater enters the sewer system through pipe defects and illegal connections.

## You Are Responsible for a Sewage Spill Caused by a Blockage or Break in Your Sewer Lines!

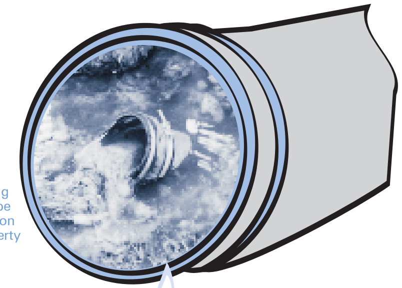
Time is of the essence in dealing with sewage spills. You are required to **immediately**:

**Control and minimize the spill.** Keep spills contained on private property and out of gutters, storm drains and public waterways by shutting off or not using the water.

**Use sandbags, dirt and/or plastic sheeting** to prevent sewage from entering the storm drain system.

**Clear the sewer blockage.** Always wear gloves and wash your hands. It is recommended that a plumbing professional be called for clearing blockages and making necessary repairs.

**Always notify your city sewer/public works department or public sewer district of sewage spills.** If the spill enters the storm drains also notify the Health Care Agency. In addition, if it exceeds 1,000 gallons notify the Office of Emergency Services. Refer to the numbers listed in this brochure.



Overflowing cleanout pipe located on private property

## You Could Be Liable

Allowing sewage from your home, business or property to discharge to a gutter or storm drain may subject you to penalties and/or out-of-pocket costs to reimburse cities or public agencies for clean-up and enforcement efforts. See Regulatory Codes & Fines section for pertinent codes and fines that apply.

## What to Look For

Sewage spills can be a very noticeable gushing of water from a manhole or a slow water leak that may take time to be noticed. Don't dismiss unaccounted-for wet areas.

Look for:

- Drain backups inside the building.
- Wet ground and water leaking around manhole lids onto your street.
- Leaking water from cleanouts or outside drains.
- Unusual odorous wet areas: sidewalks, external walls or ground/landscape around a building.

## Caution

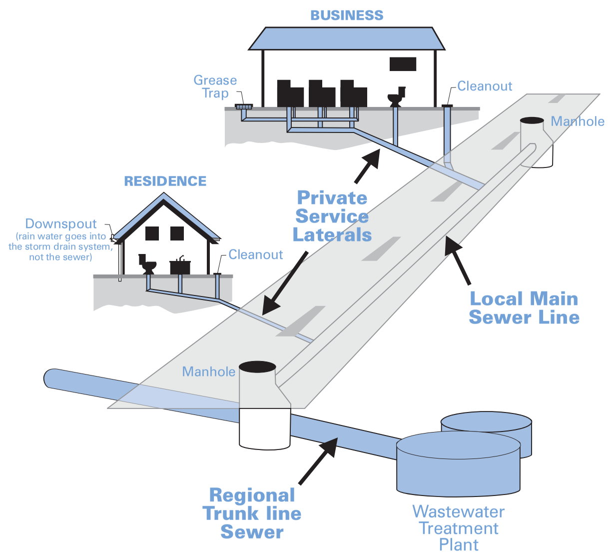
Keep people and pets away from the affected area. Untreated sewage has high levels of disease-causing viruses and bacteria. Call your local health care agency listed on the back for more information.

**If You See a Sewage Spill Occurring, Notify Your City Sewer/Public Works Department or Public Sewer District IMMEDIATELY!**

# How a Sewer System Works

A property owner's sewer pipes are called service laterals and are connected to larger local main and regional trunk lines. Service laterals run from the connection at the home to the connection with the public sewer (including the area under the street). These laterals are the responsibility of the property owner and must be maintained by the property owner. Many city agencies have adopted ordinances requiring maintenance of service laterals. Check with your city sewer/local public works department for more information.

Operation and maintenance of **local and regional sewer lines** are the responsibility of the city sewer/public works departments and public sewer districts.




## How You Can Prevent Sewage Spills

1. **Never put grease down garbage disposals, drains or toilets.**
2. **Perform periodic cleaning to eliminate grease, debris and roots in your service laterals.**
3. **Repair any structural problems in your sewer system and eliminate any rainwater infiltration/inflow leaks into your service laterals.**


## Preventing Grease Blockages

The drain is not a dump! Recycle or dispose of grease properly and never pour grease down the drain.

Homeowners should mix fats, oils and grease with absorbent waste materials such as paper, coffee grounds, or kitty litter and place it in the trash. Wipe food scraps from plates and pans and dump them in the trash.

Restaurants and commercial food service establishments should always use "Kitchen Best Management Practices." These include:

- Collecting all cooking grease and liquid oil from pots, pans and fryers in covered grease containers for recycling.
- Scraping or dry-wiping excess food and grease from dishes, pots, pans and fryers into the trash.
- Installing drain screens on all kitchen drains.
- Having spill kits readily available for cleaning up spills.
- Properly maintaining grease traps or interceptors by having them serviced regularly. Check your local city codes.

## Orange County Agency Responsibilites

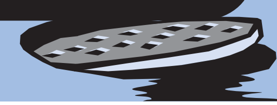
- **City Sewer/Public Works Departments—** Responsible for protecting city property and streets, the local storm drain system, sewage collection system and other public areas.
- **Public Sewer/Sanitation District—** Responsible for collecting, treating and disposing of wastewater.
- **County of Orange Health Care Agency—** Responsible for protecting public health by closing ocean/bay waters and may close food-service businesses if a spill poses a threat to public health.
- **Regional Water Quality Control Boards—** Responsible for protecting State waters.
- **Orange County Stormwater Program—** Responsible for preventing harmful pollutants from being discharged or washed by stormwater runoff into the municipal storm drain system, creeks, bays and the ocean.

## You Could Be Liable for Not Protecting the Environment

Local and state agencies have legal jurisdiction and enforcement authority to ensure that sewage spills are remedied.

They may respond and assist with containment, relieving pipe blockages, and/or clean-up of the sewage spill, especially if the spill is flowing into storm drains or onto public property.

**A property owner may be charged for costs incurred by these agencies responding to spills from private properties**.



## Report Sewage Spills!

### City Sewer/Public Works Departments

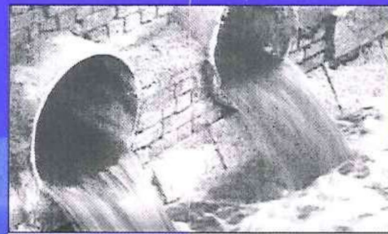
| | |
|---|---|
| Aliso Viejo | (949) 425-2500 |
| Anaheim | (714) 765-6860 |
| Brea | (714) 990-7691 |
| Buena Park | (714) 562-3655 |
| Costa Mesa | (949) 645-8400 |
| Cypress | (714) 229-6760 |
| Dana Point | (949) 248-3562 |
| Fountain Valley | (714) 593-4600 |
| Fullerton | (714) 738-6897 |
| Garden Grove | (714) 741-5375 |
| Huntington Beach | (714) 536-5921 |
| Irvine | (949) 453-5300 |
| Laguna Beach | (949) 497-0765 |
| Laguna Hills | (949) 707-2650 |
| Laguna Niguel | (949) 362-4337 |
| Laguna Woods | (949) 639-0500 |
| La Habra | (562) 905-9792 |
| Lake Forest | (949) 461-3480 |
| La Palma | (714) 690-3310 |
| Los Alamitos | (562) 431-3538 |
| Mission Viejo | (949) 831-2500 |
| Newport Beach | (949) 644-3011 |
| Orange | (714) 532-6480 |
| Orange County | (714) 567-6363 |
| Placentia | (714) 993-8245 |
| Rancho Santa Margarita | (949) 635-1800 |
| San Clemente | (949) 366-1553 |
| San Juan Capistrano | (949) 443-6363 |
| Santa Ana | (714) 647-3380 |
| Seal Beach | (562) 431-2527 |
| Stanton | (714) 379-9222 |
| Tustin | (714) 962-2411 |
| Villa Park | (714) 998-1500 |
| Westminster | (714) 893-3553 |
| Yorba Linda | (714) 961-7170 |

### Public Sewer/Water Districts

| | |
|---|---|
| Costa Mesa Sanitary District | (714) 393-4433/ (949) 645-8400 |
| El Toro Water District | (949) 837-0660 |
| Emerald Bay Service District | (949) 494-8571 |
| Garden Grove Sanitary District | (714) 741-5375 |
| Irvine Ranch Water District | (949) 453-5300 |
| Los Alamitos/Rossmoor Sewer District | (562) 431-2223 |
| Midway City Sanitary District (Westminster) | (714) 893-3553 |
| Moulton Niguel Water District | (949) 831-2500 |
| Orange County Sanitation District | (714) 962-2411 |
| Santa Margarita Water District | (949) 459-6420 |
| South Coast Water District | (949) 499-4555 |
| South Orange County Wastewater Authority | (949) 234-5400 |
| Sunset Beach Sanitary District | (562) 493-9932 |
| Trabuco Canyon Sanitary District | (949) 858-0277 |
| Yorba Linda Water District | (714) 777-3018 |

### Other Agencies

| | |
|---|---|
| Orange County Health Care Agency | (714) 433-6419 |
| Office of Emergency Services | (800) 852-7550 |



Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities can lead to water pollution if you're not careful. Fertilizers, pesticides and other chemicals that are left on yards or driveways can be blown or washed into storm drains that flow to the ocean. Overwatering lawns can also send materials into storm drains. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.

You would never pour gardening products into the ocean, so don't let them enter the storm drains. Follow these easy tips to help prevent water pollution.

The tips contained in this brochure provide useful information to help prevent water pollution while landscaping or gardening.

Additional detailed information is available from the **UCCE Master Gardener Hotline: (714) 708-1646**

To report a spill during normal business hours, please call the **City of Orange Public Works Department** at **(714) 532-6480** or visit **www.cityoforange.org.**

To report a spill after normal business hours, or on weekends, please call the **City of Orange 24-Hour Water Pollution Problem Reporting Hotline** at **(714) 538-1961.**

**For emergencies, dial 911.**

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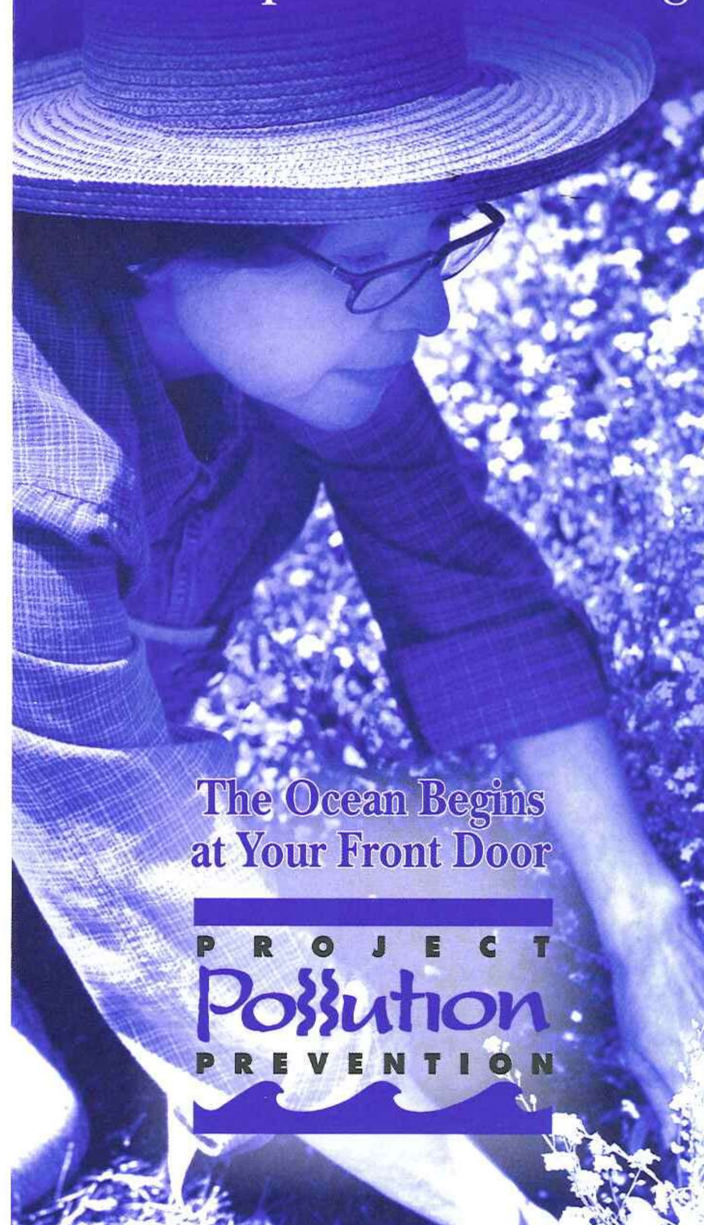
Help Prevent Ocean Pollution:

# Tips for Landscape & Gardening



# Tips for Landscape & Gardening

Never allow gardening products or polluted water to enter the street, gutter or storm drain.

## *General Landscaping Tips*

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.
- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.

- Plant native vegetation to reduce the amount of water, fertilizers, and pesticide applied to the landscape.
- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.

## *Garden & Lawn Maintenance*

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro spray systems. Periodically inspect and fix leaks and misdirected sprinklers.

- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it.
- Use slow-release fertilizers to minimize leaching, and use organic fertilizers.
- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.
- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.

- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains. Dispose of empty containers in the trash.
- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting. For more information, visit **www.ipm.ucdavis.edu**.
- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.
- Take unwanted pesticides to a Household Hazardous Waste Collection Center to be recycled. Locations are provided below.

**Household Hazardous Waste Collection Centers**

| | |
|---|---|
| **Anaheim:** | 1071 N. Blue Gum St. |
| **Huntington Beach:** | 17121 Nichols St. |
| **Irvine:** | 6411 Oak Canyon |
| **San Juan Capistrano:** | 32250 La Pata Ave. |

**For more information, call (714) 834-6752 or visit www.oclandfills.com**

## *Preventing water pollution at your commercial/industrial site*

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many landscape and building maintenance activities can lead to water pollution if you're not careful. Paint, chemicals, plant clippings and other materials can be blown or washed into storm drains that flow to the ocean. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.

You would never pour soap or fertilizers into the ocean, so why would you let them enter the storm drains? Follow these easy tips to help prevent water pollution.

Some types of industrial facilities are required to obtain coverage under the State General Industrial Permit. For more information visit: **www.swrcb.ca.gov/stormwater/industrial.html**

For more information,
please call the
**Orange County Stormwater Program**
at **1-877-89-SPILL** (1-877-897-7455)
or visit
**www.ocwatersheds.com**

To report a spill,
call the
**Orange County 24-Hour Water Pollution Problem Reporting Hotline**
at **1-877-89-SPILL** (1-877-897-7455).

**For emergencies, dial 911.**

RECYCLE USED OIL

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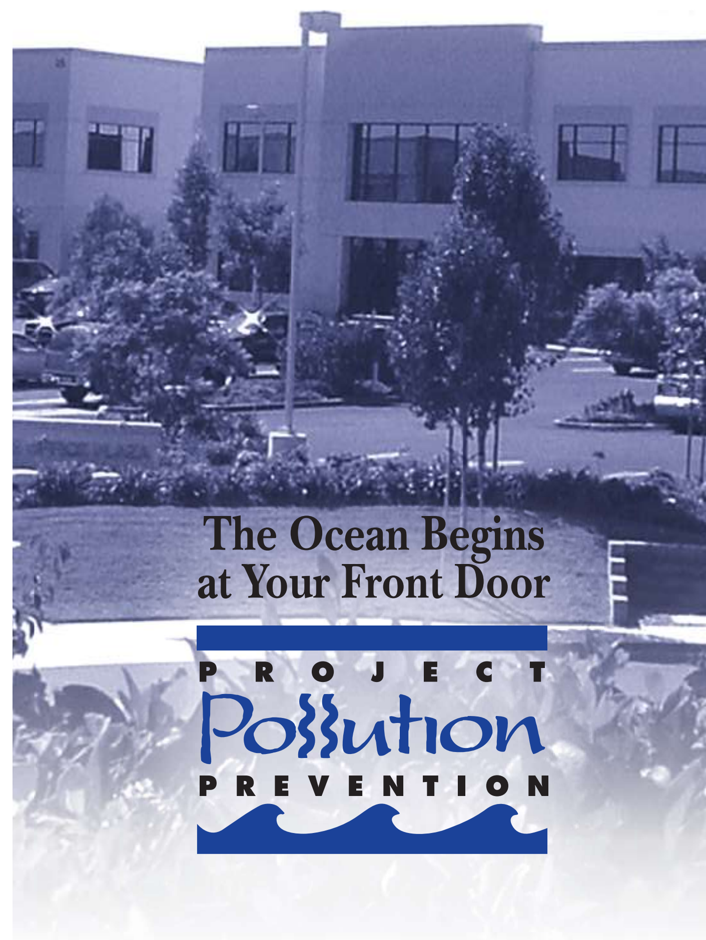
Help Prevent Ocean Pollution:

# Proper Maintenance Practices for Your Business



# Proper Maintenance Practices for your Business

## *Landscape Maintenance*

- Compost grass clippings, leaves, sticks and other vegetation, or dispose of it at a permitted landfill or in green waste containers. Do not dispose of these materials in the street, gutter or storm drain.
- Irrigate slowly and inspect the system for leaks, overspraying and runoff. Adjust automatic timers to avoid overwatering.
- Follow label directions for the use and disposal of fertilizers and pesticides.
- Do not apply pesticides or fertilizers if rain is expected within 48 hours or if wind speeds are above 5 mph.
- Do not spray pesticides within 100 feet of waterways.
- Fertilizers should be worked into the soil rather than dumped onto the surface.
- If fertilizer is spilled on the pavement or sidewalk, sweep it up immediately and place it back in the container.

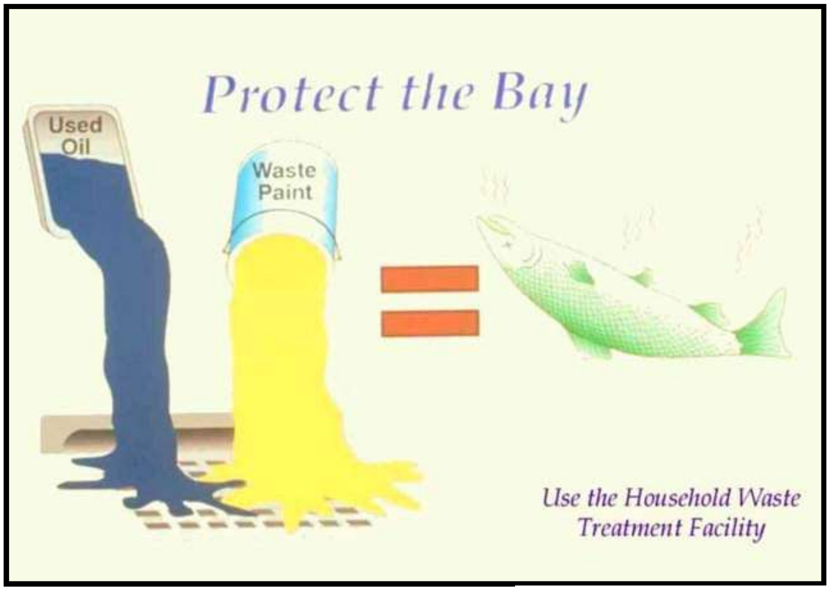
## *Building Maintenance*

- Never allow washwater, sweepings or sediment to enter the storm drain.
- Sweep up dry spills and use cat litter, towels or similar materials to absorb wet spills. Dispose of it in the trash.
- If you wash your building, sidewalk or parking lot, you **must** contain the water. Use a shop vac to collect the water and contact your city or sanitation agency for proper disposal information. Do not let water enter the street, gutter or storm drain.
- Use drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of materials in the trash.
- Use a ground cloth or oversized tub for mixing paint and cleaning tools.
- Use a damp mop or broom to clean floors.
- Cover dumpsters to keep insects, animals, rainwater and sand from entering. Keep the area around the dumpster clear of trash and debris. Do not overfill the dumpster.
- Call your trash hauler to replace leaking dumpsters.
- Do not dump any toxic substance or liquid waste on the pavement, the ground, or near a storm drain. Even materials that seem harmless such as latex paint or biodegradable cleaners can damage the environment.

NEVER DISPOSE OF ANYTHING IN THE STORM DRAIN.

- Recycle paints, solvents and other materials. For more information about recycling and collection centers, visit **www.oclandfills.com**.
- Store materials indoors or under cover and away from storm drains.
- Use a construction and demolition recycling company to recycle lumber, paper, cardboard, metals, masonry, carpet, plastic, pipes, drywall, rocks, dirt, and green waste. For a listing of construction and demolition recycling locations in your area, visit **www.ciwmb.ca.gov/recycle.**
- Properly label materials. Familiarize employees with Material Safety Data Sheets.

PROJECT Pollution PREVENTION




Graphic by: Margie Winter

### Objectives

- Contain
- Educate
- Reduce/Minimize

### Targeted Constituents

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | ☑ |
| Trash | ☑ |
| Metals | ☑ |
| Bacteria | ☑ |
| Oil and Grease | ☑ |
| Organics | ☑ |
| Oxygen Demanding | ☑ |

## Description

Non-stormwater discharges are those flows that do not consist entirely of stormwater. For municipalities non-stormwater discharges present themselves in two situations. One is from fixed facilities owned and/or operated by the municipality. The other situation is non-stormwater discharges that are discovered during the normal operation of a field program. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain. These include uncontaminated groundwater and natural springs. There are also some non-stormwater discharges that typically do not contain pollutants and may be discharged to the storm drain with conditions. These include car washing, and surface cleaning. However, there are certain non-stormwater discharges that pose environmental concern. These discharges may originate from illegal dumping or from internal floor drains, appliances, industrial processes, sinks, and toilets that are connected to the nearby storm drainage system. These discharges (which may include: process waste waters, cooling waters, wash waters, and sanitary wastewater) can carry substances (such as paint, oil, fuel and other automotive fluids, chemicals and other pollutants) into storm drains. The ultimate goal is to effectively eliminate non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges.

## Approach

The municipality must address non-stormwater discharges from its fixed facilities by assessing the types of non-stormwater discharges and implementing BMPs for the discharges determined to pose environmental concern. For field programs

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the field staff must be trained to now what to look for regarding non-stormwater discharges and the procedures to follow in investigating the detected discharges.

***Suggested Protocols***

**Fixed Facility**

*General*

- Post "No Dumping" signs with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.

- Stencil storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.

- Landscaping and beautification efforts of hot spots might also discourage future dumping, as well as provide open space and increase property values.

- Lighting or barriers may also be needed to discourage future dumping.

*Illicit Connections*

- Locate discharges from the fixed facility drainage system to the municipal storm drain system through review of "as-built" piping schematics.

- Use techniques such as smoke testing, dye testing and television camera inspection (as noted below) to verify physical connections.

- Isolate problem areas and plug illicit discharge points.

*Visual Inspection and Inventory*

- Inventory and inspect each discharge point during dry weather.

- Keep in mind that drainage from a storm event can continue for several days following the end of a storm and groundwater may infiltrate the underground stormwater collection system. Also, non-stormwater discharges are often intermittent and may require periodic inspections.

*Review Infield Piping*

- Review the "as-built" piping schematic as a way to determine if there are any connections to the stormwater collection system.

- Inspect the path of floor drains in older buildings.

*Smoke Testing*

- Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two systems.

- During dry weather the stormwater collection system is filled with smoke and then traced to sources. The appearance of smoke at the base of a toilet indicates that there may be a connection between the sanitary and the stormwater system.

  *Dye Testing*

- A dye test can be performed by simply releasing a dye into either your sanitary or process wastewater system and examining the discharge points from the stormwater collection system for discoloration.

*TV Inspection of Storm Sewer*

- TV Cameras can be employed to visually identify illicit connections to the fixed facility storm drain system.

*Illegal Dumping*

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- Clean up spills on paved surfaces with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.
- See fact sheet SC-11 Spill Prevention, Control, and Clean Up.

**<u>Field Program</u>**

*General*

- Develop clear protocols and lines of communication for effectively prohibiting non-stormwater discharges, especially ones that involve more than one jurisdiction and those that are not classified as hazardous, which are often not responded to as effectively as they need to be.
- Stencil storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as “Dump No Waste Drains to Stream” stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- See SC-74 Stormwater Drainage System Maintenance for additional information.

*Field Inspection*

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- During routine field program maintenance field staff should look for evidence of illegal discharges or illicit connection:
  - Is there evidence of spills such as paints, discoloring, etc.
  - Are there any odors associated with the drainage system
  - Record locations of apparent illegal discharges/illicit connections and notify appropriate investigating agency.
- If trained, conduct field investigation of non-stormwater discharges to determine whether they pose a threat to water quality.

*Recommended Complaint Investigation Equipment*

- Field Screening Analysis
  - pH paper or meter
  - Commercial stormwater pollutant screening kit that can detect for reactive phosphorus, nitrate nitrogen, ammonium nitrogen, specific conductance, and turbidity
  - Sample jars
  - Sample collection pole
  - A tool to remove access hole covers
- Laboratory Analysis
  - Sample cooler
  - Ice
  - Sample jars and labels
  - Chain of custody forms.
- Documentation
  - Camera
  - Notebook
  - Pens
  - Notice of Violation forms

- Educational materials

*Reporting*

- A database is useful for defining and tracking the magnitude and location of the problem.
- Report prohibited non-stormwater discharges observed during the course of normal daily activities so they can be investigated, contained and cleaned up or eliminated.
- Document that non-stormwater discharges have been eliminated by recording tests performed, methods used, dates of testing, and any onsite drainage points observed.
- Maintain documentation of illicit connection and illegal dumping incidents, including significant conditionally exempt discharges that are not properly managed.

*Enforcement*

- Educate the responsible party if identified on the impacts of their actions, explain the stormwater requirements, and provide information regarding Best Management Practices (BMP), as appropriate. Initiate follow-up and/or enforcement procedures.
- If an illegal discharge is traced to a commercial, residential or industrial source, conduct the following activities or coordinate the following activities with the appropriate agency:
    - Contact the responsible party to discuss methods of eliminating the non-stormwater discharge, including disposal options, recycling, and possible discharge to the sanitary sewer (if within POTW limits).
    - Provide information regarding BMPs to the responsible party, where appropriate.
    - Begin enforcement procedures, if appropriate.
    - Continue inspection and follow-up activities until the illicit discharge activity has ceased.
- If an illegal discharge is traced to a commercial or industrial activity, coordinate information on the discharge with the jurisdiction's commercial and industrial facility inspection program.

***Training***

- Train technical staff to identify and document illegal dumping incidents.
- Well-trained employees can reduce human errors that lead to accidental releases or spills. The employee should have the tools and knowledge to immediately begin cleaning up a spill if one should occur. Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.
- Train employees to identify non-stormwater discharges and report them to the appropriate departments.
- Train staff who have the authority to conduct surveillance and inspections, and write citations for those caught illegally dumping.

- Train municipal staff responsible for surveillance and inspection in the following:
  - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).
  - OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and federal OSHA 29 CFR 1910.146).
  - Procedural training (field screening, sampling, smoke/dye testing, TV inspection).
- Educate the identified responsible party on the impacts of his or her actions.

***Spill Response and Prevention***

- See SC-11 Spill Prevention Control and Clean Up

***Other Considerations***

- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The cost of fees for dumping at a proper waste disposal facility are often more than the fine for an illegal dumping offense, thereby discouraging people from complying with the law. The absence of routine or affordable pickup service for trash and recyclables in some communities also encourages illegal dumping. A lack of understanding regarding applicable laws or the inadequacy of existing laws may also contribute to the problem.
- Municipal codes should include sections prohibiting the discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.
- Many facilities do not have accurate, up-to-date schematic drawings.
- Can be difficult to locate illicit connections especially if there is groundwater infiltration.

## Requirements

***Costs***

- Eliminating illicit connections can be expensive especially if structural modifications are required such re-plumbing cross connections under an existing slab.
- Minor cost to train field crews regarding the identification of non-stormwater discharges. The primary cost is for a fully integrated program to identify and eliminate illicit connections and illegal dumping. However, by combining with other municipal programs (i.e. pretreatment program) cost may be lowered.
- Municipal cost for containment and disposal may be borne by the discharger.

***Maintenance***

Not applicable

## Supplemental Information

***Further Detail of the BMP***

*What constitutes a "non-stormwater" discharge?*

- Non-stormwater discharges are discharges not made up entirely of stormwater and include water used directly in the manufacturing process (process wastewater), air conditioning condensate and coolant, non-contact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, landscape irrigation, sink and drinking fountain wastewater, sanitary wastes, or other wastewaters.

*Permit Requirements*

- Current municipal NPDES permits require municipalities to effectively prohibit non-stormwater discharges unless authorized by a separate NPDES permit or allowed in accordance with the current NPDES permit conditions. Typically the current permits allow certain non-stormwater discharges in the storm drain system as long as the discharges are not significant sources of pollutants. In this context the following non-stormwater discharges are typically allowed:

  - Diverted stream flows;
  - Rising found waters;
  - Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20));
  - Uncontaminated pumped ground water;
  - Foundation drains;
  - Springs;
  - Water from crawl space pumps;
  - Footing drains;
  - Air conditioning condensation;
  - Flows from riparian habitats and wetlands;
  - Water line and hydrant flushing ;
  - Landscape irrigation;
  - Planned and unplanned discharges from potable water sources;
  - Irrigation water;
  - Individual residential car washing; and
  - Lawn watering.

Municipal facilities subject to industrial general permit requirements must include a certification that the stormwater collection system has been tested or evaluated for the presence of non-stormwater discharges. The state's General Industrial Stormwater Permit requires that non-stormwater discharges be eliminated prior to implementation of the facility's SWPPP.

*Illegal Dumping*

- Establish a system for tracking incidents. The system should be designed to identify the following:
    - Illegal dumping hot spots
    - Types and quantities (in some cases) of wastes
    - Patterns in time of occurrence (time of day/night, month, or year)
    - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
    - Responsible parties

*Outreach*

One of the keys to success of reducing or eliminating illegal dumping is increasing the number of people on the street who are aware of the problem and who have the tools to at least identify the incident, if not correct it. There we a number of ways of accomplishing this:

- Train municipal staff from all departments (public works, utilities, street cleaning, parks and recreation, industrial waste inspection, hazardous waste inspection, sewer maintenance) to recognize and report the incidents.
- Deputize municipal staff who may come into contact with illegal dumping with the authority to write illegal dumping tickets for offenders caught in the act (see below).
- Educate the public. As many as 3 out of 4 people do not understand that in most communities the storm drain does not go to the wastewater treatment plant. Unfortunately, with the heavy emphasis in recent years on public education about solid waste management, including recycling and household hazardous waste, the sewer system (both storm and sanitary) has been the likely recipient of cross-media transfers of waste.
- Provide the public with a mechanism for reporting incidents such as a hot line and/or door hanger (see below).
- Help areas where incidents occur more frequently set up environmental watch programs (like crime watch programs).
- Train volunteers to notice and report the presence and suspected source of an observed pollutant to the appropriate public agency.

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  - Individual residential car washing; and
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*Storm Drain Stenciling*

- Stencil storm drain inlets with a message to prohibit illegal dumpings, especially in areas with waste handling facilities.
- Encourage public reporting of improper waste disposal by a HOTLINE number stenciled onto the storm drain inlet.
- See Supplemental Information section of this fact sheet for further detail on stenciling program approach.

*Oil Recycling*

- Contract collection and hauling of used oil to a private licensed used oil hauler/recycler.
- Comply with all applicable state and federal regulations regarding storage, handling, and transport of petroleum products.
- Create procedures for collection such as; collection locations and schedule, acceptable containers, and maximum amounts accepted.
- The California Integrated Waste Management Board has a Recycling Hotline, (800) 553-2962, that provides information and recycling locations for used oil.

***Household Hazardous Waste***

- Provide household hazardous waste (HHW) collection facilities. Several types of collection approaches are available including permanent, periodic, or mobile centers, curbside collection, or a combination of these systems.

***Training***

- Train municipal employees and contractors in proper and consistent methods for waste disposal.
- Train municipal employees to recognize and report illegal dumping.
- Train employees and subcontractors in proper hazardous waste management.

***Spill Response and Prevention***

- Refer to SC-11, Spill Prevention, Control & Cleanup
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

### *Other Considerations*

- Federal Regulations (RCRA, SARA, CERCLA) and state regulations exist regarding the disposal of hazardous waste.
- Municipalities are required to have a used oil recycling element and a HHW element within their integrated waste management plan.
- Significant liability issues are involved with the collection, handling, and disposal of HHW.

### *Examples*

The City of Palo Alto has developed a public participation program for reporting dumping violations. When a concerned citizen or public employee encounters evidence of illegal dumping, a door hanger (similar in format to hotel "Do Not Disturb" signs) is placed on the front doors in the neighborhood. The door hanger notes that a violation has occurred in the neighborhood, informs the reader why illegal dumping is a problem, and notes that illegal dumping carries a significant financial penalty. Information is also provided on what citizens can do as well as contact numbers for more information or to report a violation.

The Port of Long Beach has a state of the art database incorporating storm drain infrastructure, potential pollutant sources, facility management practices, and a pollutant tracking system.

The State Department of Fish and Game has a hotline for reporting violations called CalTIP (1-800-952-5400). The phone number may be used to report any violation of a Fish and Game code (illegal dumping, poaching, etc.).

The California Department of Toxic Substances Control's Waste Alert Hotline, 1-800-69TOXIC, can be used to report hazardous waste violations.

## References and Resources

http://www.stormwatercenter.net/

California's Nonpoint Source Program Plan http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Stormwater Pollution Control Manual - http://dnr.metrokc.gov/wlr/dss/spcm.htm

Orange County Stormwater Program,
http://www.ocwatersheds.com/stormwater/swp_introduction.asp

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (http://www.projectcleanwater.org)

Santa Clara Valley Urban Runoff Pollution Prevention Program
http://www.scvurppp-w2k.com/pdf%20documents/PS_ICID.PDF

# Spill Prevention, Control & Cleanup SC-11

Photo Credit: Geoff Brosseau

### Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

### Targeted Constituents

| | |
|---|---|
| Sediment | |
| Nutrients | |
| Trash | |
| Metals | ☑ |
| Bacteria | |
| Oil and Grease | ☑ |
| Organics | ☑ |

## Description

Many activities that occur at an industrial or commercial site have the potential to cause accidental or illegal spills. Preparation for accidental or illegal spills, with proper training and reporting systems implemented, can minimize the discharge of pollutants to the environment.

Spills and leaks are one of the largest contributors of stormwater pollutants. Spill prevention and control plans are applicable to any site at which hazardous materials are stored or used. An effective plan should have spill prevention and response procedures that identify potential spill areas, specify material handling procedures, describe spill response procedures, and provide spill clean-up equipment. The plan should take steps to identify and characterize potential spills, eliminate and reduce spill potential, respond to spills when they occur in an effort to prevent pollutants from entering the stormwater drainage system, and train personnel to prevent and control future spills.

## Approach

### *Pollution Prevention*

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- Develop a Spill Prevention Control and Countermeasure (SPCC) Plan. The plan should include:

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  - Description of the facility, owner and address, activities and chemicals present
  - Facility map
  - Notification and evacuation procedures
  - Cleanup instructions
  - Identification of responsible departments
  - Identify key spill response personnel

- Recycle, reclaim, or reuse materials whenever possible. This will reduce the amount of process materials that are brought into the facility.

***Suggested Protocols (including equipment needs)***

*Spill Prevention*

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- If consistent illegal dumping is observed at the facility:

  - Post "No Dumping" signs with a phone number for reporting illegal dumping and disposal. Signs should also indicate fines and penalties applicable for illegal dumping.
  - Landscaping and beautification efforts may also discourage illegal dumping.
  - Bright lighting and/or entrance barriers may also be needed to discourage illegal dumping.

- Store and contain liquid materials in such a manner that if the tank is ruptured, the contents will not discharge, flow, or be washed into the storm drainage system, surface waters, or groundwater.

- If the liquid is oil, gas, or other material that separates from and floats on water, install a spill control device (such as a tee section) in the catch basins that collects runoff from the storage tank area.

- Routine maintenance:

  - Place drip pans or absorbent materials beneath all mounted taps, and at all potential drip and spill locations during filling and unloading of tanks. Any collected liquids or soiled absorbent materials must be reused/recycled or properly disposed.
  - Store and maintain appropriate spill cleanup materials in a location known to all near the tank storage area; and ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.
  - Sweep and clean the storage area monthly if it is paved, *do not hose down the area to a storm drain.*

- Check tanks (and any containment sumps) daily for leaks and spills. Replace tanks that are leaking, corroded, or otherwise deteriorating with tanks in good condition. Collect all spilled liquids and properly dispose of them.

- Label all containers according to their contents (e.g., solvent, gasoline).
- Label hazardous substances regarding the potential hazard (corrosive, radioactive, flammable, explosive, poisonous).
- Prominently display required labels on transported hazardous and toxic materials (per US DOT regulations).
- Identify key spill response personnel.

*Spill Control and Cleanup Activities*

- Follow the Spill Prevention Control and Countermeasure Plan.
- Clean up leaks and spills immediately.
- Place a stockpile of spill cleanup materials where it will be readily accessible (e.g., near storage and maintenance areas).
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste. Physical methods for the cleanup of dry chemicals include the use of brooms, shovels, sweepers, or plows.
- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Chemical cleanups of material can be achieved with the use of adsorbents, gels, and foams. Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.

*Reporting*

- Report spills that pose an immediate threat to human health or the environment to the Regional Water Quality Control Board.
- Federal regulations require that any oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hour).
- Report spills to local agencies, such as the fire department; they can assist in cleanup.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)

- Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)

- Responsible parties

***Training***

- Educate employees about spill prevention and cleanup.

- Well-trained employees can reduce human errors that lead to accidental releases or spills:

  - The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur.

  - Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.

- Employees should be educated about aboveground storage tank requirements. Employees responsible for aboveground storage tanks and liquid transfers should be thoroughly familiar with the Spill Prevention Control and Countermeasure Plan and the plan should be readily available.

- Train employees to recognize and report illegal dumping incidents.

***Other Considerations (Limitations and Regulations)***

- A Spill Prevention Control and Countermeasure Plan (SPCC) is required for facilities that are subject to the oil pollution regulations specified in Part 112 of Title 40 of the Code of Federal Regulations or if they have a storage capacity of 10,000 gallons or more of petroleum. (Health and Safety Code 6.67)

- State regulations also exist for storage of hazardous materials (Health & Safety Code Chapter 6.95), including the preparation of area and business plans for emergency response to the releases or threatened releases.

- Consider requiring smaller secondary containment areas (less than 200 sq. ft.) to be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

## Requirements

***Costs (including capital and operation & maintenance)***

- Will vary depending on the size of the facility and the necessary controls.

- Prevention of leaks and spills is inexpensive. Treatment and/or disposal of contaminated soil or water can be quite expensive.

***Maintenance (including administrative and staffing)***

- This BMP has no major administrative or staffing requirements. However, extra time is needed to properly handle and dispose of spills, which results in increased labor costs.

## Supplemental Information

***Further Detail of the BMP***

*Reporting*

Record keeping and internal reporting represent good operating practices because they can increase the efficiency of the facility and the effectiveness of BMPs. A good record keeping system helps the facility minimize incident recurrence, correctly respond with appropriate cleanup activities, and comply with legal requirements. A record keeping and reporting system should be set up for documenting spills, leaks, and other discharges, including discharges of hazardous substances in reportable quantities. Incident records describe the quality and quantity of non-stormwater discharges to the storm sewer. These records should contain the following information:

- Date and time of the incident
- Weather conditions
- Duration of the spill/leak/discharge
- Cause of the spill/leak/discharge
- Response procedures implemented
- Persons notified
- Environmental problems associated with the spill/leak/discharge

Separate record keeping systems should be established to document housekeeping and preventive maintenance inspections, and training activities. All housekeeping and preventive maintenance inspections should be documented. Inspection documentation should contain the following information:

- The date and time the inspection was performed
- Name of the inspector
- Items inspected
- Problems noted
- Corrective action required
- Date corrective action was taken

Other means to document and record inspection results are field notes, timed and dated photographs, videotapes, and drawings and maps.

*Aboveground Tank Leak and Spill Control*

Accidental releases of materials from aboveground liquid storage tanks present the potential for contaminating stormwater with many different pollutants. Materials spilled, leaked, or lost from tanks may accumulate in soils or on impervious surfaces and be carried away by stormwater runoff.

The most common causes of unintentional releases are:

- Installation problems
- Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves)
- External corrosion and structural failure
- Spills and overfills due to operator error
- Leaks during pumping of liquids or gases from truck or rail car to a storage tank or vice versa

Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code. Practices listed below should be employed to enhance the code requirements:

- Tanks should be placed in a designated area.
- Tanks located in areas where firearms are discharged should be encapsulated in concrete or the equivalent.
- Designated areas should be impervious and paved with Portland cement concrete, free of cracks and gaps, in order to contain leaks and spills.
- Liquid materials should be stored in UL approved double walled tanks or surrounded by a curb or dike to provide the volume to contain 10 percent of the volume of all of the containers or 110 percent of the volume of the largest container, whichever is greater. The area inside the curb should slope to a drain.
- For used oil or dangerous waste, a dead-end sump should be installed in the drain.
- All other liquids should be drained to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.
- Accumulated stormwater in petroleum storage areas should be passed through an oil/water separator.

Maintenance is critical to preventing leaks and spills. Conduct routine inspections and:

- Check for external corrosion and structural failure.
- Check for spills and overfills due to operator error.
- Check for failure of piping system (pipes, pumps, flanger, coupling, hoses, and valves).
- Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.

- Visually inspect new tank or container installation for loose fittings, poor welding, and improper or poorly fitted gaskets.
- Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- Frequently relocate accumulated stormwater during the wet season.
- Periodically conduct integrity testing by a qualified professional.

*Vehicle Leak and Spill Control*

Major spills on roadways and other public areas are generally handled by highly trained Hazmat teams from local fire departments or environmental health departments. The measures listed below pertain to leaks and smaller spills at vehicle maintenance shops.

In addition to implementing the spill prevention, control, and clean up practices above, use the following measures related to specific activities:

*Vehicle and Equipment Maintenance*

- Perform all vehicle fluid removal or changing inside or under cover to prevent the run-on of stormwater and the runoff of spills.
- Regularly inspect vehicles and equipment for leaks, and repair immediately.
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Immediately drain all fluids from wrecked vehicles.
- Store wrecked vehicles or damaged equipment under cover.
- Place drip pans or absorbent materials under heavy equipment when not in use.
- Use adsorbent materials on small spills rather than hosing down the spill.
- Remove the adsorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don’t leave full drip pans or other open containers lying around.
- Oil filters disposed of in trashcans or dumpsters can leak oil and contaminate stormwater. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.

- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

*Vehicle and Equipment Fueling*

- Design the fueling area to prevent the run-on of stormwater and the runoff of spills:
  - Cover fueling area if possible.
  - Use a perimeter drain or slope pavement inward with drainage to a sump.
  - Pave fueling area with concrete rather than asphalt.
- If dead-end sump is not used to collect spills, install an oil/water separator.
- Install vapor recovery nozzles to help control drips as well as air pollution.
- Discourage "topping-off" of fuel tanks.
- Use secondary containment when transferring fuel from the tank truck to the fuel tank.
- Use adsorbent materials on small spills and general cleaning rather than hosing down the area. Remove the adsorbent materials promptly.
- Carry out all Federal and State requirements regarding underground storage tanks, or install above ground tanks.
- Do not use mobile fueling of mobile industrial equipment around the facility; rather, transport the equipment to designated fueling areas.
- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Train employees in proper fueling and cleanup procedures.

*Industrial Spill Prevention Response*

For the purposes of developing a spill prevention and response program to meet the stormwater regulations, facility managers should use information provided in this fact sheet and the spill prevention/response portions of the fact sheets in this handbook, for specific activities. The program should:

- Integrate with existing emergency response/hazardous materials programs (e.g., Fire Department)
- Develop procedures to prevent/mitigate spills to storm drain systems
- Identify responsible departments
- Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures
- Address spills at municipal facilities, as well as public areas

- Provide training concerning spill prevention, response and cleanup to all appropriate personnel

## References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Stormwater Managers Resource Center http://www.stormwatercenter.net/

# Waste Handling & Disposal SC-34

## Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

## Targeted Constituents

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | ☑ |
| Trash | ☑ |
| Metals | ☑ |
| Bacteria | ☑ |
| Oil and Grease | ☑ |
| Organics | ☑ |
| Oxygen Demanding | ☑ |

## Description

Improper storage and handling of solid wastes can allow toxic compounds, oils and greases, heavy metals, nutrients, suspended solids, and other pollutants to enter stormwater runoff. The discharge of pollutants to stormwater from waste handling and disposal can be prevented and reduced by tracking waste generation, storage, and disposal; reducing waste generation and disposal through source reduction, re-use, and recycling; and preventing runon and runoff.

## Approach

### *Pollution Prevention*

- Reduction in the amount of waste generated can be accomplished using the following source controls such as:
  - Production planning and sequencing
  - Process or equipment modification
  - Raw material substitution or elimination
  - Loss prevention and housekeeping
  - Waste segregation and separation
  - Close loop recycling
- Establish a material tracking system to increase awareness about material usage. This may reduce spills and minimize contamination, thus reducing the amount of waste produced.
- Recycle materials whenever possible.

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***Suggested Protocols***

*General*

- Cover storage containers with leak proof lids or some other means. If waste is not in containers, cover all waste piles (plastic tarps are acceptable coverage) and prevent stormwater runon and runoff with a berm. The waste containers or piles must be covered except when in use.
- Use drip pans or absorbent materials whenever grease containers are emptied by vacuum trucks or other means. Grease cannot be left on the ground. Collected grease must be properly disposed of as garbage.
- Check storage containers weekly for leaks and to ensure that lids are on tightly. Replace any that are leaking, corroded, or otherwise deteriorating.
- Sweep and clean the storage area regularly. If it is paved, do not hose down the area to a storm drain.
- Dispose of rinse and wash water from cleaning waste containers into a sanitary sewer if allowed by the local sewer authority. Do not discharge wash water to the street or storm drain.
- Transfer waste from damaged containers into safe containers.
- Take special care when loading or unloading wastes to minimize losses. Loading systems can be used to minimize spills and fugitive emission losses such as dust or mist. Vacuum transfer systems can minimize waste loss.

*Controlling Litter*

- Post "No Littering" signs and enforce anti-litter laws.
- Provide a sufficient number of litter receptacles for the facility.
- Clean out and cover litter receptacles frequently to prevent spillage.

*Waste Collection*

- Keep waste collection areas clean.
- Inspect solid waste containers for structural damage or leaks regularly. Repair or replace damaged containers as necessary.
- Secure solid waste containers; containers must be closed tightly when not in use.
- Place waste containers under cover if possible.
- Do not fill waste containers with washout water or any other liquid.
- Ensure that only appropriate solid wastes are added to the solid waste container. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, etc. may not be

disposed of in solid waste containers (see chemical/ hazardous waste collection section below).

- Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal.

*Good Housekeeping*

- Use all of the product before disposing of the container.
- Keep the waste management area clean at all times by sweeping and cleaning up spills immediately.
- Use dry methods when possible (e.g. sweeping, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.
- Stencil storm drains on the facility's property with prohibitive message regarding waste disposal.

*Chemical/Hazardous Wastes*

- Select designated hazardous waste collection areas on-site.
- Store hazardous materials and wastes in covered containers protected from vandalism, and in compliance with fire and hazardous waste codes.
- Place hazardous waste containers in secondary containment.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.

*Runon/Runoff Prevention*

- Prevent stormwater runon from entering the waste management area by enclosing the area or building a berm around the area.
- Prevent the waste materials from directly contacting rain.
- Cover waste piles with temporary covering material such as reinforced tarpaulin, polyethylene, polyurethane, polypropyleneor hypalon.
- Cover the area with a permanent roof if feasible.
- Cover dumpsters to prevent rain from washing waste out of holes or cracks in the bottom of the dumpster.
- Move the activity indoor after ensuring all safety concerns such as fire hazard and ventilation are addressed.

*Inspection*

- Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.
- Check waste management areas for leaking containers or spills.
- Repair leaking equipment including valves, lines, seals, or pumps promptly.

***Training***

- Train staff pollution prevention measures and proper disposal methods.
- Train employees and contractors proper spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill if one should occur.
- Train employees and subcontractors in proper hazardous waste management.

***Spill Response and Prevention***

- Refer to SC-11, Spill Prevention, Control & Cleanup.
- Keep your Spill Prevention Control and countermeasure (SPCC) plan up-to-date, and implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.
- Vehicles transporting waste should have spill prevention equipment that can prevent spills during transport. The spill prevention equipment includes:
  - Vehicles equipped with baffles for liquid waste
  - Trucks with sealed gates and spill guards for solid waste

***Other Considerations***

- Hazardous waste cannot be re-used or recycled; it must be disposed of by a licensed hazardous waste hauler.

## Requirements

***Costs***

- Capital and operation and maintenance costs will vary substantially depending on the size of the facility and the types of waste handled. Costs should be low if there is an inventory program in place.

***Maintenance***

- None except for maintaining equipment for material tracking program.

## Supplemental Information

***Further Detail of the BMP***

*Land Treatment System*

- Minimize the runoff of polluted stormwater from land application of municipal waste on-site by:
  - Choosing a site where slopes are under 6%, the soil is permeable, there is a low water table, it is located away from wetlands or marshes, there is a closed drainage system.
  - Avoiding application of waste to the site when it is raining or when the ground is saturated with water.
  - Growing vegetation on land disposal areas to stabilize soils and reduce the volume of surface water runoff from the site.
  - Maintaining adequate barriers between the land application site and the receiving waters. Planted strips are particularly good.
  - Using erosion control techniques such as mulching and matting, filter fences, straw bales, diversion terracing, and sediment basins.
  - Performing routine maintenance to ensure the erosion control or site stabilization measures are working.

## References and Resources

King County Stormwater Pollution Control Manual - http://dnr.metrokc.gov/wlr/dss/spcm.htm

Orange County Stormwater Program
http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Associations (BASMAA). On-line: http://www.basmaa.org


### Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

### Targeted Constituents

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | ☑ |
| Trash | ☑ |
| Metals | ☑ |
| Bacteria | ☑ |
| Oil and Grease | ☑ |
| Organics | ☑ |
| Oxygen Demanding | ☑ |

## Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, and abnormal pH. Utilizing the following protocols will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

## Approach

### *Pollution Prevention*

- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.
- Encourage proper lawn management and landscaping, including use of native vegetation.
- Encourage use of Integrated Pest Management techniques for pest control.
- Encourage proper onsite recycling of yard trimmings.
- Recycle residual paints, solvents, lumber, and other material as much as possible.

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***Suggested Protocols***

*Pressure Washing of Buildings, Rooftops, and Other Large Objects*

- In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a waste water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.

- If soaps or detergents are not used, and the surrounding area is paved, wash water runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in he catch basin to trap the particles in wash water runoff.

- If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement. Ensure that this practice does not kill grass.

*Landscaping Activities*

- Do not apply any chemicals (insecticide, herbicide, or fertilizer) directly to surface waters, unless the application is approved and permitted by the state.

- Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.

- Use mulch or other erosion control measures on exposed soils.

- Check irrigation schedules so pesticides will not be washed away and to minimize non-stormwater discharge.

*Building Repair, Remodeling, and Construction*

- Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.

- Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.

- Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.

- Clean paint brushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.

- Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and solids must be collected and disposed of before removing the containment device(s) at the end of the work day.

- If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. In which case you should direct the water through hay bales and filter fabric or use other sediment filters or traps.

- Store toxic material under cover with secondary containment during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

*Mowing, Trimming, and Planting*

- Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.

- Use mulch or other erosion control measures when soils are exposed.

- Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.

- Consider an alternative approach when bailing out muddy water; do not put it in the storm drain, pour over landscaped areas.

- Use hand or mechanical weeding where practical.

*Fertilizer and Pesticide Management*

- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.

- Follow manufacturers' recommendations and label directions. Pesticides must never be applied if precipitation is occuring or predicted. Do not apply insecticides within 100 feet of surface waters such as lakes, ponds, wetlands, and streams.

- Use less toxic pesticides that will do the job, whenever possible. Avoid use of copper-based pesticides if possible.

- Do not use pesticides if rain is expected.

- Do not mix or prepare pesticides for application near storm drains.

- Use the minimum amount needed for the job.

- Calibrate fertilizer distributors to avoid excessive application.

- Employ techniques to minimize off-target application (e.g. spray drift) of pesticides, including consideration of alternative application techniques.

- Apply pesticides only when wind speeds are low.
- Work fertilizers into the soil rather than dumping or broadcasting them onto the surface.
- Irrigate slowly to prevent runoff and then only as much as is needed.
- Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Dispose of empty pesticide containers according to the instructions on the container label.
- Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.

*Inspection*

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering, and repair leaks in the irrigation system as soon as they are observed.

***Training***

- Educate and train employees on use of pesticides and in pesticide application techniques to prevent pollution.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Be sure the frequency of training takes into account the complexity of the operations and the nature of the staff.

***Spill Response and Prevention***

- Refer to SC-11, Spill Prevention, Control & Cleanup
- Keep your Spill Prevention Control and countermeasure (SPCC) plan up-to-date, and implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

***Other Considerations***

- Alternative pest/weed controls may not be available, suitable, or effective in many cases.

## Requirements

### *Costs*

- Overall costs should be low in comparison to other BMPs.

### *Maintenance*

- Sweep paved areas regularly to collect loose particles, and wipe up spills with rags and other absorbent material immediately, do not hose down the area to a storm drain.

## Supplemental Information

### *Further Detail of the BMP*

*Fire Sprinkler Line Flushing*

Building fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping but it is subject to rusting and results in lower quality water. Initially the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, poly-phosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time, typically a year, between flushes and may accumulate iron, manganese, lead, copper, nickel and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

## References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

King County - ftp://dnr.metrokc.gov/wlr/dss/spcm/Chapter%203.PDF

Orange County Stormwater Program
http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Mobile Cleaners Pilot Program: Final Report. 1997. Bay Area Stormwater Management Agencies Association (BASSMA) http://www.basmaa.org/

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA) http://www.basmaa.org/

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (URMP) -
http://www.projectcleanwater.org/pdf/Model%20Program%20Municipal%20Facilities.pdf

# Storm Drain Signage SD-13


**Design Objectives**

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

## Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

## Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

## Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

## Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

### *Designing New Installations*

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include "NO DUMPING

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– DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

### *Redeveloping Existing Installations*

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

## Additional Information

### *Maintenance Considerations*

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

### *Placement*

- Signage on top of curbs tends to weather and fade.

- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

## Supplemental Information

### *Examples*

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

## Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

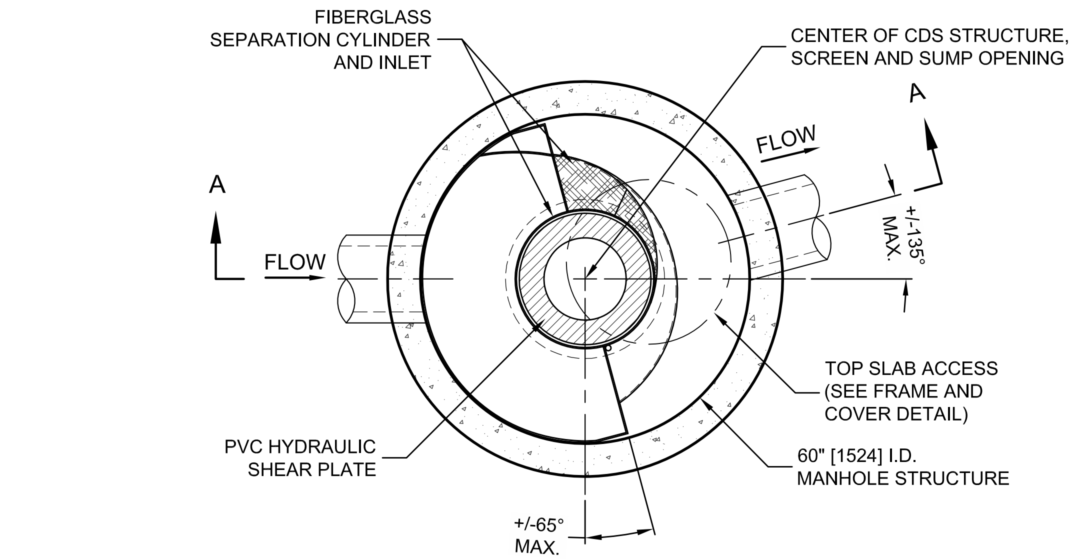
Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

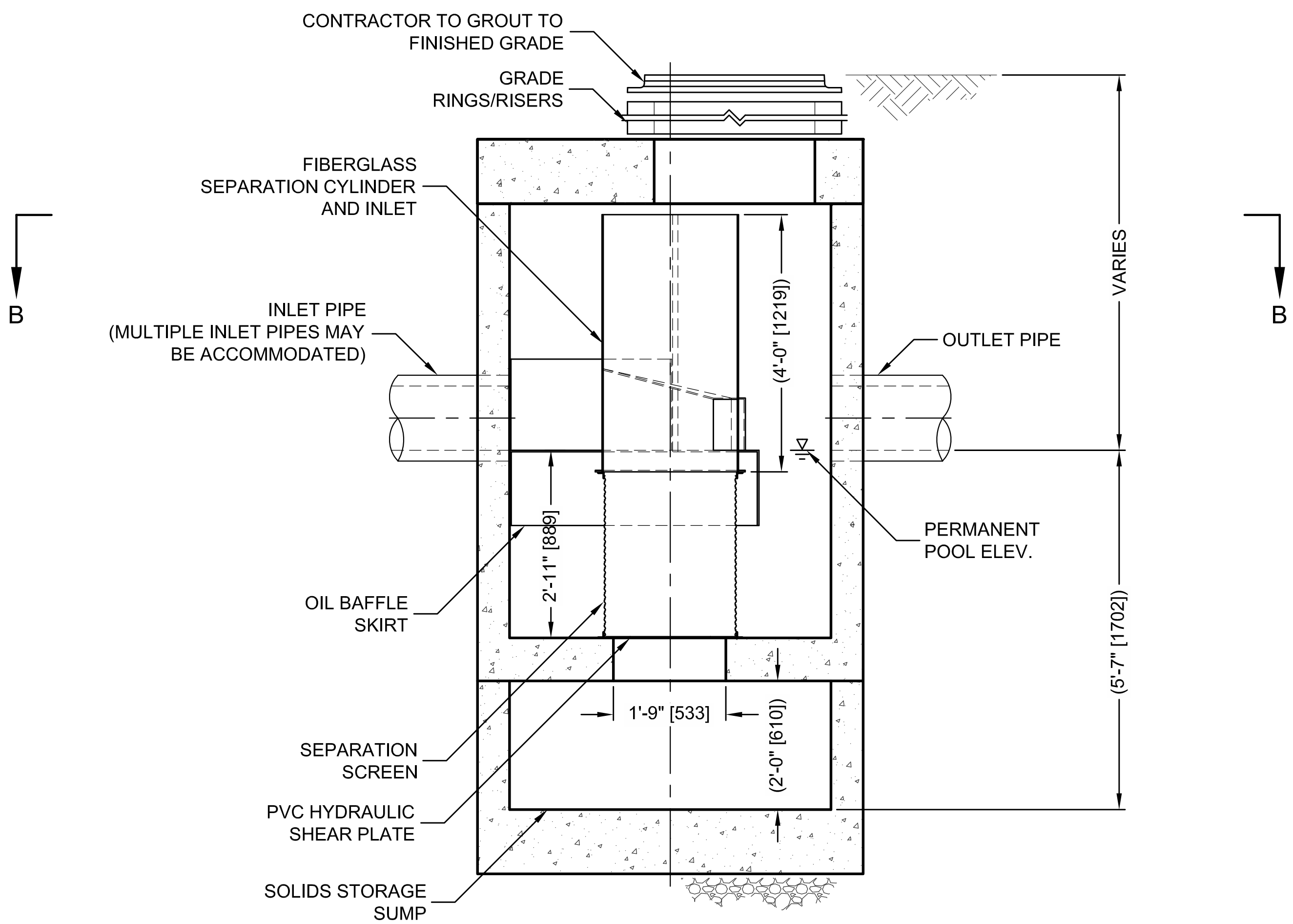
Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

# Appendix C:

# BMP Details




## PLAN VIEW B-B
N.T.S.



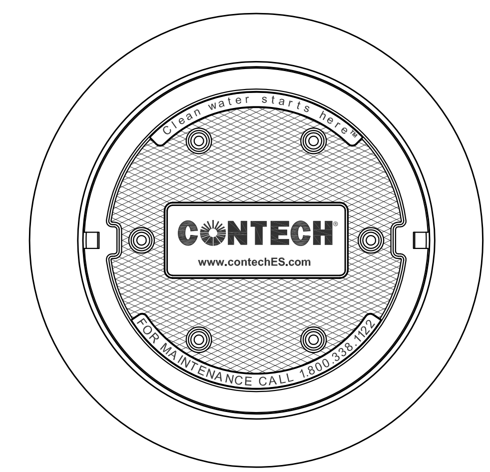

## ELEVATION A-A
N.T.S.

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,848; 6,641,720; 6,511,595; 6,581,783; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

## CDS2025-5-C DESIGN NOTES

THE STANDARD CDS2025-5-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

| CONFIGURATION DESCRIPTION |
|---|
| GRATED INLET ONLY (NO INLET PIPE) |
| GRATED INLET WITH INLET PIPE OR PIPES |
| CURB INLET ONLY (NO INLET PIPE) |
| CURB INLET WITH INLET PIPE OR PIPES |
| SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION) |
| SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS |




## FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

## SITE SPECIFIC DATA REQUIREMENTS

| | | | |
|---|---|---|---|
| STRUCTURE ID | | | |
| WATER QUALITY FLOW RATE (CFS OR L/s) | | | * |
| PEAK FLOW RATE (CFS OR L/s) | | | * |
| RETURN PERIOD OF PEAK FLOW (YRS) | | | * |
| SCREEN APERTURE (2400 OR 4700) | | | * |
| PIPE DATA: | I.E. | MATERIAL | DIAMETER |
| INLET PIPE 1 | * | * | * |
| INLET PIPE 2 | * | * | * |
| OUTLET PIPE | * | * | * |
| RIM ELEVATION | | | * |
| ANTI-FLOTATION BALLAST | | WIDTH | HEIGHT |
| | | * | * |

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES

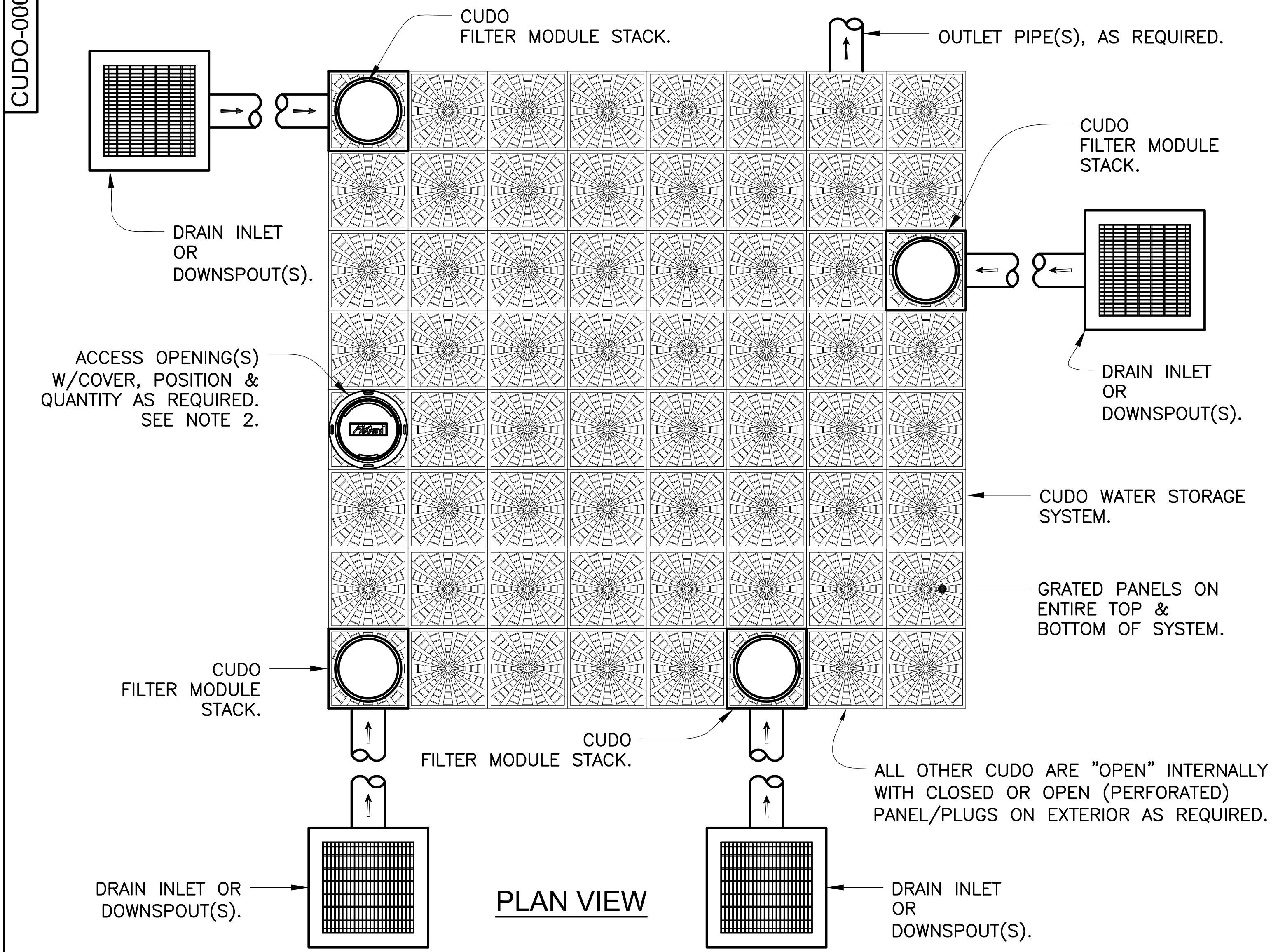
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.


CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

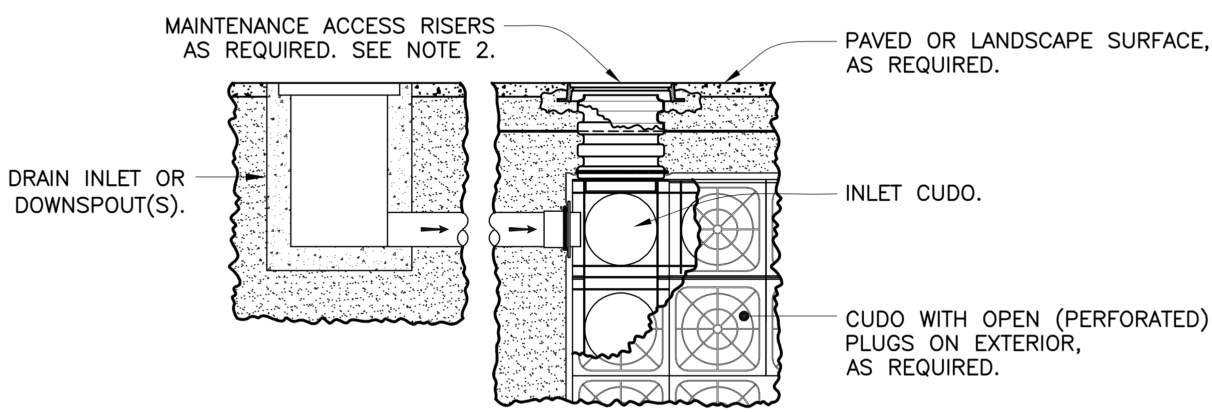

CDS2025-5-C
INLINE CDS
STANDARD DETAIL

C:\USERS\SCHLACHTERH\DESKTOP\CDS DETAILS 180 MICRON SIZING\ACAD\CDS2025-5-C-DTL.DWG 5/19/2014 5:20 PM

CUDO-0007




PLAN VIEW




SIDE SECTION VIEW

NOTES:

1. REFER TO CUDO INSTALLATION DETAILS.
2. SEE CUDO–0008 FOR TYPICAL MAINTENANCE ACCESS CONFIGURATION.

Detention/ Infiltration

**CUDO®**

Water Storage System

Typical System Layout w/ Filter Module Stacks

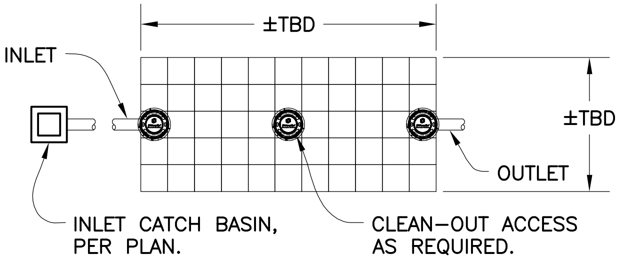
Oldcastle® Stormwater Solutions

7921 Southpark Plaza, Suite 200 | Littleton, CO | 80120 | Ph: 800.579.8819 | oldcastlestormwater.com



| DRAWING NO. | REV | ECO | DATE | |
|---|---|---|---|---|
| CUDO-0007 | C | ECO–0154 ZHD 2/6/18 | JPR 5/2/08 | SHEET 1 OF 1 |

CUDO-IN-0003

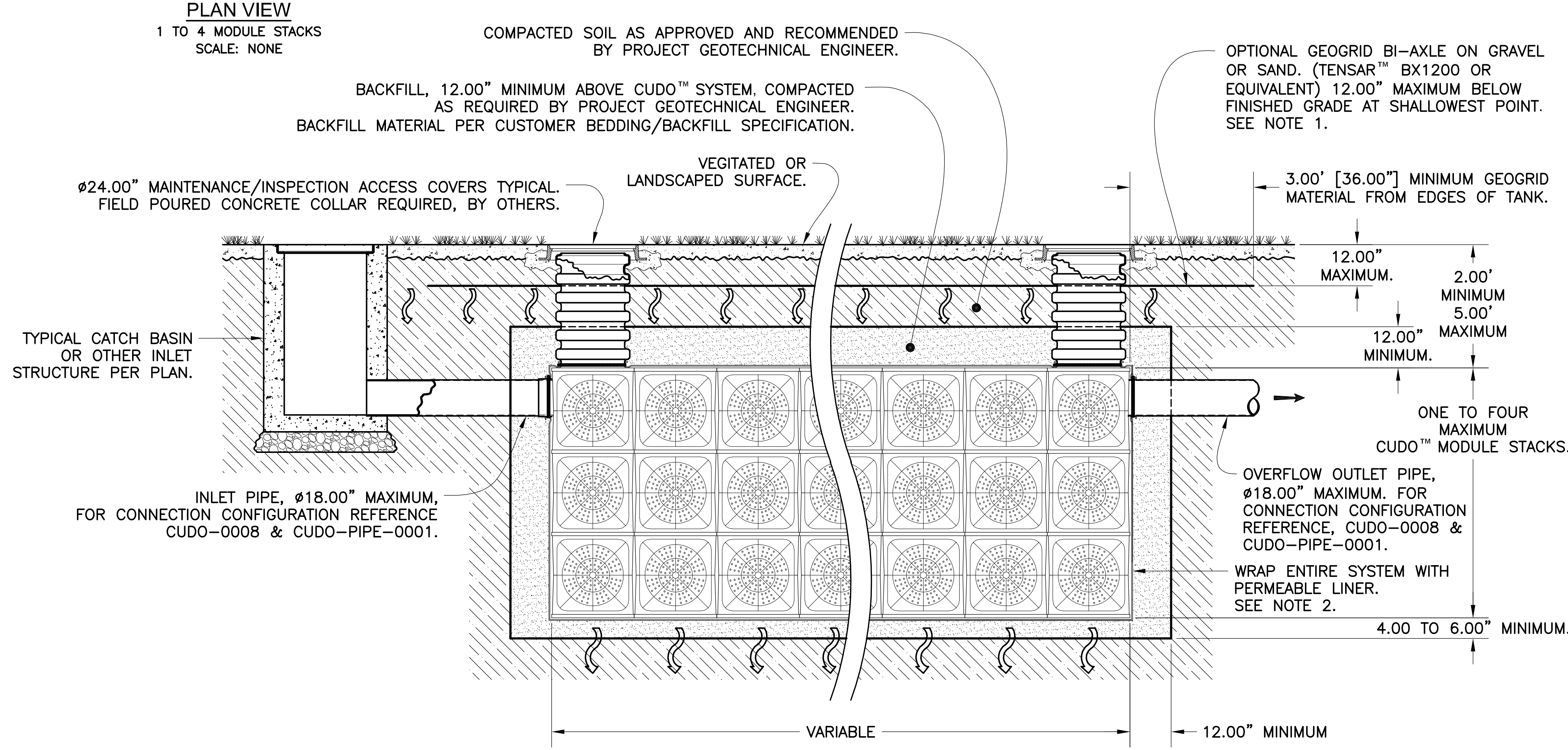



PLAN VIEW

1 TO 4 MODULE STACKS

SCALE: NONE

This is a proposed Cudo with permeable Liner and not yet be finalized. The Cudo will be finalized toward the finial stage of design.




SECTION / CUTAWAY VIEW

SCALE: NONE

NOTES:

1. INSTALL GEOGRID LAYER, (TENSAR™ BX1200 OR EQUIVALENT) IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.
2. SYSTEM ENCASED ENTIRELY WITH NONWOVEN POLYPROPYLENE GEOTEXTILE FILTER FABRIC AS REQUIRED.
3. FIELD POURED CONCRETE COLLAR REQUIRED AROUND ALL ACCESS COVERS & HATCHES, BY OTHERS.
4. ALL EXTERNAL PIPING & ANGLES BY OTHERS. REFER TO PLANS.

Detention/ Infiltration

**CUDO®**

Stormwater Infiltration System - *Typical Installation Detail*

Vegetated Permeable Area

Oldcastle® Stormwater Solutions

7921 Southpark Plaza, Suite 200 | Littleton, CO | 80120 | Ph: 800.579.8819 | oldcastlestormwater.com



| DRAWING NO. | REV | ECO | DATE | |
|---|---|---|---|---|
| CUDO-IN-0003 | C | ECO–0154 ZHD 2/6/18 | JPR 7/21/08 | SHEET 1 OF 1 |

# CUDO® CUBES

## Submittal Package

Water

# TABLE OF CONTENTS

# SECTION 1

## Submittal Drawing

# SECTION 2

## Features & Benefits

Oldcastle Infrastructure™
A CRH COMPANY

# NO HEAVY
# Equipment Required

## Reshaping the Future of Stormwater Management

A new approach to underground stormwater storage, infiltration, treatment, harvesting or other stormwater management needs, subject to availability.

Potential LEED® credits for Sustainable Sites (6.1, 6.2), Materials & Resources (4, 5 in CA, AZ, NV, OR, UT) and Water Efficiency (1, 3)

DETENTION / INFILTRATION

Oldcastle Infrastructure™
A CRH COMPANY

# Modular Polypropylene Cubes for Underground Water Storage

CUDO components snap together, forming a single or multiple stack. Assembled stacks are installed to form the desired system size and shape, with a maximum amount of footprint flexibility.

Cubes incorporate an arched design that adds structural integrity, increased water storage and enhanced access for inspection and maintenance. Made in the USA of injection molded polypropylene plastic, a single CUDO assembly requires just two modules and two end caps.

Per application, either a filter fabric or plastic liner is wrapped around the CUDO modules, encasing the entire system. Geo-grid or other structural enhancement may be incorporated into the CUDO installation, depending on the loading requirements.

## FEATURES AND BENEFITS

- Large interior openings offer ease of access for inspection and maintenance
- High water storage capacity (95%)
- CUDO size (24" x 24" x 24") offers ease of handling and installation
- Unique shape offers superior strength
- Minimal number of components required for assembly
- May be integrated into bioretention systems (rain gardens)

# SECTION 3

## Accessories

# Product Specification - Structural Geogrid BX1200

*Tensar Earth Technologies, Inc. reserves the right to change its product specifications at any time. It is the responsibility of the specifier and purchaser to ensure that product specifications used for design and procurement purposes are current and consistent with the products used in each instance. Please contact Tensar Earth Technologies at 800-836-7271 for assistance.*

The structural geogrid shall be an integrally formed grid structure manufactured of a stress resistant polypropylene material with molecular weight and molecular characteristics which impart: (a) high resistance to loss of load capacity or structural integrity when the geogrid is subjected to mechanical stress in installation; (b) high resistance to deformation when the geogrid is subjected to applied force in use; and (c) high resistance to loss of load capacity or structural integrity when the geogrid is subjected to long-term environmental stress.

The structural geogrid shall accept applied force in use by positive mechanical interlock (i.e. by direct mechanical keying) with: (a) compacted soil or construction fill materials; (b) contiguous sections of itself when overlapped and embedded in compacted soil or construction fill materials; and (c) rigid mechanical connectors such as bodkins, pins or hooks. The structural geogrid shall possess sufficient cross sectional profile to present a substantial abutment interface to compacted soil or particulate construction fill materials and to resist movement relative to such materials when subject to applied force. The structural geogrid shall possess sufficient true initial modulus to cause applied force to be transferred to the geogrid at low strain levels without material deformation of the reinforced structure. The structural geogrid shall possess complete continuity of all properties throughout its structure and shall be suitable for reinforcement of compacted soil or particulate construction fill materials to improve their long term stability in structural load bearing applications such as earth retention systems. The structural geogrid shall have the following characteristics:

**Product Type:** **Integrally Formed Structural Geogrid**
**Load Transfer Mechanism:** **Positive Mechanical Interlock**

**Product Properties Index**

| **Properties** | **Units** | **MD Values[1]** | **XMD Values[1]** |
|---|---|---|---|
| ▪ Aperture Dimensions[2] | mm (in) | 25 (1.0) | 33 (1.3) |
| ▪ Minimum Rib Thickness[2] | mm (in) | 1.27 (0.05) | 1.27 (0.05) |
| **Load Capacity** | | | |
| ▪ True Initial Modulus in Use[3] | kN/m(lb/ft) | 400 (27,420) | 650 (44,550) |
| ▪ True Tensile Strength @ 2% Strain[3] | kN/m(lb/ft) | 6.0 (410) | 9.0 (620) |
| ▪ True Tensile Strength @ 5% Strain[3] | kN/m(lb/ft) | 11.8 (810) | 19.6 (1,340) |
| **Structural Integrity** | | | |
| ▪ Junction Efficiency[4] | % | 93 | |
| ▪ Flexural Stiffness[5] | mg-cm | 750,000 | |
| ▪ Aperture Stability[6] | kg-cm/deg | 6.5 | |
| **Durability** | | | |
| ▪ Resistance to Installation Damage[7] | %SC / %SW / %GP | 95 / 93 / 90 | |
| ▪ Resistance to Long Term Degradation[8] | % | 100 | |

**Dimensions and Delivery**

The structural geogrid shall be delivered to the jobsite in roll form with each roll individually identified and nominally measuring 3.0 meters (9.8 feet) or 4.0 meters (13.1 feet) in width and 50.0 meters (164 feet) in length. A typical truckload quantity is 165 to 220 rolls. On special request, the structural geogrid may also be custom cut to specific lengths or widths to suit site specific engineering designs.

**Notes**

1. Unless indicated otherwise, values shown are minimum average roll values determined in accordance with ASTM D-4759. Brief descriptions of test procedures are given in the following notes. Complete descriptions of test procedures are available on request from Tensar Earth Technologies, Inc.
2. Nominal dimensions.
3. True resistance to elongation when initially subjected to a load measured via ASTM D6637 without deforming test materials under load before measuring such resistance or employing "secant" or "offset" tangent methods of measurement so as to overstate tensile properties.
4. Load transfer capability measured via GRI-GG2-87. Expressed as a percentage of ultimate tensile strength.
5. Resistance to bending force measured via ASTM D-5732-95, using specimens of width two ribs wide, with transverse ribs cut flush with exterior edges of longitudinal ribs (as a "ladder"), and of length sufficiently long to enable measurement of the overhang dimension. The overall Flexural Stiffness is calculated as the square root of the product of machine-and cross-machine-direction Flexural Stiffness values.
6. Resistance to in-plane rotational movement measured by applying a 20 kg-cm moment to the central junction of a 9 inch x 9 inch specimen restrained at its perimeter (U.S. Army Corps of Engineers Methodology for measurement of Torsional Rigidity).
7. Resistance to loss of load capacity or structural integrity when subjected to mechanical installation stress in clayey sand (SC), well graded sand (SW), and crushed stone classified as poorly graded gravel (GP). The geogrid shall be sampled in accordance with ASTM D5818 and load capacity shall be measured in accordance with ASTM D6637.
8. Resistance to loss of load capacity or structural integrity when subjected to chemically aggressive environments measured via EPA 9090 immersion testing.

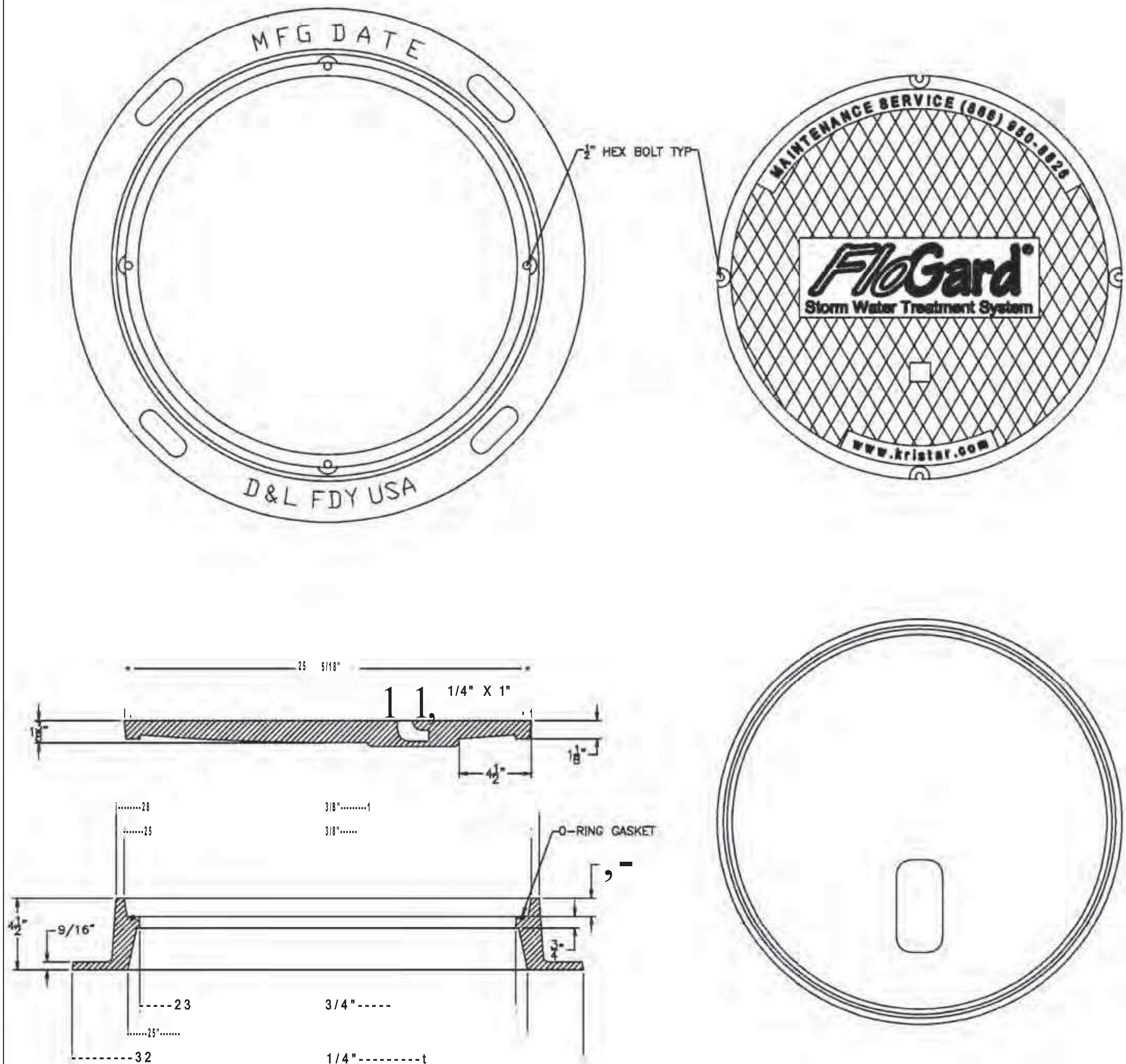
# Mirafi® 140NC

Mirafi® 140NC is a non-woven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. Mirafi 140NC is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids.

| Mechanical Properties | Test Method | Unit | Minimum Average Roll Value | |
|---|---|---|---|---|
| | | | MD | CD |
| Grab Tensile Strength | ASTM D 4632 | kN (lbs) | 0.45 (100) | 0.45 (100) |
| Grab Tensile Elongation | ASTM D 4632 | % | 60 | 60 |
| Toughness | Grab Tensile Strength x Elongation | lbs | 6000 | |
| Trapezoid Tear Strength | ASTM D 4533 | kN (lbs) | 0.20 (45) | 0.20 (45) |
| Mullen Burst Strength | ASTM D 3786 | kPa (psi) | 1447 (210) | |
| Puncture Strength[1] | ASTM D 4833 | kN (lbs) | 0.29 (65) | |
| CBR Puncture Strength | ASTM D 6241 | kN (lbs) | 1.12 (250) | |
| Apparent Opening Size (AOS) | ASTM D 4751 | mm (U.S. sieve) | 0.212 (70) | |
| Permittivity | ASTM D 4491 | $sec^{-1}$ | 1.8 | |
| Flow Rate | ASTM D 4491 | $l/min/m^2$ ($gal/min/ft^2$) | 5704 (140) | |
| Mass / Unit Area | ASTM D 5261 | $g/m^2$ ($oz/yd^2$) | 136 (4.0) | |
| UV Resistance (at 500 Hours) | ASTM D 4355 | % strength retained | 70 | |

[1] ASTM D 4833 has been replaced with ASTM D 6241.

| Physical Properties | Test Method | Unit | Typical Value | |
|---|---|---|---|---|
| Thickness | ASTM D 5199 | mm (mils) | 0.99 (39) | |
| Roll Dimensions (width x length) | -- | m (ft) | 3.8 x 110 (12.5 x 360) | 4.5 x 110 (15 x 360) |
| Roll Area | -- | $m^2$ ($yd^2$) | 418 (500) | 502 (600) |
| Estimated Roll Weight | -- | kg (lb) | 69 (152) | 83 (182) |

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TO CONFORM TO
ASTM A-48, CLASS 35B

A-1024
D&L MODEL #

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# SECTION 4

# Product Specifications

# CUDO Stormwater System

## Underground Retention/Detention/ Infiltration/Water Reuse Systems

# Product Specifications

## PART 1 – GENERAL

**1.01 General Provisions**

A. The Conditions of the Contract and all Sections of Division 1 are hereby made a part of this Section.

**1.02 Description of Work**

A. Work Included:
   1. Provide excavation and base preparation per Geotechnical Engineer's recommendations and/or as shown on drawings, to provide adequate support for project design loads and safety from excavation sidewall collapse. See 2.02 Materials.
   2. Provide CUDO cube modular system products, and install per the manufacturer's instructions furnished under this section.

B. Related Work:
   1. Subgrade excavation and preparation under Section 02300 – Earthwork.
   2. Surface Drainage materials – Section 02700 – Subsurface Drainage and Structures, as needed.

**1.03 Quality Assurance**

A. Follow Section 01340 requirements.

B. Installation: Performed only by skilled work people with satisfactory record of performance on bulk earthworks, pipe, chamber, or pond/landfill construction projects of comparable size and quality.

**1.04 Submittals**

A. Submit manufacturer's product data and installation instructions.

B. Submit CUDO module for review. Reviewed and accepted samples will be returned to the Contractor.

C. Submit material certificates for geotextile, geogrid, base course and backfill materials.

**1.05 Delivery, Storage, and Handling**

A. Protect CUDO cube modular system products from damage during delivery, and store under tarp to protect from sunlight when time of delivery to installation exceeds one week. Storage should occur on smooth surfaces, free from dirt, mud and debris.

B. Handling is to be performed with equipment appropriate to the size (height) of cubes and site conditions, and may include hand, hand cart, forklifts, extension lifts, etc.

**1.06 Project Conditions**

A. Review installation procedures and coordinate CUDO cube installation with other work affected, such as grading, excavation, utilities, construction access and erosion control to prevent all non-installation related construction traffic over completed CUDO cube installation, especially with loads greater than design load.

B. Cold weather:

1. Do not use frozen materials or materials mixed or coated with ice or frost.
2. Do not build on frozen, wet, saturated or muddy subgrade.
3. Care must be taken when handling CUDO cubes when air temperature is at 40 degrees or below as plastic becomes brittle.

C. Protect partially completed CUDO cube installation against damage from other construction traffic when work is in progress and following completion of backfill by establishing a perimeter with highly visible construction tape, fencing, or other means until construction is complete.

D. Protect adjacent work from damage during CUDO cube installation.

## PART 2 – PRODUCTS

### 2.01 Availability

A. Manufactured by Oldcastle Infrastructure, 7100 Longe Street, Stockton, California, 95206.

### 2.02 Materials

A. Base of excavation: Shall be smooth, level and free of lumps or debris.

B. Geotextile: Use non-woven geotextile with weight of at least 4 oz per square yard, appropriate for the soil type and depth conditions. Fabric shall be placed on the floor of the excavation, and the sides and top of the modular system.

C. CUDO cube modular units: The CUDO product will arrive onsite with the required number of components to complete your project. Those components will consist of (as required) CUDO half cubes, top/bottom grates, stacking couplers, side plugs, and/or lateral connectors. Assembly of the completed system will be done onsite per project specific assembly details with their simple snap together feature.

D. Side and top backfill: Using structural fill, sand or other free-draining material material as specified by the project engineer, backfill the sides of the CUDO system evenly in 12" lifts to a minimum of 95% with a mechanical compactor. Bring the backfill to the top of the CUDO system and then continue backfill placement in accordance with the project's specific requirements for the type and location of Geogrid over the top of the CUDO system.

E. Geogrid: Use Tensar BX-1200 or equivalent to reinforce backfill above CUDO cubes to support H20 loads (otherwise not required). Geogrid should extend 3 feet beyond the cube footprint.

F. Utility marker: Use metallic tape at corners of install to mark the area for future utility detection.

## PART 3 – EXECUTION

### 3.01 Site Excavation

A. The contractor shall excavate the site to the width, depth and length necessary to accommodate and install the CUDO stormwater system including provisions for cover over the system and depth below the system in accordance with the project engineer's specifications.

B. Examine prepared excavation for smoothness, compaction and level. Do not start installation of CUDO cubes until unsatisfactory conditions are corrected. Check for presence of high water table, which must be kept at levels below the bottom of the CUDO structure at all times.

C. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance. If existing conditions are found unsatisfactory, contact Project Manager for resolution.

**3.02 Base Preparation**

A. Generally a base material of sand or stone should be used and be compacted to 95%. The specific nature of the material will depend upon a myriad of factors, including but not limited to soil reports and end use of system (detention or retention). The base must be finished evenly to provide a level surface for the CUDO installation.

B. It is helpful to identify the outline of the structure on the floor of the excavation, using spray paint or chalk line, to ensure squareness during cube placement.

**3.03 Installation of CUDO Cubes**

A. Either a non-woven filter fabric material or an impermeable liner will be required to surround the perimeter of the CUDO system. Either product shall be laid to the contour of the excavation bottom and side walls with a minimum of 12″ overlapping, or as specified by the project engineer.

B. The assembled CUDO cubes shall be placed on top of the fabric/liner material in accordance with the project's specific layout details. Maintain a level top at all times and keep the units in a straight line in each direction. Complete any inlet/outlet pipe connections in accordance with the project's details. Connect the inspection/cleanout port riser material to the top of the CUDO as shown on the project layout detail. Pull the fabric/liner material taut around the CUDO cubes to completely seal the system, using duct tape to temporarily secure the material overlaps in place.

C. Start backfilling with recommended backfill, compacting in 12″ maximum lifts. Place backfill carefully to avoid shoving or damaging cubes. Use a powered mechanical compactor to compact backfill on structure sides with care to avoid damage to geotextile or liner.

D. Backfill above system should be compacted in 6″ lifts. When backfill reaches an elevation 12″ above the system, place a layer of geogrid directly over the top of the backfill (required only when there will be traffic loads (H20 loads) above the cubes), extending 3′ beyond the cube footprint.

E. Place sufficient backfill (Section 2.02 E) material over geogrid to ensure support of design loads. Place cover backfill in 6″ lifts and compact with vibrating plates or walk behind rollers (do not use drivable rolling compactors) to a minimum of 95% compaction. Take care to place backfill on top of structure to avoid damage to structure, geotextile or liner, using low pressure tire or track vehicles.

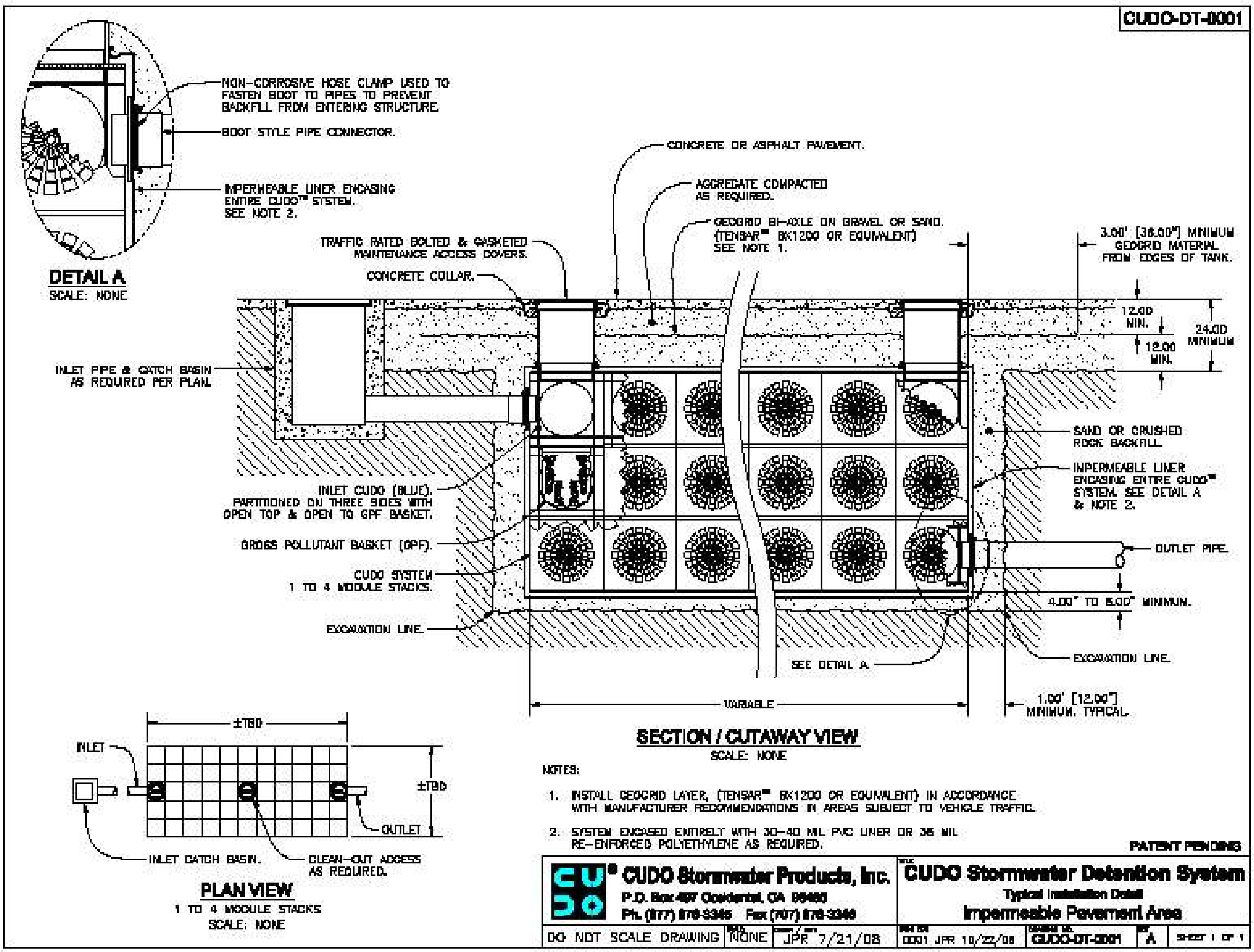
F. Ensure that all unrelated construction traffic be kept away from the limits of excavation until project is complete and final surface materials are in place.

G. Place surfacing materials, such as groundcovers (no shrubs or trees), or paving materials over the structure with care to avoid displacement of cover fill and damage to surrounding areas.

### 3.04 Cleaning

A. Perform cleaning during the installation of work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair any damage to adjacent materials and surfaces resulting from installation of this work.

**Sample Installation Detail**



# SECTION 5

# Installation Manual

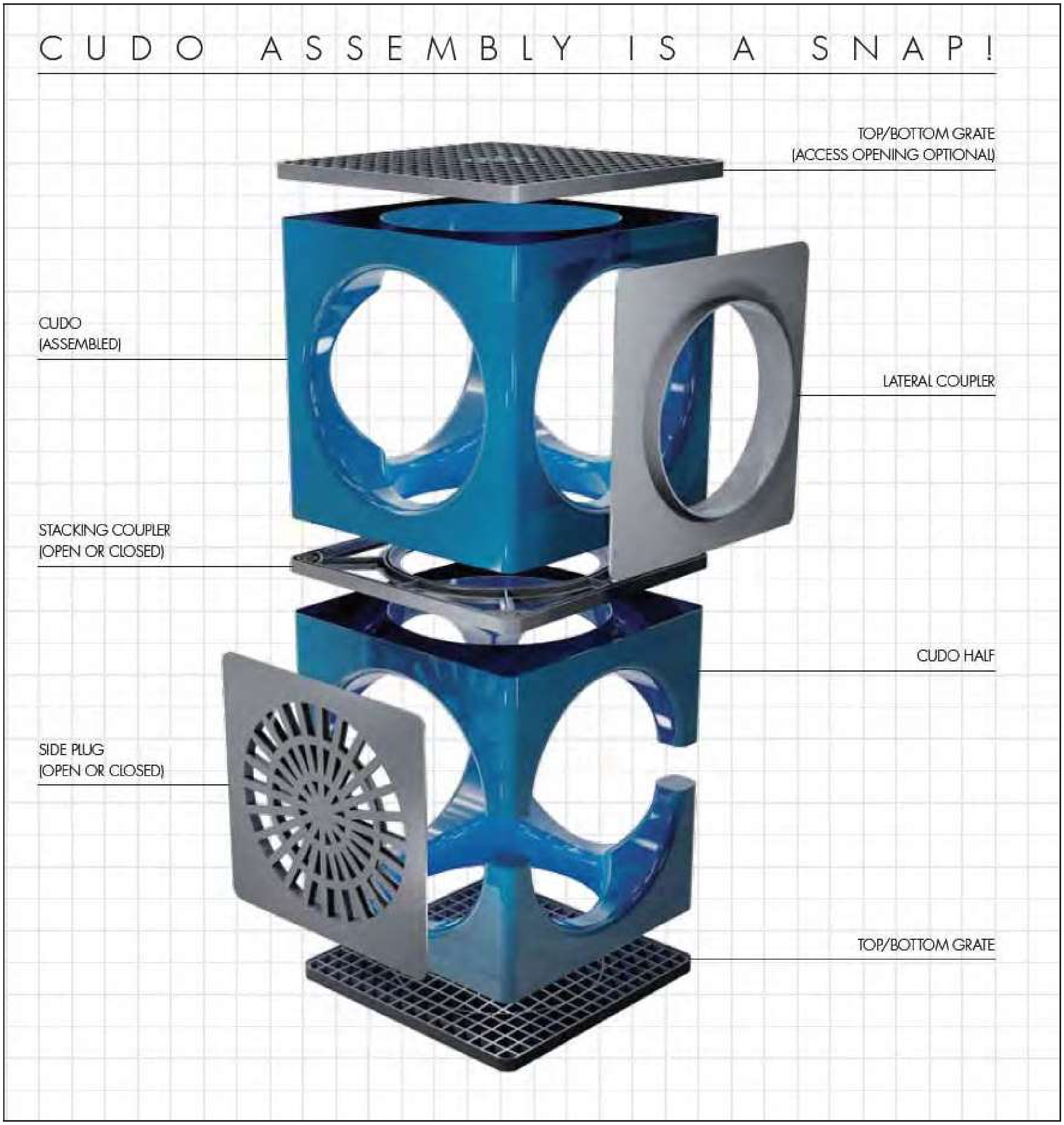
# CUDO Stormwater System

## Underground Retention/Detention/ Infiltration/Water Reuse Systems

# Installation Manual

# CUDO Cube Modular Stormwater System

**CUDO Assembly**
The CUDO product will arrive onsite with the required number of components to complete your project. Those components will consist of (as required) CUDO half cubes, top/bottom grates, stacking couplers, side plugs, and/or lateral connectors. Assembly of the completed CUDO system will be done onsite per project specific assembly details with their simple snap together feature.



### Site Excavation

The contractor shall excavate the site to the width, depth and length necessary to accommodate and install the CUDO stormwater system including provisions for cover over the system and depth below the system in accordance with the project engineer's specifications.

### Base Preparation

Generally a base material of sand or stone should be used and be compacted to 95%. The specific nature of the material will depend upon a myriad of factors, including but not limited to soil reports and end use of system (detention or retention). The base must be finished evenly to provide a level surface for the CUDO installation.

### Fabric/Liner Placement

Either a non-woven filter fabric material or an impermeable liner will be required to surround the perimeter of the CUDO system. Either product shall be laid to the contour of the excavation bottom and side walls with a minimum of 12″ overlapping, or as specified by the project engineer.

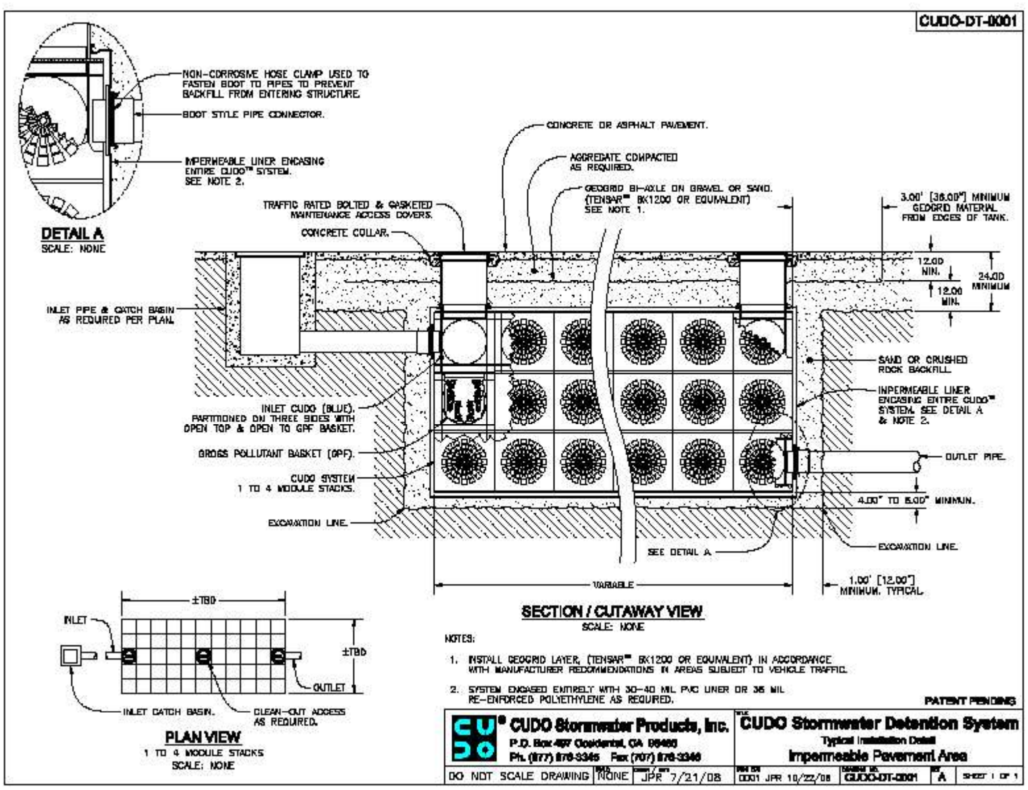
### CUDO Placement

The assembled CUDO cubes shall be placed on top of the fabric/liner material in accordance with the project's specific layout details. Maintain a level top at all times and keep the units in a straight line in each direction. Complete any inlet/outlet pipe connections in accordance with the project's details. Connect the inspection/cleanout port riser material to the top of the CUDO as shown on the project layout detail. Pull the fabric/liner material taut around the CUDO's to completely seal the system, using duct tape to temporarily secure the material overlaps in place.

### Backfilling/Geogrid Placement

Using a compactable material as specified by the project engineer, backfill the sides of the CUDO system evenly in 12″ lifts to a minimum of 95% with a mechanical compactor. Bring the backfill to the top of the CUDO system and then continue backfill placement in accordance with the project's specific requirements for the type and location of Geogrid over the top of the CUDO system.

*Sample Installation Detail*



# Appendix D:

# BMP Maintenance Information

# SECTION 6

## Operations & Maintenance

CONTECH
ENGINEERED SOLUTIONS

# CDS® Inspection and Maintenance Guide


CDS TECHNOLOGIES

## Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

## Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

## Cleaning

Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.

| CDS Model | Diameter | | Distance from Water Surface to Top of Sediment Pile | | Sediment Storage Capacity | |
|---|---|---|---|---|---|---|
| | ft | m | ft | m | $y^3$ | $m^3$ |
| CDS1515 | 3 | 0.9 | 3.0 | 0.9 | 0.5 | 0.4 |
| CDS2015 | 4 | 1.2 | 3.0 | 0.9 | 0.9 | 0.7 |
| CDS2015 | 5 | 1.3 | 3.0 | 0.9 | 1.3 | 1.0 |
| CDS2020 | 5 | 1.3 | 3.5 | 1.1 | 1.3 | 1.0 |
| CDS2025 | 5 | 1.3 | 4.0 | 1.2 | 1.3 | 1.0 |
| CDS3020 | 6 | 1.8 | 4.0 | 1.2 | 2.1 | 1.6 |
| CDS3025 | 6 | 1.8 | 4.0 | 1.2 | 2.1 | 1.6 |
| CDS3030 | 6 | 1.8 | 4.6 | 1.4 | 2.1 | 1.6 |
| CDS3035 | 6 | 1.8 | 5.0 | 1.5 | 2.1 | 1.6 |
| CDS4030 | 8 | 2.4 | 4.6 | 1.4 | 5.6 | 4.3 |
| CDS4040 | 8 | 2.4 | 5.7 | 1.7 | 5.6 | 4.3 |
| CDS4045 | 8 | 2.4 | 6.2 | 1.9 | 5.6 | 4.3 |
| CDS5640 | 10 | 3.0 | 6.3 | 1.9 | 8.7 | 6.7 |
| CDS5653 | 10 | 3.0 | 7.7 | 2.3 | 8.7 | 6.7 |
| CDS5668 | 10 | 3.0 | 9.3 | 2.8 | 8.7 | 6.7 |
| CDS5678 | 10 | 3.0 | 10.3 | 3.1 | 8.7 | 6.7 |

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

**Support**

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.



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# CDS Inspection & Maintenance Log

CDS Model: ______________________ Location: ______________________

| Date | Water depth to sediment[1] | Floatable Layer Thickness[2] | Describe Maintenance Performed | Maintenance Personnel | Comments |
|---|---|---|---|---|---|
| | | | | | |
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1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.**

2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

# CUDO® CUBES

## Operations and Maintenance Manual

(Underground Retention/Detention/Infiltration/Water Reuse Systems)

Water

# CUDO® Stormwater Cube - Modular Stormwater Systems

### Description / Basic Function

CUDO is a modular stormwater system comprised of a grouping of modular polypropylene or concrete cubes that when constructed form an underground storage area for stormwater. This system can be used for infiltration, retention, detention or water reuse. CUDO can help achieve runoff detainment and storage to help attenuate the peak flow to pre-construction levels and can help conform to current Low Impact Development requirements.

### Infiltration

The purpose of a CUDO infiltration system is to capture stormwater runoff, store the runoff, and then allow it to percolate into the ground via the open space area of the cubes and perforations in the side wall. The system is backfilled with a Class I material defined by ASTM D2321 as a cleaned open graded rock or a Class II permeable sand. The rock or sand provide additional storage capacity but also allow for a percolation interface with the native material. The ground water is “recharged” with this type of system.

### Detention

The purpose of a CUDO detention system is to capture stormwater runoff, store the runoff, and then allow it to be released at a controlled rate through an appropriately sized orifice control. A detention system helps attenuate the peak flow from the site assuring that pre-development runoff flows are not exceeded as a result of the development. A CUDO detention requires the cubes to be encapsulated with an impermeable liner for the polypropylene system or the seams of the concrete system to be sealed with a water proof mastic.

### Retention

A CUDO retention system is a hybrid system. It is a combination of a detention system and an infiltration system. A retention system is utilized to attenuate peak flow as well as promote groundwater re-charge. A retention system is outfitted with an overflow pipe at the top of the system which allows the system to fill for infiltration but also outlet if the ground is saturated.

### Water Reuse

The purpose of a water-reuse CUDO system is to capture and store water for future use. The system is constructed in a similar fashion to a detention system but instead of a controlled outlet the system is constructed with an emergency overflow. A water reuse system is a Low-Impact Development (LID) device that helps attenuate peak flows as well as conserve water. Water may be reused through an active pump system or passive irrigation.

### Inspection/Cleanout Ports

Inspection and cleanout ports are 18-inch diameter vertical risers connected to the uppermost polypropylene CUDO cubes or up to 30-inch manhole access connected to the concrete CUDO. They are used for entrance into the system, or for access to place vacuum truck hoses or water-jetting devices or CCTV equipment. Ports are strategically located near inlet and outlet pipes and in other areas or probable deposition in the system. It is recommended to keep surface level access lids sealed and bolted at all times when the system is in service.

### Inlet Bay

Some systems are configured so that pretreatment of the stormwater occurs within the CUDO system. In this case, the CUDO system will house an inlet bay. The inlet bay is separated from the rest of the CUDO system by sidewall plugs and is intended to separate gross pollutants, trash and debris and floatables from the CUDO system and pre-treatment device. The bay contains its own sump area and unique access ports.

## Maintenance Overview for CUDO

State and Local regulations require that stormwater storage systems be maintained and serviced on a recurring basis. The purpose of maintaining a clean and obstruction free CUDO system is to ensure the system performs the intended function of the primary design. Trash and debris, floatables, gross pollutants and sediment can build up in the CUDO leading to clogging of the native soil interface or blockage of the inlet or outlet pipes. This can cause the system to function improperly by limiting storage volume, limiting the design percolation rates or impeding flow in and out of the system. Downstream and upstream, areas could run the risk of flooding and deleterious environmental impact.

## Recommended Frequency of Service

It is recommended that the CUDO stormwater systems be serviced on a regularly occurring basis. Ultimately the frequency depends on the amount of runoff, pollutant loading, and interference from trash, debris and gross pollutants as well as proper maintenance of upstream pretreatment devices. However, it is recommended that each installation be inspected at least two times per year to assess service needs.

## Recommended Timing of Service

Guidelines for the timing of service are as follows:

1. For areas with a definite rainy season the system should be serviced prior to and following the rainy season.
2. For areas subject to year-round rainfall service should occur on a regularly occurring basis. (A minimum of two times per year.)
3. For areas with winter snow and summer rain the system should be serviced prior to and after the snow season.
4. For installed devices that are subject to dry weather flows only (i.e. wash racks, parking garages, etc...) the unit should be serviced on a regularly occurring basis. (A minimum of two times per year.)

## Inspection

An inspection should be performed when the system is new. This allows the owner to establish a baseline condition for comparison to future inspections. Sediment build up can typically be monitored without entering the system. (No confined space entry.) Initial and subsequent inspection data should be recorded and filed for reference. Some regulatory agencies require that the results of the inspections be documented and reported. Inspection reports should comply with regulatory requirements and be submitted as required.

## Inspection Procedures

5. Locate the inspection, cleanout and access ports. Inspection and cleanout ports are typically 18-inch diameter. Access ports are typically 24-inch or 30-inch diameter. Pictures should be taken to document the location or a site map should be generated to detail the as-built locations of the ports.
6. Unbolt and remove the access port lids.
7. Insert a measuring device into the opening making note of a point of reference to determine the quantity of sediment and other accumulated material. If access is required to measure, ensure only certified confined space entry personnel having appropriate equipment are allowed to enter the system.
8. In addition, for accessible concrete CUDO systems personnel should utilize appropriate confined space entry procedures to enter the system and photograph its condition.
9. Inspect inlet and outlet locations for obstructions. Obstructions should be removed at this time.
10. Inspect the structural components of the system.
11. Fill in the CUDO Inspection/Maintenance Data Sheet and send a copy to the regulatory agency if necessary.

## Disinfection of Water Reuse System

Periodic disinfection of water held for reuse may be required to abate bacteria and algae growth. This may be done using calcium hypochlorite tablets or by the addition of an ozone generator in a small recirculation system.

## Maintenance

Cleanout of the CUDO system should be considered if there is sediment buildup of two or more inches at over 50% of the inspection ports. Cleaning shall be performed if sediment buildup is two inches or more over 75% of the system floor. In the event of a spill of a foreign substance, cleanout of the system should be considered.

## Maintenance Procedures

1. Locate the inspection, cleanout and access ports. Inspection and cleanout ports are typically 18-inch diameter. Access ports are typically 24-inch or 30-inch diameter. Pictures should be taken to document the location or a site map should be generated to detail the as-built locations of the ports.
2. Unbolt and remove the access port lids.
3. Measure the sediment buildup at each port. If access is required to measure ensure only certified confined space entry personnel having appropriate equipment are allowed to enter the system.
4. A thorough cleaning of the system (inlets, outlets, ports, and inlet bays) shall be performed by either a vacuum truck or by manual methods.
5. Inspect inlet and outlet locations for obstructions. Obstructions should be removed at this time.
6. Inspect the structural components of the system.
7. Fill in the CUDO Inspection/Maintenance Data Sheet and send a copy to the regulatory agency if necessary.

## Inspection / Maintenance Requirements

Below are some recommendations for equipment and training of personnel to inspect and maintain a CUDO system.

Personnel: OSHA Confined Space Entry Training is a prerequisite for entrance into a system. In the state of California personnel should be CalOSHA certified.

Equipment: Record Taking (pen, paper, voice recorder)
Proper Clothing (appropriate footwear, gloves, hardhat, safety glasses, etc.)
Flashlight
Tape Measure
Measuring Stick
Pry Bar
Traffic Control (flagging, barricades, signage, cones, etc.)
First Aid Materials
Debris and Contaminant Containers
Vacuum Truck

## Disposal of Gross Pollutants, Hydrocarbons, and Sediment

The collected gross pollutants, hydrocarbons, and sediment shall be offloaded from the vacuum truck into DOT approved containers for disposal. Once in the container the maintenance contractor has possession and is responsible for disposal in accordance with local, state and federal agency requirements.

*Note: As the generator, the landowner is ultimately responsible for the proper disposal of the collected materials. Because the material likely contains petroleum hydrocarbons, heavy metals, and other harmful pollutants, the materials must be treated as EPA class 2 Hazardous Waste. Proper disposal is required.*

# CUDO® CUBES

**OUR MARKETS**

BUILDING STRUCTURES

COMMUNICATIONS

WATER

ENERGY

TRANSPORTATION

# Appendix E:

# Geotechnical Information

# REPORT OF GEOTECHNICAL INVESTIGATION

**Proposed New Ronald McDonald House Structure**

**Orange County Ronald McDonald House**

**383 South Batavia Street**

**City of Orange, California**

***Prepared For:***

**Orange County Ronald McDonald House**

**383 South Batavia Street**

**Orange, California 92868**

**Project No. 6827.18** **September 24, 2018**

2860 Walnut Avenue, Signal Hill CA 90755 * Tel: (562) 426-7990 * Fax: (562) 426-1842

SOILS ENGINEERING, INC.
Consulting Geotechnical Engineers

September 24, 2018
Project No. 6827.18

**ORANGE COUNTY RONALD MCDONALD HOUSE**
383 South Batavia Street
Orange, California 92868

Attention: Ms. Noel Burcelis, MSW
Executive Director

Subject: **Report of Geotechnical Investigation**
Proposed New Ronald McDonald House Structure
Orange County Ronald McDonald House
383 South Batavia Street, City of Orange, California

Gentlemen:

Presented herewith is the Report of Geotechnical Investigation (the Soils Report) prepared by Associated Soils Engineering, Inc. (ASE) for the proposed new Ronald McDonald House structure (the Building) to be located at 383 South Batavia Street, in the City of Orange, California (the Site). This work was conducted in accordance with ASE's Proposal No. P18-128, dated August 10, 2018, and your subsequent authorization.

The subject geotechnical investigation was planned and performed based on the relevant development information provided by your office. Provided information included a Topographic Survey Plan, Sheet No. SV-1.0, prepared by JMC$^2$ Civil Engineering & Surveying, dated June 21, 2018, on which were shown the existing on-site development and the surrounding site conditions.

The purpose of this study was to evaluate the subsurface soils conditions at the Site, followed by assessment of site geologic/seismic hazards, performance of engineering analyses, and formulation/assembly of recommendations for the geotechnical design and construction pertinent to the Building. ASE's study has concluded that construction of the Building is geotechnically feasible provided that the recommendations and design guidelines with respect to ground preparation and foundation construction presented in the Soils Report are incorporated in the project plans and design, and implemented during construction. This Soils Report also presents 1) the findings of the geotechnical field investigation, 2) the summary of potential geological/seismic hazard assessment, 3) the results of laboratory tests performed, and 4) the results of field percolation testing.

We at ASE appreciate the opportunity to provide our professional services on this important project, and look forward to assisting you during construction of the Building.

If you have any questions or require additional information, please contact the undersigned.

Respectfully submitted,
**ASSOCIATED SOILS ENGINEERING, INC.**

Gary L. Martin
Project Engineer

Lawrence J.D. Chang, P.E, G.E.
Geotechnical Engineer, RGE 2881

Edward C. (Ted) Riddell, P.G.
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# 1.0 INTRODUCTION

This Soils Report presents the results of ASE's geotechnical investigation for the proposed new Ronald McDonald House structure (the Building) to be located adjacent to and immediately south of the existing Orange County (O.C.) Ronald McDonald House facility at 383 South Batavia Street, in the City of Orange, California (the Site). The approximate location of the Site is shown on the Site Location Map (Figure 1). The purpose of this investigation was to evaluate the general subsurface soil conditions at the Site and provide geotechnical recommendations for the design and construction of the Building. This Soils Report summarizes the data collected and the results of ASE's engineering evaluations/analyses, which provide the basis for the formulation of relevant geotechnical conclusions and recommendations.

## 1.1 Project Outline

The following provided project information is understood to be applicable at the time of preparing this Soils Report.

1.1.1 Building/Development Scope:

Based on the information provided, ASE understands that the Building will consist of two to three-story high frame, stucco and masonry construction, with finish grades near existing site grades (± one foot). Other appurtenant improvements are to include new asphaltic concrete (AC) or Portland cement concrete (PCC) paved parking on property to the south, as well as associated utility connections, landscaping and hardscaping.

1.1.2 Structural Loading for Geotechnical Analyses:

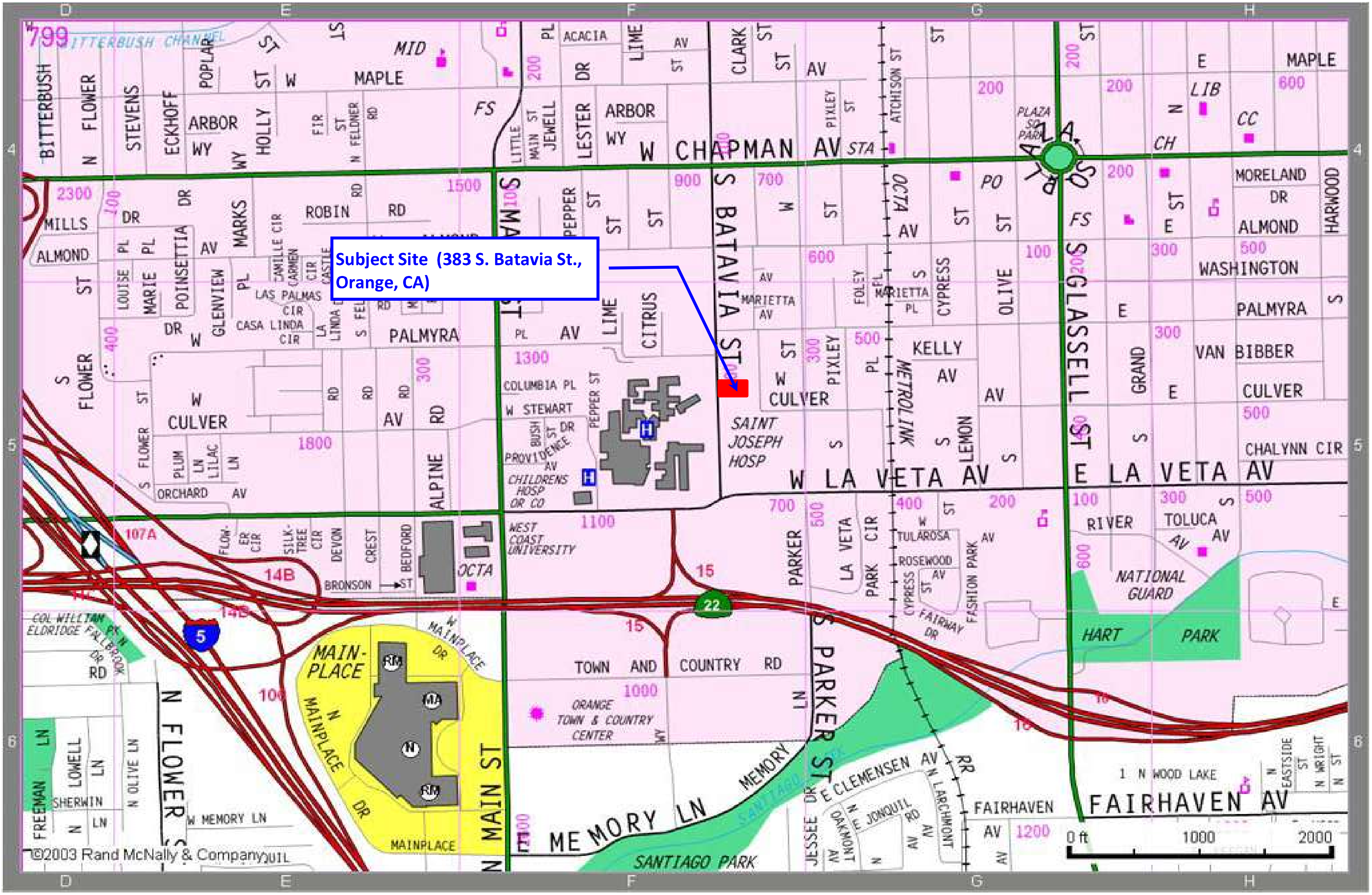
In the absence of structural loading information, ASE assumed that the Building will be supported by isolated pad footings and continuous spread footings, with maximum concentrated column load (D + L) on the order of 80 kips, and with a maximum line load (D + L) not exceeding 4,000 pounds per linear foot. Tolerable total and differential settlements resulted from the aforementioned structural loadings on the order of one (1) inch and 1/3 inch over any 30-foot span, respectively, have also been assumed by ASE.

## 1.2 Scope of Exploration

In accomplishing the subject investigation, ASE's staff had performed the following geotechnical tasks:

A. Review of available background information, including in-house geotechnical data, geotechnical literature, geologic maps, seismic hazard maps, and literature relevant to the subject Site.

B. A geotechnical site reconnaissance to observe the general surficial soil conditions at the Site and to select and mark boring locations, followed by notification to Underground Service Alert of the planned boring locations 72 hours prior to field exploration.




| | | | |
|---|---|---|---|
| **Associated Soils Engineering, Inc.**<br>**2860 Walnut Avenue**<br>**Signal Hill, CA 90755**<br>**Tel (562) 426-7990 Fax (562) 426-1842** | **Site Location Map** | Proj. Name: | **Prop. New Bldg. at O.C. Ronald McDonald House 383 S. Batavia St., Orange, CA** |
| | | **Figure 1** | Proj. No.: **6827.18** |
| | | | Date: **September, 2018** |

ASSOCIATED SOILS ENGINEERING, INC.
Consulting Geotechnical Engineers

C. Field exploration consisting of drilling six (6) exploratory borings to depths ranging from 5 feet 6 inches to 28 feet 5 inches below respective existing grades. ASE staff logged and sampled representative soils encountered in each exploratory boring. Locations of the exploratory borings on site are shown on the Boring Location Plan, Plate A, in Appendix A.

D. Field percolation testing at three (3) pre-selected test locations to measure infiltration rate of site soils as part of the requirements for the planning and design of on-site stormwater BMP system.

E. Laboratory testing on retrieved representative soil samples for classification and for determination of pertinent engineering properties.

F. Engineering analyses of data obtained from site investigation and laboratory testing including:

- Evaluation of general subsurface conditions and description of types, distribution, and engineering characteristics of subsurface materials.
- Assessment of geologic/seismic hazards based on the pertinent criteria required by the California Geological Survey (CGS).
- Determination of the seismic design parameters in accordance with Chapters 16 and 18 of the California Building Code, 2016 Edition (2016 CBC).
- Evaluation of the suitability of on-site soils for foundation support and establishment of qualification criteria for on-site or imported fill material, together with recommendations for site grading and subgrade preparation for the Building.
- Recommendations for subgrade preparation and design parameters for slab-on-grade, flatwork, and AC and Portland cement concrete (PCC) pavement support.
- Recommendations for design of shallow footing foundations, including allowable soils bearing capacity, estimated settlement, and lateral resistance.
- Recommendations for temporary excavation and shoring.
- Evaluation of the corrosion and expansion potential of the on-site materials.
- Calculation of percolation rates of site soils for stormwater BMP facility planning and design.

G. Preparation of this Soils Report presenting the work performed and data acquired, as well as summarizing our conclusions and geotechnical recommendations for the design and construction of foundation supporting the Building and calculation of design percolation rates for stormwater BMP facility planning and design.

*Please note that ASE's geotechnical investigation did not include any evaluation or assessment of hazardous or toxic materials which may or may not exist on or beneath the site. ASE does not consult in the field of potential site contamination/mitigation.*

## 2.0 SITE AND SUBSURFACE CONDITIONS

### 2.1 Location, Boundary Conditions and Existing Development

The Building is to be located at the O.C. Ronald McDonald House at 383 South Batavia Street, in the City of Orange, California.

The Site is bound to the north by the existing three-story O.C. Ronald McDonald House building. South Batavia Street is west of the Site, with an assisted living facility beyond. A small grove of orange trees and a playground for the O.C. Ronald McDonald House are south of the Site, with the gravel covered parking area beyond. Single-story single and multi-family residential developments are east of the Site, and north of the O.C. Ronald McDonald House.

The Site is presently generally uniform and is the location of the existing O. C. Ronald McDonald House. The Building location encroaches on the existing PCC paved parking area south of the existing Ronald McDonald House. Existing PCC pavement visually appears to be in good condition. A roof structure spans over a portion of the parking area connecting the existing building to a trash bin enclosure.

### 2.2 Subsurface Conditions

2.2.1 Artificial Fill (af):

Artificial fill was observed in four (4) of ASE's exploratory borings, i.e. Borings B-2 through B-5, to approximate depths ranging from a minimum of 1.5 feet (Boring B-2) to a maximum of 4.5 feet (Boring B-5) below respective existing grades. The encountered artificial fill generally consists of silty sands, silty sands with clay, sands, and sandy silts with clay, with glass and concrete pieces, and has been classified as "undocumented fill" and evaluated accordingly due to the lack of documentation substantiating prior compaction effort.

2.2.2 Younger Alluvium and Floodplain Deposits (Qyfa):

Native site soils were encountered in ASE's borings beneath the pavement section and artificial fill (Borings B-2 through B-5) to the maximum explored depth of approximately 28 feet 5 inches in Boring B-2. Per Reference 5, the younger alluvium/floodplain deposits are characterized as unconsolidated deposits comprising mainly of sand, silt, clay and gravel. In specific, on-site alluvial/floodplain soils consist of interbedded silty sands, sands, sands with gravel, sands with silt and gravel, silty sands with gravel, silty sands with clay, clayey sands, and clayey sands with gravel, and are generally in a dry to moist condition.

Blow counts recorded from advancing Standard Penetration Test (SPT) sampler and Modified California barrel sampler empirically indicate that the granular, sandy strata of on-site alluvial soils are in a loose to very dense condition.

More detailed descriptions of soils encountered and conditions observed during the subsurface exploration are shown in the Field Logs of Borings ("B" Plates) in Appendix A, together with information of soil classifications, depths and types of soil samples, blow counts, field dry densities and moisture contents, and corresponding laboratory tests performed.

The subsurface soils descriptions presented above have been interpreted from conditions exposed during the field investigation and/or information inferred from the reviewed geologic literature. As such, it is likely that not all of the subsurface conditions at the Site could be captured or represented. It is therefore essential that the Geotechnical Consultant's engineer or geologist be on site during grading and foundation construction such that information/recommendations deciphered during preliminary geotechnical investigation phase could be verified and, if necessary, amended as appropriate.

### 2.3 Groundwater and Caving

During field exploration, groundwater was not encountered to the maximum explored depth of 28 feet 5 inches in Boring B-2. Published data in Seismic Hazard Zone Report 011 for the Orange 7.5-Minute Quadrangle, Orange County, California by CGS (1997, revised 2001) indicates that the historic high groundwater contour in the vicinity of the Site is greater than 40 feet deep. A search on Google Earth indicates that the subject Site is approximately 172 feet above Mean Sea Level (MSL).

Information available from the State of California Department of Water Resources website (www.water.ca.gov/waterdatalibrary/groundwater/hydrographs) indicates that the historic high groundwater level in Well No. 04S09W31B001S, close to the Site at the northwest corner of West Almond Avenue and North Pixley Street, was 110.4 feet below ground surface elevation on May 5, 1969. The ground surface elevation of the well is 180.7 feet above MSL, or 8.7 feet higher than Site grade. The depth to groundwater for the most recent reading in this well (taken November 1, 1978) was 138 feet below grade.

Generally, seasonal and long-term fluctuations in the groundwater may occur as a result of variations in subsurface conditions, rainfall, run-off conditions and other factors. Therefore, deviations from the limited observations made in ASE's exploratory borings cannot be ruled out. Also the use of hollow-stem augers during drilling precluded observation of potential caving conditions which may have otherwise occurred in an uncased hole. Caving and/or sloughing were not measured during the extraction of auger stem at the completion of boring operations. However, caving and/or soil sloughing may be likely in excavations greater in dimension than ASE's exploratory borings.

### 2.4 Utilities

No overhead or underground utilities were encountered within the area of ASE's on-site investigation. However, underground and overhead lines are present which service the site adjacent structures, and are along site bordering streets. Other utilities, though not known at the time of this report preparation, may be present on site, and should be located and incorporated into site development plans accordingly.

## 3.0 GEOLOGY

### 3.1 Regional Geologic Setting

The Site is located in the Central Block of the Los Angeles Basin. The Los Angeles Basin is a large northwest trending synclinal depression at the southern end of the Transverse Ranges and at the north end of the Peninsula Range geomorphic Provinces of California. The Central Block is bounded by the active Newport-Inglewood Fault Zone (located 10.5 miles (16.9 km) southwest of the Site) and the active Whittier Fault Zone (approximately 9.5 miles (15.3 km) northeast of the Site).

### 3.2 Geologic and Soil Units

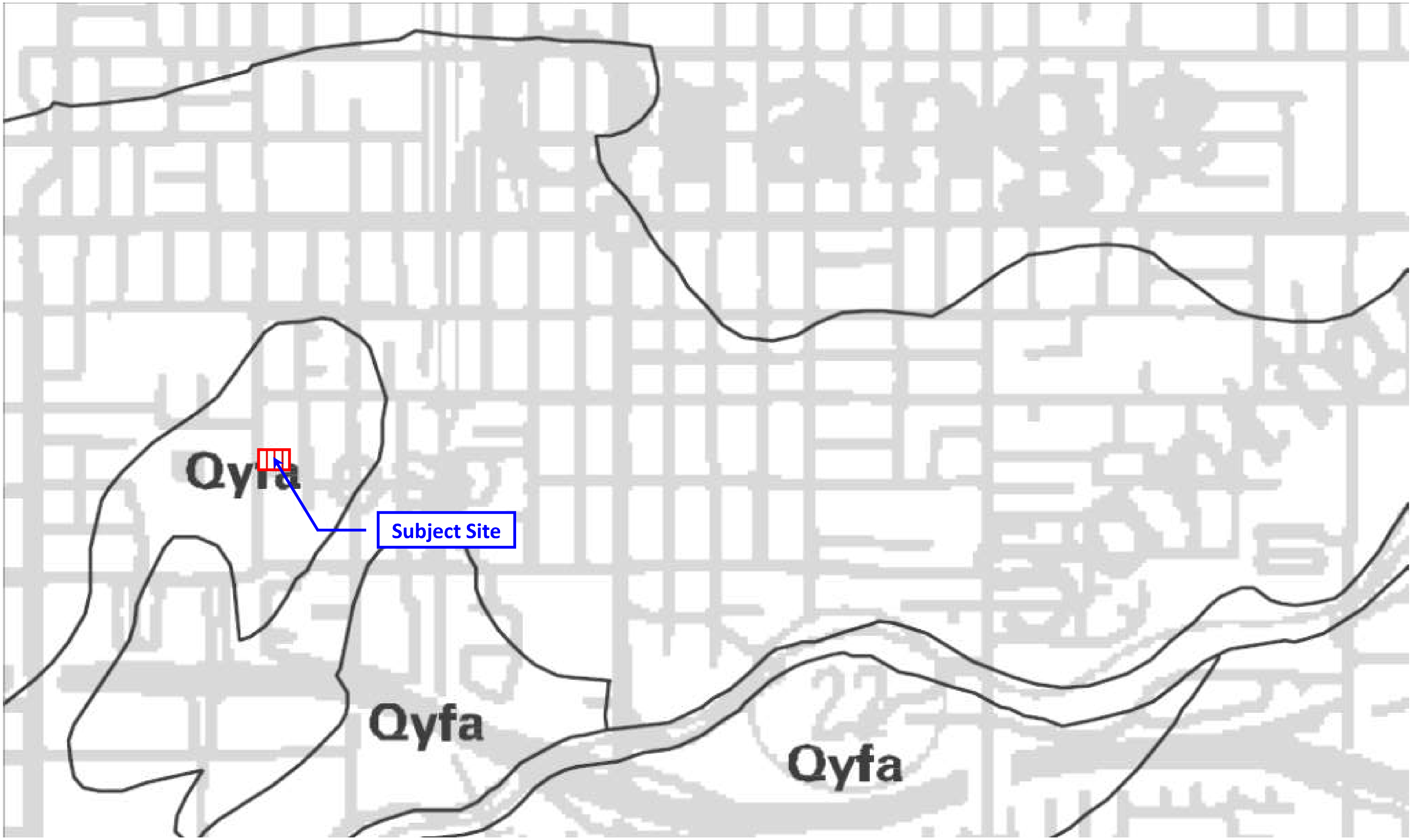
Native site soils consisting of Holocene to latest Pleistocene-age younger alluvium/floodplain deposits (Qyfa) were encountered beneath the pavement section and surficial fill in ASE's borings. Per Reference 5, the younger alluvium/floodplain deposits are associated with deposition of the Santa Ana River and Santiago Creek alluvial systems. Soils within the unit were found to predominantly consist of sand, silt, clay and gravel. In specific, on-site alluvial soils consist of interbedded silty sands, sands, sands with gravel, sands with silt and gravel, silty sands with gravel, silty sands with clay, clayey sands, and clayey sands with gravel. Figure 2, Local Geologic Map, excerpt from CGS (1991, revised 2001; Reference 5), shows geologic material distribution in the vicinity of the Site.

## 4.0 FAULTING AND SEISMICITY

Orange, like the rest of southern California, is located within a seismically active region as a result of being located near the active margin between the North American and Pacific tectonic plates. The principal source of seismic activity is movement along the northwest-trending regional faults such as the San Andreas, San Jacinto, Newport-Inglewood and Whittier-Elsinore fault zones.

By the definition of CGS, an active fault is one which has had surface displacement within the Holocene Epoch (roughly the last 11,000 years). The CGS has defined a potentially active fault as any fault which has been active during the Quaternary Period (approximately the last 1,600,000 years). These definitions are used in delineating Earthquake Fault Zones as mandated by the Alquist-Priolo Geologic Hazard Zones Act of 1972 and as subsequently revised in 1997 as the Alquist-Priolo Earthquake Fault Zoning Act and Earthquake Fault Zones. The intent of the act is to require fault investigations on sites located within Special Studies Zones to preclude new construction of certain inhabited structures across the trace of active faults.

The Site is not located within the Alquist-Priolo Earthquake Fault Zone. No evidence of active or potentially active faulting was observed during our investigation. Several sources were researched for information




*(Reprint of the Quaternary Geologic Map of the Orange 7.5- Minute Quadrangles, California Division of Mines and Geology, Seismic Hazard Zone Report 011, 1997)*

**LEGEND**

Approximate Site Location

$Q_{yfa}$ Holocene-age younger alluvial fan deposits consisting mainly of sand with lesser silty sand, silt, clay & gravel

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| | |
|---|---|
| Project: | **Prop. New Bldg. at O.C. Ronald McDonald House 383 S. Batavia St., Orange, CA** |
| **Figure 2** | **Local Geologic Map** |
| Proj. No.: **6827.18** | Date: **September, 2018** |

pertaining to site seismicity. The majority of data was obtained from the program, EQFAULT, by Blake (2000) that allows for an estimation of peak horizontal ground acceleration (PGA) using a data file of approximately 150 digitized California faults. This program compiles information including the dominant type of faulting within a particular region, the maximum earthquake magnitude each fault is capable of generating, the estimated slip-rate for each fault, and the approximate location of the fault trace. Printouts of the results of the fault search for the Site are shown as Plates I-1 and I-2 in Appendix B. Regional Fault Map, Plate J-1 in Appendix B, shows the major active faults in Southern California near the Site.

### 4.1 Deterministic Analysis

The Site is likely to be subject to strong seismic ground shaking during the life of the project. Based on the referenced literature and deterministic analysis performed with the EQFAULT software, the San Joaquin Hills Fault, approximately 6.5 mile (10.4 km) from the Site, would probably generate the most severe site ground motions. A Maximum Probable Earthquake (MPE), i.e. the maximum earthquake that is considered likely to occur during a 100-year time interval, of 6.6 Mw (moment magnitude as per USGS) has been assessed along the San Joaquin Hills Fault. As shown on Plate I-2 in Appendix B, estimated PGA resulting from a MPE event on the San Joaquin Hills Fault is on the order of 0.353g should this event occur at the fault's closest approach to the Site. Other nearby active faults include the Whittier Fault and the Puente Hills Blind Thrust Fault, located approximately 9.5 miles (15.3 km) and 10.4 miles (16.8 km) away, respectively. In sum, approximately 41 active or potentially active faults have been found within 62 miles (100 km) of the Site.

### 4.2 Probabilistic Analysis

The seismicity of the Site was evaluated utilizing probabilistic analysis available from CGS (www.quake.ca.gov/gmaps/PSHA/psha_interpolator.html). The Maximum Probable Earthquake (MPE) and the Maximum Considered Earthquake (MCE) that carry 10 percent and 2 percent exceedance probabilities, respectively, in 50 years have been considered. Based on a typical damping ratio of 5% and $V_s^{30}$ value of 280 m/sec, derived from the "Set Site Parameters for Web Services"' function as part of the "Hazard Spectrum Calculator (Local)" application available from the "OPENSHA" website, three spectral acceleration values representing peak ground acceleration (PGA), spectral acceleration for structural period of 0.2 second (Sa – 0.2 sec; typical of low-rise buildings) and spectral acceleration for structural period of 1.0 second (Sa – 1.0 sec; typical of multi-story buildings) have been analyzed and are tabulated below.

**Seismic Acceleration Values from CGS's Ground Motion Interpolator (2008)**

| Latitude | Longitude | $V_s^{30}$ (m/sec) | Scenario | Acceleration (g) | | |
|---|---|---|---|---|---|---|
| | | | | PGA | Sa – 0.2 sec | Sa – 1.0 sec |
| N 33.7825° | W 117.8615° | 280 | MPE [1] | 0.376 | 0.835 | 0.448 |
| | | | MCE [2] | 0.600 | 1.321 | 0.745 |

1. MPE scenario carries a 10% exceedance probability in 50 years.
2. MCE scenario carries a 2% exceedance probability in 50 years.

### 4.3 2016 CBC Seismic Design Parameters

The earthquake design requirements listed in 2016 CBC and other governing standards account for faults classified as "active", in accordance with the most recent fault listing as per the United States Geological Survey (USGS) or the CGS. The seismic design of the proposed structures should be implemented in accordance with the applicable provisions stipulated in 2016 CBC unless otherwise specified by the governing authority having jurisdiction over the project.

The 2016 CBC seismic design criteria for the Site based on a Site Class of "D", a Risk Category II and a scenario of Risk-Targeted Maximum Considered Earthquake ($MCE_R$) that carries a 2% exceedance probability in 50 years had been determined utilizing the U.S. Seismic Design Maps web-application available from the Seismic Design Maps and Tools webpage on the website of Earthquake Hazard Program of USGS (http://earthquake.usgs.gov/hazards/designmaps/usdesign.php). Summaries of the seismic coefficients for the Site are tabulated below.

| **2016 CBC SEISMIC DESIGN PARAMETERS** | | | | | |
|---|---|---|---|---|---|
| **Site Latitude:** | N 33.7825° | **Site Longitude:** | W 117.8615° | **Risk Category** [a] | II |
| **Seismic Parameter** | | | | **Recommended Value** | |
| **Site Class** [b] | | | | D | |
| **Soil Profile Name** [b] | | | | Stiff Soil Profile | |
| **Site Coefficient, Fa** [c] | | | | 1.0 | |
| **Site Coefficient, Fv** [d] | | | | 1.5 | |
| **0.2-Second Spectral Response Acceleration, $S_S$** [e] | | | | 1.487g | |
| **1.0-Second Spectral Response Acceleration, $S_1$** [f] | | | | 0.543g | |
| **Adjusted 0.2-Second Spectral Response Acceleration, $S_{MS}$** [g] | | | | 1.487g | |
| **Adjusted 1.0-Second Spectral Response Acceleration, $S_{M1}$** [h] | | | | 0.814g | |
| **Design 0.2-Second Spectral Response Acceleration, $S_{DS}$** [i] | | | | 0.991g | |
| **Design 1.0-Second Spectral Response Acceleration, $S_{D1}$** [j] | | | | 0.543g | |
| **Long -Period Transition Period, $T_L$** [k] | | | | 8 sec | |
| **Mapped $MCE_G$ Geometric Mean Peak Ground Acceleration, PGA** [l] | | | | 0.531g | |
| **Site Coefficient, $F_{PGA}$** [m] | | | | 1.0 | |
| **$MCE_G$ Peak Ground Acceleration adjusted for Site Class Effect, $PGA_M$** [n] | | | | 0.531g | |
| **Risk Category** | | **I or II or III** | | **IV** | |
| **Seismic Design Category based on $SD_S$** [o] | | D | | D | |
| **Seismic Design Category based on $SD_1$** [p] | | D | | D | |

a Per 2016 CBC Table 1604.5
b Per 2016 CBC Section 1613.3.2
c Per 2016 CBC Table 1613.3.3(1)
d Per 2016 CBC Table 1613.3.3(2)
e Per 2016 CBC Figure 1613.3.1(1)
f Per 2016 CBC Figure 1613.3.1(2)
g Per 2016 CBC Equation 16-37
h Per 2016 CBC Equation 16-38
i Per 2016 CBC Equation 16-39
j Per 2016 CBC Equation 16-40
k Per ASCE 7-10 Figure 22-12
l Per ASCE 7-10 Figure 22-7
m Per ASCE 7-10 Table 11.8-1
n Per ASCE 7-10 Equation 11.8-1 = PGA x $F_{PGA}$
o Per 2016 CBC Table 1613.3.5(1)
p Per 2016 CBC Table 1613.3.5(2)

Please note that conformance to the 2016 CBC seismic design criteria does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not take place during the occurrence of a $MCE_R$ event. The primary goal of seismic design is to protect life and not to avoid all damage, since such design may be economically prohibitive. Following a major earthquake, a building may be damaged beyond repair, yet not collapse. The Structural Consultant should review the pertinent parameters to evaluate the seismic design.

## 5.0 GEOLOGIC HAZARDS

### 5.1 Surface Fault Rupture and Ground Shaking

The Site is not located within an Alquist-Priolo Earthquake Fault Zone. No known active or potentially active faults are shown crossing the Site on published maps reviewed. No evidence for active faulting was encountered in the exploratory excavations performed during this evaluation. The risk of surface rupture at the Site is considered very low.

Being in close proximity to several known active and potentially active faults, severe ground shaking should be expected during the life of the proposed development.

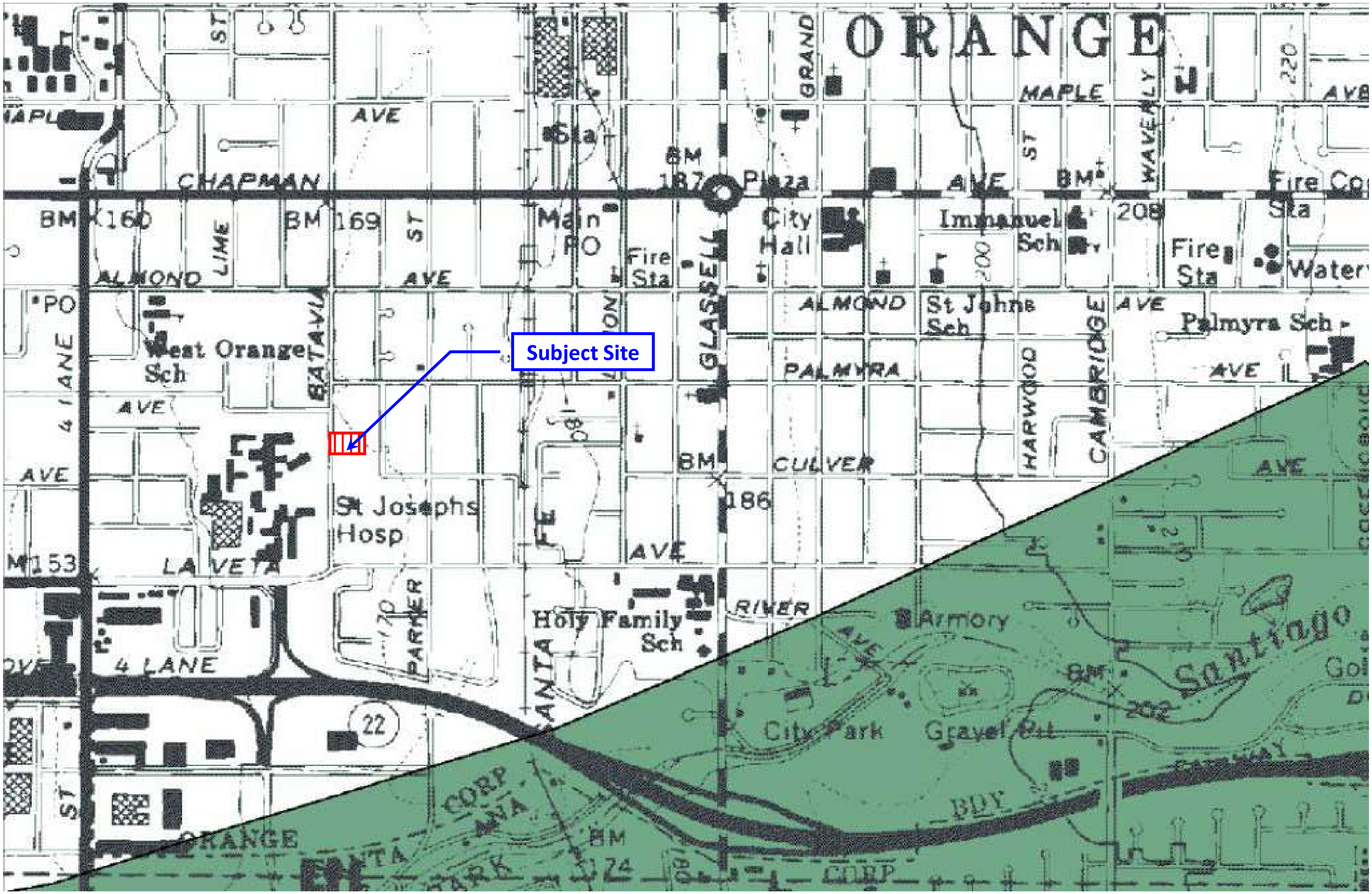
### 5.2 Seismic Hazards

5.2.1 Liquefaction:

As evidenced in Figure 3, Local Seismic Hazard Map, the Site is not within an area identified as having a potential for soil liquefaction when subject to a MPE or MCE event. The term "liquefaction" describes a phenomenon in which a saturated cohesionless soil loses strength and acquires a degree of mobility as a result of strong ground shaking during an earthquake. The factors known to influence liquefaction potential include soil type and depth, grain size, relative density, groundwater level, degree of saturation, and both the intensity and duration of ground shaking.

The soils to the maximum explored depth of 28 feet 5 inches generally consist of loose to medium dense granular soils within the upper approximate 13 feet below grade, and medium dense to very dense granular soils below 13 feet depth. During ASE's field exploration, groundwater was not encountered to the maximum explored depth of 28 feet 5 inches below grade in Boring B-2. Per the referenced CGS (1997, revised 2001) historic high groundwater in the vicinity of the Site is greater than 40 feet below grade. According to the information available from the State of California Department of Water Resources website, historic high groundwater in a well located approximately 0.3 mile northeast of the Site is approximately 110.4 feet deep.

Considering that: 1) groundwater was not encountered in Boring B-2 to a maximum explored depth of 28 feet 5 inches below existing grade, 2) historic high groundwater in a well in the vicinity of the Site is 110.4 feet below site grade based on ASE's literature and State website review, 3) the as-graded soil condition of the Site is anticipated to result in the site soils exhibiting dense to very




(Partial Extract of the State of California Seismic Hazard Zones Orange Quadrangle Official Map dated April 15, 1998)

| LEGEND | |
|---|---|
| | Approximate Site Location |
| | Potential Landslide Hazard Area |
| | Potential Liquefaction Hazard Area |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| | | | |
|---|---|---|---|
| Project: | **Prop. New Bldg. at O.C. Ronald McDonald House 383 S. Batavia St., Orange, CA** | | |
| **Figure 3** | **Local Seismic Hazard Map** | | |
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dense consistency in the upper three (3) feet, and 4) the existing site native granular soils are increasing denser with depth as per encountered in ASE's exploratory borings, the likelihood of occurrence of seismically-induced liquefaction at the Site is deemed negligible.

### 5.2.2 Seismic Settlements:

Ground accelerations emitted from a seismic event can cause densification of loose soils both above and below the groundwater table that may result in settlements on ground surface due to volumetric compression of soil mass. This phenomenon is often referred to as seismic settlement and commonly takes place in relatively clean sands, as well as soils with low plasticity and less fines.

Although the earth materials on site consist of loose to very dense silty sands and sands that are considered non-liquefiable due to deep groundwater beneath the Site, they may still undergo seismically-induced volumetric densification above groundwater level during the MPE.

Settlement of on-site granular soils above the 40-feet deep plus historic high groundwater as a result of seismically-induced densification (i.e. "dry" seismic settlement) is anticipated to be less than 1/2 inch. Such magnitude of "dry" seismic settlement is expected to affect relatively large area such that the differential settlement over short distance is likely to be very small.

### 5.2.3 Earthquake-Induced Landslides:

There is no indication that recent landslides or unstable slope conditions exist on or adjacent to the project Site that would otherwise result in an obvious landslide hazard to the proposed development or adjacent properties.

ASE's review of the same geohazard map that was based upon for the production of Figure 3 indicates that the Site is not located within an area identified as having a potential for earthquake-induced landslides. Due to the lack of significant unretained relief on or adjacent to the Site, the potential for earthquake induced landslides in the future is considered nil.

### 5.2.4 Lateral Spreading:

Lateral spreading, a phenomenon associated with seismically-induced soil liquefaction, is a display of lateral displacement of soils due to inertial motion and lack of lateral support during or post liquefaction. It is typically exemplified by the formation of vertical cracks on the surface of liquefied soils, and usually takes place on gently sloping ground or level ground with nearby free surface such as drainage or stream channel. Since the Site has been evaluated in Section 5.2.1 above not to be susceptible to seismically-induced liquefaction, the potential for the occurrence of liquefaction-induced lateral spreading is deemed unlikely on the Site.

5.2.5 Hydroconsolidation:

Laboratory test results indicate a low hydroconsolidation potential, as well as low to moderate compressibility, in near surface site soils at present condition upon moisture inundation. However, hydroconsolidation potential and compressibility of existing subgrade soils at shallow depth will be minimized upon completion of remedial grading as per recommended in Section 6.2 below. For areas on site that are covered with AC pavement or concrete flatwork, or if interceptor systems are installed beneath planter or turf areas to minimize infiltration of moisture into or divert water away from foundation subgrade soils, the potential impact from hydroconsolidation in these areas should be further reduced.

5.2.6 Tsunamis and Seiches:

Due to the elevation of the Site and absence of nearby waterfront, hazard from tsunami is considered very low.

Seiches are rhythmic movements of water within a lake or other enclosed or semi-enclosed body of water, generally caused by earthquakes. Since no lakes or other enclosed bodies of water lie on or near the Site, the hazard from seiches is not present at the Site.

5.2.7 Flood Hazards:

The Site was located on the ESRII/FEMA Hazard Awareness site. The Site is not located within the limits of the 100 year flood plain per FEMA Flood Insurance Rate Map (Map No. 06059C0161J, map revised December 3, 2009), and is located outside an area of 0.2-percent-annual-chance flood.

## 6.0 GEOTECHNICAL CONSIDERATIONS AND RECOMMENDATIONS

Based on the results of field exploration, laboratory testing, and engineering analysis, it is ASE's geotechnical opinion that the construction of the Building may be implemented as planned, provided that the ground preparation and foundation design criteria recommended herein are incorporated into the project plans and specifications and implemented during construction.

The flowing major geotechnical factors are deemed to affect the design and construction of the Building:

1. Soil disturbances as a result of site demolition, clearing and excavation operations.
2. Presence of loose, low density soils within the intended foundation bearing stratum.
3. Presence of undocumented fill soils in some areas of the Site.
4. Excavation and construction of new footings or flatworks located adjacent to or near existing building foundation that might undermine stability. Therefore it is of essential importance that the embedment depth of any new footing planned next to the existing footing be the same as the

embedment depth of the existing footing. This will ensure that: a) no soils beneath the existing footing would be undermined resulting in the bearing support to the existing footing being compromised, and b) no undesirable surcharge would be imposed on the existing footing from an adjoining new footing.

In consideration of the above factors, it is ASE's opinion that overexcavation and backfilling with properly compacted fill in the building pad area of the Building, as recommended herein, will be essential to reduce unfavorable foundation and slab displacement caused by static settlements of underlying soils, and to provide satisfactory bearing stratum for the Building. The grading recommendations provided herein should be reviewed when final grading plans become available. It is assumed that the finish grades will be close to existing site grades ($\pm$ one foot).

Conventional shallow foundations comprising continuous spread footings and isolated pad footings bearing on properly compacted fill, together with slab-on-grade, may be considered for structural support.

### 6.1 Site Preparation

6.1.1 Existing Improvements:

Prior to grading operations, it will be necessary to remove designated existing improvements, including any remaining buried obstructions, which may be in the areas of proposed construction. Structure removal should include foundations. Concrete flatwork and asphalt pavement should also be removed from the areas of proposed construction. Concrete and asphalt fragments from site demolition operations should be disposed of off-site.

6.1.2 Surface Vegetation:

Surface vegetation should be stripped from areas of proposed construction. Stripping should penetrate six (6) inches into surface soils. Any soil contaminated with organic matter (such as root systems or strippings mixed into the soil) should be disposed of off-site or set aside for future use in non-structural landscaped areas. Removal of trees and shrubs should include rootballs and attendant root systems.

6.1.3 Underground Utilities:

Any underground utilities to be abandoned within the zone of proposed construction should be cut off a minimum of five (5) feet from the area of the new structure. The ends of cut-off lines should be plugged a minimum of five (5) feet with lean concrete exhibiting minimum shrinkage characteristics to prevent water migration to or from hollow lines. Capping of lines may also be required should the plug be subject to any line pressure.

Alternatively, deep hollow lines may be left in place provided they are filled with lean concrete or 2-sack control density fill (slurry fill). No filled line should be permitted closer than two (2) feet from the bottom of future footings, unless it has been evaluated and approved by the Geotechnical Consultant. However, local ordinances relative to abandonment of underground utilities, if more restrictive, will supersede the above minimum requirements.

## 6.2 Site Grading

In view of minimizing the potential adverse effects associated with the development of excessive total or differential settlement/heave underneath the Building, as well as to ensure uniform bearing competency for the foundations and slabs, preparation of on-site soils are recommended in the following sections.

6.2.1 Undocumented Fill/Disturbed Native Soils:

All undocumented fill soil, as discussed in Section 2.3.1 above, encountered during site grading in the area of the Building, as well as any native soils disturbed during demolition and clearing operations, should be excavated full depth under the observation and confirmation by the Geotechnical Consultant. Lateral extent of overexcavation beyond Building perimeters, where possible, should be to a minimum distance equal to the depth of undocumented fill/disturbed soil encountered or three (3) feet, whichever is greater.

For other secondary improvements such as free-standing walls or hardscape, the lateral extent of removal should be to a minimum distance equal to the depth of undocumented fill/disturbed soils encountered or one (1) foot, whichever is greater.

The exposed excavation bottom should be scarified/reworked to a minimum one (1) foot depth and recompacted to at least 90 percent relative compaction with a minimum moisture content of one (1) percentage point above optimum moisture content, prior to backfilling with approved soils as specified in Section 6.2.7. Unless otherwise stated, the measurement of relative compaction in this report should always refer to ASTM D1557-12 Test Method.

6.2.2 Expansive Soils:

Laboratory test results on near surface soil samples indicate a “Very Low” soil expansion potential (i.e. Expansion Index, EI = 13 per ASTM D4829-11 Test Method), as defined in 2016 CBC. As such, no adverse impact arising from undesirable soil expansion is anticipated at the Site. Nonetheless, it may be desirable that the soil expansion potential be re-evaluated through additional testing during or after rough grading operations and interior overexcavation to verify the design adequacy of foundation or slab-on-grade against the re-tested soil expansion potential as heterogeneity within soil mass is not uncommon.

6.2.3 Remedial Grading:

To provide acceptable support for the Building foundations and slabs, it is recommended that on-site soils within the footprint of the Building be overexcavated and removed uniformly to a minimum depth of three (3) feet below existing grade, or one (1) foot below the bottom of the lowest footing, whichever is lower, and replaced with properly compacted fill such that the building foundations and slabs are supported on a re-engineered, compacted fill layer. The excavation bottoms should be near uniform. The overexcavation should extend laterally to a minimum distance of five (5) feet beyond Building perimeters, where possible.

Soils exposed at excavation bottoms to a depth of one (1) foot should be scarified, reworked and recompacted to exhibit a minimum 90 percent relative compaction with a minimum moisture content of one (1) percentage point above the optimum moisture content prior to receiving fill placement. The exposed excavation bottom should be observed, tested, and approved by the Geotechnical Consultant prior to placing compacted fill. In case of the presence of localized loose soils, the overexcavation needs to be deepened accordingly to delete the loose soil condition. However, this deepened overexcavation may be terminated when the exposed native, undisturbed soils exhibit a natural relative compaction greater than 85 percent, subject to the testing and inspection by the representative from the Geotechnical Consultant.

The Geotechnical Consultant should be provided with appropriate foundation details and staking during grading to verify that depths and/or locations of the recommended overexcavation are adequate. For areas on site that grading recommendations stipulated in both Sections 6.2.1 and 6.2.3 apply, the more stringent grading criteria between the two sections should govern.

The depth of overexcavation should be reviewed by the Geotechnical Consultant during the actual construction. Any subsurface obstruction, buried structural elements, and unsuitable material encountered during grading, should be immediately brought to the attention of the Geotechnical Consultant for proper exposure, removal and processing, as recommended.

6.2.4 Temporary Excavation:

Excavations of site soils 4 feet or deeper should be temporarily shored or sloped in accordance with Cal OSHA requirements.

a) Temporary Sloping:

In areas where excavations deeper than 4 feet are not adjacent to existing structures of public right-of-ways, sloping procedures may be utilized for temporary excavations. It is recommended that temporary slopes in both fill and native soils be graded no steeper than

1.5:1 (H:V) for excavations up to 10 feet in depth. The above temporary slope criteria is based on level soils conditions behind temporary slopes with no surcharge loading (structures, traffic) within a lateral distance behind the top of slope equivalent to the slope height.

It is recommended that excavated soils be placed a minimum lateral distance from top of slope equal to the height of slope. A minimum setback distance equivalent to the slope height should be maintained between the top of slope and heavy excavation/grading equipment. Should running sand conditions be experienced during excavation operations, flattening of cut slope faces, or other special procedures may be required to achieve stable, temporary slopes.

Soil conditions should be reviewed by the Geotechnical Consultant as excavation progresses to verify acceptability of temporary slopes. Final temporary cut slope design will be dependent upon the soil conditions encountered, construction procedures and schedule.

b) Temporary Shoring:

Temporary shoring will be required for those excavations where temporary sloping as specified above is not feasible.

Temporary cantilever shoring, if used, should be designed to resist an active earth pressure of 37 pounds per cubic foot (pcf) equivalent fluid pressure (EFP) for level soil conditions behind shoring. In addition, a minimum uniform lateral pressure of 100 pounds per square foot (psf) in the upper ten (10) feet of shoring should be incorporated in the design when normal traffic is permitted within ten (10) feet of the shoring. The resultant lateral deflection of shoring and surficial settlement immediately behind shoring are estimated to be on the order of one (1) to one and one half (1 ½) percent of the shored excavation depth. Should this ground deformation be intolerable to the existing structure, ASE should be consulted for more detailed analysis and further recommendations.

The design shoring should also include surcharge loading effects of existing structures and anticipated traffic, including delivery and construction equipment, when loading is within a distance from the shoring equal to the depth of excavation.

c) Slot Cutting:

Slot cuts, or cuts in sections, may be considered when excavation occurs adjacent to existing site structures or incurs encroachment into neighboring properties and/or public right-of-way. It is intended to allow the proceeding of site excavation without compromising greatly the overall stability of existing structures, neighboring properties and/or public right-of-way.

Based on the scale of subgrade soil exposure, the slot cutting on-site could be accomplished in a procedure hereby termed “A-B slot cutting”. This procedure involves overexcavating and recompacting the earth in all “A” sections, then followed by the same earth works in all “B” sections. Due to the relative delicate nature of the slot cutting procedure, it is essential that the Geotechnical Consultant be on-site to observe/evaluate the following: 1) slots have been excavated per the approved plans and specifications (widths and depths); 2) no signs of instability take place with the site or neighboring structures/features/right-of-way; and 3) soil compaction is performed in compliance with the requirements of this Soils Report and the applicable Grading Code.

It is estimated by ASE that the temporary vertical slot cuts facilitating site grading and/or excavation should be limited to no more than <u>5</u> feet deep and <u>6</u> feet long per section. Please note that no additional surcharge loading (structures, traffic) should be exerted behind the opened cut slots within <u>5</u> feet measured laterally from the face of vertical cut. Temporary blockade of vehicle parking or traffic movement along the sections of the existing neighboring structure/features behind the opened cut slots should be planned ahead. Time is of particular essence to the safe and successful implementation of the recommended slot cutting.

Should running soil or localized caving condition be experienced during slot cutting excavation operations, pending pertinent remedial measures to be recommended by the Geotechnical Consultant, the cut area should be backfilled immediately to prevent unfavorable movement of neighboring structures/right-of-way. Soil conditions should be reviewed and evaluated by the Geotechnical Consultant as excavation progresses.

6.2.5 Exterior Slab-on-Grade/Concrete Flatwork/Hardscape/Pavement Support:

For the purpose of reducing future unsightly and uneven movements and cracks of any newly re-constructed exterior slab-on-grade, concrete flatwork, hardscape, or pavement, it is recommended that the upper eighteen (18) inches of subgrade soils below the bottom of and eighteen (18) inches laterally beyond the footprint of exterior concrete slab-on-grade/concrete flatwork/hardscape/ pavement should be overexcavated and recompacted to at least 90 percent relative compaction with a minimum moisture content of one (1) percentage point <u>above</u> optimum moisture content. Prior to placement of the compacted fill layer, the upper six (6) inches of exposed native subgrade should be reworked to at least 90 percent relative compaction and moisture conditioned to at least one (1) percentage point <u>above</u> optimum moisture content. From geotechnical viewpoint, new landscape area with only softscape is not subject to subgrade preparation and remedial grading requirements mentioned in Sections 6.2.1, 6.2.3 and 6.2.5.

6.2.6 Suitable Soils and Imported Soils:

Unless otherwise noted, any soil re-used or imported as fill for the completion of subgrade preparation should be exhibiting a relatively uniform gradation, free of debris, particles greater than 4 inches in maximum dimension, organic matter or other deleterious materials.

Unless otherwise approved by the Geotechnical Consultant, the fill materials should also comply with the following soil corrosivity criteria with respect to the desired concrete and reinforcement protection.

| Corrosivity Criteria for Select Fill and General Fill | | | |
|---|---|---|---|
| **Soluble Sulfate (% by weight) (1)** | **Soluble Chloride (ppm) (2)** | **Resistivity Value (ohm-cm) (3)** | **pH-Value (4)** |
| ≤ 0.1 | ≤ 500 | ≥ 2000 | 7.0 ~ 8.8 |

(1) California Test Method 417. (2) California Test Method 422. (3) ASTM G187-12a Test Method. (4) California Test Method 532.

Imported fill soils or base materials should be examined by a representative of this office, and tested as necessary for evaluating their suitability for use as fill prior to being hauled to the Site. Final acceptance of any imported soil will be based upon review and testing of the soil actually delivered to the Site. All blended soils to be used as fill must be tested and approved by the Geotechnical Consultant prior to being used for fill placement.

6.2.7 Backfilling and Compaction Requirements:

Existing site soils at their present state and composition, unless indicated otherwise, are considered suitable for re-use as fill during site grading provided they are: 1) free of debris, particles greater than 4 inches in maximum dimension, organic matter or other deleterious materials, 2) are not environmentally contaminated, and 3) adequately moisture conditioned to permit achieving the required compaction. No nesting of large particles (2 to 4-inch size) should be permitted during backfilling operations.

On-site soils, blended soils and import materials approved for use as fill should be placed in horizontal lifts not exceeding 8 inches in loose thickness, moisture conditioned to a minimum of one (1) percentage point above optimum moisture content and compacted to a minimum 90 percent relative compaction per ASTM D1557-12 Test Method, unless otherwise stated.

6.2.8 Shrinking and Subsidence:

The volume change of excavated on-site materials upon excavation and placement as engineered fill will vary with soil type, depth, location and compactive effort. However, for planning purposes, a shrinkage factor on the order of ten (10) percent should be considered for earthwork calculations.

Subsidence due to scarification and recompaction of the exposed ground surfaces within removal areas has been estimated to be approximately on the order of one (1) inch.

6.2.9 Tests and Observations:

All subgrade preparation, compaction, and backfill operations should be performed under the observation of and testing by the Geotechnical Consultant's field representative. An adequate number of field tests should be taken to ensure compliance with this report and local ordinances.

If it is determined during grading that site soils require overexcavation to greater depths for obtaining proper support for the proposed structures, this additional work should be performed in accordance with the recommendations of the Geotechnical Consultant.

## 6.3 Foundation Design

It is ASE's opinion that conventional continuous spread footings and isolated pad footings bearing on approved compacted fill soils may be used to provide foundation support for the Building, provided that the site preparation recommendations presented in Section 6.2 above are incorporated in project planning and design, and implemented during site construction. Presented below are the recommended geotechnical design and construction criteria for shallow footing foundation and slab-on-grade.

6.3.1 Conventional Shallow Footing Foundation:

a) Minimum Footing Dimension and Reinforcement:

In order to mobilize sufficient soils bearing capacity supporting the new footings for the planned Building construction, it is recommended that the following tabulated minimum footing embedments, widths and reinforcements for various footing types be considered.

**Minimum Footing Dimension & Reinforcement**

| Structure Height | Continuous Spread Footing/Strip Footing | | | Isolated Pad Footing | | |
|---|---|---|---|---|---|---|
| | Depth (1) (in) | Width (in) | Reinforcement (2) | Depth (1) (in) | Width (in) | Reinforcement (2) |
| 2-Story | 18 | 15 | Two #4 bars – one near the top and one near the bottom | 18 | 24 square | Two #4 bars – one near the top and one near the bottom, applied bi-axially |
| 3-Story | 24 | 18 | | 24 | 30 square | |

(1) Footing embedment measured from the nearest adjacent lowest soils grade.
(2) Based strictly from geotechnical point of view.

Foundation design details such as concrete strength, reinforcements, etc. should be established by the Structural Consultant.

b) Allowable Soils Bearing Capacity:

For footings complying with the minimum dimension requirements stipulated in Section 6.3.1 a) above, the allowable soils bearing capacities, inclusive of both dead and live loads, should be as per tabulated below:

| Structure Height | Allowable Soils Bearing Capacity (psf) | | Increase per 12-inch Increment in Footing Width (psf) | Increase per 12-inch Increment in Footing Depth (psf) | Maximum Composite Ceiling Value (psf) |
|---|---|---|---|---|---|
| | Continuous Spread Footing/Strip Footing | Isolated Pad Footing | | | |
| 2-Story | 2,500 | 2,500 | 200 | 500 | 4,000 |
| 3-Story | 2,700 | 2,700 | | | |

The above allowable bearing capacities may be increased by one-third (1/3) when subject to short-term, transient loading induced by wind or seismic activities.

For any new footings that are within a lateral distance from any existing building footing equal to the depth of the new footing, the reduction factors tabulated below should be applied to the corresponding allowable soils bearing capacity values.

| Lateral Distance between New Footing and Existing Building Footing expressed in Fraction of the New Footing Depth, Z | ≥ 1 x Z | 1/2 x Z | 0 |
|---|---|---|---|
| Reduction Factor To Allowable Soils Bearing Capacity [a] | 1.0 | 0.75 | 0.5 |

a. Interpolation may be used for deriving reduction factor for other distance value.

c) Lateral Resistance:

Resistance to lateral loads can be assumed to be provided by passive lateral earth pressure and by friction acting on structural components in permanent contact with the subgrade soils.

For site preparation implemented as per recommended in the above Section 6.2, lateral resistance on the sides of foundations may be computed using a passive lateral earth pressure of 250 pcf EFP for footings embedded into approved compacted fill soils, subject to a maximum of 2,500 psf. An ultimate coefficient of friction on the order of 0.4 may also be used for structural dead load acting between the footing bottom and the supporting soils.

For any new footing that is within a lateral distance from any existing building footing equal to two (2) times the depth of the new footing, the following tabulated reduction factors should be applied to the corresponding passive lateral earth pressure values for the sides of the new footing that are facing the existing building footing.

| Lateral Distance between New Footing and Existing Building Footing expressed in Fraction of the New Footing Depth, Z | ≥ 2 x Z | 1 x Z | 0 |
|---|---|---|---|
| Reduction Factor To Passive Lateral Earth Pressure [a] | 1.0 | 0.5 | 0 |

a. Interpolation may be used for deriving reduction factor for other distance value.

The above passive lateral earth pressure may be used in conjunction with the ultimate coefficient of friction in calculating composite lateral resistance, provided the passive lateral earth pressure value is reduced by one-third (1/3). The composite lateral resistance may be increased by one-third (1/3) under transient wind or seismic loading.

d) Settlements:

Total static settlements resulting from compression of subgrade soils for conventional footings designed and constructed in accordance with the above criteria, and supporting maximum assumed dead plus live (D+L) column and wall loads mentioned in Section 1.1.2 above, are not anticipated to exceed <u>two-third (2/3) inch</u>, upon implementation of site preparation as per recommended in Section 6.2 above. A static differential settlement on the order of <u>one-third (1/3) inch</u> over a distance of <u>30 feet</u> is anticipated between similarly loaded adjacent isolated pad footings, as well as for continuous wall footings over a distance of approximately <u>30 feet</u>.

Please be reminded that the Geotechnical Consultant should be contracted for further evaluation and recommendations, as necessary, should final design structural loads exceed the maximum loads assumed in the above analyses by more than ten (10) percent.

6.3.2 Retaining Walls:

Cantilevered retaining walls should be designed for an "active" lateral earth pressure value tabulated on the next page for approved granular backfill soils and level backfill conditions, whereas an "At-rest" lateral earth pressure value for approved granular backfill and level backfill conditions tabulated on the next page should be used for top-restrained retaining walls. Should site silty soils be used as backfill behind retaining walls and prolonged moisture inundation behind retaining walls is anticipated, then added lateral earth pressure accounting for soils expansion should be considered. In this regard, it is recommended that cantilevered and top-restrained retaining walls should be designed for lateral earth pressure equivalent to the "at-rest" and "passive" states tabulated below for site soils, respectively. Retaining walls subject to uniform surcharge loads should be designed for an additional uniform lateral pressure equal to one-third (1/3) and one-half (1/2) of the anticipated surcharge pressure over the full retained height of the retaining wall (measuring from the top of wall to the heel of wall footing) for cantilevered and top-restrained wall fixity conditions, respectively, as shown in Figure 4, Nearby Building Surcharge Consideration and Retaining Wall Drainage Details. Appropriate back drainage should be provided to avoid excessive build-up of hydrostatic wall pressures.

Any retaining wall with a retained height exceeding <u>six (6)</u> feet should additionally be designed to resist seismic lateral earth pressure. It is our understanding that walls in excess of 6 feet in height are not currently planned for this Site. The Geotechnical Consultant should be consulted if this condition exists, or if the local governing agency requires the retaining wall to be designed for seismic lateral earth pressure regardless of the retained height. Footings should be reinforced as recommended to by Structural Consultant.

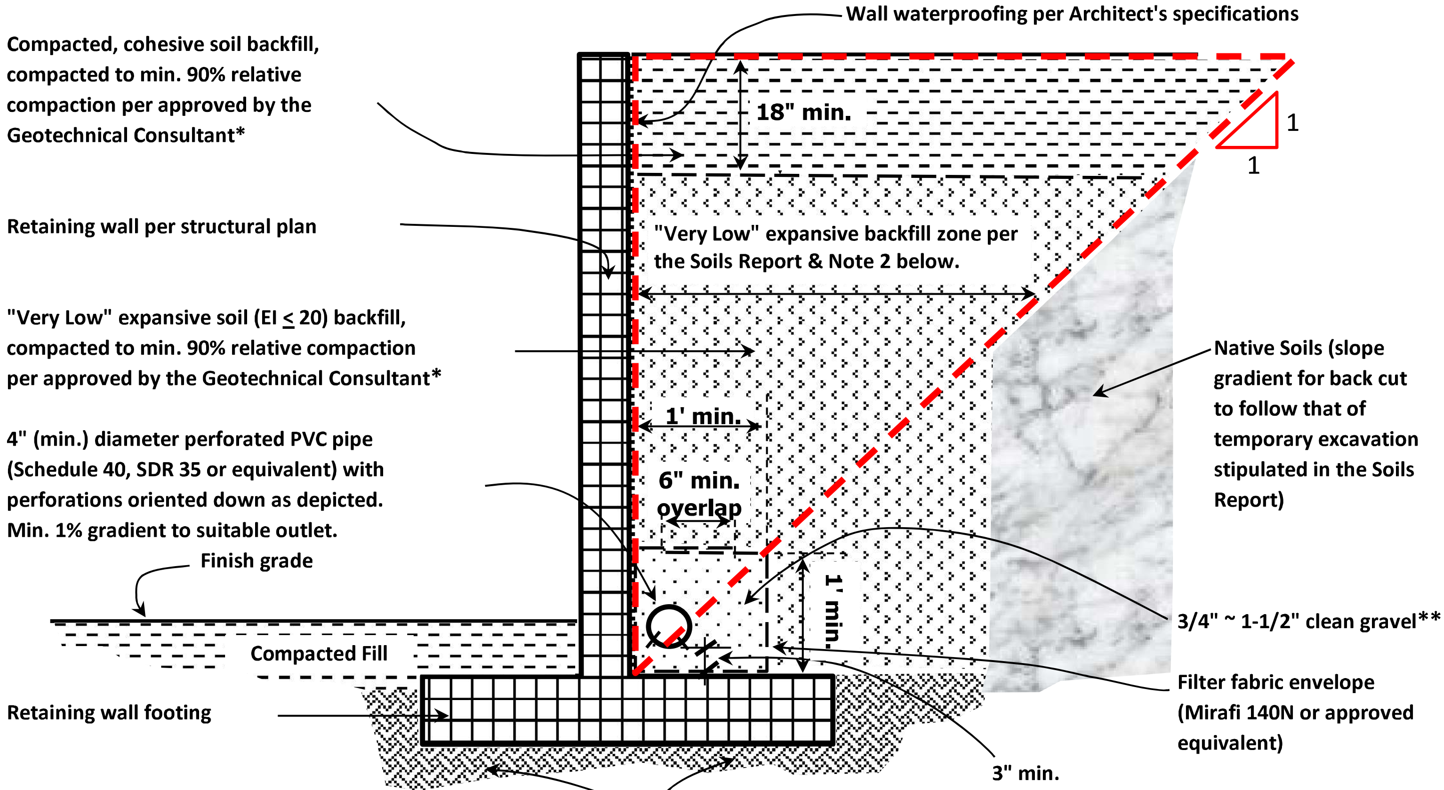
The Geotechnical Consultant should be on-site during temporary back cut and retaining wall construction to inspect and evaluate the stability of cuts and, if necessary, to provide additional remedial or mitigative recommendations.

| Retaining Wall Design Parameter | Value |
|---|---|
| **Allowable Soils Bearing Capacity** | 2,500 psf (1)(2) |
| **Active Pressure [granular backfill/site soils: level]** | 37 pcf EFP (3) |
| **At-rest Pressure [granular backfill/site soils: level]** | 57 pcf EFP (3) |
| **Passive Pressure (per foot of depth)** | 250 pcf (4) |
| **Coefficient of Friction** | 0.4 (4) |
| **Minimum Footing Depth** | 18 inches |
| **Minimum Footing Width** | 15 inches |
| **Minimum Reinforcement** | Two No. 4 rebar - 1 near top and 1 near bottom |

(1) Based on compliance with earthwork recommendations per Section 6.2 of this Soils Report.
(2) Allowable soils bearing capacity increase for larger retaining wall footings should be as per Section 6.3.1b).
(3) Design values assuming a drained condition with "Very Low" expansive materials (EI ≤ 20) within the backfill zone and no surcharge loading conditions.
(4) Passive lateral resistance may be combined with frictional resistance provided the passive lateral earth pressure is reduced by 1/3. See Section 6.3.1c.

Preferably, the backfill should consist of approved "Very Low" expansive (EI ≤ 20) material, and should be compacted to a minimum relative compaction of 90 percent. In order to be able to utilize the active or at-rest lateral earth pressure values for granular soil backfill as listed in the following table, the extent of the "Very Low" expansive (EI ≤ 20) backfill zone should be as per the red-dotted triangular wedge depicted in Figure 4. Flooding or jetting of backfill should not be permitted. Granular backfill should be capped with 18 inches (minimum) of relatively impervious fill such as native site soils to seal the backfill and prevent saturation. Figure 4 illustrates the general configuration and requirements for retaining wall drainage. Should any conflict noticed between recommendations stated in this report and those shown in Figure 4, the fore should govern. Other retaining wall drainage alternatives such as CONTECH C-Drain system or MIRADRAIN may be considered but should first be reviewed and approved by the Geotechnical Consultant prior to implementation.

Should the space behind the new retaining wall be too tight to implement the above recommended backfill effort, as an alternative, 2-sack control density fill (slurry fill) may be used in lieu of regular soil backfill, provided that the integrity and functionality of wall backdrain is protected and maintained.




Limit of area where 1/3 and 1/2 of the loading from nearby buildings/structural features should be accounted for in cantilevered and top-restrained retaining wall design, respectively.

Competent bedrock, native soils or certified compacted fill per approved by the Geotechnical Consultant

| SPECIFICATIONS FOR CALTRANS CLASS II PERMEABLE MATERIAL | |
|---|---|
| U.S. STANDARD SIEVE SIZE | % PASSING |
| 1" | 100 |
| 3/4" | 90 ~ 100 |
| 3/8" | 40 ~ 100 |
| No. 4 | 25 ~ 40 |
| No. 8 | 18 ~ 33 |
| No. 30 | 5 ~ 15 |
| No. 50 | 0 ~ 7 |
| No. 200 | 0 ~ 3 |
| Sand Equivalent > 75 | |

* Based on ASTM D-1557-02

** If Caltrans Class II permeable material (see gradation to left) is used in place of 3/4" ~ 1-1/2" gravel, filter fabric may be deleted. Caltrans Class 2 permeable material should be compacted to minimum 90 percent relative compaction. Unless otherwise specified, a minimum of 1 cubic foot of gravel should be used for each 1 foot run of drain.

Note 1: Composite drainage products such as Contech C-Drain, Miradrain or J-Drain may be used as alternative to gravel or Class II. Installation should be performed in accordance with manufacturer's specifications.

Note2: Min. Extent of " Very Low" expansion backfill zone should be as per indicated by the red-dotted wedge area behind retaining wall.

Schematic Not To Scale

Associated Soils Engineering, Inc.

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Signal Hill, CA 90755

Tel (562) 426-7990 Fax (562) 426-1842

| | | | |
|---|---|---|---|
| Project: | Prop. New Bldg. at O.C. Ronald McDonald House<br>383 S. Batavia St., Orange, CA | | |
| Figure 4 | Nearby Building Surcharge Consideration & Retaining Wall Drainage Details | | |
| Proj. No.: | 6827.18 | Date: | September, 2018 |

It should be noted that the use of heavy compaction equipment in close proximity to retaining structures can result in wall pressures exceeding design values and corresponding wall movement greater than that normally associated with the development of active or at-rest conditions. In this regard, the contractor should take appropriate precautions during the backfill placement.

6.3.3 Footing/Foundation Observation:

All footing/foundation excavations should be observed by the Geotechnical Consultant's representative to verify minimum embedment depths and competency of bearing soils. Such observations should be made prior to placement of any reinforcing steel or concrete.

## 6.4 Slabs-On-Grade

Concrete floor slabs in the Building and exterior concrete flatwork/hardscape should be supported on properly compacted soils as recommended in the Site Grading section (i.e. Section 6.2) of this report. The slab subgrade soils should also be proof-rolled just prior to construction to provide a firm, unyielding surface, especially if the subgrade has been disturbed or loosened by the passage of construction traffic. Final compaction and testing of slab subgrade should be performed just prior to placement of concrete.

For structural design of concrete slabs, a modulus of subgrade reaction ("k-value") on the order of 150 pounds per square inch per inch ("psi/in") and an allowable bearing capacity of 900 psf may be used for slab constructed on recompacted site soils. Interior and exterior slabs should be properly designed and reinforced for the construction and service loading conditions. To minimize slab distress, geotechnically, it would be prudent to provide a minimum actual slab thickness of four (4) inches with minimum reinforcement consisting of number 3 reinforcing bars spaced maximum 24 inches on centers each way for slabs constructed on site soils. The structural details, such as slab thickness, concrete strength, amount and type of reinforcements, joint spacing, etc., should be established by the Structural Consultant in accordance with pertinent sections in 2016 CBC.

The entirety of any new slabs within the Building should be underlain by an impermeable vapor barrier (minimum 15-mil-thick visqueen) per 2016 CRC Section R506.2.3. A minimum 12-inch overlap between visqueen sheets should be ensured during placement. All visqueen sheets should be puncture free prior to slab construction, and should be sandwiched top and bottom by two (2) inches of clean sand (Sand Equivalent, SE, ≥ 30 per ASTM D 2419-14 Test Method). The concrete slab shall consist of a concrete mix design which will address bleeding, shrinking and curling.

Exterior slabs should be properly jointed to limit the number of concrete shrinkage cracks. For long/thin sections, such as sidewalks, expansion or control joints should be provided at spacing intervals equal to the width of the section. Slabs between 5 and 10 feet in minimum dimension should have a control joint at centerline. Slabs greater than 10 feet in minimum dimension should have joints such that unjointed sections do not exceed 10 feet in maximum dimension. Where flatwork adjoins structures, it is recommended that a foam joint or similar expansion material be utilized. Joint depth and spacing should conform to the ACI recommendations. It is, however, cautioned that uneven heaving of exterior slabs may develop in the future when prolonged irrigation or seepage permeates the subgrade soil, especially in areas that expansive soil pockets exist due to inadequate control or inspection of earthwork construction.

## 6.5 Asphaltic Concrete (AC) Flexural Pavement Design

The finish grade at the subject Site is anticipated to be underlain by compacted structural fill consisting of site soils. For preliminary pavement design purposes, a laboratory tested R-Value of 30 has been utilized considering the site soils as subgrade soils. Three (3) traffic indices ("TI") of 4.5, 5.5 and 7.0, together with the tested R-Value, have been utilized for the development of preliminary recommendations for the pavement sections. Analyses performed in accordance with the current edition of the Caltrans Highway Design Manual, and assuming compliance with site preparation recommendations, it is recommended that the AC pavement structural sections tabulated below be considered. However, please be reminded that the following preliminary pavement section recommendations have been established based purely on procedures stipulated in Caltrans Manual. Governing authority should be consulted for minimum pavement section requirements and, if more stringent than that recommended by ASE, be complied with.

| Traffic Index (TI) | Pavement Section Alternatives | | Remark |
|---|---|---|---|
| | AC [1] (inches) | AB [2] (inches) | |
| 4.5 | 3.0 | 4.5 | For auto parking stalls. |
| 5.5 | 3.0 | 7.5 | For auto circulation aisles. |
| | 4.0 | 5.0 | |
| 7.0 | 4.0 | 9.5 | For fire lanes and truck access ways/entry and exits. |
| | 5.0 | 7.5 | |

(1) Asphaltic Concrete.
(2) CAB or CMB, Greenbook sections 200-2.2 and 200-2.4, respectively, compacted to at least 95% relative compaction.

It is recommended that R-Value testing be performed on representative soil samples after rough grading operations on the upper 2 feet to confirm/modify applicability of the above pavement sections.

The aggregate base should conform to the Crushed Aggregate Base (CAB) per Section 200-2.2 of the Greenbook requirements. The base course should be compacted to a minimum relative compaction of 95% at a minimum of one (1) percentage point above the optimum moisture content. Field testing should be used to verify compaction, aggregate gradation, and compacted thickness.

The asphalt concrete pavement should be compacted to 95% of the unit weight as tested in accordance with the Hveem procedure. The asphalt concrete material shall conform to Type III, Class C2 or C3, of the Greenbook. All subgrade and aggregate base materials should be proof-rolled by heavy rubber tire equipment to verify that the subgrade and base grade are in a non-yielding condition. If the paved areas are to be used during construction, or if the type and frequency of traffic is greater than assumed in the design, the pavement section should be re-evaluated for the anticipated traffic.

### 6.6 Portland Cement Concrete (PCC) Pavements

The concrete pavement sections tabulated below are based on load safety factors of 1.0 and 1.1, and a modulus of subgrade reaction ("k" Value) of 150 pounds per cubic inch for site soils compacted as subgrade material, and the design procedures presented in the Portland Cement Association bulletin "Thickness Design for Concrete Highway and Street Pavements" (EB109.01P), 1984. A design service life of 20 years was assumed for the design of the Portland cement concrete pavement section.

The Structural Consultant should establish the design details of the concrete pavement section, including reinforcements, concrete strength, and joint and load transfer requirements.

| Concrete Flexural Strength (psi) (1) | Pavement Thickness (in) (2), (4) | Pavement Thickness (in) (3), (4) |
|---|---|---|
| 600 | 6.0 | 6.5 |
| 650 | 5.5 | 6.0 |

(1) Represents 90-day flexural strength. Based on Figure 10 of Reference 24, concrete with 28-day unconfined compressive strength values of 4000 to 4500 psi typically correlates to 90-day flexural strength values of 600 and 650 psi, respectively.
(2) Load Safety Factor = 1.0 (Auto Parking Stalls)
(3) Load Safety Factor = 1.1 (Fire Lanes/Truck Traffic Areas/Entry and Exits)
(4) Assumes no PCC shoulder or curb.

It is recommended that edges of concrete pavements which are not adjacent to existing buildings, or are adjacent to planter areas, be downturned a minimum of 12 inches or be constructed with curbing to prevent water infiltration to subgrade soils. If edges are downturned or curbing is constructed, the above pavement thicknesses should be decreased by 1/2 inch.

The upper one (1) foot of exposed subgrade soils beneath concrete pavements should be compacted to a minimum 95 percent relative compaction with minimum moisture content of one (1) percentage point above optimum moisture content. Subgrade soils should exhibit a firm, unyielding surface in addition to the recommended compaction. Final compaction and testing of pavement subgrade should be performed just prior to placement of aggregate base and/or concreting. Other pertinent subgrade preparation measures stipulated in the "Thickness Design for Concrete Highway and Street Pavements" (EB109.01P), 1984, or required by the jurisdictional municipal authorities should be followed accordingly.

### 6.7 Site Drainage

Per Section 1804.4 of 2016 CBC, a minimum 5% descending gradient away from the Building for a minimum distance of 10 feet should be incorporated for earth grade placed adjacent to the foundation. This descending gradient may be reduced to 2% for any impervious areas, such as concrete paved walkways, within the 10-foot zone. For areas where the 10-foot drainage distance is not attainable, alternative measure such as concrete-lined swales having a minimum 2% gradient may be adopted to divert the water away from the Building, provided that a minimum 5% gradient is maintained in the distance between the building footprint and the diversion measure such as swales. For more specific site drainage guidelines, the Project Civil Consultant should refer to the pertinent sections in 2016 CBC.

Any planter areas to be placed adjacent to structure perimeters should be provided with solid bottoms and a drainage pipe, to divert water away from foundation and slab subgrade soils. Excessive moisture variations in site soils could result in significant volume changes and movement.

### 6.8 Soil Corrosivity Evaluation

Soils corrosivity tests were performed on a representative sample of site soil. These tests are meant to determine the corrosive potential of on-site soils to proposed concrete foundations/flatwork and underground metal conduit. The soils corrosivity test results are presented in Appendix A.

#### 6.8.1 Concrete Corrosion:

Disintegration of concrete may be attributed to the chemical reaction of soils sulfates and hydrated lime and calcium aluminate with the cement. The severity of the reaction resulting in expansion and disruption of the cement is primarily a function of the concentration of soluble sulfates and the water-cement ratio of the concrete.

A soluble sulfate content of 0.017% by weight has been recorded from testing per California Test Method (CTM) 417 conducted on on-site soils, as indicated in Appendix A. As per Table 4.2.1 of ACI 318-14, soils exhibiting soluble content less than 0.1% by weight are classified as having "Not Applicable" sulfate exposure and "S0" sulfate exposure category. As such, for structural features to be in direct contact with on-site soils, the special geotechnical requirements on the type of Portland cement or water cement ratio for the tested "S0" sulfate exposure category as per stipulated in Table 4.3.1 of ACI 318-14 should be considered.

#### 6.8.2 Metal Corrosion:

In the evaluation of soil corrosivity to metal, the hydrogen ion concentrates (pH) and the electrical resistivity of the site and backfill soils are the principal variables in determining the service life of ferrous metal conduit. The pH of soil and water is a measure of acidity or alkalinity, while the resistivity is a measure of the soils resistance to the flow of electrical current.

Currently available design charts indicate that corrosion rates decrease with increasing resistivities and increasing alkalinities. It can also be noted that for alkaline soils, the corrosion rate is more influenced by resistivity than by pH.

The resistivity value of 1,480 ohm-cm per ASTM G187-12a Test Method coupled with a pH-value of 8.29 per CTM 643 classifies the on-site soils tested to be corrosive to buried ferrous metals. Based on CTM 643, the year to perforation for 18-gauge steel in contact with soils of similar resistivity and pH-value is approximately 29 years for the corrosive on-site soils. In lieu of additional testing, alternative piping materials, i.e. plastic piping, may be used instead of metal if longer service life is desired or required for utility pipes and fittings in direct contact with on-site soils. These resistivity values of on-site soils may also have implications to other building materials and depths of embedment for steel reinforcement, etc. Thus, it might be desirable that a qualified corrosion consultant be engaged to review the building plans.

A soluble chloride content of 39 ppm was recorded in our laboratory tests per CTM 422. Per Caltrans guidelines and specifications (References 21 and 22), soils exhibiting soluble chloride contents exceeding 500 ppm are considered “corrosive”. The soils are thus classified as “non-corrosive” per Caltrans criterion. In addition, special measure in terms of rebar protection against chloride corrosion under Exposure Class “C0” stipulated in Tables 4.2.1 and 4.3.1 of ACI 318-14 may be required as a result of the soluble chloride content tested. However, the compliance with the corrosivity criteria stipulated in Section 6.2.8 above will ensure that no other particular reinforcement protection measure will be needed for slab-on-grade in contact with import fill.

### 6.9 Utility Trenches

All trenches should be backfilled with approved fill material compacted to relative compaction of not less than 90 percent per ASTM D1557-12 Test Method. Care should be taken during backfilling to prevent utility line damage.

The on-site soils may be used for backfilling utility trenches from one (1) foot above the top of pipe to the surface, provided the material is free of organic matter and deleterious substances. Any soft and/or loose materials or fill encountered at pipe invert should be removed and replaced with properly compacted fill or adequate bedding material.

On-site soils are not considered suitable for bedding or shading of utilities. Imported soils for pipe bedding should consist of non-expansive granular soils. Bedding materials should consist of sand with a Sand Equivalent value (ASTM Test Method D2419-14) not less than 30.

If sandy soils are used for trench backfill, the backfill should be topped with a minimum 2-foot thick cap of compacted fine-grained, cohesive soil. Also, a minimum 10-foot length of trench at the entrance and exit points of buildings should be backfilled with fine-grained soils to serve as a plug to prevent water migration into structure foundation support zones.

The walls of temporary construction trenches may not be stable when excavated nearly vertical due to the potential for caving. Shoring of excavation walls or flattening of slopes will be required if excavation depths greater than 4 feet are necessary.

Trenches should be located so as not to impair the bearing capacity of soils or cause settlement under foundations. As a guide, trenches parallel to foundations should be clear of a 45-degree plane extending outward and downward from the edge of the foundations. All work associated with trenches, excavations and shoring must conform to the State of California Safety Code.

### 6.10 Plan Review, Observations and Testing

Once foundation and grading plans are completed, they should be forwarded to the Geotechnical Consultant for review of conformance with the intent of these recommendations and criteria presented in the pertinent sections of this report.

All excavations should be observed by a representative of this office to verify minimum embedment depths, competency of bearing soils and that the excavations are free of loose and disturbed materials. Such observations should be made prior to placement of any fill, reinforcing steel or concrete. All grading and fill compaction should be performed under the observation of and testing by a Geotechnical Consultant or his representative.

## 7.0 FIELD PERCOLATION TEST DATA

Initial seepage rates obtained during the "Reading Time Interval Test" in Borings B-4 and B-6 after overnight pre-soaking indicated the time interval between readings should be 30 minutes maximum, i.e. the “Normal Soil” category, whereas initial seepage rates in Boring B-5 after overnight pre-soaking indicated the time interval between readings should be 10 minutes maximum, i.e. the “Sandy Soil” category. The percolation tests were therefore performed using the normal soil method (i.e. six hour test maximum) for Borings B-4 and B-6, and the sandy soil method (i.e. one hour test maximum) for Boring B-5, in accordance with the Orange County Technical Guidance Document Appendices (Appendix VII) procedures modified to test the cross sectional zone of typical soils within the level of anticipated storm water infiltration (e.g. approximately 1 foot to 5 feet below existing grades for Borings B-4 and B-6, and approximately 5 feet to 10 feet below existing grade for Boring B-5).

Field percolation testing was conducted on September 6, 2018. Stabilized field percolation test data indicates preadjusted percolation test rates ranging from a minimum of 1.54 to a maximum of 40.0 minutes per inch (mpi) for clean water at the locations of Borings B-5 and B-4, respectively. Field percolation test data is presented on the attached Plates H-1 through H-3 in Appendix A.

Tabulated below are the results of percolation testing conducted at the locations of Borings B-4 through B-6, including the infiltration rate derived from the Porchet Method of Percolation Rate Conversion procedures outlined in Appendix VII of the Technical Guidelines Document Appendices.

| | **Percolation Test Rate** | **Infiltration Rate*** |
|---|---|---|
| **Boring No.** | **(Minutes/Inch)** | **(Inches/Hour)** |
| B-4 | 40.0 | 0.03 |
| B-5 | 1.54 | 0.72 |
| B-6 | 7.5 | 0.165 |

*Infiltration Rate derived from Porchet Method Conversion from Percolation Rate using a Factor of Safety of 2

The rate presented above is anticipated to be the fastest rate that can be absorbed by the site soils at the boring locations. However, with time and depending on the degree of saturation of soils and other factors, the percolation rate may reduce which is typical for sewage disposal or stormwater dispersal fields.

Please be informed that during installation of on-site storm water dispersal system, the following factors should be noted:

- The degree of compactive effort in the upper 1 to 1.5 feet of soils above any filter material should be between 90 and 92 percent relative compaction. As any greater compactive efforts in the soil strata of water retention system construction may cause the percolation rates to reduce substantially, it is not advisable to impose significant structural loading in these areas, from a geotechnical viewpoint.
- The rate of water transmission from the filter material to the soil will be limited the porosity characteristics of the fabric wrap around the filter material.

## 8.0 CLOSURE

This report has been prepared for the exclusive use of **Orange County Ronald McDonald House** and its design consultants for use in the design and construction of the proposed new Building adjacent to the existing Ronald McDonald House building. The report has not been prepared for use by other parties, and may not contain sufficient information for purposes of other parties.

The Client or its representatives are responsible for ensuring the information and recommendations contained in this report are brought to the attention of the project engineers and architects, incorporated into the project plans, and implemented by project contractors. This report should be reflected on project grading plans as a part of the project specifications.

ASE requests and recommends proper notification from the Client should any of the following occur:

1. Final plans for site development indicate utilization of areas not originally proposed for construction.
2. Structural loading conditions vary from those utilized for evaluation and preparation of this report.

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JOB 6827.18 O.C.R. McDonald House - 383 S. Batavia, Orange
SHEET NO. 1 OF
CALCULATED BY Gary L. Martin DATE 9/12/2018
CHECKED BY DATE
SCALE Percolation / Infiltration Rates - Porchet Method

**Boring B-4**

Time Interval, $\Delta t$ = 30 minutes
Final Depth to Water, $D_f$ = 12.75"
Test Hole Radius, r = 4 inches

Initial Depth to Water, $D_0$ = 12.0"
Total Depth of Test Hole, $D_T$ = 61.0"

$H_0 = D_T - D_0 = 61 - 12 = 49$ inches
$H_f = D_T - D_f = 61 - 12.75 = 48.25$ inches

$\Delta H = \Delta D = H_0 - H_f = 49 - 48.25 = 0.75$ inches

$H_{avg} = \frac{(H_0 + H_f)}{2} = \frac{49 + 48.25}{2} = 48.625$ inches

$I_t = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})} = \frac{0.75(60)(4)}{30(4 + 2(48.625))}$

$= 0.059$ in/hr

for FS = 2 = 0.03 in/hr

**Boring B-5**

Time Interval, $\Delta t$ = 10 minutes
Final Depth to Water, $D_f$ = 66.5 inches
Test Hole Radius, r = 4 inches

Initial Depth to Water, $D_0$ = 60.0"
Total Depth of Test Hole, $D_T$ = 115.5"

$H_0 = D_T - D_0 = 115.5 - 60 = 55.5$ inches
$H_f = D_T - D_f = 115.5 - 66.5 = 49$ inches

$\Delta H = \Delta D = H_0 - H_f = 55.5 - 49 = 6.5$ inches

$H_{avg} = \frac{(H_0 + H_f)}{2} = \frac{55.5 + 49}{2} = 52.25$ inches

$I_t = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})} = \frac{6.5(60)(4)}{10(4 + 2(52.25))}$

$= 1.4378$ in/hr

for FS = 2 = 0.72 in/hr

**Boring B-6**

Time Interval, $\Delta t$ = 30 minutes
Final Depth to Water, $D_f$ = 16.0 inches
Test Hole Radius, r = 4 inches

Initial Depth to Water, $D_0$ = 12.0"
Total Depth of Test Hole, $D_T$ = 60.5"

$H_0 = D_T - D_0 = 60.5 - 12 = 48.5$ inches
$H_f = D_T - D_f = 60.5 - 16 = 44.5$ inches

$\Delta H = \Delta D = H_0 - H_f = 48.5 - 44.5 = 4.0$ inches

$H_{avg} = \frac{(H_0 + H_f)}{2} = \frac{48.5 + 44.5}{2} = 46.5$ inches

$I_t = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})} = \frac{4(60)(4)}{30(4 + 2(46.5))}$

$= 0.33$ in/hr

for FS = 2 = 0.165 in/hr

FIGURE 2

**Worksheet H: Factor of Safety and Design Infiltration Rate and Worksheet**

| Factor Category | | Factor Description | Assigned Weight (w) | Factor Value (v) | Product (p) $p = w \times v$ |
|---|---|---|---|---|---|
| A | Suitability Assessment | Soil assessment methods | 0.25 | 3 | 0.75 |
| | | Predominant soil texture | 0.25 | 1 | 0.25 |
| | | Site soil variability | 0.25 | 1 | 0.25 |
| | | Depth to groundwater / impervious layer | 0.25 | 1 | 0.25 |
| | | Suitability Assessment Safety Factor, $S_A = \Sigma p$ | | | 1.5 |
| B | Design | Tributary area size | 0.25 | | |
| | | Level of pretreatment/ expected sediment loads | 0.25 | | |
| | | Redundancy | 0.25 | | |
| | | Compaction during construction | 0.25 | | |
| | | Design Safety Factor, $S_B = \Sigma p$ | | | |
| Combined Safety Factor, $S_{Total} = S_A \times S_B$ | | | | | 2.0 |
| Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias) | | | | | |
| Design Infiltration Rate, in/hr, $K_{DESIGN} = K_{Observed} / S_{Total}$ | | | | | |

USE MINIMUM FS = 2.0

**Supporting Data**

Briefly describe infiltration test and provide reference to test forms:

**Note:** The minimum combined adjustment factor shall not be less than 2.0 and the maximum combined adjustment factor shall not exceed 9.0.



FIGURE 3

3. The Site is not developed within 12 months following the date of this report.

If changes or delays do occur, this office should be notified and provided with finalized plans of site development for our review to enable us to provide the necessary recommendations for additional work and/or updating of the report. Any charges for such review and necessary recommendations would be at the prevailing rate at the time of performing review work.

The findings contained in this report are based upon our evaluation and interpretation of the information obtained from the limited number of test borings and the results of laboratory testing and engineering analysis. As part of the engineering analysis it has been assumed, and is expected, that the geotechnical conditions existing across the area of study are similar to those encountered in the test excavations. However, no warranty is expressed or implied as to the conditions at locations or depths other than those excavated. Should conditions encountered during construction differ significantly from those described in this report, this office should be contacted immediately for recommendations prior to continuation of work.

Our findings and recommendations were obtained in accordance with generally accepted current professional principles and local practice in geotechnical engineering and reflect our best professional judgment. We make no other warranty, either express or implied.

These recommendations are, however, dependent on the aforementioned assumption of uniformity and upon proper quality control of engineered fill and foundations. Geotechnical observations and testing should be provided on a continuous basis during grading at the site to confirm preliminary design assumptions and to verify conformance with the intent of our recommendations. If parties other than ASE are engaged to provide geotechnical services during construction, they must be informed that they will be required to assume complete responsibility for the geotechnical phase of the project by either concurring with the recommendations in this report or providing alternative recommendations.

This concludes our scope of services as indicated in ASE's proposal dated August 10, 2018, however, our report is subject to review by the controlling authorities for the project. Any further geotechnical services that may be required of our office to respond to questions/comments of the controlling authorities after their review of the report will be performed on a time-and-expense basis as per our current fee schedule. We would not proceed with any response to report review comments/questions without authorization from your office.

We at ASE appreciate your business and are prepared to assist you with construction-related services.

## APPENDIX A

The following Appendix contains the substantiating data and laboratory test results to complement the engineering evaluations and recommendations contained in the report.

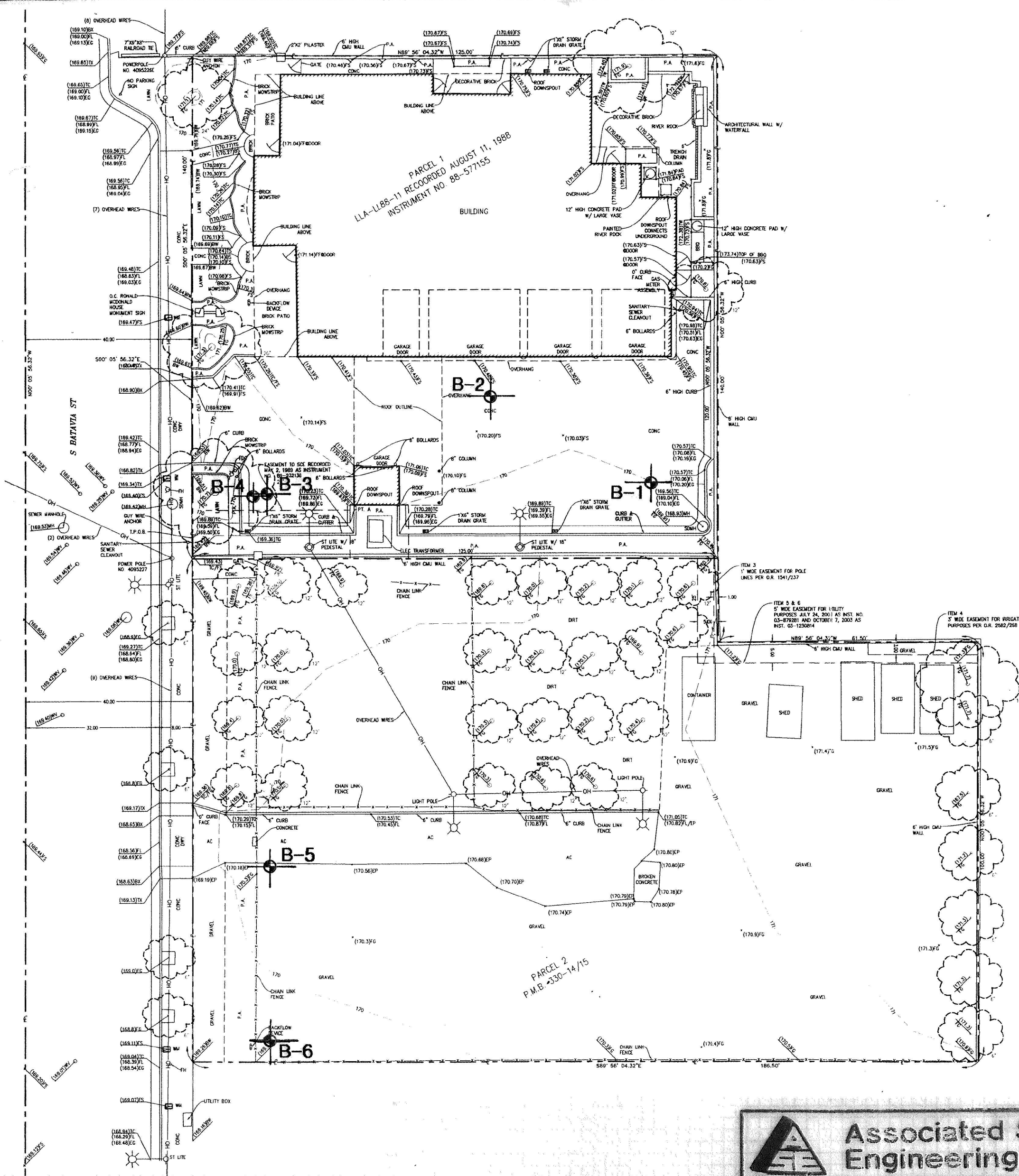
### Site Exploration

On September 5, 2018, field explorations were performed by drilling six (6) test borings at the approximate locations indicated on the attached Boring Location Plan, Plate A. The exploratory borings were drilled by Choice Drilling, Inc. utilizing a track mounted, CME75 rotary drilling rig equipped with 8-inch diameter continuous flight, hollow-stem rotary augers. The borings extended to depths of 5 feet 6 inches to 28 feet 5 inches from the existing grades.

Continuous observations of the materials encountered in the borings were recorded in the field. The soils were classified in the field by visual and textural examination and these classifications were supplemented by obtaining bulk soil samples for future examination in the laboratory. Relatively undisturbed samples of soils were extracted in a Modified California barrel sampler lined with 2.416-inch diameter by one-inch high rings and tipped with tapered cutting shoe. Additional samples were obtained in a Standard Penetration sampler in accordance with specification outlined in ASTM D1586-11 Test Method. All samples were secured in moisture-resistant bags immediately after retrieval from exploratory boring to minimize the loss of field moisture, followed by timely transportation to ASE's laboratory for ensuing testing. Upon completion of exploration, the borings were backfilled with excavated materials and compacted by tamping, with existing pavement cores replaced in hole and secured with rapid set cement.

Description of the soils encountered, depth of samples, field density and moisture content of tested samples, respective laboratory tests performed, as well as Standard Penetration Test ("N" Valves) and Modified California barrel sampler blow counts are presented in the attached Field Logs of Borings ("B" Plates).

| | |
|---|---|
| Plate A | Boring Location Plan |
| Plates B-1 through B-6 | Field Logs of Borings |




Approximate Scale: 1"= 28'

Denotes Approximate Boring Location

SOURCE:TOPOGRAPHIC SURVEY,Sheet No. SV-1.0,prepared by JMC² Civil Engineering & Surveying, dated 6/21/2018.

| Associated Soils Engineering, Inc. | BORING LOCATION PLAN | Project# 6827.18 | Plate A |
|---|---|---|---|

SOILS ENGINEERING, INC.

# FIELD LOG OF BORING B-1



| | | | |
|---|---|---|---|
| Project: | *Orange County Ronald McDonald House Addition-Orange* | | |
| Location: | *383 South Batavia Street* | Project No. | *6827.18* |

| | | | |
|---|---|---|---|
| Dates(s) Drilled: | **9/5/2018** | Logged By: | **Gary L. Martin** |
| Drilled By: | **Choice Drilling,Inc.** | Total Depth: | **23 Feet 6 Inches** |
| Rig Make/Model: | **CME 75** | Hammer Type: | **Automatic** |
| Drilling Method: | **Hollow-stem Auger** | Hammer Weight/Drop: | **140 Lb./±30 In.** |
| Hole Diameter: | **8 Inches** | Surface Elevation: | **N/A** |

Comments: Groundwater not encountered. Backfill not determined.

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.) | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | WELL COMPLETION | OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | | | CONCRETE PAVEMENT: 7.5" (wire mesh 6-5/8" to 6-3/4" from surface) | | | | R-VALUE |
| | | | SC | CLAYEY SAND: Dark brown,moist,fine-grained sand | | | | |
| | | 10(Ring) | SM | SILTY SAND: Yellowish brown,damp to moist,fine-grained sand,trace clay,with some gravel | 113.4 | 7.5 | | |
| | | | SM | SILTY SAND: Yellowish brown,moist,fine-grained sand,with some gravel | | | | |
| 5 | 5 | 16(Ring) | | | 109.9 | 9.3 | | |
| 10 | 10 | 16(Ring) | SM | same as above | 111.0 | 12.4 | | CONSOL |
| | | | SM | SILTY SAND WITH CLAY: Yellowish brown,moist,fine-grained sand,with gravel | | | | |
| | | | SM | SILTY SAND WITH GRAVEL: Brown with gray,dry to damp,fine to coarse-grained sand,trace clay | | | | |
| 15 | 15 | 28/6" (Ring) | | | 130.9 | 2.9 | | |

ASSOCIATED SOILS ENGINEERING, INC.

# FIELD LOG OF BORING B - 1



Project: *Orange County Ronald McDonald House Addition-Orange*

Location: *383 South Batavia Street* | Project No. *6827.18*

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS TYPE, "N" or (Blows/ft.) | LITHOLOGY | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | WELL COMPLETION | OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | | 34/6" (Ring) | | SP | SAND WITH GRAVEL: Light yellowish brown with gray,dry,fine to medium-grained sand | 132.0 | 2.1 | | |
| | | | | | with gravel/rock layer at 17.5 feet | | | | |
| 20 | 20 | 27(Ring) | | | #no recovery | # | # | | |
| | | 28(SPT) | | SM | SILTY SAND WITH GRAVEL: Yellowish brown with brownish yellow and gray,damp,fine to coarse-grained sand | | 5.0 | | |
| | | | | | NOTE:Gravel/rock layer encountered at 23.5 feet. Unable to penetrate deeper without damaging equipment. Boring terminated. | | | | |
| 25 | 25 | | | | | | | | |

ASSOCIATED SOILS ENGINEERING, INC.

# FIELD LOG OF BORING B-2



| | |
|---|---|
| Project: | *Orange County Ronald McDonald House Addition-Orange* |
| Location: | *383 South Batavia Street* |
| Project No. | *6827.18* |

| | | | |
|---|---|---|---|
| Dates(s) Drilled: | **9/5/2018** | Logged By: | **Gary L. Martin** |
| Drilled By: | **Choice Drilling,Inc.** | Total Depth: | **28 Feet 5 Inches** |
| Rig Make/Model: | **CME 75** | Hammer Type: | **Automatic** |
| Drilling Method: | **Hollow-stem Auger** | Hammer Weight/Drop: | **140 Lb./±30 In.** |
| Hole Diameter: | **8 Inches** | Surface Elevation: | **N/A** |

Comments: Groundwater not encountered. Backfill not determined.

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.) | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | WELL COMPLETION | OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | | SM | CONCRETE PAVEMENT: 7-3/8" (wire mesh 6-1/2" from surface) | | | | |
| | | | SM | SILTY SAND: FILL-Brown to olive brown,moist,fine to medium-grained sand,trace clay,with glass piece | | | | |
| | | 7(Ring) | SM | | 107.5 | 9.9 | | CONSOL,SHEAR |
| | | | | SILTY SAND WITH GRAVEL: NATIVE-Yellowish brown,moist,fine to medium-grained sand | | | | |
| | | | | SILTY SAND: Brown to yellowish brown,moist,fine-grained sand,trace clay and gravel | | | | |
| 5 | 5 | 16(Ring) | SM | same as above,less clay @ 5 ft. | 101.8 | 9.9 | | |
| | | | SM | SILTY SAND: Brown,moist,fine-grained sand | | | | |
| 10 | 10 | 9/6"(Ring) | | | 107.8 | 12.4 | | |
| | | 11/6" (Ring) | SP | SAND: Light yellowish brown with light gray,damp,fine to medium-grained sand,trace gravel<br>*insufficient sample for density | * | 4.3 | | |
| | | | SP | SAND WITH GRAVEL: Light yellowish brown with gray,dry,fine to medium-grained sand | | | | |
| 15 | 15 | 48(Ring) | | #no recovery | # | # | | |

ASSOCIATED SOILS ENGINEERING, INC.

# FIELD LOG OF BORING B - 2



Project: *Orange County Ronald McDonald House Addition-Orange*

Location: *383 South Batavia Street*

Project No. *6827.18*

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.) | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | WELL COMPLETION | OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| | | | SP | SAND WITH GRAVEL: Light yellowish brown with gray,dry,fine to medium-grained sand<br>with gravel/rock layer at 17 feet | | | | |
| 20 | 20 | 16(Ring) | SM | SILTY SAND WITH GRAVEL: Brown to dark brown,moist,fine to medium-grained sand,trace clay | # | # | | |
| | | 106/10.5" (Ring) | | #no recovery @ 20 ft.<br>+disturbed sample,unable to determine density | + | 10.1 | | |
| | | | SP | SAND WITH GRAVEL: Light yellowish brown with gray,moist,fine to coarse-grained sand,with layer Yellowish Brown Clayey Fine to Coarse Sand (SC) | | | | |
| 25 | 25 | 76(SPT) | | | | 9.3 | | |
| | | 55/5" (Ring) | SC | CLAYEY SAND WITH GRAVEL: Brown,damp,fine to medium-grained sand<br>+disturbed sample,unable to determine density | + | 6.5 | | |
| 30 | 30 | | | NOTE:Gravel/rock layer encountered at 28 feet 5 inches. Unable to penetrate deeper without damaging equipment. Boring terminated. | | | | |

# FIELD LOG OF BORING B-3



ASSOCIATED SOILS ENGINEERING, INC.

Project: *Orange County Ronald McDonald House Addition-Orange*

Location: *383 South Batavia Street*

Project No. *6827.18*

| | | | |
|---|---|---|---|
| Dates(s) Drilled: | **9/5/2018** | Logged By: | **Gary L. Martin** |
| Drilled By: | **Choice Drilling,Inc.** | Total Depth: | **26 Feet 6 Inches** |
| Rig Make/Model: | **CME 75** | Hammer Type: | **Automatic** |
| Drilling Method: | **Hollow-stem Auger** | Hammer Weight/Drop: | **140 Lb./±30 In.** |
| Hole Diameter: | **8 Inches** | Surface Elevation: | **N/A** |

Comments: Groundwater not encountered. Backfill not determined.

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.) | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | WELL COMPLETION | OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | | | CONCRETE PAVEMENT: 7.5" (wire mesh 6.25" to 6.5" from surface) | | | | |
| | | | SM | SILTY SAND: FILL-Brown,moist,fine-grained sand,trace clay and gravel,with concrete pieces | | | | MAX DENSITY, EXPANSION, REMOLD SHEAR, CORROSIVITY TESTS |
| | | N/A | | | 122.0 | 9.6 | | |
| | | | SM | SILTY SAND: NATIVE-Yellowish brown,moist,fine-grained sand,trace clay | | | | |
| 5 | 5 | 9(Ring) | | | 107.1 | 10.5 | | CONSOL,SHEAR |
| | | | SP-SM | SAND WITH SILT AND GRAVEL: Light yellowish brown with gray and dark gray,dry,fine to medium-grained sand | | | | |
| 10 | 10 | 17/6" (Ring) | | | 123.7 | 2.0 | | |
| | | 19/6" (Ring) | SP | SAND WITH GRAVEL: Pale yellow to light yellowish brown,with gray,dry,fine to medium-grained sand,with some coarse sand | 101.6 | 2.1 | | |
| | | | SP-SM | SAND WITH SILT AND GRAVEL: Light olive brown,dry to damp,fine to coarse-grained sand | | | | |
| 15 | 15 | 66(Ring) | | | 128.3 | 3.8 | | CONSOL |
| | | | | with gravel/rock layer at 16 feet | | | | |

# FIELD LOG OF BORING B - 3



ASSOCIATED SOILS ENGINEERING, INC.

Project: *Orange County Ronald McDonald House Addition-Orange*

Location: *383 South Batavia Street* | Project No. *6827.18*

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS: BULK | SAMPLE INTERVALS: DRIVE | TYPE, "N" or (Blows/ft.) | LITHOLOGY | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | WELL COMPLETION | OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 23(Ring) | | SP | SAND: Light yellowish brown with gray,dry to damp,fine to medium-grained sand,trace gravel,with layer Yellowish Brown Silty Clay (CL) at 19.5 feet | 109.9 | 2.6 | | |
| 20 | 20 | | | | | | | | | | |
| | | | | | | SP | SAND WITH GRAVEL: Light yellowish brown,dry to damp,fine to medium-grained sand | | | | |
| 25 | 25 | | | 57(SPT) | | SC | CLAYEY SAND WITH GRAVEL: Dark yellowish brown with light olive brown,damp,fine to coarse-grained sand | | 6.0 | | |

# FIELD LOG OF BORING B-4

Sheet 1 of 1

SOILS ENGINEERING, INC.

| | |
|---|---|
| Project: | *Orange County Ronald McDonald House Addition-Orange* |
| Location: | *383 South Batavia Street* — Project No. *6827.18* |

| | | | |
|---|---|---|---|
| Dates(s) Drilled: | **9/5/2018** | Logged By: | **Gary L. Martin** |
| Drilled By: | **Choice Drilling,Inc.** | Total Depth: | **5 Feet 6 Inches** |
| Rig Make/Model: | **CME 75** | Hammer Type: | **Automatic** |
| Drilling Method: | **Hollow-stem Auger** | Hammer Weight/Drop: | **140 Lb./±30 In.** |
| Hole Diameter: | **8 Inches** | Surface Elevation: | **N/A** |

Comments: Groundwater not encountered. Backfill not determined.

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS: BULK | SAMPLE INTERVALS: DRIVE | TYPE, "N" or (Blows/ft.) | LITHOLOGY | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | WELL COMPLETION | OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | | | | | | CONCRETE PAVEMENT: 7.0" (wire mesh 2-3/4",3-1/8",3-3/4" & 4-3/8" from surface) | | | | |
| | | | | 9/6"(Ring) | | SM | SILTY SAND WITH CLAY: FILL-Dark brown,moist,fine-grained sand,trace gravel | 119.4 | 11.2 | | |
| | | | | 15/6" (Ring) | | SM | SILTY SAND: FILL-Dark brown,damp,fine to coarse-grained sand,with some gravel,with concrete piece | 132.7 | 5.7 | | |
| | | | | 4(SPT) | | SM | SILTY SAND: NATIVE-Brown to dark brown,moist,fine-grained sand,trace clay | | 11.7 | | |
| 5 | 5 | | | | | | | | | | |

NOTE:Boring backfilled to 5 feet 3 inch (5' 3") depth with site soils. Five feet three inch (5' 3") length of 6-inch I.D. slotted PVC pipe (one piece) placed in boring with the annular area backfilled with pea gravel to surface. Two (2) inches of pea gravel placed at bottom of pipe. Percolation test performed after overnight presoaking.

# FIELD LOG OF BORING B-5

Sheet 1 of 1

ASSOCIATED SOILS ENGINEERING, INC.

| | |
|---|---|
| Project: | *Orange County Ronald McDonald House Addition-Orange* |
| Location: | *383 South Batavia Street* |
| Project No. | *6827.18* |

| | | | |
|---|---|---|---|
| Dates(s) Drilled: | **9/5/2018** | Logged By: | **Gary L. Martin** |
| Drilled By: | **Choice Drilling,Inc.** | Total Depth: | **10 Feet 1 Inch** |
| Rig Make/Model: | **CME 75** | Hammer Type: | **Automatic** |
| Drilling Method: | **Hollow-stem Auger** | Hammer Weight/Drop: | **140 Lb./±30 In.** |
| Hole Diameter: | **8 Inches** | Surface Elevation: | **N/A** |

Comments: Groundwater not encountered. Backfill not determined.

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS: BULK | DRIVE | TYPE, "N" or (Blows/ft.) | LITHOLOGY | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | WELL COMPLETION | OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | | | | | GP | GRAVEL: Gray and light gray,dry (4.0") | | | | |
| | | | | | | SM | SILTY SAND: FILL-Light yellowish brown,damp,fine-grained sand | | | | |
| | | | | | | SP-SM | SAND: FILL-Pale brown,dry,fine-grained sand,trace silt | | | | |
| | | | | 5/6"(Ring) | | | | 120.5 | 2.6 | | |
| | | | | 4/6"(Ring) | | ML | SANDY SILT WITH CLAY: FILL-Brown,moist,fine-grained sand,trace gravel | 110.9 | 13.0 | | |
| | | | | | | SM | SILTY SAND: NATIVE-Yellowish brown,damp to moist,fine-grained sand | | | | |
| 5 | 5 | | | 11(Ring) | | | | 110.9 | 7.5 | | |
| | | | | 8(SPT) | | SM | same as above | | 7.5 | | |
| 10 | 10 | | | | | | NOTE:Ten feet one inch (10' 1") length of 6-inch I.D. slotted PVC pipe (two pieces:upper 5 feet 1 inch solid,lower 5 feet slotted) placed in boring with the annular area backfilled with pea gravel to surface. Five and one-half (5.5) inches of pea gravel placed at bottom of pipe. Percolation test performed after overnight presoaking. | | | | |

ASSOCIATED SOILS ENGINEERING, INC.

# FIELD LOG OF BORING B-6

Sheet 1 of 1

**Project:** *Orange County Ronald McDonald House Addition-Orange*

**Location:** *383 South Batavia Street* | **Project No.** *6827.18*

| | | | |
|---|---|---|---|
| Dates(s) Drilled: | **9/5/2018** | Logged By: | **Gary L. Martin** |
| Drilled By: | **Choice Drilling,Inc.** | Total Depth: | **5 Feet 7 Inches** |
| Rig Make/Model: | **CME 75** | Hammer Type: | **Automatic** |
| Drilling Method: | **Hollow-stem Auger** | Hammer Weight/Drop: | **140 Lb./±30 In.** |
| Hole Diameter: | **8 Inches** | Surface Elevation: | **N/A** |

Comments: Groundwater not encountered. Backfill not determined.

| DEPTH (Ft.) | ELEVATION (MSL) | SAMPLE INTERVALS: BULK | SAMPLE INTERVALS: DRIVE | SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.) | LITHOLOGY | USCS | GEOTECHNICAL DESCRIPTION | DRY DENSITY (Pcf) | MOISTURE CONTENT (%) | WELL COMPLETION | OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | | | | | GP SM | GRAVEL: Light gray,dry (2.0") | | | | |
| | | | | 20(Ring) | | | SILTY SAND: Yellowish brown,damp to moist,fine-grained sand,trace gravel | 116.8 | 7.5 | | |
| | | | | 6(SPT) | | SM | same as above | | 7.0 | | |
| 5 | 5 | | | | | | | | | | |
| | | | | | | | NOTE:Boring backfilled to 5 feet 3 inch (5' 3") depth with site soils. Five feet three inch (5' 3") length of 6-inch I.D. slotted PVC pipe (one piece) placed in boring with the annular area backfilled with pea gravel to surface. Two and one-half (2.5) inches of pea gravel placed at bottom of pipe. Percolation test performed after overnight presoaking. | | | | |

## Laboratory Tests

After samples were visually classified in the laboratory, a testing program that would provide sufficient data for our evaluation was established.

- Moisture Content and Density Tests

The undisturbed soil retained within the rings of the Modified California barrel sampler was tested in the laboratory to determine in-place dry density and moisture content. Test results are presented on the Field Logs of Borings, Plates B-1 through B-6.

- Consolidation and Direct Shear Tests

Consolidation (ASTM D2435-11 Test Method) and direct shear (ASTM D3080-11 Test Method) tests were performed on selected relatively undisturbed and remolded samples to determine the settlement characteristics and shear strength parameters of various soil samples, respectively. The results of these tests are shown graphically on the appended "C" and "D" Plates.

- Soil Corrosivity

Tests of soluble sulfate and chloride contents were performed in accordance with California Test Methods 417 and 422, respectively, to assess the degree of corrosivity of the subgrade soils with regard to concrete and normal grade steel. Resistivity and pH-value tests were performed in accordance with the latest edition of ASTM G187-12a Test Method and California Test Method 643, respectively, to assess the degree of corrosivity of the subgrade soils with regard to ferrous metal piping. The test results are presented below.

| Sample ID | Sulfate Content [1] (%)/ Degree of Severity | Chloride Content [2] (ppm) / Degree of Severity | Resistivity [3] (OHM-cm)/ Degree of Corrosivity | Ph-Value[3] |
|---|---|---|---|---|
| B-3 @ 0.67'-5' | 0.017/Not Applicable | 39/Not Applicable | 1,480/Corrosive | 8.29 |

(1) California Test Method 417. (2) California Test Method 422. (3) ASTM G187-12a Test Method. (4) California Test Method 643.

- Maximum Dry Density/Optimum Moisture Content Test

A maximum density test was conducted in accordance with ASTM D1557-12 Test Method, Method A, using 5 equal layers, 25 blows each layer, 10-pound hammer, 18 inch drop in a 1/30 cubic foot mold. The results are as follows:

| Sample ID | Maximum Dry Density (pcf) | Optimum Moisture Content (%) | Material Classification |
|---|---|---|---|
| B-3 @ 0.67'-5' | 133.5 | 8.0 | SM |

**Laboratory Tests** – continued

- Expansion Test

An expansion test was performed on a soil sample to determine the swell characteristics. The expansion test was conducted in accordance with ASTM D4829-11 test procedures. The expansion sample was remolded to approximately 90 percent relative compaction at near optimum moisture content subjected to 144 pounds per square foot surcharge load and were saturated.

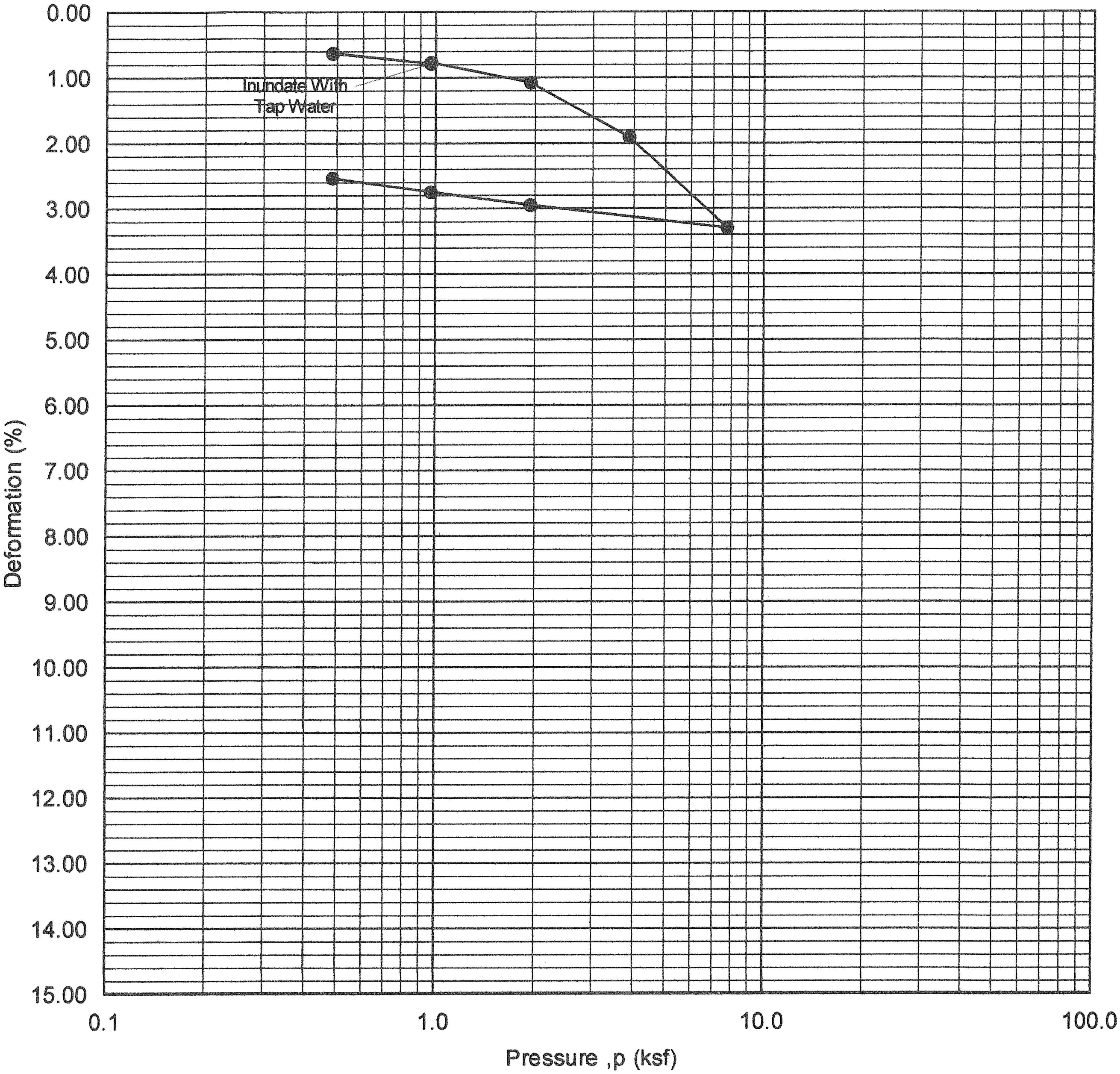
| Sample ID | Molded Dry Density (pcf) | Molded Moisture Content (%) | % Saturation | Expansion Index (EI) | Expansion Classification |
|---|---|---|---|---|---|
| B-3 @ 0.67'-5' | 119.9 | 7.7 | 51.1 | 13 | Very Low |

- "R" Value Analysis

The following "R" Value Stabilometer results were obtained in accordance with California 301 test procedures.

| Stabilometer Results | Trial #1 | Trial #2 | Trial #3 |
|---|---|---|---|
| Dry Density as molded, pcf | 128.9 | 128.0 | 127.0 |
| Moisture content as molded, % | 9.2 | 9.8 | 10.2 |
| Expansion Pressure, dial reading $10^4$ | 9 | 5 | 3 |
| Exudation Pressure, psi | 405 | 275 | 135 |
| Stabilometer "R" Value | 51 | 26 | 14 |
| Classification: Yellowish Brown Silty Fine Sand with trace Clay | | | |
| Source: Boring B-1 @ 0.67'-5' | | | |
| "R" Value equilibrium (300 psi Exudation Pressure)= 30 | | | |

| | |
|---|---|
| Plates C-1 through C-4 | Uni-axial Consolidation Test Results |
| Plates D-1 through D-3 | Direct Shear Test Results |
| Plates H-1 through H-3 | Field Percolation Data Sheets |

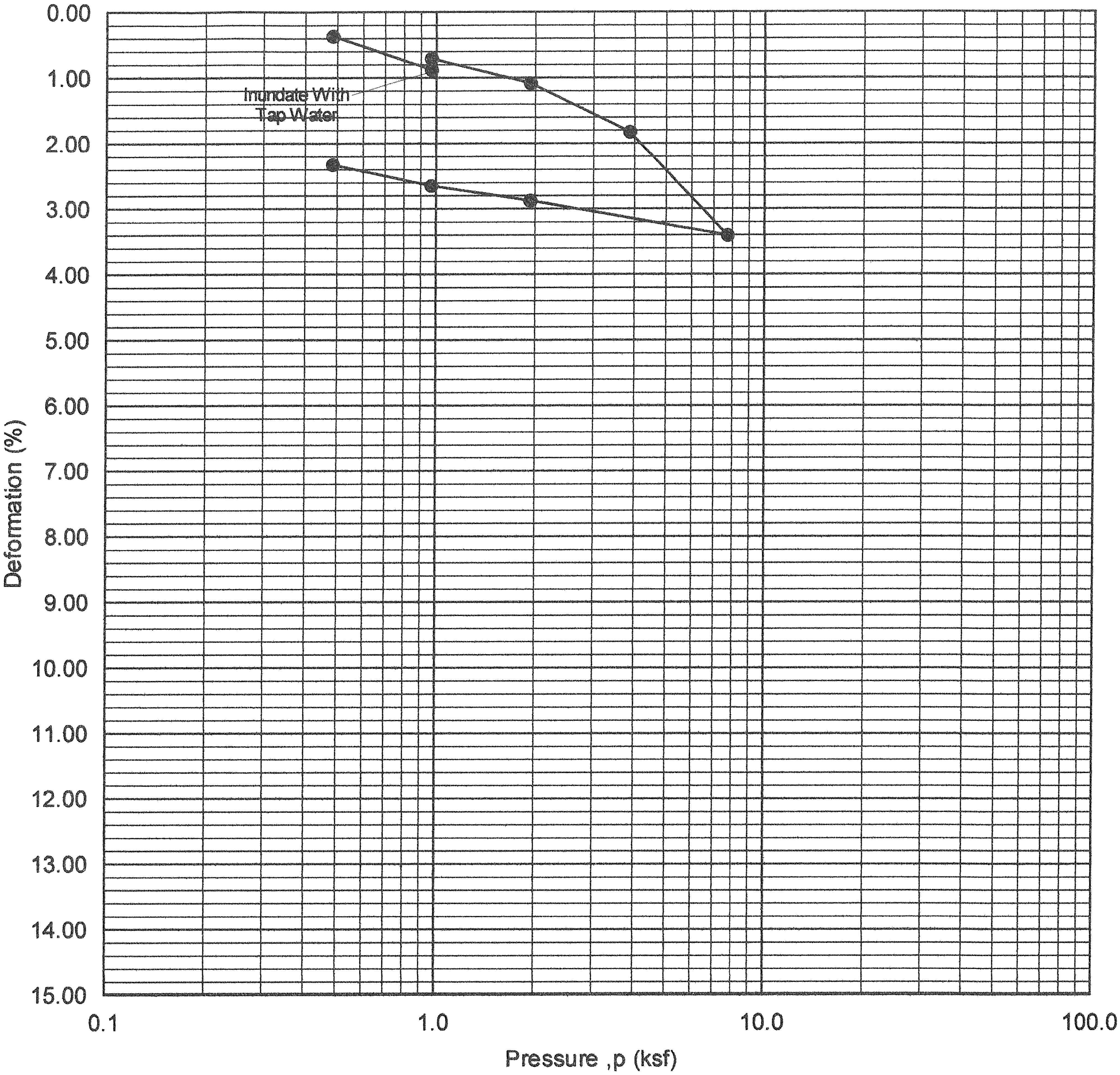



Boring No. : B-1
Depth (ft.) : 10.0
Sample Type: Silty Fine Sand with some Gravel

Dry Density (pcf) = 111.0
Moisture (%) = 12.4

| | |
|---|---|
| Project Name:O. C. Ronald McDonald House-383 S. Batavia Street | Project No.: 6827.18 |
| ASSOCIATED SOILS ENGINEERING, INC. | ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435) |

**PLATE C-1**

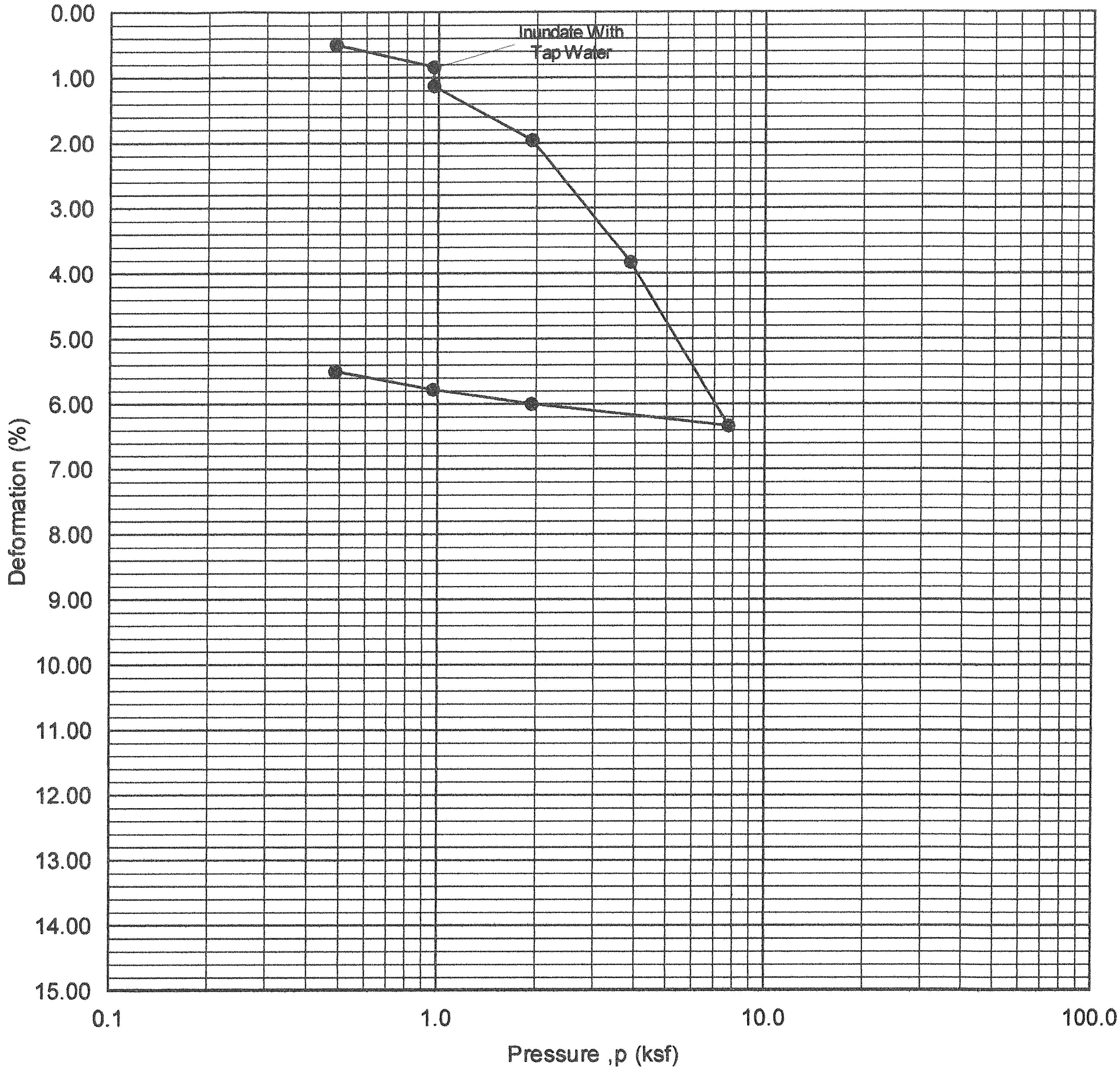



Boring No. : B-2
Depth (ft.) : 2.0
Sample Type: Silty Fine Sand with trace Clay and Gravel

Dry Density (pcf) = 107.5
Moisture (%) = 9.9

| | |
|---|---|
| Project Name:O. C. Ronald McDonald House-383 S. Batavia Street | Project No.: 6827.18 |
| ASSOCIATED SOILS ENGINEERING, INC. | ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435) |

**PLATE C-2**

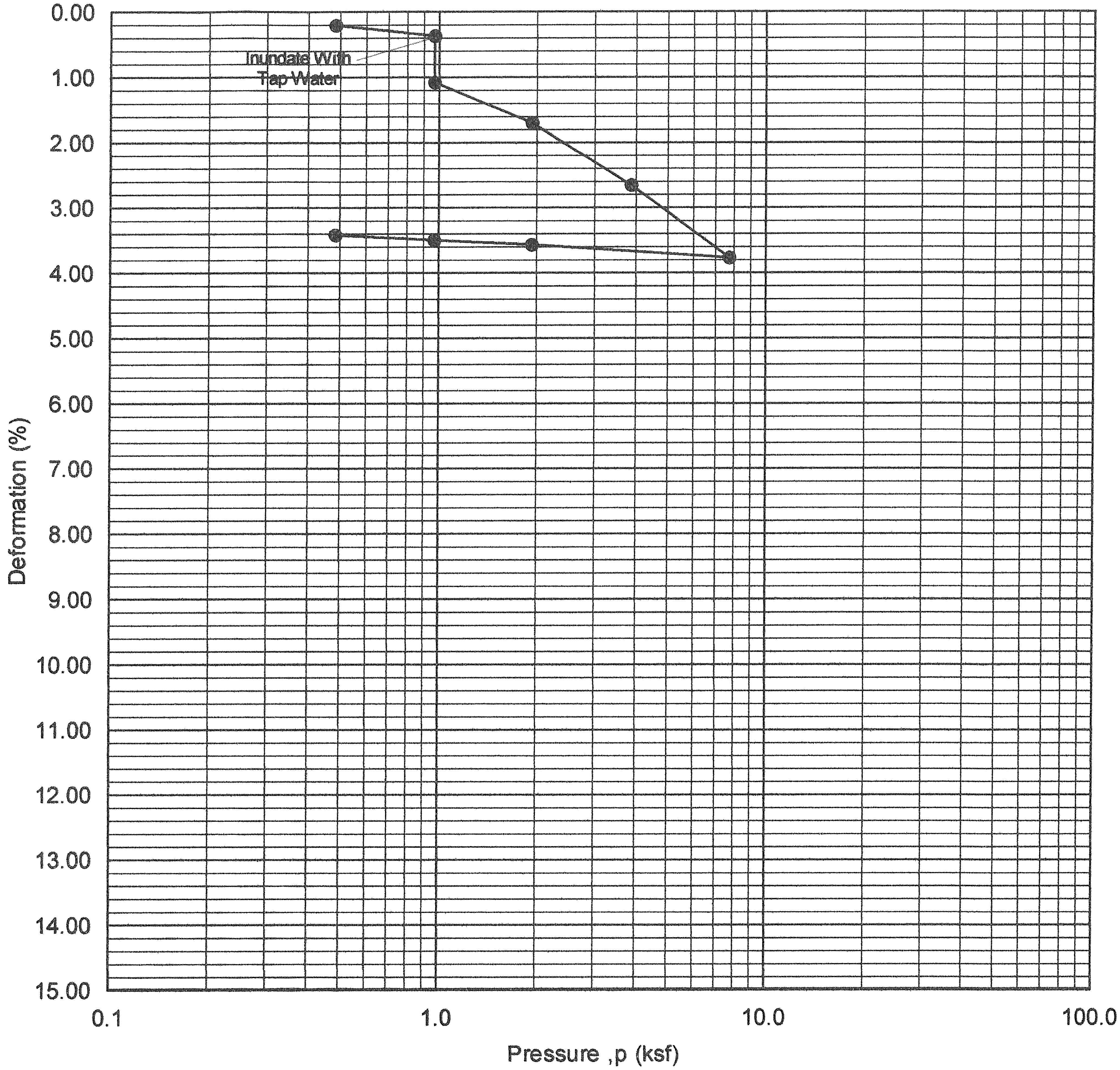



Boring No. : B-3
Depth (ft.) : 5.0
Sample Type: Silty Fine Sand with trace Clay

Dry Density (pcf) = 107.1
Moisture (%) = 10.5

| Project Name:O. C. Ronald McDonald House-383 S. Batavia Street | Project No.: 6827.18 |
|---|---|
| ASSOCIATED SOILS ENGINEERING, INC. | ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435) |

**PLATE C-3**

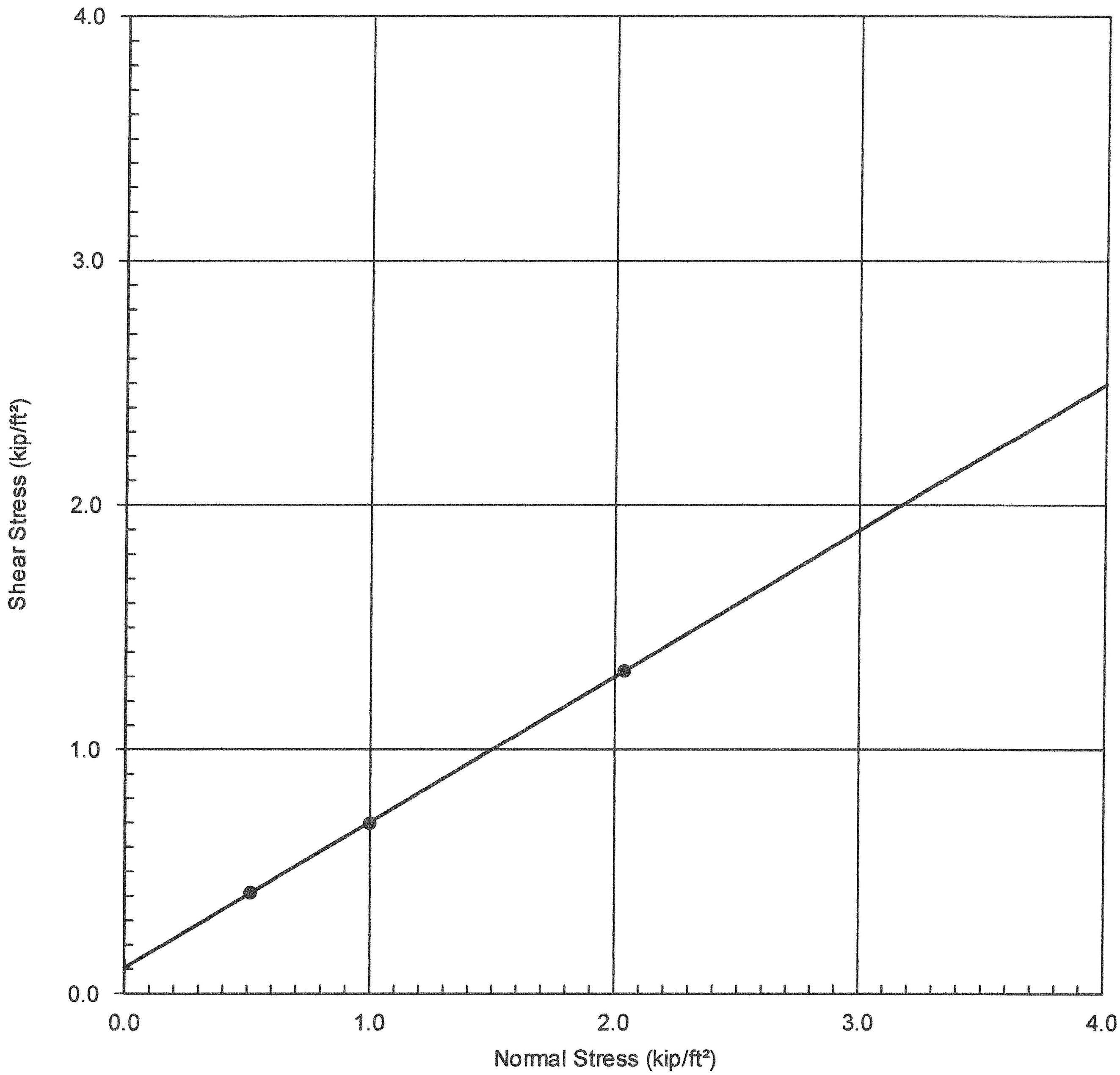



Boring No. : B-3
Depth (ft.) : 15.0
Sample Type: Fine to Coarse Sand with Silt and Gravel

Dry Density (pcf) = 128.3
Moisture (%) = 3.8

| Project Name:O. C. Ronald McDonald House-383 S. Batavia Street | Project No.: 6827.18 |
|---|---|
| ASSOCIATED SOILS ENGINEERING, INC. | ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435) |

**PLATE C-4**

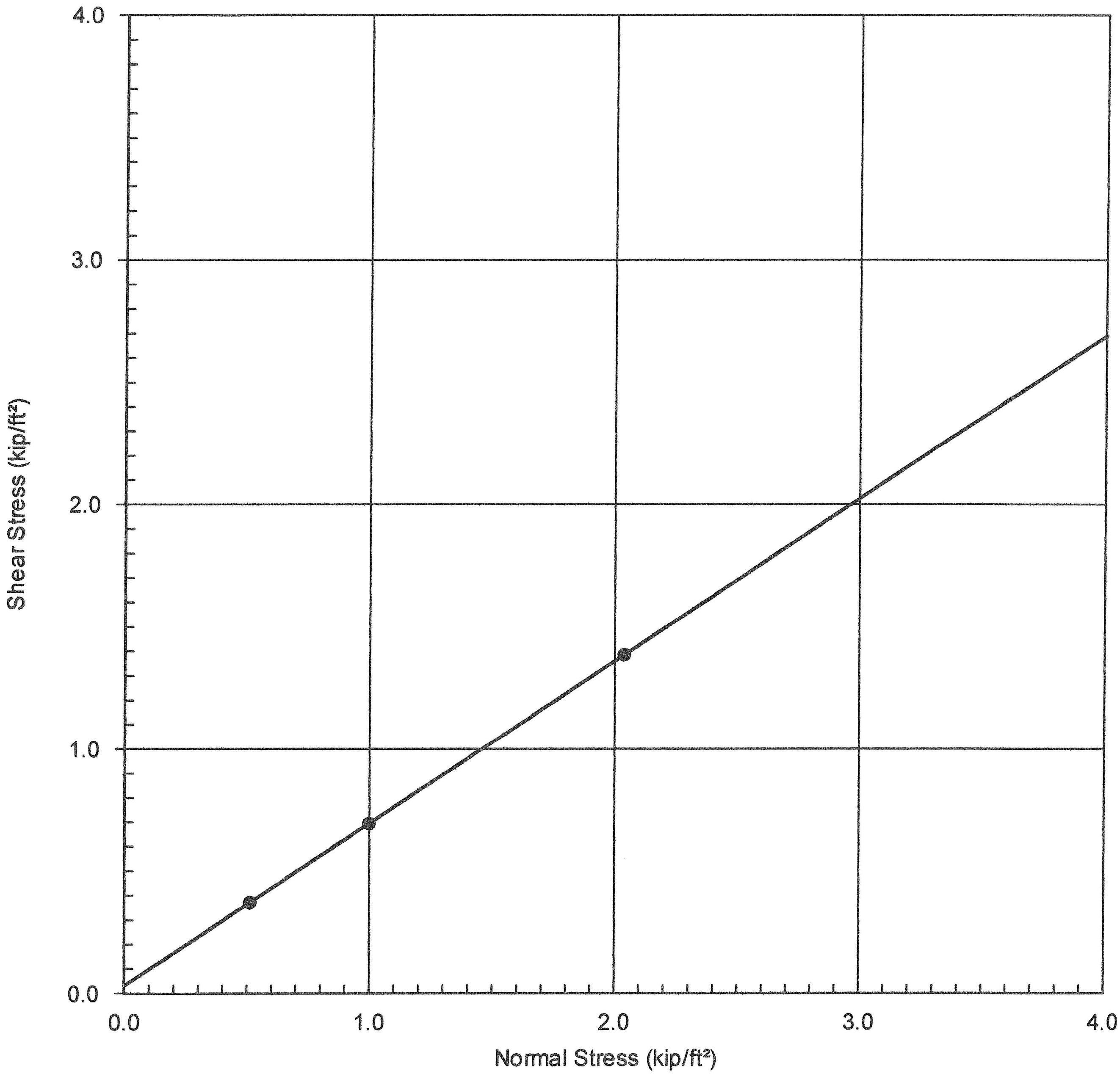



Boring No. : B-2
Depth (ft.) : 2.0
Sample Type : Relatively Undisturbed
Soil Type : Silty Fine Sand with trace Clay and Gravel

Cohesion(C) = 105 psf
Friction ($\phi$) = 30.5°
Dry Density (pcf) = 117.5
Moisture (%) = 9.9

| Project Name:O. C. Ronald McDonald House-383 S. Batavia St.,Orange | Project No.: 6827.18 |
|---|---|
| ASSOCIATED SOILS ENGINEERING, INC. | DIRECT SHEAR TEST RESULTS (ASTM D 3080) |

**PLATE D-1**

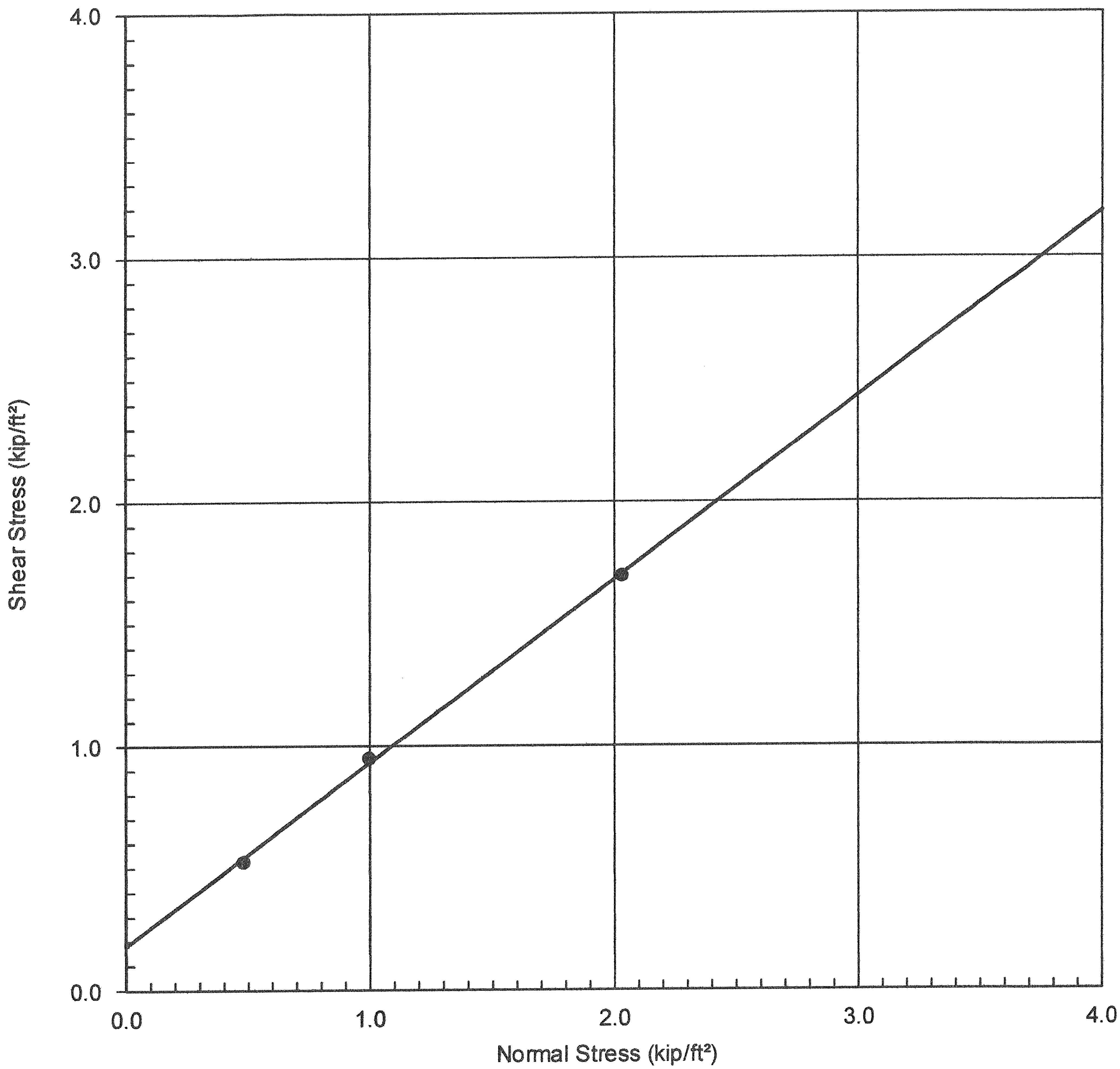



Boring No. : B-3
Depth (ft.) : 5.0
Sample Type : Relatively Undisturbed
Soil Type : Silty Fine Sand with trace Clay

Cohesion(C) = 30 psf
Friction ($\phi$) = 33.5°
Dry Density (pcf) = 107.1
Moisture (%) = 10.5

| | |
|---|---|
| Project Name:O. C. Ronald McDonald House-383 S. Batavia St.,Orange | Project No.: 6827.18 |
| ASSOCIATED SOILS ENGINEERING, INC. | DIRECT SHEAR TEST RESULTS (ASTM D 3080) |

**PLATE D-2**




| | |
|---|---|
| Boring No. | : B-3 |
| Depth (ft.) | : 0.67-5.0 |
| Sample Type | : Remolded (90% of Maximum Density) |
| Soil Type | : Silty Fine Sand with trace Clay and Gravel |

| | |
|---|---|
| Cohesion(C) | = 180 psf |
| Friction ($\phi$) | = 36.5° |
| Dry Density (pcf) | = 120.2 |
| Moisture (%) | = 8.0 |

| | |
|---|---|
| Project Name:O. C. Ronald McDonald House-383 S. Batavia St.,Orange | Project No.: 6827.18 |
| ASSOCIATED SOILS ENGINEERING, INC. | DIRECT SHEAR TEST RESULTS (ASTM D 3080) |

**PLATE D-3**

## PERCOLATION DATA SHEET

Project: Ronald McDonald House of Orange County Job No.: 6827.18
383 South Batavia Street, Orange, California
Test Hole No.: B-4 Date Excavated: 9/5/2018 Depth of Test Hole: 5' 3"
Soil Classification: Silty Fine Sand with trace Clay
Check for Sandy Soil Criteria Tested By: Grant Zike Date: 9/6/2018
Presoak: √ Actual Percolation Tested By: Grant Zike Date: 9/6/2018
(2.0" Gravel on Bottom)

## SANDY SOIL CRITERIA TEST

| Trial No. | Time | Time Interval (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) |
|---|---|---|---|---|---|
| 1 | 7:10<br>7:35 | 25 | -12.25 | -13.0 | 0.75 |

## USE NORMAL SANDY (CIRCLE ONE) SOIL CRITERIA

| Time | Time Interval (Min.) | Total Elapsed Time (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) | Percolation Rate (Min./Inches) |
|---|---|---|---|---|---|---|
| 7:10<br>7:40 | 30 | 30 | -12.25 | -13.0 | 0.75 | 40.0 |
| 7:42<br>8:12 | 30 | 60 | -12.0 | -13.0 | 1.0 | 30.0 |
| 8:17<br>8:47 | 30 | 90 | -12.5 | -13.25 | 0.75 | 40.0 |
| 8:47<br>9:17 | 30 | 120 | -11.75 | -12.5 | 0.75 | 40.0 |
| 9:17<br>9:47 | 30 | 150 | -12.0 | -13.0 | 1.0 | 30.0 |
| 9:47<br>10:17 | 30 | 180 | -12.5 | -13.0 | 0.5 | 60.0 |
| 10:17<br>10:47 | 30 | 210 | -11.75 | -12.75 | 1.0 | 30.0 |
| 10:48<br>11:18 | 30 | 240 | -12.0 | -12.75 | 0.75 | 40.0 |
| 11:18<br>11:48 | 30 | 270 | -11.75 | -12.5 | 0.75 | 40.0 |
| 11:49<br>12:19 | 30 | 300 | -12.0 | -13.0 | 1.0 | 30.0 |
| 12:20<br>12:50 | 30 | 330 | -12.25 | -13.25 | 1.0 | 30.0 |
| 12:51<br>13:21 | 30 | 360 | -12.0 | -12.75 | 0.75 | 40.0 |

**PLATE H-1**

## PERCOLATION DATA SHEET

Project: Ronald McDonald House of Orange County Job No.: 6827.18

383 South Batavia Street, Orange, California

Test Hole No.: B-5 Date Excavated: 9/5/2018 Depth of Test Hole: 10' 1"

Soil Classification: Silty Fine Sand

Check for Sandy Soil Criteria Tested By: Grant Zike Date: 9/6/2018

Presoak: √ Actual Percolation Tested By: Grant Zike Date: 9/6/2018

(5.5" Gravel on Bottom)

## SANDY SOIL CRITERIA TEST

| Trial No. | Time | Time Interval (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) |
|---|---|---|---|---|---|
| 1 | 7:15<br>7:40 | 25 | -13.5 | -28.75 | 15.25 |
| 2 | 7:45<br>8:10 | 25 | -12.75 | -28.25 | 15.5 |

## USE NORMAL SANDY (CIRCLE ONE) SOIL CRITERIA

| Time | Time Interval (Min.) | Total Elapsed Time (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) | Percolation Rate (Min./Inches) |
|---|---|---|---|---|---|---|
| 8:15<br>8:25 | 10 | 10 | -12.75 | -19.5 | 6.75 | 1.48 |
| 8:27<br>8:37 | 10 | 20 | -13.0 | -20.0 | 7.0 | 1.43 |
| 8:40<br>8:50 | 10 | 30 | -12.5 | -19.25 | 6.75 | 1.48 |
| 8:53<br>9:03 | 10 | 40 | -12.25 | -19.5 | 7.25 | 1.38 |
| 9:05<br>9:15 | 10 | 50 | -12.0 | -18.5 | 6.5 | 1.54 |
| 9:18<br>9:28 | 10 | 60 | -12.25 | -19.75 | 7.5 | 1.33 |

**PLATE H-2**

## PERCOLATION DATA SHEET

Project: Ronald McDonald House of Orange County Job No.: 6827.18

383 South Batavia Street, Orange, California

Test Hole No.: B-6 Date Excavated: 9/5/2018 Depth of Test Hole: 5' 3"

Soil Classification: Silty Fine Sand

Check for Sandy Soil Criteria Tested By: Grant Zike Date: 9/6/2018

Presoak: √ Actual Percolation Tested By: Grant Zike Date: 9/6/2018

(2.5" Gravel on Bottom)

## SANDY SOIL CRITERIA TEST

| Trial No. | Time | Time Interval (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) |
|---|---|---|---|---|---|
| 1 | 7:19<br>7:44 | 25 | -11.75 | -15.5 | 3.75 |

## USE NORMAL SANDY (CIRCLE ONE) SOIL CRITERIA

| Time | Time Interval (Min.) | Total Elapsed Time (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) | Percolation Rate (Min./Inches) |
|---|---|---|---|---|---|---|
| 7:19<br>7:49 | 30 | 30 | -11.75 | -15.75 | 4.0 | 7.5 |
| 7:52<br>8:22 | 30 | 60 | -12.0 | -16.5 | 4.5 | 6.67 |
| 8:29<br>8:59 | 30 | 90 | -12.75 | -17.0 | 4.25 | 7.06 |
| 9:01<br>9:31 | 30 | 120 | -11.75 | -15.5 | 3.75 | 8.0 |
| 9:33<br>10:03 | 30 | 150 | -11.5 | -15.5 | 4.0 | 7.5 |
| 10:04<br>10:34 | 30 | 180 | -12.0 | -16.25 | 4.25 | 7.06 |
| 10:35<br>11:05 | 30 | 210 | -11.75 | -15.75 | 4.0 | 7.5 |
| 11:06<br>11:36 | 30 | 240 | -11.5 | -15.25 | 3.75 | 8.0 |
| 11:37<br>12:07 | 30 | 270 | -12.0 | -16.25 | 4.25 | 7.06 |
| 12:08<br>12:38 | 30 | 300 | -12.25 | -16.25 | 4.0 | 7.5 |
| 12:39<br>13:09 | 30 | 330 | -12.5 | -16.75 | 4.25 | 7.06 |
| 13:10<br>13:40 | 30 | 360 | -12.0 | -16.0 | 4.0 | 7.5 |

**PLATE H-3**

## APPENDIX B - SITE FAULTING AND SEISMIC HAZARD DATA

Plates I-1 and I-2 Results of EQFUALT Search

```
*************************
*                       *
*    E Q F A U L T      *
*                       *
*    Version 3.00       *
*                       *
*************************
```

DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 6827.18

DATE: 08-28-2018

JOB NAME: Propsed Ronald McDonald House Project
383 South Batavia Street,Orange,CA
CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\Cgsflte.dat

SITE COORDINATES:
SITE LATITUDE: 33.7825
SITE LONGITUDE: 117.8615

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 20) Sadigh et al. (1997) Horiz. - Soil
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: clodis
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\Cgsflte.dat

MINIMUM DEPTH VALUE (km): 0.0

---------------
EQFAULT SUMMARY
---------------

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DETERMINISTIC SITE PARAMETERS
------------------------------

Page 1

PLATE I-1

| ABBREVIATED FAULT NAME | APPROXIMATE DISTANCE mi (km) | ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw) | PEAK SITE ACCEL. g | EST. SITE INTENSITY MOD.MERC. |
|---|---|---|---|---|
| SAN JOAQUIN HILLS | 6.5( 10.4) | 6.6 | 0.353 | IX |
| WHITTIER | 9.5( 15.3) | 6.8 | 0.230 | IX |
| PUENTE HILLS BLIND THRUST | 10.4( 16.8) | 7.1 | 0.313 | IX |
| NEWPORT-INGLEWOOD (L.A.Basin) | 10.5( 16.9) | 7.1 | 0.243 | IX |
| NEWPORT-INGLEWOOD (Offshore) | 13.6( 21.9) | 7.1 | 0.200 | VIII |
| ELSINORE (GLEN IVY) | 13.8( 22.2) | 6.8 | 0.171 | VIII |
| CHINO-CENTRAL AVE. (Elsinore) | 14.0( 22.6) | 6.7 | 0.205 | VIII |
| SAN JOSE | 17.8( 28.6) | 6.4 | 0.134 | VIII |
| PALOS VERDES | 21.1( 33.9) | 7.3 | 0.152 | VIII |
| UPPER ELYSIAN PARK BLIND THRUST | 24.1( 38.8) | 6.4 | 0.095 | VII |
| SIERRA MADRE | 24.2( 39.0) | 7.2 | 0.161 | VIII |
| CUCAMONGA | 24.9( 40.0) | 6.9 | 0.130 | VIII |
| RAYMOND | 27.0( 43.5) | 6.5 | 0.090 | VII |
| CLAMSHELL-SAWPIT | 28.4( 45.7) | 6.5 | 0.085 | VII |
| VERDUGO | 29.4( 47.3) | 6.9 | 0.108 | VII |
| ELSINORE (TEMECULA) | 31.0( 49.9) | 6.8 | 0.073 | VII |
| HOLLYWOOD | 31.4( 50.6) | 6.4 | 0.068 | VI |
| CORONADO BANK | 35.7( 57.5) | 7.6 | 0.107 | VII |
| SAN JACINTO-SAN BERNARDINO | 36.9( 59.4) | 6.7 | 0.055 | VI |
| SANTA MONICA | 37.4( 60.2) | 6.6 | 0.064 | VI |
| SAN JACINTO-SAN JACINTO VALLEY | 39.5( 63.6) | 6.9 | 0.059 | VI |
| SAN ANDREAS - SB-Coach. M-1b-2 | 40.8( 65.6) | 7.7 | 0.099 | VII |
| SAN ANDREAS - Cho-Moj M-1b-1 | 40.8( 65.6) | 7.8 | 0.105 | VII |
| SAN ANDREAS - SB-Coach. M-2b | 40.8( 65.6) | 7.7 | 0.099 | VII |
| SAN ANDREAS - 1857 Rupture M-2a | 40.8( 65.6) | 7.8 | 0.105 | VII |
| SAN ANDREAS - Mojave M-1c-3 | 40.8( 65.6) | 7.4 | 0.081 | VII |
| SAN ANDREAS - San Bernardino M-1 | 40.8( 65.6) | 7.5 | 0.086 | VII |
| SAN ANDREAS - Whole M-1a | 40.8( 65.6) | 8.0 | 0.119 | VII |
| MALIBU COAST | 42.2( 67.9) | 6.7 | 0.059 | VI |
| SIERRA MADRE (San Fernando) | 42.3( 68.1) | 6.7 | 0.059 | VI |
| CLEGHORN | 43.1( 69.3) | 6.5 | 0.038 | V |
| SAN GABRIEL | 44.1( 71.0) | 7.2 | 0.064 | VI |
| NORTHRIDGE (E. Oak Ridge) | 45.5( 73.3) | 7.0 | 0.068 | VI |
| ANACAPA-DUME | 49.8( 80.2) | 7.5 | 0.087 | VII |
| NORTH FRONTAL FAULT ZONE (West) | 49.9( 80.3) | 7.2 | 0.070 | VI |
| ROSE CANYON | 52.1( 83.8) | 7.2 | 0.052 | VI |
| SANTA SUSANA | 52.2( 84.0) | 6.7 | 0.045 | VI |
| SAN JACINTO-ANZA | 54.3( 87.4) | 7.2 | 0.049 | VI |
| ELSINORE (JULIAN) | 56.2( 90.5) | 7.1 | 0.043 | VI |
| HOLSER | 58.0( 93.3) | 6.5 | 0.033 | V |

DETERMINISTIC SITE PARAMETERS

Page 2

| ABBREVIATED FAULT NAME | APPROXIMATE DISTANCE mi (km) | ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw) | PEAK SITE ACCEL. g | EST. SITE INTENSITY MOD.MERC. |
|---|---|---|---|---|
| SIMI-SANTA ROSA | 59.6( 95.9) | 7.0 | 0.047 | VI |

*******************************************************************************

-END OF SEARCH- 41 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE SAN JOAQUIN HILLS FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 6.5 MILES (10.4 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.3527 g

PLATE I-2

## APPENDIX C - LIST OF REFERENCES


1. Blake, T.F., 2000, EQFAULT, A Computer Program for the Deterministic Predication of Peak Horizontal Acceleration from Digitized California Faults.
2. Blake, Thomas F., 2000, FRISKP (V4.0), A Computer Program for the Probabilistic Seismic Hazard Analysis.
3. Guidelines for Evaluating and Mitigating Seismic Hazards in California, 2008, Special Publication 117A, California Geological Survey.
4. California Geological Survey, 1998, Seismic Hazard Zones Official Map, Orange Quadrangle, released April 15.
5. California Geological Survey, 1997 (revised 2001), Seismic Hazard Zone Report 011, Seismic Hazard Zone Report for the Orange 7.5-Minute Quadrangle, Orange County, California.
6. California Building Code, 2016 Edition: Sacramento, CA, California Building Standards Commission, 2 Volumes.
7. Legg, M.R., Borrero, J.C., and Synolakis, C.E., 2003, Evaluation of Tsunami Risk to Southern California Coastal Cities, The 2002 NEHRP Professional Fellowship Report, PF 2002-11, Earthquake Engineering Research Institute.
8. Soil Mechanics Design Manual 7.1 (NAVFAC DM-7.1), 1982, Department of the Navy, Naval Facilities Engineering Command, p. 347.
9. Foundation and Earth Structures Design Manual 7.2 (NAVFAC DM-7.2), 1982, Department of the Navy, Naval Facilities Engineering Command.
10. Stewart, J.P., Whang, D.H., Moyneur, M., and Duku, P., 2004, Seismic Compression of As-Compacted Fill Soils with Variable Level of Fines Content and Fines Plasticity, CUREE Publication No. EDA-05, 101p.
11. Tokimatsu, A.M. and Seed, H.B., 1987, Evaluation of Settlements in Sands Due to Earthquake Shaking, Journal of Geotechnical Engineering, ASCE, Vol. 113, No. 8, p. 861-878.
12. 2008 Interactive Deaggregations, Hazards Program, United States Geological Survey, website: http:/eqint.cr.usgs.gov/deaggint/2008/dndez.php.
13. Krinitzsky, Ellis L., Gould, James P. and Edinger, Peter H., 1993, Fundamentals of Earthquake Resistant Construction, John Wiley & Sons, Inc.
14. Settlement Analysis, 1994, Technical Engineering and Design Guides as adapted from the US Army Corps of Engineers, No. 9, published by American Society of Civil Engineers, New York, NY, p. 136.
15. Minimum Design Loads for Building and Other Structures, 2010, American Society of Civil Engineers, ASCE Standard 7-10, 608p.
16. Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary, 2008, published by American Concrete Institute, Farmington Hill, MI, 465p.

17. Civil Engineering Pavements, Design Manual 5.4 (DM 5.4), 1979, Department of the Navy, Naval Facilities Engineering Command, 60 pp.

18. California Division of Mines and Geology (now California Geological Survey), Revised 1994, Fault Rupture Hazard Zones in California, Special Publication 42.

19. California Division of Mines and Geology (now California Geological Survey), 1998, Map of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada, Published February.

20. Federal Emergency Management Agency, 2009, National Flood Insurance Program, Flood Insurance Rate Map, Orange County, California and Incorporated Areas, Panel 161 of 539, Map Number 06059C0161J, effective date December 3.

21. Corrosion Guidelines, Version 2.0, November 2012, Published by California Department of Transportation (Caltrans), 44p.

22. Bridge Design Specifications, September 2003, Published by California Department of Transportation (Caltrans).

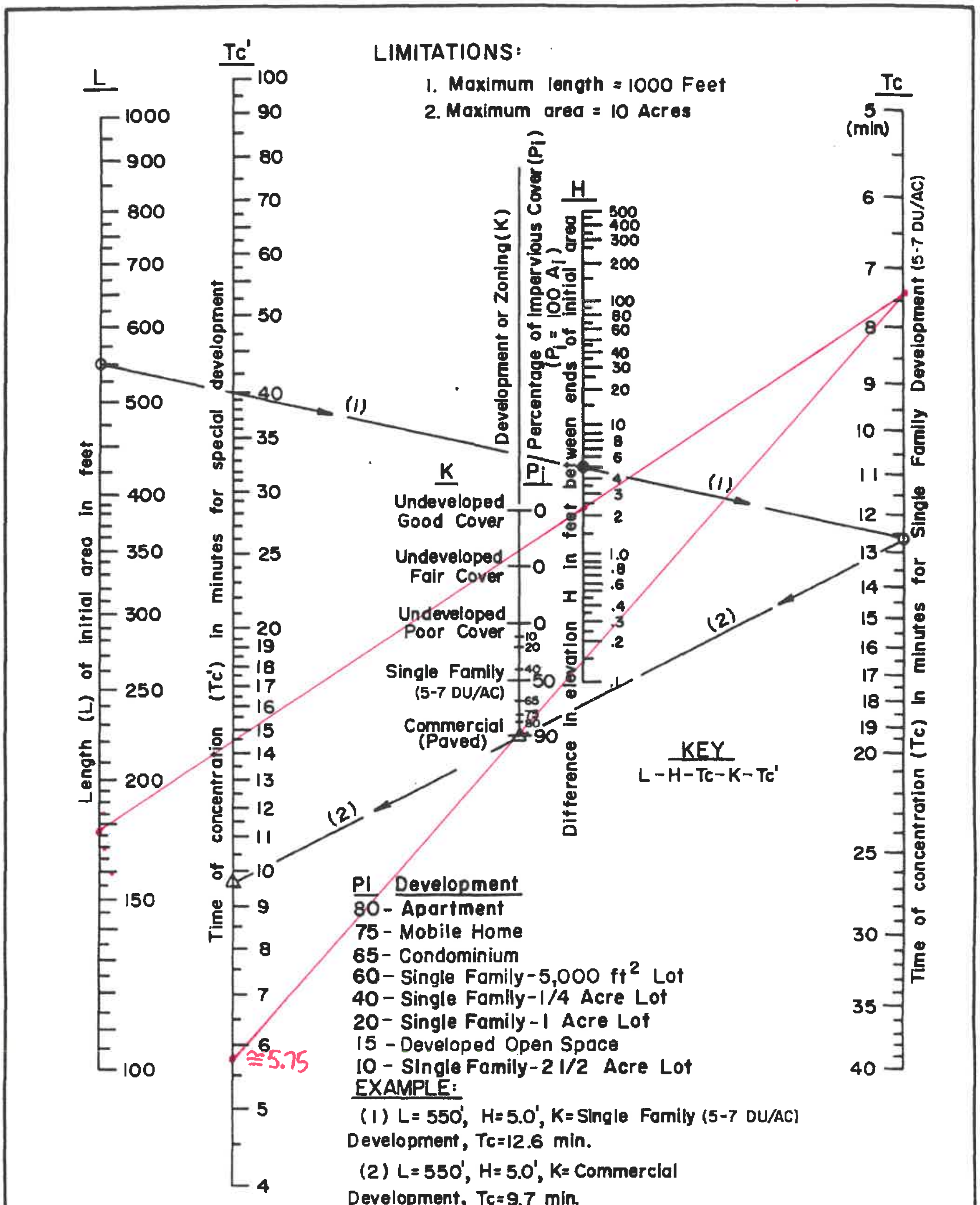
23. Winterkorn, H.F., and Fang, H.Y., 1976, Foundation Engineering Handbook: New York, NY, Van Nostrand Reinhold, 751p.

24. Peterson, M.D., Bryant, W.A., Cramer, C.H., Cao, T., Reichle, M., Frankel, A.D., Lienkaemper, J.J., McCrory, P.A., and Schwartz, D.P., 1996, Probabilistic Seismic Hazard Assessment for the State of California, California Department of Conservation, Division of Mines and Geology, Open-File Report 96-706.

# Appendix F:

# Hydrology Information

(Pre-Condition)




**ORANGE COUNTY**

**HYDROLOGY MANUAL**

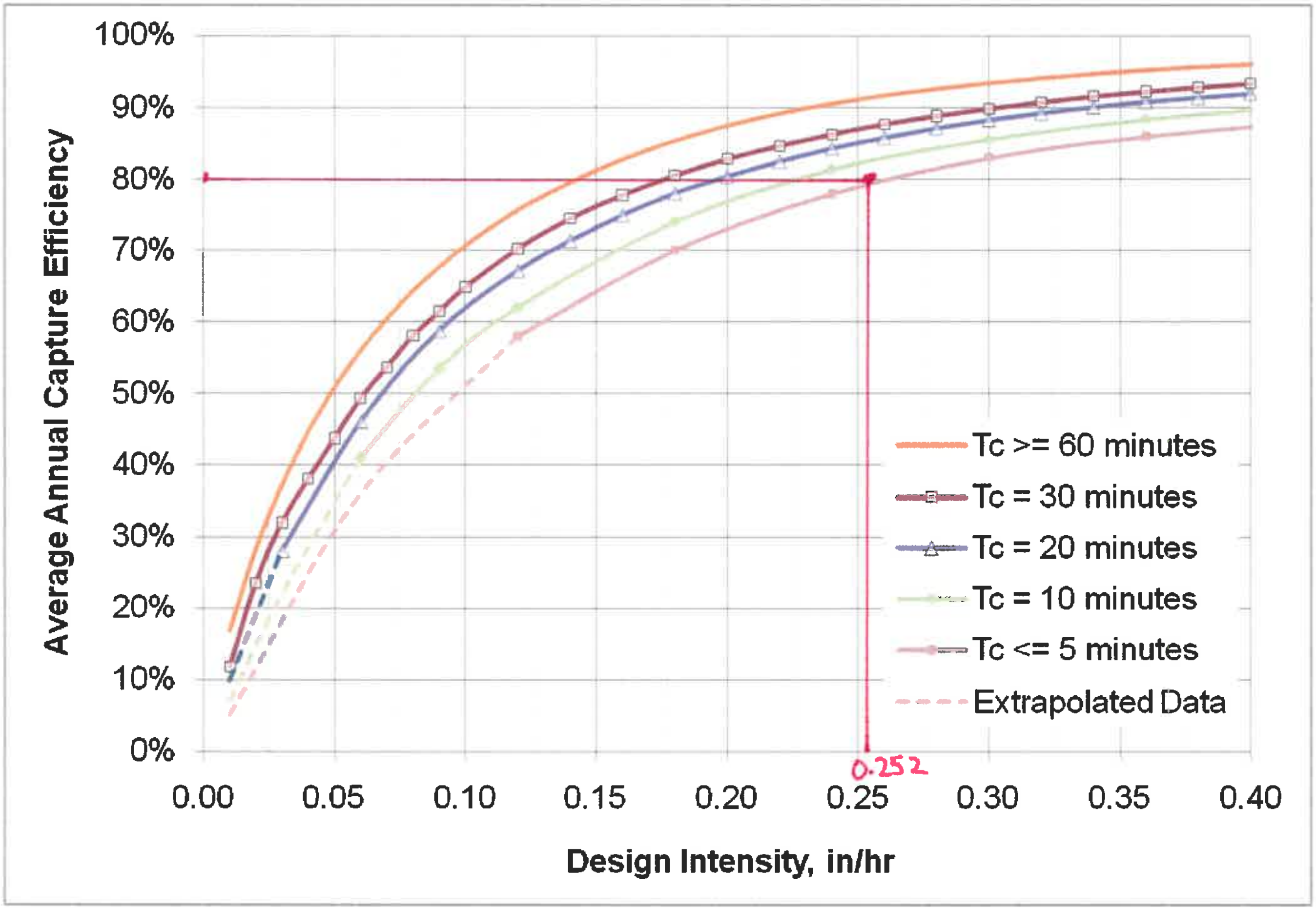
**TIME OF CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA**



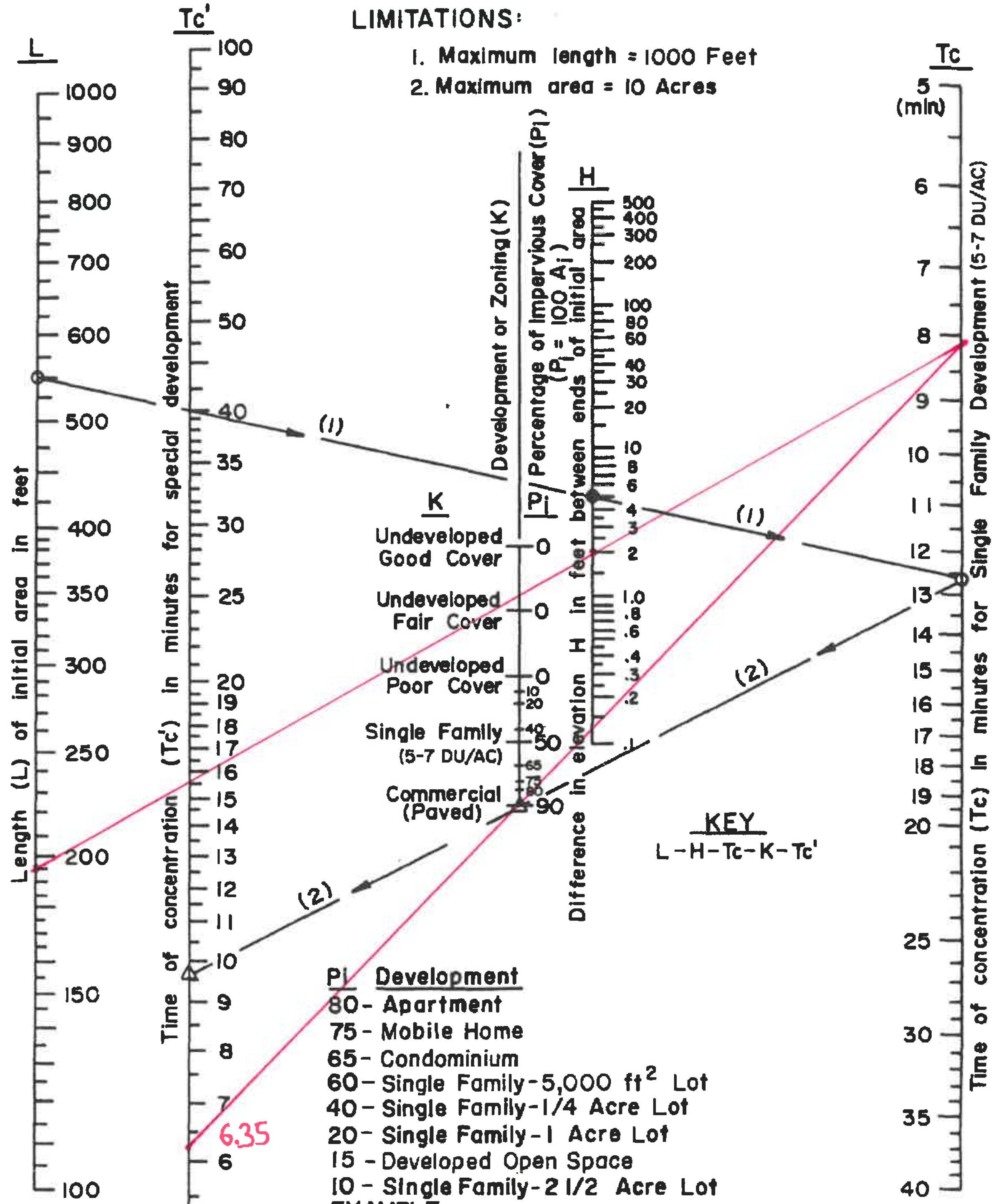
Figure D-1

 (Pre-Condition)

**Figure III.4. Capture Efficiency Nomograph for Off-line Flow-based Systems in Orange County**



(Post-Condition)




| Pi | Development |
|---|---|
| 80 | Apartment |
| 75 | Mobile Home |
| 65 | Condominium |
| 60 | Single Family-5,000 ft$^2$ Lot |
| 40 | Single Family-1/4 Acre Lot |
| 20 | Single Family-1 Acre Lot |
| 15 | Developed Open Space |
| 10 | Single Family-2 1/2 Acre Lot |

EXAMPLE:

(1) L= 550', H= 5.0', K= Single Family (5-7 DU/AC) Development, Tc=12.6 min.

(2) L= 550', H= 5.0', K= Commercial Development, Tc= 9.7 min.

**ORANGE COUNTY**

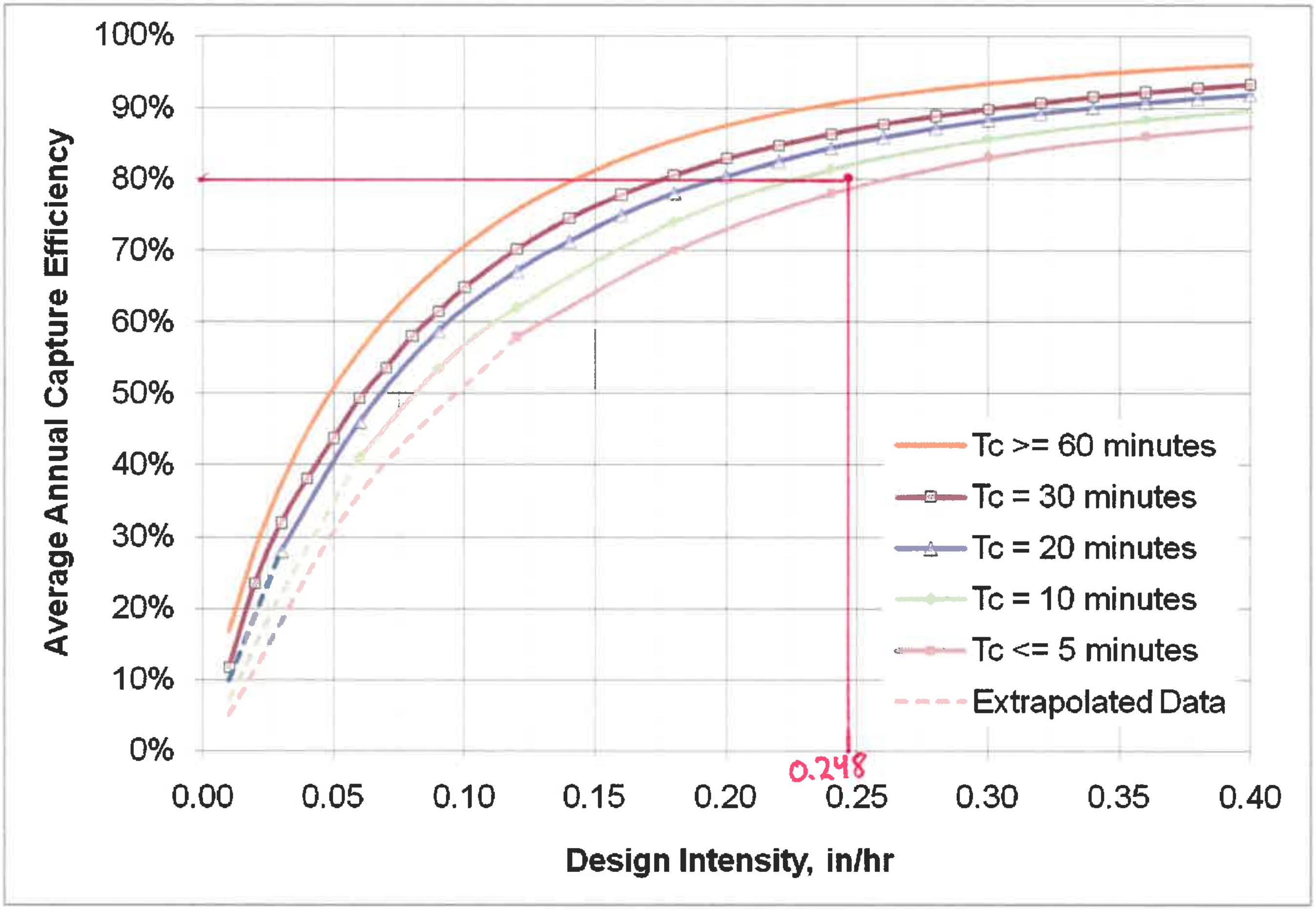
**HYDROLOGY MANUAL**

**TIME OF CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA**

Figure D-1

 (Post - Condition)

**Figure III.4. Capture Efficiency Nomograph for Off-line Flow-based Systems in Orange County**



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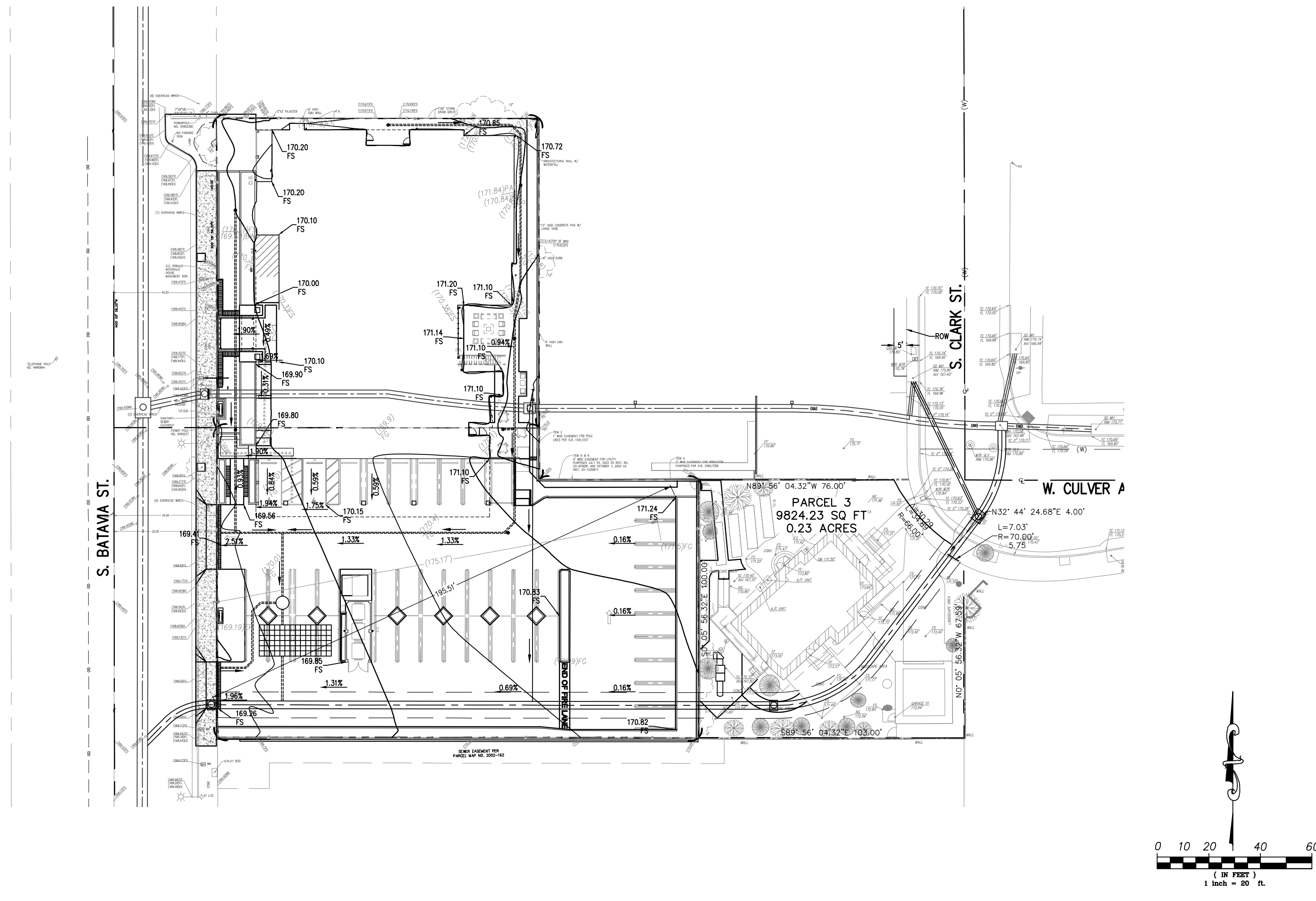


| REVISIONS: | BY: | DATE: |
| --- | --- | --- |
| NO. | | |

PLANS PREPARED BY

JMC²

Civil Engineering & Surveying

PROJECT

383 S BATAVIA STREET
ORANGE, CA 92868

SHEET TITLE

PROJECT NO. 20180034

SCALE 1"= 20'

DATE 08/20/2020

DESIGNED BY VR

DRAWN BY VR

CHECKED BY KA

SHEET NO.

# Appendix E

Noise Measurement and Analyses Data

- Freq Weight : A
- Time Weight : FAST
- Level Range : 40-100
- Max dB : 84.2 - 2018/09/11 17:18:24
- Level Range : 40-100
- SEL : 95.9
- Leq : 66.4
-

| No.s | Date Time | (dB) |
|---|---|---|
| 1 | 2018/09/11 17:03:37 | 64.1 |
| 2 | 2018/09/11 17:03:38 | 66.8 |
| 3 | 2018/09/11 17:03:39 | 68.6 |
| 4 | 2018/09/11 17:03:40 | 63.0 |
| 5 | 2018/09/11 17:03:41 | 64.0 |
| 6 | 2018/09/11 17:03:42 | 59.9 |
| 7 | 2018/09/11 17:03:43 | 58.6 |
| 8 | 2018/09/11 17:03:44 | 58.4 |
| 9 | 2018/09/11 17:03:45 | 60.6 |
| 10 | 2018/09/11 17:03:46 | 58.8 |
| 11 | 2018/09/11 17:03:47 | 59.3 |
| 12 | 2018/09/11 17:03:48 | 65.2 |
| 13 | 2018/09/11 17:03:49 | 63.8 |
| 14 | 2018/09/11 17:03:50 | 64.5 |
| 15 | 2018/09/11 17:03:51 | 63.8 |
| 16 | 2018/09/11 17:03:52 | 60.8 |
| 17 | 2018/09/11 17:03:53 | 58.7 |
| 18 | 2018/09/11 17:03:54 | 61.6 |
| 19 | 2018/09/11 17:03:55 | 64.1 |
| 20 | 2018/09/11 17:03:56 | 68.9 |
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| 797 | 2018/09/11 17:16:53 | 68.0 |
| 798 | 2018/09/11 17:16:54 | 66.1 |
| 799 | 2018/09/11 17:16:55 | 67.8 |
| 800 | 2018/09/11 17:16:56 | 67.8 |
| 801 | 2018/09/11 17:16:57 | 68.8 |
| 802 | 2018/09/11 17:16:58 | 70.6 |
| 803 | 2018/09/11 17:16:59 | 67.3 |
| 804 | 2018/09/11 17:17:00 | 69.1 |
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| 806 | 2018/09/11 17:17:02 | 63.0 |
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| 823 | 2018/09/11 17:17:19 | 63.4 |
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| 825 | 2018/09/11 17:17:21 | 71.9 |
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| 842 | 2018/09/11 17:17:38 | 60.2 |
| 843 | 2018/09/11 17:17:39 | 61.2 |
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| 853 | 2018/09/11 17:17:49 | 57.2 |
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| 855 | 2018/09/11 17:17:51 | 56.6 |
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| 858 | 2018/09/11 17:17:54 | 59.4 |
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| 860 | 2018/09/11 17:17:56 | 67.7 |
| 861 | 2018/09/11 17:17:57 | 65.2 |
| 862 | 2018/09/11 17:17:58 | 61.0 |
| 863 | 2018/09/11 17:17:59 | 59.0 |
| 864 | 2018/09/11 17:18:00 | 59.2 |
| 865 | 2018/09/11 17:18:01 | 60.9 |
| 866 | 2018/09/11 17:18:02 | 67.0 |
| 867 | 2018/09/11 17:18:03 | 64.4 |
| 868 | 2018/09/11 17:18:04 | 60.1 |
| 869 | 2018/09/11 17:18:05 | 56.8 |
| 870 | 2018/09/11 17:18:06 | 56.1 |
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| 876 | 2018/09/11 17:18:12 | 66.7 |
| 877 | 2018/09/11 17:18:13 | 66.0 |

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| 879 | 2018/09/11 17:18:15 | 68.8 |
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| 886 | 2018/09/11 17:18:22 | 79.8 |
| 887 | 2018/09/11 17:18:23 | 76.6 |
| 888 | 2018/09/11 17:18:24 | 71.9 |
| 889 | 2018/09/11 17:18:25 | 76.4 |
| 890 | 2018/09/11 17:18:26 | 81.8 |
| 891 | 2018/09/11 17:18:27 | 72.9 |
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| 895 | 2018/09/11 17:18:31 | 72.1 |
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| 897 | 2018/09/11 17:18:33 | 66.8 |
| 898 | 2018/09/11 17:18:34 | 65.4 |
| 899 | 2018/09/11 17:18:35 | 70.1 |
| 900 | 2018/09/11 17:18:36 | 72.8 |

- Freq Weight : A
- Time Weight : FAST
- Level Range : 40-100
- Max dB : 77.5 - 2018/09/11 17:21:39
- Level Range : 40-100
- SEL : 88.3
- Leq : 58.8
-

| No.s | Date Time | (dB) |
|---|---|---|
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| 2 | 2018/09/11 17:21:17 | 49.0 |
| 3 | 2018/09/11 17:21:18 | 49.3 |
| 4 | 2018/09/11 17:21:19 | 49.1 |
| 5 | 2018/09/11 17:21:20 | 49.9 |
| 6 | 2018/09/11 17:21:21 | 51.4 |
| 7 | 2018/09/11 17:21:22 | 52.2 |
| 8 | 2018/09/11 17:21:23 | 62.3 |
| 9 | 2018/09/11 17:21:24 | 53.7 |
| 10 | 2018/09/11 17:21:25 | 60.8 |
| 11 | 2018/09/11 17:21:26 | 60.9 |
| 12 | 2018/09/11 17:21:27 | 55.3 |
| 13 | 2018/09/11 17:21:28 | 56.2 |
| 14 | 2018/09/11 17:21:29 | 57.8 |
| 15 | 2018/09/11 17:21:30 | 53.7 |
| 16 | 2018/09/11 17:21:31 | 52.0 |
| 17 | 2018/09/11 17:21:32 | 58.1 |
| 18 | 2018/09/11 17:21:33 | 55.4 |
| 19 | 2018/09/11 17:21:34 | 56.6 |
| 20 | 2018/09/11 17:21:35 | 57.7 |
| 21 | 2018/09/11 17:21:36 | 56.5 |
| 22 | 2018/09/11 17:21:37 | 62.3 |
| 23 | 2018/09/11 17:21:38 | 72.1 |
| 24 | 2018/09/11 17:21:39 | 72.9 |
| 25 | 2018/09/11 17:21:40 | 67.0 |
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| 27 | 2018/09/11 17:21:42 | 62.4 |
| 28 | 2018/09/11 17:21:43 | 50.9 |
| 29 | 2018/09/11 17:21:44 | 50.4 |
| 30 | 2018/09/11 17:21:45 | 56.1 |
| 31 | 2018/09/11 17:21:46 | 51.0 |
| 32 | 2018/09/11 17:21:47 | 52.0 |
| 33 | 2018/09/11 17:21:48 | 52.2 |
| 34 | 2018/09/11 17:21:49 | 58.0 |
| 35 | 2018/09/11 17:21:50 | 59.0 |
| 36 | 2018/09/11 17:21:51 | 55.6 |
| 37 | 2018/09/11 17:21:52 | 57.7 |
| 38 | 2018/09/11 17:21:53 | 51.9 |
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| 40 | 2018/09/11 17:21:55 | 52.8 |
| 41 | 2018/09/11 17:21:56 | 51.2 |
| 42 | 2018/09/11 17:21:57 | 50.7 |
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| 45 | 2018/09/11 17:22:00 | 53.9 |
| 46 | 2018/09/11 17:22:01 | 51.8 |
| 47 | 2018/09/11 17:22:02 | 59.2 |
| 48 | 2018/09/11 17:22:03 | 57.7 |
| 49 | 2018/09/11 17:22:04 | 57.0 |
| 50 | 2018/09/11 17:22:05 | 50.9 |
| 51 | 2018/09/11 17:22:06 | 50.8 |
| 52 | 2018/09/11 17:22:07 | 50.7 |
| 53 | 2018/09/11 17:22:08 | 50.3 |
| 54 | 2018/09/11 17:22:09 | 54.3 |
| 55 | 2018/09/11 17:22:10 | 63.2 |
| 56 | 2018/09/11 17:22:11 | 56.5 |
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| 66 | 2018/09/11 17:22:21 | 57.1 |
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| 68 | 2018/09/11 17:22:23 | 60.0 |
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| 72 | 2018/09/11 17:22:27 | 59.7 |
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| 75 | 2018/09/11 17:22:30 | 55.2 |
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| 84 | 2018/09/11 17:22:39 | 51.3 |
| 85 | 2018/09/11 17:22:40 | 56.1 |

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|---|---|---|---|
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| 89 | 2018/09/11 | 17:22:44 | 55.9 |
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| 663 | 2018/09/11 | 17:32:18 | 52.8 |
| 664 | 2018/09/11 | 17:32:19 | 53.6 |
| 665 | 2018/09/11 | 17:32:20 | 57.7 |
| 666 | 2018/09/11 | 17:32:21 | 51.5 |
| 667 | 2018/09/11 | 17:32:22 | 53.9 |
| 668 | 2018/09/11 | 17:32:23 | 51.4 |
| 669 | 2018/09/11 | 17:32:24 | 50.8 |
| 670 | 2018/09/11 | 17:32:25 | 54.1 |
| 671 | 2018/09/11 | 17:32:26 | 50.0 |
| 672 | 2018/09/11 | 17:32:27 | 50.5 |
| 673 | 2018/09/11 | 17:32:28 | 50.0 |
| 674 | 2018/09/11 | 17:32:29 | 50.5 |
| 675 | 2018/09/11 | 17:32:30 | 50.9 |
| 676 | 2018/09/11 | 17:32:31 | 50.3 |
| 677 | 2018/09/11 | 17:32:32 | 50.7 |
| 678 | 2018/09/11 | 17:32:33 | 50.3 |
| 679 | 2018/09/11 | 17:32:34 | 50.9 |

| | | | |
|---|---|---|---|
| 680 | 2018/09/11 | 17:32:35 | 54.3 |
| 681 | 2018/09/11 | 17:32:36 | 54.6 |
| 682 | 2018/09/11 | 17:32:37 | 51.9 |
| 683 | 2018/09/11 | 17:32:38 | 52.0 |
| 684 | 2018/09/11 | 17:32:39 | 53.9 |
| 685 | 2018/09/11 | 17:32:40 | 55.5 |
| 686 | 2018/09/11 | 17:32:41 | 55.9 |
| 687 | 2018/09/11 | 17:32:42 | 57.1 |
| 688 | 2018/09/11 | 17:32:43 | 57.9 |
| 689 | 2018/09/11 | 17:32:44 | 55.8 |
| 690 | 2018/09/11 | 17:32:45 | 52.9 |
| 691 | 2018/09/11 | 17:32:46 | 54.9 |
| 692 | 2018/09/11 | 17:32:47 | 53.5 |
| 693 | 2018/09/11 | 17:32:48 | 52.6 |
| 694 | 2018/09/11 | 17:32:49 | 57.9 |
| 695 | 2018/09/11 | 17:32:50 | 54.0 |
| 696 | 2018/09/11 | 17:32:51 | 52.5 |
| 697 | 2018/09/11 | 17:32:52 | 53.2 |
| 698 | 2018/09/11 | 17:32:53 | 53.3 |
| 699 | 2018/09/11 | 17:32:54 | 53.7 |
| 700 | 2018/09/11 | 17:32:55 | 53.7 |
| 701 | 2018/09/11 | 17:32:56 | 53.2 |
| 702 | 2018/09/11 | 17:32:57 | 52.5 |
| 703 | 2018/09/11 | 17:32:58 | 56.8 |
| 704 | 2018/09/11 | 17:32:59 | 53.3 |
| 705 | 2018/09/11 | 17:33:00 | 54.3 |
| 706 | 2018/09/11 | 17:33:01 | 57.6 |
| 707 | 2018/09/11 | 17:33:02 | 56.2 |
| 708 | 2018/09/11 | 17:33:03 | 53.5 |
| 709 | 2018/09/11 | 17:33:04 | 57.0 |
| 710 | 2018/09/11 | 17:33:05 | 62.3 |
| 711 | 2018/09/11 | 17:33:06 | 58.3 |
| 712 | 2018/09/11 | 17:33:07 | 53.0 |
| 713 | 2018/09/11 | 17:33:08 | 51.4 |
| 714 | 2018/09/11 | 17:33:09 | 51.7 |
| 715 | 2018/09/11 | 17:33:10 | 52.0 |
| 716 | 2018/09/11 | 17:33:11 | 52.0 |
| 717 | 2018/09/11 | 17:33:12 | 60.0 |
| 718 | 2018/09/11 | 17:33:13 | 54.3 |
| 719 | 2018/09/11 | 17:33:14 | 52.4 |
| 720 | 2018/09/11 | 17:33:15 | 52.0 |
| 721 | 2018/09/11 | 17:33:16 | 57.2 |
| 722 | 2018/09/11 | 17:33:17 | 52.3 |
| 723 | 2018/09/11 | 17:33:18 | 50.3 |
| 724 | 2018/09/11 | 17:33:19 | 50.3 |
| 725 | 2018/09/11 | 17:33:20 | 49.9 |
| 726 | 2018/09/11 | 17:33:21 | 50.3 |
| 727 | 2018/09/11 | 17:33:22 | 50.5 |
| 728 | 2018/09/11 | 17:33:23 | 50.8 |
| 729 | 2018/09/11 | 17:33:24 | 51.4 |
| 730 | 2018/09/11 | 17:33:25 | 54.7 |
| 731 | 2018/09/11 | 17:33:26 | 55.5 |
| 732 | 2018/09/11 | 17:33:27 | 52.6 |
| 733 | 2018/09/11 | 17:33:28 | 53.0 |
| 734 | 2018/09/11 | 17:33:29 | 53.1 |
| 735 | 2018/09/11 | 17:33:30 | 59.7 |
| 736 | 2018/09/11 | 17:33:31 | 57.7 |
| 737 | 2018/09/11 | 17:33:32 | 54.8 |
| 738 | 2018/09/11 | 17:33:33 | 52.8 |
| 739 | 2018/09/11 | 17:33:34 | 51.4 |
| 740 | 2018/09/11 | 17:33:35 | 52.5 |
| 741 | 2018/09/11 | 17:33:36 | 58.2 |
| 742 | 2018/09/11 | 17:33:37 | 63.1 |
| 743 | 2018/09/11 | 17:33:38 | 53.7 |
| 744 | 2018/09/11 | 17:33:39 | 54.7 |
| 745 | 2018/09/11 | 17:33:40 | 55.9 |
| 746 | 2018/09/11 | 17:33:41 | 54.4 |
| 747 | 2018/09/11 | 17:33:42 | 54.0 |
| 748 | 2018/09/11 | 17:33:43 | 54.4 |
| 749 | 2018/09/11 | 17:33:44 | 56.0 |
| 750 | 2018/09/11 | 17:33:45 | 61.4 |
| 751 | 2018/09/11 | 17:33:46 | 57.4 |
| 752 | 2018/09/11 | 17:33:47 | 57.2 |
| 753 | 2018/09/11 | 17:33:48 | 55.2 |
| 754 | 2018/09/11 | 17:33:49 | 57.4 |
| 755 | 2018/09/11 | 17:33:50 | 57.3 |
| 756 | 2018/09/11 | 17:33:51 | 58.3 |
| 757 | 2018/09/11 | 17:33:52 | 60.8 |
| 758 | 2018/09/11 | 17:33:53 | 57.9 |
| 759 | 2018/09/11 | 17:33:54 | 57.9 |
| 760 | 2018/09/11 | 17:33:55 | 61.8 |
| 761 | 2018/09/11 | 17:33:56 | 59.6 |
| 762 | 2018/09/11 | 17:33:57 | 60.9 |
| 763 | 2018/09/11 | 17:33:58 | 60.8 |
| 764 | 2018/09/11 | 17:33:59 | 61.3 |
| 765 | 2018/09/11 | 17:34:00 | 65.1 |
| 766 | 2018/09/11 | 17:34:01 | 63.9 |
| 767 | 2018/09/11 | 17:34:02 | 62.8 |
| 768 | 2018/09/11 | 17:34:03 | 62.6 |
| 769 | 2018/09/11 | 17:34:04 | 65.5 |
| 770 | 2018/09/11 | 17:34:05 | 65.2 |
| 771 | 2018/09/11 | 17:34:06 | 66.9 |
| 772 | 2018/09/11 | 17:34:07 | 62.4 |
| 773 | 2018/09/11 | 17:34:08 | 63.1 |
| 774 | 2018/09/11 | 17:34:09 | 64.9 |
| 775 | 2018/09/11 | 17:34:10 | 59.6 |
| 776 | 2018/09/11 | 17:34:11 | 62.0 |
| 777 | 2018/09/11 | 17:34:12 | 62.0 |
| 778 | 2018/09/11 | 17:34:13 | 62.5 |

| | | | |
|---|---|---|---|
| 779 | 2018/09/11 | 17:34:14 | 58.3 |
| 780 | 2018/09/11 | 17:34:15 | 59.4 |
| 781 | 2018/09/11 | 17:34:16 | 57.2 |
| 782 | 2018/09/11 | 17:34:17 | 57.4 |
| 783 | 2018/09/11 | 17:34:18 | 56.7 |
| 784 | 2018/09/11 | 17:34:19 | 55.5 |
| 785 | 2018/09/11 | 17:34:20 | 57.9 |
| 786 | 2018/09/11 | 17:34:21 | 54.4 |
| 787 | 2018/09/11 | 17:34:22 | 54.8 |
| 788 | 2018/09/11 | 17:34:23 | 53.5 |
| 789 | 2018/09/11 | 17:34:24 | 54.4 |
| 790 | 2018/09/11 | 17:34:25 | 54.7 |
| 791 | 2018/09/11 | 17:34:26 | 59.7 |
| 792 | 2018/09/11 | 17:34:27 | 56.0 |
| 793 | 2018/09/11 | 17:34:28 | 53.4 |
| 794 | 2018/09/11 | 17:34:29 | 50.8 |
| 795 | 2018/09/11 | 17:34:30 | 54.9 |
| 796 | 2018/09/11 | 17:34:31 | 52.2 |
| 797 | 2018/09/11 | 17:34:32 | 50.7 |
| 798 | 2018/09/11 | 17:34:33 | 51.4 |
| 799 | 2018/09/11 | 17:34:34 | 50.7 |
| 800 | 2018/09/11 | 17:34:35 | 50.1 |
| 801 | 2018/09/11 | 17:34:36 | 49.8 |
| 802 | 2018/09/11 | 17:34:37 | 50.7 |
| 803 | 2018/09/11 | 17:34:38 | 50.5 |
| 804 | 2018/09/11 | 17:34:39 | 56.7 |
| 805 | 2018/09/11 | 17:34:40 | 50.8 |
| 806 | 2018/09/11 | 17:34:41 | 51.1 |
| 807 | 2018/09/11 | 17:34:42 | 51.5 |
| 808 | 2018/09/11 | 17:34:43 | 49.9 |
| 809 | 2018/09/11 | 17:34:44 | 50.4 |
| 810 | 2018/09/11 | 17:34:45 | 56.7 |
| 811 | 2018/09/11 | 17:34:46 | 51.9 |
| 812 | 2018/09/11 | 17:34:47 | 51.9 |
| 813 | 2018/09/11 | 17:34:48 | 50.3 |
| 814 | 2018/09/11 | 17:34:49 | 50.9 |
| 815 | 2018/09/11 | 17:34:50 | 49.8 |
| 816 | 2018/09/11 | 17:34:51 | 49.5 |
| 817 | 2018/09/11 | 17:34:52 | 49.5 |
| 818 | 2018/09/11 | 17:34:53 | 50.2 |
| 819 | 2018/09/11 | 17:34:54 | 59.5 |
| 820 | 2018/09/11 | 17:34:55 | 54.0 |
| 821 | 2018/09/11 | 17:34:56 | 51.0 |
| 822 | 2018/09/11 | 17:34:57 | 50.9 |
| 823 | 2018/09/11 | 17:34:58 | 49.0 |
| 824 | 2018/09/11 | 17:34:59 | 49.2 |
| 825 | 2018/09/11 | 17:35:00 | 49.4 |
| 826 | 2018/09/11 | 17:35:01 | 49.8 |
| 827 | 2018/09/11 | 17:35:02 | 50.0 |
| 828 | 2018/09/11 | 17:35:03 | 50.7 |
| 829 | 2018/09/11 | 17:35:04 | 50.1 |
| 830 | 2018/09/11 | 17:35:05 | 49.4 |
| 831 | 2018/09/11 | 17:35:06 | 50.1 |
| 832 | 2018/09/11 | 17:35:07 | 51.8 |
| 833 | 2018/09/11 | 17:35:08 | 54.1 |
| 834 | 2018/09/11 | 17:35:09 | 52.4 |
| 835 | 2018/09/11 | 17:35:10 | 56.3 |
| 836 | 2018/09/11 | 17:35:11 | 54.0 |
| 837 | 2018/09/11 | 17:35:12 | 51.5 |
| 838 | 2018/09/11 | 17:35:13 | 51.1 |
| 839 | 2018/09/11 | 17:35:14 | 51.3 |
| 840 | 2018/09/11 | 17:35:15 | 53.8 |
| 841 | 2018/09/11 | 17:35:16 | 54.1 |
| 842 | 2018/09/11 | 17:35:17 | 58.6 |
| 843 | 2018/09/11 | 17:35:18 | 54.6 |
| 844 | 2018/09/11 | 17:35:19 | 53.5 |
| 845 | 2018/09/11 | 17:35:20 | 58.0 |
| 846 | 2018/09/11 | 17:35:21 | 54.7 |
| 847 | 2018/09/11 | 17:35:22 | 54.4 |
| 848 | 2018/09/11 | 17:35:23 | 58.9 |
| 849 | 2018/09/11 | 17:35:24 | 53.3 |
| 850 | 2018/09/11 | 17:35:25 | 56.4 |
| 851 | 2018/09/11 | 17:35:26 | 55.5 |
| 852 | 2018/09/11 | 17:35:27 | 53.4 |
| 853 | 2018/09/11 | 17:35:28 | 53.3 |
| 854 | 2018/09/11 | 17:35:29 | 50.8 |
| 855 | 2018/09/11 | 17:35:30 | 51.4 |
| 856 | 2018/09/11 | 17:35:31 | 55.1 |
| 857 | 2018/09/11 | 17:35:32 | 53.0 |
| 858 | 2018/09/11 | 17:35:33 | 51.2 |
| 859 | 2018/09/11 | 17:35:34 | 51.9 |
| 860 | 2018/09/11 | 17:35:35 | 51.0 |
| 861 | 2018/09/11 | 17:35:36 | 52.4 |
| 862 | 2018/09/11 | 17:35:37 | 54.5 |
| 863 | 2018/09/11 | 17:35:38 | 50.8 |
| 864 | 2018/09/11 | 17:35:39 | 51.8 |
| 865 | 2018/09/11 | 17:35:40 | 56.6 |
| 866 | 2018/09/11 | 17:35:41 | 55.2 |
| 867 | 2018/09/11 | 17:35:42 | 52.8 |
| 868 | 2018/09/11 | 17:35:43 | 51.1 |
| 869 | 2018/09/11 | 17:35:44 | 49.4 |
| 870 | 2018/09/11 | 17:35:45 | 49.5 |
| 871 | 2018/09/11 | 17:35:46 | 50.5 |
| 872 | 2018/09/11 | 17:35:47 | 50.8 |
| 873 | 2018/09/11 | 17:35:48 | 49.8 |
| 874 | 2018/09/11 | 17:35:49 | 50.4 |
| 875 | 2018/09/11 | 17:35:50 | 51.5 |
| 876 | 2018/09/11 | 17:35:51 | 52.6 |
| 877 | 2018/09/11 | 17:35:52 | 50.2 |

| | | | |
|---|---|---|---|
| 878 | 2018/09/11 | 17:35:53 | 50.5 |
| 879 | 2018/09/11 | 17:35:54 | 55.9 |
| 880 | 2018/09/11 | 17:35:55 | 53.4 |
| 881 | 2018/09/11 | 17:35:56 | 52.2 |
| 882 | 2018/09/11 | 17:35:57 | 51.8 |
| 883 | 2018/09/11 | 17:35:58 | 52.4 |
| 884 | 2018/09/11 | 17:35:59 | 56.3 |
| 885 | 2018/09/11 | 17:36:00 | 50.6 |
| 886 | 2018/09/11 | 17:36:01 | 57.0 |
| 887 | 2018/09/11 | 17:36:02 | 52.6 |
| 888 | 2018/09/11 | 17:36:03 | 50.8 |
| 889 | 2018/09/11 | 17:36:04 | 49.9 |
| 890 | 2018/09/11 | 17:36:05 | 49.8 |
| 891 | 2018/09/11 | 17:36:06 | 49.9 |
| 892 | 2018/09/11 | 17:36:07 | 53.5 |
| 893 | 2018/09/11 | 17:36:08 | 52.6 |
| 894 | 2018/09/11 | 17:36:09 | 50.4 |
| 895 | 2018/09/11 | 17:36:10 | 50.5 |
| 896 | 2018/09/11 | 17:36:11 | 57.0 |
| 897 | 2018/09/11 | 17:36:12 | 51.3 |
| 898 | 2018/09/11 | 17:36:13 | 50.6 |
| 899 | 2018/09/11 | 17:36:14 | 52.0 |
| 900 | 2018/09/11 | 17:36:15 | 50.2 |

Rincon Consultants, Inc.
Environmental Scientists Planners Engineers
www.rinconconsultants.com

# Ambient Noise Survey Data Sheet

**Instructions:** Document noise measurement locations with a photo of the site, including the noise meter. Additionally, take notes on general and secondary noise sources, including the instantaneous noise level if possible. As a reminder, A/C weighting should be set to "A" and generally response time should be set to "fast." For additional information, please review the *Noise Measurement Protocol* in the pelican case.

**Project Name:** Ronald McDonald **Job Number:** 18-05893
**Date:** 9/11/18 **Operator Name:** Megna Murali

## Measurement #1

**Location:** Front **Begin time:** 5:05 **Finish time:** 5:20
**Measurement No.:** 1 **Wind (mph):** 71 **Direction:**
**Cloud Cover Class:** Overcast (>80%) ○ Light (20-80%) ○ Sunny (<20%) ✓
**Calibration (dB):** Start: 94 End:
**Primary Noise Sources:** on-street traffic **Distance:**
**Secondary Noise Sources:** residents ; music from house
**Notes:**

**Traffic Count:** Passenger Cars: 183
Medium to Heavy Duty Trucks (3 axles): Heavy Duty Trucks (4+ axles): 1
**Instantaneous Noise Sources/Levels** (e.g., airplane, bus airbrake, etc.):
**Leq:** 66.4 **SEL:** 95.9 **Lmax:** 84.2 **Lmin:** 50.6 **PK:** 100.2
**L(05):** 70.6 **L(10):** 69.0 **L(50):** 63.9 **L(90):** 56.0 **L(95):** 53.8
**Response:** Slow ○ Fast ✓ Peak ○ Impulse ○

## Measurement #2

**Location:** back **Begin time:** 5:22 **Finish time:** 5:37
**Measurement No.:** 2 **Wind (mph):** **Direction:**
**Cloud Cover Class:** Overcast (>80%) ○ Light (20-80%) ○ Sunny (<20%) ✓
**Calibration (dB):** Start: 94 End:
**Primary Noise Sources:** residents, traffic **Distance:**
**Secondary Noise Sources:**
**Notes:**

**Traffic Count:** Passenger Cars: 0
Medium to Heavy Duty Trucks (3 axles): Heavy Duty Trucks (4+ axles):
**Instantaneous Noise Sources/Levels** (e.g., airplane, bus airbrake, etc.):
**Leq:** 56.8 **SEL:** 86.3 **Lmax:** 77.5 **Lmin:** 48.4 **PK:** 93.6
**L(05):** 63.0 **L(10):** 61.3 **L(50):** 54.4 **L(90):** 50.6 **L(95):** 50.0
**Response:** Slow ○ Fast ✓ Peak ○ Impulse ○

# Appendix F

Trip Generation Analysis

Your Trusted Advisors for
Transportation & Environmental Analysis

October 5, 2018

Mr. Joe Power, Vice President/Principal
RINCON CONSULTANTS, INC.
180 North Ashwood Avenue
Ventura, California 93003

Mr. Joe Power:

## INTRODUCTION

The firm of Ganddini Group, Inc. is pleased to provide this trip generation analysis for the proposed Ronald McDonald House Expansion project. The project site is located at 383 South Batavia Street in the City of Orange. The project location map is shown on Figure 1. This trip generation analysis documents the existing, proposed, and net trip generation for the project site. We trust the findings of this analysis will aid the City of Orange in determining whether a traffic impact analysis is required.

Although this is a technical report, effort has been made to write the report clearly and concisely. To assist the reader with terms unique to transportation engineering, a glossary is provided in Appendix A.

## PROJECT DESCRIPTION

The project site is currently designated as "Single-Family Residential District" in the City of Orange General Plan Land Use Element. The project site is currently developed with a Ronald McDonald House with 21 bedrooms totaling approximately 12,580 square feet of floor area. The Ronald McDonald House is a charitable temporary housing facility that provides a "home-away-from-home" for the families of seriously ill children receiving treatment in Orange County hospitals.

The proposed project consists of expanding the Ronald McDonald House by 18,640 square feet of floor area to accommodate 23 additional bedrooms. This will expand the existing Ronald McDonald House to a total of 44 bedrooms and 31,220 square feet. The proposed project site plan is illustrated on Figure 2.

## TRIP GENERATION

Table 1 shows the calculation of project trip generation rates. Trip generation rates were determined for daily trips, morning peak hour inbound and outbound trips, and evening peak hour inbound and outbound trips for the existing and proposed land use. These rates were derived by Ganddini Group, Inc. by conducting trip count surveys on a Thursday (September 27, 2018) at the existing Ronald McDonald House driveways, then dividing the number of trips counted by both the existing square footage and number of bedrooms. Thursday was determined to be the peak day of the week based upon discussions with the Ronald McDonald House management. The trip count survey is provided in Appendix B.

As shown in Table 1, the Ronald McDonald House currently generates approximately 107 daily trips, including 10 trips during the morning peak hour and 10 trips during the evening peak hour.

## FORECAST TRIP GENERATION PER THOUSAND SQUARE FEET

The number of trips forecast to be generated by the proposed project are determined by multiplying the calculated trip generation rates by the land use quantity.

Table 2 calculates the proposed trip generation using the calculated rates of trips per thousand square feet of floor space. As shown in Table 2, the Ronald McDonald House Expansion is forecast to generate approximately 266 daily trips, including 24 trips during the morning peak hour and 24 trips during the evening peak hour.

Based on a comparison of trips generated by the Ronald McDonald House per thousand square feet before and after the proposed expansion, the expansion is forecast to result in a net increase of approximately 159 additional daily trips, including 14 additional trips during the morning peak hour and 14 additional trips during the evening peak hour.

## FORECAST TRIP GENERATION PER BEDROOM

Table 3 calculates the proposed trip generation using the calculated rates of trips per bedroom. As shown in Table 3, the Ronald McDonald House Expansion is forecast to generate approximately 224 daily trips, including 22 trips during the morning peak hour and 22 trips during the evening peak hour.

Based on a comparison of trips generated by the Ronald McDonald House per room before and after the proposed expansion, the expansion is forecast to result in a net increase of approximately 117 additional daily trips, including 12 additional trips during the morning peak hour and 12 additional trips during the evening peak hour.

## TRIP DISTRIBUTION

The project trip distribution patterns are based on review of existing volume data, surrounding land uses, and the local and regional roadway facilities in the project vicinity. Figure 3 shows the forecast directional distribution patterns for the project generated trips.

## CRITERIA FOR THE PREPARATION OF TRAFFIC IMPACT ANALYSES

The City of Orange "Traffic Impact Analysis Guidelines" (2007) state that a Traffic Impact Analysis shall be required for a proposed project that meets any of the following criteria:

- When the morning or evening peak hour trip generation is expected to exceed 100 vehicle trips from the proposed development.
- Projects on the Arterial Highway System which generate 1,600 Average Daily Trips (ADT).
- Projects that will add 51 or more trips during either morning or evening peak hours to any intersection.
- Any project where variations from the standards and guidelines provided in the City of Orange Traffic Impact Analysis Guidelines are being proposed.

Mr. Joe Power, Vice President/Principal
RINCON CONSULTANTS, INC.
October 5, 2018

## CONCLUSION

The proposed Ronald McDonald House Expansion is forecast to result in a maximum net increase of approximately 159 additional daily trips, including 14 additional trips during the morning peak hour and 14 additional trips during the evening peak hour. Therefore, the proposed project does not satisfy the City of Orange criteria for preparation of a Traffic Impact Analysis.

It has been a pleasure to service this project. Should you have any questions or if we can be of further assistance, please do not hesitate to call at (714) 795-3100 x 106.

Sincerely,

GANDDINI GROUP, INC.

Brandon Alvarado, EIT
Transportation Analyst

REGISTERED PROFESSIONAL ENGINEER
GIANCARLO J. GANDDINI
TR 2663
TRAFFIC
STATE OF CALIFORNIA

GANDDINI GROUP, INC.

Giancarlo Ganddini, TE, PTP
Founding Principal

**Table 1**
**Project Trip Generation Rates**

| Trips Generated[1] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | | PM Peak Hour | | | |
| Land Use | Quantity | Unit[2] | In | Out | Total | In | Out | Total | Daily |
| Existing Ronald McDonald House (TSF) | 12.580 | TSF | 5 | 5 | 10 | 5 | 5 | 10 | 107 |
| Existing Ronald McDonald House (RM) | 21 | RM | 5 | 5 | 10 | 5 | 5 | 10 | 107 |

| Trip Generation Rates | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | | PM Peak Hour | | | |
| Land Use | Quantity | Unit[2] | %In | %Out | Total | %In | %Out | Total | Daily |
| Ronald McDonald House (TSF) | 1.000 | TSF | 50% | 50% | 0.79 | 50% | 50% | 0.79 | 8.51 |
| Ronald McDonald House (RM) | 1 | RM | 50% | 50% | 0.48 | 50% | 50% | 0.48 | 5.10 |

Notes:

(1) Source: Count survey conducted at the existing Ronald McDonald House in the City of Orange on Thursday, September 27, 2018. The AM Peak Hour occurred at 9:30 AM - 10:30 AM and the PM Peak Hour occurred at 8:45 PM - 9:45 PM (see Appendix B).

(2) TSF = Thousand Square Feet; RM = Rooms

## Table 2
## Project Trip Generation Per Thousand Square Feet

| Trip Generation Rates | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | | PM Peak Hour | | | |
| Land Use | Source[1] | Unit[2] | % In | % Out | Total | % In | % Out | Total | Daily |
| Ronald McDonald House (TSF) | Survey | TSF | 50% | 50% | 0.79 | 50% | 50% | 0.79 | 8.51 |

| Trips Generated | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | | PM Peak Hour | | | |
| Land Use | Quantity | Unit[2] | % In | % Out | Total | % In | % Out | Total | Daily |
| Existing | 12.580 | TSF | 5 | 5 | 10 | 5 | 5 | 10 | 107 |
| Proposed | 31.220 | TSF | 12 | 12 | 24 | 12 | 12 | 24 | 266 |
| **TOTAL NET NEW TRIPS (PROPOSED - EXISTING):** | | | **+7** | **+7** | **+14** | **+7** | **+7** | **+14** | **+159** |

Notes:

(1) Trip count survey conducted at the existing Ronald McDonald House in the City of Orange on Thursday, September 27, 2018 (see Table 1).

(2) TSF = Thousand Square Feet

**Table 3**
**Project Trip Generation Per Bedroom**

| Trip Generation Rates | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | | PM Peak Hour | | | |
| Land Use | Source[1] | Unit[2] | % In | % Out | Total | % In | % Out | Total | Daily |
| Ronald McDonald House (RM) | Survey | RM | 50% | 50% | 0.48 | 50% | 50% | 0.48 | 5.1 |

| Trips Generated | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | | PM Peak Hour | | | |
| Land Use | Quantity | Unit[2] | % In | % Out | Total | % In | % Out | Total | Daily |
| Existing | 21 | RM | 5 | 5 | 10 | 5 | 5 | 10 | 107 |
| Proposed | 44 | RM | 11 | 11 | 22 | 11 | 11 | 22 | 224 |
| **TOTAL NET NEW TRIPS (PROPOSED - EXISTING):** | | | **+6** | **+6** | **+12** | **+6** | **+6** | **+12** | **+117** |

Notes:

(1) Trip count survey conducted at the existing Ronald McDonald House in the City of Orange on Thursday, September 27, 2018 (see Table 1).

(2) RM = Rooms

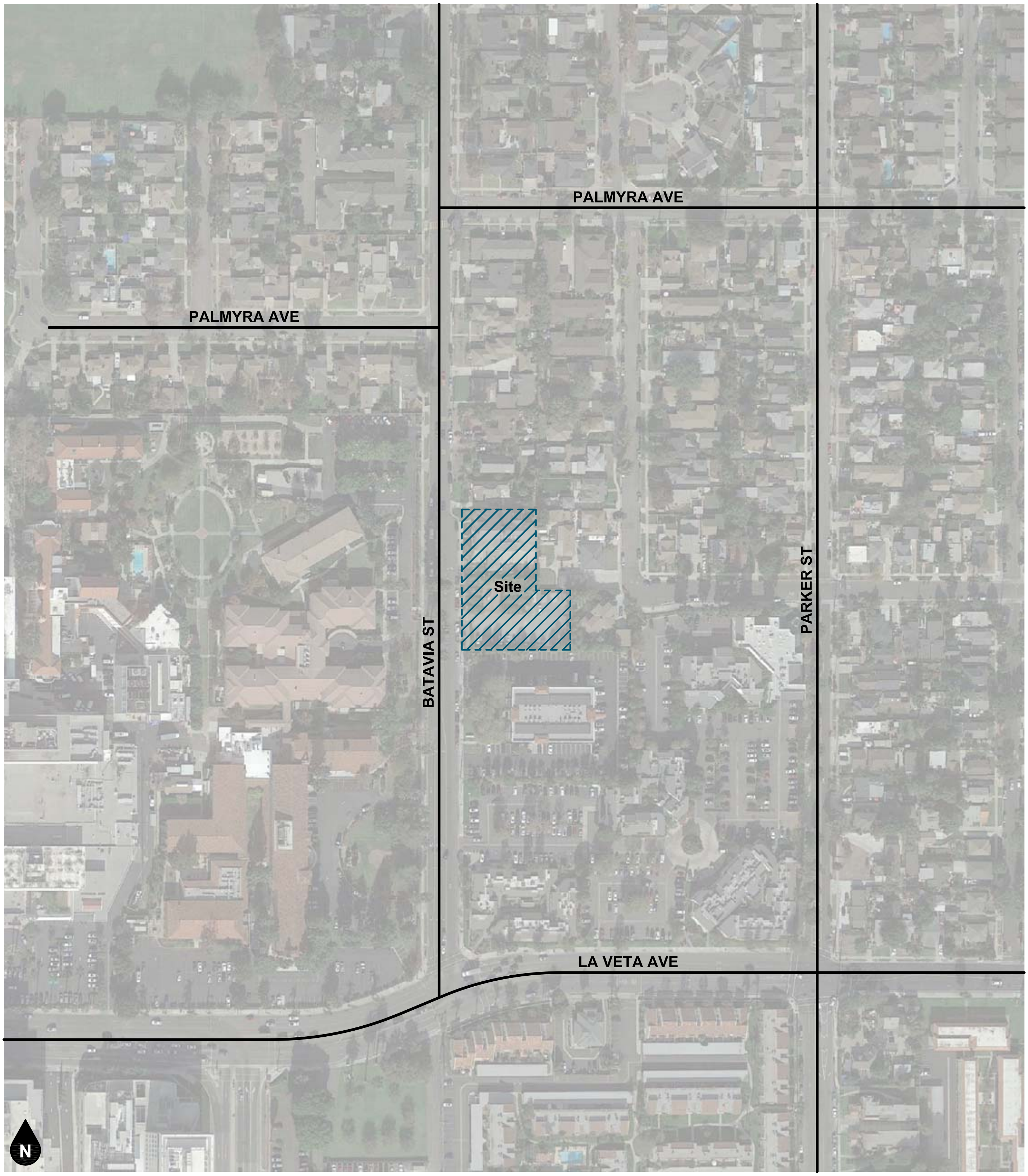


**Figure 1**
**Project Location Map**


**Figure 2**
**Site Plan**


Legend
10% Percent To/From Project

**Figure 3**
**Project Trip Distribution**

ganddini

Ronald McDonald House Expansion
Trip Generation Analysis
18-0039

# APPENDICES

# APPENDIX A

# GLOSSARY

# GLOSSARY OF TERMS

ACRONYMS

| | |
|---|---|
| AC | Acres |
| ADT | Average Daily Traffic |
| Caltrans | California Department of Transportation |
| DU | Dwelling Unit |
| ICU | Intersection Capacity Utilization |
| LOS | Level of Service |
| TSF | Thousand Square Feet |
| V/C | Volume/Capacity |
| VMT | Vehicle Miles Traveled |

TERMS

AVERAGE DAILY TRAFFIC: The average 24-hour volume for a stated period divided by the number of days in that period. For example, Annual Average Daily Traffic is the total volume during a year divided by 365 days.

BANDWIDTH: The number of seconds of green time available for through traffic in a signal progression.

BOTTLENECK: A point of constriction along a roadway that limits the amount of traffic that can proceed downstream from its location.

CAPACITY: The maximum number of vehicles that can be reasonably expected to pass over a given section of a lane or a roadway in a given time period.

CHANNELIZATION: The separation or regulation of conflicting traffic movements into definite paths of travel by the use of pavement markings, raised islands, or other suitable means to facilitate the safe and orderly movements of both vehicles and pedestrians.

CLEARANCE INTERVAL: Nearly same as yellow time. If there is an all red interval after the end of a yellow, then that is also added into the clearance interval.

CONTROL DELAY: The component of delay, typically expressed in seconds per vehicle, resulting from the type of traffic control at an intersection. Control delay is measured by comparison with the uncontrolled condition; it includes delay incurred by slowing down, stopping/waiting, and speeding up.

CORDON: An imaginary line around an area across which vehicles, persons, or other items are counted (in and out).

CORNER SIGHT DISTANCE: The minimum sight distance required by the driver of a vehicle to cross or enter the lanes of the major roadway without requiring approaching traffic travelling at a given speed to radically alter their speed or trajectory. Corner sight distance is measured from the driver's eye at 42 inches above the pavement to an object height of 36 inches above the pavement in the center of the nearest approach lane.

CYCLE LENGTH: The time period in seconds required for a traffic signal to complete one full cycle of indications.

CUL-DE-SAC: A local street open at one end only and with special provisions for turning around.

DAILY CAPACITY: A theoretical value representing the daily traffic volume that will typically result in a peak hour volume equal to the capacity of the roadway.

DELAY: The time consumed while traffic is impeded in its movement by some element over which it has no control, usually expressed in seconds per vehicle.

DEMAND RESPONSIVE SIGNAL: Same as traffic-actuated signal.

DENSITY: The number of vehicles occupying in a unit length of the through traffic lanes of a roadway at any given instant. Usually expressed in vehicles per mile.

DETECTOR: A device that responds to a physical stimulus and transmits a resulting impulse to the signal controller.

DESIGN SPEED: A speed selected for purposes of design. Features of a highway, such as curvature, superelevation, and sight distance (upon which the safe operation of vehicles is dependent) are correlated to design speed.

DIRECTIONAL SPLIT: The percent of traffic in the peak direction at any point in time.

DIVERSION: The rerouting of peak hour traffic to avoid congestion.

FORCED FLOW: Opposite of free flow.

FREE FLOW: Volumes are well below capacity. Vehicles can maneuver freely and travel is unimpeded by other traffic.

GAP: Time or distance between successive vehicles in a traffic stream, rear bumper to front bumper.

HEADWAY: Time or distance spacing between successive vehicles in a traffic stream, front bumper to front bumper.

INTERCONNECTED SIGNAL SYSTEM: A number of intersections that are connected to achieve signal progression.

LEVEL OF SERVICE: A qualitative measure of a number of factors, which include speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs.

LOOP DETECTOR: A vehicle detector consisting of a loop of wire embedded in the roadway, energized by alternating current and producing an output circuit closure when passed over by a vehicle.

MINIMUM ACCEPTABLE GAP: Smallest time headway between successive vehicles in a traffic stream into which another vehicle is willing and able to cross or merge.

MULTI-MODAL: More than one mode; such as automobile, bus transit, rail rapid transit, and bicycle transportation modes.

OFFSET: The time interval in seconds between the beginning of green at one intersection and the beginning of green at an adjacent intersection.

PLATOON: A closely grouped component of traffic that is composed of several vehicles moving, or standing ready to move, with clear spaces ahead and behind.

PASSENGER CAR EQUIVALENT (PCE): A metric used to assess the impact of larger vehicles, such as trucks, recreational vehicles, and buses, by converting the traffic volume of larger vehicles to an equivalent number of passenger cars.

PEAK HOUR: The 60 consecutive minutes with the highest number of vehicles.

PRETIMED SIGNAL: A type of traffic signal that directs traffic to stop and go on a predetermined time schedule without regard to traffic conditions. Also, fixed time signal.

PROGRESSION: A term used to describe the progressive movement of traffic through several signalized intersections.

QUEUE: The number of vehicles waiting at a service area such as a traffic signal, stop sign, or access gate.

QUEUE LENGTH: The length of vehicle queue, typically expressed in feet, waiting at a service area such as a traffic signal, stop sign, or access gate.

SCREEN-LINE: An imaginary line or physical feature across which all trips are counted, normally to verify the validity of mathematical traffic models.

SHARED/RECIPROCAL PARKING AGREEMENT: A written binding document executed between property owners to provide a designated number of off-street parking stalls within a designated area to be available for specified businesses or land uses.

SIGHT DISTANCE: The continuous length of roadway visible to a driver or roadway user.

SIGNAL CYCLE: The time period in seconds required for one complete sequence of signal indications.

SIGNAL PHASE: The part of the signal cycle allocated to one or more traffic movements.

STACKING DISTANCE: The length of area available behind a service area, such as a traffic signal or gate, for vehicle queueing to occur.

STARTING DELAY: The delay experienced in initiating the movement of queued traffic from a stop to an average running speed through an intersection.

STOPPING SIGHT DISTANCE: The minimum distance required by the driver of a vehicle on the major roadway travelling at a given speed to bring the vehicle to a stop after an object on the road becomes visible. Stopping sight distance is measured from the driver's eye at 42 inches above the pavement to an object height of 6 inches above the pavement.

TRAFFIC-ACTUATED SIGNAL: A type of traffic signal that directs traffic to stop and go in accordance with the demands of traffic, as registered by the actuation of detectors.

TRIP: The movement of a person or vehicle from one location (origin) to another (destination). For example, from home to store to home is two trips, not one.

TRIP-END: One end of a trip at either the origin or destination (i.e., each trip has two trip-ends). A trip-end occurs when a person, object, or message is transferred to or from a vehicle.

TRIP GENERATION RATE: The quantity of trips produced and/or attracted by a specific land use stated in terms of units such as per dwelling, per acre, and per 1,000 square feet of floor space.

TRUCK: A vehicle having dual tires on one or more axles, or having more than two axles.

TURNING RADIUS: The circular arc formed by the smallest turning path radius of the front outside tire of a vehicle, such as that performed by a U-turn maneuver. This is based on the length and width of the wheel base as well as the steering mechanism of the vehicle.

UNBALANCED FLOW: Heavier traffic flow in one direction than the other. On a daily basis, most facilities have balanced flow. During the peak hours, flow is seldom balanced in an urban area.

VEHICLE MILES OF TRAVEL: A measure of the amount of usage of a section of highway, obtained by multiplying the average daily traffic by length of facility in miles.

# APPENDIX B

# COUNT SURVEY WORKSHEET

| Thursday, September 27, 2018 | CITY: Orange | PROJECT: SC1899 |
|---|---|---|
| **ADT1 Driveway west of Batavia.** | Prepared by: Field Data Services of Arizor | **Prepared by AimTD LLC tel. 714 253 7888** |

| AM Period | | | | | IN | | OUT | | | PM Period | | | | | IN | | OUT | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0:00 | 0 | | 0 | | 1 | | 0 | | | 12:00 | 0 | | 0 | | 0 | | 1 | | |
| 0:15 | 0 | | 0 | | 0 | | 0 | | | 12:15 | 0 | | 0 | | 0 | | 0 | | |
| 0:30 | 0 | | 0 | | 0 | | 0 | | | 12:30 | 0 | | 0 | | 1 | | 2 | | |
| 0:45 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 12:45 | 0 | 0 | 0 | 0 | 3 | 4 | 0 | 3 | 7 |
| 1:00 | 0 | | 0 | | 0 | | 0 | | | 13:00 | 0 | | 0 | | 1 | | 0 | | |
| 1:15 | 0 | | 0 | | 0 | | 0 | | | 13:15 | 0 | | 0 | | 1 | | 1 | | |
| 1:30 | 0 | | 0 | | 1 | | 0 | | | 13:30 | 0 | | 0 | | 1 | | 0 | | |
| 1:45 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 13:45 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 2 | 6 |
| 2:00 | 0 | | 0 | | 0 | | 0 | | | 14:00 | 0 | | 0 | | 0 | | 1 | | |
| 2:15 | 0 | | 0 | | 0 | | 0 | | | 14:15 | 0 | | 0 | | 1 | | 1 | | |
| 2:30 | 0 | | 0 | | 0 | | 0 | | | 14:30 | 0 | | 0 | | 1 | | 1 | | |
| 2:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 14:45 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 5 |
| 3:00 | 0 | | 0 | | 0 | | 0 | | | 15:00 | 0 | | 0 | | 0 | | 1 | | |
| 3:15 | 0 | | 0 | | 0 | | 0 | | | 15:15 | 0 | | 0 | | 1 | | 0 | | |
| 3:30 | 0 | | 0 | | 0 | | 0 | | | 15:30 | 0 | | 0 | | 0 | | 1 | | |
| 3:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 15:45 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 4 | 6 |
| 4:00 | 0 | | 0 | | 0 | | 0 | | | 16:00 | 0 | | 0 | | 0 | | 1 | | |
| 4:15 | 0 | | 0 | | 0 | | 0 | | | 16:15 | 0 | | 0 | | 1 | | 1 | | |
| 4:30 | 0 | | 0 | | 0 | | 0 | | | 16:30 | 0 | | 0 | | 0 | | 0 | | |
| 4:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 16:45 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 2 | 4 |
| 5:00 | 0 | | 0 | | 0 | | 0 | | | 17:00 | 0 | | 0 | | 1 | | 2 | | |
| 5:15 | 0 | | 0 | | 0 | | 0 | | | 17:15 | 0 | | 0 | | 0 | | 0 | | |
| 5:30 | 0 | | 0 | | 0 | | 0 | | | 17:30 | 0 | | 0 | | 0 | | 1 | | |
| 5:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 17:45 | 0 | 0 | 0 | 0 | 2 | 3 | 1 | 4 | 7 |
| 6:00 | 0 | | 0 | | 0 | | 0 | | | 18:00 | 0 | | 0 | | 0 | | 2 | | |
| 6:15 | 0 | | 0 | | 0 | | 0 | | | 18:15 | 0 | | 0 | | 0 | | 3 | | |
| 6:30 | 0 | | 0 | | 1 | | 2 | | | 18:30 | 0 | | 0 | | 0 | | 0 | | |
| 6:45 | 0 | 0 | 0 | 0 | 2 | 3 | 2 | 4 | 7 | 18:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 |
| 7:00 | 0 | | 0 | | 0 | | 0 | | | 19:00 | 0 | | 0 | | 0 | | 0 | | |
| 7:15 | 0 | | 0 | | 0 | | 0 | | | 19:15 | 0 | | 0 | | 1 | | 0 | | |
| 7:30 | 0 | | 0 | | 0 | | 1 | | | 19:30 | 0 | | 0 | | 1 | | 1 | | |
| 7:45 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 4 | 4 | 19:45 | 0 | 0 | 0 | 0 | 2 | 4 | 0 | 1 | 5 |
| 8:00 | 0 | | 0 | | 3 | | 0 | | | 20:00 | 0 | | 0 | | 0 | | 0 | | |
| 8:15 | 0 | | 0 | | 0 | | 1 | | | 20:15 | 0 | | 0 | | 1 | | 1 | | |
| 8:30 | 0 | | 0 | | 2 | | 0 | | | 20:30 | 0 | | 0 | | 0 | | 0 | | |
| 8:45 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 1 | 7 | 20:45 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 2 | 4 |
| 9:00 | 0 | | 0 | | 2 | | 1 | | | 21:00 | 0 | | 0 | | 1 | | 2 | | |
| 9:15 | 0 | | 0 | | 1 | | 2 | | | 21:15 | 0 | | 0 | | 2 | | 1 | | |
| 9:30 | 0 | | 0 | | 1 | | 0 | | | 21:30 | 0 | | 0 | | 1 | | 1 | | |
| 9:45 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 3 | 8 | 21:45 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 5 | 9 |
| 10:00 | 0 | | 0 | | 1 | | 2 | | | 22:00 | 0 | | 0 | | 0 | | 0 | | |
| 10:15 | 0 | | 0 | | 2 | | 3 | | | 22:15 | 0 | | 0 | | 0 | | 0 | | |
| 10:30 | 0 | | 0 | | 0 | | 0 | | | 22:30 | 0 | | 0 | | 0 | | 0 | | |
| 10:45 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 5 | 8 | 22:45 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 1 | 3 |
| 11:00 | 0 | | 0 | | 1 | | 1 | | | 23:00 | 0 | | 0 | | 2 | | 1 | | |
| 11:15 | 0 | | 0 | | 0 | | 0 | | | 23:15 | 0 | | 0 | | 0 | | 0 | | |
| 11:30 | 0 | | 0 | | 2 | | 1 | | | 23:30 | 0 | | 0 | | 0 | | 0 | | |
| 11:45 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 3 | 7 | 23:45 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 3 |
| **Total Vol.** | | | | | | 23 | | 20 | **43** | | | | | | | 31 | | 33 | **64** |

**Daily Totals**

| NB | SB | EB | WB | Combined |
|---|---|---|---|---|
| | | 54 | 53 | **107** |

| | AM | | | PM | | |
|---|---|---|---|---|---|---|
| **Split %** | 53.5% | 46.5% | **40.2%** | 48.4% | 51.6% | **59.8%** |
| **Peak Hour** | 8:00 | 7:30 | **9:30** | 12:30 | 17:30 | **20:45** |
| **Volume** | 6 | 5 | **10** | 6 | 7 | **10** |
| **P.H.F.** | 0.50 | 0.42 | **0.50** | 0.50 | 0.58 | **0.83** |

# Appendix G

Arborist Evaluation

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November 17th, 2020

NUVIS Landscape Architecture
Attn: Janet Stone
3151 Airway Ave
Costa Mesa, CA 92626

RE: Orange County Ronald McDonald House Expansion – Arborist Evaluation

Dear Janet,

This letter is in reference to an evaluation conducted on the existing trees located on the property of the Orange County Ronald McDonald House. This assessment was conducted in response to concerns regarding the effects the construction would have on the existing trees, due to the expansion of the property. Documentation was provided to Park West for the new proposed development, as well as the existing site plan. Specific trees were noted by Perkins-Eastman Dougherty to be removed or to remain onsite due to the new development plan. Below are recommendations for the trees per the provided site plans.

On June 3rd, 2019 the original evaluation was conducted on the existing trees located on the property of the OCRM, however the trees were re-evaluated on August 17th, 2020 based on new plan changes to the construction pertaining to OCRM and adjacent properties. The following trees were GPS mapped and inspected for their overall health, and potential risks directly related to the expansion project: *Koelreuteria bipinnata*, *Cupaniopsis anacardioides*, *Lophostemon confertus*, *Lagerstroemia indica*, *Citrus x sinensis*, *Sequoia sempervirens, Dodonea viscosa cv. Purpurea, Eriobotrya japonica, Fraxinus spp., Araucaria spp., & Phoenix dactylifera.*

Based on the current proposed site plan, specific trees are recommended for removal due to the following: general decline in health, disease, structure encroaching canopy, or a current/impending compromised root system.

Please reference the GPS map included for correlating tree identification numbers.

- *Koelreuteria bipinnata* – ID #'s 1, 2 & 3

The existing Koelreuteria's were noted to be generally healthy and free of any pests or disease. However, it was observed that tree #3 had begun to cause damage to the surrounding planter and curb. (Fig. 1). Further damage should be expected if the tree is to remain in its current location. Root pruning is not recommended, as this may cause the tree to become susceptible to soil borne illnesses due to open wounds caused by the root pruning. Any sub surface trenching or digging would also likely affect the tree's health and overall structural stability.

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The site design intends to keep some of the existing three Koelreuteria trees in place. In order to keep the existing trees in place the following tree protection is recommended. Critical Root Zone (CRZ) is the area of soil extending from the tree trunk where roots required for future tree health and survival are located. This area can also be defined as a circle with a minimum radius of 1' for every 1" min. trunk diameter at 4.5" above ground. Erect a tree protection barrier that encloses the Tree Protection Zone (TPZ). A tree protection barrier encloses the TPZ and is at least 4' tall, highly visible, sturdy, permanent and has warning signs on or near it for the duration of any construction activities. TPZ is an area where construction activities are prohibited or restricted to prevent injury to preserved trees, especially during pre-construction and construction, and includes the Critical Root Zone and/or beyond. An acceptable Tree Protection Zone for trees #1-3 would need to be a diameter of 12 feet from the base of the trunk. Considering the construction plans provided need a greater clearance, it is recommended that these two trees (#2 and #3) be removed.

- *Cupaniopsis anacardioides* – ID #25

The existing Carrotwood is recommended for removal due to the proposed addition (as noted on page A003 of the proposed site plan). This addition appears to suggest that a walkway would be installed where the existing tree is located, therefore not leaving an appropriate amount of space for the tree's growth (Fig. 2). Trees typically kept in tight spaces can cause structural damage to surfaces and structures. In addition, it was noted that the trees dripline measured at 16' in diameter, suggesting that any demolition or construction in or around that area could significantly affect the trees root system, and likely the trees health. A tree protection plan would not coincide with the proposed addition. In order to keep the existing tree in place, it is recommended that no construction or demolition activity be conducted within 16' of the tree's trunk, or inside of the existing dripline.

- *Lophostemon confertus* – ID #26

The existing Tristania is recommended for removal due to the installation of the proposed planter (as noted on page A003 of the proposed site plan). According to the proposed site plan, the planter would be extended, causing the curb and surrounding concrete to be removed. Any construction or soil disturbance is not recommended due to the small nature of the current planter. Such digging could cause root damage and affect the heath of the tree. It was also mentioned that the Orange City Fire Department requires a 5' clearance around structures. Due to the trees large size and encroaching canopy, it would not be in the best interest of the tree to severely encroachment prune the canopy in a way to meet this fire code (Fig. 3). Additionally, it was noted that the Tristania did not appear to be currently irrigated.

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- *Lagerstroemia indica* – ID #'s 27, 28, 29 & 45

Three of the existing Crape Myrtles are recommended for removal based on the proposed fire lane entrance addition (as noted on page A003 on the proposed site plan). The exception would be tree #29 since this Crape Myrtle will not likely be compromised by the proposed addition.

- *Citrus x sinensis* – ID #'s 4-24 & 30-35

The existing Orange trees are recommended for removal based on the general decline in health, as well as the construction of the proposed parking lot, and footprint expansion areas (as noted on page A003 of the proposed site plan). It was determined that none of the orange trees could be salvaged due to the extent of the construction area. The root zone of the trees would be adversely affected by soil compaction due to the machinery likely needed on-site during the construction. It was also noted that more than 50% of the orange trees on the property appeared to have symptoms of a soil borne illness, which has caused the bark to strip away, and allowed the trees to become susceptible to other pathogens and pests. Additional pathogen testing would be required in order to identify the disease causing this specific issue, if needed. Some pests observed during the evaluation were Scale and Thrips (Fig. 4). A tree protection plan would not coincide with the proposed construction of the parking lot or footprint expansion.

On June 26th, 2019 the existing trees on the property at 802 W. Culver were inspected in addition to the original tree evaluations conducted on June 3rd and once again re-evaluated on August 17th, 2020. This assessment was conducted in response to concerns regarding the effect's construction would have on the existing trees, due to the expansion of the property. Per page A003 of the site plan, an entry way and path are to be added onto the 802 W. Culver property as well as a proposed drainage system. Based on the current proposed plan, the specific trees noted below are recommended for removal due to an impending compromised root system from the additional construction.

- *Citrus x sinensis* – ID #46 & 85

    The existing Citrus #46 is recommended for removal due to its proximity to the proposed walkway noted on page A003 (Fig. 5). Based on the site plan, the proposed walkway appears to compromise the structural integrity of the trees root ball and would cause the tree's canopy to encroach heavily onto the walkway itself. Severe pruning to the canopy would need to be conducted in order to maintain an appropriate pathway, although this action is not recommended.

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Regarding Citrus #85, this tree is recommended for removal based on the new proposal of the drainage system installation that appears to run through the property at 802 W. Culver. Removal of this tree is due to its location being in the direct path of the proposed storm drain. A protection zone or TPZ would not likely aid in the preservation of these trees due to the likelihood of the damaged root system caused by the trenching and installation.

- *Lophostemon confertus* – ID #'s 47, 84, 74, 80 & 82

The existing Tristanias are recommended for removal due to the installation of the proposed entry gate noted on page A003 of the proposed site plan as well as the proposed storm drain installation. The new entryway would appear to be installed in close proximity to Tristania #47, possibly compromising the trees structural integrity (Fig. 6). It was also noted during the evaluation that the potential for damage to the trunk or canopy specifically during the construction, would likely occur. Regarding Tristania #'s 84 & 74, a proper RPZ to maintain the structural integrity of the trees does not apply as the proposed storm drain appears to run in close proximity to the trees, greatly or totally compromising Tristania #'s 84 & 74. Therefore, it is recommended that both be removed.

- *Dodonaea viscosa cv. Purpurea* – ID #79, 81 & 83

The existing Dodonaea's are recommended for removal due to their location being in the direct path of the proposed storm drain as well as their overall declining health. A protection zone or TPZ would not likely aid in the preservation of these trees due to the likelihood of the damaged root system caused by the trenching and installation.

- *Eriobotrya japonica* – ID #76

The existing Eriobotrya is recommended for removal due to its location being in the direct path of the proposed storm drain. A protection zone or TPZ would not likely aid in the preservation of these trees due to the likelihood of the damaged root system caused by the trenching and installation.

- *Sequoia sempervirens* – ID #70

The existing Sequoia is recommended for removal due to its location being in the direct path of the proposed storm drain. A protection zone or TPZ would not likely aid in the preservation of this specimen due to the likelihood of the damaged root system caused by the trenching and installation.

For all trees that are to remain in place the following tree protection is recommended. Critical Root Zone (CRZ) is the area of soil extending from the tree trunk where roots required for future tree health and survival are located. This area can also be defined as a circle with a minimum radius of 1' for every 1" min. trunk diameter at 4.5" above ground. Erect a tree protection barrier that encloses the Tree Protection Zone (TPZ). A tree protection barrier encloses the TPZ and is at least 4' tall, highly visible,

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sturdy, permanent and has warning signs on or near it for the duration of any construction activities. TPZ is an area where construction activities are prohibited or restricted to prevent injury to preserved trees, especially during pre-construction and construction, and includes the Critical Root Zone and/or beyond. Therefore, the remaining Sequoias, Tristanias, Loquat, & Hopbush species should at least have a 6-foot diameter TPZ to increase the likelihood of survival due to the trenching of the proposed storm drain installation.

- *Lophostemon conferta* – ID # 36
- *Phoenix dactylifera* – ID # 43
- *Fraxinus spp.* – ID #44

The above species are recommended for removal due to their close proximity to the proposed sewer drain installation as well as parking lot improvement work.

- *Lophostemon conferta* – ID #'s 50-63, & 69

It was also requested that the Tristania trees to the south of the property bordering the nearby medical facility also be assessed for any TPZ recommendations. Due to these species being an adequate distance away from any trenching proposed, it is likely these trees will not be affected by the proposed construction on-site.

Tree protection zones in general are recommended for all remaining trees onsite, except the trees located in the nearby medical office parking lot. Regular irrigation is recommended to keep the stress of the trees to a minimum. This is also recommended for all trees site-wide during and after construction.

This general tree evaluation was conducted from the ground. The inspection of the upper canopy and the testing of root density was not completed. The information provided is based on a visual observation performed under current weather conditions. If you have any questions, or need any additional information, please feel free to contact me at (949)283-3338. Thank you for your time and consideration.

Best Regards,

Jessica Weber
Certified Arborist (WE-11779A)


(Figure 1) *Koelreuteria* – ID #3

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(Figure 2) *Cupaniopsis* – ID #25

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(Figure 3) *Lophostemon* – ID #26

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(Figure 4) *Citrus* – Peeling bark

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Fax: (949) 546-8301
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(Figure 5) *Citrus* – Conflicting with proposed path

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(Figure 6) *Lophostemon* – ID # 47

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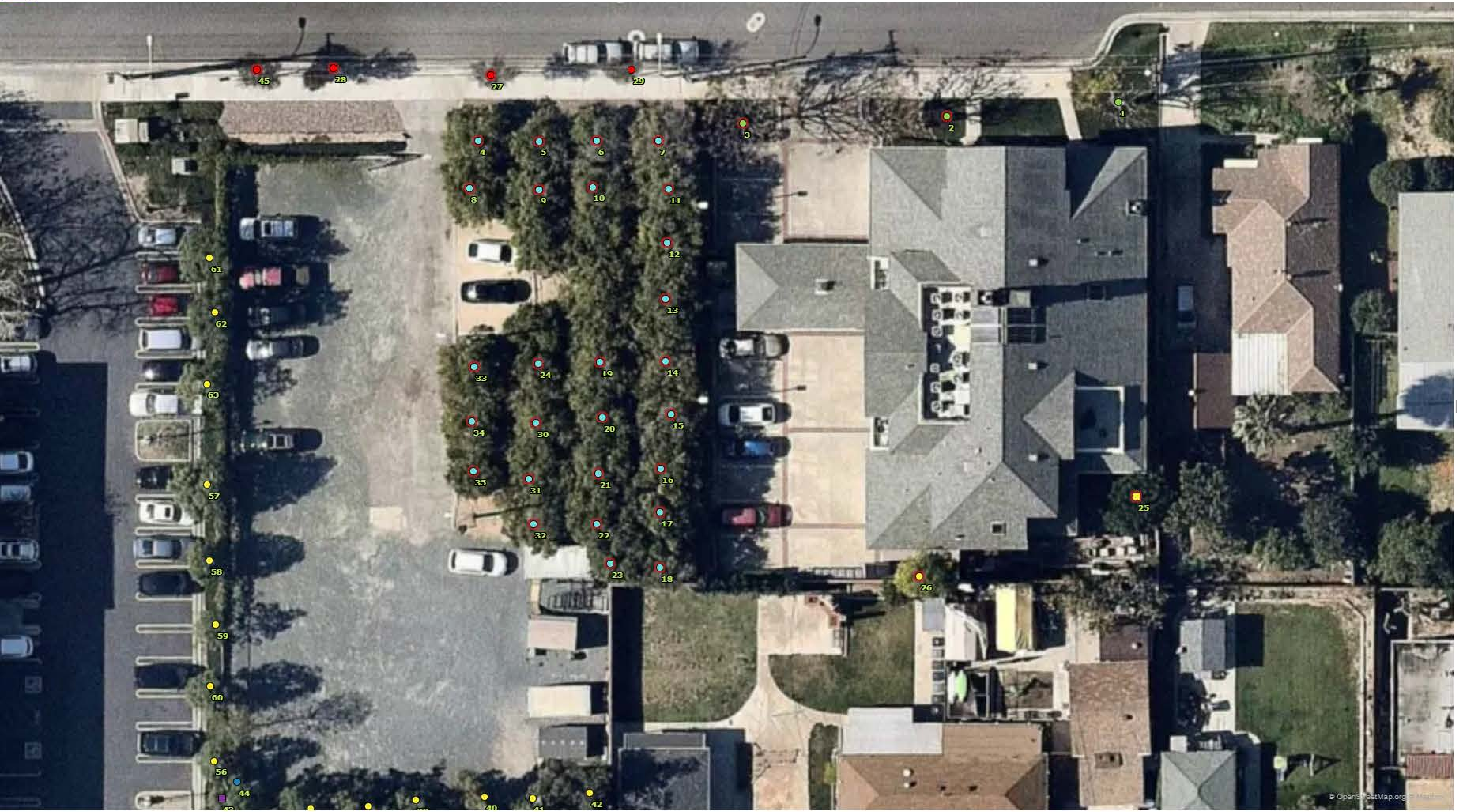
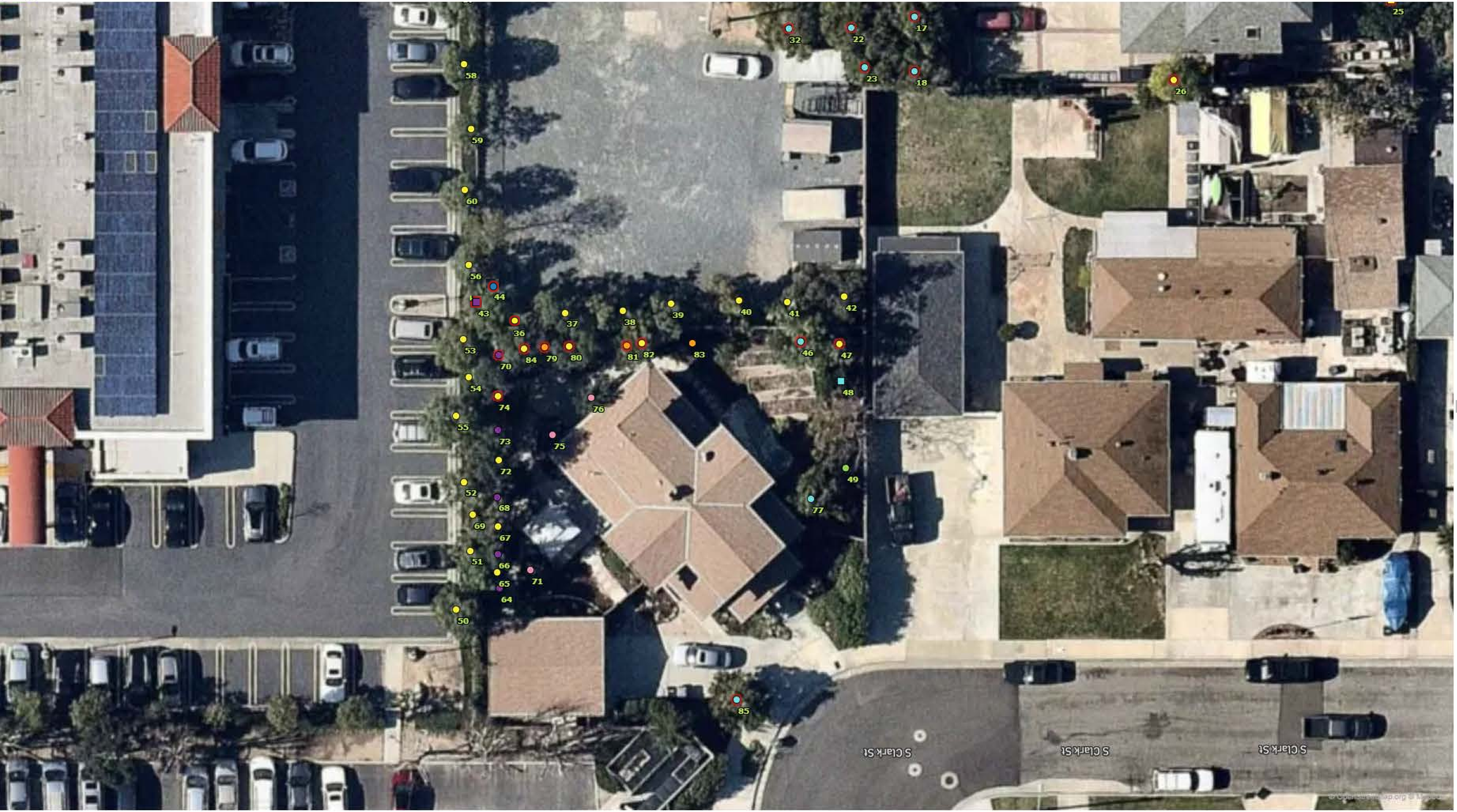



**Species** (84)

- Tristania conferta (31)
- Citrus x sinensis (30)
- Sequoia sempervirens (5)
- Koelreuteria bipinnata (4)
- Crape Myrtle (4)
- Dodonaea viscosa cv. Purpurea (3)
- Eriobotrya japonica (3)
- Fraxinus spp. (1)
- Cupaniopsis anacardioides (1)
- Araucaria araucana (1)
- Phoenix dactylifera (1)

Orange County Ronald McDonald House

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