Draft Initial Study and Notice of Intent to Adopt a Mitigated Negative Declaration for the Aurora Builders Development Project – Subdivision No. 23-01 (Tentative Tract Map TTM 20539) and Development Permit DP-P 23-01

Northwest corner of W. Meyers Road and N. Magnolia Avenue,
San Bernardino, CA, 92407,
County of San Bernardino

Lead Agency:
City of San Bernardino
290 North D St
San Bernardino, CA 92401

Applicant:
Aurora Builders LLC
9987 Fox Meadow Road
San Diego, CA 92127

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1 Introduction

The City of San Bernardino (Lead Agency) received applications for Subdivision 23-01 Tentative Tract Map 20539 (TTM) a subdivision of 11.11-gross acres/9.69 net acres into 30 single—family residential lots under the RL-Residential Low General Plan Land Use Designation and Development Permit DP-P 23-01 to allow the construction and use of 30 single-family detached residences with the future development of an accessory dwelling unit on each of the 30 proposed lots. The site is located at the northwest corner of W. Meyers Road and N. Magnolia Avenue in the Verdemont area of the City of San Bernardino. The approval of the applications constitute a *project* that is subject to review under the California Environmental Quality Act (CEQA) 1970 (Public Resources Code, Section 21000 et seq.), and the State CEQA Guidelines (California Code of Regulations, Section 15000 et. seq.).

This Initial Study has been prepared to assess the short-term, long-term, and cumulative environmental impacts that could result from the proposed residential subdivision project.

This report has been prepared to comply with Section 15063 of the State CEQA Guidelines, which sets forth the required contents of an Initial Study. These include:

- A description of the project, including the location of the project (See Section 2);
- Identification of the environmental setting (See Section 2.9);
- Identification of environmental effects by use of a checklist, matrix, or other methods, provided that entries on the checklist or other form are briefly explained to indicate that there is some evidence to support the entries (See Section 4);
- Discussion of ways to mitigate significant effects identified, if any (See Section 4);
- Examination of whether the project is compatible with existing zoning, plans, and other applicable land use controls (See Section 4.11); and
- The name(s) of the person(s) who prepared or participated in the preparation of the Initial Study (See Section 5).

1.1 – Purpose of CEQA

The body of state law known as *CEQA* was originally enacted in 1970 and has been amended a number of times since then. The legislative intent of these regulations is established in Section 21000 of the California Public Resources Code, as follows:

The Legislature finds and declares as follows:

a) The maintenance of a quality environment for the people of this state now and in the future is a matter of statewide concern.
b) It is necessary to provide a high-quality environment that at all times is healthful and pleasing to the senses and intellect of man.
c) There is a need to understand the relationship between the maintenance of high-quality ecological systems and the general welfare of the people of the state, including their enjoyment of the natural resources of the state.
d) The capacity of the environment is limited, and it is the intent of the Legislature that the government of the state takes immediate steps to identify any critical thresholds for the health and safety of the people of the state and take all coordinated actions necessary to prevent such thresholds being reached.
e) Every citizen has a responsibility to contribute to the preservation and enhancement of the environment.

f) The interrelationship of policies and practices in the management of natural resources and waste disposal requires systematic and concerted efforts by public and private interests to enhance environmental quality and to control environmental pollution.
g) It is the intent of the Legislature that all agencies of the state government which regulate activities of private individuals, corporations, and public agencies which are found to affect the quality of the environment, shall regulate such activities so that major consideration is given to preventing environmental damage, while providing a decent home and satisfying living environment for every Californian.

The Legislature further finds and declares that it is the policy of the State to:

a) Develop and maintain a high-quality environment now and in the future, and take all action necessary to protect, rehabilitate, and enhance the environmental quality of the state.
b) Take all action necessary to provide the people of this state with clean air and water, enjoyment of aesthetic, natural, scenic, and historic environmental qualities, and freedom from excessive noise.
c) Prevent the elimination of fish or wildlife species due to man's activities, insure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities and examples of the major periods of California history.
d) Ensure that the long-term protection of the environment, consistent with the provision of a decent home and suitable living environment for every Californian, shall be the guiding criterion in public decisions.
e) Create and maintain conditions under which man and nature can exist in productive harmony to fulfill the social and economic requirements of present and future generations.
f) Require governmental agencies at all levels to develop standards and procedures necessary to protect environmental quality.
g) Require governmental agencies at all levels to consider qualitative factors as well as economic and technical factors and long-term benefits and costs, in addition to short-term benefits and costs and to consider alternatives to proposed actions affecting the environment.

A concise statement of legislative policy, with respect to public agency consideration of projects for some form of approval, is found in Section 21002 of the Public Resources Code, quoted below:

> The Legislature finds and declares that it is the policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects, and that the procedures required by this division are intended to assist public agencies in systematically identifying both the significant effects of proposed projects and the feasible alternatives or feasible mitigation measures which will avoid or substantially lessen such significant effects. The Legislature further finds and declares that in the event specific economic, social, or other conditions make infeasible such project alternatives or such mitigation measures, individual projects may be approved in spite of one or more significant effects thereof.

1.2 – Public Comments

Comments from all agencies and individuals are invited regarding the information contained in this Initial Study. Such comments should explain any perceived deficiencies in the assessment of impacts, identify the information that is purportedly lacking in the Initial Study or indicate where the information may be found. All comments on the Initial Study are to be submitted to:

Chantel Choice
Senior Planner
City of San Bernardino
Community Development and Housing
290 North D St, San Bernardino, CA 92401
O: 909-384-3328
choice_ch@sbcity.org

Following a 30-day period of circulation and review of the Initial Study, all comments will be considered by the City of San Bernardino prior to adoption.

1.3 – Availability of Materials

All materials related to the preparation of this Initial Study are available for public review. To request an appointment to review these materials, please contact:

Chantel Choice
Senior Planner
City of San Bernardino
Community Development and Housing
290 North D St, San Bernardino, CA 92401
O: 909-384-3328
choice_ch@sbcity.org

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2 Project Description

2.1 – Project Title

Aurora Builders Development Project – Subdivision 23-01 Tentative Tract Map 20539 (TTM) and Development Permit DP-P 23-01

2.2 – Lead Agency Name and Address

City of San Bernardino
Community Development and Housing
290 North D Street
San Bernardino, CA 92401 (Mailing Address)

2.3 – Contact Person and Phone Number

Chantel Choice, Senior Planner at 909-384-3328

2.4 – Project Location

The site is located on the north side of W. Meyers Road at N. Magnolia Avenue in the Verdemont Hills subarea of the Verdemont Heights Area Plan. The project site is identified as Assessor Parcel Numbers 0261-062-015 and 016. The latitude and longitude is 34° 12′ 20.08″ North and 117° 21′ 44.06″ West (see Figure 1 Regional Map and Figure 2 Project Aerial). Regional access to the project site is generally via Interstate 215 at either the Little League Drive or Palm Avenue exits.

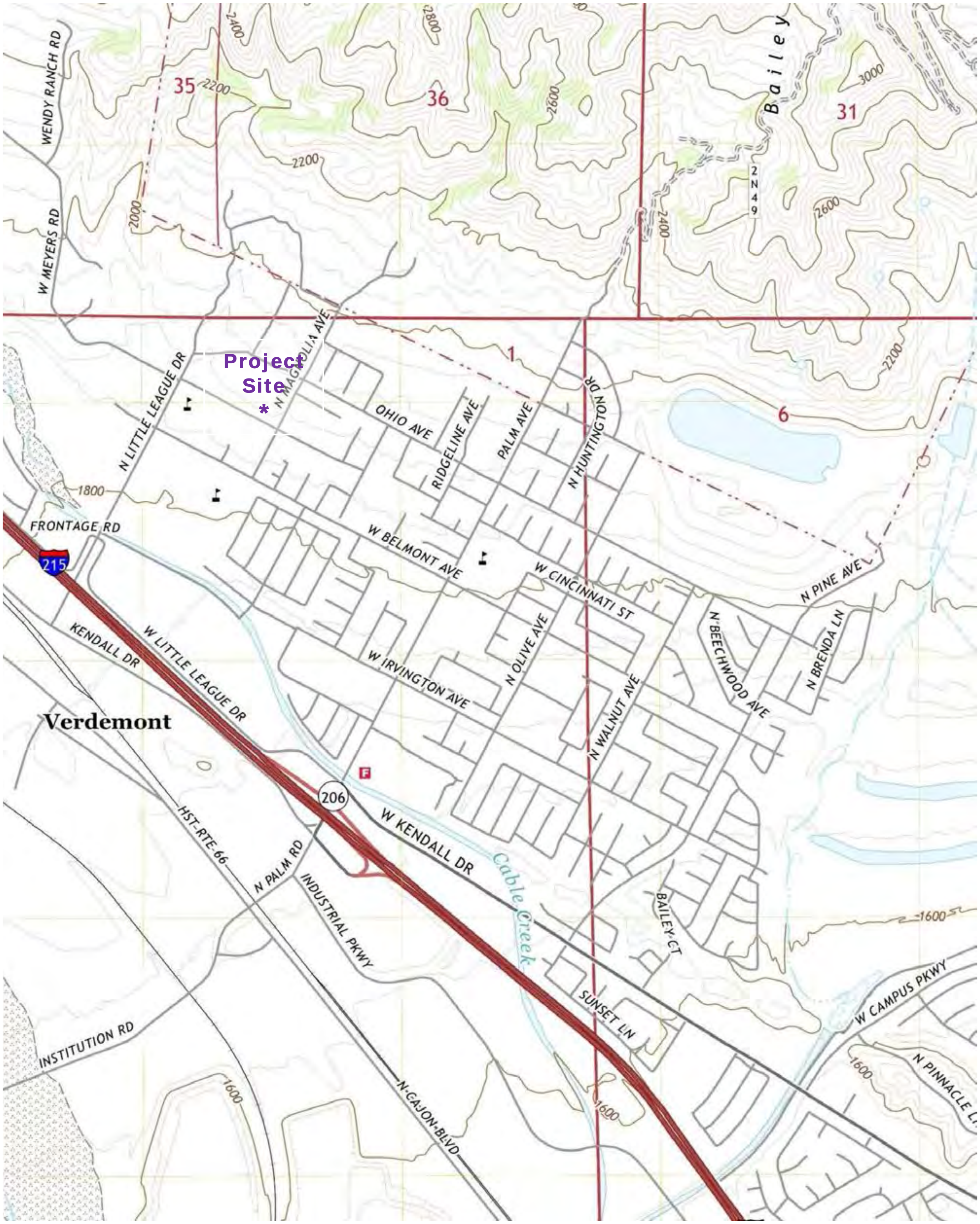
2.5 – Project Sponsor's Name and Address

Aurora Builders LLC
9987 Fox Meadow Road
San Diego, CA 92127

2.6 – General Plan Land Use Designation

The project site lies within the Verdemont Heights Area Plan of the City. Verdemont Heights is a residential community located in the northwestern most corner of the City, nestled in the foothills of the San Bernardino Mountains and overlooking the Cajon Creek Wash and the Glen Helen Regional Park. Verdemont Heights is bordered on the north by the San Bernardino National Forest, on the southwest by Kendall Drive, Interstate 215, and the Cajon Creek, and on the southeast by the Devil's Canyon Flood Control Basins and the East Branch of the California Aqueduct. Immediately southeast of these flood control basins is the California State University at San Bernardino. Verdemont Heights encompasses a gently north-south sloping hill at the base of the San Bernardino Mountains.

Figure 1 Regional Location



Source: USGS San Bernardino North, Calif., 7.5’ quadrangle [USGS 2021]

Figure 2 Project Aerial

Source: Google Earth Pro, 2023

The site is located in the subarea known as the Verdemont Hills, which is a collection of suburban subdivisions located adjacent to I-215 and extending to the foothills east of Little League Drive. The Residential Low and Residential Suburban land use designations characterize this subarea.

The subject site has a land use designation of Residential Low (RL), which allows for a maximum of 3.1 dwelling units per adjusted gross acre and requires a minimum lot size of 10,800 square feet as identified by the Land Use Element of the City of San Bernardino General Plan. The intended use for this designation is single-family detached residences in a low-density setting.

2.7 – Zoning

The project site is currently zoned Residential Low. According to San Bernardino Municipal Code Chapter 19.04, Section 19.04.030 Development Standards, Table 4.02 RESIDENTIAL DEVELOPMENT STANDARDS, the maximum units/net acre is 3.5 with an average lot size of 10,800 square feet and a minimum lot size of 9,720 square feet for new developments. Although the Municipal Code identifies the maximum units/net acre at 3.5 dwelling units per acre, this density only is applicable to a limited number of parcels north of Palm Avenue, directly fronting Interstate 215 as depicted on the City's Interactive Zoning Map on the City's website. The balance of the land areas assigned under the Residential Low have a density maximum of 3.1 dwelling units per net acre (10,800 minimum lot size).

2.8 – Project Description

Subdivision 23-01 (Tentative Tract Map [TTM] No. 20539) is a request to allow the division of two parcels containing approximately 11.11-gross acres/9.69 net acres into 30 single-family residential lots and two water quality basin lots (Lot A-11,441 square feet and Lot B-11,595 square feet) under the RL (Residential Low) General Plan Land Use Designation with a minimum average lot size of 10,800 square feet. The lot sizes range from 10,800 to 11,629 square feet at a density of 3.1 dwelling units per net acre (see Figure 3 Tentative Tract Map No. 20539).

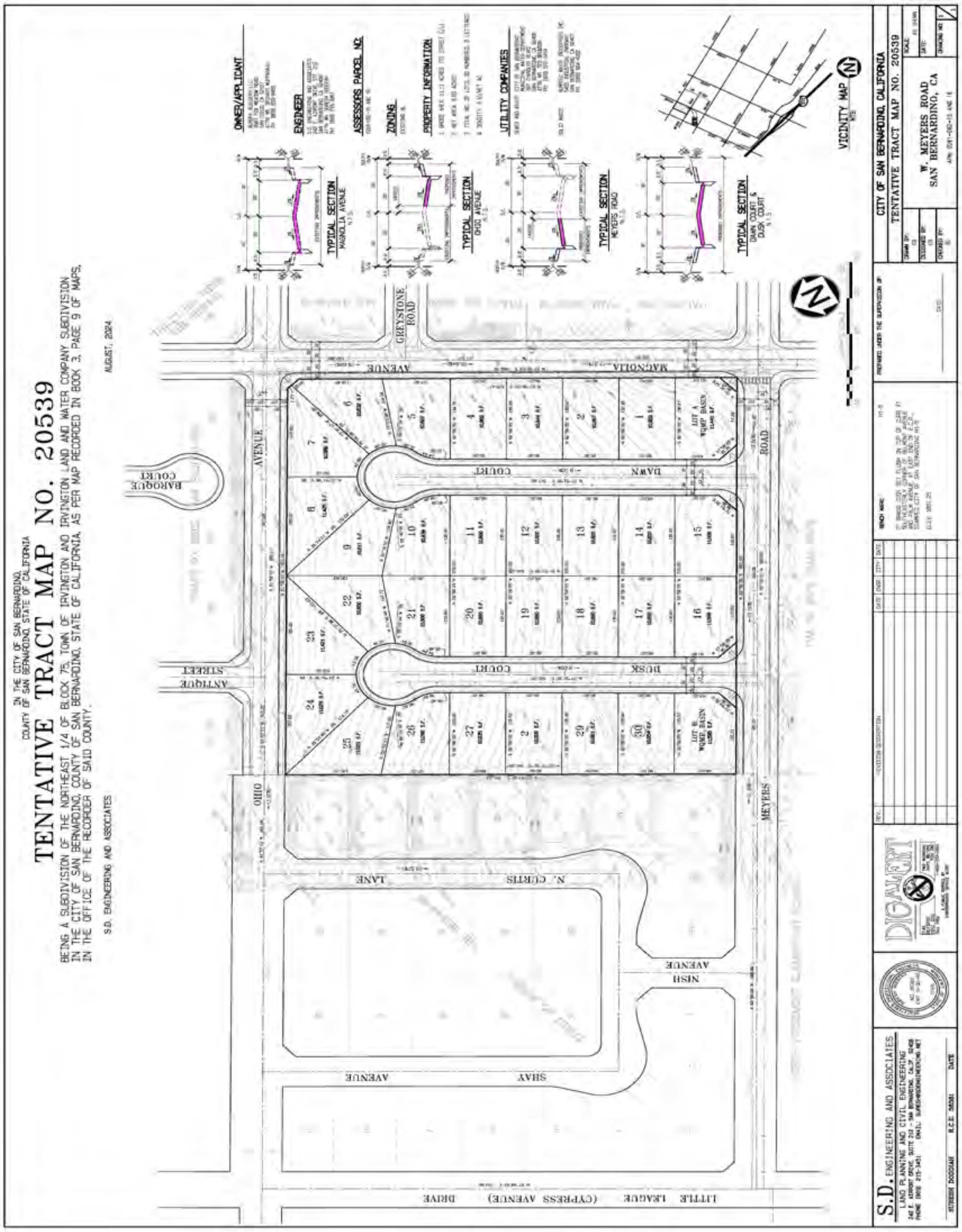
Development Permit DP-P 23-01 would allow the construction and use of 30 single-family detached residential homes within the Residential Low (RL) zone. The detached single-family homes range in size from 2,053 square feet for a single-story Plan 1 with a 3-car garage, 2,564 square feet for a two-story Plan 2 with a 3-car garage and 2,664 square feet for a two-story Plan 3 with attached 2-car garage. The applicant has planned for accessory dwelling units (ADU) for each lot that range in size from 600 square feet to 755 square feet. The ADU will be reviewed under a separate permitting process.

The project applicant has designed the project to incorporate three distinct architectural styles: Craftsman, Spanish and Tuscan. The typical features of each style are incorporated into each unit of that particular design, but based on the location of each unit, various enhancements are included. The R-L development standards require that no building or structure shall have a height in excess of thirty-five feet or 2.5 stories. The proposed structures are compliant with the R-L standards. The breakdown of units, type, size, and structure height is shown on Table 2.8-1, Unit Mix.

Table 2.8-1
Unit Mix

Plan #	Architectural Style	Plans	Bedrooms	Bathrooms	Livable Area-SF	Garage Area- SF	Garage Spaces	Height
1B	Spanish	1	4	2 ½	2,053	624	3	20′ 3 ¾″
1C	Tuscan	1	4	2 ½	2,053	624	3	19′ 10″
2A	Craftsman	2	5	3	2,564	633	3	25′ 8 ½″
2B	Spanish	6	5	3	2,564	633	3	25′ 8 ½″
2C	Tuscan	6	5	3	2,564	633	3	25′ 8 ½″
3A	Craftsman	7	5	3	2,664	419	2	25′ 1″
3B	Spanish	4	5	3	2,664	419	2	25′ 1″
3C	Tuscan	3	5	3	2,664	419	2	26′ 8″

Figure 3 Tentative Tract Map No. 20539



Source: S.D. Engineering and Associates, August 2024

PROJECT CHARACTERISTICS

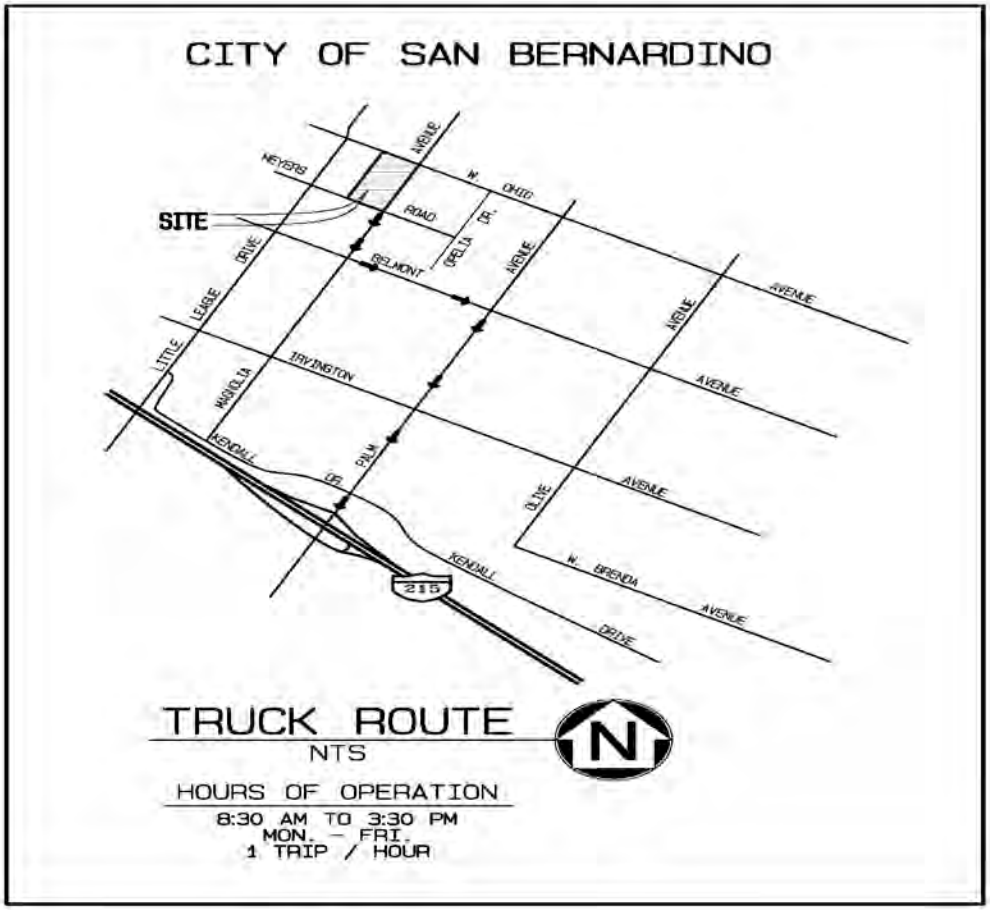
Walls and Fences

The applicant proposes to construct a new six-foot high block wall with a decorative cap along the project's perimeter property lines.

Site Grading

The site will require grading to facilitate the creation of the 30 residential lots, the construction of the residential homes, the construction of the two water quality basin lots (Lot A-11,441 square feet and Lot B-11,595 square feet) and the associated infrastructure improvements. The anticipated cut is approximately 27,102 cubic yards and the approximate fill material is 17,681 cubic yards requiring the export of 9,421 cubic yards of cut material to support the proposed development. A specific receiving location has not been identified for the excess cut material, however within the City the haul route is anticipated to run from the site southerly to Belmont Avenue then along Belmont Avenue to Palm Avenue and ending at Interstate 215 as depicted on Figure 4 Truck Route. Hauling will be limited to 8:30 am to 3:30 pm Monday-Friday.

Figure 4 Truck Route



Source: S.D. Engineering and Associates, June 2024

New Infrastructure

Residential Dwellings – All homes will be constructed with solar photovoltaic systems standard and will incorporate the latest energy efficiency technology as required by the California Energy Commission.

Streets, Circulation and Parking – Access to the site is available from W. Meyers Road, N. Magnolia Avenue and W. Ohio Avenue, all paved improved streets located adjacent to the southern, eastern and northern boundaries of the site, respectively. No additional roadway dedications are necessary to develop the project site. The project off-site improvements are predominately related to the project's frontage along W. Meyers Road, N. Magnolia Avenue and W. Ohio Avenue. They include the construction of road sections, new curbs and gutters, new sidewalks and new walls/fencing, the installation of landscaping within the road rights-of-way, the construction/installation of drainage improvements, sewer and water systems, and the construction/installation of new dry utilities. All construction activities will take place within the existing right-of-ways. Vehicular access will be provided via two interior 60-foot right-of-way streets (Dawn Court for lots 1 through 15, and via Dusk Court for lots 16 through 30). The project meets City of San Bernardino fire access standards.

The applicant prepared a Traffic Scoping form for the proposal, which was reviewed by the City's Traffic Engineer to determine whether or not a Traffic Impact Analysis was required. The City Engineer's determined that a Traffic Impact Analysis was required because the vehicle trips generated by the proposal exceeded 250 daily trips. The original project was projected to generate 302 daily trips, 22 AM peak hour trips, and 30 PM peak hour trips based on an original design of 32 residential lots. The number of residential lots has been reduced to 30.

In anticipation of the application submittals, a Vehicle Miles Traveled (VMT) analysis (Tentative Tract Map No. 20539 Vehicle Miles Traveled Analysis prepared by TJW Engineering, Inc. dated October 18, 2022) was prepared in late 2022. It used a baseline project year of 2022. The City has accepted said report. According to the VMT Analysis, the project is located within a low VMT generating area per the San Bernardino County Transportation Analysis screening tool. The baseline (year 2022) project VMT per service population was calculated at 20.7, which is 34.5 percent below the City's threshold of 31.6. The cumulative project VMT per service population (year 2040) was forecasted to be 21.5, which is 31.83 percent below the City's threshold of 31.6.

Parking will be provided for each dwelling in conformance with San Bernardino Municipal Code standards.

Drainage – Topographically, the site slopes gently downward to the south at an approximate five percent gradient with approximately 45 feet of elevation differential across the site. Site drainage is predominately by sheet flow to the south. A shallow drainage course trends approximately east-west through the central portion of the site. The site is vacant with limited vegetation. The proposed drainage pattern is to match existing. The proposed project will comply with the National Pollution Discharge Elimination System (NPDES) permits and a Storm Water Pollution Prevention Plan (SWPPP) will be prepared, reviewed and implemented for construction activities. A Preliminary Water Quality Control Plan will be prepared and reviewed by the Land Development Staff for the post-construction operational management of storm water runoff, and identify Best Management Practices to minimize pollutants entering the drainage system after construction and at the time when development plans are submitted for the construction of the residential dwellings. Wet utility connections would be made to existing facilities within W. Meyers Road.

Sanitary Sewer – Sewer collection will be accomplished by way of sewer laterals and mains which will drain southerly connecting to the existing 8-inch sewer line in W. Meyers Road.

Domestic Water – The City of San Bernardino Department of Public Works Water Division provides water services to Verdemont area of the City of San Bernardino. The proposed project site is located in the area served by the San Bernardino Municipal Water District. Domestic water will be provided by connection to existing water main in W. Meyers Road.

Dry Utilities – The project will be served with a new underground electric distribution system which connects to the existing power lines on N. Magnolia Avenue. The power lines adjacent to N. Magnolia Avenue will require undergrounding as part of this project. A private street light system will be constructed within the tract.

Solid Waste Collection

Trash storage will be in the garage or side yard of each residential unit, and containers (green waste, landfill, and recyclables) will be picked up by Burrtec (City franchisee) weekly.

PROJECT PHASING AND CONSTRUCTION

It should be noted that the original modeling assumed project construction starting in November 2024 and lasting 18-months and would be operational in 2026; while the construction details stay the same, the latest project update has changed the construction to start in 2025 and be operational in 2027. However, remodeling is not required as the original modeling results represent a conservative analysis, because construction and operational emission rates are lower in future years as technology advances, resulting in lower emissions. The proposed project will be constructed in the following phases: 1) site preparation (10 days); 2) grading (30 days); 3) building construction (300 days); 4) paving (20 days); and 5) architectural coatings (20 days). Construction would occur within the hours allowable by the San Bernardino Code Chapter 8.54.070, which states that construction shall occur only between the hours of 7:00 AM and 8:00 PM.

2.9 – Surrounding Land Uses and Setting

The 11.11-gross acres/9.69 net acre project consists of a square shaped tract of land. Single-family residential developments are located adjacent to the northern, western, eastern and southern boundaries of the site. North Verdemont Elementary School borders the southwest corner of the site. The terrain in the project area is generally flat, and slopes gently downward to the south and southwest. The elevations range from 1,866 feet to 1,922 feet above mean sea level. The surface soils are alluvial in nature, consisting of fine- to coarse-grained sands mixed with silt, small to large rocks, and small boulders and associated with the Tujunga gravelly loamy sand, 0 to 9 percent slopes mapping unit. Most of the property is occupied by ruderal vegetation.

Table 2.9-1
Existing General Plan and Zoning Designations

Direction	General Plan Designation	Zoning District	Existing Land Use
Project Site	Foundation Component: Single Family Residential Land Use: Residential Low	Residential Low (RL)	Vacant land
North	Foundation Component: Single Family Residential Land Use: Residential Low	Residential Low (RL)	Single-family residences
South	Foundation Component: Single Family Residential and Open Space Land Use: Residential Low and Open Space	Residential Low (RL) and Public Park (PP)	Single-family residences and park.
East	Foundation Component: Single Family Residential Land Use: Residential Low	Residential Low (RL)	Single-family residences
West	Foundation Component: Single Family Residential and Public Facility Land Use: Residential Low and Public/Quasi Public	Residential Low (RL) and Public Facility (PF)	Single-family residences and North Verdemont Elementary School

Source: City of San Bernardino Community Development and Housing webpage, 2024

2.10 – Required Approvals

The City of San Bernardino is the only land use authority for this project requiring the following approvals:

- Subdivision 23-01 Tentative Tract Map 20539 (TTM) a subdivision of 11.11-gross acres/9.69 net acres into 30 single—family residential lots under the RL-Residential Low General Plan Land Use Designation.
- Development Permit DP-P 23-01 to allow the construction and use of 30 single-family detached residences with the future development of an accessory dwelling unit on each of the 30 proposed lots.
- Approvals and permits necessary to execute the proposed project, including but not limited to accessory dwelling permits, grading permit, building permit, etc.

2.11 – Other Public Agencies Whose Approval is Required

Although land use authority is provided by the City of San Bernardino, the project may be subject to additional permits and/or fees by other public agencies. A summary of these additional requirements are as follows:

Standard permits through the State Water Resources Control Board for compliance with NPDES standards. These include the following: Construction Stormwater General Permit; Notice of Intent to Comply with Section 402 of the Clean Water Act, Construction Stormwater Pollution Prevention Plan (SWPPP); and Approval of O&M SWPPP.

A PM-10 Plan for compliance with Rule 401, Dust Control for the South Coast Air Basin will be required from the South Coast Air Quality Management District (SCAQMD) at the time of site disturbance.

The project will be subject to the regional Transportation Uniform Mitigation Fee (TUMF) as administered by the San Bernardino Associated Governments (SANBAG).

2.12 – Tribal Consultation

Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?

Yes. The consultation process was initiated and completed. See Section 4.18 Tribal Cultural Resources for expanded discussion.

3 Determination

3.1 – Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a 'Potentially Significant Impact' as indicated by the checklist on the following pages.

☐	Aesthetics	☐	Agriculture & 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

3.2 – Determination

☐	I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
☑	I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made 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 potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Name: Chantel Choice, Senior Planner

Date

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," as described in (5) below, may be cross-referenced).

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 identify 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.

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4 Evaluation of Environmental Impacts

4.1 – 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 nonurbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?			☑	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			☑	

Sources

Information used to prepare the Aesthetics section is from the following sources: project plans, aerial and ground-level photographs of the project area, the City of San Bernardino Updated General Plan, Chapter 5, Community Design, 2005, the California Department of Transportation website identifying the California Scenic Highway Mapping System accessed on October 5, 2023, the City of San Bernardino Development Code, Google Earth, 2024 and the United States Census Bureau, 2012, *2010 Census - Urbanized Area Reference Map – Riverside--San Bernardino, CA*.

Environmental Setting

The project site is 11.11 gross acres/9.69-net acres of undeveloped land. The project site is adjacent to W. Meyers Road, N. Magnolia Avenue, W. Ohio Avenue and single family residential units. The site is visible from W. Meyers Road, N. Magnolia Avenue, W. Ohio Avenue. The site is not located in an area of a designated State scenic highway and does not contain identified scenic resources such as rock outcroppings or historic buildings. The site is currently vacant and is not considered to be a scenic resource by the City of San Bernardino.

Discussion

a) **Less Than Significant Impact.** Scenic vistas can be impacted by development in two ways. First, a structure may be constructed that blocks the view of a vista. Second, the vista itself may be altered (i.e., development on a scenic hillside). The City of San Bernardino's General

Plan Natural Resources and Conservation Element states that scenic resources in the City include views of the Kendall Hills, San Bernardino Mountains, the hillsides adjacent to Arrowhead Springs, Lytle Creek Wash, East Twin Creeks Wash, the Santa Ana River, Badger Canyon, Bailey Canyon, and Waterman Canyon. The project site and surrounding area have immediate views of the San Bernardino Mountains to the northeast and east. The proposed project is located within an urbanized area visually dominated by residential land uses and surface street features. This site is not considered to be within or to comprise a portion of a scenic vista.

The project, Subdivision 23-01 Tentative Tract Map 20539 (TTM) and Development Permit DP-P 23-01, would have less than significant effect on a scenic vista. The proposed subdivision and development permit are generally consistent in type and scale with the existing surrounding development. In addition, appropriate landscaping in accordance with the Verdemont Heights Area Plan and the City's Development Code would be required. With the approval of the Development Permit, the proposed single-family units will have a maximum allowable height in conformance with proposed development standards of the Residential Low (RL) Zone so as to not impede or hinder a scenic view. Therefore, the project will result in a less than significant impact on any scenic vista.

b) **No Impact.** The subdivision of land and development permit will not impact visual resources or scenic vistas. The project is not adjacent to a designated state scenic highway or eligible state scenic highway as identified on the California Scenic Highway Mapping System. Two roadways within the City have been nominated for official Scenic Highway status. The portions of State Route 30 (SR-30), south of the State Route 330 (SR-330), and State Route 330 that pass through the City are designated as Eligible Scenic Highways. The eligible portions of SR-30 and SR-330 are approximately 11.5 miles southeast of the project site and are not visible from the project site due to distance and intervening topography, development, and landscaping (Google Earth, 2024). Thus, the proposed project would not damage the integrity of existing visual resources or historic buildings located along a State Scenic Highway. No significant impact on scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a State Scenic Highway, would result. The project site is located in a previously developed, urbanized area, and contains no scenic resources. Due to the absence of on-site scenic resources, no impact would occur.

c) **Less Than Significant Impact.** The project site is located within the Riverside-San Bernardino urbanized area (USCB, 2012); therefore, the analysis of potential impacts to visual character considers whether the project design conflicts with applicable zoning and/or regulations governing scenic quality. Regulations governing scenic quality are established through the City's Municipal Code, and General Plan. The project has been designed to comply with all applicable provisions of the City's Municipal Code related to visual quality. The project also would be consistent with all policies related to scenic quality in the San Bernardino General Plan. Future grading of the site and construction of the single-family residences would result in short-term impacts to the existing visual character and quality of the area. Construction activities would require the use of equipment and storage of materials within the project site. However, construction activities are temporary and would not result in any permanent visual impact. Construction of the proposed buildings would alter the existing visual character of the site. Upon project completion, the proposed buildings would consist of 30 single-family residential units compliant with Residential Low (RL) development standards such as building heights and lot coverages. The project will not substantially degrade the surroundings, as the current residentially designated land is maintained in accordance with City standards. Therefore, visual impacts to existing visual character of the site are less than significant and no mitigation is required.

d) **Less Than Significant Impact.** Excessive or inappropriately directed lighting can adversely impact nighttime views by reducing the ability to see the night sky and stars. Glare can be caused from unshielded or misdirected lighting sources. Reflective surfaces (i.e., polished metal) can also cause glare. Impacts associated with glare range from simple nuisance to potentially dangerous situations (i.e., if glare is directed into the eyes of motorists).

There are lighting sources adjacent to this site, including freestanding street lights, light fixtures on buildings, and vehicle headlights. The City of San Bernardino has established standards for the design, placement, and operation of outdoor lighting within its Development Code. The Development Code identifies preferred lighting sources, intensities, and shielding requirements. These standards are imposed on all outdoor lighting sources and must be adhered to in order to obtain project approval. As shown on the Andresen Architecture, Inc. elevations in Appendix A, the exterior building materials proposed as part of the project primarily include concrete roof tiles, stucco, fiberglass shutters, painted metal garage doors, and window glass. These non-reflective building materials would not result in potential glare impacts within the project site or surrounding areas, and glare impacts would be less than significant. With adherence to the lighting standards established by the City and standard conditions of approval for Development Permit DP-P 23-01, potential impacts related to light and glare would be less than significant.

Mitigation Measures

No mitigation is necessary because Aesthetic impacts will be less than significant.

Level of Significance After Mitigation

Not Applicable.

4.2 – Agriculture and Forest Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the Project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				☑
b) Conflict with existing zoning for agricultural use, or a Williamson Act Contract?				☑

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code 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?				☑

Sources

Information used to prepare this section is from the following sources: California Department of Conservation, Farmland Mapping and Monitoring Program of the California Resources Agency and California Department of Conservation Division Of Land Resource Protection, State of California Williamson Act Contract Land Map, 2023.

Environmental Setting

The proposed project site is located in a suburban area surrounded by residential neighborhoods. According to the California Department of Conservation, *Farmland Mapping and Monitoring Program* Map, the site is designated as grazing land. The site is vacant disturbed land and is zoned for residential use in the City of San Bernardino. The General Plan Foundation Component designates the site as Single-Family Residential with a land use of Residential Low. The site is not under the Williamson Act Contract as shown on the 2023 Williamson Act Lands map for San Bernardino County.

Discussion

a) **No Impact.** The proposed project will be located in a developed urbanized area. The map of Important Farmland in California prepared by the Department of Conservation does not identify the project site as being Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. No Williamson Act contracts are active for the project site. The property is zoned Residential Low. Although the project site has existing vacant land, it is not under active cultivation and has not been cultivated for a number of years based on aerial mapping. The project site is currently designated as General Plan Foundation Component of Single-Family Residential with a land use of Residential Low. Therefore, because the site has not been designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, there is no impact from the project on these types of farmland.

b) **No Impact.** Currently, the General Plan Foundation Component is Single-Family Residential with a land use designation of Residential Low. There are other residential developments in the vicinity so the project would be compatible with the existing surroundings. The project will be developed consistent with the City Design Guidelines, so it will be aesthetically compatible with surrounding development and as stated above, the property is not subject to a Williamson Act contract. Therefore, there will be no impacts to existing land use compatibility and no mitigation is required

c) **No Impact.** Public Resources Code Section 12220(g) identifies forest land as *land that can support 10-percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.* The project site and surrounding properties are not currently being managed or used for forest land as identified in Public Resources Code Section 12220(g). The USDA Forest Service vegetation maps for the project site identify it as *urban* type, indicating that it is not capable of growing industrial wood tree species. The project site is surrounded by residential uses and an elementary school with no substantial vegetation onsite. Therefore, development of this project will have no impact to any timberland zoning.

d) **No Impact.** The project site is vacant; thus, there will be no loss of forest land or conversion of forest land to non-forest use as a result of this project. No impact will occur.

e) **No Impact.** The project site is a previously disturbed site within an urban environment. The project is surrounded by other residential uses and an elementary school. The project would not encroach onto agricultural land and would not encourage the conversion of existing farmland to non-agricultural uses. None of the surrounding sites contain existing forest uses. Development of this project will not change the existing environment in a manner that will result in the conversion of forest land to a non-forest use. No impact will occur.

Mitigation Measures

No mitigation measures are necessary because Agricultural and Forestry impacts will be less than significant.

Level of Significance After Mitigation

Not Applicable.

4.3 – 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 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?			☑	

Sources

Information used to prepare this section is from the following sources: City of San Bernardino Updated General Plan, 2005 and California Emissions Estimator Model version 2022.1.1.21.

Environmental Setting

Local jurisdictions, such as the City of San Bernardino, have the authority and responsibility to reduce air pollution through its police power and decision-making authority. Specifically, the City is responsible for the assessment and mitigation of air emissions resulting from its land use decisions. The City is also responsible for the implementation of transportation control measures as outlined in the 2022 Air Quality Management Plan (AQMP). Examples of such measures include bus turnouts, energy-efficient streetlights, and synchronized traffic signals. In accordance with CEQA requirements and the CEQA review process, the City assesses the air quality impacts of new development projects, requires mitigation of potentially significant air quality impacts by conditioning discretionary permits and monitors and enforces implementation of such mitigation. The City relies on the expertise of the South Coast Air Quality Management District (SCAQMD) and utilizes the SCAQMD CEQA Handbook as the guidance document for the environmental review of plans and development proposals within its jurisdiction.

Discussion

a) **Less Than Significant Impact.** The California Environmental Quality Act (CEQA) requires a discussion of any inconsistencies between a proposed project and applicable General Plans and Regional Plans (CEQA Guidelines Section 15125). The regional plan that applies to the proposed project includes the 2022 SCAQMD Air Quality Management Plan (AQMP). The Final 2022 AQMP was adopted by the South Coast AQMD Governing Board on December 2, 2022.

The purpose of this discussion is to set forth the issues regarding consistency with the assumptions and objectives of the AQMP and discuss whether the proposed project would interfere with the region’s ability to comply with Federal and State air quality standards. If the decision-makers determine that the proposed project is inconsistent, the lead agency may consider project modifications or inclusion of mitigation to eliminate the inconsistency. The SCAQMD CEQA Handbook states that "New or amended General Plan Elements (including land use zoning and density amendments), Specific Plans, and significant projects must be analyzed for consistency with the AQMP." Strict consistency with all aspects of the plan is usually not required. A proposed project should be considered to be consistent with the AQMP if it furthers one or more policies and does not obstruct other policies. The SCAQMD CEQA Handbook identifies two key indicators of consistency:

(1) Whether the project will result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP.

(2) Whether the project will exceed the assumptions in the AQMP in 2022 or increments based on the year of project buildout and phase.

Both of these criteria are evaluated in the following sections.

A. Criterion 1 - Increase in the Frequency or Severity of Violations

Based on the air quality modeling analysis, neither short-term construction, nor long-term operation of the proposed project will result in significant impacts based on the SCAQMD regional and local thresholds of significance. Therefore, the proposed project is not projected to contribute to the exceedance of any air pollutant concentration standards and is found to be consistent with the AQMP for the first criterion.

B. Criterion 2 - Exceed Assumptions in the AQMP?

Consistency with the AQMP assumptions is determined by performing an analysis of the proposed project with the assumptions in the AQMP. The emphasis of this criterion is to insure that the analyses conducted for the proposed project are based on the same forecasts as the AQMP. The Connect SoCal (2020-2045 Regional Transportation/Sustainable Communities Strategy), adopted by SCAG, September 2020, includes chapters on: the plan, SoCal today, a path to greater access, mobility & sustainability, paying our way forward, measuring our progress and looking. These chapters currently respond directly to federal and state requirements placed on SCAG. Local governments are required to use these as the basis of their plans for purposes of consistency with applicable regional plans under CEQA.

The project site is currently designated as Single-Family Residential in the City of San Bernardino General Plan Land Use Element Foundation Component with a land use designation of RL (Residential Low - 3.1 du/net ac) with a minimum average lot size of 10,800 square feet. The proposed project does not involve a General Plan Amendment or a Change of Zone. The proposed project is consistent with the development standards of the Residential Low designation and zoning classification. The proposed project is expected to result in increased operational emissions from mobile sources and energy sources, compared to the current use as vacant land. However, as shown in the regional analysis, the project is below the SCAQMD thresholds of significant for cumulative impacts. The project meets the goals of the Connect So Cal to adapt to a changing climate and support an integrated regional development pattern and transportation network and encourage development of diverse housing types in areas that are supported by multiple transportation options. The project will construct adjacent roadways to their ultimate half-width right-of-way and will benefit from regional/local transit opportunities. Based on the above, the proposed project will not result in an inconsistency with the SCAQMD AQMP. Therefore, a less than significant impact will occur.

b) **Less Than Significant Impact.** A project may have a significant impact if project related emissions would exceed federal, state, or regional standards or thresholds, or if project-related emissions would substantially contribute to existing or project air quality violations. The proposed project is located within the South Coast Air Basin, where efforts to attain state and federal air quality standards are governed by the South Coast Air Quality Management District (SCAQMD). Both the State of California (State) and the Federal government have established health-based ambient air quality standards (AAQS) for seven air pollutants (known as 'criteria pollutants'). These pollutants include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide

(SO_2), inhalable particulate matter with a diameter of 10 microns or less (PM_{10}), fine particulate matter with a diameter of 2.5 microns or less ($PM_{2.5}$), and lead (Pb). The State has also established AAQS for additional pollutants. The AAQS are designed to protect the health and welfare of the populace within a reasonable margin of safety. Where the state and federal standards differ, California AAQS are more stringent than the national AAQS.

Air pollution levels are measured at monitoring stations located throughout the air basin. Areas that are in nonattainment with respect to federal or state AAQS are required to prepare plans and implement measures that will bring the region into attainment. Table 4.3-1 (South Coast Air Basin Attainment Status) summarizes the attainment status in the project area for the criteria pollutants. Discussion of potential impacts related to short-term construction impacts and long-term area source and operational impacts are presented below.

Table 4.3-1
South Coast Air Basin Attainment Status

Pollutant	State Status[1]	National Status[2]
Ozone	Nonattainment	Nonattainment
Carbon monoxide	Attainment	Attainment
Nitrogen dioxide	Attainment	Unclassified/Attainment
Sulfur dioxide	Attainment	Attainment
PM_{10}	Nonattainment	Nonattainment
$PM_{2.5}$	Unclassified	Attainment

Notes:

[1] Source of State status: California Air Resources Board June 2013.

[2] Source of National status: http://www3.epa.gov/airquality/greenbook/ca25_2012.html.

Emissions

Construction Emissions

The California Emissions Estimator Model (CalEEMod) version 2022.1.1.21 was utilized to estimate emissions from the proposed construction activities. This model was prepared by SCAQMD for use on projects occurring within the South Coast Air Basin and has been adopted by several other air districts within California. The model includes many default values which can be overridden to include site-specific data by the modeler, which requires appropriate documentation of the source. The model estimates the daily emissions for criteria pollutants and GHGs and has allowances for mitigation measures to be applied, if required.

The project inputs for the model were estimated based on site drawings and project descriptions provided by S.D. Engineering and Associates for the original application consisting of 32 residential lots. Through the City's review process the number of residential lots was reduced to 30. It should be noted that the original modeling assumed project construction starting in November 2024 and lasting 18-months and would be operational in 2026; while the construction details stay the same, the latest project update has changed the construction to start in 2025 and be operational in 2027. However, remodeling is not required as the original modeling results represent a conservative analysis; because construction and operational emission rates are lower in future years as technology advances, resulting in lower emissions. Assumptions are documented in the model output and are discussed in the next section.

Table 4.3-2 *Construction-Related Criteria Pollutants* shows that none of the analyzed criteria pollutants would exceed the regional emissions thresholds. Furthermore, minimum requirements for SCAQMD's Rule 403 include the application of the best available dust control measures to be used for all grading operations and include the application of water or other soil stabilizers in sufficient quantity to prevent the generation of visible dust plumes. Implementation of best available dust control measures were assumed in the model to include watering of the site's exposed area two times per day, which significantly reduced PM_{10} and $PM_{2.5}$ construction emissions. Therefore, none of SCAQMD's thresholds would be exceeded during grading and construction after dust control measures and typical BMPs for the control of emissions are implemented. Because the model assumed compliance with SCAQMD Rules for the control of criteria pollutants, Conditions of Approval for the project will include compliance with SCAQMD's Rule 403 as a general condition.

Table 4.3-2

Construction-Related Criteria Pollutants

Time Period	Pollutant Emissions (pounds/day)					
	ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
Summer- Daily (unmitigated)	30.8	10.6	14.0	0.02	0.61	0.44
Winter- Daily (unmitigated)	3.73	36.1	34.0	0.05	21.5	11.6
SCAQMD Thresholds	**75**	**100**	**550**	**150**	**150**	**55**
Exceeds Thresholds	**no**	**no**	**no**	**no**	**no**	**no**

Source: CalEEMod version 2022.1.1.21

Notes:

1. On-site emissions from equipment operated on-site that is not operated on public roads.
2. Off-site emissions from equipment operated on public roads.
3. Construction, paving and painting phases may overlap.

The project will not 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. Therefore, construction emissions will be a less than significant impact.

Operational Emissions

The emission rates for summer and winter from the CalEEMod model were used to determine operational emissions generated from the project and are shown in Table 4.3-3, *Operational Regional Criteria Air Pollutant Emissions*.

Table 4.3-3

Operational Regional Pollutant Emissions

Activity	Pollutant Emissions (pounds/day)					
	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$
Summer						
Area Sources	2.43	0.02	1.81	0.00	0.00	0.00
Energy Usage	0.01	0.25	0.11	0.00	0.02	0.02
Mobile Sources	1.17	1.07	10.2	0.03	2.21	0.57
Total Summer Emissions	**3.61**	**1.34**	**12.12**	**0.03**	**2.23**	**0.59**
Winter						

Area Sources	2.27	0.00	0.00	0.00	0.00	0.00
Energy Usage	0.01	0.25	0.11	0.00	0.02	0.02
Mobile Sources	1.09	1.15	8.56	0.02	2.21	0.57
Total Winter Emissions	**3.37**	**1.40**	**8.67**	**0.02**	**2.23**	**0.59**
SCAQMD Thresholds	**55**	**55**	**550**	**150**	**150**	**55**
Exceeds Thresholds	**no**	**no**	**no**	**no**	**no**	**no**

Source: CalEEMod version 2022.1.1.21
Notes:

1. Area sources consist of emissions from consumer products, architectural coatings, and landscaping equipment.
2. Energy usage consists of emissions from generation of electricity and on-site non-hearth natural gas usage.
3. Mobile sources consist of emissions from vehicles and road dust.

As shown in Table 4.3-3, none of the emissions thresholds are exceeded during the operation of the project. Therefore, Air Quality impacts associated with project operation would be less than significant.

Compliance with SCAQMD Rules 402 and 403

The Permittee/Owner would be required to comply with all applicable SCAQMD rules and regulations as the SCAB is in non-attainment status for ozone and suspended particulates (PM_{10} and $PM_{2.5}$). The Permittee/Owner would be required to comply with Rule 402 nuisance, and Rule 403 fugitive dust, which require the implementation of Best Available Control Measures (BACMs) for each fugitive dust source, and the AQMP, which identifies Best Available Control Technologies (BACTs) for area sources and point sources. The BACMs and BACTs would include, but not be limited to the following:

1. The Permittee/Owner shall ensure that any portion of the site to be graded shall be pre-watered prior to the onset of grading activities.
2. The Permittee/Owner shall ensure that watering of the site or other soil stabilization method shall be employed on an on-going basis after the initiation of any grading activity on the site. Portions of the site that are actively being graded shall be watered regularly (2x daily) to ensure that a crust is formed on the ground surface and shall be watered at the end of each workday.
3. The Permittee/Owner shall ensure that all disturbed areas are treated to prevent erosion until the site is constructed upon.
4. The Permittee/Owner shall ensure that landscaped areas are installed as soon as possible to reduce the potential for wind erosion.
5. The Permittee/Owner shall ensure that all grading activities are suspended during first and second stage ozone episodes or when winds exceed 25 miles per hour.

During construction, exhaust emissions from construction vehicles and equipment and fugitive dust generated by equipment traveling over exposed surfaces, would increase NO_X and PM_{10} levels in the area. Although the proposed project does not exceed SCAQMD thresholds during construction, the Applicant/Contractor would be required to implement the following conditions as required by SCAQMD:

1. To reduce emissions, all equipment used in grading and construction must be tuned and maintained to the manufacturer's specification to maximize efficient burning of vehicle fuel.

2. The Permittee/Owner shall ensure that existing power sources are utilized where feasible via temporary power poles to avoid on-site power generation during construction.
3. The Permittee/Owner shall ensure that construction personnel are informed of ride sharing and transit opportunities.
4. All buildings on the project site shall conform to energy use guidelines in Title 24 of the California Administrative Code.
5. The operator shall maintain and effectively utilize and schedule on-site equipment in order to minimize exhaust emissions from truck idling.
6. The operator shall comply with all existing and future California Air Resources Board (CARB) and SCAQMD regulations related to diesel-fueled trucks, which may include among others: (1) meeting more stringent emission standards; (2) retrofitting existing engines with particulate traps; (3) use of low sulfur fuel; and (4) use of alternative fuels or equipment.

c) **Less Than Significant Impact.** Sensitive receptors are those segments of the population that are most susceptible to poor air quality such as children, the elderly, the sick, and athletes who perform outdoors. Land uses associated with sensitive receptors include residences, schools, playgrounds, childcare centers, outdoor athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. The nearest land uses that considered *sensitive receptors* are the residential dwelling units located adjacent to the project site and the North Verdemont Elementary School located to the southwest.

The greatest potential for toxic air contaminant emissions would be related to diesel particulate emissions associated with heavy equipment operations during construction of the proposed project. According to SCAQMD's methodology, health effects from carcinogenic air toxics are usually described in terms of "individual cancer risk". "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of toxic air contaminants over a 70-year lifetime will contract cancer, based on the use of standard risk-assessment methodology. Given the relatively limited number of heavy-duty construction equipment and the short-term construction schedule, the proposed project would not result in a long-term (i.e., 70 years) substantial source of toxic air contaminant emissions and corresponding individual cancer risk. No significant short-term toxic air contaminant impacts would occur during construction of the proposed project.

The proposed residential subdivision and development will not generate toxic pollutant emissions because the proposed residential use is characterized as typical residential uses that do not produce such emissions. The Planning staff determined that potential impacts are within generally acceptable levels for short-term construction activities. The proposed residential development, therefore, would have a less than significant impact on sensitive receptors relating to toxic pollutant emissions.

A carbon monoxide (CO) hotspot is an area of localized CO pollution that is caused by severe vehicle congestion on major roadways, typically near intersections. CO hotspots have the potential for violation of state and federal CO standards at study area intersections, even if the broader Basin is in attainment for federal and state levels. In general, SCAQMD and the California Department of Transportation Project-Level Carbon Monoxide Protocol (CO Protocol) recommend analyzing CO hotspots when a project has the potential to result in higher CO concentrations within the region and increase traffic congestion at an intersection operating at level of service (LOS) D or worse by more than two percent. There has been a decline in CO emissions over the past two decades even though vehicle miles traveled (VMT) on U.S. urban and rural roads have increased. Three major control programs have contributed to the reduced per vehicle CO emissions: exhaust standards, cleaner burning fuels, and motor vehicle inspection/maintenance programs. There are no designated CO hotspots in the immediate vicinity of the project. Impacts related to CO hotspots will be less than significant.

d) **Less Than Significant Impact.** According to the CEQA Air Quality Handbook, land uses associated with odor complaints include agricultural operations, wastewater treatment plants, landfills, and certain industrial operations (such as manufacturing uses that produce chemicals, paper, etc.). Odors are typically associated with industrial projects involving the use of chemicals, solvents, petroleum products, and other strong-smelling elements used in manufacturing processes, as well as sewage treatment facilities and landfills. The proposed residential subdivision and development does not include any of the above noted uses or process. The short-term construction sources may emit odors including the application of materials such as asphalt pavement, paints, and solvents and emissions from diesel equipment. However, SCAQMD Rule 1108 limits the amount of volatile organic compounds from asphalt paving; mandatory compliance with SCAQMD rules would ensure that no construction activities or materials would be included that would create a significant level of objectionable odors. Standard construction requirements would minimize odor impacts resulting from construction activity. It should be noted that any construction odor emissions generated would be temporary, short-term, and intermittent in nature and would cease upon completion of the respective phase of construction activity. It is expected that project-generated refuse would be stored in covered containers and removed at regular intervals in compliance with the City of San Bernardino’s solid waste regulations. The project would be also required to comply with SCAQMD Rule 402 to prevent occurrences of public nuisances. Therefore, no significant adverse impacts are identified or are anticipated, and no mitigation measures are required.

Mitigation Measures

No mitigation measures are necessary because Air Quality impacts will be less than significant with standard conditions applied.

Level of Significance After Mitigation

Not Applicable.

4.4 – 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, and 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?				☑

Sources

Information used to prepare this section is from the following sources: USGS San Bernardino North, California Quadrangle (2016); United States Fish and Wildlife Service, National Wetlands Inventory, Wetlands Mapper; US Fish & Wildlife Services, Environmental Conservation Online System; California Department of Fish and Wildlife, California Regional Conservation Plans Map; and City of San Bernardino General Plan, 2005.

Environmental Setting

Residential dwellings are located immediately adjacent to the site to the north, south, east and west. North Verdemont Elementary School is located to the southwest. The USGS San Bernardino North, California Quadrangle (2016) does not show any blue-line channels or other water features within the boundaries of the parcel. There is no wetland or riparian habitat on site. There are no drainages or evidence of water flow.

Discussion

a) **Less than Significant Impact.** The property is occupied by ruderal vegetation. Patches of bare ground occur at scattered locations throughout the site but are most common in high-use areas. Other bare areas are present mainly because of off-road trespassing and foot traffic. No water sources are found on the property that would be used by amphibians, and the relative lack of ground cover, rocks or shrub makes the site unsuitable for most reptile species. There is no habitat for sensitive plants, fish, amphibians, reptiles or mammals that were listed as potentially present in the vicinity of the property. Due to the developed and disturbed nature of the project area, the potential for the presence of special-status species is very low. Development activities are expected to result in the removal of all vegetation on the site; however, cumulative impacts to the general biological resources (plants and animals) are expected to be negligible. This assumption is based on the fact the site shows a significant level of past and ongoing disturbance, and the presence of a disturbed grassland community that supports only a few plant species. In addition, impacts to wildlife species are expected to be negligible. Development activities are not expected to have any impact on any State or Federal listed or State special status plant or animal species. If any sensitive species are observed on the property during future activities, CDFW and USFWS (as applicable) will be contacted to discuss specific mitigation measures which may be required for the individual species. CDFW and USFWS are the only agencies which can grant authorization for the "take" of any special status species, and can approve the implementation of any applicable mitigation measures. The proposed project would, therefore, not have a substantial adverse effect on any species identified as a candidate, sensitive, or special-status species in local or regional plans or by the California Department of Fish and Wildlife (CDFW) or U.S. Fish and Wildlife Service (USFWS). Considering the lack of habitat on the property, less than significant impact to wildlife species of concern will occur.

b) **No Impact.** The project site is located on land that has been previously disturbed in a primarily residential portion of the City. The site has very limited vegetation. There is no riparian habitat onsite. The USGS San Bernardino North, California Quadrangle (2016) does not show any blue-line channels or other water features within the boundaries of the parcels or in the immediate area. As such, no impact to riparian habitat or other sensitive natural habitat would occur.

c) **No Impact.** According to the federal National Wetlands Inventory, the project site does not contain any wetlands; furthermore, the proposed project would not disturb any offsite wetlands as no wetlands are adjacent to the project site. There is no vegetation or on-site water features indicative of potential wetlands. No impact will occur.

d) **No Impact.** The project site is currently vacant and is surrounded by existing residential development, preventing the use of the project site and surrounding area as a wildlife corridor. The project site contains very limited non-native vegetation, in the context of a completely urbanized setting located in the City of San Bernardino. There are no substantial vegetated areas or waterbodies located on-site. The project site does not provide for the movement of any native resident or migratory fish or wildlife. No impact will occur.

e) **Less Than Significant Impact.** The City has a tree removal policy that states that if more than five trees are to be removed, a tree removal permit application must be submitted to and approved by the City. The project will not remove any trees during site preparation activities. Therefore, the project would have less than significant impacts related to this topic, and no mitigation is required.

f) **No Impact.** The proposed project would not conflict with the provisions of an adopted Habitat Conservation Plan because neither the City of San Bernardino nor the County of San Bernardino have adopted Habitat Conservation Plan areas in the vicinity of the site according to the US Fish & Wildlife Services, Environmental Conservation Online System (ECOS) mapping or any Natural Community Conservation Plan areas apply to the project site according to the California Department of Fish and Wildlife, California Regional Conservation Plans Map. Therefore, implementation of the proposed project would have no adverse impact. No impact would occur.

Mitigation Measures

No mitigation measures are necessary because Biological Resource impacts will be less than significant.

Level of Significance After Mitigation

Not Applicable.

4.5 – 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 pursuant to § 15064.5?		☑		
c) Disturb any human remains, including those interred outside of formal cemeteries?		☑		

Sources

Information used to prepare this section is from the following sources: City of San Bernardino Updated General Plan, 2005; and email dated June 12, 2023 from Ryan Nordness, Cultural Resource Analyst, Yuhaaviatam of San Manuel Nation.

Environmental Setting

The proposed project site is located in a suburban area surrounded by residential neighborhoods and the North Verdemont Elementary School. The site is vacant disturbed land and is zoned for residential use in the City of San Bernardino.

Discussion

a) **Less Than Significant Impact.** Much of the land around the project location has been developed into suburban residential tracts, but the project area itself has remained undeveloped to the present time. The project site is accessible by existing paved roadways, N. Meyers Road, W. Ohio Avenue, and N. Magnolia Avenue. There are no buildings or features on site that would meet any of the criteria for listing in the California Register of Historical Resources and thus the site does not qualify of a "historical resource," as defined by CEQA and the associated regulations. Therefore, the development of the project site into a residential development would have no impact on historic resources and no mitigation is required.

b) **Less Than Significant Impact with Mitigation Incorporated.** The property is a previously disturbed site in an urbanized area. No buildings, structures, objects, sites, features, or artifacts of prehistoric or historical origin are known within or adjacent to the project area. No known archaeological sites are documented.

The Yuhaaviatam of San Manuel Nation Cultural Resources Department (YSMN) has commented that the proposed project area exists within Serrano ancestral territory and, therefore, is of interest to the Tribe. They noted that due to the nature and location of the proposed project, and given the CRM Department's present state of knowledge, YSMN does not have any concerns with the project's implementation, as planned, at this time.

In accordance with standard City procedures, a halt-work condition would be in place in the unlikely event that archaeological resources are discovered during construction. The contractor would be required to halt work in the immediate area of the find and to retain a professional archaeologist to examine the materials to determine whether they are a "unique archaeological resource" as defined in Section 21083.2(g) of the State CEQA Statutes. If this determination is positive, the scientifically consequential information must be fully recovered by the archaeologist consistent with standard City protocol. However, if during grading, any archaeological resources are uncovered Mitigation Measures CR-1 and CR-2 will be implemented. See Mitigation Measures section below for the list of actions. Implementation of the Mitigation Measures CR-1 and CR-2 would reduce impacts to archaeological resources to a less than significant level.

c) **Less Than Significant Impact with Mitigation Incorporated.** It is unlikely that human remains could be uncovered during grading operations, considering that the project site was previously disturbed during past agricultural operations. Nonetheless, should suspected human remains be encountered, the contractor would be required to notify the County Coroner in accordance with Section 7050.5 of the California Health and Safety Code, who must then determine whether the remains are of forensic interest. If the Coroner, with the aid of a supervising archaeologist, determines that the remains are or appear to be of a Native American, he/she would be required to contact the Native American Heritage Commission for further investigations and proper recovery of such remains, if necessary. Through this existing regulatory procedure, impacts to human remains would be avoided. Mitigation Measure CR-3 shall be implemented to ensure that impacts in regard to disturbance of human remains are reduced to less than significant. See Mitigation Measure section below for the action.

Mitigation Measures

YSMN requests that the following language be made a part of the project/permit/plan conditions:

CR-1: In the event that cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. Additionally, the Yuhaaviatam of San Manuel Nation Cultural Resources Department shall be contacted regarding any pre-contact and/or historic-era finds and be provided information after the archaeologist makes his/her initial assessment of the nature of the find, so as to provide Tribal input with regards to significance and treatment.

CR-2: If significant pre-contact and/or historic-era cultural resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, the archaeologist shall develop a Monitoring and Treatment Plan, the drafts of which shall be provided to the Yuhaaviatam of San Manuel Nation for review and comment. The archaeologist shall monitor the remainder of the project and implement the Plan accordingly.

CR-3: If human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5 and that code enforced for the duration of the project.

Level of Significance After Mitigation

Less than significant.

4.6 – 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?			☑	

Sources

Information used to prepare this section is from the following sources: City of San Bernardino Updated General Plan, 2005; California Energy Commission (CEC) website; California Energy Commission, 2022 Building Energy Efficiency Standards for Residential and Nonresidential Buildings; California Air Resources Board (CARB), Airborne Toxic Control Measures; California Energy Commission (CEC), 2021 Total System Electric Generation; California Energy Commission, Diesel Fuel Data, Facts, and Statistics; U.S Energy Information Administration, Natural Gas Consumption by End Use (Million Cubic Feet); and California Emissions Estimator Model version 2022.1.1.21.

Environmental Setting

Energy resources include electricity, natural gas and other fuels. The production of electricity requires the consumption or conversion of energy resources, including water, wind, oil, gas, coal, solar, geothermal, and nuclear resources, into energy. Energy production and energy use both result in the depletion of nonrenewable resources (e.g., oil, natural gas, coal, etc.) and emission of pollutants. Energy usage is typically quantified using the British Thermal Unit (BTU). The BTU is the amount of energy that is required to raise the temperature of one pound of water by one degree Fahrenheit. As points of reference, the approximate amount of energy contained in a gallon of gasoline, 100 cubic feet (one therm) of natural gas, and a kilowatt hour of electricity are 123,000 BTUs, 100,000 BTUs, and 3,400 BTUs, respectively.

Existing Electricity Consumption

Southern California Edison is the service provider for electric. The electricity generated is distributed through a network of transmission and distribution lines commonly called a power grid. Conveyance of electricity through transmission lines is typically responsive to market demands. The delivery of electricity involves a number of system components, including substations and transformers that lower transmission line power (voltage) to a level appropriate for on-site distribution and use. The site will be served via an underground electrical distribution system. According to the California Energy Commission (CEC), total system electric generation for California in 2022 was 287,220 gigawatt-hours (GWh). California's renewable and non-GHG (nuclear and large hydroelectric) resources accounted for 54.2 percent of total generation in 2022. California's electricity imports were 83,960 GWh accounting for 29.2 percent of the total system electric generation in 2022.

Existing Natural Gas Consumption

Southern California Gas Company (SoCalGas) is responsible for providing natural gas supply to the City and is regulated by the California Public Utilities Commission and other state agencies. There are gas lines serving the project site within West Belmont Avenue. Natural gas is a combustible mixture of simple hydrocarbon compounds (primarily methane) that is used as a fuel source. Natural gas consumed in California is obtained from naturally occurring reservoirs and delivered through high-pressure transmission pipelines. The natural gas transportation system is a nationwide network. Natural gas is used in electricity generation, space heating, cooking, water heating, industrial processes, and as a transportation fuel. Natural gas is measured in terms of cubic feet. According to the CEC, nearly 45 percent of the natural gas burned in California was used for electricity generation, with the remainder consumed in the residential (21 percent), industrial (25 percent), and commercial (9 percent) sectors. In 2022, total natural gas demand in California for residential uses was 432,636 million cubic feet.

Existing Transportation Energy

According to the California Energy Commission, transportation accounts for a major portion of California's overall energy consumption and has a significant impact on air quality. It is also the single largest source of the state's greenhouse gas emissions. Since 1975, the California Energy Commission has promoted a secure, affordable, reliable, and environmentally sound transportation energy infrastructure by ensuring that the supply, production, distribution, and price of petroleum fuels and other blending components are available to meet demand; and viable alternative, low-carbon, and renewable fuel options exist. The proposed residential subdivision and future housing generates transportation energy demand from vehicles traveling to and from the site. Transportation fuels, primarily gasoline and diesel, would be provided by local or regional suppliers, vendors, and residents. Californians consumed 13.82 billion gallons of finished gasoline in 2021, or 38 million gallons per day. Diesel fuel is the second largest transportation fuel used in California, representing 17 percent of total fuel sales behind gasoline. According to the California State Board of Equalization, in 2022, 3.6 billion gallons of diesel (including offroad diesel) was sold.

Discussion

a) **Less Than Significant Impact.** The subdivision and housing project would be constructed in a single phase with overlapping development activities. Building construction could commence as early as 2025, pending permits for housing plans, with full buildout and occupancy of the project anticipated by 2027.

Electricity Consumption

Based on the air quality modeling, the proposed project has an average annual electricity demand of approximately 243,508 kilowatt hour (kWh) per year. Electrical power would be consumed to construct the project. The demand would be supplied from existing electrical services adjacent to the project site and local extensions. Construction of the proposed project would require the use of construction equipment for grading, hauling, and building activities. Equipment proposed for these types of activities during construction would vary during different phases of construction—the majority of construction equipment during grading would be gas powered or diesel powered, and the later construction phases would require electricity-powered equipment, such as interior construction and architectural coatings. Construction also includes the vehicles of construction workers traveling to and from the project site and haul trucks for the export of materials from site clearing and the export and import of soil for grading. Since the project site area is already served by onsite electrical infrastructure by SCE, adequate infrastructure capacity is available to accommodate the electricity demand for construction activities and would not require expanded infrastructure. The construction contractors are also anticipated to minimize idling of construction equipment during construction and reduce construction waste by recycling. These required practices would limit wasteful and unnecessary electrical energy consumption. Furthermore, there are no unusual project characteristics that would necessitate the use of construction equipment that would be less energy efficient than at comparable construction sites in other parts of the state. Therefore, the proposed short-term construction activities would not result in inefficient, wasteful, or unnecessary fuel consumption and impacts on electricity supply and infrastructure associated with short-term construction activities would be less than significant.

Natural Gas Consumption

Based on the air quality modeling, the proposed project has an average annual natural gas demand of 1,001,271 thousand British thermal units (kBTU) per year. Southern California Gas Company (SCGC) provides natural gas service for residential, commercial, and industrial uses. SCGC purchases natural gas from several bordering states. Most of the major natural gas transmission pipelines within the City are owned and operated by SCGC. The CPUC regulates SCGC, who is the default provider required by state law, for natural gas delivery to the City. SCGC has the capacity and resources to deliver gas except in certain situations that are noted in state law. As development occurs, SCGC will continue to extend its service to accommodate development and supply the necessary gas lines. SCGC does not base its service levels on the demands of the City; rather, it makes periodic upgrades to provide service for particular projects and new development. SCGC is continuously expanding its network of gas pipelines to meet the needs of new commercial and residential developments in Southern California. SCGC can provide additional connections if necessary once utility plans are finalized for the proposed project. Impacts to natural gas services would be less than significant and would not result in inefficient, wasteful, or unnecessary natural gas consumption. Natural gas is not expected to be consumed in any substantial quantities during construction of the project or during operation of the proposed project including the appliance packages for the residences. Therefore, project impacts on energy and gas associated with construction activities would be less than significant.

Transportation Energy

Site preparation, grading, paving, and building construction would consume energy in the form of gasoline and diesel fuel through the operation of heavy off-road equipment, trucks, and worker traffic. Consumption of such resources would be temporary and would cease upon the completion of construction. Due to the limited scale of the proposed project and the provision to limit idling, construction activities would not result in inefficient energy consumption during construction. As such, construction-related energy impacts would be less than significant. Operation long-term operational energy use associated with the project includes electricity and natural gas consumption associated with the new buildings (e.g., lighting, electronics, heating, air conditioning, refrigeration), energy consumption related to water usage and solid waste disposal, and fuel consumption (gasoline and diesel) by vehicles associated with the project through the generation of new vehicle trips. The California Emissions Estimator Model (CalEEMod) version 2022.1.1.21 was used to estimate energy use at project operation based on the original 32 residential lots. At operation, the proposed project would result in the consumption of approximately 243,508 kWh of electricity per year. At operation, the proposed project would result in the consumption of approximately 1,001,271 kBTU of natural gas per year. At operation, the proposed project would result in the consumption of petroleum-and diesel fuel related to vehicular travel quantified as vehicle miles traveled (VMT) to and from the project site with the projected annual estimate of 1,103,877 VMT (unmitigated) for the project. Californians consumed 13.82 billion gallons of finished gasoline in 2021, or 38 million gallons per day. Diesel fuel is the second largest transportation fuel used in California, representing 17 percent of total fuel sales behind gasoline. According to the California State Board of Equalization, in 2022, 3.6 billion gallons of diesel (including offroad diesel) was sold. The project's consumption of gasoline and diesel would represent an insignificant fraction of statewide consumption. Therefore, the project would not result in the wasteful, inefficient, and unnecessary consumption of petroleum-based fuel during project operation. As such, operational-related energy impacts related to the consumption of petroleum-based fuel would be less than significant.

The project would also result in energy consumption for the provision of potable water to the residences through supply, treatment, and distribution. The project would comply with the Green Code, which includes standards to reduce potable water demand for both indoor and outdoor use. By limiting water demand on-site through efficient irrigation of landscaping and water-efficient fixtures and appliances indoors, the wasteful or inefficient use of water would be reduced. Therefore, energy consumption associated with water use would be minimized. The greenhouse gas emissions analysis described in Section 4.8 Greenhouse Gas Emissions shows that the project's total emissions from all energy use, including solid waste management and water conveyance, will not exceed the SCAQMD threshold. The GHG analysis concludes that the project's emissions will be below the established threshold, which supports a conclusion that the project's use of energy will not be wasteful or inefficient. The proposed project will also be required to comply with Title 24 standards to improve energy efficiency of the residential structures. The proposed housing will conform to San Bernardino's Development Code which specifies lighting standards for all new exterior lighting, such as the requirement that outdoor lighting fixtures utilize energy-efficient fixtures and lamps. The housing development will also conform to landscaping plant materials being selected for energy efficiency and drought tolerance, and that the landscape plan be designed to minimize energy demand. As such, the proposed project would not result in the wasteful, inefficient, and unnecessary consumption of electricity and natural gas during project operation. Therefore, operational-related energy impacts related to electricity and natural gas would be less than significant. In conclusion, energy would be consumed through daily activities the proposed buildings, the delivery of water for potable and irrigation purposes, solid waste management, and daily vehicle use. While the long-term operation of the project would result in an increase in energy consumption compared to existing conditions, the project will incorporate design measures (related to electricity, natural gas and water use) in compliance with Title 24, the Updated General Plan, and Development Code to minimize energy consumption. As such, the project would promote energy efficiency. Therefore, operation of the proposed project would not result in the wasteful, inefficient, and unnecessary consumption of energy.

b) **Less Than Significant Impact.** The project would be designed in a manner that is consistent with relevant energy conservation plans designed to encourage development that results in the efficient use of energy resources. The project would comply with the San Bernardino Green Building Code to reduce energy consumption by implementing energy efficient building designs, reducing indoor and outdoor water demand, and installing energy-efficient appliances and equipment. These measures are consistent with the City's sustainability and smart-growth goals of improving energy and water efficiency in buildings, decreasing per-capita water use, using energy efficient appliances and equipment, and creating a more livable city. When implemented, the planned City actions may further decrease energy consumption from the project. These actions are not under the control of the project; however, they would nonetheless further reduce project-related energy use from nonrenewable sources.

The housing project would also implement features that would result in energy reductions beyond those specified by regulation by incorporating energy efficient design features. The project would incorporate water conservation, energy conservation, tree-planting, and other features for energy conservation. Therefore, the project would be consistent with the City's applicable plans for conserving energy and impacts would be less than significant.

The project would utilize construction contractors who demonstrate compliance with applicable CARB regulations restricting the idling of heavy-duty diesel motor vehicles and governing the accelerated retrofitting, repowering, or replacement of heavy duty diesel on- and off-road equipment. CARB has adopted an Airborne Toxic Control Measure to limit heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel particulate matter and other toxic air contaminants. The measure prohibits diesel-fueled commercial vehicles greater than 10,000 pounds from idling for more than 5 minutes at any given time. While intended to reduce construction emissions, compliance with the above anti-idling and emissions regulations would also result in energy savings from the use of more fuel efficient engines. According to the CARB staff report that was prepared at the time the anti-idling Airborne Toxic Control Measure was being proposed for adoption in late 2004/early 2005, the regulation was estimated to reduce non-essential idling and associated emissions of diesel particulate matter and nitrogen oxide (NOX) emissions by 64 and 78 percent respectively in analysis year 2009. These reductions in emissions are directly attributable to overall reduced idling times and the resultant reduced fuel consumption.

CARB has also adopted emission standards for off-road diesel construction equipment of greater than 25 hp. The emissions standards are referred to as "tiers" with Tier 4 being the most stringent (i.e., less polluting). The requirements are phased in, with full implementation for large and medium fleets by 2023 and for small fleets by 2028. Field testing from construction equipment manufacturers has shown that higher tier equipment results in lower fuel consumption. For example, Tier 4 interim engines have shown a 5 percent reduced fuel consumption compared to a Tier 3 engine. Similar reductions in fuel consumption have been shown for Tier 3 engines compared to a Tier 2 engine.

The daily operation of the project would generate demand for electricity, natural gas, and water supply, as well as generating wastewater requiring conveyance, treatment and disposal off-site and municipal solid waste requiring collection and transport off-site. The project would comply with the applicable provisions of Title 24 and the Green Code in effect at the time of building permit issuance. The 2022 Building Energy Efficiency Standards focused on several key areas to improve the energy efficiency of newly constructed buildings. As part of the latest Code updates, the 2022 Energy Code encourages efficient electric heat pumps, establishes electric-ready requirements for new homes, expands solar photovoltaic and battery storage standards, and strengthens ventilation standards. The housing project would be designed to include numerous energy and waste reduction features that would allow the project to comply with the Title 24 standards. Therefore, construction and operation of the project would be consistent with State and federal energy standards and would be designed to include numerous energy and waste saving features as well as waste reduction features. The project would also be sited in a transportation-efficient location and achieve reductions in VMT from private automobiles traveling to and from the site consistent with the 2022 Connect SoCal strategies. As a result, impacts would be less than significant.

Mitigation Measures

With the compliance with existing regulations, the project would not result in significant impacts associated with Energy.

Level of Significance After Mitigation

Not Applicable.

4.7 – 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 substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.			☑	
ii) Strong seismic ground shaking?			☑	
iii) Seismic-related ground failure, including liquefaction?			☑	
iv) Landslides?				☑
b) Result in substantial soil erosion or the loss of topsoil?			☑	
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?			☑	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?				☑

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?				☑
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		☑		

Sources

Information used to prepare this section is from the following sources: City of San Bernardino General Plan, 2005, Chapter 10 Safety; GeoTek, Inc., Geotechnical Investigation Proposed Single-Family Residential Development, Tentative Tract Map No. 20539, West Meyers Road and Magnolia Avenue, San Bernardino, San Bernardino County, California dated May 24, 2022; and UC Davis Soil Resource Laboratory, SoilWeb.

Environmental Setting

The subject property is situated in the Peninsular Ranges geomorphic province. The Peninsular Ranges province is one of the largest geomorphic units in western North America. It extends approximately 975 miles south of the Transverse Ranges geomorphic province to the tip of Baja California. This province varies in width from about 30 to 100 miles. It is bounded on the west by the Pacific Ocean, on the south by the Gulf of California and on the east by the Colorado Desert Province. The Peninsular Ranges are essentially a series of northwest-southeast oriented fault blocks. Several major fault zones are found in this province. The Elsinore Fault zone and the San Jacinto Fault zone trend northwest-southeast and are found near the middle of the province. The San Andreas Fault zone borders the northeasterly margin of the province. More specific to the subject property, the site is located in an area geologically mapped to be underlain by alluvial fan deposits according to the Geotechnical Investigation.

The elevations range from 1,866 feet to 1,922 feet above mean sea level. Topographically, the site slopes gently downward to the south at an approximate five percent gradient with approximately 45 feet of elevation differential across the site. Site drainage is predominately by sheet flow to the south. A shallow drainage course trends approximately east-west through the central portion of the site. Local development adjacent to the site is residential and an elementary school to the southwest. The property is currently undeveloped open land with non-native vegetation.

Discussion

a.i) **Less Than Significant Impact.** The geologic structure of the entire California area is dominated mainly by northwest-trending faults associated with the San Andreas system. The site is in a seismically active region. However, the site is not situated within a State of California designated "Alquist-Priolo" Earthquake Fault Zone or a County of San Bernardino Designated Fault Zone. The subject property is not located within a State of California Seismic Hazard Zone for earthquake-induced landsliding. The nearest zoned fault is the San Andreas fault, located approximately 0.5-mile northeast of the site.

Risks associated with surface rupture are low and there is no impact expected. However, because the project site is located in the seismically active Southern California, all habitable structures including single family homes must be built to seismic standards established in the California Building Code (CBC). The CBC sets the standards in the State for the development of all buildings including residential buildings and sets requirements for structural design, plumbing and mechanical fixtures, fire and smoke protection, construction materials, interior finishes, and any other elements that make up construction of habitable structures. The City's Building and Safety Department is responsible for implementing not only the CBC but any additional code requirements that the City may have. Adherence to all code requirements for the construction of the 30 houses will ensure that impacts associated with seismic activity are less than significant and no additional mitigation is required.

a.ii) **Less Than Significant Impact.** Although there are no known active surface faults within or adjacent to the site that will significantly impact the project, the project is located in a region with active earthquakes and strong seismic motion of those earthquakes could affect the project. The residential structures that will be constructed on the site will be required to meet and comply with all applicable city and State building codes to reduce seismic ground shaking at the site to less-than-significant.

a.iii) **Less Than Significant Impact.** Liquefaction is a mode of ground failure that results from the generation of high pore water pressures during earthquake ground shaking, causing loss of shear strength. Liquefaction is typically a hazard where loose sandy soils exist below groundwater. The California Geological Survey (CGS) has designated certain areas within southern California as potential liquefaction hazard zones. These are areas considered at a risk of liquefaction-related ground failure during a seismic event, based upon mapped surficial deposits and the presence of a relatively shallow water table. According to the Geotechnical Investigation, the project site is not located within an area mapped by the State of California for liquefaction potential. The County of San Bernardino Land Use Services (Geologic Hazard Maps) has designated the site as not having a potential for liquefaction. Based on the current mapping and the depth to groundwater, it is GeoTek's opinion that the liquefaction potential at the site is very low and further analysis appears to be unwarranted at this time. Other geologic hazards related to liquefaction, such as lateral spreading, are therefore also considered low. Impacts would be less than significant.

a.iv) **No Impact.** Structures built below or on slopes subject to failure or landslides may expose people and structures to harm. The subject property is in an area of flat gently sloping terrain. The elevations range from 1,866 feet to 1,922 feet above mean sea level. Topographically, the site slopes gently downward to the south at an approximate five percent gradient with approximately 45 feet of elevation differential across the site. The site is not located in an Earthquake-Induced Landslide Zone. This indicates a low probability for landslides. The project report concluded that the site is not considered susceptible to static slope instability or seismically induced landslides. Grading and construction would be performed in compliance with State and local codes and the recommendations of the geotechnical report. There is no potential impact to future residents from landslides.

b) **Less Than Significant Impact.** Topsoil is used to cover surface areas for the establishment and maintenance of vegetation due to its high concentrations of organic matter and microorganisms. Little, if any, native topsoil is likely to occur on site. According to the geotechnical Investigation, alluvial fan deposits were encountered in all the borings and extended to the maximum depth explored (51.5 feet in Boring B-1). As encountered in the borings, the alluvial fan deposits consisted of interbedded layers of silty sands, clayey sand and sand (SM, SC and SP soil types).

The project has the potential to expose surficial soils to wind and water erosion during construction activities. Wind erosion will be minimized through soil stabilization measures required by South Coast Air Quality Management District (SCAQMD) Rule 403 (Fugitive Dust), such as daily watering. Construction of the project will be required to have a PM_{10} Dust Control

Plan to identify best management practices for the control fugitive dust. The intent of SCAQMD Rule 403 is to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (man-made) fugitive dust sources by requiring actions to prevent, reduce or mitigate fugitive dust emissions. Elements of the Dust Control Plan may appear as notes on the grading plan that must be approved by the City prior to any site disturbance.

Water erosion will be prevented through the City's standard erosion control practices required pursuant to the California Building Code and the National Pollution Discharge Elimination System (NPDES), such as silt fencing or sandbags. Construction of the project will be required to have a Stormwater Pollution Prevention Plan (SWPPP). Any project involving grading of an area greater than one acre is required to apply for an NPDES permit from the Regional Water Quality Control Board (RWQCB). The project's SWPPP would identify typical best management practices specific towards fugitive dust and containment of sediment discharge and transport from the site. Once construction is completed, a Water Quality Management Plan (WQMP) must be implemented during the life of the project that includes best management practices (BMPs) specific towards maintenance of vegetative landscaping, drainage culverts/channels and drainage inlets. Following project construction, the site would be covered completely by paving, structures, and landscaping. Compliance with regulatory requirements of the RWQCB and of SCAQMD would ensure that impacts with regard to soil erosion or loss of topsoil are less than significant and no mitigation is required.

c) **Less Than Significant Impact.** Impacts related to liquefaction and landslides are discussed above in Section 4.7.a. Lateral spreading is the downslope movement of surface sediment due to liquefaction in a subsurface layer. The downslope movement is due to gravity and earthquake shaking combined. Such movement can occur on slope gradients of as little as one degree. Lateral spreading typically damages pipelines, utilities, bridges, and structures.

Lateral spreading of the ground surface during a seismic activity usually occurs along the weak shear zones within a liquefiable soil layer and has been observed to generally take place toward a free face (i.e. retaining wall, slope, or channel) and to lesser extent on ground surfaces with a very gentle slope. Due to the absence of any substantial change in grade or channel within or near the subject site, and the subsurface soil conditions that are not conducive to liquefaction, the potential for lateral spread occurring within the site is considered to be low. The project-specific geotechnical investigation concludes that site soils would be capable of supporting proposed structures after grading and compaction. A precise grading plan has been prepared as part of the entitlement process. As a condition of approval of the tentative tract map, a final grading permit will be required prior to the issuance of an actual grading permit. The project will require mass grading and the final grading plan will identify best grading practices for cut and fill, compaction and drainage. The final grading plan will be prepared prior to any site disturbance and the issuance of a grading permit by the City of San Bernardino. The project is required to be constructed in accordance with the CBC and the requirements of the project soils investigation report. The CBC includes a requirement that any City-approved recommendations contained in the soil report be made conditions of the building permit. Based on the considerations of the project soil report, soils can be prepared to maintain stability sufficient to support the proposed project. The recommendations of the report will be implemented through the City's routine plan check and permitting processes. Impacts will be less than significant.

d) **No Impact.** The CBC requires special design considerations for foundations of structures built on soils with expansion indices greater than 20. The geotechnical investigation included testing of site soil samples within the proposed building footprint for expansion potential. Based on laboratory testing, the near surface soils have a "very low" expansion potential (ASTM D 4829) with the near surface soils have a soluble sulfate content of less than 0.1 percent (ASTM D 4327). Based upon the collapse tests performed, the upper approximate site soils are anticipated to have a very low potential for hydroconsolidation (settlement due to the addition of water with or without additional loading). Therefore, there would be no impact

e) **No Impact.** The proposed project will be connected to the City of San Bernardino Public Work's sewer system and no septic system or any alternative wastewater treatment is proposed. Therefore, there will be no impact in terms of soil support for septic tanks.

f) **Less Than Significant Impact with Mitigation Incorporated.** No paleontological localities were previously reported within the project area. The entire project area is situated upon surface exposures of relatively recent alluvium that is unlikely to contain fossil material. Excavations within the project area would have to be of substantial depths to impact potentially fossiliferous Pleistocene sediments. Based on these findings, the proposed project's potential to impact significant, nonrenewable paleontological resources appears to be low within the typical depth of disturbance for residential development but potentially high at a greater but unknown depth. Therefore, no paleontological resource impact mitigation program is recommended for the proposed project unless a greater depth of disturbance is anticipated than typical surface grading and underground utility installation would require. However, if any potential paleontological remains are unearthed during the project, all work in the immediate area should be halted or diverted until a qualified paleontologist can evaluate the nature and significance of the finds.

In accordance with standard City procedures, a halt-work condition would be in place in the unlikely event that paleontological resources are discovered during construction. The contractor would be required to halt work in the immediate area of the find and to retain a professional paleontologist to examine the materials to determine whether they are a unique paleontological resource. If this determination is positive, the scientifically consequential information must be fully recovered by the paleontologist consistent with standard City protocol. However, if during grading, any paleontological resources are uncovered Mitigation Measure GS-1 will be implemented to ensure that impacts in regard to disturbance of paleontological resources are reduced to less than significant. See Mitigation Measure section below for the action.

Mitigation Measures

GS-1: If subsurface paleontological resources are encountered during grading or construction, all ground-disturbing activity will cease within 100 feet of the resource. A qualified paleontologist as determined by the City's Community Development & Housing Director will be retained by the City/applicant to assess the find, and to determine whether the resource requires further study or any protection measures. No further grading will occur in the area of the discovery until the City approves the measures to protect the resources. Any archaeological artifacts or paleontological resources recovered as a result of mitigation will be donated to a qualified scientific institution approved by the City where they would be afforded long-term preservation to allow future scientific study.

Level of Significance After Mitigation

Less than Significant.

4.8 – 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 an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			☑	

Sources

Information used to prepare this section is from the following source: California Emissions Estimator Model version 2022.1.1.21.

Environmental Setting

Constituent gases of the Earth's atmosphere, called atmospheric greenhouse gases (GHG), play a critical role in the Earth's radiation amount by trapping infrared radiation emitted from the Earth's surface, which otherwise would have escaped to space. Prominent greenhouse gases contributing to this process include carbon dioxide (CO_2), methane (CH4), ozone, water vapor, nitrous oxide (NO_x), and chlorofluorocarbons (CFCs). This phenomenon, known as the Greenhouse Effect, is responsible for maintaining a habitable climate. Anthropogenic (caused or produced by humans) emissions of these greenhouse gases in excess of natural ambient concentrations are responsible for the enhancement of the Greenhouse Effect and have led to a trend of unnatural warming of the Earth's natural climate, known as global warming or climate change. Emissions of gases that induce global warming are attributable to human activities associated with industrial/manufacturing, agriculture, utilities, transportation, and residential land uses. Transportation is responsible for 41 percent of the State's greenhouse gas emissions, followed by electricity generation. Emissions of CO_2 and NO_x are byproducts of fossil fuel combustion. Methane, a potent greenhouse gas, results from off-gassing associated with agricultural practices and landfills. Sinks of CO_2, where CO_2 is stored outside of the atmosphere, include uptake by vegetation and dissolution into the ocean.

The project is within the South Coast Air Basin, which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD).

The evaluation of an impact under CEQA requires measuring data from a project against both existing conditions and a "threshold of significance." For establishing significance thresholds, the Office of Planning and Research's amendments to the CEQA Guidelines Section 15064.7(c) state "[w]hen adopting thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies, or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence."

CEQA Guidelines Section 15064.4(a) further states, ". . . A lead agency shall have discretion to determine, in the context of a particular project, whether to: (1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use . . .; or (2) Rely on a qualitative analysis or performance-based standards."

CEQA Guidelines Section 15064.4 provides that a lead agency should consider the following factors, among others, in assessing the significance of impacts from greenhouse gas emissions:

- **Consideration #1:** The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting.
- **Consideration #2:** Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
- **Consideration #3:** The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such regulations or requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions. In determining the significance of impacts, the lead agency may consider a project's consistency with the State's long-term climate goals or strategies, provided that substantial evidence supports the agency's analysis of how those goals or strategies address the project's incremental contribution to climate change and its conclusion that the project's incremental contribution is not cumulatively considerable.

City of San Bernardino. As of the date of this report, the City of San Bernardino has not adopted a Climate Action Plan.

Through the San Bernardino County Transportation Authority (SBCTA) formerly known as San Bernardino Associated Governments (SANBAG), the City of San Bernardino forms the San Bernardino Chapter of the San Bernardino County Regional GHG Reduction Plan. Released in March, 2014, the Plan has been prepared to assist the City in conforming to the GHG emissions reductions as mandated under AB 32. Based on the CARB Scoping Plan, reducing GHG emissions to 1990 levels by 2020 means cutting approximately 30 percent from business-as-usual (BAU) emissions levels, or about 15 percent from year 2008 levels, which is the baseline year for the GHG Reduction Plan. Consistent with the CARB Scoping Plan, the City of San Bernardino has chosen a reduction target of 15 percent below 2008 GHG emissions levels by 2020. If the project exceeds the GHG Reduction Plan screening threshold of 3,000 MTCO2e per year for all land use types, then the project's year 2020 emissions will be compared to the project's baseline GHG emissions.

The proposed project would result in the subdivision of 11.11 gross acres/9.69 net acres of land and the development and on-going use of 30 single-family detached residential dwelling units. The proposed project is anticipated to generate GHG emissions from area sources, energy usage, mobile sources, waste disposal, water usage, and construction equipment.

Discussion

a) **Less Than Significant Impact.** GHG emissions for the project were quantified utilizing the California Emissions Estimator Model (CalEEMod) version 2022.1.1.21 to determine if the project could have a cumulatively considerable impact related to greenhouse gas emissions for the original application consisting of 32 residential lots. Through the City's review process the number of residential lots was reduced to 30. It should be noted that the original modeling assumed project construction starting in November 2024 and lasting 18-months and would be operational in 2026; while the construction details stay the same, the latest project update has changed the construction to start in 2025 and be operational in 2027. However, remodeling is not required as the original modeling results represent a conservative analysis; because construction and operational emission rates are lower in future years as technology advances, resulting in lower emissions. The results are summarized in Table 4.7-1. The GHG emissions were calculated for opening year 2026 without mitigation. The emissions inventory accounts for GHG emissions from construction activities and operational activities.

Operation emissions associated with the proposed residential housing would include GHG emissions from mobile sources (transportation), energy, water use and treatment, waste disposal, and area sources. GHG emissions from electricity use are indirect GHG emissions from the energy (purchased energy) that is produced offsite. Area sources are owned or controlled by the project (e.g., natural gas combustion and furnaces) and produced onsite. Construction activities are short term and cease to emit greenhouse gases upon completion, unlike operational emissions that are continuous year after year until operation of the use ceases. Because of this difference, SCAQMD recommends amortizing construction emissions over a 30-year operational lifetime. This normalizes construction emissions so that they can be grouped with operational emissions in order to generate a precise project-based GHG inventory.

Table 4.7-1
Greenhouse Gas Emissions Inventory

Category	Greenhouse Gas Emissions (Metric Tons/Year)					
	Bio-CO_2	NonBio-C	CO_2	CH4	N_2O	CO_2e
Area Sources	0.00	0.55	0.55	0.00	0.00	0.55
Energy Usage	0.00	112.00	112.00	0.01	0.00	112.00
Mobile Sources	0.00	397.00	397.00	0.02	0.02	404.00
Waste	2.76	0.00	2.76	0.28	0.00	9.66
Water	0.42	3.67	4.09	0.04	0.00	5.05
Amortized Construction Emissions	0.00	11.13	11.13	0.00	0.00	11.23
Total Emissions	**3.18**	**524.35**	**527.53**	**0.35**	**0.02**	**542.49**
SCAQMD and GHG Reduction Plan Screening Threshold						**3,000**
Exceeds Threshold?						**No**

Source: CalEEMod Version 2022.1.1.21.

Table 4.7-1 projects that the proposed project, as modeled for year 2024-2026, would generate approximately 542.49 metric tons of CO2e per year of GHG emissions. According to the thresholds of significance established above, a cumulative global climate change impact would not occur since the GHG emissions created from the on-going operations would not exceed the screening threshold of 3,000 metric tons per year of CO2e. Therefore, the project will have less than significant impacts due to GHG contribution at operation. No mitigation will be required.

The project is also subject to the requirements of the California Green Building Standards Code. The Code is a comprehensive and uniform regulatory code for all residential, commercial and school buildings. The California Green Building Standards Code does not prevent a local jurisdiction from adopting a more stringent code as state law provides methods for local enhancements. The Code recognizes that many jurisdictions have developed existing construction and demolition ordinances, and defers to them as the ruling guidance provided they provide a minimum 50-percent diversion requirement. The code also provides exemptions for areas not served by construction and demolition recycling infrastructure. State building code provides the minimum standard that buildings need to meet in order to be certified for occupancy. Enforcement is generally through the local building official.

The California Green Building Standards Code (code section in parentheses) requires:

- Water Efficiency and Conservation [Indoor Water Use (4.303.1)]. Fixtures and fixture fittings reducing the overall use of potable water within the building by at least 20 percent shall be provided. The 20 percent reduction shall be demonstrated by one of the following methods:

    - Prescriptive Method: Showerheads (≤ 2.0 gpm @ 80 psi); Residential Lavatory Faucets (≤ 1.5 gpm @ 60 psi); Nonresidential Lavatory Faucets (≤.4 gpm @ 60 psi); Kitchen Faucets (≤ 1.8 gpm @ 60 psi); Toilets (≤ 1.28 gal/flush); and urinals (≤ 0.5 gal/flush).
    - Performance Method: Provide a calculation demonstrating a 20% reduction of indoor potable water using the baseline values set forth in Table 4.303.1. The calculation will be limited to the total water usage of showerheads, lavatory faucets, water closets and urinals within the dwelling.

- Water Efficiency and Conservation [Outdoor Water Use (4.304.1)]. Irrigation Controllers. Automatic irrigation system controllers for landscaping provided by the builder and installed at the time of final inspection shall comply with the following:

    - Controllers shall be weather- or soil moisture-based controllers that automatically adjust irrigation in response to changes in plants' watering needs as weather or soil conditions change.
    - Weather-based controllers without integral rain sensors or communication systems that account for rainfall shall have a separate wired or wireless rain sensor which connects or communicates with the controller(s).

- Construction Waste Reduction of at least 50 percent (4.408.1). Recycle and/or salvage for reuse a minimum of 50 percent of the nonhazardous construction and demolition waste in accordance with either Section 4.408.2, 4.408.3 or 4.408.4; OR meet a more stringent local construction and demolition waste management ordinance. Documentation is required per Section 4.408.5. Exceptions:

    - Excavated soil and land-clearing debris.
    - Alternate waste reduction methods developed by working with local enforcing agencies if diversion or recycle facilities capable of compliance with this item do not exist or are not located reasonably close to the jobsite.
    - The enforcing agency may make exceptions to the requirements of this section when jobsites are located in areas beyond the haul boundaries of the diversion facility.

- Materials pollution control (4.504.1 – 4.504.6). Low-pollutant emitting interior finish materials such as paints, carpet, vinyl flooring and particleboard.

- Installer and Special Inspector Qualifications (702.1-702.2). Mandatory special installer inspector qualifications for installation and inspection of energy systems (e.g., heat furnace, air conditioner, mechanical equipment).

Compliance with Green Building Standards and 2022 Title 24 Standards will further reduce project-related greenhouse emissions.

b) **Less Than Significant Impact.** San Bernardino has adopted the 2022 edition of the California Building Code (Title 24), including the California Green Building Standards Code. The project would be subject to the California Green Building Standards Code, which requires new buildings to reduce water consumption, employ building commissioning to increase building system efficiencies for large buildings, divert construction waste from landfills, and install low pollutant-emitting finish materials. The project does not include any feature (i.e. substantially alter energy demands) that would interfere with implementation of these State and City codes and plans. The City of San Bernardino does not have any additional plans, policies, standards, or regulations related to climate change and GHG emissions. Also, no other government-adopted plans or regulatory programs in effect at this time have established a specific performance standard to reduce GHG emissions from a single building project. As discussion under Section 4.3, Air Quality above, the project meets the goals of Connect SoCal to adapt to a changing climate and support an integrated regional development pattern and transportation network and encourages development of diverse housing types in areas that are supported by multiple transportation options. The project will construct adjacent roadways to their ultimate half-width right-of-way and will benefit from regional/local transit opportunities.

Pursuant to 15604.4 of the *CEQA Guidelines*, a lead agency may rely on qualitative analysis or performance-based standards to determine the significance of impacts from GHG emissions. As such, the project's consistency with the CARB 2022 Scoping Plan is discussed below. It should be noted that the project's consistency with the 2022 Scoping Plan also satisfies consistency with AB 32 since the 2022 Scoping Plan is based on the overall targets established by AB 32 and SB 32. Consistency with the 2008 and 2017 Scoping Plan is not necessary since both of these plans have been superseded by the 2022 Scoping Plan. Project consistency with SB 32 is evaluated in the following discussion.

SB 32/2022 Scoping Plan Consistency

The project would not impede the State's progress towards carbon neutrality by 2045 under the 2022 Scoping Plan. The project would be required to comply with applicable current and future regulatory requirements promulgated through the 2022 Scoping Plan. Some of the current transportation sector policies the project will comply with (through vehicle manufacturer compliance) include: Advanced Clean Cars II, Advanced Clean Trucks, Advanced Clean Fleets, Zero Emission Forklifts, the Off-Road Zero-Emission Targeted Manufacturer Rule, Clean Off-Road Fleet Recognition Program, In-use Off-Road Diesel-Fueled Fleets Regulation, Off-Road Zero-Emission Targeted Manufacturer rule, Clean Off-Road Fleet Recognition Program, Amendments to the In-use Off-Road Diesel-Fueled Fleets Regulation, carbon pricing through the Cap-and-Trade Program, and the Low Carbon Fuel Standard. As such, the project would be consistent with the 2022 Scoping Plan.

In conclusion, the project does not conflict with a local plan adopted for the purpose of reducing GHG emissions. A less than significant impact would occur.

Mitigation Measures

No mitigation measures are necessary because impacts to Greenhouse Gas Emissions will be less than significant.

Level of Significance After Mitigation

Not Applicable.

4.9 – 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 reasonable foreseeable upset and accident condition involving the release of hazardous materials into the environment?			☑	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?			☑	
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				☑
e) For a project located within an airport land use plan or, where such a plan has not been adopted within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?				☑
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			☑	
g) Expose people or structures, directly or indirectly to a significant risk of loss, injury or death involving wildland fires, including where wildlands?			☑	

Sources

Information used to prepare this section is from the following sources: City of San Bernardino General Plan Update, 2005, Chapter 10 Safety and Chapter 14 Noise; California Department of Toxic Substances Control, EnviroStor; California State Water Resources Control Board, GeoTracker; California State Water Resources Control Board, Sites Identified with Waste Constituents Above Hazardous Waste Levels Outside the Waste Management Unit; California State Water Resources Control Board, List of Active CDO and CAO; California Department of Toxic Substances Control, Hazardous Facilities Subject to Corrective Action; California

Department of Forestry and Fire Protection, Incorporated Fire Hazard Severity Zone: City of San Bernardino, Very High Fire Hazard Severity Zones in LRA (Local Responsibility Area), Recommended, October 2008; and California Department of Transportation, Division of Aeronautics website, California Public Use Airport list.

Environmental Setting

Hazardous Waste Site

The proposed project site is not on the State of California Hazardous Waste and Substances Site List pursuant to Government Code Section 65962.5. California Department of Toxic Substances Control Envirostar database accessed October 5, 2023.

Local Schools

The nearest school to the site is North Verdemont Elementary School located 3555 W Meyers Rd, San Bernardino, CA 92407 directly across W. Meyers Road to the southwest. Cesar Chavez Middle School is located at the southwest corner of W. Belmont Avenue and N. Magnolia Avenue (6650 North Magnolia Avenue) is approximately 0.6 miles away. The nearest high school is Cajon High School located at 1200 W Hill Drive, San Bernardino, approximately 4.4 miles away.

Public Airports/Private Airstrips

There are no private or public airports located within two miles of the project site. San Bernardino International Airport is approximately 11.8 miles southeast of the project site at 225 North Leland Norton Way, San Bernardino, CA 92408 and Ontario International Airport is approximately 21.5 miles southwest of the project site at 2500 East Airport Drive, Ontario, CA 91761.

Discussion

a) **Less Than Significant Impact.** The proposed project could result in a significant hazard to the public if the project includes the routine transport, use, or disposal of hazardous materials or places housing near a facility which routinely transports, uses, or disposes of hazardous materials. The proposed project is located within a primarily residential area within the city. The routine use, transport, or disposal of hazardous materials is primarily associated with industrial uses which require such materials for manufacturing operations or produce hazardous wastes as by-products of production applications. The proposed project does not propose or facilitate any activity involving significant use, routine transport, or disposal of hazardous substances as part of the subdivision and 30 single-family homes.

During construction, there would be a minor level of transport, use, and disposal of hazardous materials and wastes that are typical of construction projects. This would include fuels and lubricants for construction machinery, coating materials, etc. This requirement would be spelled out in detail in the SWPPP that must be prepared by the applicant prior to any site disturbance. The SWPPP is discussed further in the next section (Hydrology and Water Quality). Routine construction control measures and best management practices for hazardous materials storage, application, waste disposal, accident prevention and clean-up, etc. would be sufficient to reduce potential impacts to a less than significant level.

With regard to project operation, a limited amount of widely used hazardous materials, including paints and other solvents, cleaners, and pesticides would be anticipated. The remnants of these and other products are disposed of as household hazardous waste (HHW) that includes used dead batteries, electronic wastes, and other wastes that are prohibited or discouraged from being disposed of at local landfills. Regular operation and cleaning of the residential structures would not result in significant impacts involving use, storage, transport or disposal of hazardous wastes and substances. Use of common household hazardous materials and their disposal does not present a substantial health risk to the community. Impacts associated with the routine transport, use of hazardous materials or wastes will be less than significant.

b) **Less Than Significant Impact.** Construction of the 30 housing units will require the use and transport of hazardous materials such as asphalt, paints, and other solvents. Construction activities could also produce hazardous wastes associated with the use of such products. The construction of proposed residential development requires ordinary construction activities and will not require a substantial or uncommon amount of hazardous materials to complete. All hazardous materials are required to be utilized and transported in accordance with their labeling pursuant to federal and state law. Routine construction practices include good housekeeping measures to prevent/contain/clean-up spills and contamination from fuels, solvents, concrete wastes and other waste materials. During construction, BMPs would be required to be implemented by the City as well as standard construction controls and safety procedures that would avoid or minimize the potential for accidental release of these substances. Standard construction practices would be observed such that any materials released are appropriately contained and remediated as required by the San Bernardino City Fire Department, the local Certified Unified Program Agency for hazardous materials in the region. With implementation of standard conditions, hazard to the public or the environment through reasonable foreseeable upset and accident condition involving the release of hazardous materials into the environment would be less than significant.

c) **Less than Significant Impact.** There are schools within 0.25 miles of the proposed project site. The nearest school to the site is North Verdemont Elementary School located 3555 W Meyers Rd, San Bernardino, CA 92407 directly across W. Meyers Road to the southwest. The project consists of the subdivision of 11.11 gross acres/9.69 net acres into 30 single-family residential lots and the construction of 30 single-family residential dwellings which do not emit or generate significant hazardous materials. Therefore, the project would not result in impacts to schools due to hazardous materials handling or emissions and no mitigation is required.

d) **No Impact.** A review of known electronic database listings for possible hazardous waste generating establishments in the vicinity of the subject property, as well as adjacent sites with known environmental concerns was conducted. Facilities were identified by county, state, or federal agencies that generate, store, or dispose of hazardous materials. The project is not located on the State of California Hazardous Waste and Substances Site List pursuant to Government Code Section 65962.5. California Department of Toxic Substances Control Envirostar database, accessed October 5, 2023. The project would have no impact in this regard.

e) **No Impact.** There are no private or public airports located within 2 miles of the project site. San Bernardino International Airport is approximately 11.8 miles southeast of the project site at 225 North Leland Norton Way, San Bernardino, CA 92408 and Ontario International Airport is approximately 21.5 miles southwest of the project site at 2500 East Airport Drive, Ontario, CA 91761. Therefore, the project would not result in safety hazards from proximity to airports for people living in the project area or excessive noise for people residing or working in the project area. No impact will occur.

f) **Less Than Significant Impact.** The proposed project is a subdivision of 11.11 gross acres/9.69 net acres into 30 single-family residential lots and the construction of the 30 single-family homes. It is a residential infill project. Per State Fire and Building Codes, sufficient space will have to be provided around the structures for emergency personnel and equipment access and emergency evacuation. All project elements, including landscaping, would be sited with sufficient clearance from existing and proposed structures so as not to interfere with emergency access to and evacuation from the facility. The project would comply with the California Fire Code (Title 24, California Code of Regulations, Section 9).

The project driveways would allow emergency access and evacuation from the site, and would be constructed to San Bernardino Code specifications. Over the long term, the project would not impair implementation of or physically interfere with an adopted emergency response plan or evacuation plan because no permanent public street or lane closures are proposed. Construction work in the street associated with the project would be limited to lateral utility connections, undergrounding of utility lines and installation of street trees; all of which would be limited to nominal potential traffic diversion. Traffic control would be provided for any lane closures. Project impacts would be less than significant.

g) **No Impact.** The project site is located within an urbanized area of the City of San Bernardino and is not located within a fire hazard zone, as identified on the latest Fire Hazard Severity Zone (FHSZ) maps prepared by the California Department of Forestry and Fire Protection (CALFIRE). There are no wildland conditions in the urbanized area that the project site is located. No impact would occur.

Mitigation Measures

No mitigation measures are necessary because impacts to Hazards and Hazardous Materials will be less than significant.

Level of Significance After Mitigation

Not applicable.

4.10 – 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 offsite;			☑	
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?			☑	

Sources

Information used to prepare this section is from the following sources: City of San Bernardino General Plan Update, 2005; San Bernardino Municipal Code; Flood Insurance Rate Maps (FIRM), Panel 06071C7930J, September 2, 2016; S.D. Engineering and Associates, Hydrology Report, Tract 20539, APN 0261-062-15 &16, Meyers Road, San Bernardino, CA 92407 dated March 24, 2024; and GeoTek, Inc., Geotechnical Investigation Proposed Single-Family Residential Development, Tentative Tract Map No. 20539, West Meyers Road and Magnolia Avenue, San Bernardino, San Bernardino County, California dated May 24, 2022.

Environmental Setting

The City of San Bernardino lies within the Santa Ana River Basin (Region 8) of the Regional Water Quality Control Board. Region 8 extends from the San Bernardino and San Gabriel Mountains in the north and east to Newport Bay along the coast. This Santa Ana River Basin is geographically the smallest region, at 2,800 square miles, yet contains one of the largest populations with almost five million people. The region contains 460 miles of streams, 21,090 acres of lakes and 24 miles of coastline. The Santa Ana River is the largest stream system in southern California, and is also the region's main surface water body. The Santa Ana River transports more than 125 million gallons per day of reclaimed water from Riverside and San Bernardino Counties for recharge into the Orange County Groundwater Basin. This recharge provides 40 percent of the Orange County water demand. The Santa Ana River has a number of tributaries in the vicinity of San Bernardino that contribute flow to the main stem of the river including Lytle Creek, East Twin Creek, East Warm Creek and San Timoteo Creek.

Storm drains and flood control facilities within the planning area include natural and man-made channels, storm drains, street waterways, natural drainage courses, dams, basins, and levees. Storm drain and flood control facilities are administered by City of San Bernardino, San Bernardino County Flood Control District, Army Corps of Engineers, and San Bernardino International Airport and Trade Center. Design and construction of storm drain and flood control facilities are the responsibility of the City Public Works Department. The Public Services Department is responsible for the operation and maintenance of storm drain and flood control facilities. San Bernardino's planning area encompasses 71 square miles, much of which is paved and impervious to stormwater.

The San Bernardino County Flood Control District divides the City into subareas for planning purposes pursuant to the District's Comprehensive Storm Drain Plans No. 3, 4, 6, and 7. The City uses the Flood Control District's Comprehensive Storm Drain Plans for the development of the City's storm drain system. The City of San Bernardino requires all 10-year frequency storm waters, except for street flows at intersection points, be contained in the underground drain system. Storm flows in excess of the 10-year frequency storm flow, but less than or equal to the 25-year storm flow, will be carried in the curbed portion of the street. Storm flows associated with 100-year storms may be carried in the street right-of-way. One-hundred-year storm flows may also be conveyed via a combination of storm drains sized to convey a 25-year storm in the curbed part of the street with the balance of the flow conveyed in the street section.

The City of San Bernardino has established design criteria for both major and local drains within the City. Major drains are systems using 36-inch or larger pipes (or equivalent channels) and are identified on the comprehensive storm drain plans. Local drains are systems using less than 36-inch-diameter conduits. Storm drains and flood control facilities within the City include: channels, storm drains, street waterways, natural drainage courses, dams, basins, and levees. Some streets in the City of San Bernardino are specifically designed to accommodate storm flow. Flows carried within the street right-of-way may cause localized flooding during storms, possibly making some roads impassable during the storm event.

Federal and State Oversight

The federal Clean Water Act (CWA) is the principal federal law that provides for the protection of water quality. The primary objectives of the CWA are to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters," and to make all surface waters "fishable" and "swimmable." The U.S. Environmental Protection Agency (EPA) is the designated federal agency responsible for implementing the CWA and it has further delegated authority to the State Water Resources Control Board (SWRCB) and associated Regional Water Quality Control Boards (RWQCB) for compliance with the CWA. Relevant programs identified in the CWA include the National Pollution Discharge Elimination System (NDPES) program which regulates discharge of pollutants from known sources (point sources), as well as non-point sources, into waters of the United States through the issuance of permits. As part of the NPDES program, a Storm Water Pollution Prevention Plan (SWPPP) must be prepared for construction activities affecting greater than one acre because the discharge of stormwater during construction is considered a non-point source of water pollution.

Stormwater Pollution Prevention Plans

According the Storm Water Program run by the State Water Resources Control Board (SWRCB), any developer engaging in construction activities which disturb one acre or more of land shall apply for coverage under the general stormwater permit for construction activity with the SWRCB. In addition, the owner shall also prepare a SWPPP in accordance with state requirements. All construction projects which could potentially have an adverse impact on the City's municipal separate storm sewer system or waters of the State shall install and/or implement appropriate construction and post-construction BMPs, as listed in their SWPPP. The City of San

Bernardino, along with other cities in the San Bernardino Valley, is a co-permitee with the County of San Bernardino, in the County's Area-Wide Urban Stormwater Runoff Management Program in order to comply with the Santa Ana Regional Water Quality Control Board Waste Discharge Requirements issued in 2010 for the County's MS4 Permit. Under this permit, all development projects are subject to the NPDES requirements which include the preparation, approval, and implementation a SWPPP.

Water Quality Management Plans
According to San Bernardino Municipal Code 8.80.501, prior to the issuance of any grading or building permit, all qualifying land development projects shall submit and have approved a storm water quality management plan (SWQMP) to the city engineer on a form provided by the City. The SWQMP shall identify all BMPs that will be incorporated into the operation of the project to control stormwater and non-stormwater pollutants during and after construction and shall be revised as necessary during the life of the project. The SWQMP submittal applies to construction projects covered by the NPDES general construction permit as well as construction projects less than five acres. Following the approval of the SWQMP by the city engineer, the owner of the qualifying project and the city shall enter into a recordable Storm Water Quality Management Plan Agreement which shall contain enforceable mechanisms to ensure that the operations and maintenance costs of post-construction BMPs are paid in perpetuity.

Discussion

a) **Less Than Significant Impact.** A project normally would have an impact on surface water quality if discharges associated with the project would create pollution, contamination, or nuisance as defined in Section 13050 of the California Water Code (CWC), or that cause regulatory standards to be violated as defined in the applicable National Pollutant Discharge Elimination System (NPDES) stormwater permit or Water Quality Control Plan for the receiving water body. For the purpose of this specific issue, a significant impact could occur if the project would discharge water that does not meet the quality standards of the agencies which regulate surface water quality and water discharge into stormwater drainage systems. Significant impacts could also occur if the project does not comply with all applicable regulations with regard to surface water quality as governed by the State Water Resources Control Board (SWRCB). These regulations include preparation of a Storm Water Quality Management Plan (SWQMP) to reduce potential post-construction water quality impacts.

Discharges into stormwater drains or channels from construction sites of one acre or larger are regulated by the General Permit for Storm Water Discharges Associated with Construction Activity issued by the State Water Quality Control Board. The General Permit was issued pursuant to National Pollutant Discharge Elimination System (NPDES) regulations of the Environmental Protection Agency (EPA), as authorized by the Clean Water Act. Compliance with the General Permit involves developing and implementing a Storm Water Pollution Prevention Plan (SWPPP) specifying best management practices (BMPs) that the project would use to minimize pollution of stormwater. The SWPPP BMPs would follow the guidelines set forth by the State Water Resources Control Board (SWRCB).

The project applicant will be required to comply with NPDES permit requirements through the preparation and implementation of a SWPPP for construction activities. The City's Engineer will review the application for compliance with applicable regulations and to ensure that no water quality standards or discharge requirements are violated. A Notice of Intent (NOI) to the SWRCB will be required who will issue a Waste Discharge Identification Number (WDID) for the project. Prior to obtaining any City-issued grading and/or construction permits, the developer/owner shall provide evidence of compliance with the general construction permit by providing a copy of the WDID to the City's Development Services Department. Plans for stormwater treatment are required to meet City and regional standards. Given required compliance with existing laws, project impacts on water quality standards would be less than significant, and no additional mitigation is required.

b) **Less Than Significant Impact.** If the project removed an existing groundwater recharge area or substantially reduced runoff that results in groundwater recharge, a potentially significant impact could occur.

No groundwater or perched water was observed in the exploratory borings conducted by GeoTek, Inc. to a depth of 51.5 feet. Based on available ground water data from the County of San Bernardino, the depths of ground water is 100 feet plus (100'+) below ground in the project area. Project-related grading would not reach these depths and no disturbance of groundwater is anticipated. The proposed building footprint areas and paved streets would increase impervious surface coverage on the site. As such, the total amount of infiltration on site would be decreased over existing conditions. Since this site is currently disturbed and is not managed for groundwater supplies, this change in infiltration would not have a significant effect on groundwater supplies or recharge.

The project would be required to comply with the City of San Bernardino Municipal Code, Chapter 17.06 for water wise landscape requirements, which would lessen the project's demand for water resources. Also, finally, CBC Title 24 water efficiency measures require a demonstrated 20 percent reduction in the use of potable water. The project's landscaping plans will include drought tolerant landscaping materials. Compliance with Title 24 and the City's Water Wise Landscaping standards will reduce the proposed project's impacts to groundwater supplies to a level of less than significant. Water supply is further discussed in Checklist Section 4.19.

c.i) **Less Than Significant Impact.** Potentially significant impacts to the existing drainage pattern of the site or area could occur if development of the project results in substantial on- or off-site erosion or siltation. There are no streams cross the project site; thus, the project would not alter any stream course. The project will collect and convey run-off from upstream areas and convey these flows through the site, to the storm drainage system. A site drainage plan is required by the City of San Bernardino and would be reviewed by the City Engineer. The final grading and drainage plan would be approved by the City Engineer during plan check review. Erosion and siltation reduction measures would be implemented during construction consistent with an approved SWPPP, which will demonstrate compliance with the City's NPDES permit. At the completion of construction, the project would consist of impervious surfaces and landscaped areas, and would therefore not be prone to substantial erosion. Impacts will be less than significant.

c.ii) **Less Than Significant Impact.** With regard to project operation, on-site drainage will continue to function through sheet flow to the driveways, discharging into streets and drainage systems. The existing pre-development flows were calculated at 51.03 cfs – Q_{100}. The proposed post-development flows were calculated at 25.08 cfs – Q_{100}. To handle water flows and water quality treatment, two water quality basin lots (Lot A-11,441 square feet and Lot B-11,595 square feet) have been planned for the development. The basins have been sized to handle the anticipated drainage flows and as a result the project will not substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite. Impacts will be less than significant.

c.iii) **Less Than Significant Impact.** The 30-lot subdivision will not 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. The proposed post-development flows of 25.08 cfs – Q_{100} are within the capacity of the stormwater drainage facilities. During construction, the project applicant would be required to develop and implement a SWPPP as required by law;

this would prevent polluted runoff from leaving the construction site. Adherence to all code requirements for the construction of the 30 single-family houses will ensure that impacts associated with drainage activities are less than significant and no additional mitigation is required.

c.iv) **Less Than Significant Impact.** The Federal Emergency Management Agency (FEMA) produces maps (Flood Insurance Rate Map) that identify areas that are located in flood zones. The map that addresses this portion of the City of San Bernardino is FIRM Panel 06071C7930J, September 2, 2016, which shows that the project site is located within Zone X. This zone designates areas of 0.2 percent annual chance flood, areas of 1 percent annual chance flood with average depths of 1 foot or with drainage areas less than 1 square mile, and areas protected by levees from 1 percent annual chance flood. Therefore, there will be a less than significant impact as the project will not impede or redirect flood flows.

d) **Less Than Significant Impact.** According to the General Plan Update, the project site is not located within a flood hazard, tsunami, or seiche zones. The project will not result in a risk release of pollutants due to project inundation. Therefore, the project will be a less than significant impact.

e) **Less Than Significant Impact.** During construction, the project applicant would be required to develop and implement a SWPPP as required by law; this would prevent polluted runoff from leaving the construction site. The project by design will not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. The future structures to be constructed on the site will be required to meet and comply with all applicable city and State building codes to reduce impacts to water quality to less-than-significant level.

Mitigation Measures

No mitigation measures are necessary because Hydrology impacts will be less than significant.

Level of Significance After Mitigation

Not Applicable.

4.11 – 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?			☑	

Sources

Information used to prepare this section is from the following sources: City of San Bernardino General Plan Update, 2005.

Environmental Setting

The proposed project site is in an area that is mainly developed with residential uses with limited institutional uses. The General Plan Foundation Component is Single Family Residential with a land use designation of Residential Low (RL), which allows for a maximum of 3.1 dwelling units per acre and requires a minimum lot size of 10,800 square feet as identified by the Land Use Element of the City of San Bernardino General Plan. The intended use for this designation is single-family detached residences in a low-density setting. The project site is currently zoned Residential Low [3.1 dwelling units per acre (10,800 minimum lot size)].

Discussion

a) **No Impact.** The proposed infill project is surrounded by residential uses, an elementary school and public park. The project is compatible with the surrounding land uses along W. Meyers Road, W. Ohio Avenue and N. Magnolia Avenue and will not divide an established community. The project does not propose construction of any roadway, flood control channel, or other structure that would physically divide any portion of the community. The project will complete half-width right-of-way improvements along W. Meyers Road, W. Ohio Avenue and N. Magnolia Avenue. Therefore, no impact will occur.

b) **Less than Significant Impact.** The project site is designated as Residential in the City's General Plan Foundation Component. The proposed project includes Subdivision 23-01 Tentative Tract Map 20539 (TTM) a request to allow the division of two parcels containing approximately 11.11-gross acres/9.69 net acres into 30 residential lots and two water quality basin lots (Lot A-11,441 square feet and Lot B-11,595 square feet) with the proposed construction and use of 30 single-family detached product together with the construction of the required on-site infrastructure improvements under Development Permit DP-P 23-01.

San Bernardino offers a wide range of housing densities and products to meet the demand of current and future residents with equally varying lifestyles. The Residential Low designation is envisioned for single-family detached residences in low-density setting. The proposed project satisfied the vision for Residential Low in the General Plan with single-family detached residences at 3.1 dwelling units per acre.

General Plan Consistency

A detailed analysis of the Project's consistency with the policies of the various elements of the City's General Plan and related to topics of environmental concern is provided in Table 4.11-1: General Plan Consistency Analysis. The analysis contained in Table 4.11-1 concludes that the proposed project would be consistent with the City's General Plan because due to the residential lots would be located within a Residential Low designated area, which is suitable for the proposed use. Therefore, implementation of the proposed project would not result in significant land use impacts due to inconsistency with the City's General Plan. Accordingly, impacts would be less than significant.

Table 4.11-1
General Plan Consistency Analysis

Applicable General Plan Goal	Project Consistency
2.1 Preserve and enhance San Bernardino's unique neighborhoods.	Consistent. The project complies with development standards, design guidelines, and policies to preserve and enhance the character of San Bernardino's neighborhoods.
2.2 Promote development that integrates with and minimizes impacts on surrounding land uses.	Consistent. The project would be required adhere to the standards and regulations in the Development Code and policies and guidelines in the Community Design Element.
2.3 Create and enhance dynamic, recognizable places for San Bernardino's residents, employees, and visitors.	Consistent. The project site is surrounded by a mix of single family residential uses, an educational facility and public park providing a linkage between all uses that is pedestrian friendly.
2.4 Enhance the quality of life and economic vitality in San Bernardino by strategic infill of new development and revitalization of existing development.	Consistent. The project promotes economic vitality in San Bernardino by providing jobs and revenue to the City through the construction of the development and the payment of building and development impact fees.
2.5 Enhance the aesthetic quality of land uses and structures in San Bernardino.	Consistent. The project would be aesthetically pleasing as all new structures would achieve a high level of architectural design and provide a careful attention to detail. Drought-tolerant ornamental landscaping would be provided along the project boundary, along with fencing, and sidewalks.
2.6 Control development and the use of land to minimize adverse impacts on significant natural, historic, cultural, habitat, and hillside resources.	Consistent. The project has been evaluated through site plan review process by City staff and through the preparation of an Initial Study compliant with the California Environmental Quality Act.
2.7 Provide for the development and maintenance of public infrastructure and services to support existing and future residents, businesses, recreation, and other uses.	Consistent. The project is contingent upon the ability of public infrastructure to provide sufficient capacity to accommodate its demands and mitigate its impacts. New infrastructure for drainage, water, sewer, and roadways will be constructed as part of this development.

Source: San Bernardino General Plan Update 2005 and SCAG's Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), 2020.

Zoning Consistency

The project is in character with the intent of the RL (Residential Low) zone in that the zone is intended to promote the development of low-density, large lot, single-family detached residential units with a minimum average lot size of 10,800 square feet. The RL zone allows a maximum density of 3.1 units per net acre. The construction of single family homes is permitted with the approval of a Development Permit. Development Permit DP-P 23-01 proposes a density of 3.1 dwelling units per acre with lots sizes ranging from 10,800 to 11,629 square feet. The project satisfies the residential development standards identified in Table 04.02 of the City's Development Code for lot width, lot depth, setbacks, building lot coverage, distance between buildings, and maximum structure height in stories/feet as demonstrated in Table 4.11-2.

Table 4.11-2
Development Standard Comparison

Standard	**Residential Low**	**Development Permit DP-P 23-01**
Lot Area Maximum Units/Net Acre	3.1	3.1
Lot Area (sf) (Minimum required for new development)	10,800 av. 9,720 min.	10,800 min.
Lot Width (feet) Corner Lot Width	80 88	80 88
Lot Depth (feet)	100	100
Front Setback (feet)	25	25
Rear Setback (feet)	20 av. 15 min.	15 min.
Side Setback minimum (feet)	5	5
Side Setback Street Side (feet)	15	21.5
Distance Between Buildings (feet)	10	10
Maximum Structure Height in Stories (feet)	2.5 35	2 26' 8"

Source: San Bernardino Municipal Code.

Therefore, the implementation of this project at this site is consistent with the City's plans and policies. Based on the preceding information, implementation of the proposed project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, zone classification, or the City's Municipal Code) adopted for the purpose of avoiding or mitigating an environmental effect. No adverse impacts are anticipated under this issue and no additional mitigation is required.

Regional Transportation Plan/Sustainable Communities Strategy Consistency

The Southern California Association of Governments (SCAG) is the metropolitan planning organization for the Project Site area, and in that capacity bears the responsibility under SB 375 to implement and administer regional transportation plans (RTPs) and sustainable communities strategies (SCSs) for purposes of achieving the goals for reducing greenhouse gases as envisioned by AB 32.

On April 7, 2016, SCAG adopted the 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (2016-2040 RTP/SCS). The 2016-2040 RTP/SCS contains a forecasted transportation system and development pattern for the region, which, if implemented, will reduce greenhouse gas emissions to meet regional greenhouse gas emission reduction targets, which CARB had established as eight percent below 2005 per capita emissions levels by 2020, and 13 percent below 2005 per capita emissions levels by 2035.

On June 28, 2016, CARB accepted SCAG's quantification of GHG emission reductions from the 2016-2040 RTP/SCS and determined that the 2016-2040 RTP/SCS would, if implemented, achieve the 2020 and 2035 GHG emission reduction targets and thus, met the criteria to be a sustainable communities strategy. The 2016-2040 RTP/SCS was last amended in September 2018, to reflect

CARB's revised long-range GHG emissions reduction target of 19 percent below 2005 per capita emissions levels by 2035.

The 2020-2045 RTP/SCS (also known as the Connect SoCal plan) is SCAG's most recent update to the 2016-2040 RTP/SCS. Like the 2016-2040 RTP/SCS, the 2020-2045 RTP/SCS is a long-range visioning plan for the six-county SCAG region that highlights the existing land use and transportation conditions throughout the SCAG region and forecasts how it will meet the region's transportation needs between 2020 and 2045, as well as achieve CARB's GHG emissions reduction targets. Specifically, the 2020-2045 RTP/SCS identifies and prioritizes expenditures of this anticipated funding for transportation projects of all transportation modes: highways, streets and roads, transit, rail, bicycle and pedestrian, as well as aviation ground access. It also includes a set of visions, goals, objectives, policies and performance measures developed through public and stakeholder outreach sessions across SCAG's region. On September 3, 2020, SCAG's Regional Council formally adopted the 2020-2045 RTP/SCS. On October 30, 2020, CARB officially determined that the 2020-2045 RTP/SCS would achieve CARB's 2035 GHG emission reduction target.

It is acknowledged that on April 4, 2024, SCAG adopted the 2024-2050 Regional Transportation Plan/Sustainable Communities Plan (2024-2050 RTP/SCS, also known as Connect SoCal 2024). However, as part of the approval process for any SCS, CARB must accept that metropolitan planning organization's determination that the SCS would achieve the identified GHG emission reduction targets in the SCS. In the case of SCAG's 2024-2050 RTP/SCS, CARB has indicated in a letter to SCAG dated March 29, 2024 that the technological methodology utilized to quantify GHG emission reductions does not accurately quantify operational emissions. Thus, as of the date of preparation of this IS/MND, CARB has not yet accepted SCAG's determination that the 2024-2050 RTP/SCS would achieve identified GHG reduction targets, and the timing for acceptance is unknown. Accordingly, this IS/MND analyzes the project's consistency with the currently approved 2020-2045 RTP/SCS.

The project would be required to comply with the goals and policies of SCAG's Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). As shown in Table 4.11-3: SCAG RTP/SCS Consistency Analysis, the proposed Project would be consistent with the goals and policies of the plan. As such, no impacts related to regional plan inconsistency would occur.

Table 4.11-3
SCAG RTP / SCS Consistency Analysis

Goal / Principle / Strategy	Project Consistency
G1 Encourage regional economic prosperity and global competitiveness.	Not Applicable. This goal is directed toward SCAG as it relates to encouraging regional economic prosperity and global competitiveness and does not apply to individual development projects.
G2 Improve mobility, accessibility, reliability, and travel safety for people and goods.	Consistent. As an individual development, the project is limited in its ability to maximize mobility and access for people and goods in the SCAG region. However, the project would not create substantial traffic impediments that would affect the accessibility of goods in the region and it would provide added mobility in the immediate vicinity of the project through the incorporation of sidewalks and construction of ultimate road rights-of-way.

G3 Ensure the preservation, security, and resilience of the regional transportation system.	Not Applicable. As an individual development, the project is limited in its ability to ensure security and resilience of the regional transportation system. There are no components of the project that would result in the deterioration of the transportation system.
G4 Increase person and goods movement and travel choices within the transportation system.	Not Applicable. As an individual development, the project is limited in its ability to maximize the goods movement and travel choices within the SCAG region. However, the project would not create substantial traffic impediments and would not affect the accessibility of goods to the surrounding area.
G5 Reduce greenhouse gas emissions and improve air quality.	Consistent. While the project would not improve air quality or reduce greenhouse gas emissions, it would not prevent SCAG from implementing actions that would improve air quality within the region and the project would incorporate various measures related to building design, landscaping, and energy systems to promote the efficient use of energy, pursuant to Title 24 CALGreen Code and Building Energy Efficiency Standards and Consistent with Policy NR-1.9.
G6 Support healthy and equitable communities.	Consistent. The project would comply with Citywide goal and policies to support healthy and equitable communities. Additionally, the project would construct improvements, including sidewalks, which would encourage walking in the project area.
G7 Adapt to a changing climate and support an integrated regional development pattern and transportation network.	Consistent. This policy would be implemented by cities and the counties within the SCAG region as part of their overall planning efforts; the project however is consistent with residential use planned for the area.
G8 Leverage new transportation technologies and data-driven solutions that result in more efficient travel.	Not Applicable. This policy would be implemented by cities and the counties within the SCAG region as part of the overall planning and maintenance of the regional transportation system. The project would not conflict with this goal.
G9 Encourage development of diverse housing types in areas that are supported by multiple transportation options.	Consistent. The proposed project would develop 30 new residential lots and housing units in an area that is designated and zoned for residential development. The project area is served by roads, transit, bicycles and sidewalks.
G10 Promote conservation of natural and agricultural lands and restoration habitats.	Consistent. The proposed project would be consistent with goals and policies of the City's General Plan and would not cause significant environmental impacts to agricultural lands or biological resources.
P1: Base transportation investments on adopted regional performance indicators and MAP-21/Fast Act regional targets.	Not Applicable. This principle regarding transportation investments is directed toward SCAG and does not apply to individual development projects.
P2: Place high priority for transportation funding in the region on projects and programs that improve mobility, accessibility, reliability and safety, and that preserve the existing transportation system.	Not Applicable. This principle regarding funding is directed toward SCAG and does not apply to individual development projects.

P3: Assure that land use and growth strategies recognize local input, promote sustainable transportation options, and support equitable and adaptable communities.	Not Applicable. This principle regarding land use and growth strategies that recognize local input, promote sustainable transportation options, and supports equitable and adaptable communities is directed toward SCAG and does not apply to individual development projects.
P4: Encourage RTP/SCS investments and strategies that collectively result in reduced non-recurrent congestion and demand for single occupancy vehicle use, by leveraging new transportation technologies and expanding travel choices.	Not Applicable. This principle about encouraging investments and strategies that collectively result in reduced non-recurrent congestion and demand for single occupancy vehicle use is primarily directed toward SCAG and does not apply to individual development projects.
P5: Encourage transportation investments that will result in improved air quality and public health, and reduced greenhouse gas emissions.	Not Applicable. This principle is directed toward SCAG and does not apply to individual development projects.
P6: Monitor progress on all aspects of the Plan, including the timely implementation of projects, programs, and strategies.	Not Applicable. This principle about monitoring progress on all aspects of the plan is directed toward SCAG and does not apply to individual development projects.
P7: Regionally, transportation investments should reflect best-known science regarding climate change vulnerability, in order to design for long term resilience.	Not Applicable. This principle is directed toward SCAG and does not apply to individual development projects.
S1: Focus Growth Near Destinations and Mobility Options.	Consistent. The project would develop 30 new residential units in the Residential Low designation. The project has convenient access to an Omnitrans bus route (Route 2) at Kendall Avenue and Palm Avenue and a sbX Green Line route at the same location that is within 1.3 miles of the project site.
S2: Promote Diverse Housing Choices.	Consistent. The project would construct 30 residential units of various sizes in the Residential Low designation and is planned for the construction of additional accessory dwelling units.
S3: Leverage Technology Innovations.	Not Applicable. This broad strategy is directed toward SCAG and does not apply to individual development projects.
S4: Support Implementation of Sustainability Policies.	Not Applicable. This broad strategy is directed toward SCAG and does not apply to individual development projects.
S5: Promote a Green Region.	Not Applicable. This broad strategy is directed toward SCAG and does not apply to individual development projects.

Source: SCAG 2020-2045 RTP/SCS, 2020.

Mitigation Measures

No mitigation measures are necessary because impacts to Land Use and Planning will be less than significant.

Level of Significance After Mitigation

Not Applicable.

4.12 – 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?				☑

Sources

Information used to prepare this section is from the City of San Bernardino General Plan Update, 2005, Chapter 12 Natural Resources and Conservation.

Environmental Setting

According to the City's General Plan Update, Figure NRC-3 Mineral Resources, the City contains several areas within the San Bernardino region have been classified as Mineral Resource Zone 2 (MRZ-2). MRZ-2 areas indicate the existence of a construction aggregate deposit that meets certain State criteria for value and marketability based solely on geologic factors. The project site is located in the MRZ-3 zone, which designates areas containing mineral resources where the significance cannot be evaluated from available data.

Discussion

a-b) **No Impact.** The project site, located within an urbanized area of the City of San Bernardino, is predominately surrounded by residential uses and an elementary school. The General Plan, Natural Resources and Conservation chapter describes the importance of conservation of significant mineral deposits. The project site and adjacent lands are located within an MRZ-3 zone, where the significance of mineral deposits cannot be determined. These properties are fully developed with residential uses. Mineral production is not compatible with the project area due to urbanization and location of residential uses near the project site. Development would not result in the loss of a known mineral resource. No impact would occur.

Mitigation Measures

No mitigation measures are necessary because Mineral impacts will be less than significant.

Level of Significance After Mitigation

Not Applicable.

4.13 – 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 or 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?				☑

Sources

Information used to prepare this section is from the following sources: City of San Bernardino General Plan Update, *2005;* City of San Bernardino Municipal Code*; Tentative Tract Map No. 20150 Noise Impact Analysis, City of San Bernardino prepared by Urban Crossroads; United States Department of Transportation, Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual FTA Report No. 0123; and United States Environmental Protection Agency, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.*

Environmental Setting

The project proposes to subdivide 11.11 gross acres/9.69 net acres into 30 single-family residential lots for the development and construction of 30 single-family detached residential dwelling units. The project site is bordered by W. Meyers Road, W. Ohio Avenue and N. Magnolia Avenue. There are single-family detached residential dwelling units to the north, east, west and south with North Verdemont Elementary School across W. Meyers Road to the southwest and a small pocket park at the southeast corner of W. Meyers Road and N. Magnolia Avenue. The main noise sources in the area that could affect the project site would be associated with traffic along N. Magnolia Avenue, W. Meyers Road and W. Ohio Avenue and the adjacent elementary school site. The General Plan based exterior/interior traffic noise level projections on average daily traffic volumes (ADTs), topography, and the centerline distances from the subject roadways. Secondary noise sources would be associated with residences, such as air conditioning units and various maintenance activities including landscaping or home improvement.

Noise Terminology

The unit of measurement used to describe a noise level is the decibel (dB). The human ear is not equally sensitive to all frequencies within the sound spectrum. Therefore, the "A-weighted" noise scale, which weights the frequencies to which humans are sensitive, is used for measurements. Noise levels using A- weighted measurements are written dB(A) or dBA. Decibels are measured on a logarithmic scale, which means a doubling of the energy of a noise source, such as a doubled traffic volume, would increase the noise levels by 3 dBA; halving of the energy would result in a 3 dBA decrease.

Average noise levels over a period of minutes or hours are usually expressed as dBA Leq, or the equivalent noise level for that period of time. For example, Leq(3) would represent a 3-hour average. When no period is specified, a one-hour average is assumed.

It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA; that a change of 5 dBA is readily perceptible, and that an increase (decrease) of 10 dBA sounds twice (half) as loud. This definition is recommended by Caltrans publication, *Transportation's Traffic Noise Analysis Protocol for New Highway and Reconstruction Projects*.

Vibration

Groundborne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of groundborne vibrations typically only cause a nuisance to people, but at extreme vibration levels, damage to buildings may occur. Although groundborne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Groundborne noise is an effect of groundborne vibration and only exists indoors, since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

Noise Standards

State Regulations

State standards regulate noise levels of motor vehicles, sound transmission through buildings, occupational noise control, and noise insulation. Title 24 of the California Code of Regulations, also known as the California Building Standards Code, establishes building standards applicable to all occupancies throughout the state. The Code provides acoustical regulations for both exterior-to-interior sound insulation, as well as sound and impact isolation between adjacent spaces of various occupied units. Title 24 regulations state that interior noise levels generated by exterior noise sources shall not exceed 45 dBA Ldn/CNEL, with windows closed, in any habitable room for general residential uses.

City of San Bernardino General Plan

The San Bernardino Noise Guidelines for land Use planning reflects the City's interpretation of noise guidelines promulgated by the California Office of Noise Control. The guidelines provide the City with an integral tool to gauge the compatibility of land uses relative to existing and future noise levels. Based on guidelines, single-family detached residential dwelling units are considered to be normally acceptable in noise environments of up to 60 dBA CNEL and conditionally acceptable in noise environments that reach up to 70 dBA CNEL. New construction projects in areas where future noise levels are expected to range between 60-70 dBA CNEL should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

City of San Bernardino Municipal Code

The City's Municipal Code in Chapter 8.54 addresses noise controls. It prohibits any person from engaging in the following activities other than between the hours of 8:00 a.m. and 8:00 p.m. in residential zones per Section 8.54.050 Controlled Hours of Operation.

A. Operate or permit the use of powered model vehicles and planes.
B. Load or unload any vehicle, or operate or permit the use of dollies, carts, forklifts, or other wheeled equipment that causes any impulsive sound, raucous, or unnecessary noise within one thousand (1,000) feet of a residence.
C. Operate or permit the use of domestic power tools, or machinery or any other equipment or tool in any garage, workshop, house, or any other structure.
D. Operate or permit the use of gasoline or electric powered leaf blowers, such as commonly used by gardeners and other persons for cleaning lawns, yards, driveways, gutters, and other property.
E. Operate or permit the use of privately operated street/parking lot sweepers or vacuums, except that emergency work and/or work necessitated by unusual conditions may be performed with the written consent of the City Manager.
F. Operate or permit the use of electrically operated compressor, fan, and other similar devices.
G. Operate or permit the use of any motor vehicle with a gross vehicle weight rating in excess of ten thousand (10,000) pounds, or of any auxiliary equipment attached to such a vehicle, including, but not limited to, refrigerated truck compressors for a period longer than fifteen (15) minutes in any hour while the vehicle is stationary and on a public right-of-way or public space except when movement of said vehicle is restricted by other traffic.
H. Repair, rebuild, reconstruct, or dismantle any motor vehicle or other mechanical equipment or devices in a manner so as to be plainly audible across property lines

Vibration Standards

The City of San Bernardino does not have a published vibration impact criterion. The California Department of Transportation (Caltrans) has published one of the seminal works for the analysis of groundborne noise and vibration relating to transportation- and construction-induced vibrations and although the project is not subject to the regulations, it serves as a useful tool to evaluate vibration impacts. A vibration impact would generally be considered significant if it involves any construction-related or operations-related impacts in excess of 0.2 +inches per second (in/sec) PPV.

Discussion

a) **Less Than Significant Impact with Mitigation Incorporated.**

Ambient Noise

The primary source for existing ambient noise in the project area is from traffic along N. Magnolia Avenue, W. Ohio Avenue and W. Meyers Road. Noise contours for the City's roadways and freeways are presented in Figure N-2, Future Roadway Noise Contours. The two adjacent access roadways, N. Magnolia Avenue and W. Meyers Road are located outside of the contours for 60 CNEL as such outdoor ambient noise levels in the area of the project are expected to be below 70 CNEL conditionally acceptable standard. According to the Urban Crossroads Noise Impact Analysis on W. Meyers Road near North Verdemont Elementary School and existing residential homes, the

CNEL was measured at 59.6. To ensure satisfaction of the City of San Bernardino's 65 dBA CNEL exterior noise level standards for residential land use, the applicant is proposing to construct a new six-foot high block wall with a decorative cap along the project's perimeter property lines to reduce any potential impacts associated with the adjacent roadways.
The proposed project will be consistent with the City's exterior noise/land use compatibility criteria based on the Residential Low designation as it relates to W. Meyers Road, W. Ohio Avenue and N. Magnolia Avenue. The proposed project is expected to generate approximately 302 average daily trips (ADT). In no case will project generated vehicle traffic result in increases of more than 1 dBA along affected road segments. Project generated vehicular traffic volumes will not result in substantial increases in ambient noise levels. No mitigation is required.

Construction Noise Impacts

The project site's southerly boundary is W. Meyers Road which has a 60-foot right-of way. The northern boundary is W. Ohio Avenue which has a 60-foot right-of way. The eastern boundary is N. Magnolia Avenue at a 62-foot right-of way. Detached single-family residential uses around the proposed project site are located approximately 35 feet from the northwest boundary, approximately 75 feet from the southern boundary across W. Meyers Road, approximately 77 feet from the eastern boundary across N. Magnolia Avenue, and approximately 75 feet from the northeastern boundary across W. Ohio Avenue. North Verdemont Elementary School is across W. Meyers Road to the southwest and a small pocket park is located at the southeast corner of W. Meyers Road and N. Magnolia Avenue. The main noise sources in the area that could affect the project site would be associated with traffic along N. Magnolia Avenue, W. Meyers Road and W. Ohio Avenue and the adjacent elementary school site.

The project site lies adjacent to single-family residential dwellings that may be affected by short-term noise impacts associated with the transport of workers, the movement of construction materials to and from the project site, ground clearing, excavation, grading, and building activities. Project generated construction noise will vary depending on the construction process, type of equipment involved, location of the construction site with respect to sensitive receptors, the schedule proposed to carry out each task (e.g., hours and days of the week) and the duration of the construction work. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Site grading is expected to produce the highest sustained construction noise levels. A likely worst-case construction noise scenario during grading assumes the use of a grader, a dozer, a water truck (modeled as a dump truck), and a backhoe. Construction noise will have a temporary or periodic increase in the ambient noise levels above existing within the project vicinity. Table 4.13-1, Typical Construction Equipment Noise Levels identifies the level of noise generated by construction equipment associated with the development of residential housing.

Table 4.13-1
Typical Construction Equipment Noise Levels

Type	Lmax (dBA) at 50 Feet	Lmax (dBA) at 100 Feet
Air Compressor	80	74
Backhoe	80	74
Concrete Mixer	85	79
Dozer, Excavator, Grader, or Scraper	85	79
Generator	82	76
Paver or Roller	85	79
Pneumatic Tool	85	79
Pump	77	71

Saw, Electric	76	70
Truck	84	78

Source: FTA Transit Noise and Vibration Impact Assessment Manual, Sept. 2018.

The City of San Bernardino has set restrictions to control noise impacts from construction activities. Section 8.54.070 (Disturbances from Construction Activity) of the San Bernardino Municipal Code states that no person shall be engaged or employed, or cause any person to be engaged or employed, in any work of construction, erection, alteration, repair, addition, movement, demolition, or improvement to any building or structure except within the hours of 7:00 a.m. and 8:00 p.m.

The Municipal Code also exempts certain activities associated with the proposed project. Section 8.54.060(I) states that noise resulting from "Construction, repair, or excavation work performed pursuant to a valid written agreement with the City, or any of its political subdivisions, which provides for noise mitigation measures" are exempt from the provisions of Chapter 8.

While the City establishes limits to the hours during which construction activity may take place, it does not identify specific noise level limits for construction noise. Therefore, to evaluate whether the project will generate a substantial increase in the short-term noise levels at the offsite sensitive receptors (residences), the construction-related noise level threshold is based on the National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit (REL) for occupation noise exposure at 85 dBA, as an 8-hour time-weighted average (85 dBA – 8-hr TWA).

The highest equipment noise level as indicated in Table 4.13-1 will be equipment operating at 85 dBA. During the construction phase the noise levels will be the highest as heavy equipment pass along the project site boundaries. During the site preparation and the grading phase, equipment will not be stationary, rather equipment will be moving throughout the site and varying speeds and power levels and as a result not operating at the maximum noise level for the entire work day. From the center of the site to the nearest sensitive receptor is over 330-feet which would decrease the 85 dBA noise level to 68.6 dBA. These levels are below the NIOSH REL of 85 dBA 8-hour TWA, and would be less than significant. Construction noise is of short-term duration and will not present any long-term impacts on the project site or the surrounding area.

Through compliance with mandatory City requirements and ordinances to reduce noise during construction, the project's construction noise impacts will not result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project. Adherence to the allowed hours of operation, and implementation of the measure N-1 presented in below, will minimize construction noise impacts.

Operational Noise Impacts

Typical operational sound levels generated by single-family residential activities include normal outdoor conversations, air conditioner units, and lawn care equipment with levels as indicated below:

- Normal conversation, air conditioner - 60 dBA
- Gas-powered lawnmowers and leaf blowers – 80 to 85 dBA.6

Noise generated from air conditioners and lawn care equipment is not at constant and consistent levels throughout the day. Lawn care is performed during daylight hours for short durations and although air conditioners are operating both day and night they are cycling on/off with windows closed conditions. Noise levels would be attenuated as with mobile noise sources with standard building construction and windows closed by approximately 25 dBA.

The USEPA identifies noise levels affecting health and welfare as exposure levels over 70 dBA over a 24-hour period. Noise levels for various levels are identified according to the use of the area. Levels of 45 dbA are associated with indoor residential areas, hospitals, and schools, whereas 55 dBA is identified for outdoor areas where typical residential human activity takes place. According to the USEPA levels of 55 dbA outdoors and 45 dbA indoors are identified as levels of noise considered to permit spoken conversation and other activities such as sleeping, working, and recreation, which are part of the daily human condition. Levels exceeding 55 dbA in a residential setting are normally short in duration and not significant in affecting health and welfare of residents.

The proposed project is compatible with the noise compatibility criteria and noise contours as defined in the Comprehensive Land Use Plan for the SBIA and depicted in Figure LU-4 of the General Plan. Perimeter block walls will separate the residential lots from the adjacent roadways. The proposed project will adhere to current building code requirements regarding noise reduction features. The project's operational noise will be consistent with noise generally associated with single-family development. Impacts would be less than significant and as such impacts to the environment for noise are less than significant.

b) **Less Than Significant Impact.** A significant impact would occur if project construction or operation results in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

Construction activity can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. The City allows vibration from temporary construction. There are several types of construction equipment that can cause vibration levels high enough to annoy persons in the vicinity and/or result in architectural or structural damage to nearby structures and improvements. Table 4.13-2 Vibration Source Levels for Construction Equipment identifies ground vibration levels associated with several types of construction equipment.

Table 4.13-2
Vibration Source Levels for Construction Equipment

Equipment	PPV (in/sec) at 25 feet
Small bulldozer	0.003
Jackhammer	0.035
Loaded Trucks	0.076
Large Bulldozer	0.089

Source: FTA Transit Noise and Vibration Impact Assessment Manual, Sept. 2018.

For example, operation of a large bulldozer could reach up to 0.089 PPV at a distance of 25 feet. Groundborne vibration at sensitive receptors associated with this equipment would drop off as the equipment moves away. For example, as a bulldozer moves further than 100 feet from the sensitive receptors, the vibration associated with it would drop below 0.019 PPV. It should be noted that these vibration levels are reference levels and may vary slightly depending upon soil type and specific usage of each piece of equipment.

The primary effect of perceptible vibration is often a concern. However, secondary effects, such as the rattling of a china cabinet, can also occur, even when vibration levels are well below perception. Any effect (primary perceptible vibration, secondary effects, or a combination of the two) can lead to annoyance. The degree to which a person is annoyed depends on the activity in which they are participating at the time of the disturbance. For example, someone sleeping or reading will be more sensitive than someone who is running on a treadmill. Reoccurring primary and secondary vibration effects often lead people to believe that the vibration is damaging their home, although vibration levels are well below minimum thresholds for damage potential. Vibration can be annoying to people in buildings at a peak particle velocity (PPV) of 0.20. Due to the proximity of adjacent single-family detached residential dwelling units (as close as thirty-five-feet) from the northwestern site boundary, project construction activities within 15 feet of the dwelling units may result in groundborne vibration that is annoying. Annoyance is expected to be short-term, occurring only during site grading and preparation.

Ground-borne vibration levels resulting from construction activities occurring within the project site were estimated by data published by the Federal Transit Administration. Construction activities that would have the potential to generate low levels of ground-borne vibration within the project site include grading. Using the vibration source level of construction equipment provided on Table 4.13-2 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the project vibration impacts.

Table 4.13-3
Unmitigated Construction Equipment Vibration Levels

Distance to Construction Activity (Feet)	Receiver PPV Levels (in/sec)					RMS Levels (in/sec)[1]	Threshold	
	Small Bulldozer	Jack-hammer	Loaded Trucks	Large Bulldozer	Highest Vibration Level		Vibration Level	Exceeded?
35'	0.000	0.001	0.001	0.002	0.002	0.001	0.7	No
77'	0.000	0.000	0.000	0.001	0.001	0.000	0.7	No

Notes:

[1] Vibration levels in PPV are converted to RMS velocity using a 0.71 conversion factor identified in the Caltrans Transportation and Construction Vibration Guidance Manual, September 2013.

"PPV" = Peak Particle Velocity; "RMS" = Root Mean Square

Based on the reference vibration levels provided by the FTA, a large bulldozer represents the peak source of vibration with a reference velocity of 0.089 in/sec (PPV) at 25 feet. At distances ranging from 35 to 77 feet from project construction activities, construction vibration velocity levels are expected to approach 0.002 in/sec (PPV), as shown on Table 4.13-3. To assess the human perception of vibration levels in PPV, the velocities are converted to RMS vibration levels based on the Caltrans Transportation and Construction Vibration Guidance Manual conversion factor of 0.71. Table 4.13-3 shows the construction vibration levels in RMS are expected to approach 0.001 in/sec (RMS) at the nearby residential location to the northwest. Based on the vibration threshold of 0.7 in/sec, the construction-related vibration impacts are considered less than significant.

Further, vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating at the project site perimeter. Moreover, construction at the project site will be restricted to daytime hours consistent with City of San Bernardino requirements thereby eliminating potential vibration impacts during the sensitive nighttime hours.

c) **No Impact.** No airport land use plans apply to the area, and the proposed project site is not located within two miles of an airport. The project falls outside any airport’s noise contours for excessive noise. Therefore, residents or workers would not be exposed to excessive airport noise levels and there would be no impact.

Mitigation Measures

N-1: Prior to the issuance of grading and building permits, the contractor shall establish a Construction Management Plan that includes the following standards:

- Construction shall adhere to the allowable operable hours as denoted within the SBMC Chapter 8.54.
- During all project site excavation and grading on-site, construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturer standards.
- The contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the project site.
- Equipment shall be shut off and not left to idle when not in use.
- The contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and sensitive receptors nearest the project site during all project construction.
- The contractor shall limit the use of vibratory and/or heavy equipment along the project boundaries to the greatest degree possible.

Level of Significance After Mitigation

Less than significant level.

4.14 – 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 (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other			☑	
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				☑

Sources

Information used to prepare this section is from the following sources: State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties, and the State, January 1, 2021-2024. May 2024; City of San Bernardino General Plan Update, 2005 and *City of San Bernardino 2021-2029 Housing Element*, January 2024.

Environmental Setting

Estimated population of San Bernardino for January 1, 2023 was 226,541 and had an estimated 3.31 persons per household. According to the City's General Plan 2021-2029 Housing Element Table 4-7 *San Bernardino RHNA Status Summary*, the City estimates that a total of 8,123 new housing units are needed in varying income levels. These are based on SCAG's *Regional Housing Needs Assessment* for San Bernardino. The project site is currently designated as Residential in the City's General Plan and is zoned as RL (Residential Low).

Discussion

a) **Less Than Significant Impact.** The project consists of Subdivision 21-11 Tentative Tract Map 20539 (TTM) a request to allow the division of two parcels containing approximately 11.11-gross acres/9.69-net acres into 30 residential lots for the construction and use of single-family detached product together with the construction of the required on-site infrastructure improvements.

Using the State's factor of 3.31 persons per household, the project would generate 99 new residents in the City. The project site is an infill project in an area where existing residential already exists. The 99 new residents would represent a less than one percent increase to the City's current population. Therefore, the proposed project would not induce substantial population growth in the area either by building a large number of new dwellings or by extending infrastructure into an area not previously served. The project is directly bringing jobs during construction. Project employment represents approximately less than one percent of the city's project growth which is not substantial and is within the employment growth assumptions for the city. Due to the urban nature of the City and surrounding area, this potential minimal increase in population is expected to be accommodated by existing housing in the City and neighboring communities. Impacts will be less than significant.

b) **No Impact.** Replacement housing will not need to be constructed elsewhere as the proposal will not result in the displacement of substantial numbers of existing housing. No impacts to replacement housing will occur.

Mitigation Measures

No mitigation measures are necessary because impacts to Population and Housing will be less than significant.

Level of Significance After Mitigation

Not Applicable.

4.15 – 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, need for new of 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:				
Fire Protection?			☑	
Police Protection?			☑	
Schools?			☑	
Parks?			☑	
Other public facilities?			☑	

Sources

Information used to prepare this section is from the following sources: City of San Bernardino General Plan Update, Chapter 7, Public Facilities and Services, and Chapter 8, Parks, Recreation, and Trails, 2005; San Bernardino City Unified School District Website, www.sbcusd.com; State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties, and the State, January 1, 2021-2024 dated May 2024; and Great!Schools website, www.greatschools.org/school-district-boundaries-map.

Environmental Setting

Fire Protection

Fire protection and emergency medical response services are being provided by the San Bernardino County Fire District (SBCFD). The Valley Regional Service Zone was formed through a reorganization process effective July 1, 2008 per Local Agency Formation Commission Resolution 2997. This regional service zone provides fire protection and paramedic services to the City of San Bernardino (Stations #221, #222, #224, #225, #226, #227, #228, #229, #231, #232 and #233). Additionally, there are two voter approved special tax fire protection service zones for the Cities of San Bernardino and Upland, and three Community Facilities Districts that levy special taxes to fund fire protection services in the City of San Bernardino, Fontana Fire Protection District, and Glen Helen area. Service Zone FP-5 San Bernardino special tax was originally approved by the Board of Supervisors in April 2006 (originally under CSA 70 Zone FP-5). With the approval of LAFCO 3198, the City of San Bernardino's Fire Department was annexed into County Fire's Valley Regional Service Zone. The annexation included a special tax to fund fire protection and emergency medical response services within the City of San Bernardino. This special tax includes an annual inflationary increase of up to 3%. For 2022, the FP-5 special tax rate was $166.84 per parcel. Services are provided through Stations #221, #222, #224, #225, #226, #227, #228, #229, #231, #232 and #233. In 2004, Community Facilities District (CFD) 1033 was formed by the City of San Bernardino to provide funding for fire protection services in the City's Verdemont area through special taxes assessed on commercial parcels within the CFD. The administration of CFD 1033 was transferred from the City of San Bernardino to County Fire by issuance of the Certificate of Compliance for LAFCO 3198 in June 2016. Services are provided through Fire Station #232.

The SBCFD serves a San Bernardino resident population of over 221,130 and covers a diverse City service area of 60 square miles. In the City service area there are approximately 19 miles of wildland interface area, a major rail yard, an international airport, the County Seat, a correctional facility, two major mall complexes, and two major interstate freeways. The closest fire station (Station 232) is located at 6065 Palm Avenue, San Bernardino, approximately 1.2 miles southwest from the project site. The fire department also supplies emergency response personnel, firefighters/paramedics, and a Hazardous Materials Response Team.

The Department tries to adhere to standards recommended by the National Fire Insurance organization as well as the National Fire Protection Association. Those standards allow one minute alarm time, one minute turnout time (time it takes personnel to put on their turnout gear), and first units to respond to a fire or medical emergency within four minutes; the remaining equipment must respond within eight minutes.

Police Protection

The City of San Bernardino operates its own police force, providing a full range of law enforcement and community safety programs, including: field patrol, K-9, School Resource Officer (SRO), Drug Abuse Resistance Education (DARE), Street Crime Attack Team, investigations, traffic, narcotics, training/backgrounds, Strategic Weapons and Tactics, and crisis negotiations. The Police Department headquarters is located at 710 North D Street San Bernardino. The Northern District Office is located at 941 Kendall Drive. The project area is within the Northwest Division, Baker Beat B-1.

Schools

The Verdemont area of San Bernardino is served by the San Bernardino City Unified School District (SBCUSD). The District serves over 46,509 students. SBCUSD has 50 elementary schools, 11 middle schools, 10 high schools, and one adult education facility. The district provides kindergarten through 12th grade educational services and facilities to the City of San Bernardino. Schools that would serve the site are North Verdemont Elementary School, located at 3555 W. Meyers Road, San Bernardino (across W. Meyers Road from the project site), Cesar Chavez Middle School at the southwest corner of West Belmont Avenue and North Magnolia Avenue (6650 North Magnolia Avenue) approximately 0.6 mile away and Cajon High School at 1200 Hill Drive, San Bernardino approximately 4.4 miles away. SBCUSD currently charges Developer fees to offset impacts on influx of students from new developments. The residential developer fee is currently $4.79 per square foot.

Parks

See Section 4.16, Recreation for discussion on parks.

Other Public Services

Library services in San Bernardino are provided by the San Bernardino County Library System. The Baker Family Learning Center at 2818 Macy Street, Muscoy is the closest library facility to the Verdemont area. It is approximately 5.3 miles south of the project site. The library provides a full range of resources, including: books, movies, computers, and internet access.

Discussion

a) **Less Than Significant Impact.** The project would have a less than significant impact on San Bernardino County Fire Department's ability to provide fire protection services to the project site. The 30-lot subdivision and housing project is an infill development in an area with residential development adjacent to the property. The San Bernardino County Fire Department currently has a service response goal of one minute alarm time, one minute turnout time (time it takes personnel to put on their turnout gear), and first units to respond to a fire or medical emergency within four minutes; the remaining equipment must respond within eight minutes, based on the NFPA 1710 standards.

The nearest Fire Station (Station 232) is located at 6065 Palm Avenue, San Bernardino, approximately 1.2 miles southwest from the project site. The Station has a current operating apparatus of: one brush engine, and one medic engine. Based on the project's close proximity to Station 232, service response goals for San Bernardino County Fire Department in respect to the project location will be met. The developer will be required to pay the City's development impact fees for Fire Service which will help fund fire services necessary to protect the City of San Bernardino. The project is a proposed infill site. The project is within 5-minute proximity to a fire station. Therefore, the project would not have a significant impact on fire response times and would not otherwise create a substantially greater need for fire protection services than already exists. No new or expanded fire protection facilities would be required as a result of this project. Impacts related to expansion of fire protection services will be less than significant.

b) **Less Than Significant Impact.** The 30-lot subdivision and housing project is an infill development in an area that is primarily residential development. The San Bernardino Police Department headquarters is located at 710 North D Street San Bernardino. The Northern District Office is located at 941 Kendall Drive. The department consists of 255 sworn positions and 150 civilian support staff, according to the City's Police Department website. Generally, the desired officer to resident ratio is 1:1000. Currently, based on the California Department of Finance E-5 Report, the population of San Bernardino is estimated to be 223,230 people. The officer-to-1000 resident ratio is currently estimated to be 1.14 [255/(223,230/1000)=1.14].

Based on a family of 3.31 persons in each home, the proposed project has the potential to increase the population of the City by 99 residents. Funding for services by the Department is derived from the City's General Fund, and state and federal grants. The proposed residential subdivision and housing development will not result in any unique or more extensive crime problems that cannot be handled with the existing level of police resources. No new or expanded police facilities would need to be constructed as a result of this project. Impacts related to expansion of police protection services will be less than significant.

c) **Less Than Significant Impact.** The Verdemont area of San Bernardino is served by the San Bernardino City Unified School District (SBCUSD). The district provides kindergarten through 12th grade educational services and facilities to the City of San Bernardino. Schools that would serve the site are North Verdemont Elementary School, located southwest of the project site at 3555 W. Meyers Road, San Bernardino, Cesar Chavez Middle School at the southwest corner of West Belmont Avenue and North Magnolia Avenue (6650 North Magnolia Avenue) approximately 0.6 miles away and Cajon High School at 1200 Hill Drive, San Bernardino approximately 4.4 miles away.

Based on the estimated student generation rates provided by the SBCUSD, it is estimated that the project could generate 25 students. There would be 14 elementary aged children (0.4451 x 30), 5 middle school students (0.1577 x 30) and 6 high school students (0.1859 x 30) generated by this proposed project. These students may or may not be totally new to the district; families may relocate to the proposed development from other parts of the district, merely shifting the student population from other areas of the District.

Pursuant to the Leroy F. Green School Facilities Act (AB 2926), the project proponent will be required to pay developer fees prior to the issuance of building permits. The SBCUSD charges a Residential Developer Fee in the amount of $5.17 per square foot (July 8, 2024) to mitigate for students generated from new residential developments. This fee will help support provision of school services for the community as a whole. According to AB 2926, payment of developer fees constitutes adequate mitigation for any project-related impacts to school facilities. Impacts to the school facilities will be less than significant.

d) Less Than Significant Impact. Demand for park and recreational facilities are generally the direct result of residential development. The project will contribute a total of 99 new residents. There is a pocket park at the southeast corner of W. Meyers Road and N. Magnolia Avenue. The nearest neighborhood park to the project site is Al Guhin Park at 3664 Little League Drive (Little League Dr. and Palm). The park is 28 acres with open play areas, picnic shelter, 11 picnic tables, restroom, 2 full basketball courts and amphitheater.

According to City of San Bernardino General Plan Policy 8.1.1, 5.0 acres of parkland is required for every 1,000 residents. The project would generate a demand for approximately 0.50 acres of parkland. Although the project provides private open space on-site, it does not propose any public parks. The City of San Bernardino Municipal Code, Chapter 3.27, requires the subdivider, as a condition of approval of a tentative map, to pay a fee in lieu, dedicate land, or both, at the discretion of the Council for park and/or recreational purposes according to the Subdivision Map Act, Government Code Section 66477. The project is proposing to pay an in-lieu fee. The project's contribution of Development Impact fees for park and recreation facilities within the City would result in a less than significant impact.

e) Less Than Significant Impact. The 30-lot subdivision and housing project will result in a limited population growth; however, will not require expansion of any other public services such as libraries or hospitals. The closest public library to the project site is the Baker Family Learning Center at 2818 Macy Street, Muscoy which is approximately 5.3 miles southwest of the site. Library services in San Bernardino are provided by the San Bernardino County Library System. The project is not anticipated to impact the libraries in the community because an increase in the population of up to 99 people would represent less than one percent of the City's estimated 2024 population. No substantial demand for other services or facilities will result. Impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary because impacts to Public Services will be less than significant.

Level of Significance After Mitigation

Not Applicable.

4.16 – 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?			☑	

Sources

Information used to prepare this section is from the following sources: City of San Bernardino General Plan Update, Chapter 8, Parks, Recreation, and Trails, 2005; and State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties, and the State, January 1, 2021-2024 dated May 2024.

Environmental Setting

According to the City's Parks, Recreation and Community Services Department, the city has 34 parks and fields located throughout the City. The nearest park to the project is Al Guhin Park at 3664 Little League Drive (Little League Dr. and Palm). The park is 28 acres with open play areas, picnic shelter, 11 picnic tables, restroom, 2 full basketball courts and amphitheater.

The San Bernardino Parks, Recreation and Community Services Department also operate community and recreation centers for residents. Verdemont Community Center is located at 3664 Little League Park, approximately 0.8 miles west of the project site. The community centers that offer a variety of leisure and social activities for all ages and cultural interest such as youth and adult sports, summer and off track lunch program, teen and youth clubs, tutoring, arts and crafts, senior nutrition, family night, etc. The centers also act as a focal point for collaboration and partnership with other organizations and agencies to provide specialized services and resources such as the HeartSmart Program, ESL, teen pregnancy prevention programs, immunization, health screenings, food distribution, and Headstart.

Discussion

a) **Less Than Significant Impact.** Implementation of the proposed 30-lot subdivision and housing project could result in an increase in population of approximately 99 persons based on a family of 3.31 persons (2024 State Department of Finance E-5 Report). Therefore, the demand for recreation facilities will grow. This project will incrementally increase the use of some types of recreational facilities in the City of San Bernardino. The developer must pay development impact fees for the City's parks based on the number of dwelling units in the subdivision. The Quimby Act of 1975 requires cities to pass ordinances requiring that developers set aside land, donate conservation easements, or pay fees for park improvements. Revenues generated through the Quimby Act cannot be used for the operation and maintenance of park facilities. In addition to fees for future park land, the City's Parks, Recreation and Community Services Department offers programs that can be used by residents for a fee (the cost is dependent on the type of class/program and length of the class/program). Therefore, the project's impact on the City's park and recreation facilities and programs would be less than significant and no mitigation is required.

b) **Less Than Significant Impact.** The proposed project is a 30-lot residential subdivision and housing development. The project will not include any recreational facilities. The site currently contains a vacant lot, with no existing recreational facilities on or near the project site, and is designated for residential use, which allows for single-family detached uses in the Residential Low zoning classification. As described throughout this Initial Study, the construction of the proposed project would not cause a significant adverse physical effect on the environment under any issue. No recreational facilities are required to serve the project, thus any impacts under this issue are considered less than significant. No mitigation is required. The project's contribution of Development Impact fees for park and recreation facilities within the City would result in a less than significant impact

Mitigation Measures

No mitigation measures are necessary because Recreation impacts will be less than significant.

Level of Significance After Mitigation

Not Applicable.

4.17 – Transportation

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a) Conflict with an applicable program plan, ordinance or policy establishing measures of effectiveness for the performance of addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?			☑	
b) Would the project 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 uses (e.g., farm equipment)?				☑
d) Result in inadequate emergency access?			☑	

Sources

Information used to prepare this section is from the following sources: San Bernardino Associated Governments, San Bernardino County Congestion Management Program 2016 Update, June 2016; California Emissions Estimator Model version 2022.1.1.21; City of San Bernardino General Plan Update, 2005; TJW Engineering, Inc., Tentative Tract Map No. 20539 Traffic Impact Analysis, San Bernardino, California dated March 28, 2023; and TJW Engineering, Inc., Tentative Tract Map No. 20539 Vehicle Miles Traveled (VMT) Analysis, San Bernardino, California dated October 18, 2022.

Environmental Setting

The proposed project is the subdivision of 11.11-gross acres/9.69-net acres for the development of 30 single-family homes (under Tentative Tract Map (TTM) 20539) located on W. Meyers Road at N. Magnolia Avenue in the Verdemont area of the City of San Bernardino. The project is estimated to generate a net total of approximately 302 daily vehicle trips.

The General Plan designates the entire area as Residential. Primary access to the site will be from W. Meyers Road, which has been designated as a Local-Collector with a 60-foot right-of-way. The designation of the street as a Local-Collector and the existing configuration of the travel lanes, intersections, etc. are consistent with the General Plan Circulation Element and Map. Accessibility to the new development will be provided via two cul-de-sacs off of W. Meyers Road. The local roads (Dawn Court and Dusk Court) will 60 feet in ultimate right-of-way, as illustrated on TTM 20539.

According to the General Plan Circulation Element, there is public transit within proximity that could potentially service future residents within the project. There is an Omnitrans bus route (Route 2) at Kendall Avenue and Palm Avenue and a sbX Green Line route at the same location.

Discussion

a) **Less than Significant Impact.** Access to the site is available from W. Meyers Road, N. Magnolia Avenue and W. Ohio Avenue, all paved improved streets located adjacent to the southern, eastern and northern boundaries of the site, respectively. No additional roadway dedications are necessary to develop the project site. The project off-site improvements are predominately related to the project’s frontage along W. Meyers Road, N. Magnolia Avenue and W. Ohio Avenue. They include the construction of road sections, new curbs and gutters, new sidewalks and new walls/fencing, the installation of landscaping within the road rights-of-way, the construction/installation of drainage improvements, sewer and water systems, and the construction/installation of new dry utilities. All construction activities will take place within the existing right-of-ways. Vehicular access will be provided via two interior 60-foot right-of-way streets (Dawn Court for lots 1 through 15, and via Dusk Court for lots 16 through 30). The project meets City of San Bernardino fire access standards. Parking will be provided for each dwelling in conformance with San Bernardino Municipal Code standards.

The applicant prepared a Traffic Scoping form for the proposal, which was reviewed by the City's Traffic Engineer to determine whether or not a Traffic Impact Analysis was required. The City Engineer's determined that a Traffic Impact Analysis was required because the vehicle trips generated by the proposal exceeded 250 daily trips. The proposed project is projected to generate 302 daily trips, 22 AM peak hour trips, and 30 PM peak hour trips. As the project is consistent with the General Plan designation, it is forecast to result in no significant traffic impacts for project completion traffic conditions, with implementation of the identified improvements. Incremental but not significant impacts are noted at the study intersections with completion of the proposed project. Because there are no significant impacts, no direct traffic mitigation measures are required or recommended for the project.

The General Plan requires that all City streets be constructed, maintained, and rehabilitated in an adequate, safe, and interconnected system of transit, pedestrian and bicycle paths in accordance with the Circulation Plan (Figure C-2) and the standards established by the Public Works Department. The project applicant will be responsible for the construction of the following improvements as part of on-site improvements including the construction of W. Meyers Road, N. Magnolia Avenue and W. Ohio Avenue along the property frontage at their ultimate half-section width. The proposed project driveways shall be constructed in conformance with City of San Bernardino standards, including provisions for sight distance requirements. On-site traffic signing and striping shall be submitted for City approval in conjunction with detailed construction plans for the project. Off-street parking shall be provided to meet City of San Bernardino Development Code requirements.

Based on the City's thresholds of significance the addition of project generated trips is forecast to result in no significant impacts at the study intersections for project opening year (2026) with project conditions.

OmniTrans provides bus service to the City of San Bernardino. There is an Omnitrans bus route (Route 2) at Kendall Avenue and Palm Avenue and a sbX Green Line route at the same location that is within 1.3 miles of the project site. The project is not proposing any roadway improvements that interfere with the existing bus route or future transit bus stops.

Pedestrian and bicycle access will be available to the project site from W. Meyers Road, N. Magnolia Avenue and W. Ohio Avenue via sidewalks and the street travel lanes. The nearest designated bicycle route is on Palm Avenue to the southeast as shown on General Plan Figure PRT-2. In conclusion, the project would not conflict with an applicable plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.

b) **Less than Significant Impact.** Trip generation is a measure or forecast of the number of trips that begin or end at a particular site, and is a function of the extent and types of land use proposed as part of a project. Vehicular traffic generation characteristics for projects are estimated based on established rates. These rates identify the probable traffic generation of various land uses based on studies of developments in comparable settings. Vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact. Generally, projects within one-half mile of either an existing major transit stop or a stop along an existing high quality transit corridor should be presumed to cause a less than significant transportation impact. Projects that decrease vehicle miles traveled in the project area compared to existing conditions should be considered to have a less than significant transportation impact.

The trip generation rates used in this analysis were determined based on the TJW Engineering estimates based on the original application consisting of 32 residential lots. The project is estimated to generate a net total of approximately 302 daily vehicle trips. Based on the zoning classification of Residential Low, the property could yield a maximum of 30 dwelling units. The applicant prepared a Traffic Scoping form for the proposal, which was reviewed by the City's Traffic Engineers to determine whether or not a Traffic Impact Analysis was required. The City Engineer's determined that a Traffic Impact Analysis was required because the vehicle trips generated by the proposal exceeded 250 daily trips. The project was assessed using the San Bernardino County Transportation Authority's (SBCTA) screening tool. The result found that the project is within a low VMT generating area per the SBCTA screening tool. The year 2022 project VMT per service population would be 20.7, which is 34.5 percent below the City's threshold of 31.6. The cumulative project VMT per service population would be 21.5, which is 31.83 percent below the City's threshold of 31.6. The project's effect on VMT would not be considered significant as both the City-wide roadway VMT and the roadway VMT within an 11-mile radius would be reduced with the implementation of the project. It should be noted that the link-level VMT within an 11-mile radius is much higher than within the City boundary because there are segments of I-215, I-15, I-10, and SR-60 located within the 11-mile radius boundary.

There is an Omnitrans bus route (Route 2) at Kendall Avenue and Palm Avenue and a sbX Green Line route at the same location that is within 1.3 miles of the project site. Accordingly, proposed project VMT impacts related to transportation projects would be less than significant and the project will not conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b).

c) **No Impact.** A significant impact would occur if the proposed project substantially increased an existing hazardous geometric design feature or introduced incompatible uses to the existing traffic pattern. Access to the site is available from W. Meyers Road, N. Magnolia Avenue and W. Ohio Avenue, all paved improved streets located adjacent to the southern, eastern and northern boundaries of the site, respectively. No additional roadway dedications are necessary to develop the project site. Vehicular access will be provided via two interior 60-foot right-of-way streets (Dawn Court for lots 1 through 15, and via Dusk Court for lots 16 through 30).

The design of the proposed project would comply with all applicable City regulations. Furthermore, the proposed project does not involve changes in the alignment of W. Meyers Road, W. Ohio Avenue or N. Magnolia Avenue, which are adjacent to the project site. Where the project site meets W. Meyers Road and N. Magnolia, the roadways are nearly at grade with the project site. No line of sight issues will occur due to undulations in the road. Sight distance at the project access shall comply with standard California Department of Transportation and City of San Bernardino sight distance standards. The final grading, landscaping, and street improvement plans shall demonstrate that sight distance standards are met. Such plans must be reviewed by the City and approved as consistent with this measure prior to issue of grading permits. The applicant will be constructing W. Meyers Road, N. Magnolia Avenue and W. Ohio Avenue at their ultimate half-section width including landscaping and parkway improvements in conjunction with development, as necessary. The project design will be in accordance with City standards and, therefore, there will be no impact cause by hazardous design features.

d) **Less Than Significant Impact.** A significant impact would occur if the design of the proposed project would not satisfy emergency access requirements of the San Bernardino Fire Department or in any other way threaten the ability of emergency vehicles to access and serve the project site or adjacent uses. The proposed project would not result in inadequate emergency access. As discussed above, access to the project site is proposed via W. Meyers Road. The roadway is of sufficient length to provide access to fire and emergency vehicles and is consistent with the California Fire Code. All access features are subject to and must satisfy the City of San Bernardino and San Bernardino County Fire Department design requirements. This project would not result in adverse impacts with regard to emergency access.

Mitigation Measures

No mitigation measures are necessary because Transportation impacts will be less than significant.

Level of Significance After Mitigation

Not Applicable.

4.18 – 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 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 Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.		☑		

Sources

Information used to prepare this section is from the following sources: Email dated June 12, 2023 from Ryan Nordness, Cultural Resource Analyst from the Yuhaaviatam of San Manuel Nation and City of San Bernardino General Plan Update, 2005.

Environmental Setting

As of July 1, 2015, California Assembly Bill 52 (AB 52) was enacted and expanded CEQA by establishing a formal consultation process for California tribes within the CEQA process. The bill specified that any project may affect or cause a substantial adverse change in the significance of a tribal cultural resource would require a lead agency to "begin consultation with a California Native American tribe that is traditional and culturally affiliated with the geographic area of the proposed project." Section 21074 of AB 52 also defined a new category of resources under CEQA called "tribal cultural resources." Tribal cultural resources are defined as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe" and is either listed on or eligible for the California Register of Historical Resources or a local historic register, or if the lead agency chooses to treat the resource as a tribal cultural resource.

On February 19, 2016, the California Natural Resources Agency proposed to adopt and amend regulations as part of AB 52 implementing Title 14, Division 6, Chapter 3 of the California Code of Regulations, CEQA Guidelines, to include consideration of impacts to tribal cultural resources pursuant to Government Code Section 11346.6. On September 27, 2016, the California Office of Administrative Law approved the amendments to Appendix G of the CEQA Guidelines, and these amendments are addressed within this environmental document.

Chapter 532 Statutes of 2014 (i.e., AB 52) requires that lead agencies evaluate a project's potential impact on "tribal cultural resources." Such resources include "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are eligible for inclusion in the California Register of Historical Resources or included in a local register of historical resources." AB 52 also gives lead agencies the discretion to determine, based on substantial evidence, whether a resource qualifies as a "tribal cultural resource."

In compliance with AB 52, the City of San Bernardino distributed letters to numerous Native American tribes notifying each tribe of the opportunity to consult with the City regarding the proposed project. The tribes were identified based on previous requests to be notified of future projects proposed by the City. Please note that the San Manuel Band of Mission Indians (SMBMI) has changed their Tribe's name to the Yuhaaviatam of San Manuel Nation (YSMN).

Discussion

a) **Less Than Significant Impact.** Background research was conducted including historical maps of the Verdemont area, and aerial/satellite photographs of the project vicinity. The maps consulted were primarily USGS topographic quadrangles dated 1901-1996, which were accessible at the USGS website. The aerial photographs are available through the Google Earth software.

The San Bernardino General Plan suggests that project area is relatively low in sensitivity for cultural resources from the historic period. No buildings, structures, objects, sites, features, or artifacts of prehistoric or historical origin are within or adjacent to the project area.

CEQA establishes that a project that may cause a substantial adverse change in the significance of a "historical resource" or a "tribal cultural resource" is a project that may have a significant effect on the environment (PRC §21084.1-2). "Substantial adverse change," according to PRC §5020.1(q), "means demolition, destruction, relocation, or alteration such that the significance of a historical resource would be impaired." No "historical resources" are within or adjacent to the project area. Therefore, the proposed project would not have a significant impact to a historical resource, as defined in PRC Section 5020.1(k). Thus, impacts to a listed or eligible resource under the California Register of Historical Resources or a local register as defined under Public Resources Code section 5020.1(k) are anticipated to be less than significant.

b) **Less Than Significant Impact with Mitigation Incorporated.** On June 2, 2023, the City of San Bernardino sent out letters compliance with AB52 to the following Tribes:

Andrew Salas, Chairperson, Gabrieleño Band of Mission Indians-Kizh Nation;
Jessica Mauck, Cultural Resources Analyst, San Manuel Band of Mission Indians;
Joseph Ontiveros, Tribal Historic Preservation Officer, Soboba Band of Luiseño Indians.

No response was received from the Soboba Band of Luiseño Indians or the Gabrieleño Band of Mission Indians – Kizh Nation. The Yuhaaviatam of San Manuel Nation responded pursuant to

AB52 on June 12, 2023. They indicated that the proposed project area exists within their ancestral territory and, therefore, is of interest to the Tribe. However, due to the nature and location of the proposed project, and given the CRM Department's present state of knowledge, YSMN does not have any concerns with the project's implementation, as planned, at the present time. YSMN requested that the language be made a part of the project/permit/plan conditions. See Mitigation Measures below.

Given the level of previous disturbance within the project site, it is not expected that any tribal cultural resources as defined in Public Resources Code Section 21074 would occur within the project area. There are no known site, feature, place, cultural landscape, sacred place, or object with cultural value to a California Native American Tribe has been identified as a Tribal Cultural Resource within the project limits. The site is within an urbanized area of the City. However, there is the potential for the project to affect previously unidentified Native American tribal cultural resources. Mitigation Measure TCR-1 and TCR-2 have been identified to mitigate this potential impact to tribal cultural resources.

Mitigation Measures

TCR-1: The Yuhaaviatam of San Manuel Nation Cultural Resources Department (YSMN) shall be contacted of any pre-contact cultural resources discovered during project implementation, and be provided information regarding the nature of the find, so as to provide Tribal input with regards to significance and treatment. Should the find be deemed significant, as defined by CEQA (as amended, 2015), a Cultural Resources Monitoring and Treatment Plan shall be created by the archaeologist, in coordination with the Yuhaaviatam of San Manuel Nation, and all subsequent finds shall be subject to this plan. This plan shall allow for a monitor to be present that represents YSMN for the remainder of the project, should the Yuhaaviatam of San Manuel Nation elect to place a monitor on-site.

TCR-2: Any and all cultural documents created as a part of the project (isolate records, site records, survey reports, testing reports, etc.) shall be supplied to the applicant and Lead Agency for dissemination to the Yuhaaviatam of San Manuel Nation. The Lead Agency and/or applicant shall, in good faith, consult with the Yuhaaviatam of San Manuel Nation throughout the life of the project.

Level of Significance After Mitigation

Compliance with MM TCR-1 and TCR-2 would mitigate potential impacts to tribal cultural resources to a less than significant level.

4.19 – 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, or 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?			☑	

Sources

Information used to prepare this section is from the following sources: CalRecycle Website (http://www.calrecycle.ca.gov/); Water Systems Consulting, Inc. and Woodard & Curran, June 2021, 2020 Upper Santa Ana River Watershed Integrated Regional Urban Water Management Plan; City of San Bernardino Water Department, Water Reclamation Plant Facilities Assessment and Master Plan May 2020; County of San Bernardino, 2018, Countywide Summary Plan, Countywide Integrated Waste Management Plan; and City of San Bernardino General Plan Update, 2005.

Environmental Setting

Water

The City of San Bernardino Department of Public Works Water Division provides water services to Verdemont area of the City of San Bernardino. The proposed project site is located in the area served by the San Bernardino Water District.

Wastewater

The City of San Bernardino owns, operates, and maintains the local public sanitary sewer system, which includes a wastewater collection system and treatment plant that serve most properties within the City limits. The sewer system serves all of the City's incorporated areas and accepts wastewater from outside the city limits.

Solid Waste Service

The City of San Bernardino has contracted Burrtec with solid waste collection services. Burrtec provides curbside pickup for regular trash, green waste, and recyclables. According to the Burrtec website, they also offer bulky item pick-up, Christmas tree recycling, electronic waste, and used motor oil collection upon request. Solid waste that is collected from the City is routed to the Mid-Valley Sanitary Landfill, located within City limits north of the 210 Freeway. The Mid-Valley Sanitary Landfill is owned and operated by the County of San Bernardino Solid Waste Management Division. The landfill encompasses 498 acres, 222 of which are being used for waste disposal activities. The landfill is permitted to accept 7,500 ton/day of solid waste.

Discussion

a) **Less Than Significant Impact.**

Water

The City operates its own municipal water supply and distribution system, which provides water service to much of the City of San Bernardino, including the project site. Sections 10910-10915 of the State Water Code require the preparation of a water supply assessment (WSA) demonstrating sufficient water supplies for any subdivision that involves the construction of more than 500 dwelling units, or the equivalent thereof. As the project is below the established thresholds, no WSA is required. The proposed project site is located in the area served by the San Bernardino Municipal Water District. There is an existing 8-inch domestic water line in W. Meyers Road. Connections to local water main would involve temporary and less than significant construction impacts that would occur in conjunction with other on-site improvements. The project would not alter or impact any existing water treatment facilities, and would not substantially increase demand so as to require expansion of existing or new facilities.

Wastewater

The project is proposing to connect to the 8-inch sewer main in W. Meyers Road. Connections to local sewer main would involve temporary and less than significant construction impacts that would occur in conjunction with other on-site improvements. No additional improvements are anticipated to either sewer lines or treatment facilities to serve the proposed project. Standard connection fees will address any incremental impacts of the proposed project.

Wastewater use for the project was estimated using the California Emissions Estimator Model (CalEEMod). The model can estimate wastewater usage for analysis in CEQA documents. The Project is estimated to have an indoor water demand of 1,333,798 gallons per year (3,654 gallons per day) which includes wastewater, assuming that all the water is discharged to the sewer system. Wastewater collection will be provided by San Bernardino Municipal Water Department. All wastewater generated by the proposed project would be routed to and treated by the San Bernardino Water Reclamation Plant (SBWRP). The SBWRP is considered to be a Publicly Owned Treatment Works (POTW), so operational discharge flows treated at the SBWRP would be required to comply with waste discharge requirements contained within the WDRs for that facility. The current permitted capacity of the Plant is 33 MGD. The SBMWD 2020 UWMP showed that the City's collection system has sufficient capacity to handle peak dry-weather flows. The project density was included in the assumptions for the Residential Low land use designation in the SBMWD 2020 UWMP. Compliance with condition or permit requirements established by the City, and waste discharge requirements at the SBWRP would ensure that discharges into the wastewater treatment facility system from the operation of the proposed project would not exceed applicable Santa Ana Regional Water Quality Control Board wastewater treatment requirements. Expected wastewater flows from the proposed project will not exceed the capabilities of the serving treatment plant. Therefore, the project will result in less than significant impacts as a result of new or expanded wastewater treatment facilities. No mitigation is required.

Drainage

Storm drains and flood control facilities within the area include natural and man-made channels, storm drains, street waterways, natural drainage courses, basins, and levees. Storm drain and flood control facilities are administered by the City of San Bernardino, San Bernardino County Flood Control District, and ACOE. Design and construction of storm drains and flood control facilities are the responsibility of the City of San Bernardino Public Works Department. The proposed project would drain to two detention/infiltration basins on-site via a network of storm drain pipes, and concrete swales. The proposed detention/infiltration basins would discharge to a proposed pipe located south of the project site, via the proposed outfall structure in the detention basins. Discharges would converge with the existing 84-inch storm drain at Meyers Road. Details of the proposed drainage system have been be reviewed and will be approved as part of the final permit design package by the Public Works Staff. Therefore, no significant adverse impact is identified or anticipated, and no mitigation measures are required.

Electric Power

The project will be served with a new underground electric distribution system which connects to the existing power lines on N. Magnolia Avenue. The power lines adjacent to N. Magnolia Avenue will require undergrounding as part of this project. A private street light system will be constructed within the tract. Southern California Edison (SCE) will provide electricity to the site and the power distribution system located adjacent to the site will be able to supply sufficient electricity. The effort to connect to the existing electrical system and to install electricity connections within the project site to serve future residents of Tentative Tract Map No. 20539 with electricity is not anticipated to result in significant impacts as 30 dwelling units are being proposed in an area that has be planned for Residential Low densities and existing services are adjacent to the project site. Therefore, development of the project would not result in a significant environmental effect related to the relocation or construction of new or expanded electric power facilities. Impacts are less than significant.

Natural Gas

Natural gas will be supplied by Southern California Gas. The site will require a connection to the existing natural gas line adjacent to the project site. The effort to connect to the existing gas line within the adjacent roadway, and to install natural gas lines within the project site to serve future residents of the project with natural gas is not anticipated to result in significant impacts as 30 dwelling units are being proposed in an area that has be planned for Residential Low densities and existing services are adjacent to the project site. Therefore, development of the project would not result in a significant environmental effect related to the relocation or construction of new or expanded natural gas facilities. Impacts are less than significant.

Telecommunications

Development of the project would require a connection to telecommunication services, such as wireless internet service and phone service. This can be accomplished through connection to existing services that are available to the developer at the project site. Therefore, development of the project would not result in a significant environmental effect related to the relocation or construction of new or expanded telecommunications facilities. Impacts are less than significant.

b) **Less Than Significant Impact.**

The project site would be served with potable water by the San Bernardino Municipal Water District (SBMWD). The Urban Water Management Planning Act requires every public and private urban water supplier that directly or indirectly provides water for municipal purposes to prepare and adopt an urban water management plan (UWMP) and update its plan once every five years. The Act requires that a UWMP assess water supply reliability by comparing total projected water use with the expected water supply over the next twenty years in five-year increments. The Act also requires an assessment of single-dry years and multiple-dry years. Water supply and demand for SBMWD is included in the 2020 Upper Santa Ana River Watershed, Integrated Regional Urban Water Management Plan (Part 2, Chapter 8) which summarizes SBMWD water supply availability as follows: "SBMWD's water supply is comprised entirely of groundwater from the Bunker Hill Basin (part of the San Bernardino Basin Area)." SBMWD does not currently purchase imported SWP water or other supplies for direct use. SBMWD participates in the San Bernardino Basin (SBB) Groundwater Council, which utilizes imported water to recharge the basin. Groundwater currently supplies the 100% of SBMWD's total supply, and SBMWD will continue to rely on groundwater as its preferred source of supply. SBMWD participates in several ongoing water conservation measures and contributes to regional recharge projects through the SBB Groundwater Council to optimize and enhance the use and reliability of local groundwater water resources.

The development of 30 houses would use approximately 12,000 gallons per day (gpd) of water, estimating 400 gpd per household, or 4,380,000 gallons per year. It would generate a marginal increase in additional demand for water, relative to overall existing citywide demand. As the Integrated Regional Urban Water Management Plan anticipates an overall increase in demand associated with development in the area over 2020 conditions, and the water demand for this project is within that demand assumption, impacts would be less than significant. There are sufficient water supplies in the City to meet the project's estimated water demand. The project would not substantially deplete water supplies, and the project would have a less than significant impact on entitled water supplies.

The project would be required to comply with Water Wise Landscaping of the City of San Bernardino Municipal Code, which would lessen the project's demand for water resources. Also, CBC Title 24 water efficiency measures require a demonstrated 20 percent reduction in the use of potable water. The project's landscaping plans will include drought tolerant landscaping materials. Compliance with Title 24 and the City's Water Wise standards will reduce the proposed project's impacts to groundwater supplies to a level of less than significant.

c) **Less Than Significant Impact.**

Wastewater collection will be provided by San Bernardino Municipal Water Department's (SBMWD) Water Reclamation Plant (WRP). The current permitted capacity of the Plant is 33 MGD. Wastewater use for the project was estimated using the California Emissions Estimator Model (CalEEMod). The model can estimate wastewater usage for analysis in CEQA documents. The Project is estimated to have an indoor water demand of 1,333,798 gallons per year (3,654 gallons per day) which includes wastewater, assuming that all the water is discharged to the sewer system. The City's collection system has sufficient capacity to handle peak dry-weather flows. Over the past ten years, the City of San Bernardino has not experienced any capacity related sanitary sewer overflows. Therefore, the proposed project's implementation would not result in impacts related to wastewater treatment provider capacity, and impacts would be less than significant.

d) and e) **Less Than Significant Impact.** Significant impacts could occur if the proposed project will exceed the existing permitted landfill capacity or violates federal, state, and local statutes and regulations.

Waste generated during the project's construction phase would primarily consist of discarded materials from the construction of streets, common areas, infrastructure installation, and other Project-related construction activities. The California Green Building Standards Code ("CALGreen') requires all newly constructed buildings to prepare a Waste Management Plan and divert construction waste through recycling and source reduction methods. Solid waste generated during construction and post construction will be managed by the applicant's contractor. A waste management plan will be developed with the General Contractor and appropriate third party recycling vendor for the project so that 50 percent of construction wastes are recycled or salvaged. The City of San Bernardino Building and Safety Division reviews and approves all new construction projects required to submit a Waste Management Plan. Mandatory compliance with CALGreen solid waste requirements will ensure that construction waste impacts are less than significant.

San Bernardino contracts its waste collection services with Burrtec Waste Industries. Burrtec Waste Industries disposes waste at the West Valley Materials Recovery Facility in the City of Fontana. This facility is permitted to receive up to 7,500 tons of solid waste daily. The California Emissions Estimator Model (CalEEMod) is a statewide land-use emissions computer model designed to provide a uniform platform for government agencies to quantify potential air quality criteria pollutant emissions associated with construction and operations from various land-use projects. The model can also estimate solid waste generation rates for various types of land uses for analysis in CEQA documents. Waste disposal rates by land use and overall municipal solid waste composition in California are primarily based on CalRecycle data. Based on solid waste generation usage obtained from CalEEMod, the 30-lot project would generate approximately 30.9 tons of solid waste per year (0.08 tons per day). Based on the amount of waste generated by the project vs. the capacity of the West Valley Materials Recovery Facility, the Project is not anticipated to cause this landfill to exceed its maximum permitted daily disposal volume.

The 30 single-family homes that would be built after the land is subdivided would have solid waste service provided. Trash storage will be in the garage or side yard of each residential unit, and containers (green waste, landfill, and recyclables) will be picked up by Burrtec (City franchisee) weekly. The USEPA has estimated that in the United States, a typical person will generate 4.4 pounds of solid waste per day. Using the average of 3.31 persons per household for the 30 new homes, approximately 437 pounds per day would be generated. The USEPA has also estimated that approximately 1.53 pounds of every 4.4 pounds generated are recycled. The remaining solid waste would go to the landfill.

The California Legislature passed the Integrated Waste Management Act of 1989 (known as AB 939 or the IWM Act). The IWM Act established a hierarchy of preferred waste management practices: (l) Source Reduction, to reduce the amount of waste generated at its source; (2) Recycling and Composting; and (3) Disposal. Waste disposal must be cut by 25% by 1995 and 50% by 2000. Percentages are based on 1990 levels and adjusted for population and economic conditions changes. According to the County of San Bernardino Integrated Waste Management Plan, each city is responsible for its own integrated solid waste management planning, implementation, and monitoring, as well as public information, budgeting, and enforcement. The City of San Bernardino is committed to meeting the goals of SB 939 with regard to meeting the State's goal of 50 percent diversion of solid waste from landfills. In order to meet this goal and also continue to accommodate additional population growth in the region, cities counties and waste managers must increase the amount of source reduction, recycling and composting that can be done. Municipal Code Section 8.24 sets forth San Bernardino City law for the appropriate containment, collection, and disposal of garbage, recyclable materials, organics waste, and byproducts. The project is required to comply with the provisions of Municipal Code Section 8.24. As such, the project will comply with federal, state, and local management and reduction statutes and regulations related to solid waste. Therefore this impact would be less than significant and no mitigation is required. The proposed project is required to comply with all applicable Federal, State, County, and City statutes and regulations related to solid waste as a standard project condition of approval.

Mitigation Measures

No mitigation measures are necessary because impacts to Utilities will be less than significant.

Level of Significance After Mitigation

Not Applicable.

4.20 – 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 wildfire or the uncontrolled spread of 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 result temporary or ongoing impacts to the environment?			☑	
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?			☑	

Sources

Information used to prepare this section is from the following sources: City of San Bernardino General Plan Update, 2005 and State of California, Department of Forestry and Fire Protection, 2022, Fire Hazard Severity Zone Viewer.

Environmental Setting

The project site is located within an urbanized area of the City of San Bernardino and is not located within a fire hazard zone, as identified on the latest Fire Hazard Severity Zone (FHSZ) maps prepared by the California Department of Forestry and Fire Protection (CALFIRE).

Discussion

a) thru d) **Less Than Significant Impact.** The proposed subdivision and housing project for the development of 32-dwelling units is a residential infill project. Per State Fire and Building Codes, sufficient space will have to be provided around the structures for emergency personnel and equipment access and emergency evacuation. All project elements, including landscaping, would be sited with sufficient clearance from existing and proposed structures so as not to interfere with emergency access to and evacuation from the facility. The project would comply with the California Fire Code (Title 24, California Code of Regulations, Section 9).

The project driveways would allow emergency access and evacuation from the site, and would be constructed to San Bernardino Code specifications. Over the long term, the project would not impair implementation of or physically interfere with an adopted emergency response plan or evacuation plan because no permanent public street or lane closures are proposed. Construction work in the street associated with the project would be limited to lateral utility connections, undergrounding of utility lines and installation of street trees; all of which would be limited to nominal potential traffic diversion. Traffic control would be provided for any lane closures. Project impacts would be less than significant.

The project site is located within an urbanized area of the City of San Bernardino and is not located within a fire hazard zone, as identified on the latest Fire Hazard Severity Zone (FHSZ) maps prepared by the California Department of Forestry and Fire Protection (CALFIRE). The project would not be expected to impair emergency plans, exacerbate wildfire risks or expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of wildfire. The project would not require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may result temporary or ongoing impacts to the environment. The project would not expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. The project area is relatively flat and characterized with slopes that are not high (less than 10 percent) or steep. Therefore this impact would be less than significant and no mitigation is required

g) **No Impact.**

Mitigation Measures

No mitigation measures are necessary because impacts to Wildfires will be less than significant.

Level of Significance After Mitigation

Not Applicable.

4.21 – Mandatory Findings of Significance

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

Sources

Information used to prepare this section is from Sections 4.1 through 4.20 above.

Discussion

a) **Less Than Significant with Mitigation Incorporated.** The proposed project would not substantially impact any scenic vistas, scenic resources, or the visual character of the area, as discussed in Section 4.1, and would not result in excessive light or glare. The project site is located within an urbanized area with limited natural habitat. The project would not significantly impact any sensitive plants, plant communities, fish, wildlife or habitat for any sensitive species, as discussed in Section 4.4. The environmental analysis provided in Section 4.2 concludes that impacts related to emissions of criteria pollutants and other air quality impacts will be less than significant. Section 4.5 identifies measures to mitigate potential impacts to inadvertent archaeological finds and human remains. Sections 4.8 and 4.10 conclude that impacts related to climate change and hydrology and water quality will be less than significant. Section 4.18 identifies measures to mitigate potential impacts to tribal cultural resources. Based on the preceding analysis of potential impacts in the responses to items 4.1 thru 4.20, no evidence is presented that this project would degrade the quality of the environment. The City hereby finds that impacts related to degradation of the environment, biological resources and cultural resources will be less than significant with mitigation incorporated.

b) **Less Than Significant.** Cumulative impacts can result from the interactions of environmental changes resulting from one proposed project with changes resulting from other past, present, and future projects that affect the same resources, utilities and infrastructure systems, public services, transportation network elements, air basin, watershed, or other physical conditions. Such impacts could be short-term and temporary, usually consisting of overlapping construction impacts, as well as long term, due to the permanent land use changes involved in the project. The proposed development will generally result in less than significant environmental impacts, as discussed herein. Short-term impacts related to noise will be less than significant and therefore will not contribute substantially to any other concurrent construction programs that may be occurring in the vicinity. Short-term impacts related to pollutant emissions will be less than significant and will not exceed maximum thresholds.

The proposed project would not significantly cumulatively affect the environment. Water supplies have been studied in the Urban Water Management Plan, and the above cumulative projects are consistent with UWMP level of development assumptions. Continued efforts towards water conservation, as required by State law, would reduce water demands; the project would result in a less than significant cumulative impact on water supply and other resources. As indicated in Section 4.17 herein, the proposed project would not result in any significant traffic impacts to transportation. Based on the air quality modeling, air quality could be affected in the short-term during construction, but long-term cumulative effects will have a less than significant impact on air quality. Adherence to all conditions recommended, the cumulative impacts can be less than significant.

c) **Less Than Significant with Mitigation Incorporated.** Based on the analysis of the proposed project's impacts in the responses to items 4.1 thru 4.20, there is no indication that this project could result in substantial adverse effects on human beings. While there would be a variety of temporary adverse effects during construction related to noise and criteria pollutant emission these would be minimized to acceptable levels through implementation of routine construction control measures and mitigation measures. Long-term effects would include increased vehicular traffic, traffic-related noise, periodic on-site operational noise, minor changes to on-site drainage, and changing of the visual character of the site. Projected emission levels would be below the thresholds of significance recommended by the South Coast Air Quality Management District. Project-related traffic would represent a small percentage increase in traffic volumes along nearby roadways and would have a less-than-significant impact on roadway noise levels. Based on the analysis in this Initial Study, the City finds that direct and indirect impacts to human beings will be less than significant.

5 References

5.1 – *List of Preparers*

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5.2 – *Persons and Organizations Consulted*

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6 Summary of Mitigation Measures

Cultural Resources

CR-1: In the event that cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. Additionally, the Yuhaaviatam of San Manuel Nation Cultural Resources Department shall be contacted regarding any pre-contact and/or historic-era finds and be provided information after the archaeologist makes his/her initial assessment of the nature of the find, so as to provide Tribal input with regards to significance and treatment.

CR-2: If significant pre-contact and/or historic-era cultural resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, the archaeologist shall develop a Monitoring and Treatment Plan, the drafts of which shall be provided to Yuhaaviatam of San Manuel Nation for review and comment. The archaeologist shall monitor the remainder of the project and implement the Plan accordingly.

CR-3: If human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5 and that code enforced for the duration of the project.

Geology and Soils

GS-1: If subsurface paleontological resources are encountered during grading or construction, all ground-disturbing activity will cease within 100 feet of the resource. A qualified paleontologist as determined by the City’s Community Development & Housing Director will be retained by the City/applicant to assess the find, and to determine whether the resource requires further study or any protection measures. No further grading will occur in the area of the discovery until the City approves the measures to protect the resources. Any archaeological artifacts or paleontological resources recovered as a result of mitigation will be donated to a qualified scientific institution approved by the City where they would be afforded long-term preservation to allow future scientific study.

Noise

N-1: Prior to the issuance of grading and building permits, the contractor shall establish a Construction Management Plan that includes the following standards:

- Construction shall adhere to the allowable operable hours as denoted within the SBMC Chapter 8.54.
- During all project site excavation and grading on-site, construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturer standards.
- The contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the project site.
- Equipment shall be shut off and not left to idle when not in use.

- The contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and sensitive receptors nearest the project site during all project construction.
- The contractor shall limit the use of vibratory and/or heavy equipment along the project boundaries to the greatest degree possible.

Tribal Cultural Resources

TCR-1: The Yuhaaviatam of San Manuel Nation Cultural Resources Department shall be contacted of any pre-contact cultural resources discovered during project implementation, and be provided information regarding the nature of the find, so as to provide Tribal input with regards to significance and treatment. Should the find be deemed significant, as defined by CEQA (as amended, 2015), a Cultural Resources Monitoring and Treatment Plan shall be created by the archaeologist, in coordination with the Yuhaaviatam of San Manuel Nation, and all subsequent finds shall be subject to this plan. This plan shall allow for a monitor to be present that represents YSMN for the remainder of the project, should the Yuhaaviatam of San Manuel Nation elect to place a monitor on-site.

TCR-2: Any and all cultural documents created as a part of the project (isolate records, site records, survey reports, testing reports, etc.) shall be supplied to the applicant and Lead Agency for dissemination to the Yuhaaviatam of San Manuel Nation. The Lead Agency and/or applicant shall, in good faith, consult with the Yuhaaviatam of San Manuel Nation throughout the life of the project.

Appendix Materials

Appendix A	Project Plans
Appendix B	Air Quality and Greenhouse Gas Emissions CalEEMod Run Sheets
Appendix C	Geotechnical Evaluation
Appendix D	Hydrology Report
Appendix E	Traffic Impact Analysis
Appendix F	Vehicle Miles Traveled (VMT) Analysis

Appendix A Project Plans

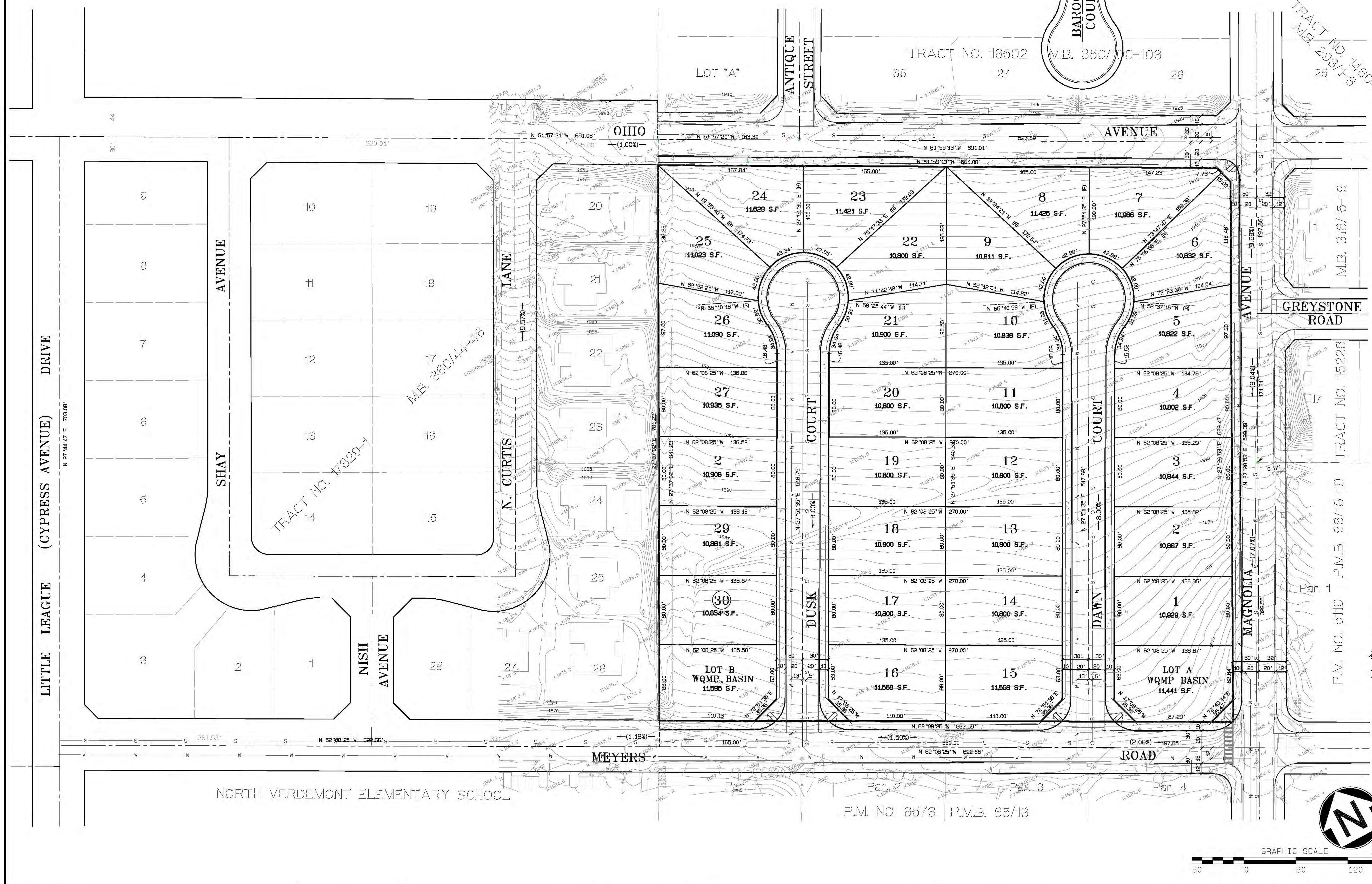
IN THE CITY OF SAN BERNARDINO,
COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

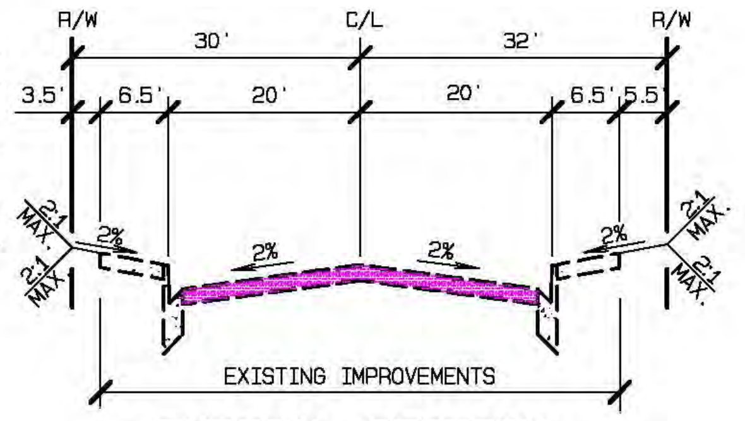
TENTATIVE TRACT MAP NO. 20539

BEING A SUBDIVISION OF THE NORTHEAST 1/4 OF BLOCK 75, TOWN OF IRVINGTON AND IRVINGTON LAND AND WATER COMPANY SUBDIVISION IN THE CITY OF SAN BERNARDINO, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 3, PAGE 9 OF MAPS, IN THE OFFICE OF THE RECORDER OF SAID COUNTY.

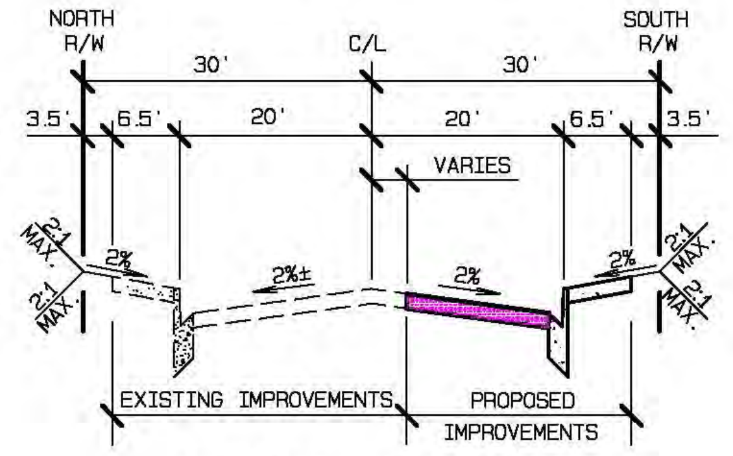
S.D. ENGINEERING AND ASSOCIATES

AUGUST, 2024

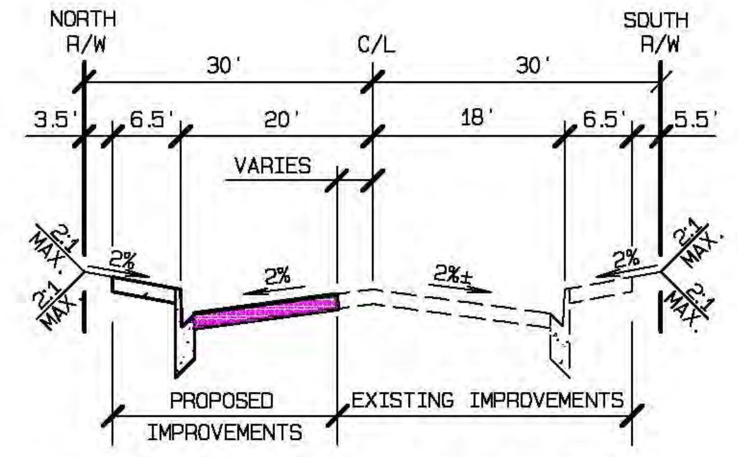




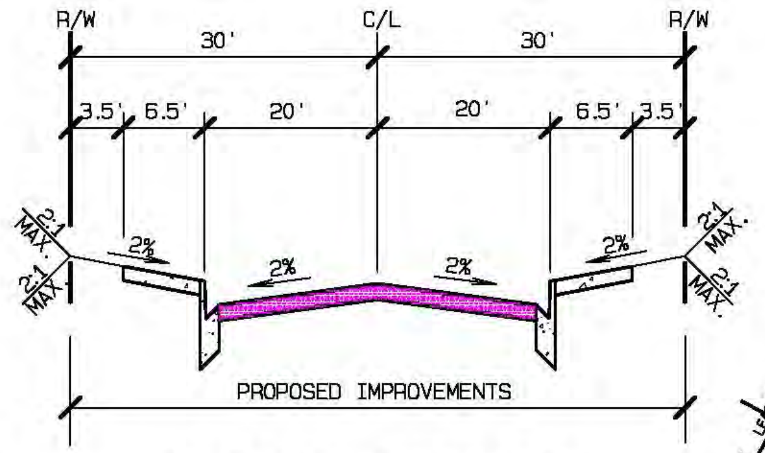
TYPICAL SECTION
MAGNOLIA AVENUE
N.T.S.



TYPICAL SECTION
OHIO AVENUE
N.T.S.



TYPICAL SECTION
MEYERS ROAD
N.T.S.



TYPICAL SECTION
DAWN COURT &
DUSK COURT
N.T.S.

OWNER/APPLICANT

AURORA BUILDERS LLC
9987 FOX MEADOW ROAD
SAN DIEGO, CA 92127
ATTN: MR. SRIHARI MUPPARAJU
PH: (858) 699-8455

ENGINEER

S.D. ENGINEERING AND ASSOCIATES
242 E. AIRPORT DRIVE, STE. 212
SAN BERNARDINO, CA 92408
ATTN: MR. SURESH DODDIAH
PH: (909) 215-3451

ASSESSORS PARCEL NO:

0261-062-15 AND 16

ZONING

EXISTING: RL

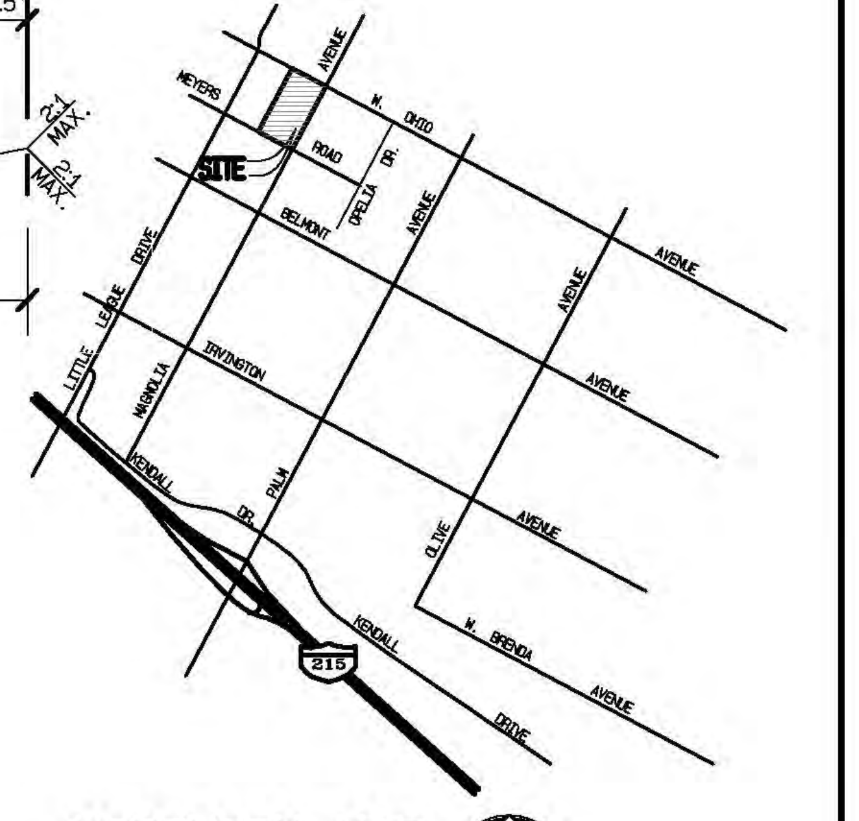
PROPERTY INFORMATION

1. GROSS AREA: 11.11 ACRES (TO STREET C/L)
2. NET AREA: 9.69 ACRES
3. TOTAL NO. OF LOTS: 30 NUMBERED, 2 LETTERED
4. DENSITY: 3.10/NET AC.

UTILITY COMPANIES

SEWER AND WATER: CITY OF SAN BERNARDINO
MUNICIPAL WATER DEPARTMENT
397 CHANDLER PLACE
SAN BERNARDINO, CA 92408
ATTN: MR. TED BRUNSON
PH: (909) 522-3414

SOLID WASTE: BURRTEC WASTE INDUSTRIES, INC.
5455 INDUSTRIAL PARKWAY
SAN BERNARDINO, CA 92407
PH: (909) 804-4222



VICINITY MAP
NTS

S.D. ENGINEERING AND ASSOCIATES
LAND PLANNING AND CIVIL ENGINEERING
242 E. AIRPORT DRIVE, SUITE 212 - SAN BERNARDINO, CALIF. 92408
PHONE (909) 215-3451 EMAIL: SURESH@SDENGINEERING.NET

SURESH DODDIAH R.C.E. 36361 DATE

SURESH DODDIAH NO. 36361 EXP. 6-30-26 CIVIL

DIGALERT
DIAL BEFORE YOU DIG TOLL FREE
TWO WORKING DAYS BEFORE YOU DIG 1-800-227-2600
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

REV.	REVISION DESCRIPTION	DATE	ENGR.	CITY	DATE

BENCH MARK: H1-5

2" BRASS DISK SET FLUSH IN TOP OF CURB AT SOUTHEASTERLY CORNER OF BELMONT AVENUE AND PALM AVENUE, AT EAST END OF E.C.R., STAMPED CITY OF SAN BERNARDINO H1-5

ELEV: 1807.25

PREPARED UNDER THE SUPERVISION OF:

DATE:

CITY OF SAN BERNARDINO, CALIFORNIA

TENTATIVE TRACT MAP NO. 20539

DRAWN BY: EB
DESIGNED BY: EB
CHECKED BY: SD

W. MEYERS ROAD
SAN BERNARDINO, CA

APN: 0261-062-15 AND 16

SCALE: AS SHOWN
DATE:
DRAWING NO: 1/1

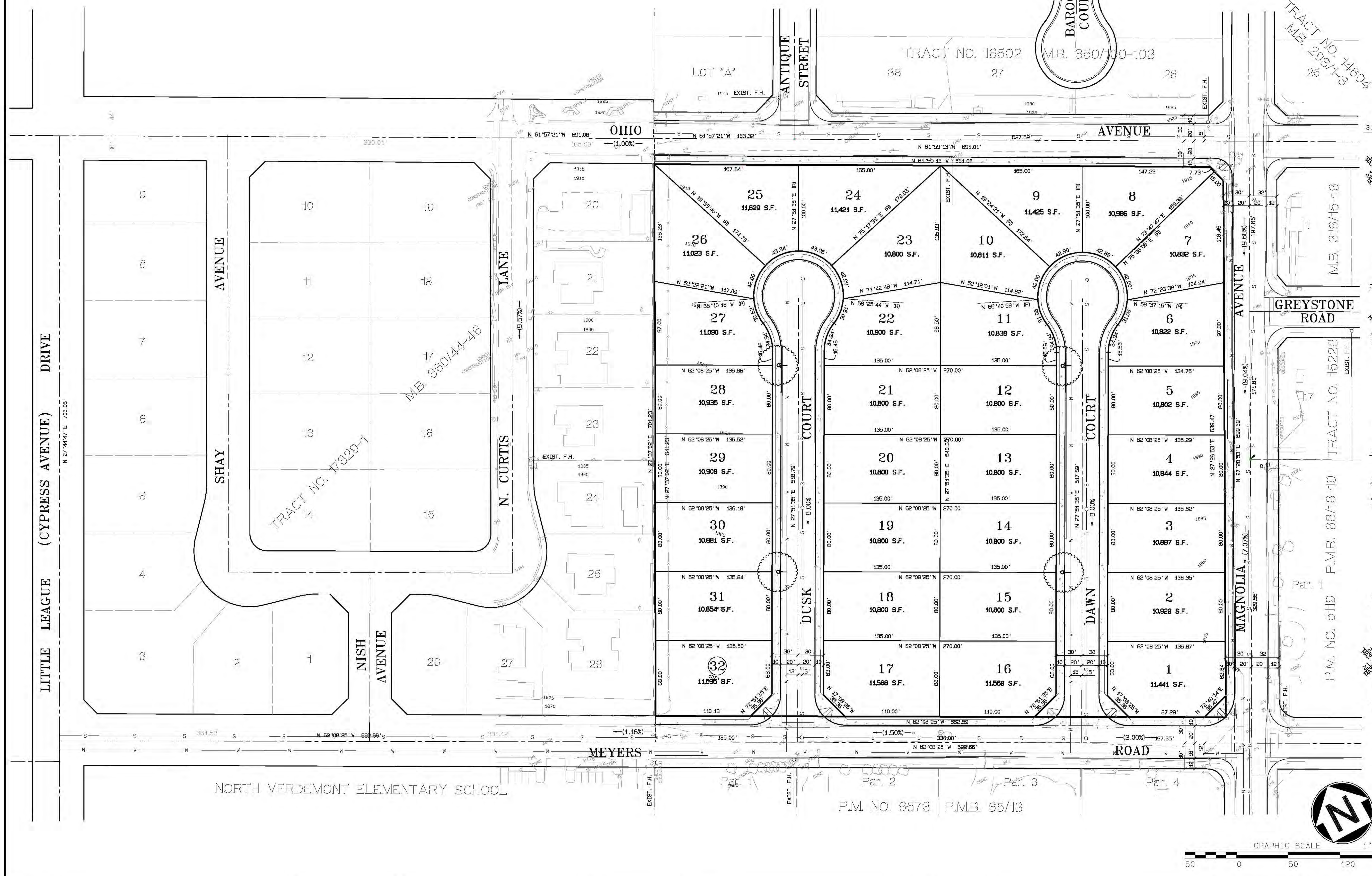
IN THE CITY OF SAN BERNARDINO,
COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

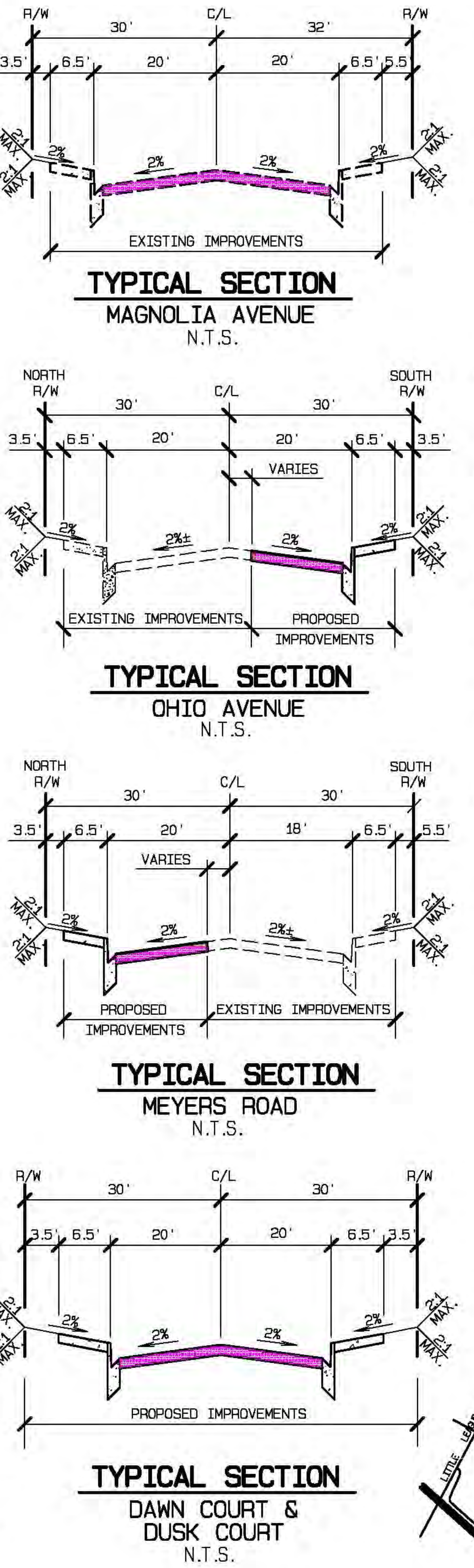
TENTATIVE TRACT MAP NO. 20539 FIRE HYDRANT LOCATIONS

BEING A SUBDIVISION OF THE NORTHEAST 1/4 OF BLOCK 75, TOWN OF IRVINGTON AND IRVINGTON LAND AND WATER COMPANY SUBDIVISION IN THE CITY OF SAN BERNARDINO, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 3, PAGE 9 OF MAPS, IN THE OFFICE OF THE RECORDER OF SAID COUNTY.

S.D. ENGINEERING AND ASSOCIATES

MARCH, 2023





TYPICAL SECTION
MAGNOLIA AVENUE
N.T.S.

TYPICAL SECTION
OHIO AVENUE
N.T.S.

TYPICAL SECTION
MEYERS ROAD
N.T.S.

TYPICAL SECTION
DAWN COURT &
DUSK COURT
N.T.S.

OWNER/APPLICANT

AURORA BUILDERS LLC
9987 FOX MEADOW ROAD
SAN DIEGO, CA 92127
ATTN: MR. SRIHARI MUPPARAJU
PH: (858) 699-8455

ENGINEER

S.D. ENGINEERING AND ASSOCIATES
242 E. AIRPORT DRIVE, STE. 212
SAN BERNARDINO, CA 92408
ATTN: MR. SURESH DODDIAH
PH: (909) 215-3451

ASSESSORS PARCEL NO:

0261-062-15 AND 16

ZONING

EXISTING: RL

PROPERTY INFORMATION

1. GROSS AREA: 11.11 ACRES (TO STREET C/L)
2. NET AREA: 9.69 ACRES
3. TOTAL NO. OF LOTS: 32
4. DENSITY: 2.88/GROSS AC.

UTILITY COMPANIES

SEWER AND WATER: CITY OF SAN BERNARDINO
MUNICIPAL WATER DEPARTMENT
397 CHANDLER PLACE
SAN BERNARDINO, CA 92408
ATTN: MR. TED BRUNSON
PH: (909) 522-3414

SOLID WASTE: BURRTEC WASTE INDUSTRIES, INC.
5455 INDUSTRIAL PARKWAY
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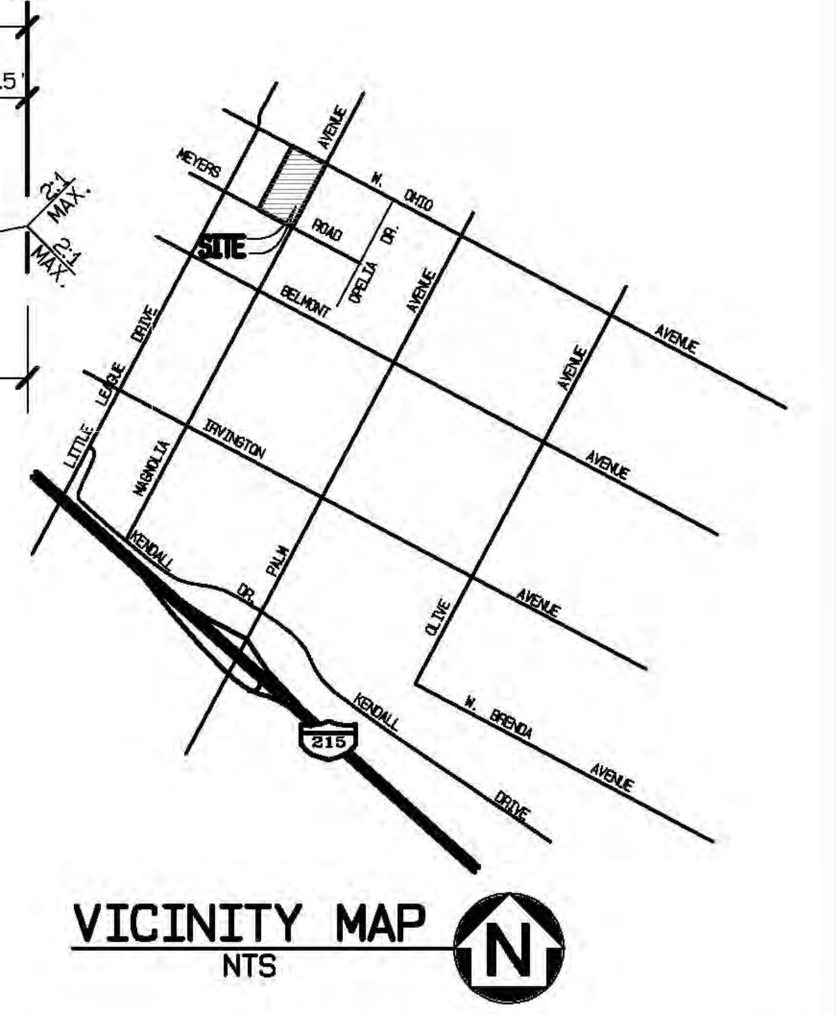


VICINITY MAP
NTS

S.D. ENGINEERING AND ASSOCIATES
LAND PLANNING AND CIVIL ENGINEERING
242 E. AIRPORT DRIVE, SUITE 212 - SAN BERNARDINO, CALIF. 92408
PHONE (909) 215-3451 EMAIL: SURESH@SDENGINEERING.NET

SURESH DODDIAH R.C.E. 36361 DATE

SURESH DODDIAH
NO. 36361
EXP. 6-30-24
CIVIL

DIGALERT
DIAL BEFORE YOU DIG
TOLL FREE
TWO WORKING DAYS BEFORE YOU DIG
1-800-227-2600
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

REV.	REVISION DESCRIPTION	DATE	ENGR.	CITY	DATE

BENCH MARK: H1-5

2" BRASS DISK SET FLUSH IN TOP OF CURB AT SOUTHEASTERLY CORNER OF BELMONT AVENUE AND PALM AVENUE, AT EAST END OF E.C.R., STAMPED CITY OF SAN BERNARDINO H1-5

ELEV: 1807.25

PREPARED UNDER THE SUPERVISION OF:

DATE:

CITY OF SAN BERNARDINO, CALIFORNIA
FIRE HYDRANT LOCATION MAP

DRAWN BY: EB
DESIGNED BY: EB
CHECKED BY: SD

W. MEYERS ROAD
SAN BERNARDINO, CA
APN: 0261-062-15 AND 16

SCALE: AS SHOWN
DATE:
DRAWING NO: 1/1

CITY OF SAN BERNARDINO
PRECISE GRADING PLAN
TRACT NO. 20539

GENERAL NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH TITLE 15 OF THE CITY OF SAN BERNARDINO MUNICIPAL CODE, THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (GREEN BOOK), LATEST EDITION, AND ALL SUPPLEMENTS, THE PRELIMINARY SOILS REPORT DATED MAY 24, 2022 BY GEOTEK, INC., PROJECT NO. 3190-CR AND ANY SPECIAL REQUIREMENTS OF THE PERMIT.
2. APPROVAL OF THIS PLAN BY THE CITY OF SAN BERNARDINO DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF THE LOCATION OR OF THE EXISTENCE OR NON-EXISTENCE OF ANY UNDERGROUND UTILITY PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR THE PROTECTION OF ALL UTILITIES WITHIN THE LIMITS OF THIS PROJECT.
3. PROPOSED STARTING DATE = COMPLETION DATE =
4. CUT YARDAGE = 25,602 C.Y. FILL YARDAGE = 17,681 C.Y.
5. DUST SHALL BE CONTROLLED BY WATERING.
6. FINISH GRADING SHALL BE COMPLETED AND APPROVED BEFORE OCCUPANCY OF BUILDINGS.
7. PUBLIC STREETS SHALL BE KEPT CLEAN AND FREE FROM DIRT AND/OR DEBRIS. THE GRADING CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COST INCURRED IN STREET CLEANING NECESSITATED BY HIS/HER OPERATION.
8. THE FACE OF ALL CUT AND FILL SLOPES SHALL BE PLANTED WITH A GROUND COVER APPROVED BY THE CITY ENGINEER.
9. THE CIVIL ENGINEER RESPONSIBLE FOR PLAN PREPARATION SHALL SIGN THE FOLLOWING STATEMENT ON THE PLANS:

   "I CERTIFY THAT I WILL BE RESPONSIBLE FOR THIS GRADING PLAN IN ACCORDANCE WITH SECTION 7014(C) OF THE BUILDING CODE TO INCLUDE INCORPORATING ALL RECOMMENDATIONS OF THE GRADING. THIS SHALL INCLUDE, BUT NOT LIMITED TO INSPECTION AND APPROVAL AS TO THE ESTABLISHMENT OF LINE GRADE AND DRAINAGE OF DEVELOPMENT AREA. I WILL ALSO BE RESPONSIBLE FOR THE PREPARATION OF REVISED PLANS AND THE SUBMISSION OF "AS GRADED" GRADING PLANS UPON THE COMPLETION OF THE WORK."

   SUPERVISING CIVIL ENGINEER: SURESH DODDIAH ______________ RCE 36361 DATE ______________
10. THE SOILS ENGINEER SHALL SIGN THE FOLLOWING STATEMENT ON THE PLANS:

    "I SHALL PROVIDE PROFESSIONAL INSPECTION AND APPROVAL CONCERNING THE PREPARATION OF GROUND TO PROVIDE FILLS, TESTING FOR REQUIRED COMPACTION STABILITY OF ALL FINISHED SLOPES AND INCORPORATING THE DATA SUPPLIED BY THE ENGINEERING GEOLOGIST AND THE PREPARATION OF THE SOILS GRADING REPORT."

    SUPERVISING SOILS ENGINEER: BRUCE A. HICK ______________ GE 2284 DATE ______________
    (TO BE SIGNED PRIOR TO ISSUANCE OF GRADING PERMIT BY SOILS ENGINEER OF RECORD)
11. NO FILL TO BE PLACED UNTIL STRIPPING OF VEGETATION, REMOVAL OF UNSUITABLE SOILS AND INSTALLATION OF SUB-DRAINS, IF ANY, HAS BEEN INSPECTED AND APPROVED BY THE SOILS ENGINEER.
12. NO ROCK OR SIMILAR MATERIAL GREATER THAN 8" IN DIAMETER WILL BE PLACED IN THE FILL UNLESS RECOMMENDATION FOR SUCH PLACEMENT HAVING BEEN SUBMITTED BY THE SOILS ENGINEER IN ADVANCE AND APPROVED BY THE BUILDING OFFICIAL.
13. ALL EXISTING FILLS SHALL BE APPROVED BY THE CITY DEPARTMENT OF PUBLIC WORKS OR REMOVED BEFORE ANY ADDITIONAL FILLS ARE ADDED.
14. FILLS SHALL BE BENCHED IN COMPETENT MATERIAL AS REQUIRED IN SOILS REPORT. AREAS TO RECEIVE FILL SHALL BE PROPERLY PREPARED AND APPROVED BY THE CITY DEPARTMENT OF PUBLIC WORKS AND SOILS ENGINEER PRIOR TO THE PLACING OF FILL.
15. PRIOR TO ISSUANCE OF BUILDING PERMITS, SUBMIT A SOILS ENGINEER'S REPORT ON THE EXPANSION PROPERTIES OF SOILS AS SUCH SOILS ARE DEFINED BY BUILDING CODE SECTION (2904(B) ON ALL BUILDING SITES IN THE PROPOSED SUBDIVISION.
16. IF ANY DEVELOPMENT IS SCHEDULED TO BE DONE BETWEEN OCTOBER 15 AND APRIL 15, THE ENGINEER SHALL SUBMIT A DETAILED EROSION CONTROL PLAN INCLUDING DESILTING BASINS OR OTHER TEMPORARY DRAINAGE OR CONTROL MEASURES, OR BOTH, AS MAY BE NECESSARY TO PROTECT ADJOINING PUBLIC AND PRIVATE PROPERTY FROM DAMAGE BY EROSION, FLOODING OR THE DEPOSITION OF MUD OR DEBRIS WHICH MAY ORIGINATE FROM THE SITE OR RESULT FROM SUCH DEVELOPMENT.
17. SLOPES IN EXCESS OF 15 FEET MUST BE APPROVED WITH AN APPROVED IRRIGATION SYSTEM.
18. THE SOILS ENGINEER SHALL BE RESPONSIBLE FOR THE PROFESSIONAL INSPECTION AND APPROVAL CONCERNING THE PREPARATION OF GROUND TO RECEIVE FILLS, TESTING FOR REQUIRED COMPACTION, STABILITY OF ALL FINISH SLOPES AND THE DESIGN OF BUTTRESS FILLS, WHERE REQUIRED, INCORPORATING DATA SUPPLIED BY THE ENGINEERING GEOLOGIST AND INSURE COMPLIANCE WITH THE PLANS, SPECIFICATIONS AND CODE WITHIN THEIR PURVIEW.
19. THE DESIGN CIVIL ENGINEER SHALL EXERCISE SUFFICIENT SUPERVISORY CONTROL DURING GRADING AND CONSTRUCTION TO INSURE COMPLIANCE WITH THE PLANS, SPECIFICATIONS, AND CODE WITHIN HIS PURVIEW.
20. WHERE SUPPORT OF BUTTRESSING OF CUT AND NATURAL SLOPES IS DETERMINED TO BE NECESSARY BY THE SOILS ENGINEER AND/OR GEOLOGIST, THE SOILS ENGINEER WILL SUBMIT DESIGN, LOCATION AND CALCULATIONS TO THE CITY PRIOR TO CONSTRUCTION. THE SOILS ENGINEER AND/OR GEOLOGIST WILL INSPECT AND CONTROL THE CONSTRUCTION OF THE BUTTRESSING AND CERTIFY APPROVAL TO THE STABILITY OF THE SLOPE AND ADJACENT STRUCTURES UPON COMPLETION.
21. SANITARY FACILITIES SHALL BE MAINTAINED ON THE SITE DURING CONSTRUCTION PERIOD.
22. THE LOCATION AND PROTECTION OF ALL UTILITIES IS THE RESPONSIBILITY OF THE PERMITTEE.

SURVEY MONUMENT NOTE:

SURVEY MONUMENTS THAT EXIST AS SHOWN ON RECORDED MAPS, HIGHWAY MAPS, OR POINTS THAT PROVIDE SURVEY CONTROL WITHIN THE CONSTRUCTION AREAS, SHALL BE LOCATED AND REFERENCED BY A LICENSED LAND SURVEYOR OR REGISTERED CIVIL ENGINEER (AUTHORIZED TO PRACTICE LAND SURVEYING) BEFORE THE START OF CONSTRUCTION, CORNER RECORDS SHALL BE FILED WITH THE COUNTY SURVEYOR. THESE CORNER RECORDS SHALL DESCRIBE THE MONUMENTS FOUND WITH TIE DISTANCES TO REFERENCE POINTS FOR THE RESETTING OF SURVEY MONUMENTS. WHEN CONSTRUCTION IS COMPLETED, ANY DISTURBED MONUMENTS SHALL BE REPLACED AND CORNER RECORDS SHALL BE FILED WITH THE COUNTY SURVEYOR SHOWING THE NEW MONUMENTS.

ENGINEER'S NOTE TO CONTRACTOR:

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES, CONDUITS OR ANY OTHER STRUCTURES SHOWN ON THESE DRAWINGS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO OTHER UTILITIES OR STRUCTURES EXCEPT AS SHOWN ON THESE DRAWINGS. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN ON THE DRAWINGS. THE CONTRACTOR FURTHER ASSUMES ALL LIABILITY AND RESPONSIBILITY FOR UTILITY PIPES, CONDUITS OR STRUCTURES SHOWN OR NOT SHOWN ON THESE DRAWINGS.

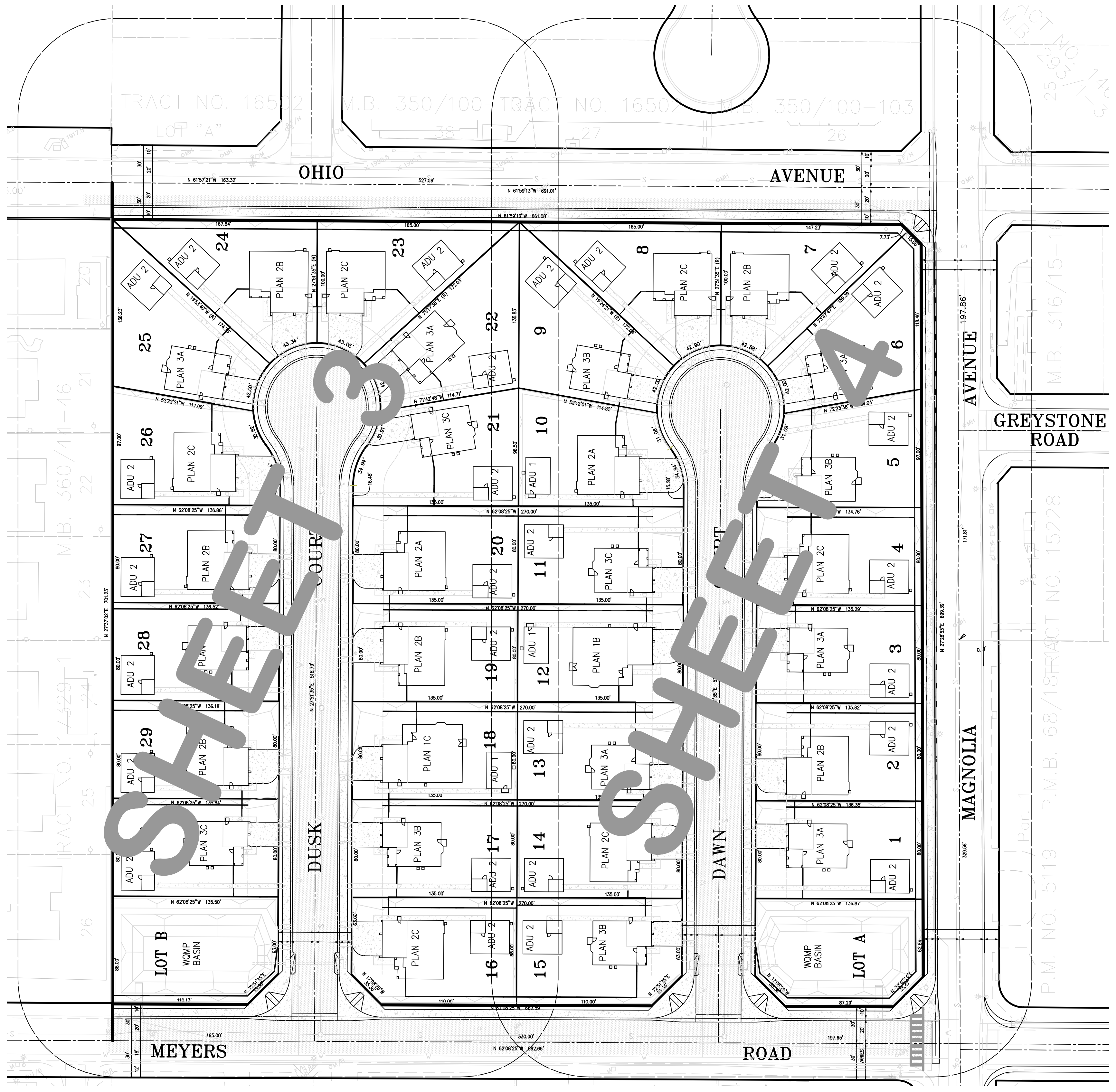
CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, AND THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE COUNTY, THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

NOTE:

REFER TO ARCHITECT'S PLANS FOR THE ACCURATE DIMENSIONS OF THE FOLLOWING:
1. BUILDING DIMENSIONS.

DIGALERT
DIAL BEFORE YOU DIG
TOLL FREE
CALL BEFORE YOU DIG
TWO WORKING DAYS BEFORE YOU DIG
1-800-227-2600
A PUBLIC SERVICE BY
UNDERGROUND SERVICE ALERT

1/9/2025 3:16:52 PM



INDEX MAP
SCALE: 1" = 80'

CONSTRUCTION NOTES — QUANTITIES

①	CONST. PARKWAY CULVERT W/ INLET TYPE II EXTENDED TO INSIDE SLOPE OF WQMP BASIN PER S.B. CITY STD. 400, S=6'-0"	32 EA.
②	CONST. 6" THICK PCC DRIVEWAY (WIDTH=16')	32 EA. (14,790 S.F.)
③	CONST. 4" THICK PCC WALKWAY	15,737 S.F.

EARTHWORK QUANTITIES

CUT YARDAGE: 25,602 C.Y.
FILL YARDAGE: 17,681 C.Y.

THESE ARE RAW DIRT QUANTITIES WITHOUT ALLOWANCE FOR LOSS DUE TO CLEARING, GRUBBING, OVEREXCAVATION, SHRINKAGE AND SUBSIDENCE.

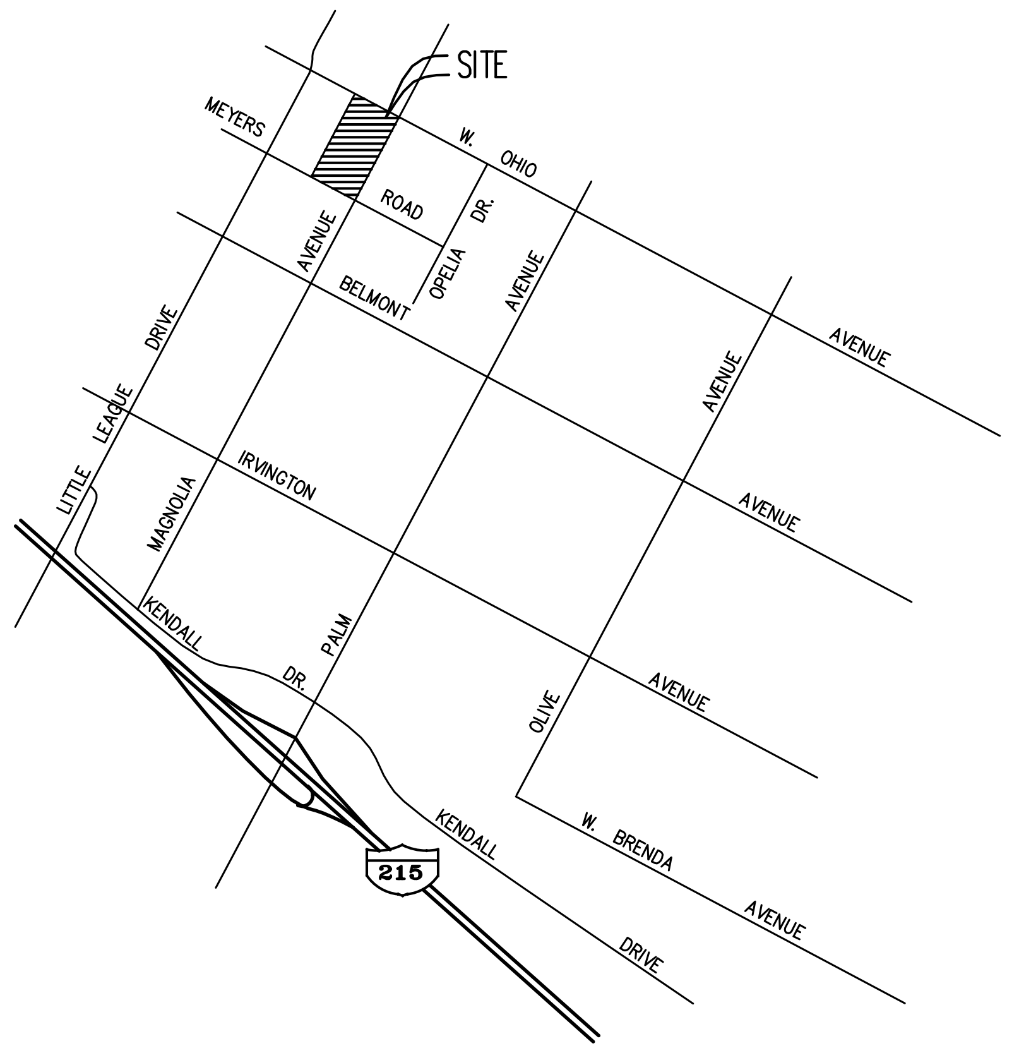
TOPOGRAPHY

AERIAL SURVEY WAS PERFORMED BY
ARROWHEAD MAPPING CORP.
FEBRUARY 16, 2022
JOB #AMC 22-122
PH: (909) 889-2420

NOTE:

1. GRADING PLAN SHALL COMPLY WITH THE LATEST ADOPTED EDITION OF THE FOLLOWING CODES:
   - A. 2022 CALIFORNIA BUILDING CODE AND ITS APPENDICES AND STANDARDS
   - B. 2022 CALIFORNIA PLUMBING CODE AND ITS APPENDICES AND STANDARDS
   - C. CITY OF SAN BERNARDINO ORDINANCES AND REGULATIONS
2. A. PAD CERTIFICATION, COMPACTION REPORT AND ANY OTHER REQUIRED DOCUMENTS SHALL BE PROVIDED TO THE BUILDING INSPECTOR AT ROUGH GRADING INSPECTION.

   B. BUILDER SHALL PROVIDE THE BUILDING INSPECTOR WITH A FINAL PRECISE GRADING CERTIFICATE FROM THE ENGINEER OF RECORD PRIOR TO BUILDING'S FINAL INSPECTION.
3. ALL OFFSITE IMPROVEMENTS ARE TO BE COMPLETED PER A SEPARATE PERMIT.



VICINITY MAP
NTS

DIVISION V TESTING AND INSPECTION

TESTING AND INSPECTION ARE AS PER REQUIREMENTS OF THE UNIFORM BUILDING CODE AND APPLICABLE CITY CODES. IN ADDITION TO CODE REQUIREMENTS, THE FOLLOWING SHALL APPLY WHEN APPLICABLE.

1. FILL TO BE COMPACTED TO NOT LESS THAN 90% OF MAXIMUM DENSITY AS DETERMINED BY ASTM SOIL COMPACTION TEST D1557-70T.
2. NOT LESS THAN ONE FIELD DENSITY TEST WILL BE MADE FOR EACH 2 FEET VERTICAL LIFT OF FILL, NOR LESS THAN ONE SUCH TEST FOR EACH 1,000 CUBIC YARDS OF MATERIAL PLACED.
3. FIELD DENSITY WILL BE DETERMINED BY THE SAND-CONE METHOD ASTM D1556-64. IN FINE GRAINED, COHESIVE SOILS FIELD DENSITY MAY BE DETERMINED BY THE DRIVE CYLINDER METHOD. D9237-71 ASTM PROVIDED NOT LESS THAN 20% OF THE REQUIRED DENSITY TESTS, UNIFORMLY DISTRIBUTED, ARE BY THE SAND CONE METHOD. THE METHOD OF DETERMINING FIELD DENSITY SHALL BE SHOWN IN THE COMPACTION REPORT. OTHER METHODS MAY BE USED IF RECOMMENDED BY THE SOILS ENGINEER AND APPROVED IN ADVANCE BY THE CITY ENGINEER.
4. DENSITY TEST WILL BE MADE AT POINTS APPROXIMATELY ONE FOOT BELOW THE FILL SLOPE SURFACE. ONE TEST WILL BE MADE FOR EACH 1,000 SQUARE FEET OF SLOPE SURFACE, BUT NOT LESS THAN ONE TEST FOR EACH 10-FOOT VERTICAL OF SLOPE HEIGHT.
5. ALL PADS AT ROUGH GRADING WILL HAVE A MINIMUM SLOPE OF 1% TOWARD THE STREET OR DESIGNED DRAINAGE OUTLET.
6. ENGINEER MUST SET GRADE STAKES FOR ALL DRAINAGE DEVICES AND INSPECTIONS MUST BE OBTAINED BEFORE POURING.
7. THE FINAL COMPACTION REPORT AND APPROVAL FROM THE SOILS ENGINEER SHALL CONTAIN THE TYPE OF FIELD TESTING PERFORMED. EACH TEST SHALL BE IDENTIFIED WITH THE METHOD OF OBTAINING THE IN-PLACE DENSITY, WHETHER SAND-CONE, DRIVE-RING, OR OTHER APPROVED METHOD AND SHALL BE SO NOTED FOR EACH TEST. SUFFICIENT MAXIMUM DENSITY DETERMINATIONS SHALL BE PERFORMED TO VERIFY THE ACCURACY OF THE MAXIMUM DENSITY CURVES USED BY THE FIELD TECHNICIAN.
8. ALL TRENCH BACKFILLS SHALL BE TESTED AND APPROVED BY THE SOILS ENGINEER PER THE GRADING CODE.

REQUEST FOR INSPECTIONS SHOULD BE MADE A MINIMUM OF 24 HOURS BEFORE THE INSPECTION IS REQUIRED.

ARRANGEMENTS FOR INSPECTIONS ARE MADE BY CONTACTING (909) 384-5111 BETWEEN THE HOURS OF 7:30 A.M. AND 4:30 P.M.

NORMAL INSPECTION HOURS ARE 7:30 A.M. TO 4:30 P.M., MONDAY THROUGH FRIDAY. ANY REQUESTS FOR INSPECTIONS AT OTHER TIMES OR ON OTHER DAYS MUST BE SUBMITTED TO THE DEPARTMENT OF PUBLIC WORKS A MINIMUM OF 48 HOURS BEFORE THE INSPECTION IS REQUIRED. THE PERMITTEE MUST BEAR THE COST OF SUCH OVER-TIME INSPECTIONS AND WILL BE BILLED ACCORDINGLY. NORMAL OVER-TIME RATE IS 1.5 TIMES THE BASE RATE. OVER-TIME INSPECTIONS MAY BE DISALLOWED DEPENDING ON STAFF AVAILABILITY.

INSPECTION ROUTES ARE PLANNED 24 HOURS IN ADVANCE AND ARE BASED ON EFFICIENT USE OF PERSONNEL. INSPECTION REQUEST MADE WITH LESS THAN 24 HOURS NOTICE WILL BE PROCESSED ON AN AVAILABILITY BASIS ONLY AND NO GUARANTEE IS MADE THAT AN INSPECTION CAN BE PERFORMED WITHOUT PRIOR ADVANCE NOTICE.

EVIDENCE OF BUSINESS LICENSE, INSURANCE AND PERMITS WILL BE CHECKED BY THE INSPECTION STAFF.

LEGEND

FF = FINISHED FLOOR ELEVATION
GFF = GARAGE FINISHED FLOOR ELEVATION
PE = PAD ELEVATION
HP = HIGHPOINT ELEVATION
TC = TOP OF CURB ELEVATION
FL = FLOWLINE ELEVATION
TG = TOP OF GRATE
INV = INVERT ELEVATION
FG = FINISHED GRADE ELEVATION
EG = EXISTING GROUND
BSL = BUILDING SETBACK LINE
TF = TOP OF FOOTING
TW = TOP OF WALL
TRW = TOP OF RETAINING WALL
FH = FIRE HYDRANT
MB = MAIL BOX
S = SEWERLINE
W = WATERLINE

▨ CONCRETE
TOP / TOE 2:1 SLOPE

SHEET INDEX

SHEET 1 _____ TITLE SHEET
SHEET 2 _____ LOT TABULATIONS & SECTIONS
SHEET 3 _____ GRADING PLAN (LOTS 16-30)
SHEET 4 _____ GRADING PLAN (LOTS 1-15)

APN 0261-0062-15 AND 16

REGISTERED PROFESSIONAL ENGINEER
SURESH DODDIAH
NO. 36361
EXP. 6-30-26
CIVIL
STATE OF CALIFORNIA

S.D. ENGINEERING AND ASSOCIATES
LAND PLANNING AND CIVIL ENGINEERING
242 E. AIRPORT DRIVE, STE. 212 – SAN BERNARDINO, CALIF. 92408
PHONE: (909) 215-3451 EMAIL: SURESH@SDENGINEERING.NET

SURESH DODDIAH R.C.E. 36361 DATE

MARK	REVISIONS	BY	APPR.	DATE

BENCH MARK:

APPROVED ____________ 2025
ACTING CITY ENGINEER: ____________
R.C.E. NO. ________ , EXP. ________
DRAWN BY:
CHECKED BY:
RECOMMENDED BY:

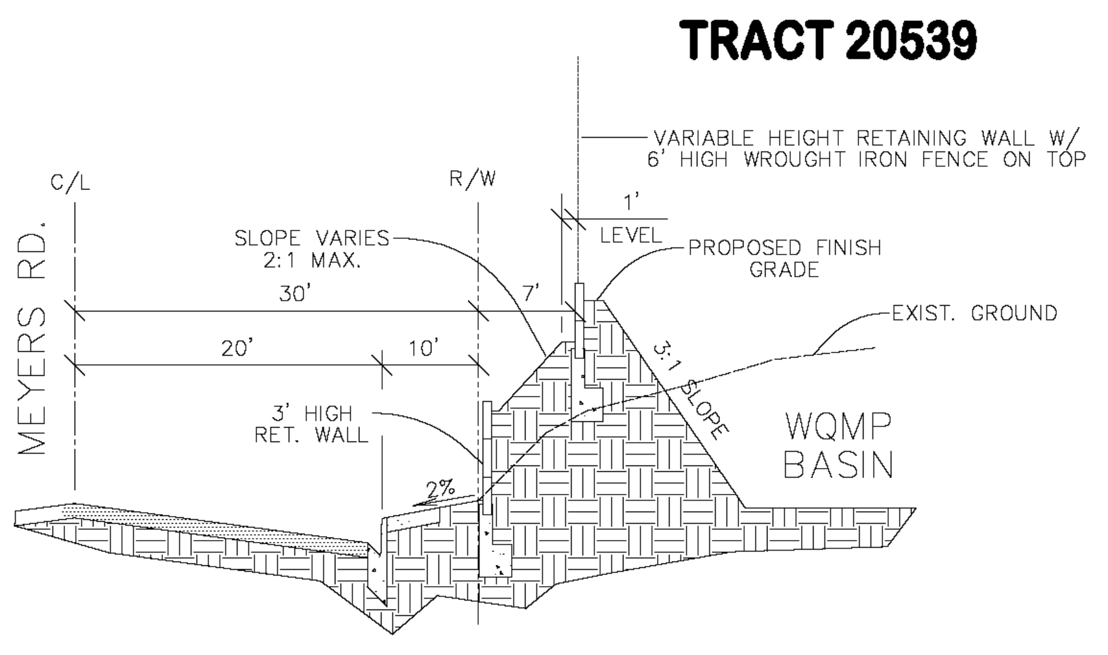
CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES

PRECISE GRADING PLAN
TRACT NO. 20539
TITLE SHEET

DRAWING NO.

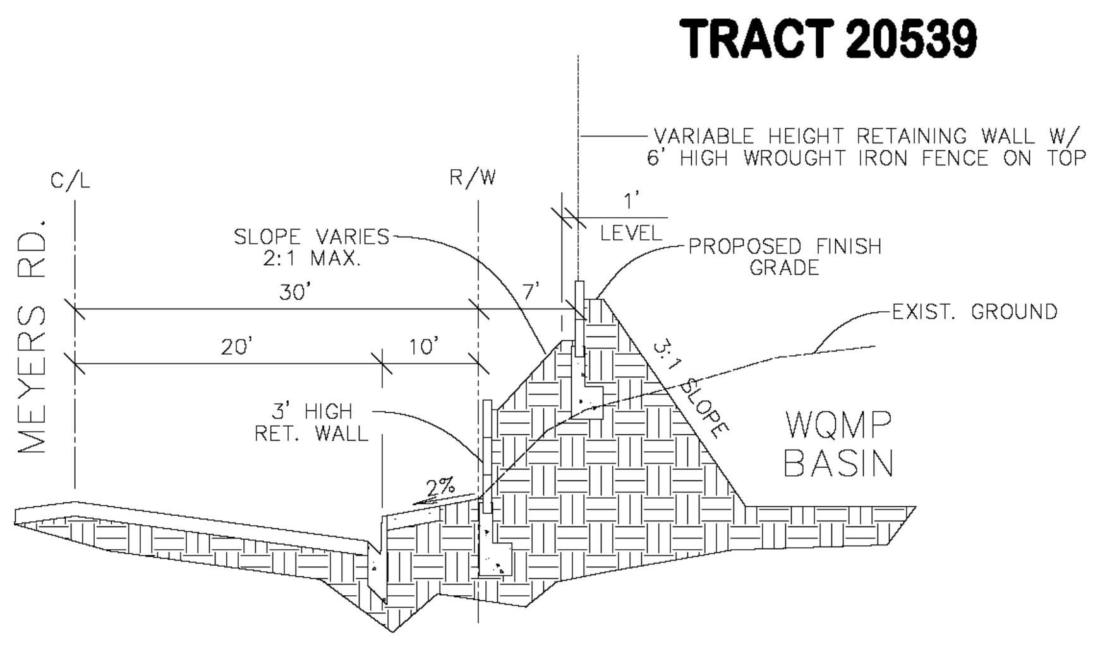
SHEET 1 OF 4 SHEETS

FOR CITY USE ONLY: FILE NO. W.O. NO.



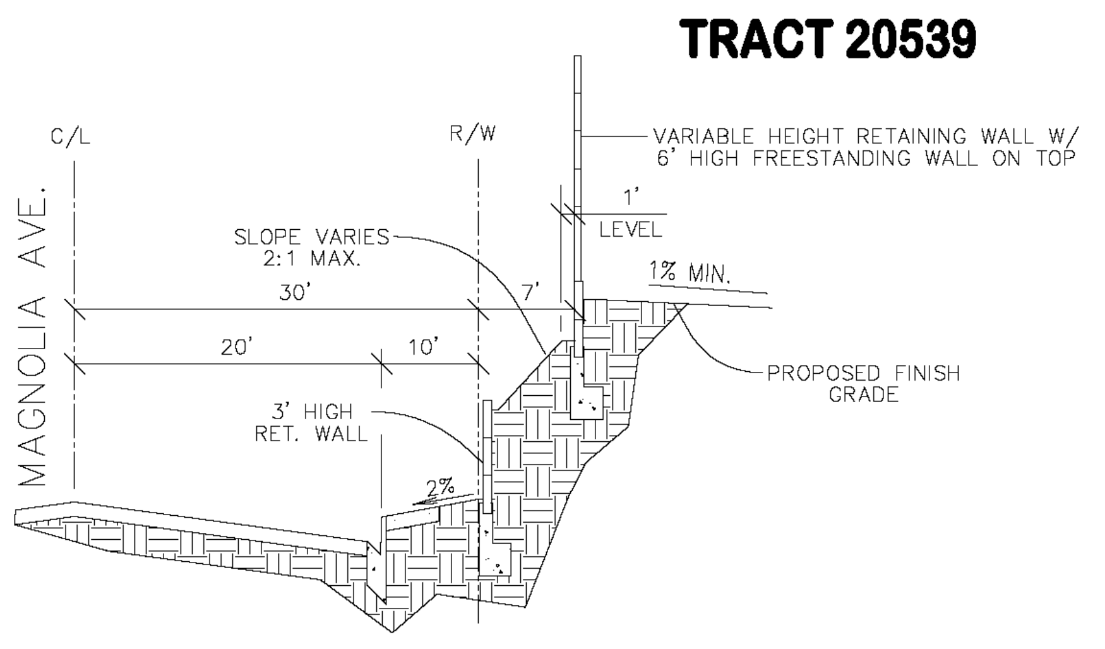
SECTION "A"—"A"

NTS



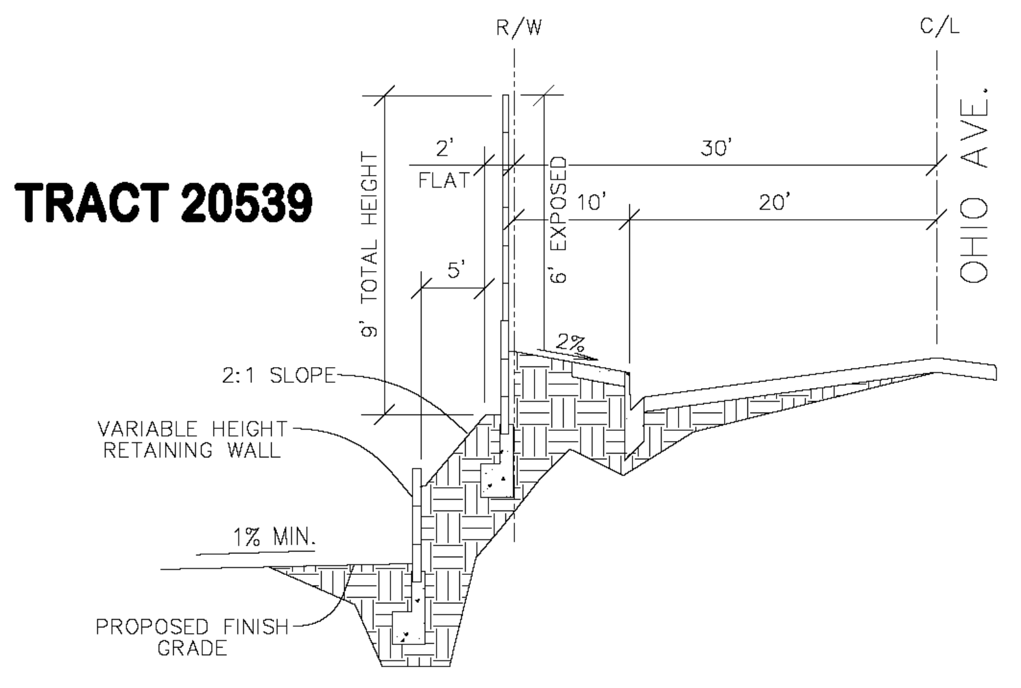
SECTION "B"—"B"

NTS



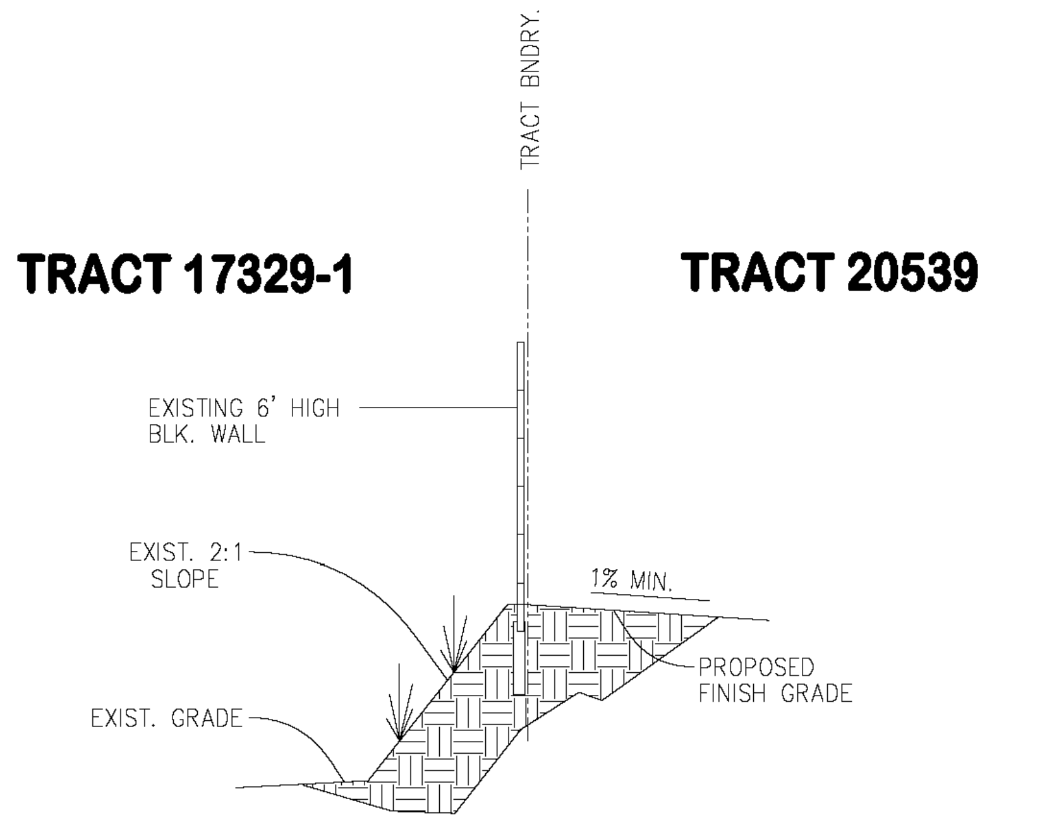
SECTION "C"—"C"

NTS



SECTION "D"—"D"

NTS



SECTION "E"—"E"

NTS

LOT TABULATION – TRACT NO. 20539

LOT NO.	PLAN/ELEV.	TOTAL DUSF	GARAGE S.F.	PORCH S.F.	COVERED BALCONY S.F.	COVERED PATIO S.F.	STREET ADDRESS	LOT AREA S.F.	LOT COVERAGE
1	3A / ADU 2	2,664 / 750	419	206 / 128	360	349	0000 DAWN COURT	10,929	27.3%
2	2B / ADU 2	2,564 / 750	633	138 / 128			0000 DAWN COURT	10,887	28.5%
3	3A / ADU 2	2,664 / 750	419	206 / 128	360	349	0000 DAWN COURT	10,844	27.4%
4	2C / ADU 2	2,564 / 750	633	138 / 128			0000 DAWN COURT	10,802	28.8%
5	3B / ADU 2	2,664 / 750	419	120 / 128	360	349	0000 DAWN COURT	10,822	26.8%
6	3A / ADU 2	2,664 / 750	419	206 / 128	360	349	0000 DAWN COURT	10,832	26.8%
7	2B / ADU 2	2,564 / 750	633	138 / 128			0000 DAWN COURT	10,986	28.3%
8	2C / ADU 2	2,564 / 750	633	138 / 128			0000 DAWN COURT	11,425	27.2%
9	3B / ADU 2	2,664 / 750	419	120 / 128	360	349	0000 DAWN COURT	10,811	26.8%
10	2A / ADU 1	2,564 / 600	633	138			0000 DAWN COURT	10,838	28.7%
11	3C / ADU 2	2,664 / 750	419	120 / 128	360	349	0000 DAWN COURT	10,800	26.8%
12	1B / ADU 1	2,053 / 600	624	140			0000 DAWN COURT	10,800	31.6%
13	3A / ADU 2	2,664 / 750	419	206 / 128	360	349	0000 DAWN COURT	10,800	27.6%
14	2C / ADU 2	2,564 / 750	633	138 / 128			0000 DAWN COURT	10,800	28.8%
15	3B / ADU 2	2,664 / 750	419	120 / 128	360	349	0000 DAWN COURT	11,568	25.1%
16	2C / ADU 2	2,564 / 750	633	138 / 128			0000 DUSK COURT	11,568	26.8%
17	3B / ADU 2	2,664 / 750	419	120 / 128	360	349	0000 DUSK COURT	10,800	26.8%
18	1C / ADU 1	2,053 / 600	624	140			0000 DUSK COURT	10,800	31.6%
19	2B / ADU 2	2,564 / 750	633	138 / 128			0000 DUSK COURT	10,800	28.8%
20	2A / ADU 2	2,564 / 750	633	138 / 128			0000 DUSK COURT	10,800	28.8%
21	3C / ADU 2	2,664 / 750	419	120 / 128			0000 DUSK COURT	10,900	26.6%
22	3A / ADU 2	2,664 / 750	419	206 / 128			0000 DUSK COURT	10,800	27.6%
23	2C / ADU 2	2,564 / 750	633	138 / 128			0000 DUSK COURT	11,421	27.2%
24	2B / ADU 2	2,564 / 750	633	138 / 128			0000 DUSK COURT	11,629	26.7%
25	3A / ADU 2	2,664 / 750	419	206 / 128	360	349	0000 DUSK COURT	11,023	27.1%
26	2C / ADU 2	2,564	633	138			0000 DUSK COURT	11,090	28.0%
27	2B / ADU 2	2,564 / 750	633	138 / 128			0000 DUSK COURT	10,935	28.4%
28	3A / ADU 2	2,664 / 750	419	206 / 128	360	349	0000 DUSK COURT	10,908	27.4%
29	2B / ADU 2	2,564 / 750	633	138 / 128			0000 DUSK COURT	10,881	28.5%
30	3C / ADU 2	2,664 / 750	419	120 / 128	360	349	0000 DUSK COURT	10,854	26.7%
A	WQMP BASIN							11,441	
B	WQMP BASIN							11,595	

APN 0261–0062–15 AND 16

DIGALERT
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TWO WORKING DAYS BEFORE YOU DIG
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UNDERGROUND SERVICE ALERT

1/8/2025 7:07:57 PM

SURESH DODDIAH
NO. 36361
EXP. 6-30-26

S.D. ENGINEERING AND ASSOCIATES
LAND PLANNING AND CIVIL ENGINEERING
242 E. AIRPORT DRIVE, STE. 212 – SAN BERNARDINO, CALIF. 92408
PHONE: (909) 215–3451 EMAIL: SURESH@SDENGINEERING.NET

SURESH DODDIAH R.C.E. 36361 DATE

MARK	REVISIONS	BY	APPR.	DATE

BENCH MARK:

APPROVED____________ 2025
ACTING CITY ENGINEER: ____________
R.C.E. NO. ________ , EXP. ________
DRAWN BY:
CHECKED BY:
RECOMMENDED BY:

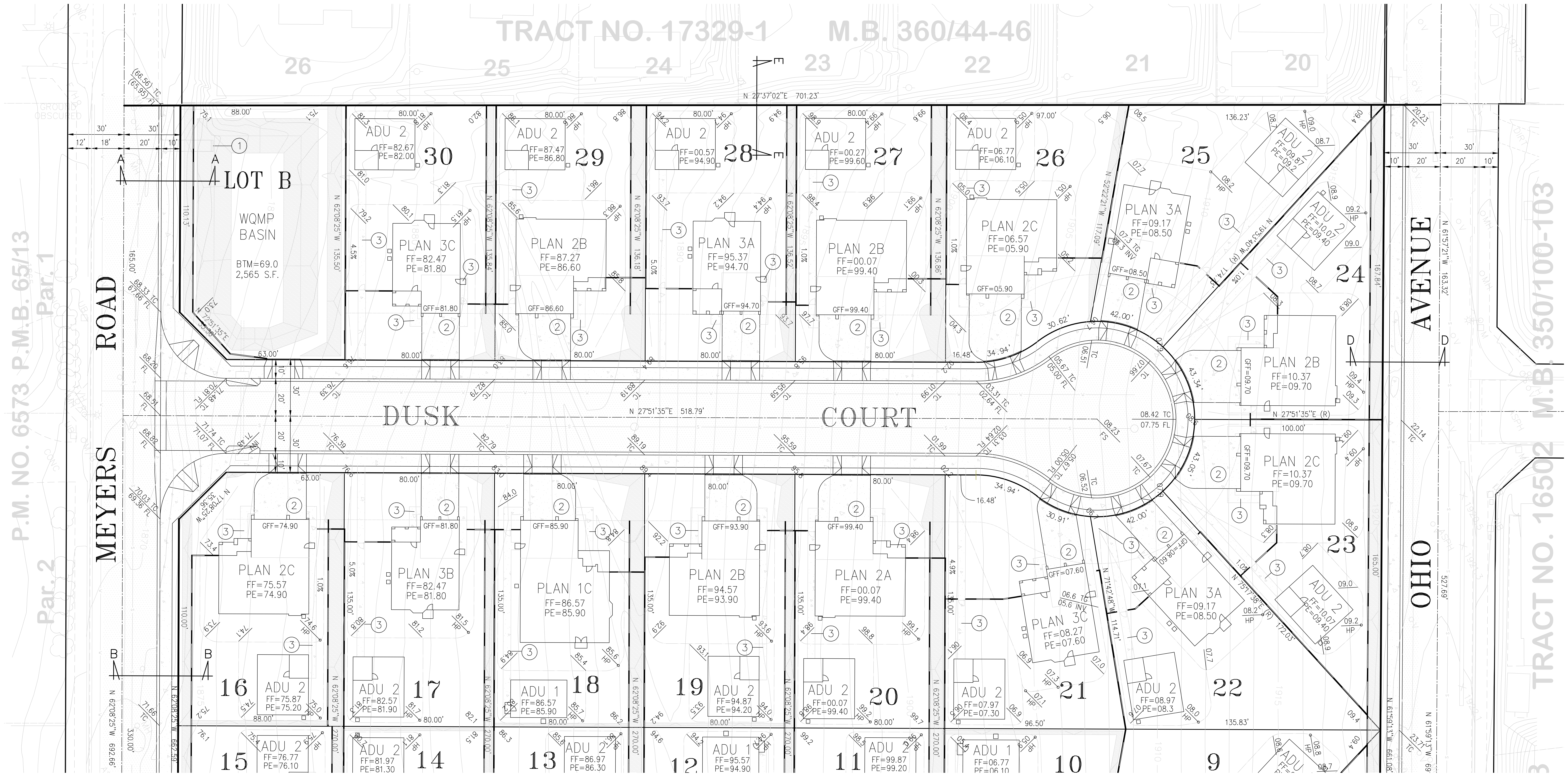
CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES

PRECISE GRADING PLAN
TRACT NO. 20539
LOT TABULATIONS AND SECTIONS

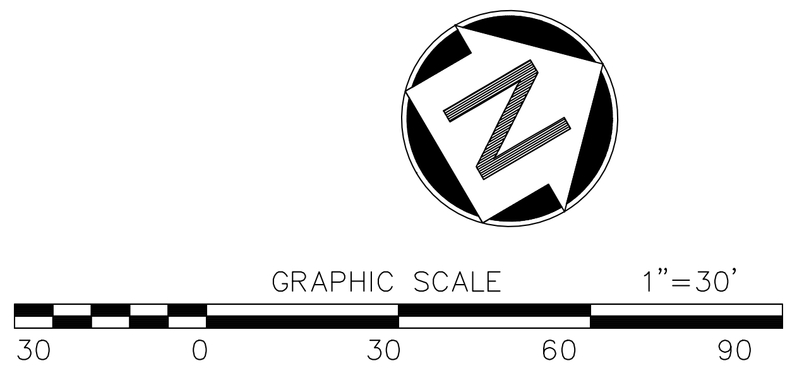
DRAWING NO.

SHEET 2 OF 4 SHEETS

FOR CITY USE ONLY: FILE NO.
W.O. NO.



SEE SHEET 4



CONSTRUCTION NOTES

① CONST. PARKWAY CULVERT W/ INLET TYPE II EXTENDED TO INSIDE SLOPE OF WQMP BASIN PER S.B. CITY STD. 400, S=6'-0"

② CONST. 6" THICK PCC DRIVEWAY (WIDTH=16')

③ CONST. 4" THICK PCC WALKWAY

APN 0261-0062-15 AND 16

DIGALERT
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EXP. 6-30-26
SURESH DODDIAH

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LAND PLANNING AND CIVIL ENGINEERING
242 E. AIRPORT DRIVE, STE. 212 – SAN BERNARDINO, CALIF. 92408
PHONE: (909) 215-3451 EMAIL: SURESH@SDENGINEERING.NET

SURESH DODDIAH R.C.E. 36361 DATE

MARK	REVISIONS	BY	APPR.	DATE

BENCH MARK: H1-5

2" BRASS DISK SET FLUSH IN TOP OF CURB AT SOUTHEASTERLY CORNER OF BELMONT AVENUE AND PALM AVENUE, AT EAST END OF E.C.R., STAMPED CITY OF SAN BERNARDINO H1-5

ELEV: 1807.25

APPROVED__________ 2025

ACTING CITY ENGINEER: __________
R.C.E. NO. __________ , EXP. __________
DRAWN BY:
CHECKED BY:
RECOMMENDED BY:

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES

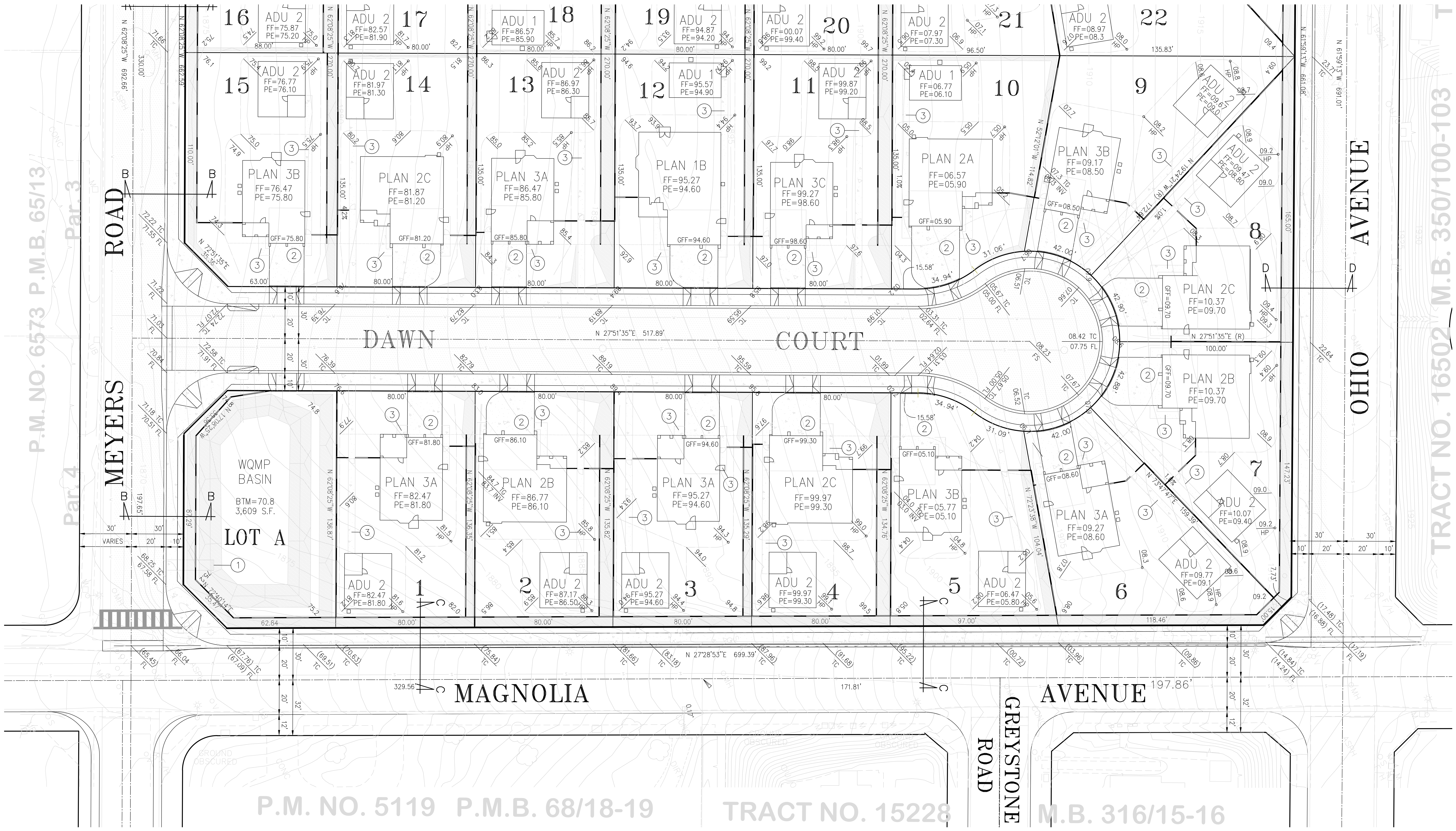
PRECISE GRADING PLAN
TRACT NO. 20539

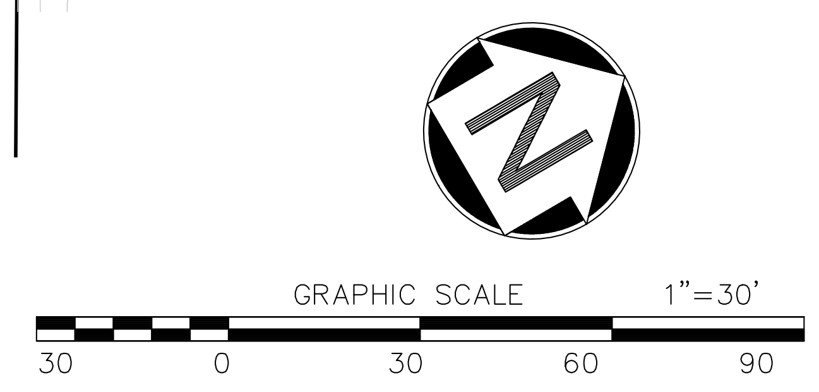
FOR CITY USE ONLY: FILE NO. W.O. NO.

DRAWING NO.

SHEET 3 OF 4 SHEETS

SEE SHEET 3





CONSTRUCTION NOTES

① CONST. PARKWAY CULVERT W/ INLET TYPE II EXTENDED TO INSIDE SLOPE OF WQMP BASIN PER S.B. CITY STD. 400, S=6'-0"

② CONST. 6" THICK PCC DRIVEWAY (WIDTH=16')

③ CONST. 4" THICK PCC WALKWAY

APN 0261-0062-15 AND 16

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REGISTERED PROFESSIONAL ENGINEER
SURESH DODDIAH
NO. 36361
EXP. 6-30-26
CIVIL
STATE OF CALIFORNIA

S.D. ENGINEERING AND ASSOCIATES
LAND PLANNING AND CIVIL ENGINEERING
242 E. AIRPORT DRIVE, STE. 212 – SAN BERNARDINO, CALIF. 92408
PHONE: (909) 215-3451 EMAIL: SURESH@SDENGINEERING.NET

SURESH DODDIAH R.C.E. 36361 DATE

MARK	REVISIONS	BY	APPR.	DATE

BENCH MARK: H1-5

2" BRASS DISK SET FLUSH IN TOP OF CURB AT SOUTHEASTERLY CORNER OF BELMONT AVENUE AND PALM AVENUE, AT EAST END OF E.C.R., STAMPED CITY OF SAN BERNARDINO H1-5

ELEV: 1807.25

APPROVED__________2023

ACTING CITY ENGINEER: ____________
R.C.E. NO. ________, EXP. ________
DRAWN BY:
CHECKED BY:
RECOMMENDED BY:

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES

PRECISE GRADING PLAN
TRACT NO. 20539

FOR CITY USE ONLY: FILE NO. W.O. NO.

DRAWING NO.

SHEET 4 OF 4 SHEETS

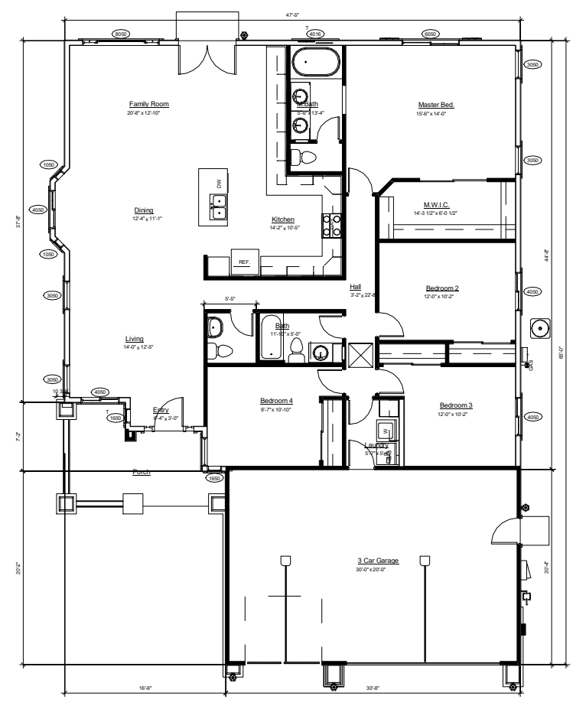
1/9/2025 3:16:35 PM

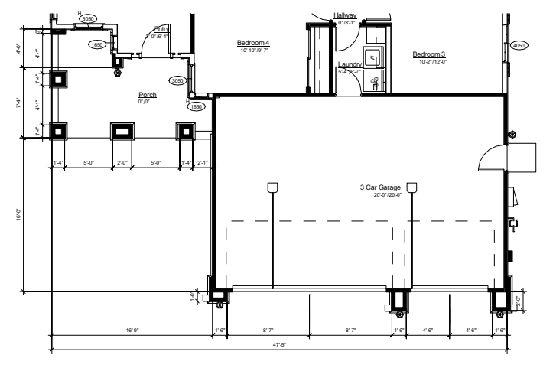
C:\Users\adrig\Andresen Architecture Inc\AAI - Access\Projects\4_Projects 2020-2029\2022\22-4510 Meyers 32 Homes\Revit\22-4510 Meyers 32 Homes - Site.rvt

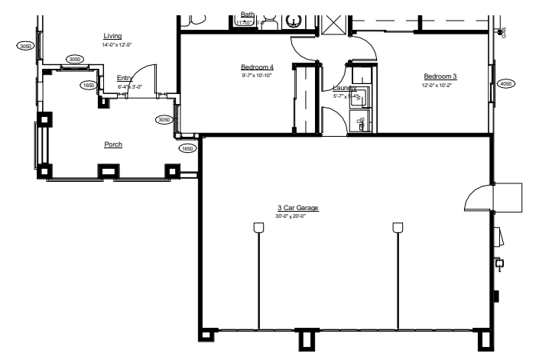
2/7/2025 10:32:19 AM

Proposed 30 Homes For:
Aurora Builders LLC
Meyers Road, San Bernardino, CA / No. 20539

ANDRESEN ARCHITECTURE INC.
17087 ORANGE WAY, FONTANA, CA 92335 (909) 355-6688

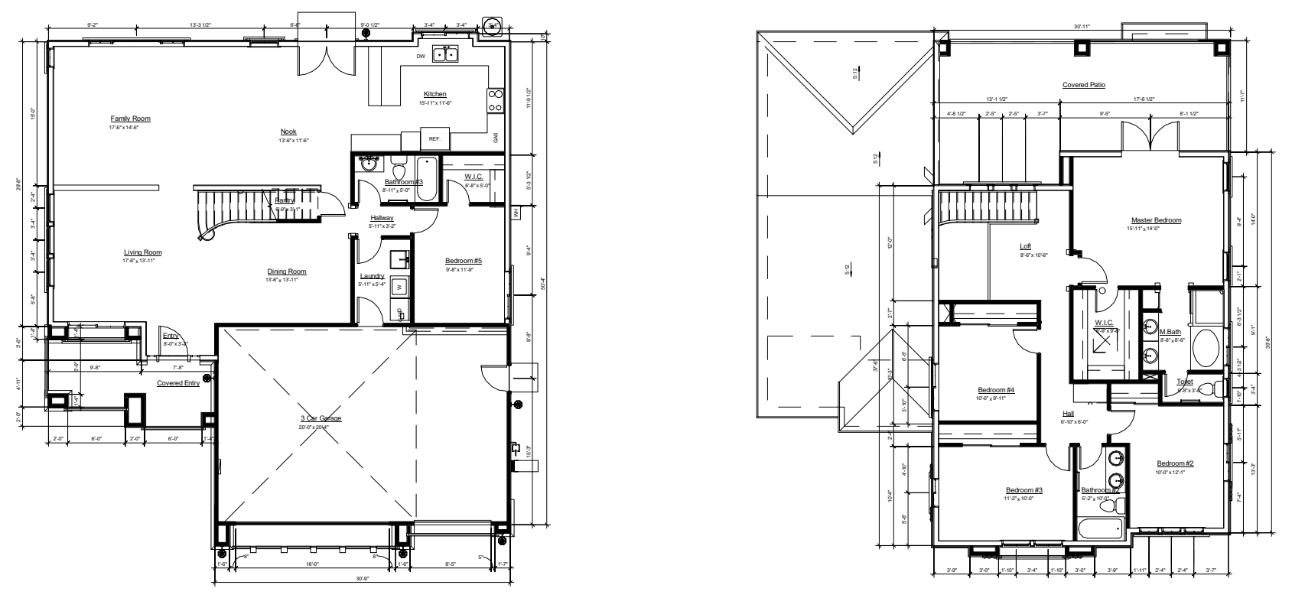

PLAN 1 - ELEV 'A'

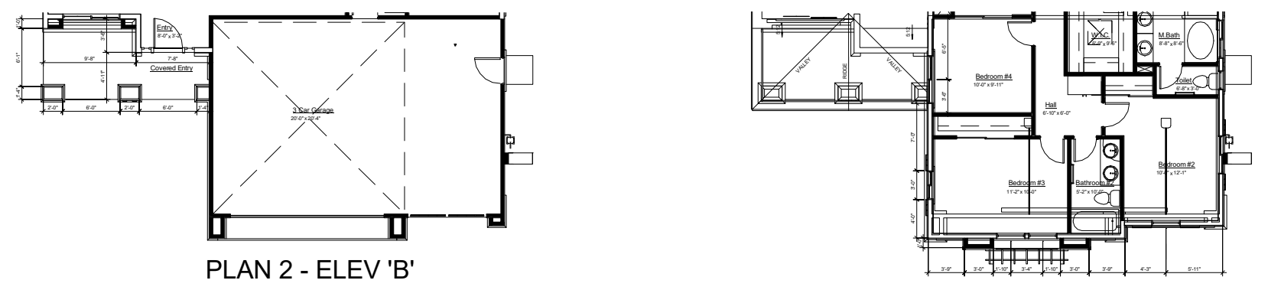

PLAN 1 - ELEV 'B'

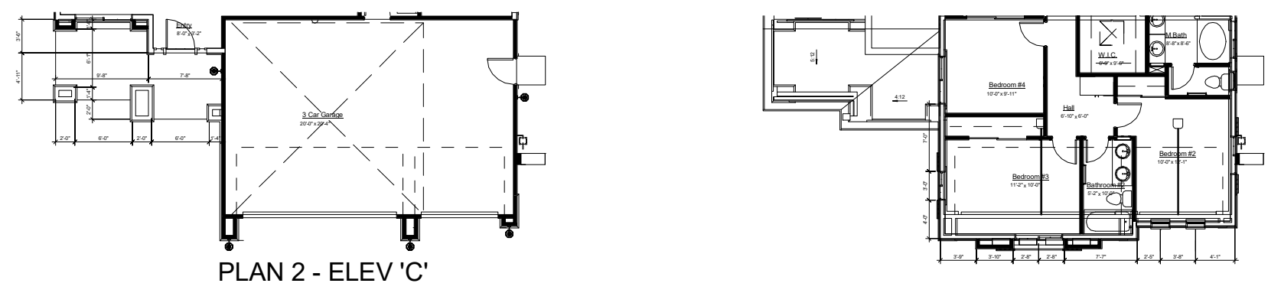

PLAN 1 - ELEV 'A'

PLAN 1
FIRST FLOOR 2,053 SQ. FT.
TOTAL FLOOR AREA 2,053 SQ. FT.

PORCH 140 SQ. FT.
3-CAR GARAGE 624 SQ. FT.
TOTAL 764 SQ. FT.


PLAN 2 - ELEV 'A'

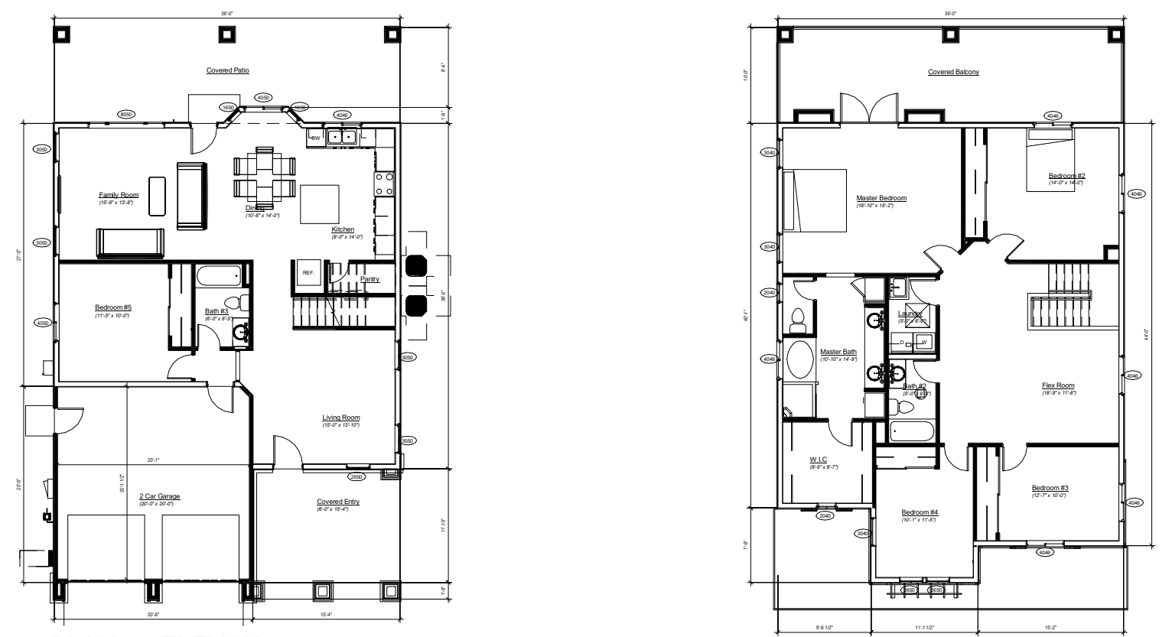

PLAN 2 - ELEV 'B'


PLAN 2 - ELEV 'C'

PLAN 2
FIRST FLOOR 1,457 SQ. FT.
SECOND FLOOR 1,107 SQ. FT.
TOTAL FLOOR AREA 2,564 SQ. FT.

PORCH 'C' 138 SQ. FT.
COVERED BALCONY 396 SQ. FT.
3-CAR GARAGE 633 SQ. FT.
TOTAL 1,167 SQ. FT.

PORCH 'A' 113 SQ. FT.
PORCH 'B' 142 SQ. TF.


PLAN 3 - ELEV 'A'

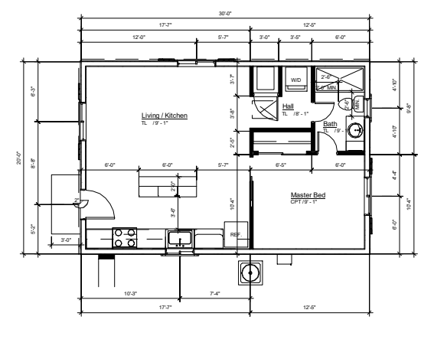

PLAN 3 - ELEV 'B'


PLAN 3 - ELEV 'C'

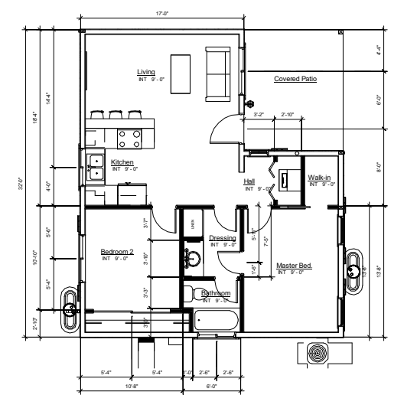
PLAN 3
FIRST FLOOR 1,133 SQ. FT.
SECOND FLOOR 1,531 SQ. FT.
TOTAL FLOOR AREA 2,664 SQ. FT.

PORCH 'A' 206 SQ. FT.
COVERED PATIO 349 SQ. FT.
2-CAR GARAGE 419 SQ. FT.
TOTAL 974 SQ. FT.

REAR COVERED BALCONY 360 SQ. FT.
PORCH 'B' & 'C' 120 SQ. FT.
FRONT BALCONY 'C' 56 SQ. FT.

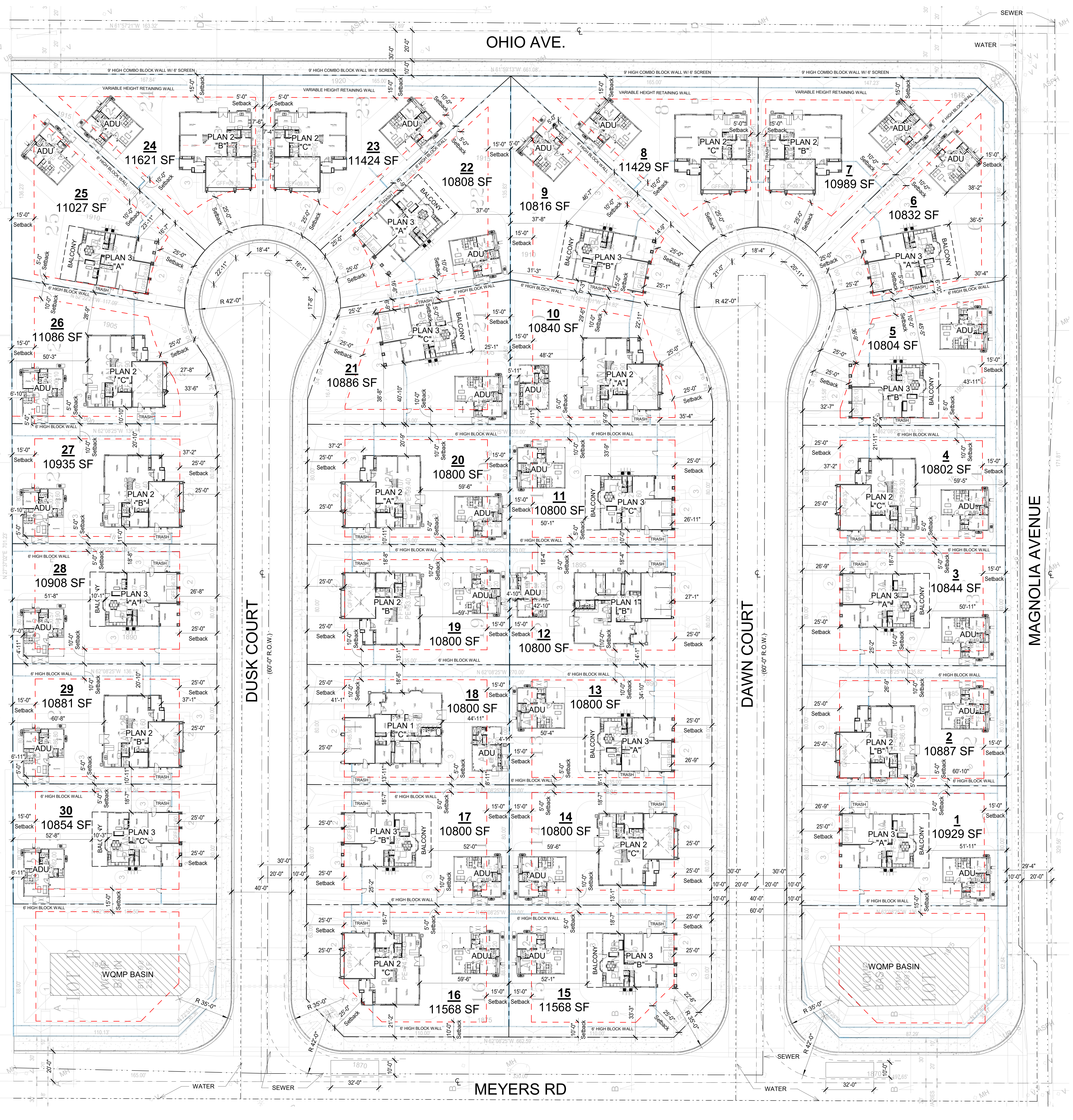


ADU 1
FIRST FLOOR 600 SQ. FT.
TOTAL FLOOR AREA 600 SQ. FT.



ADU 2
FIRST FLOOR 744 SQ. FT.
TOTAL FLOOR AREA 744 SQ. FT.

COVERED PATIO 131 SQ. FT.



Site Plan
1" = 30'-0"

OWNER:	AURORA BUILDERS LLC
CONTACT:	SRIHARI MUPPARAJU sriharim@yahoo.com (858) 699-8455
PROJECT ADDRESS:	MEYERS ROAD, SAN BERNARDINO, CA / NO. 20539
ARCHITECT:	ANDRESEN ARCHITECTURE INC. 17087 ORANGE WAY FONTANA, CA 92335 (909) 355-6688 FAX: (909) 349-2302
CONTACT:	DOUG ANDRESEN doug.andresen@aaifirm.com
CIVIL ENGINEER:	S.D. ENGINEERING AND ASSOCIATES 242 EAST AIRPORT DRIVE, STE. 212 SAN BERNARDINO, CA 92408 (909) 215-3451
CONTACT:	SURESH DODDIAH, P.E. suresh@sdengineering.net
STRUCTURAL:	INNOVATIVE STRUCTURAL ENGINEERING, INC 40810 COUNTY CENTER DRIVE, SUITE 110 TEMECULA, CA 92591
CONTACT:	JARED FERINI (951) 600-0032 x 1011 jared@iseengineering.com
LANDSCAPE:	RICHARD POPE AND ASSOCIATES 1585 S. 'D' STREET, SUITE 103 SAN BERNARDINO, CA 92408
CONTACT:	RICHARD POPE (909) 888-5568 rpla.la@verizon.net
APN:	0261-062-15 & 16
ZONING:	RESIDENTIAL LOW (RL)
CONSTRUCTION:	V-B
OCCUPANCY:	R-3 / U
FIRE SPRINKLERS:	REQUIRED
DESCRIPTION:	PROPOSED 30 SINGLE FAMILY RESIDENCES WITH 30 ADU's. ADU's TO BE REVIEWED UNDER A SEPARATE ADMIN REVIEW.

Lot Coverage Schedule (35% MAX)

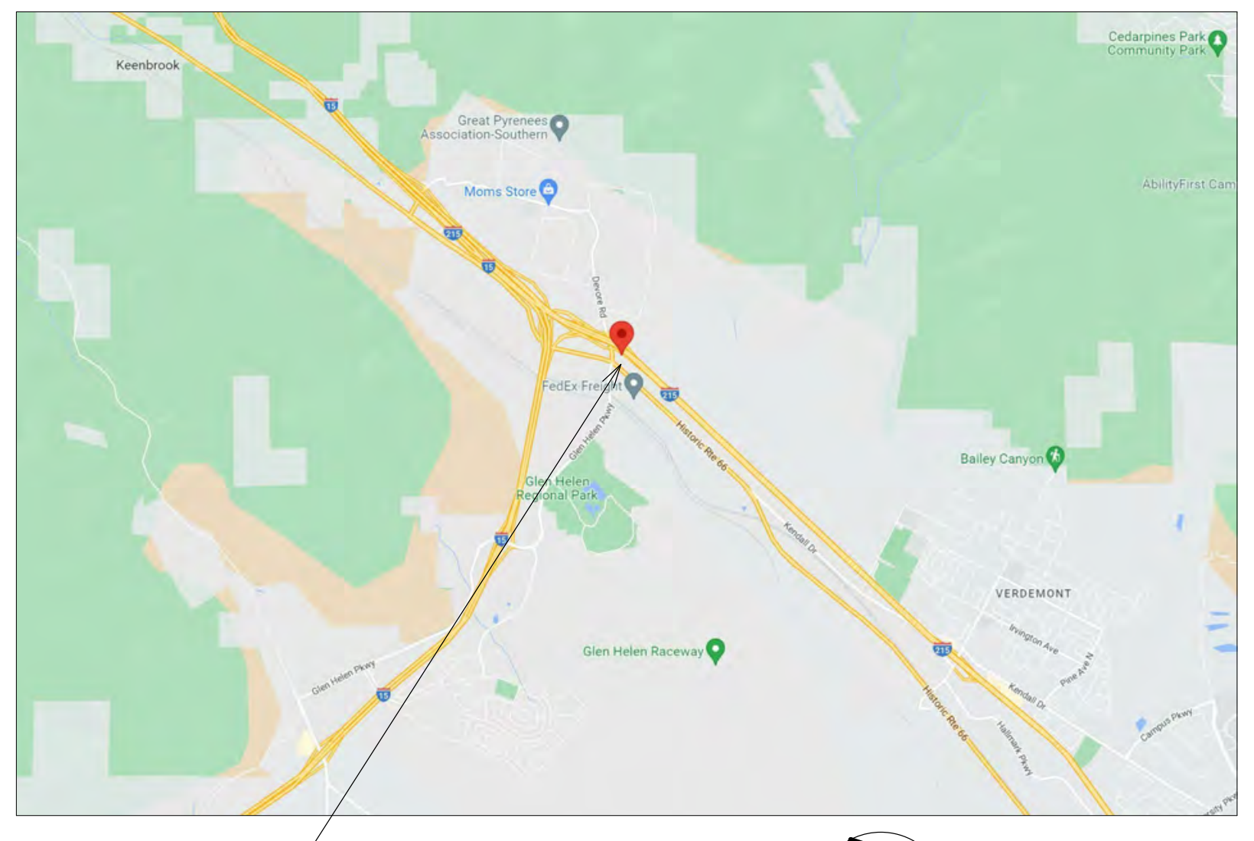
Lot Number	*Floor Plan*	*Elevation Type*	*Area*	*Footprint*	*Lot Coverage (%)*
1	Plan 3	A	10929 SF	2107 SF	19.28
2	Plan 2	B	10887 SF	2628 SF	24.14
3	Plan 3	A	10844 SF	2017 SF	18.60
4	Plan 2	C	10802 SF	2624 SF	24.29
5	Plan 3	B	10804 SF	2021 SF	18.71
6	Plan 3	A	10832 SF	2107 SF	19.45
7	Plan 2	B	10989 SF	2628 SF	23.91
8	Plan 2	C	11429 SF	2624 SF	22.96
9	Plan 3	B	10816 SF	2021 SF	18.69
10	Plan 2	A	10840 SF	2599 SF	23.98
11	Plan 3	C	10800 SF	2021 SF	18.71
12	Plan 1	B	10800 SF	2817 SF	26.08
13	Plan 3	A	10800 SF	2107 SF	19.51
14	Plan 2	C	10800 SF	2624 SF	24.30
15	Plan 3	B	11568 SF	2021 SF	17.47
16	Plan 2	C	11568 SF	2624 SF	22.68
17	Plan 3	B	10800 SF	2021 SF	18.71
18	Plan 1	C	10800 SF	2817 SF	26.08
19	Plan 2	B	10800 SF	2628 SF	24.33
20	Plan 2	A	10800 SF	2599 SF	24.06
21	Plan 3	C	10886 SF	2021 SF	18.57
22	Plan 3	A	10808 SF	2107 SF	19.50
23	Plan 2	C	11424 SF	2624 SF	22.97
24	Plan 2	B	11621 SF	2628 SF	22.61
25	Plan 3	A	11027 SF	2107 SF	19.11
26	Plan 2	C	11086 SF	2624 SF	23.67
27	Plan 2	B	10935 SF	2628 SF	24.03
28	Plan 3	A	10908 SF	2107 SF	19.32
29	Plan 2	B	10881 SF	2628 SF	24.15
30	Plan 3	C	10854 SF	2021 SF	18.62
			329138 SF		

Sequence of Drawings DR

Number	*Description*
DR1	Site Plan
DR2	Plan 1 - Floor & Roof Plans
DR3	Plan 1 - Elevations
DR4	Plan 2 - Floor & Roof Plans
DR5	Plan 2 - Elevations
DR6	Plan 3 - Floor & Roof Plans

Sequence of Drawings DR

Number	*Description*
DR7	Plan 3 - Elevations



Vicinity Map
1" = 10'-0"

Proposed 30 Homes For:
Aurora Builders LLC
Meyers Road, San Bernardino, CA / No. 20539

4 Feb 2025	△
	△
22-4510	△
	△

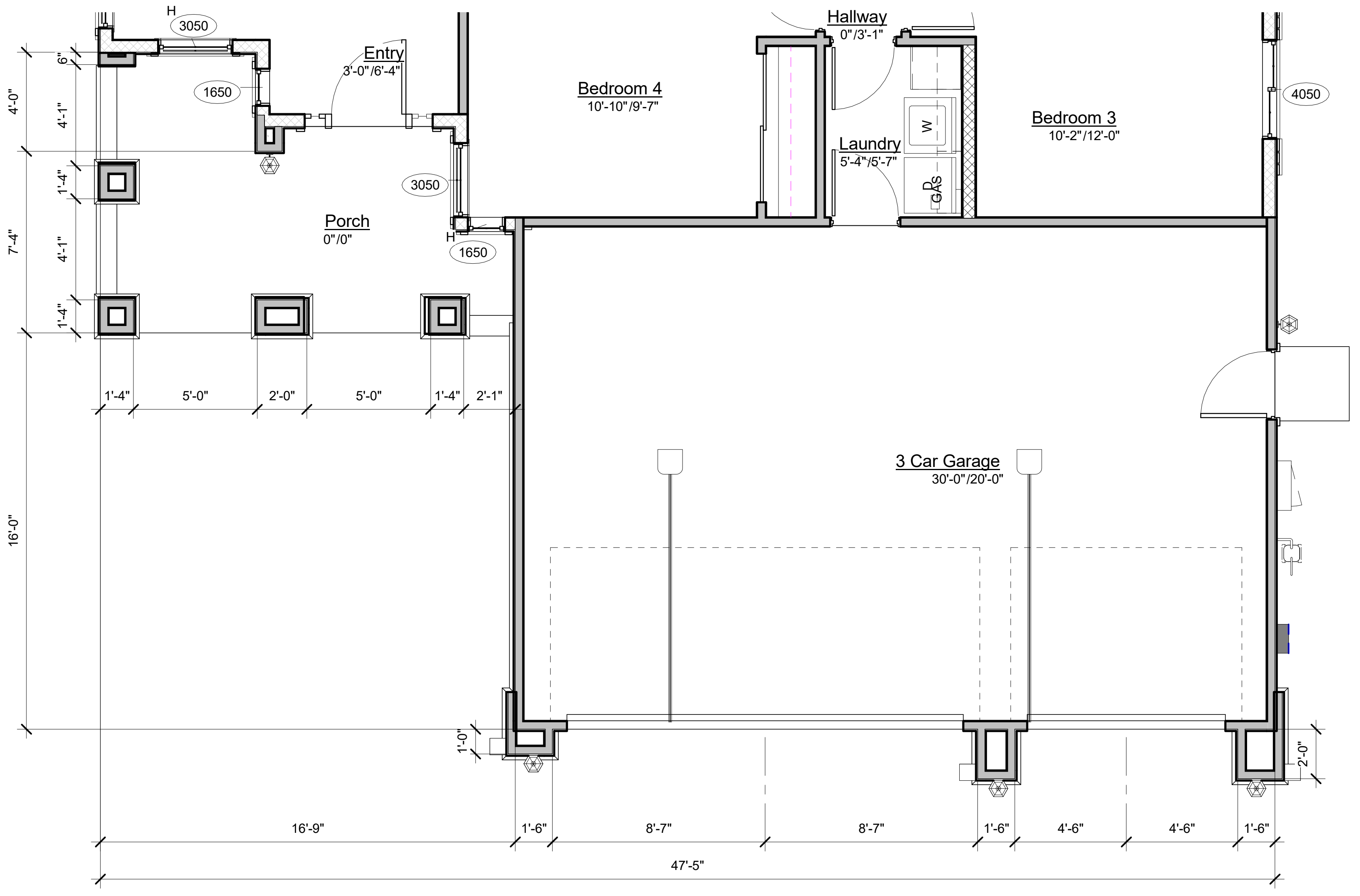
LICENSED ARCHITECT
Douglas Andresen
C-14504
12-31-25
RENEWAL DATE
STATE OF CALIFORNIA

Site Plan

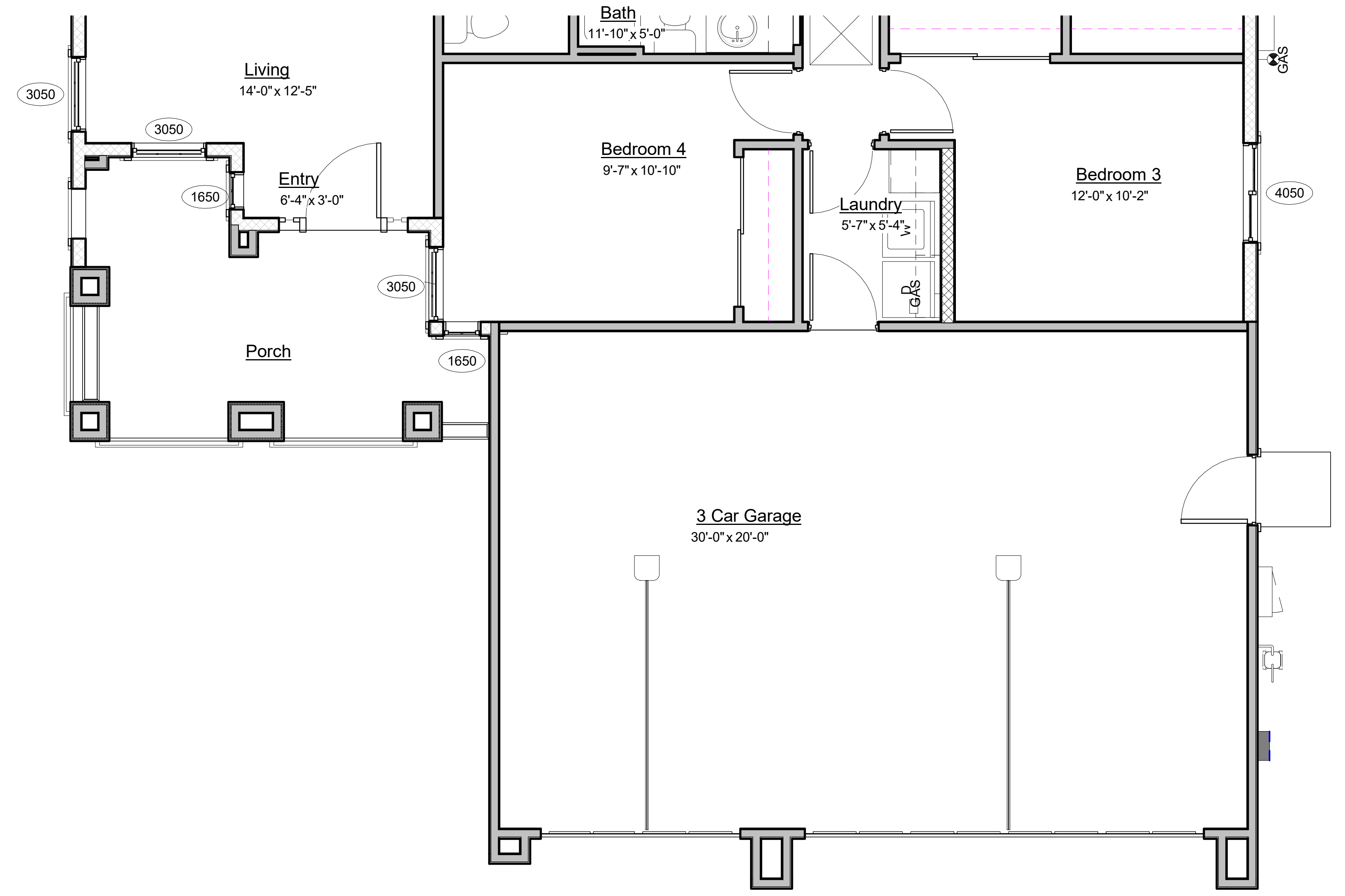
DR1

10/18/2024 12:04:23 PM C:\Users\JasonAndrese_3ljo5pp\Andresen Architecture Inc\AAI - Access\Projects\4_Projects 2020-2029\2022\22-4510 Meyers 32 Homes\Revit\Sample McKinley 19-3496\19-3496 McKinley 16 Homes - Plan 1 (2019).rvt

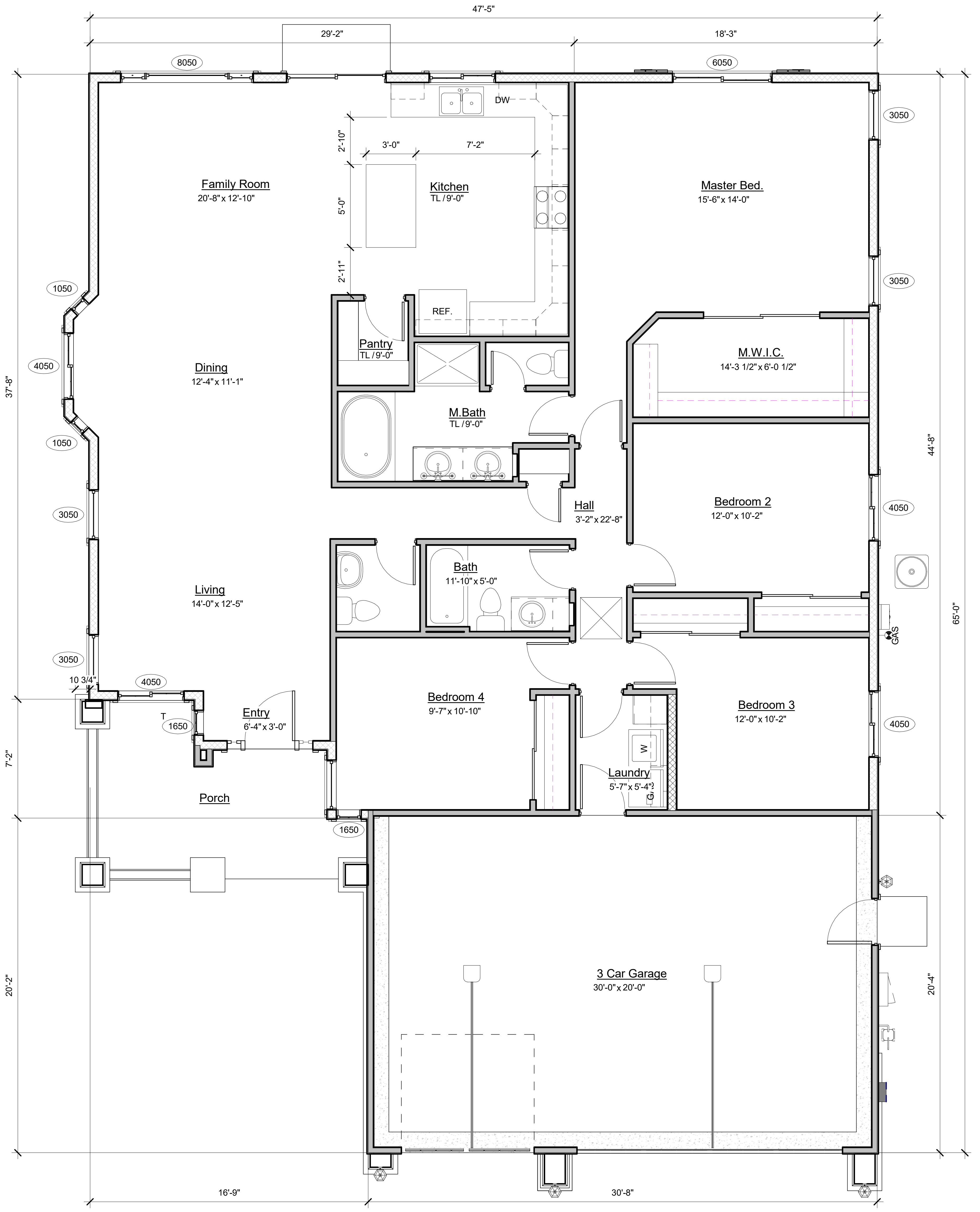
ANDRESEN
ARCHITECTURE
INC.
17087 ORANGE WAY, FONTANA, CA 92335 (909) 355-6688



Floor Plan - B
1/4" = 1'-0"

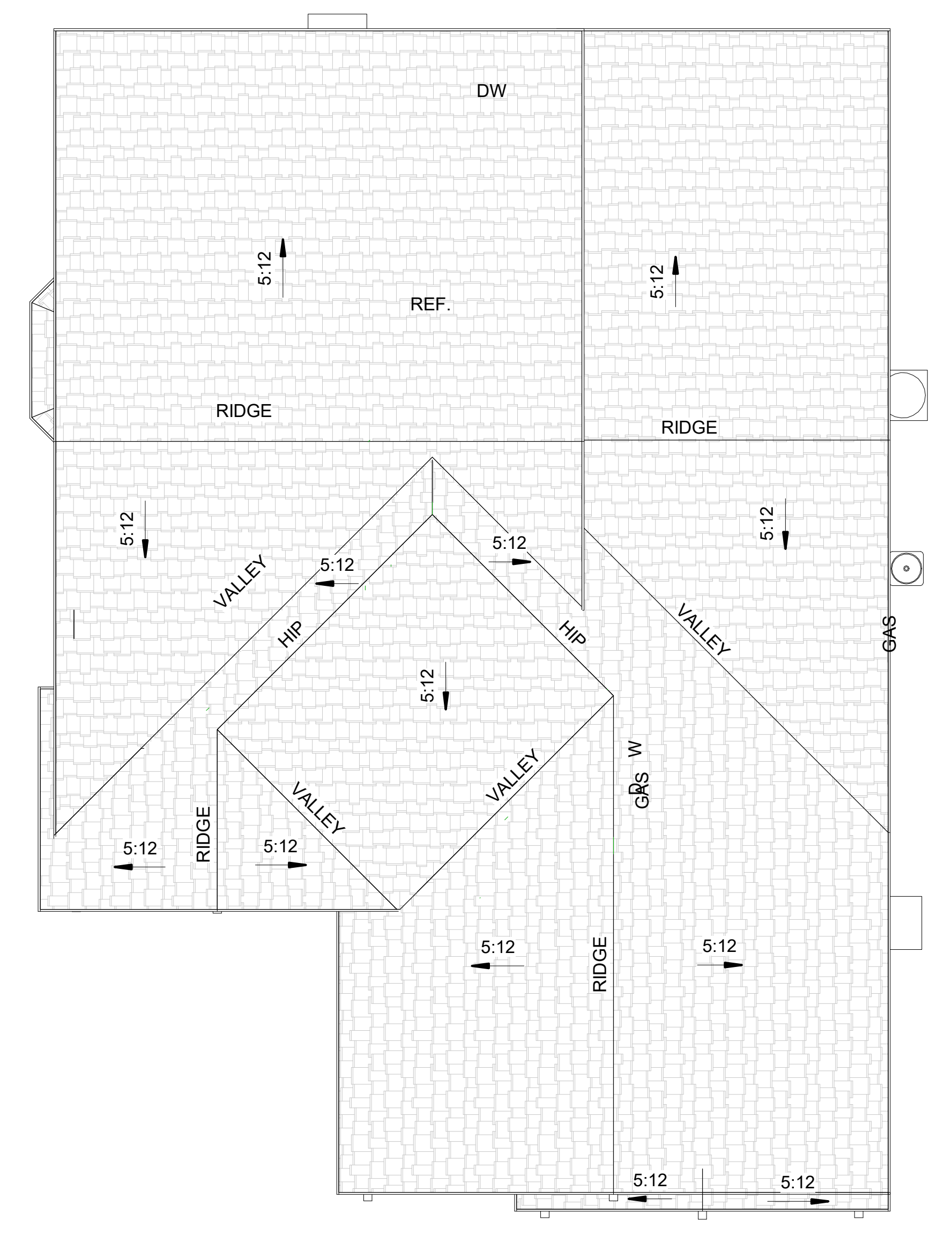


Floor Plan - C
1/4" = 1'-0"

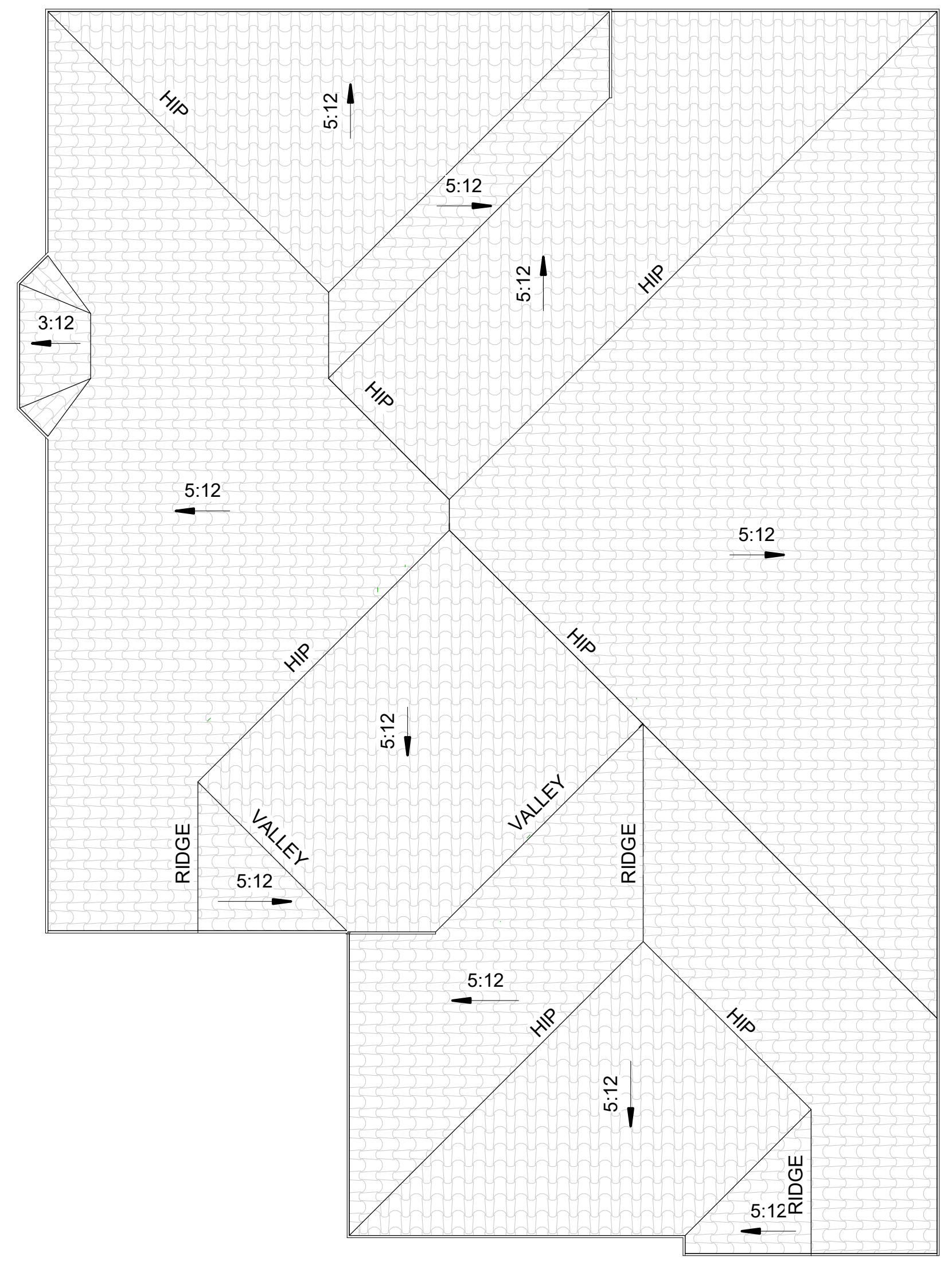


Floor Plan - A
1/4" = 1'-0"

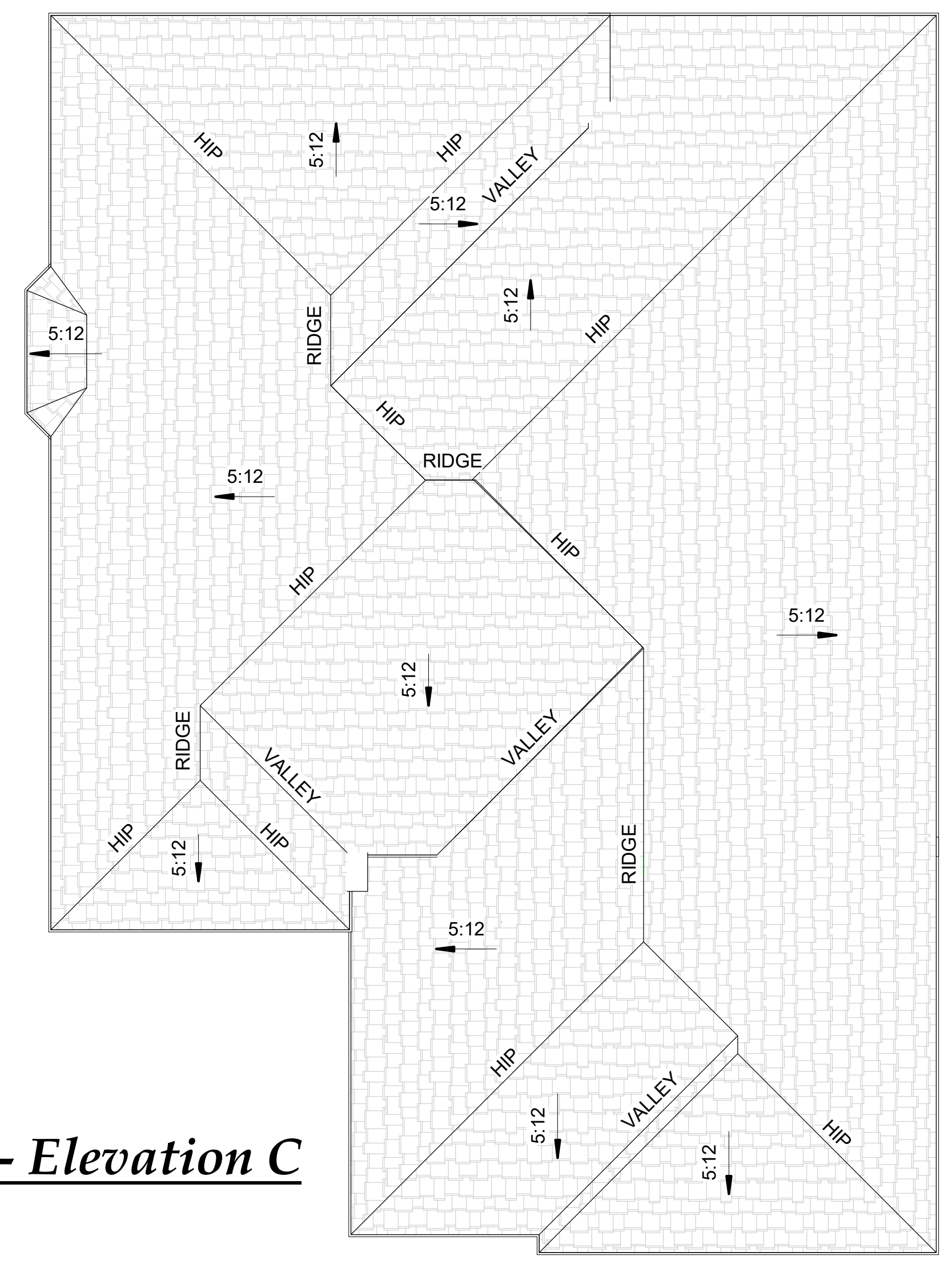
Area Schedule	
Name	***Area***
Conditioned Area	
SINGLE FAMILY RESIDENCE	2,053 SF
	2,053 SF
Non-Conditioned Area	
PORCH	140 SF
3 CAR GARAGE	624 SF
	764 SF



Roof Plan - Elevation A
1/8" = 1'-0"



Roof Plan - Elevation B
1/8" = 1'-0"



Roof Plan - Elevation C
1/8" = 1'-0"

Proposed Homes For:
Aurora Builders LLC
No. 20539, Meyers Road, San Bernardino, CA

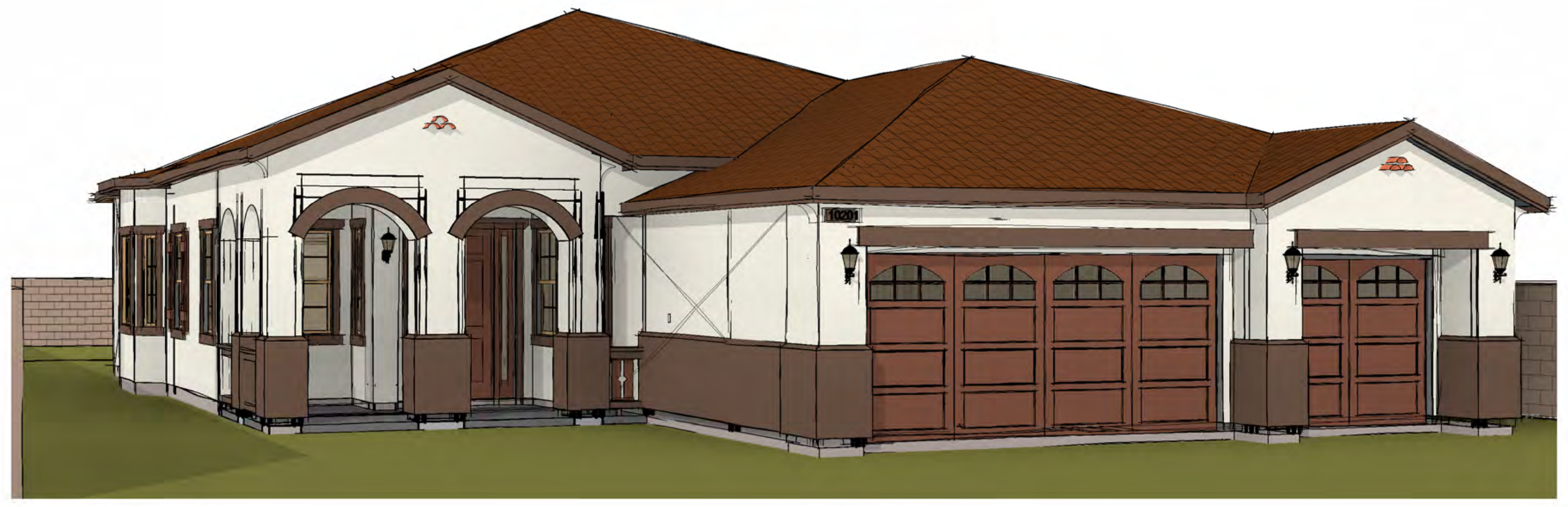
28 June 2023
22-4510

LICENSED ARCHITECT
Douglas Andresen
C-14504
12-31-25
RENEWAL DATE
STATE OF CALIFORNIA

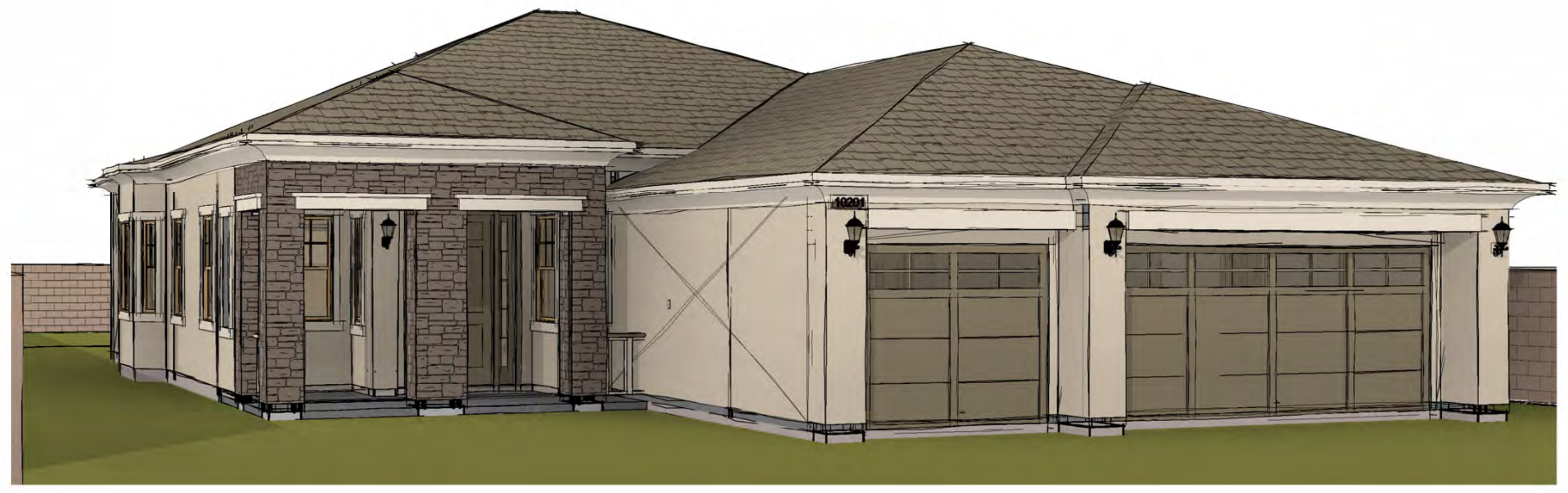
Plan 1 - Floor & Roof Plans

DR2

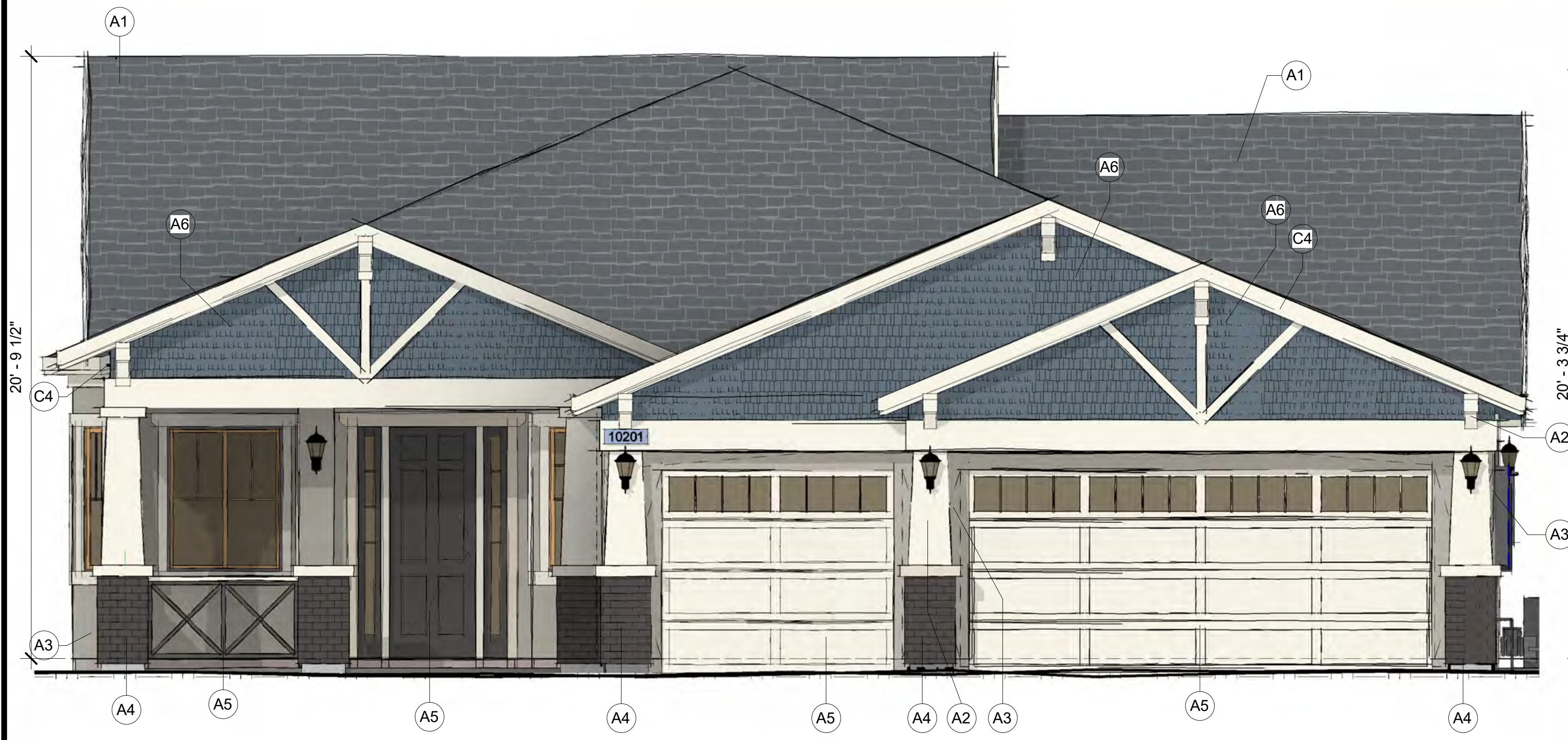
Elevation A



Elevation B



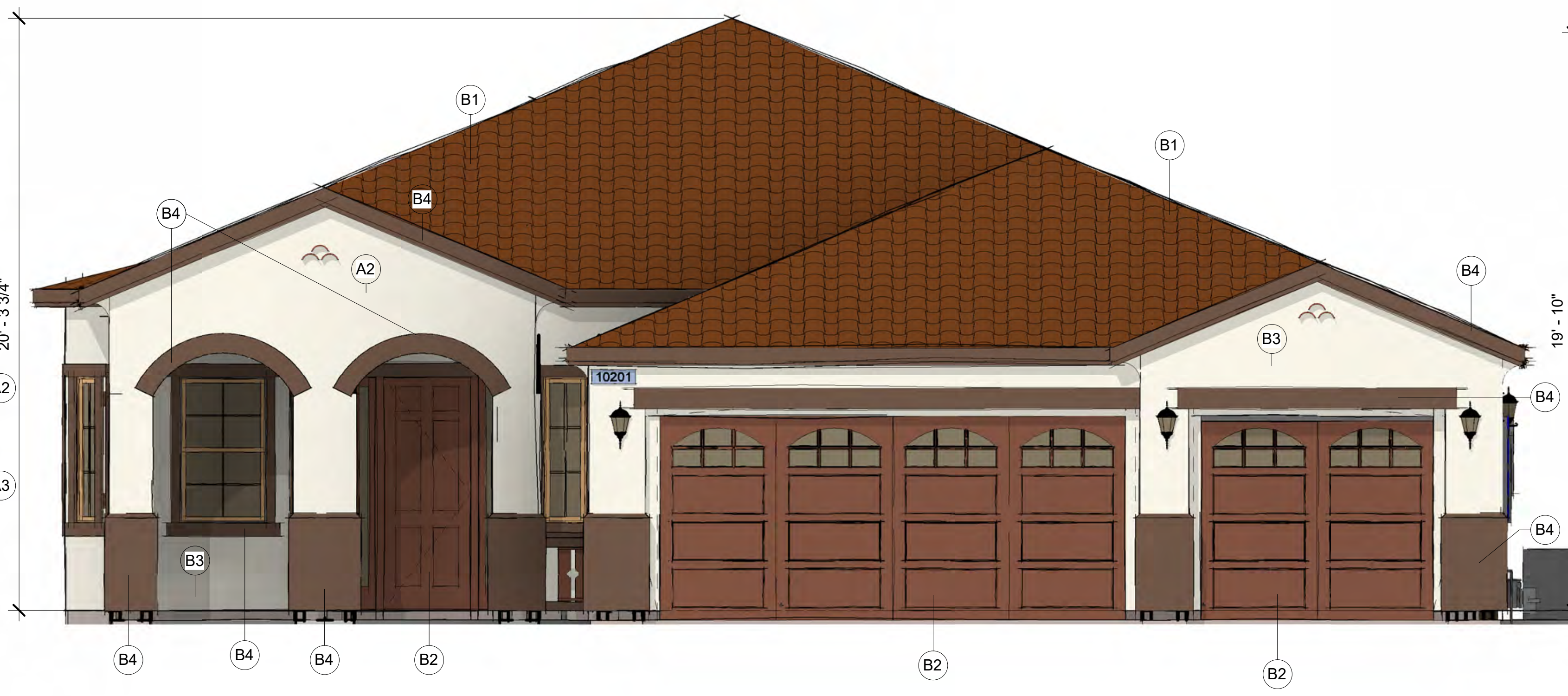
Elevation C



Front Elevation - A

1/4" = 1'-0"

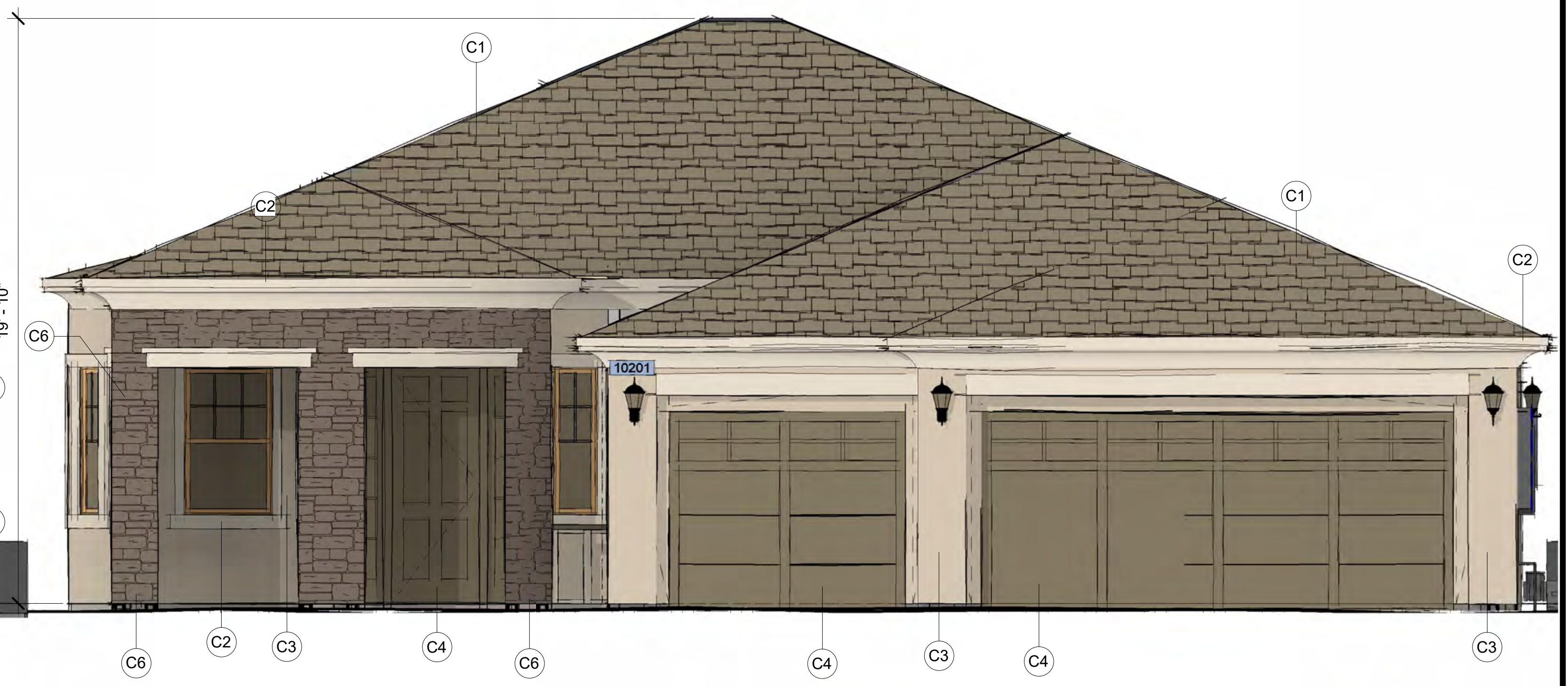
ARCHITECTURAL
STYLE: CRAFTSMAN



Front Elevation - B

1/4" = 1'-0"

ARCHITECTURAL
STYLE: SPANISH



Front Elevation C

1/4" = 1'-0"

ARCHITECTURAL
STYLE: TUSCAN

Material Legend A

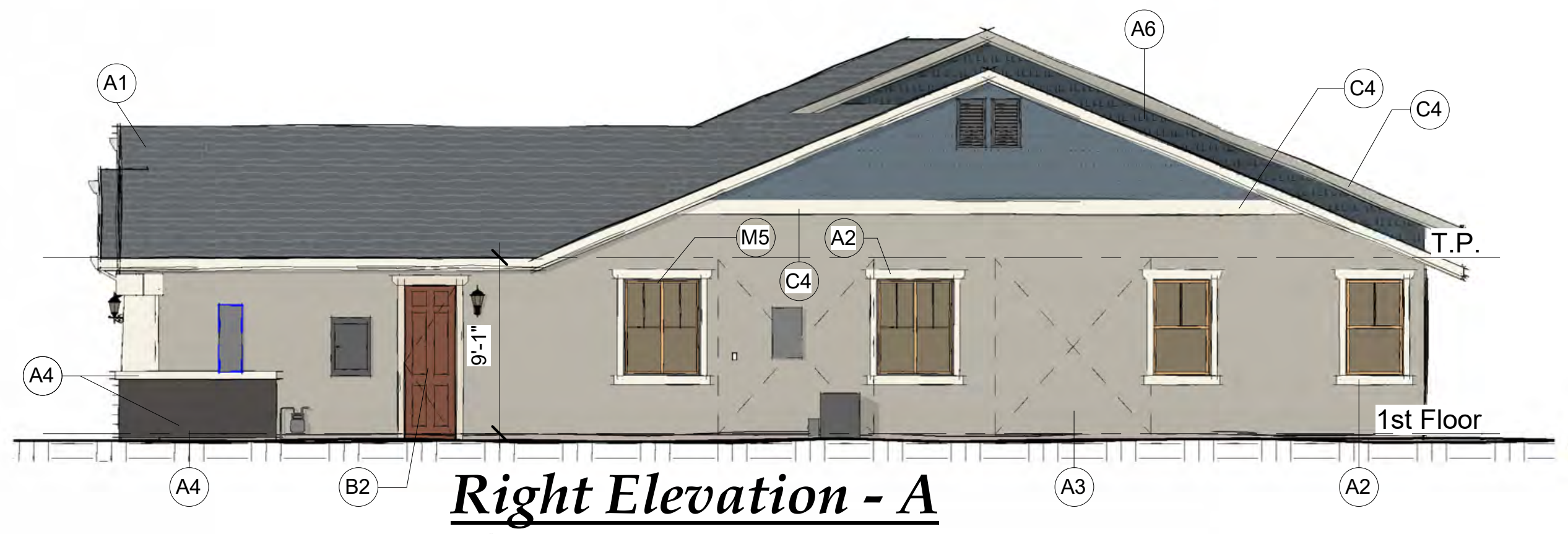
Mark	Material	Manufacturer	Material Color	Product #
A1	ROOFING-CONCRETE TILE	EAGLE ROOFING	CHARCOAL RANGE (PONDEROSA)	399
A2	GARAGE DOORS / FASCIA / TRIM	DUNN EDWARDS - PAINT	SWISS COFFEE	DEW-341
A3	MAIN STUCCO	DUNN EDWARDS - PAINT	RECLAIMED WOOD	DET-625
A4	VENEER BRICK	EL DORADO STONE	IRONSIDE (TUNDRA BRICK)	
A5	ENTRY DOOR / SHUTTERS	DUNN EDWARDS - PAINT	LONG LAKE	DE-6334
A6	WOOD SHAKE SIDING	DUNN EDWARDS - PAINT	LONG LAKE	DE-6334

Material Legend B

Mark	Material	Manufacturer	Material Color	Product #
B1	ROOFING-CONCRETE TILE	EAGLE ROOFING	VALENCIA (CAPISTRANO)	3562
B2	ENTRY DOORS & SHUTTERS/ACCENT	DUNN EDWARDS - PAINT	RED HOOK	DE-6091
B3	MAIN STUCCO	DUNN EDWARDS - PAINT	SWISS COFFEE	DEW-341
B4	TRIM / FACIA	DUNN EDWARDS - PAINT	DEEP BROWN	DE-6077

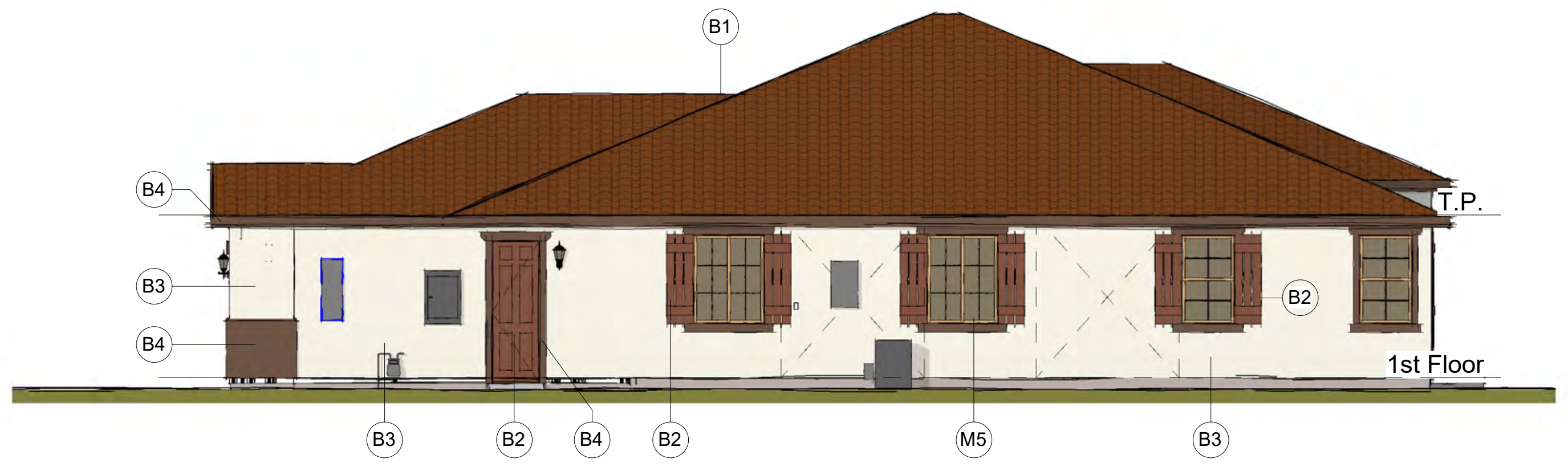
Material Legend C

Mark	Material	Manufacturer	Material Color	Product #
C1	ROOFING-CONCRETE TILE	EAGLE ROOFING	ARCADIA CANYON BROWN (PONDEROSA)	302
C2	FASCIA / TRIM	DUNN EDWARDS - PAINT	STUCCO TAN	DE-6205
C3	MAIN STUCCO	DUNN EDWARDS - PAINT	DESERT SUEDE	DE-6206
C4	ENTRY & GARAGE DOORS	DUNN EDWARDS - PAINT	MISSION TRAIL	DE-6223
C5	SHUTTERS - FIBERGLASS	DUNN EDWARDS - PAINT	MISSION TRAIL	DE-6223
C6	VENEER - STONE/VENEER	EL DORADO STONE	SIERRA (MOUNTAIN LEDGE)	



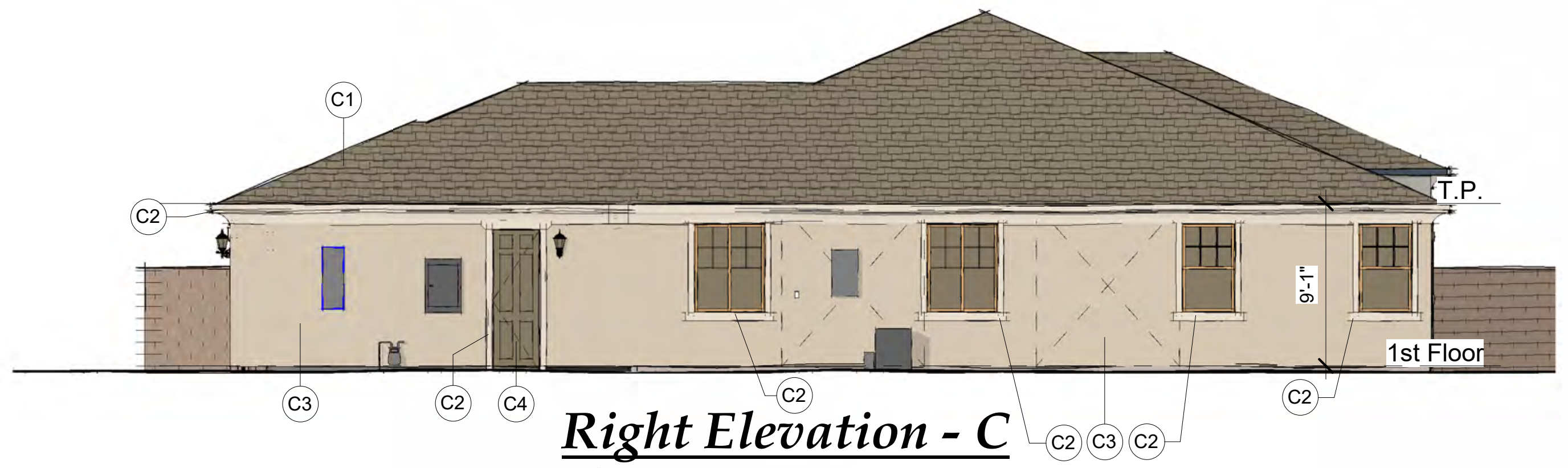
Right Elevation - A

1/8" = 1'-0"



Right Elevation - B

1/8" = 1'-0"



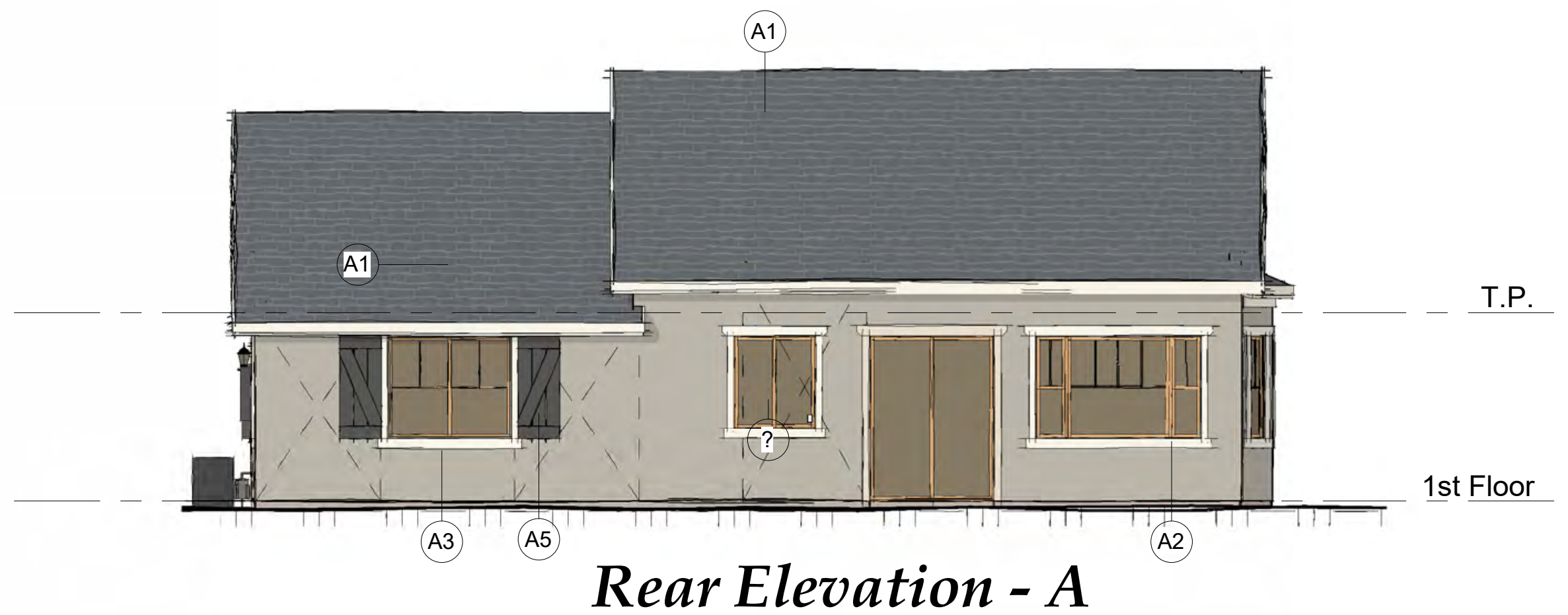
Right Elevation - C

1/8" = 1'-0"

36 IN. X 80 IN. PROVIDENCE CENTER ARCH
PAINTED SMOOTH FIBERGLASS PREHUNG
FRONT DOOR WITH BRICKMOLD
MASONITE
MODEL # 33620
INTERNET # 202971753

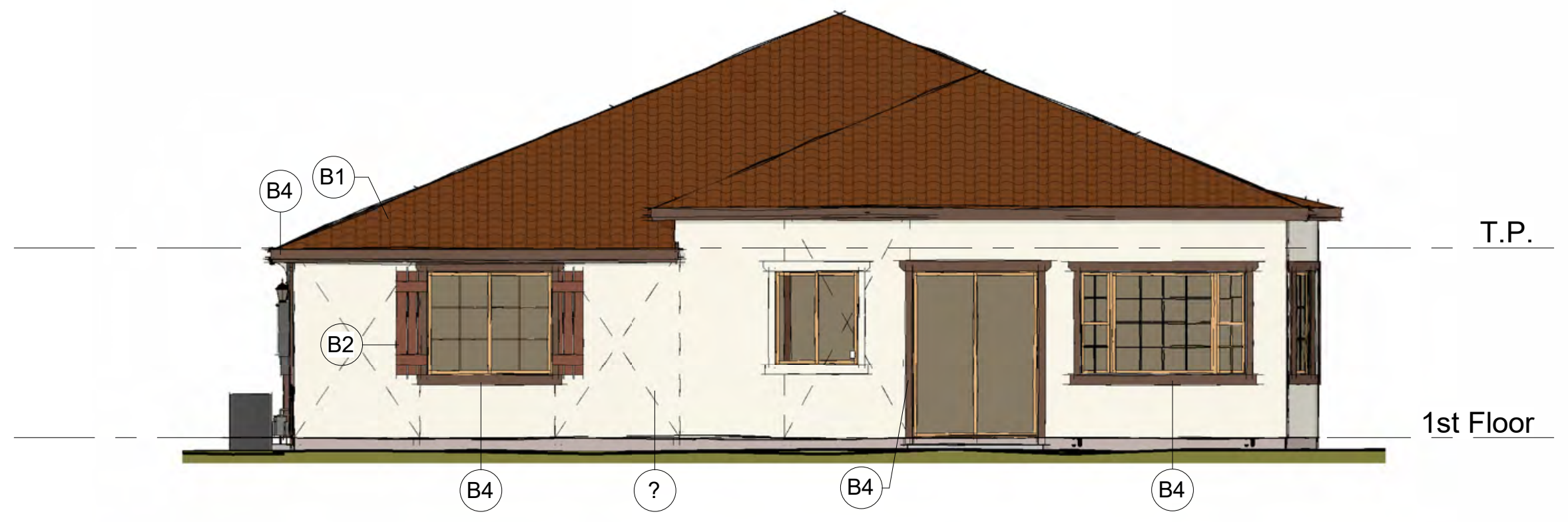
36 IN. X 80 IN. HALIFAX CAMBER FANLITE
PAINTED SMOOTH FIBERGLASS
PREHUNG FRONT DOOR WITH
BRICKMOLD
MASONITE
MODEL # 33156
INTERNET # 202971637

Front Doors



Rear Elevation - A

1/8" = 1'-0"

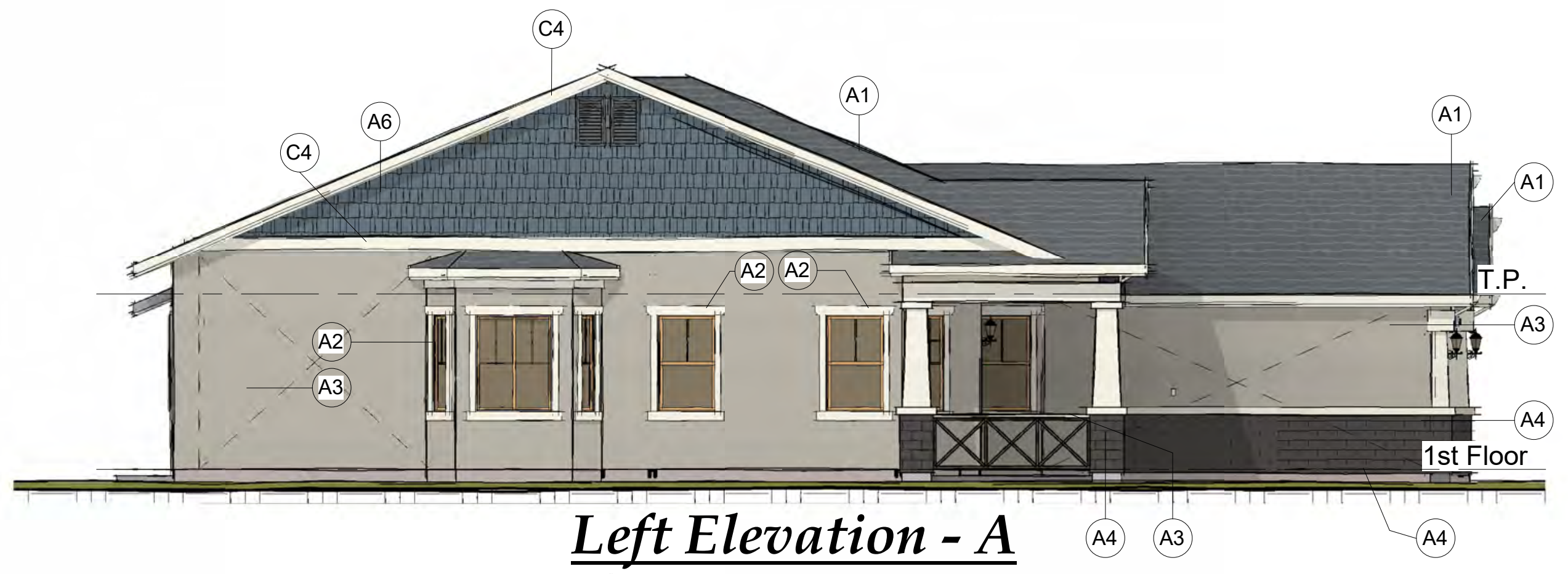


Rear Elevation - B

1/8" = 1'-0"

Rear Elevation - C

1/8" = 1'-0"

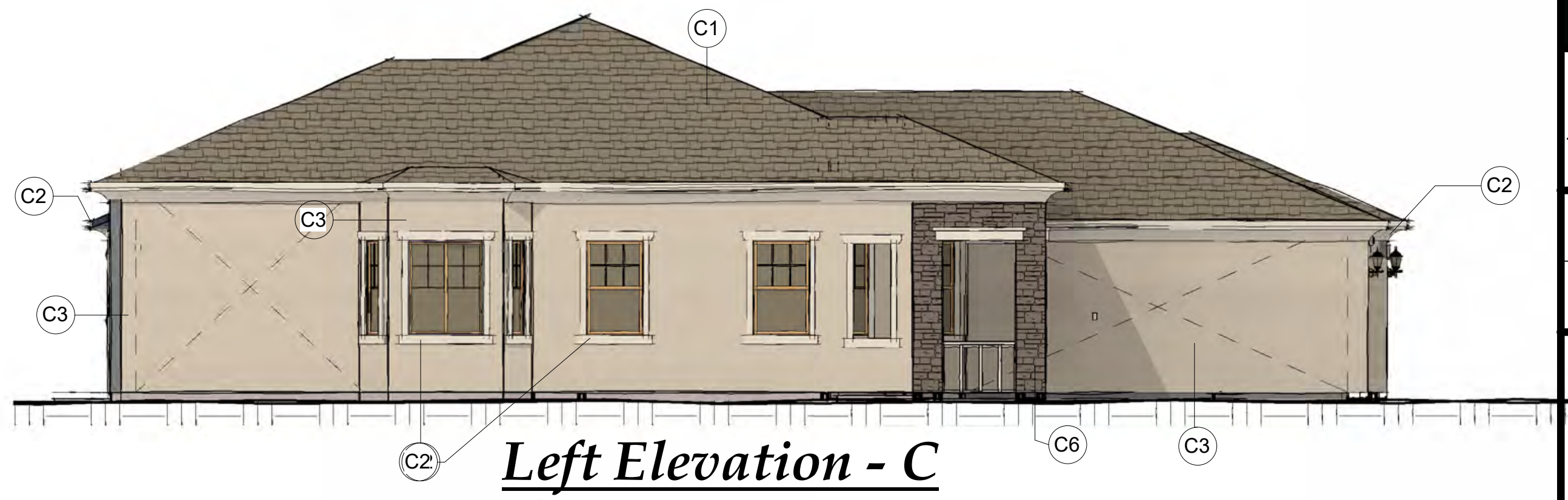


Left Elevation - A

1/8" = 1'-0"

Left Elevation - B

1/8" = 1'-0"



Left Elevation - C

1/8" = 1'-0"

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Proposed Homes For:
Aurora Builders LLC
No. 20539, Meyers Road, San Bernardino, CA

28 June 2023
22-4510

Douglas Andresen
C-14504
12-31-25
RENEWAL DATE

Plan 1- Elevations

DR3

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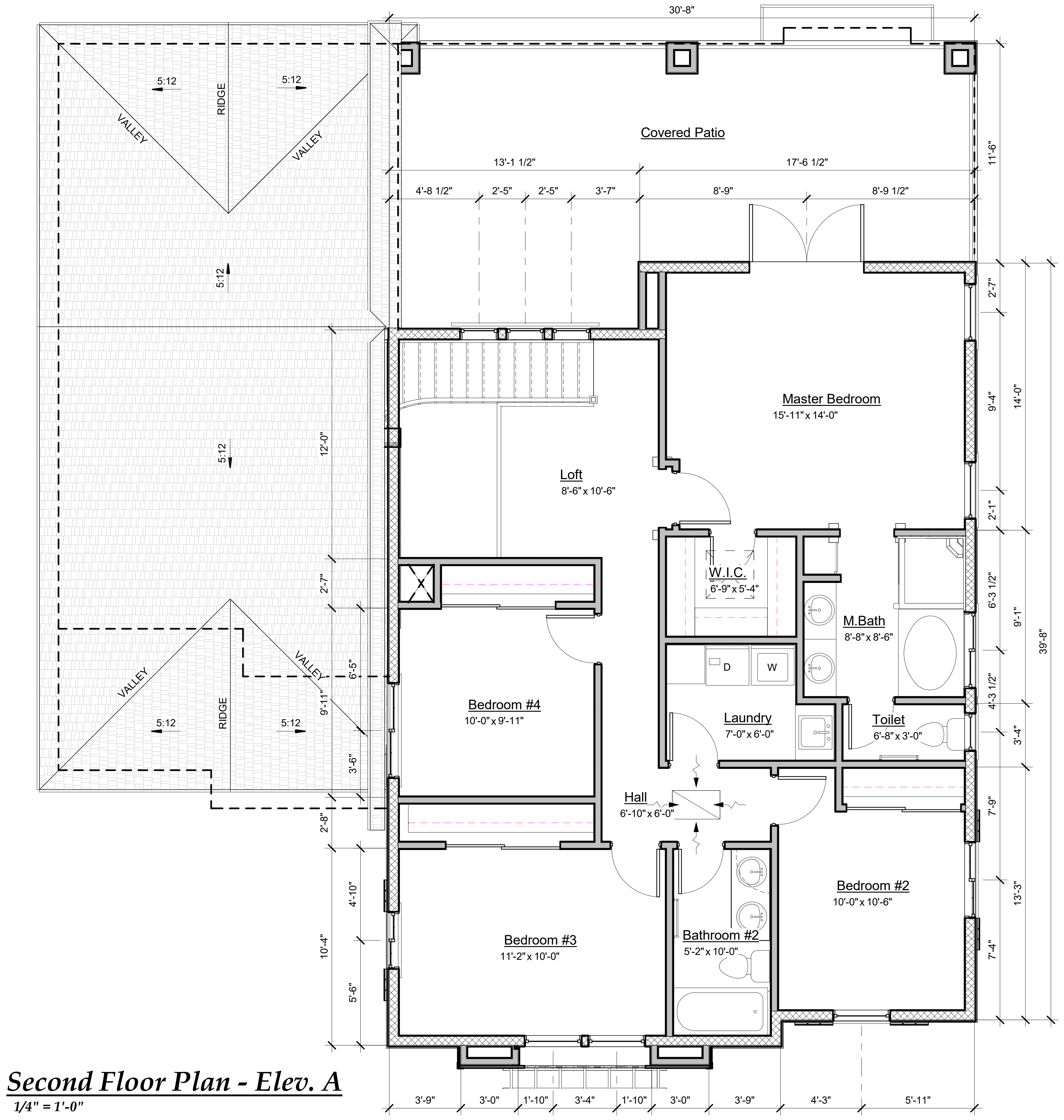
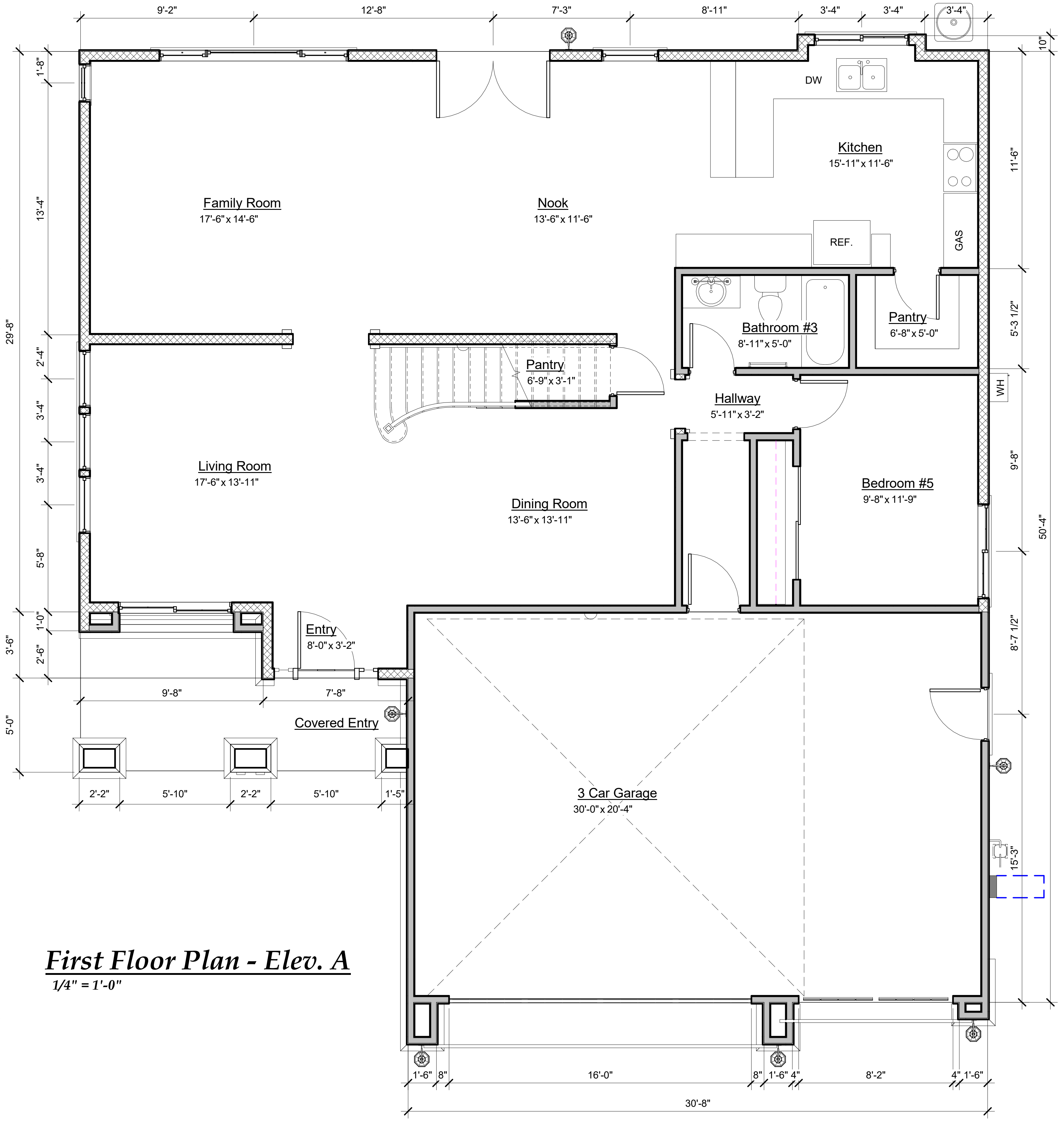
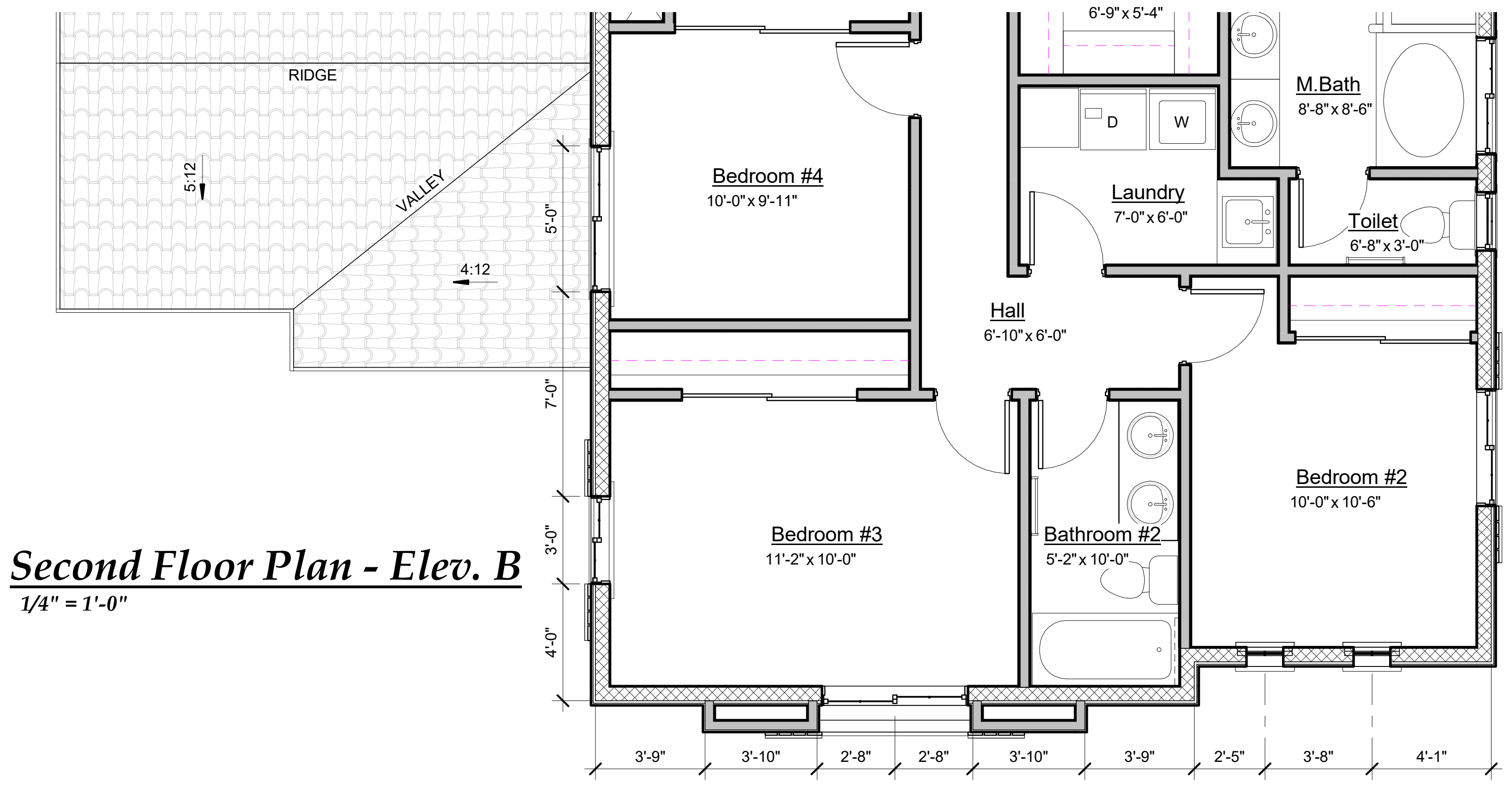


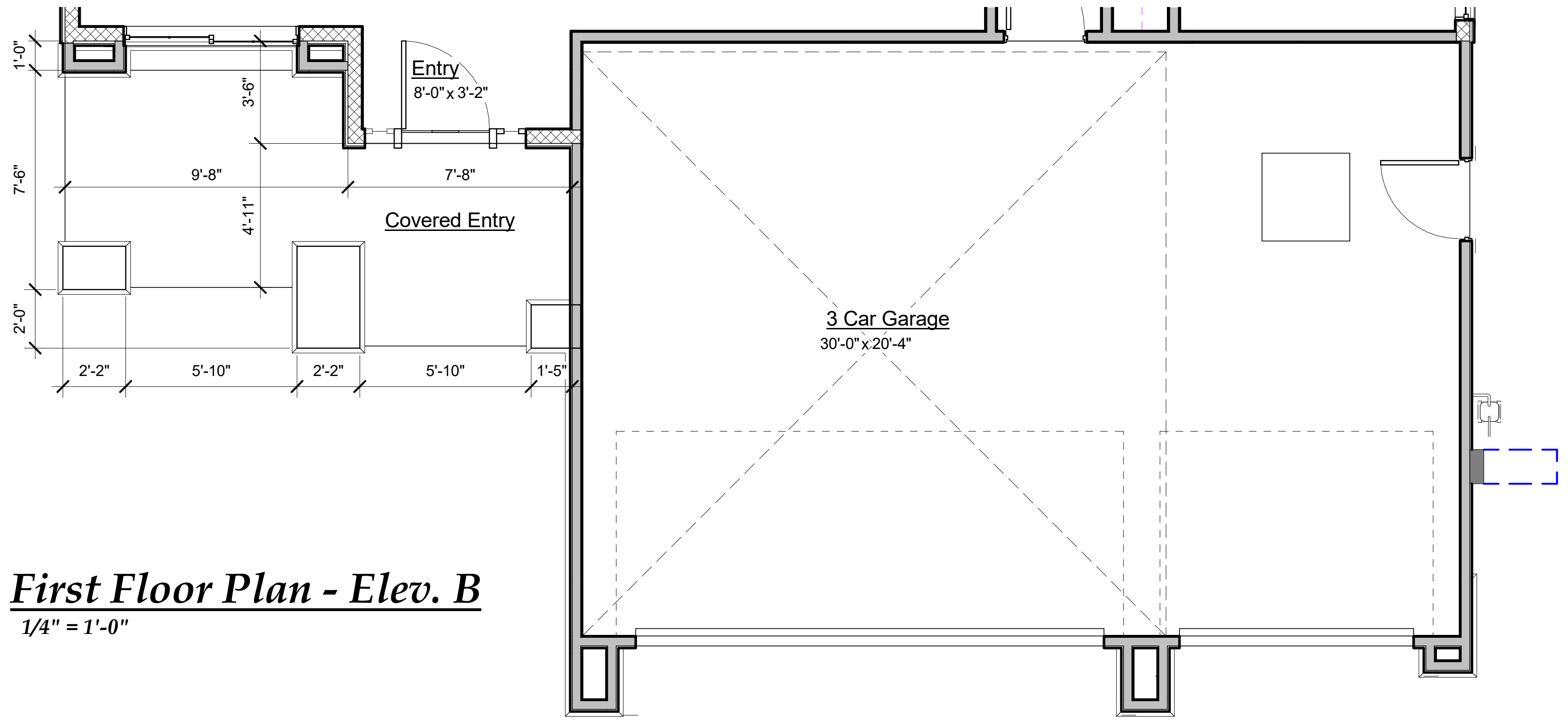
Second Floor Plan - Elev. A
1/4" = 1'-0"



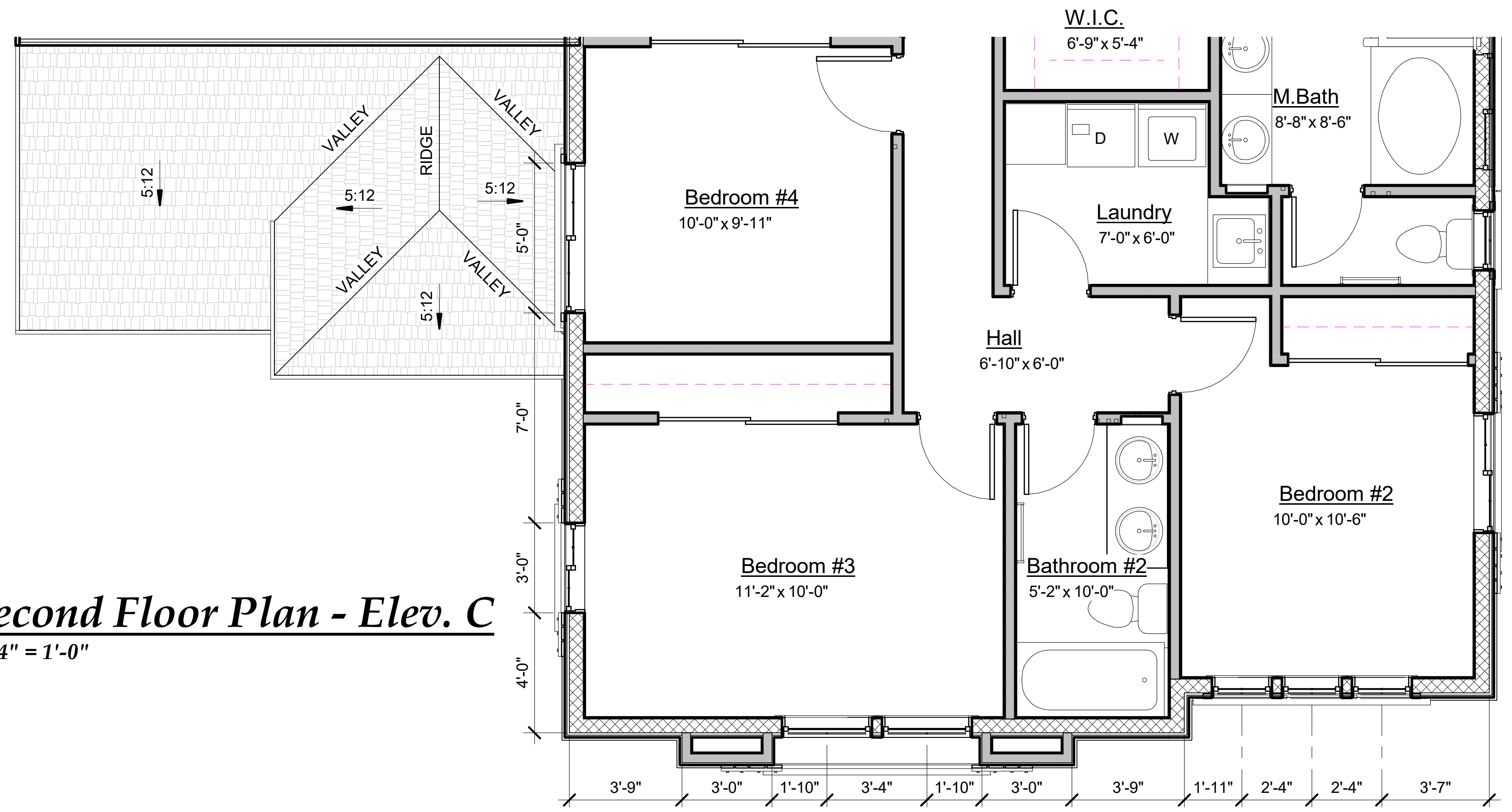
First Floor Plan - Elev. A
1/4" = 1'-0"



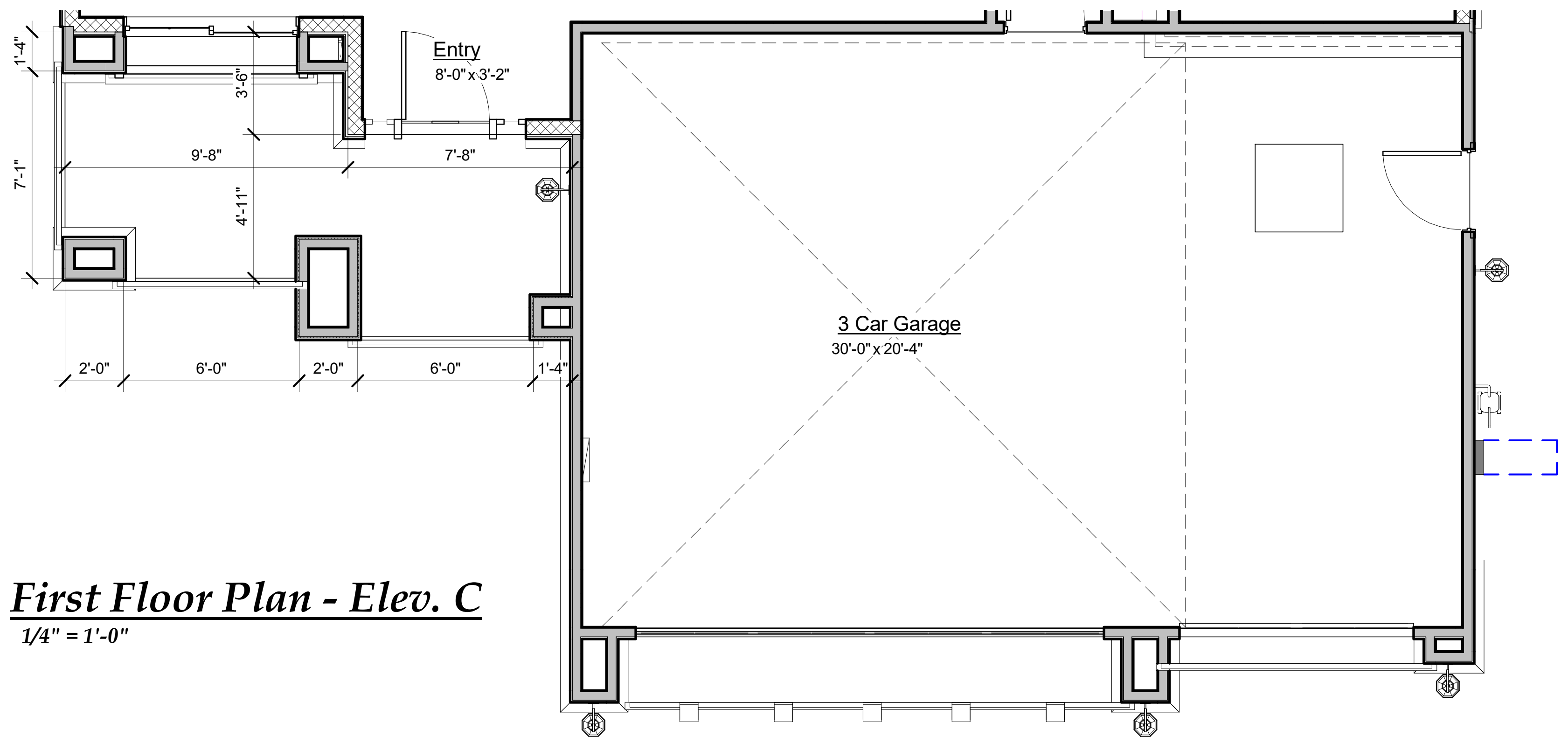
Second Floor Plan - Elev. B
1/4" = 1'-0"



First Floor Plan - Elev. B
1/4" = 1'-0"



Second Floor Plan - Elev. C
1/4" = 1'-0"



First Floor Plan - Elev. C
1/4" = 1'-0"

Plan 2,564 Square Footage

Name	Area
Conditioned Area	
First Floor	1,457 SF
Second Floor	1,107 SF
Total Conditioned Area	2,564 SF
Non-Conditioned Area	
3 Car Garage	633 SF
Porch C	138 SF
Covered Balcony	396 SF
Total Non-Conditioned Area	1,167 SF
PORCH A	113 SF
PORCH B	142 SF

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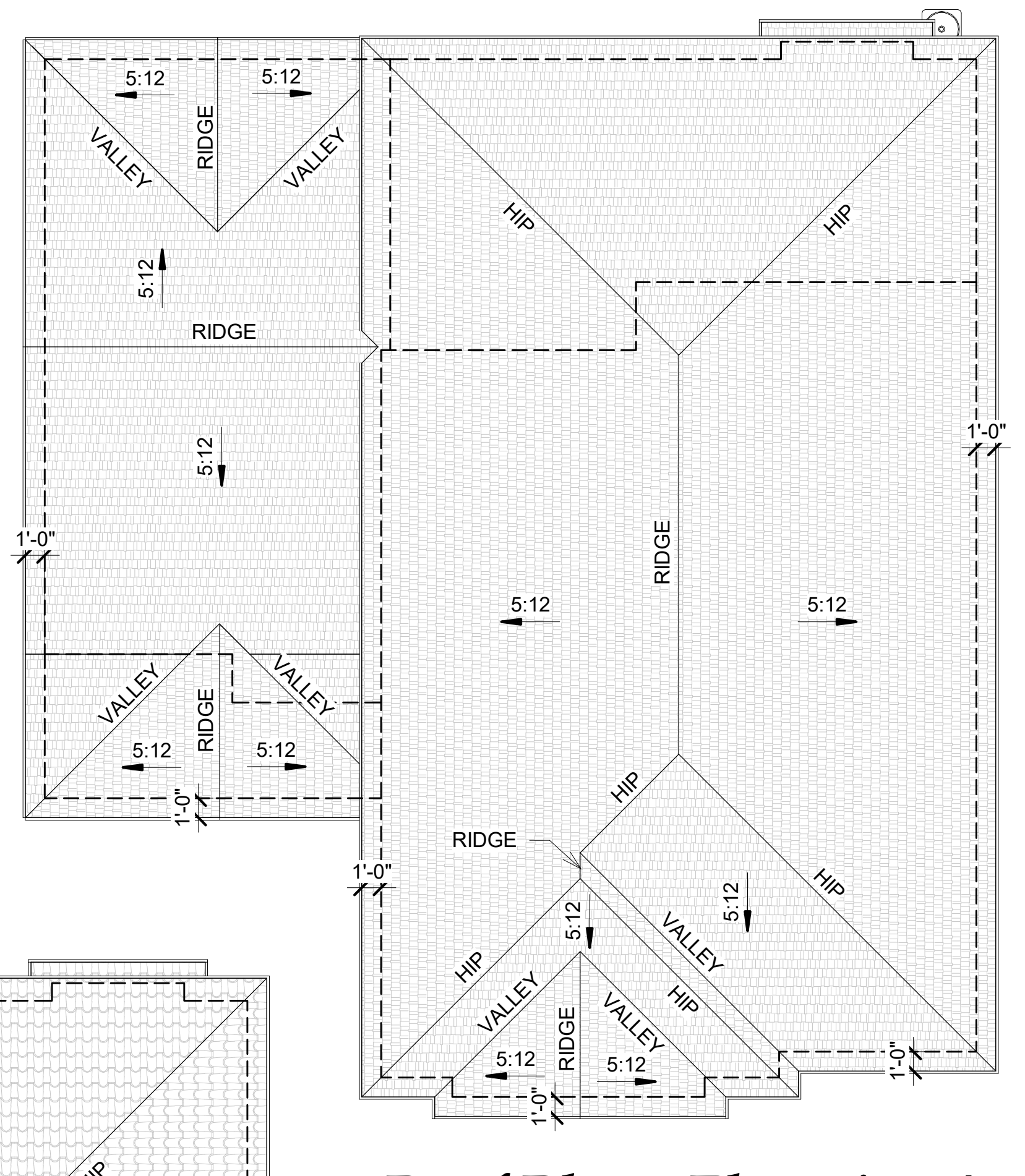
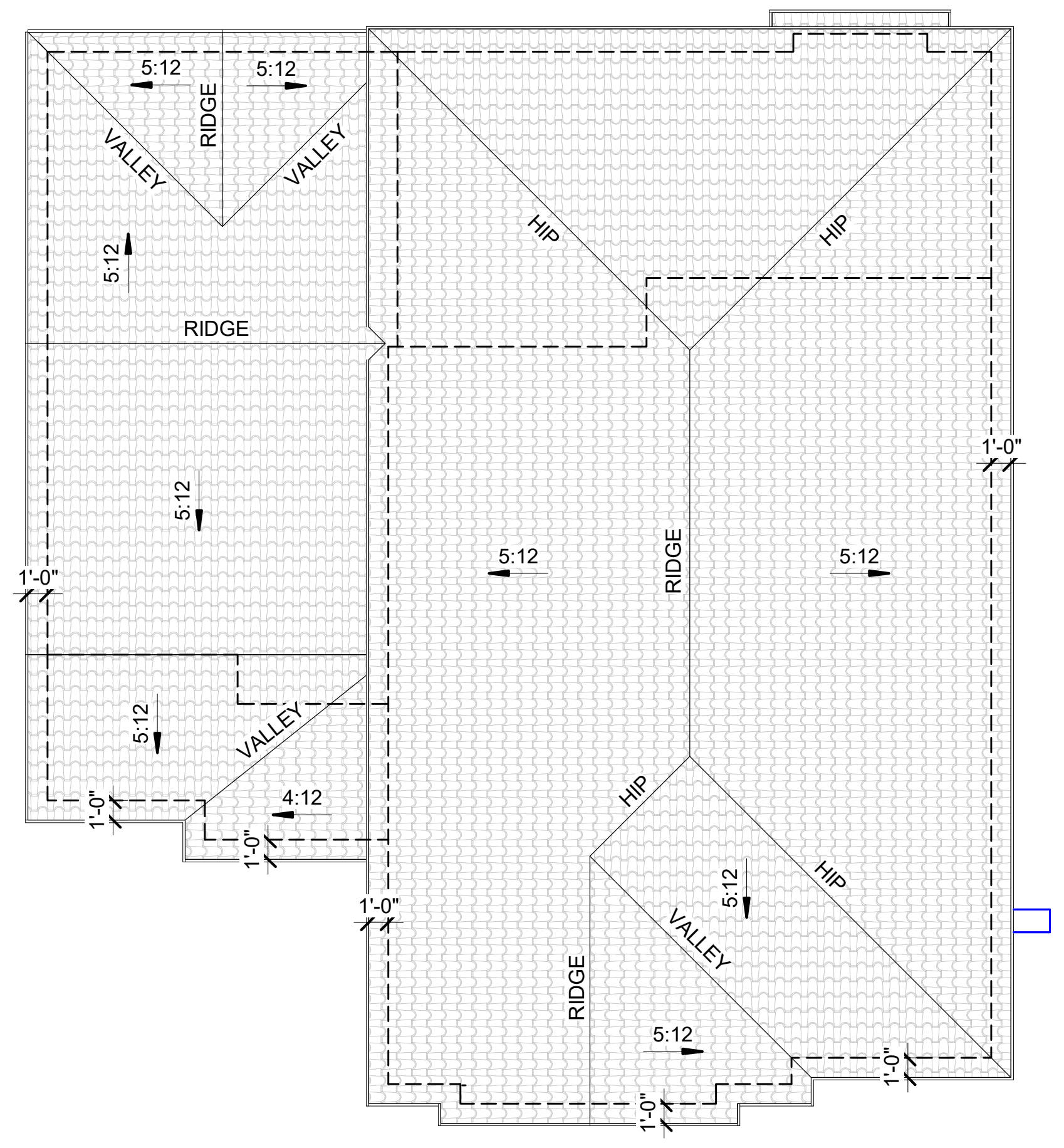
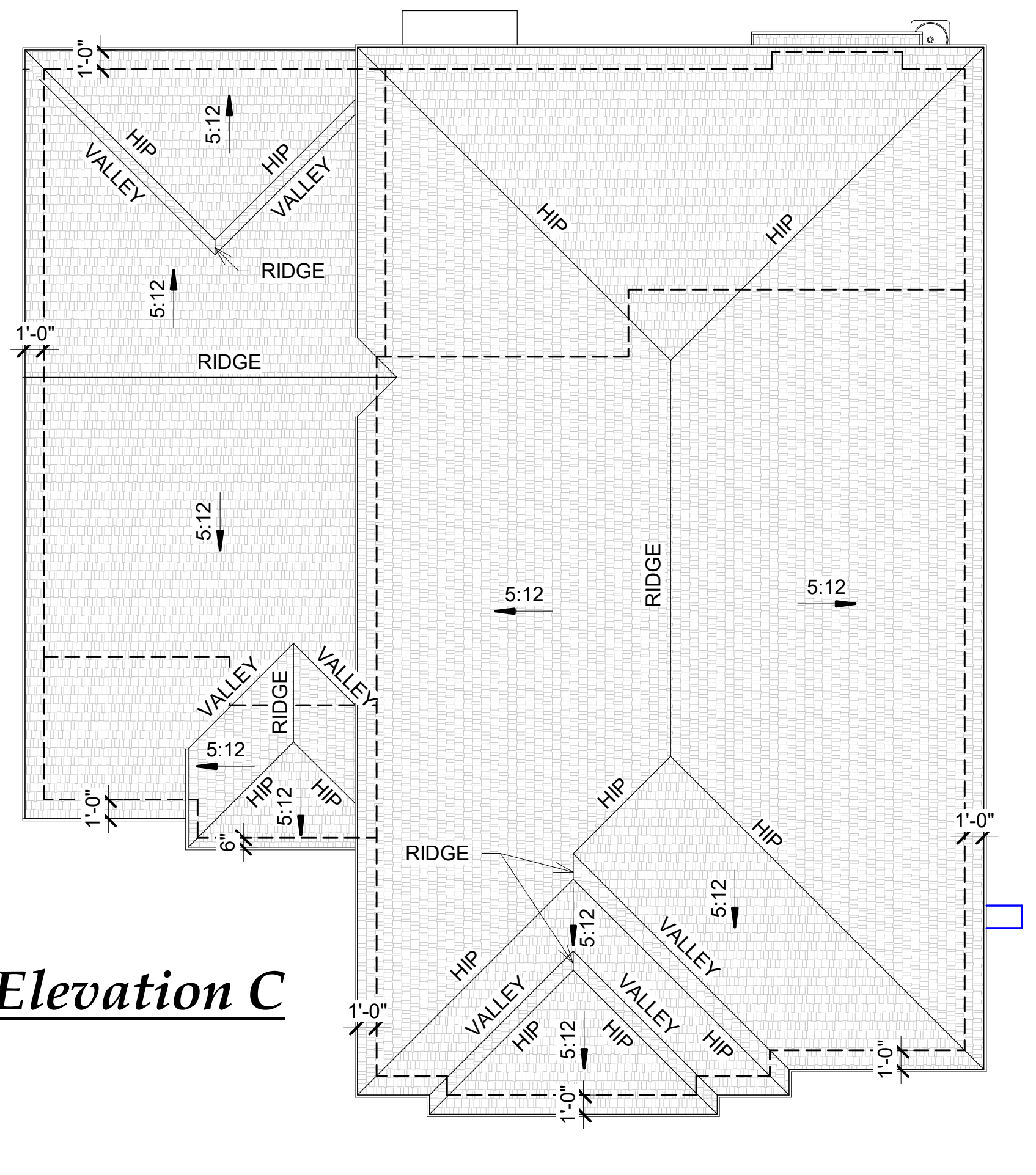


Roof Plan - Elevation A
1/8" = 1'-0"



Roof Plan - Elevation B
1/8" = 1'-0"



Roof Plan - Elevation C
1/8" = 1'-0"

Proposed Homes For:
Aurora Builders LLC
No. 20539, Meyers Road, San Bernardino, CA

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22-4510

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C-14504
12-31-25
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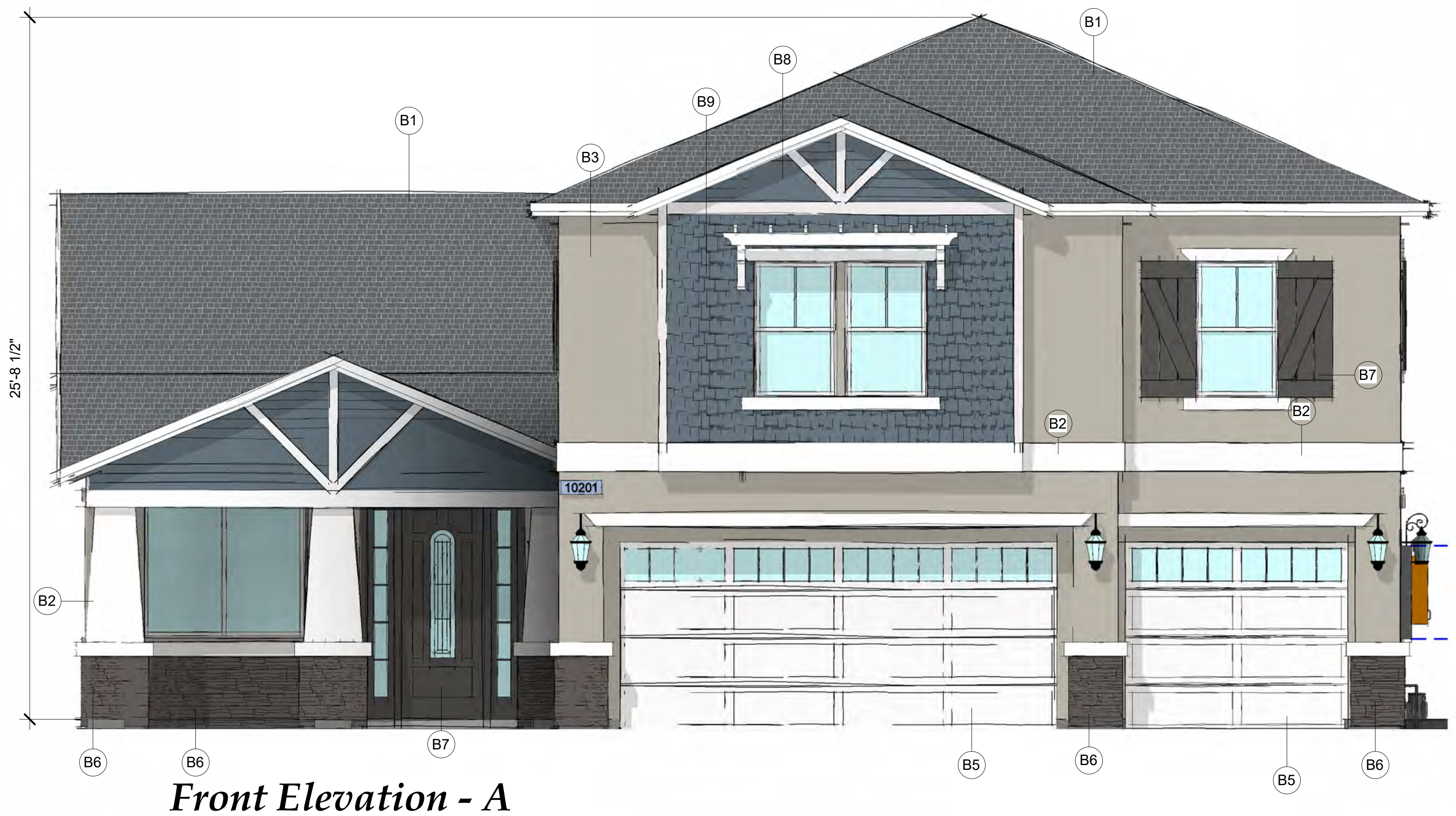
Plan 2 - Floor Plans

DR4

Elevation A

Elevation B

Elevation C



Front Elevation - A

1/4" = 1'-0" ARCHITECTURAL STYLE: CRAFTSMAN

Front Elevation - B

1/4" = 1'-0" ARCHITECTURAL STYLE: SPANISH

Front Elevation - C

1/4" = 1'-0" ARCHITECTURAL STYLE: TUSCAN

Material Legend - Elevation A				
Mark	**Material**	**Manufacturer**	**Material Color**	**Product #**
B1	ROOFING	BORAL	CHARCOAL BROWN BLEND (SAXONY 900 SLATE PROFILE)	3FASC1430
B2	FASCIA & TRIM - RESAWN WOOD	DUNN EDWARDS - PAINT	WHITE	DEW 380
B3	MAIN STUCCO	DUNN EDWARDS - PAINT	STONE CREEK	DE 6278
B5	GARAGE DOORS	DUNN EDWARDS - PAINT	WHITE	DEW 380
B7	ENTRY DOOR & SHUTTERS - FIBERGLASS	DUNN EDWARDS - PAINT	JET	DE 6378
B8	HORIZONTAL SIDING	DUNN EDWARDS - PAINT	WILD MUSTANG	DEA 161
B9	WOOD SHAKE SIDING	DUNN EDWARDS - PAINT	WILD MUSTANG	DEA 161

Material Legend - Elevation B				
Mark	**Material**	**Manufacturer**	**Material Color**	**Product #**
C1	ROOFING - CONCRETE TILE	BORAL	COPPER MOUNTAIN BLEND (BARCELONA PROFILE)	1BECS6099K
C2	TRIM & FASCIA - RESAWN WOOD	DUNN EDWARDS - PAINT	BLACK WALNUT	DE 6063
C3	MAIN STUCCO	DUNN EDWARDS - PAINT	SWISS COFFEE	DEW 341
C5	ENTRY & GARAGE DOORS	DUNN EDWARDS - PAINT	CELLAR DOOR	DEA 157
C7	SHUTTERS - FIBERGLASS	DUNN EDWARDS - PAINT	CELLAR DOOR	DEA 157

Material Legend - Elevation C				
Mark	**Material**	**Manufacturer**	**Material Color**	**Product #**
A1	ROOFING - CONCRETE TILE	BORAL	SMOKEY TOPAZ (BARCELONA PROFILE)	1BCCS 3181
A2	TRIM - RESAWN WOOD	DUNN EDWARDS - PAINT	SHORTBREAD	DE 6134
A3	MAIN STUCCO - PAINT	DUNN EDWARDS - PAINT	WOODED ACRE	DE 6130
A5	ENTRY & GARAGE DOORS	DUNN EDWARDS - PAINT	BLACK WALNUT	DE 6063
A6	VENEER - STONE/VENEER	BORAL	SIENA	ANCIENT VILLA LEDGESTONE PROFILE
A7	SHUTTERS - FIBERGLASS	DUNN EDWARDS - PAINT	SLATE WALL	DE 5797

Right Elevation - A

1/8" = 1'-0"

Right Elevation - B

1/8" = 1'-0"

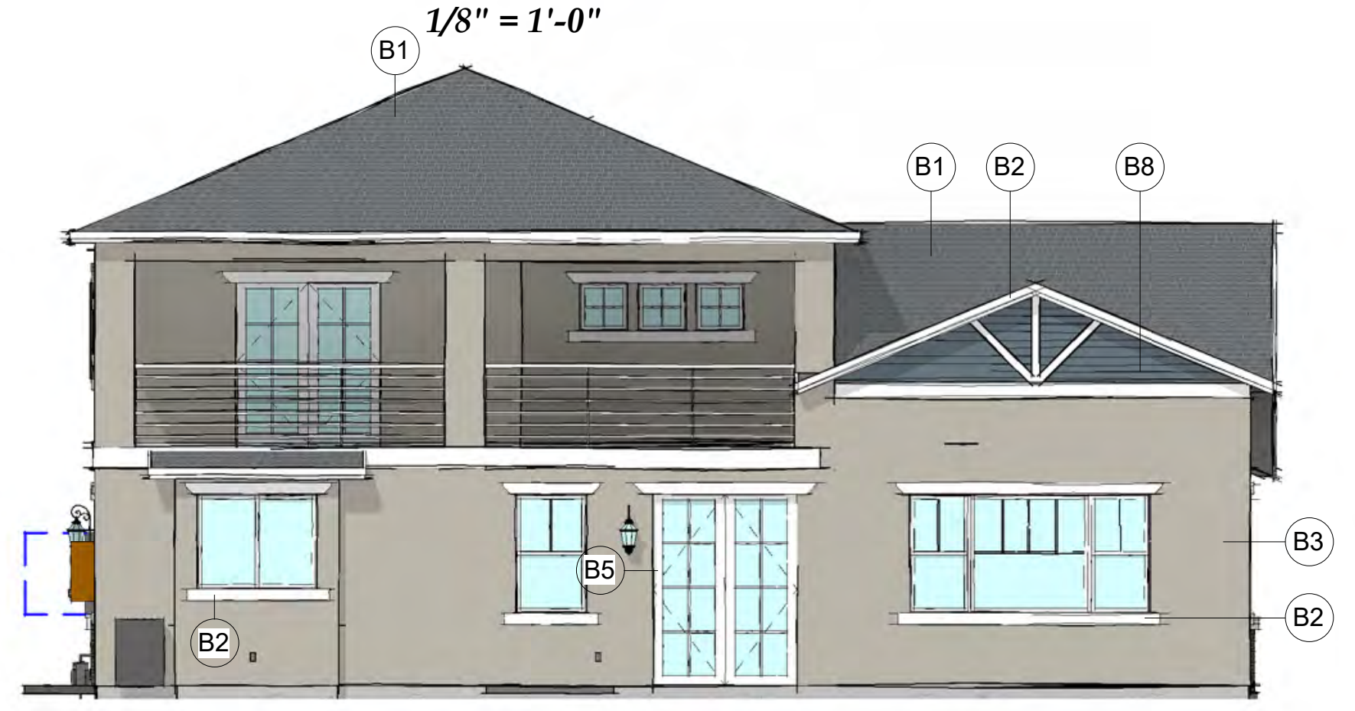
Right Elevation - C

1/8" = 1'-0"

36 IN. X 80 IN. PROVIDENCE CENTER ARCH
PAINTED SMOOTH FIBERGLASS PREHUNG
FRONT DOOR WITH BRICKMOLD
MASONITE
MODEL # 33620
INTERNET # 202971753

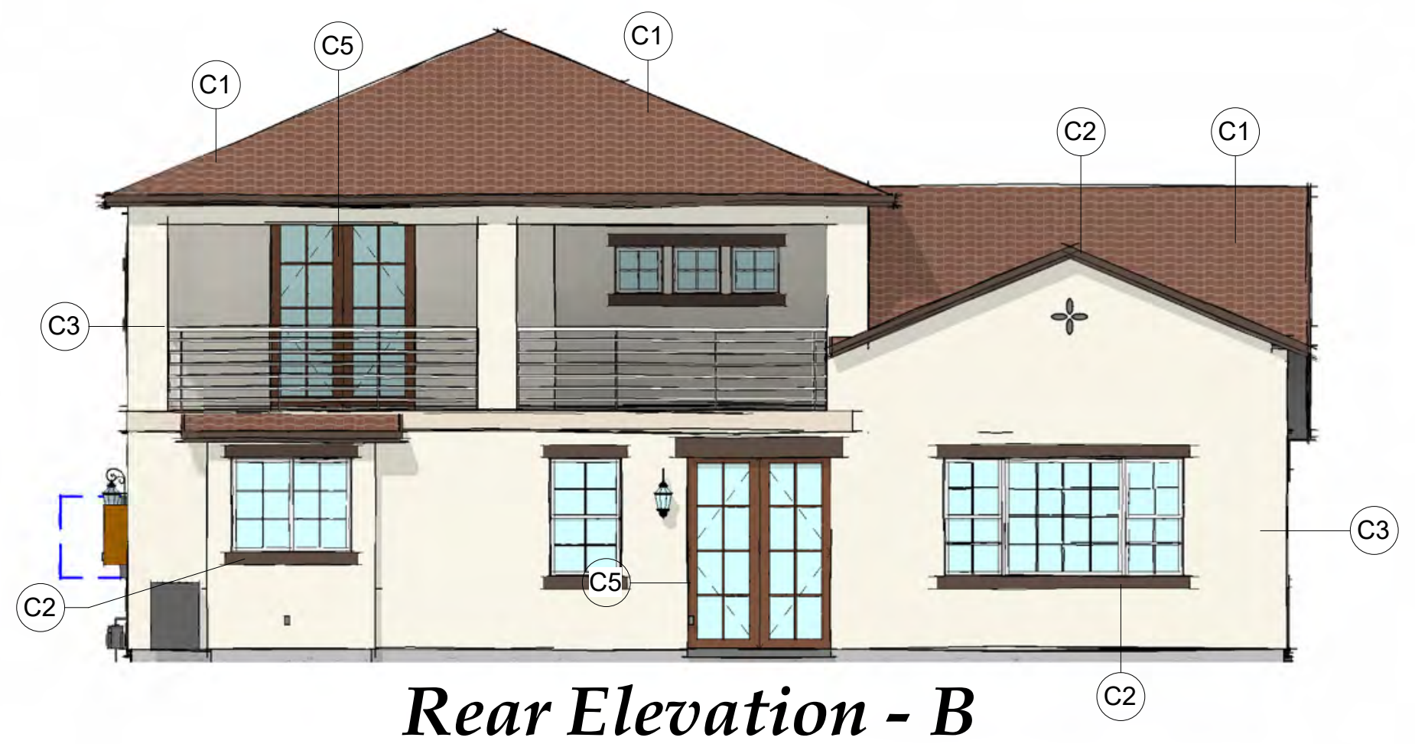
36 IN. X 80 IN. HALIFAX CAMBER FANLITE
PAINTED SMOOTH FIBERGLASS
PREHUNG FRONT DOOR WITH
BRICKMOLD
MASONITE
MODEL # 33156
INTERNET # 202971637

Masonite - Front Door w/Glass



Rear Elevation - A

1/8" = 1'-0"

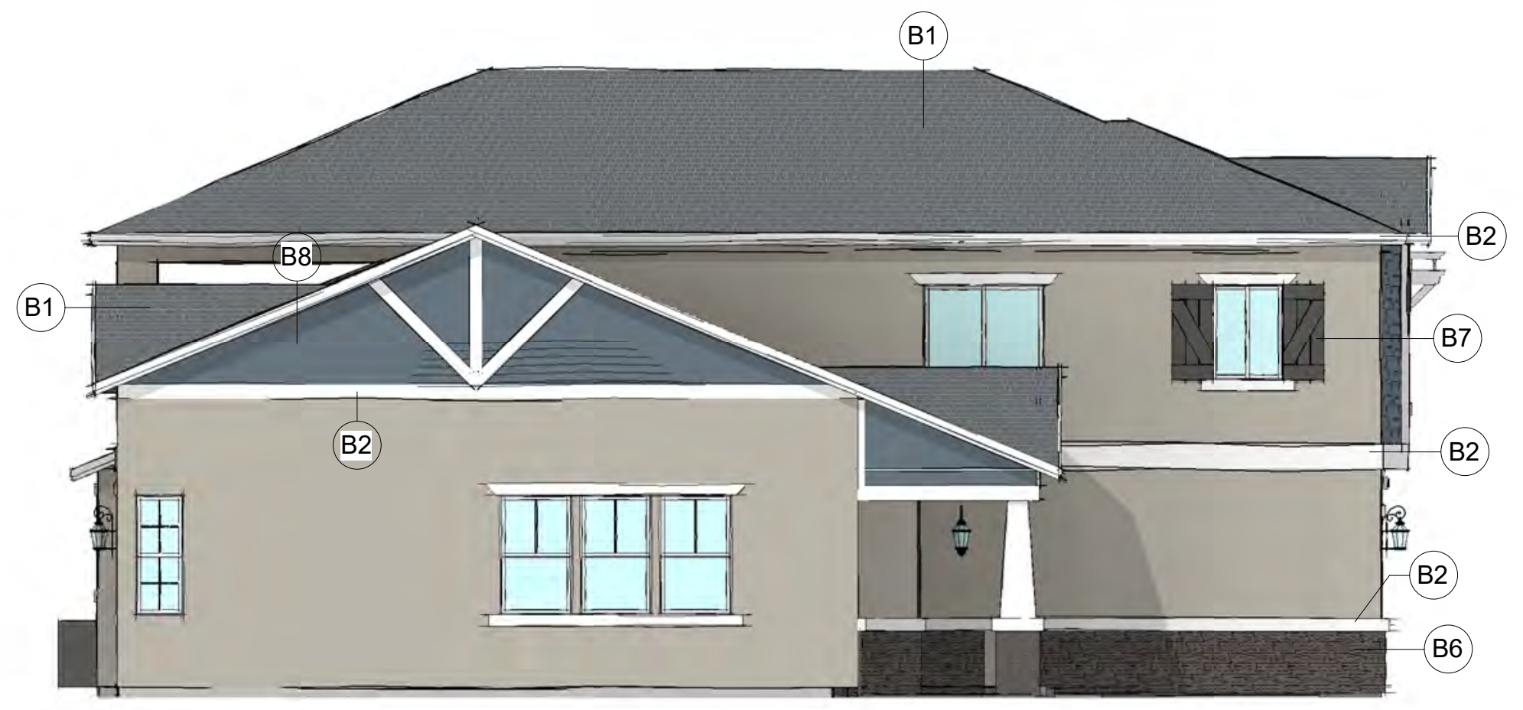


Rear Elevation - B

1/8" = 1'-0"

Rear Elevation - C

1/8" = 1'-0"

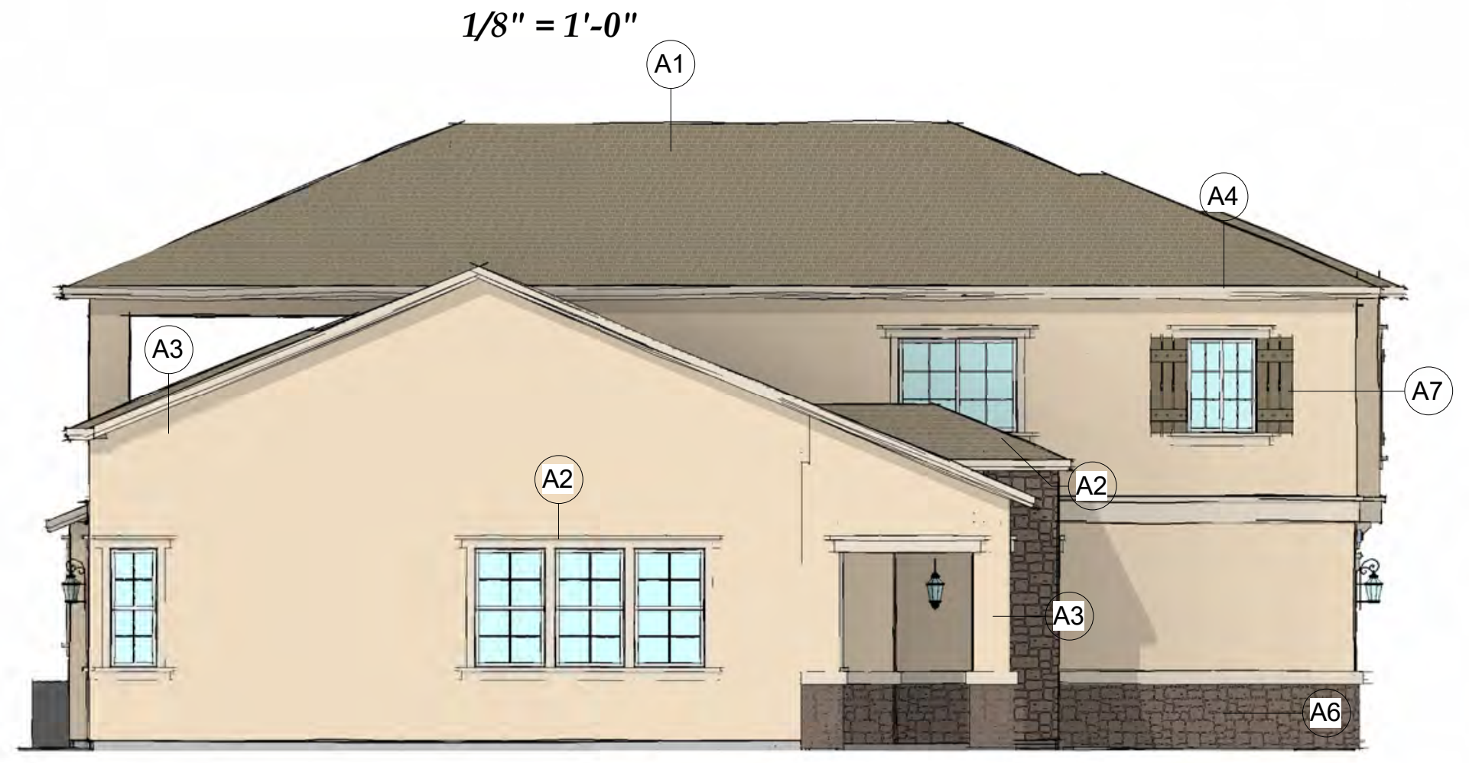


Left Elevation - A

1/8" = 1'-0"

Left Elevation - B

1/8" = 1'-0"



Left Elevation - C

1/8" = 1'-0"

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Aurora Builders LLC
No. 20539, Meyers Road, San Bernardino, CA

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	△
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Plan 2 - Elevations

DR5

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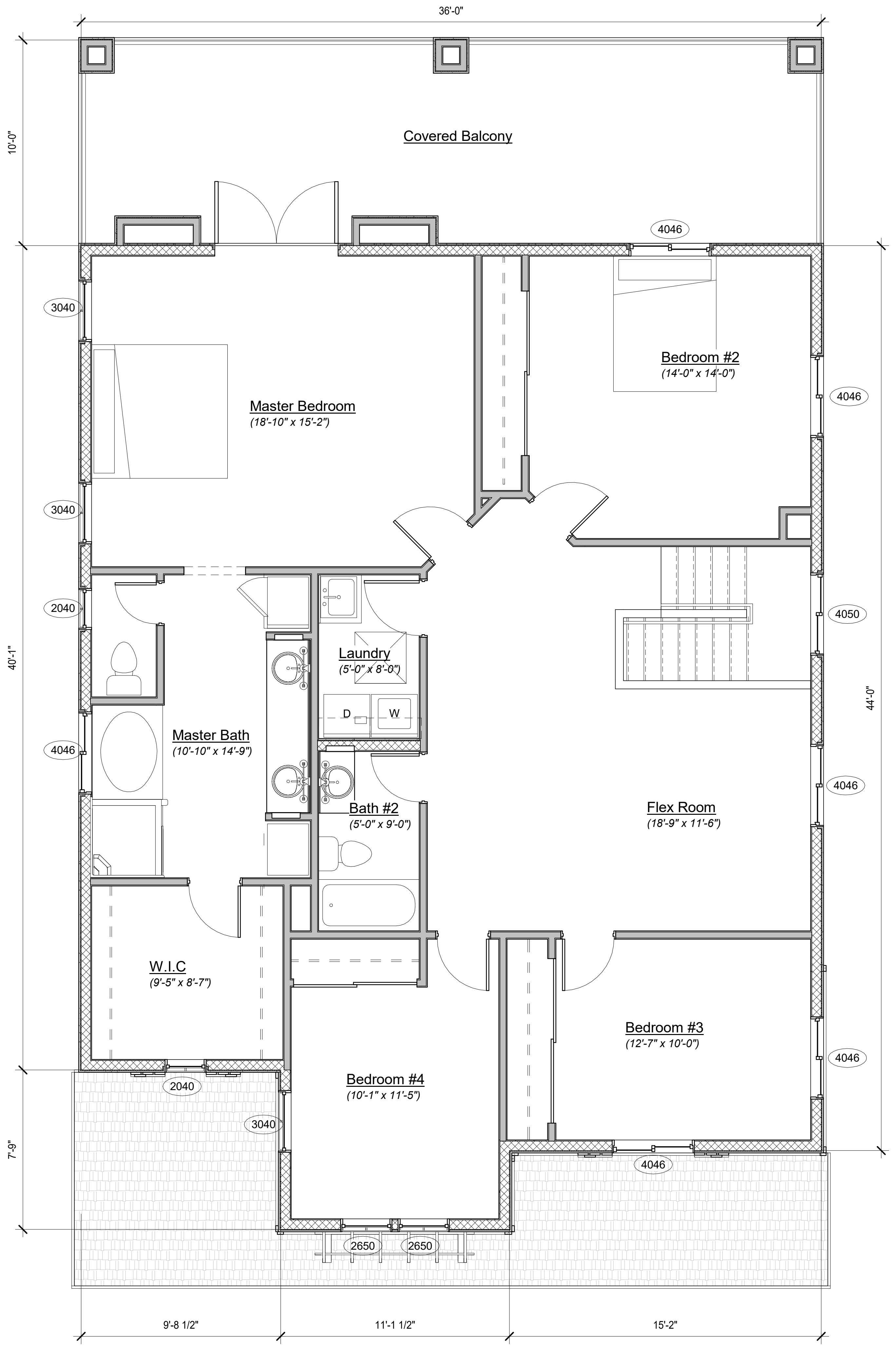
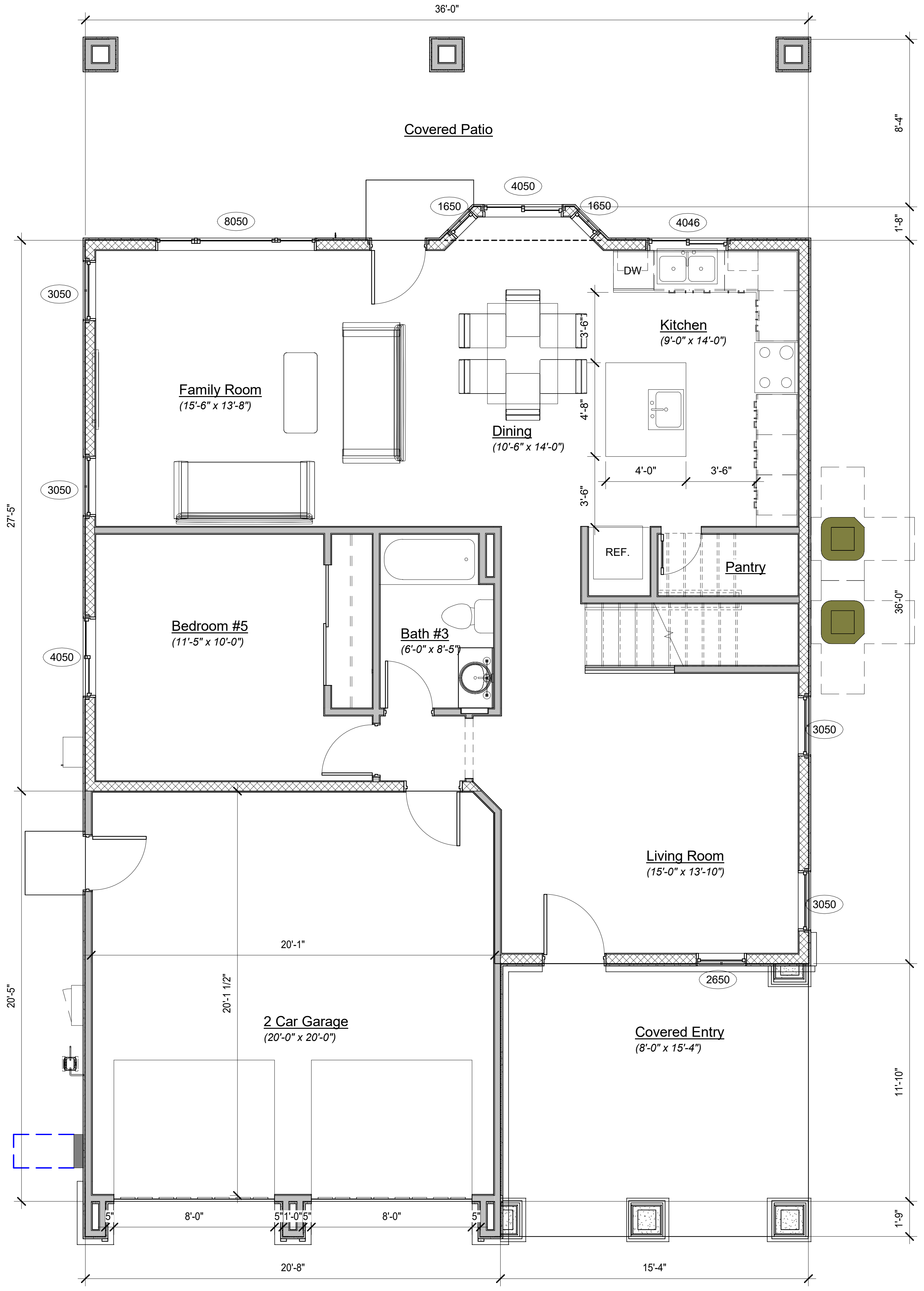


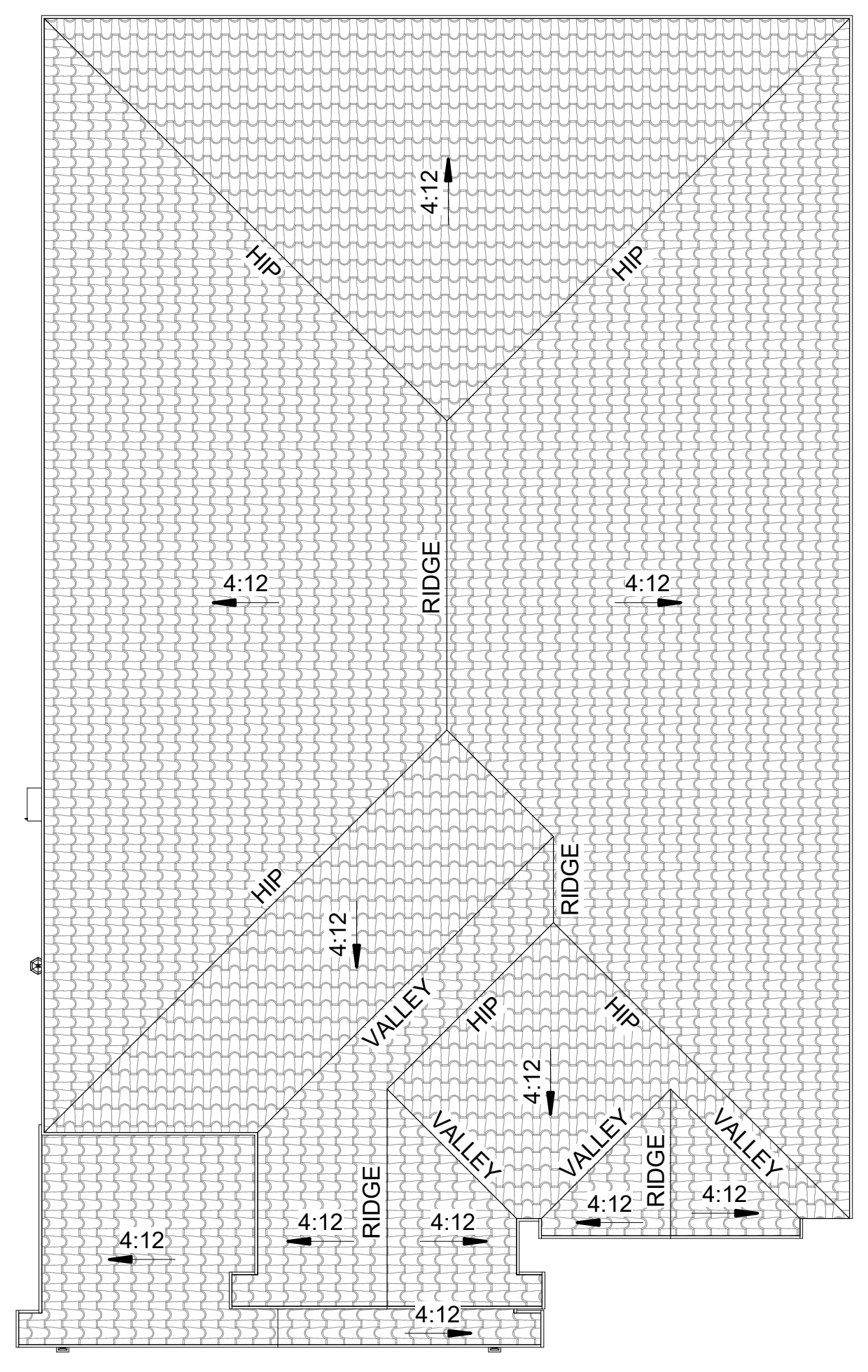
Plan 3 - Second Floor Plan - Elev. A

1/4" = 1'-0"



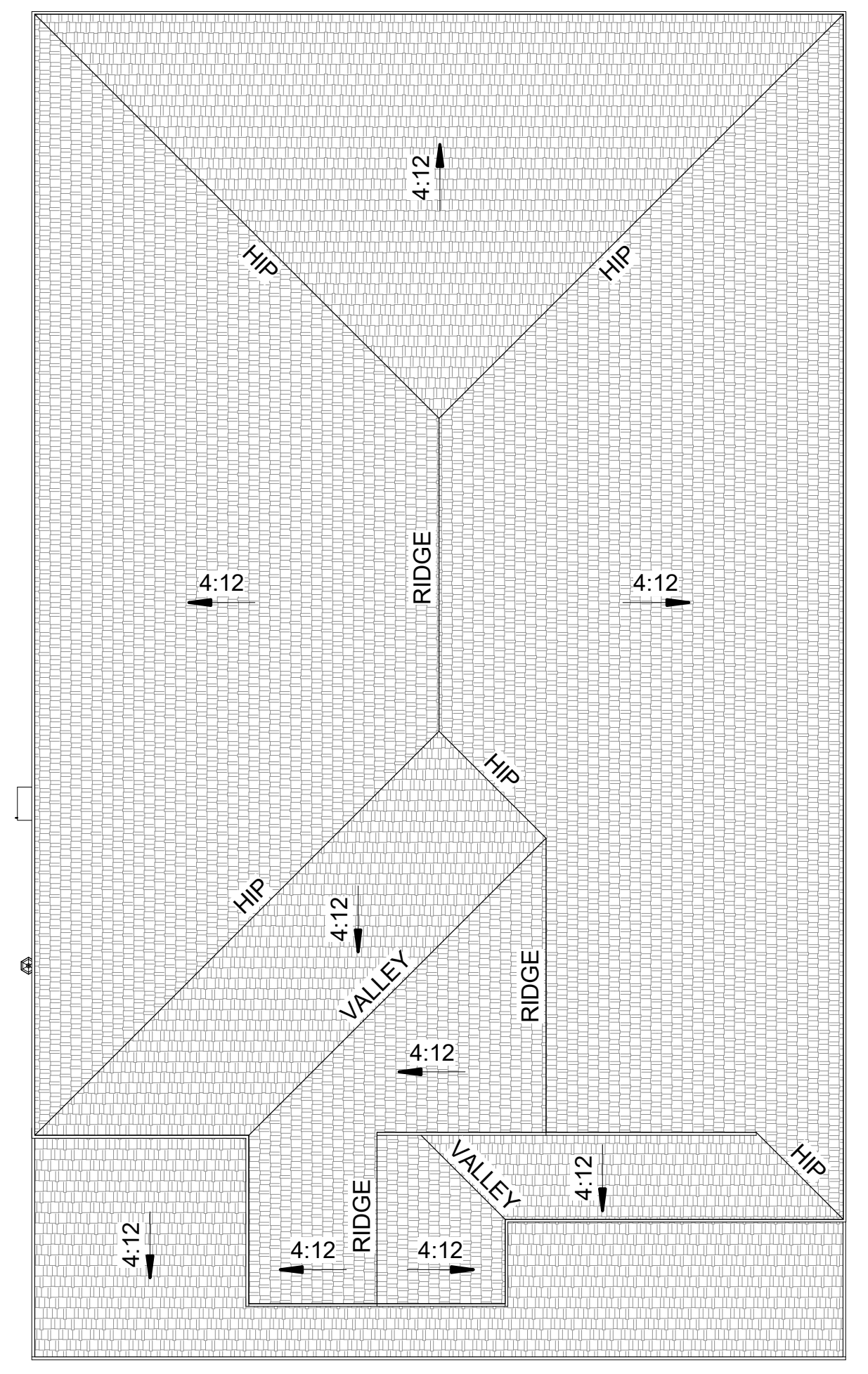
Plan 3 - First Floor Plan - Elev. A

1/4" = 1'-0"



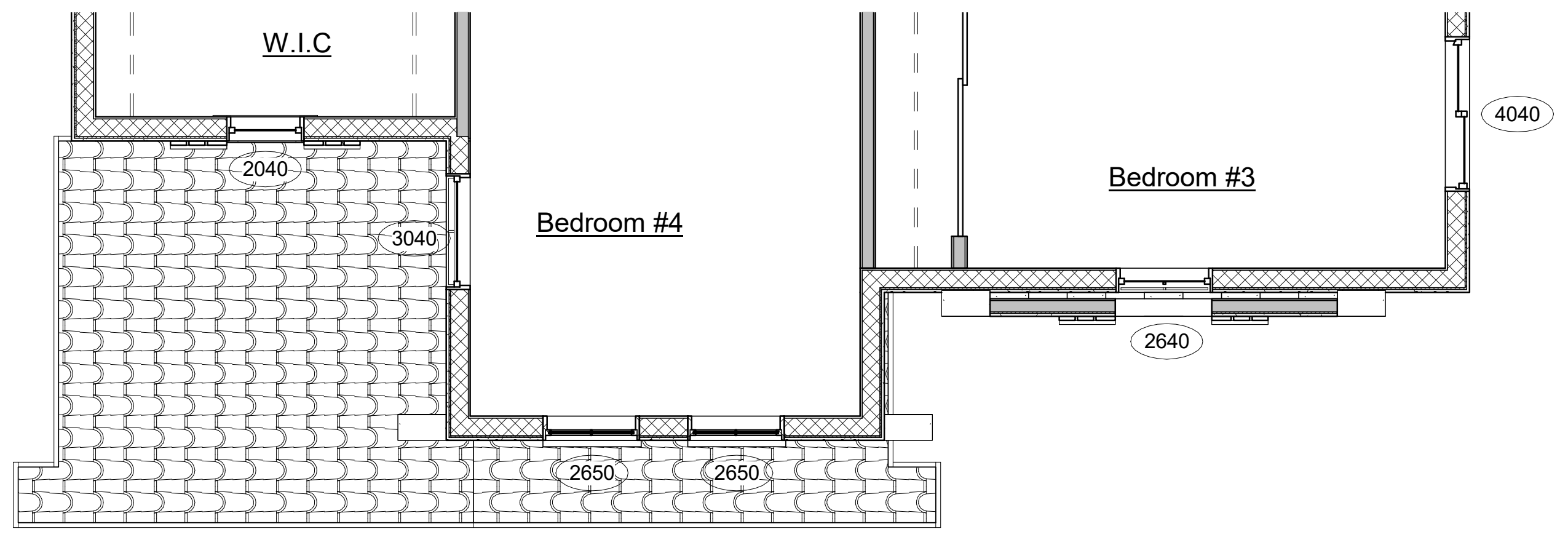
Roof Plan - Elev. "B"

1/8" = 1'-0"



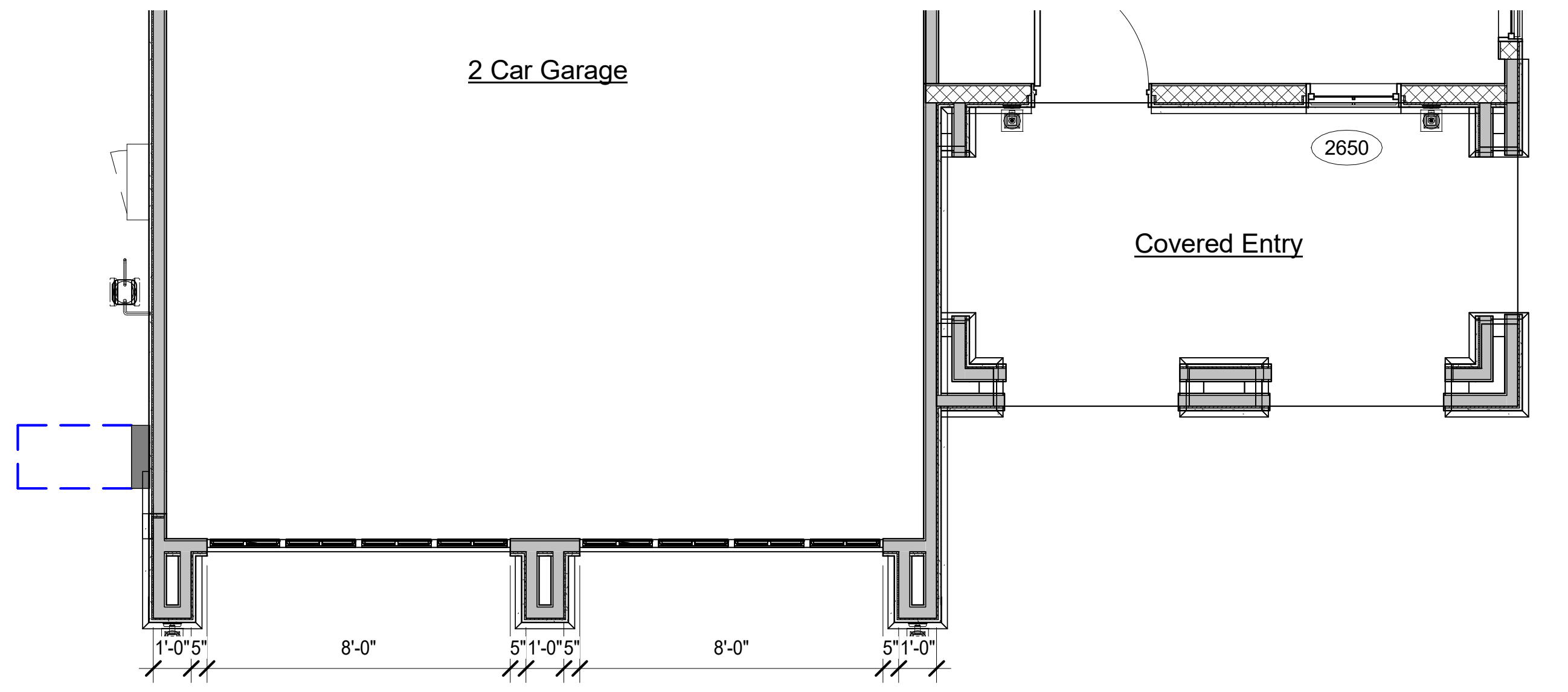
Roof Plan - Elev. "A"

1/8" = 1'-0"



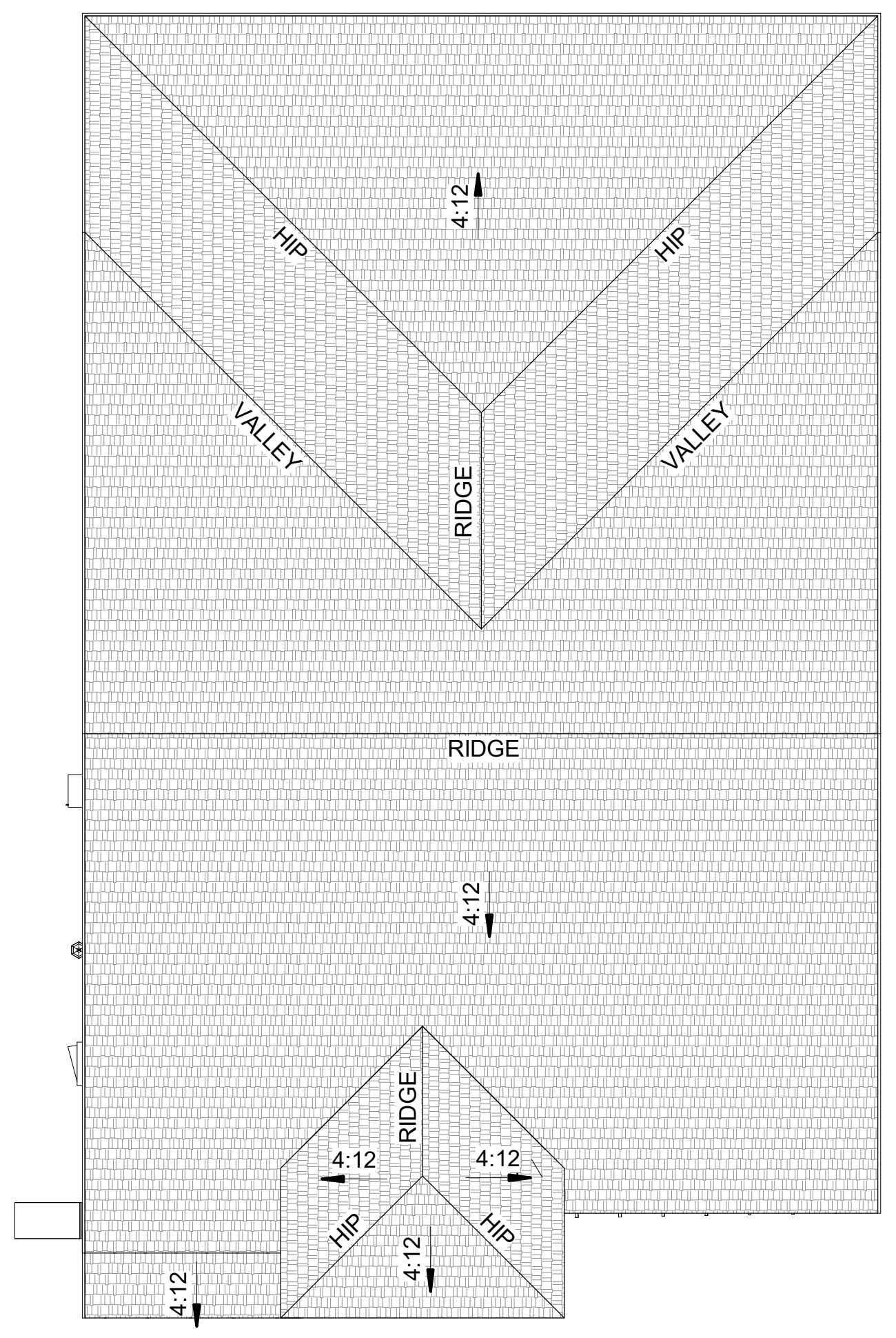
Plan 3 - Second Floor Plan - Elev. B

1/4" = 1'-0"



Plan 3 - First Floor Plan - Elev. B

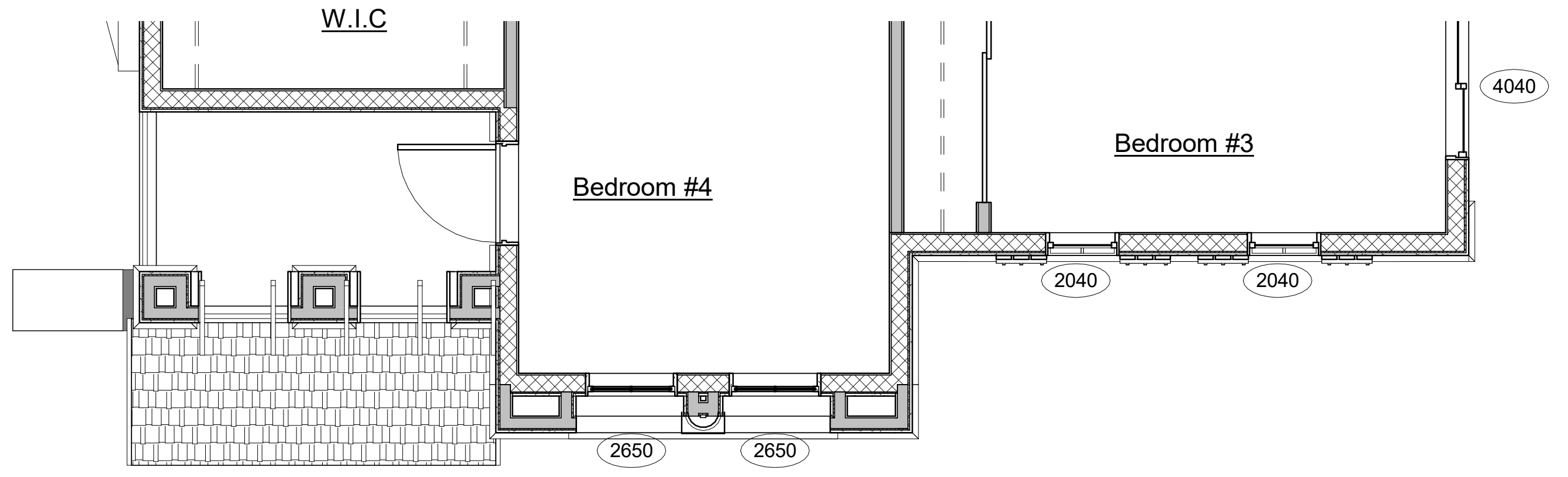
1/4" = 1'-0"



Roof Plan - Elev. "C"

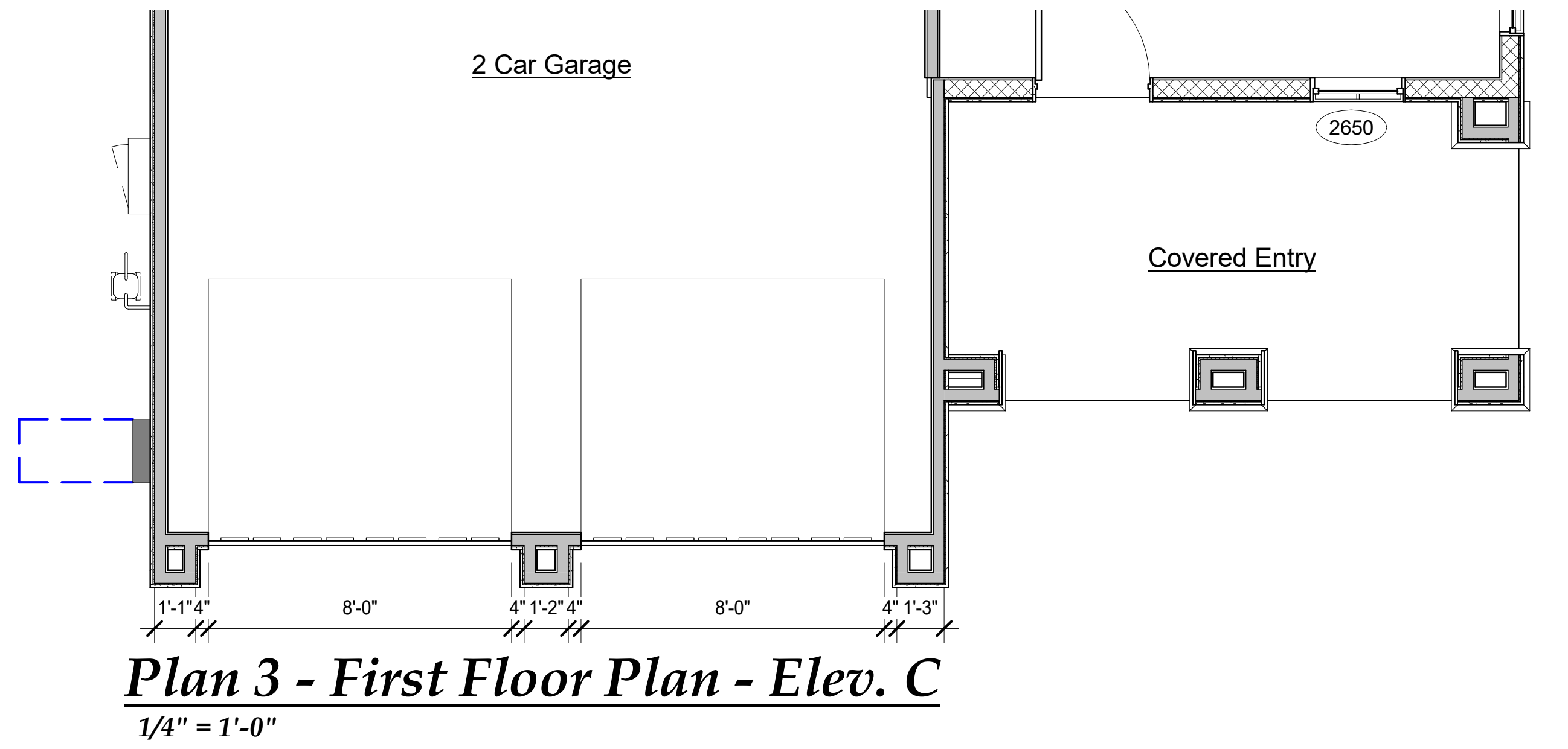
1/8" = 1'-0"

Area Schedule		
Name	Area	
Living		
Second Floor	1531 SF	
First Floor	1133 SF	
	2664 SF	
Non-Living		
2-Car Garage	419 SF	
Covered Balcony	360 SF	
Covered Patio	349 SF	
Porch	206 SF	Elev. 'A'
Porch	120 SF	Elev. 'B' & 'C'
Balcony	56 SF	Elev. 'C'



Plan 3 - Second Floor Plan - Elev. C

1/4" = 1'-0"



Plan 3 - First Floor Plan - Elev. C

1/4" = 1'-0"

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Proposed Homes For:
Aurora Builders LLC
No. 20539, Meyers Road, San Bernardino, CA

28 June 2023
22-4510

Douglas Andresen
C-14504
12-31-25
RENEWAL DATE

Plan 3 - Floor & Roof Plans

DR6

"A" - Craftsman Style

"B" - Spanish Style

"C" - Tuscan Style

3D View

Front
1/4" = 1'-0"

SHUTTERS ON THE SIDE
ELEVATIONS FOR LOT 27

Right
1/8" = 1'-0"

Left
1/8" = 1'-0"

Rear
1/8" = 1'-0"

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Material Legends

"A" - Craftsman

Mark	Designation	Manufacturer	Color Information
M1	MAIN COLOR	DUNN EDWARDS	"RECLAIMED WOOD" DE625
M2	ACCENT COLOR	DUNN EDWARDS	"LONG LAKE" DE6334
M3	FASCIA/TRIM/GARAGE DOOR	DUNN EDWARDS	"SWISS COFFEE" DEW341
M4	ROOF TILES	EAGLE ROOFING	CHARCOAL BROWN BLEND (PONDEROSA)
M5	SHUTTERS/ENTRY DOOR	DUNN EDWARDS	"LONG LAKE" DE6334
M6	STONE VENEER	EL DORADO STONE	IRONSIDE (TUNDRA BRICK)

"B" - Spanish

Mark	Designation	Manufacturer	Color Information
M1	MAIN COLOR	DUNN EDWARDS	"SWISS COFFEE" DEW341
M2	ACCENT COLOR	DUNN EDWARDS	"RED HOOK" DE6091
M3	FASCIA/TRIM COLOR	DUNN EDWARDS	"DEEP BROWN" DE6077
M4	ROOFING TILES	EAGLE ROOFING	VALENCIA (CAPISTRANO)
M5	SHUTTERS/ENTRY/GARAGE	DUNN EDWARDS	"RED HOOK" DE6091

"C" - Tuscan

Mark	Designation	Manufacturer	Color Information
M1	MAIN COLOR	DUNN EDWARDS	"DESERT SUEDE" DE6206
M2	STONE VENEER	EL DORADO STONE	SIERRA (MOUNTAIN LEDGE)
M3	FASCIA/TRIM	DUNN EDWARDS	"DEEP BROWN" DE6077
M4	ROOF TILES	EAGLE ROOFING	ARCADIA CANYON BROWN (PONDEROSA)
M5	SHUTTERS/ENTRY/ GARAGE DOOR	DUNN EDWARDS	"MISSION TRAIL" DE6223

Proposed Homes For:
Aurora Builders LLC
No. 20539, Meyers Road, San Bernardino, CA

28 June 2023
22-4510

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Douglas Andresen
C-14504
12-31-25
RENEWAL DATE
STATE OF CALIFORNIA

Plan 3 - Elevations

DR7

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Appendix B Air Quality and Greenhouse Gas Emissions CalEEMod Run Sheets

Subdivision No. 23-01 (Tentative Tract Map TTM 20539) and Development Permit DP-P 23-01 v2 Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Subdivision No. 23-01 (Tentative Tract Map TTM 20539) and Development Permit DP-P 23-01 v2
Construction Start Date	11/1/2024
Operational Year	2026
Lead Agency	City of San Bernardino
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.80
Precipitation (days)	6.80
Location	34.20547661803728, -117.36364246141329
County	San Bernardino-South Coast
City	San Bernardino
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	5355
EDFZ	10
Electric Utility	Southern California Edison
Gas Utility	Southern California Gas
App Version	2022.1.1.21

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description

Single Family Housing	32.0	Dwelling Unit	8.57	98,138	58,696	—	106	Single family residential

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.42	30.8	10.6	14.0	0.02	0.43	0.20	0.61	0.40	0.05	0.44	—	2,666	2,666	0.11	0.04	0.90	2,682
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	4.43	3.73	36.1	34.0	0.05	1.60	19.9	21.5	1.47	10.2	11.6	—	5,527	5,527	0.39	0.41	0.15	5,614
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.05	1.91	7.95	10.1	0.02	0.32	0.81	0.88	0.30	0.40	0.50	—	2,016	2,016	0.09	0.05	0.37	2,033
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.19	0.35	1.45	1.85	< 0.005	0.06	0.15	0.16	0.05	0.07	0.09	—	334	334	0.02	0.01	0.06	337

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	1.42	1.18	10.6	14.0	0.02	0.43	0.18	0.61	0.40	0.04	0.44	—	2,666	2,666	0.11	0.04	0.90	2,682
2026	0.98	30.8	7.18	11.0	0.01	0.32	0.20	0.52	0.29	0.05	0.34	—	1,718	1,718	0.07	0.02	0.71	1,726
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	4.43	3.73	36.1	34.0	0.05	1.60	19.9	21.5	1.47	10.2	11.6	—	5,527	5,527	0.39	0.41	0.15	5,614
2025	2.44	1.85	19.2	20.3	0.04	0.75	7.91	8.66	0.69	3.64	4.33	—	5,438	5,438	0.37	0.41	0.15	5,568
2026	1.34	1.12	10.0	13.7	0.02	0.38	0.20	0.56	0.35	0.05	0.39	—	2,647	2,647	0.11	0.04	0.02	2,662
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.21	0.17	1.70	1.65	< 0.005	0.07	0.81	0.88	0.07	0.40	0.47	—	334	334	0.02	0.01	0.09	339
2025	1.05	0.87	7.95	10.1	0.02	0.32	0.49	0.81	0.30	0.20	0.50	—	2,016	2,016	0.09	0.05	0.37	2,033
2026	0.27	1.91	1.99	2.78	< 0.005	0.08	0.04	0.12	0.07	0.01	0.08	—	512	512	0.02	0.01	0.07	515
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.04	0.03	0.31	0.30	< 0.005	0.01	0.15	0.16	0.01	0.07	0.09	—	55.3	55.3	< 0.005	< 0.005	0.02	56.1
2025	0.19	0.16	1.45	1.85	< 0.005	0.06	0.09	0.15	0.05	0.04	0.09	—	334	334	0.02	0.01	0.06	337
2026	0.05	0.35	0.36	0.51	< 0.005	0.01	0.01	0.02	0.01	< 0.005	0.01	—	84.7	84.7	< 0.005	< 0.005	0.01	85.2

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.49	3.61	1.33	12.1	0.02	0.03	2.19	2.22	0.03	0.55	0.59	19.2	3,269	3,288	2.10	0.13	9.53	3,388

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.24	3.37	1.40	8.67	0.02	0.03	2.19	2.21	0.03	0.55	0.59	19.2	3,103	3,122	2.10	0.13	0.93	3,214
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.32	3.45	1.40	10.0	0.02	0.03	2.13	2.16	0.03	0.54	0.57	19.2	3,077	3,096	2.10	0.13	4.43	3,191
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.24	0.63	0.26	1.83	< 0.005	0.01	0.39	0.39	0.01	0.10	0.10	3.18	509	513	0.35	0.02	0.73	528

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.29	1.17	1.07	10.2	0.03	0.02	2.19	2.21	0.02	0.56	0.57	—	2,588	2,588	0.12	0.12	8.82	2,634
Area	0.17	2.43	0.02	1.81	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.85	4.85	< 0.005	< 0.005	—	4.87
Energy	0.03	0.01	0.25	0.11	< 0.005	0.02	—	0.02	0.02	—	0.02	—	676	676	0.05	< 0.005	—	678
Water	—	—	—	—	—	—	—	—	—	—	—	2.56	22.1	24.7	0.26	0.01	—	33.2
Waste	—	—	—	—	—	—	—	—	—	—	—	16.7	0.00	16.7	1.67	0.00	—	58.4
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.70	0.70
Vegetation	—	-0.01	-0.01	—	> -0.005	-0.01	-0.01	-0.02	> -0.005	> -0.005	> -0.005	—	-21.2	-21.2	—	—	—	-21.2
Total	1.49	3.61	1.33	12.1	0.02	0.03	2.19	2.22	0.03	0.55	0.59	19.2	3,269	3,288	2.10	0.13	9.53	3,388
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.21	1.09	1.15	8.56	0.02	0.02	2.19	2.21	0.02	0.56	0.57	—	2,426	2,426	0.12	0.12	0.23	2,465

Area	—	2.27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.03	0.01	0.25	0.11	< 0.005	0.02	—	0.02	0.02	—	0.02	—	676	676	0.05	< 0.005	—	678
Water	—	—	—	—	—	—	—	—	—	—	—	2.56	22.1	24.7	0.26	0.01	—	33.2
Waste	—	—	—	—	—	—	—	—	—	—	—	16.7	0.00	16.7	1.67	0.00	—	58.4
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.70	0.70
Vegetation	—	-0.01	-0.01	—	> -0.005	-0.01	-0.01	-0.02	> -0.005	> -0.005	> -0.005	—	-21.2	-21.2	—	—	—	-21.2
Total	1.24	3.37	1.40	8.67	0.02	0.03	2.19	2.21	0.03	0.55	0.59	19.2	3,103	3,122	2.10	0.13	0.93	3,214
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.18	1.06	1.14	8.68	0.02	0.02	2.14	2.15	0.02	0.54	0.56	—	2,396	2,396	0.12	0.12	3.72	2,439
Area	0.12	2.38	0.01	1.24	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.32	3.32	< 0.005	< 0.005	—	3.34
Energy	0.03	0.01	0.25	0.11	< 0.005	0.02	—	0.02	0.02	—	0.02	—	676	676	0.05	< 0.005	—	678
Water	—	—	—	—	—	—	—	—	—	—	—	2.56	22.1	24.7	0.26	0.01	—	33.2
Waste	—	—	—	—	—	—	—	—	—	—	—	16.7	0.00	16.7	1.67	0.00	—	58.4
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.70	0.70
Vegetation	—	-0.01	-0.01	—	> -0.005	-0.01	-0.01	-0.02	> -0.005	> -0.005	> -0.005	—	-21.2	-21.2	—	—	—	-21.2
Total	1.32	3.45	1.40	10.0	0.02	0.03	2.13	2.16	0.03	0.54	0.57	19.2	3,077	3,096	2.10	0.13	4.43	3,191
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.21	0.19	0.21	1.58	< 0.005	< 0.005	0.39	0.39	< 0.005	0.10	0.10	—	397	397	0.02	0.02	0.62	404
Area	0.02	0.43	< 0.005	0.23	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.55	0.55	< 0.005	< 0.005	—	0.55
Energy	0.01	< 0.005	0.05	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	112	112	0.01	< 0.005	—	112
Water	—	—	—	—	—	—	—	—	—	—	—	0.42	3.67	4.09	0.04	< 0.005	—	5.50
Waste	—	—	—	—	—	—	—	—	—	—	—	2.76	0.00	2.76	0.28	0.00	—	9.66
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.12	0.12
Vegetation	—	> -0.005	> -0.005	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	-3.51	-3.51	—	—	—	-3.51
Total	0.24	0.63	0.26	1.83	< 0.005	0.01	0.39	0.39	0.01	0.10	0.10	3.18	509	513	0.35	0.02	0.73	528

3. Construction Emissions Details

3.1. Site Preparation (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	4.34	3.65	36.0	32.9	0.05	1.60	—	1.60	1.47	—	1.47	—	5,296	5,296	0.21	0.04	—	5,314
Dust From Material Movement	—	—	—	—	—	—	19.7	19.7	—	10.1	10.1	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.99	0.90	< 0.005	0.04	—	0.04	0.04	—	0.04	—	145	145	0.01	< 0.005	—	146
Dust From Material Movement	—	—	—	—	—	—	0.54	0.54	—	0.28	0.28	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.18	0.16	< 0.005	0.01	—	0.01	0.01	—	0.01	—	24.0	24.0	< 0.005	< 0.005	—	24.1

Dust From Material Movement	—	—	—	—	—	—	0.10	0.10	—	0.05	0.05	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.10	1.12	0.00	0.00	0.23	0.23	0.00	0.05	0.05	—	231	231	0.01	0.01	0.03	234
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.42	6.42	< 0.005	< 0.005	0.01	6.51
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.06	1.06	< 0.005	< 0.005	< 0.005	1.08
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.3. Grading (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.26	1.90	18.2	18.8	0.03	0.84	—	0.84	0.77	—	0.77	—	2,958	2,958	0.12	0.02	—	2,969
Dust From Material Movement	—	—	—	—	—	—	7.10	7.10	—	3.43	3.43	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.06	0.61	0.63	< 0.005	0.03	—	0.03	0.03	—	0.03	—	98.4	98.4	< 0.005	< 0.005	—	98.8
Dust From Material Movement	—	—	—	—	—	—	0.24	0.24	—	0.11	0.11	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.11	0.11	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	—	16.3	16.3	< 0.005	< 0.005	—	16.4
Dust From Material Movement	—	—	—	—	—	—	0.04	0.04	—	0.02	0.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.09	0.96	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	198	198	0.01	0.01	0.02	200
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.31	0.05	2.98	1.61	0.02	0.04	0.61	0.66	0.03	0.17	0.20	—	2,326	2,326	0.26	0.37	0.13	2,444
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.68	6.68	< 0.005	< 0.005	0.01	6.77
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	< 0.005	0.10	0.05	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	77.4	77.4	0.01	0.01	0.07	81.4
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.11	1.11	< 0.005	< 0.005	< 0.005	1.12
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	12.8	12.8	< 0.005	< 0.005	0.01	13.5

3.5. Grading (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.07	1.74	16.3	17.9	0.03	0.72	—	0.72	0.66	—	0.66	—	2,959	2,959	0.12	0.02	—	2,970

Dust From Material Movement	—	—	—	—	—	—	7.10	7.10	—	3.43	3.43	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.08	0.76	0.84	< 0.005	0.03	—	0.03	0.03	—	0.03	—	139	139	0.01	< 0.005	—	139
Dust From Material Movement	—	—	—	—	—	—	0.33	0.33	—	0.16	0.16	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.01	0.14	0.15	< 0.005	0.01	—	0.01	0.01	—	0.01	—	23.0	23.0	< 0.005	< 0.005	—	23.1
Dust From Material Movement	—	—	—	—	—	—	0.06	0.06	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.07	0.88	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	194	194	0.01	0.01	0.02	196
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.29	0.05	2.86	1.55	0.02	0.03	0.61	0.64	0.03	0.17	0.20	—	2,285	2,285	0.24	0.37	0.13	2,403

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.23	9.23	< 0.005	< 0.005	0.02	9.36
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	< 0.005	0.14	0.07	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	107	107	0.01	0.02	0.10	113
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.53	1.53	< 0.005	< 0.005	< 0.005	1.55
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	17.8	17.8	< 0.005	< 0.005	0.02	18.7

3.7. Building Construction (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.35	1.13	10.4	13.0	0.02	0.43	—	0.43	0.40	—	0.40	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.35	1.13	10.4	13.0	0.02	0.43	—	0.43	0.40	—	0.40	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.89	0.75	6.93	8.65	0.02	0.29	—	0.29	0.26	—	0.26	—	1,591	1,591	0.06	0.01	—	1,596
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.14	1.26	1.58	< 0.005	0.05	—	0.05	0.05	—	0.05	—	263	263	0.01	< 0.005	—	264
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.05	0.90	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	162	162	0.01	0.01	0.60	165
Vendor	0.01	< 0.005	0.12	0.06	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	106	106	0.01	0.02	0.30	111
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.06	0.68	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	149	149	0.01	0.01	0.02	151
Vendor	0.01	< 0.005	0.12	0.06	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	106	106	0.01	0.02	0.01	111
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.03	0.04	0.47	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	100	100	< 0.005	< 0.005	0.17	102
Vendor	0.01	< 0.005	0.08	0.04	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	70.0	70.0	0.01	0.01	0.09	73.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.09	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	16.6	16.6	< 0.005	< 0.005	0.03	16.8
Vendor	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	11.6	11.6	< 0.005	< 0.005	0.01	12.2
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Building Construction (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.28	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.20	0.17	1.52	2.00	< 0.005	0.06	—	0.06	0.05	—	0.05	—	371	371	0.02	< 0.005	—	372
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.03	0.28	0.37	< 0.005	0.01	—	0.01	0.01	—	0.01	—	61.4	61.4	< 0.005	< 0.005	—	61.6
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.05	0.05	0.05	0.63	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	146	146	< 0.005	0.01	0.01	148
Vendor	0.01	< 0.005	0.12	0.06	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	104	104	0.01	0.02	0.01	109
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.10	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	22.9	22.9	< 0.005	< 0.005	0.04	23.2
Vendor	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	16.0	16.0	< 0.005	< 0.005	0.02	16.8
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.78	3.78	< 0.005	< 0.005	0.01	3.84
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.66	2.66	< 0.005	< 0.005	< 0.005	2.79
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Paving (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.91	0.76	7.12	9.94	0.01	0.32	—	0.32	0.29	—	0.29	—	1,511	1,511	0.06	0.01	—	1,516
Paving	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.91	0.76	7.12	9.94	0.01	0.32	—	0.32	0.29	—	0.29	—	1,511	1,511	0.06	0.01	—	1,516

Paving	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.04	0.39	0.54	< 0.005	0.02	—	0.02	0.02	—	0.02	—	82.8	82.8	< 0.005	< 0.005	—	83.1
Paving	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.07	0.10	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	13.7	13.7	< 0.005	< 0.005	—	13.8
Paving	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	1.08	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	207	207	0.01	0.01	0.71	210
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.07	0.82	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	190	190	< 0.005	0.01	0.02	192
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.6	10.6	< 0.005	< 0.005	0.02	10.7

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.75	1.75	< 0.005	< 0.005	< 0.005	1.77
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Architectural Coating (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.12	0.86	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	30.7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.05	0.06	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.32	7.32	< 0.005	< 0.005	—	7.34
Architectural Coatings	—	1.68	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.21	1.21	< 0.005	< 0.005	—	1.22
Architectural Coatings	—	0.31	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.17	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	31.8	31.8	< 0.005	< 0.005	0.11	32.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.62	1.62	< 0.005	< 0.005	< 0.005	1.64
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.27	0.27	< 0.005	< 0.005	< 0.005	0.27
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	1.29	1.17	1.07	10.2	0.03	0.02	2.19	2.21	0.02	0.56	0.57	—	2,588	2,588	0.12	0.12	8.82	2,634
Total	1.29	1.17	1.07	10.2	0.03	0.02	2.19	2.21	0.02	0.56	0.57	—	2,588	2,588	0.12	0.12	8.82	2,634
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	1.21	1.09	1.15	8.56	0.02	0.02	2.19	2.21	0.02	0.56	0.57	—	2,426	2,426	0.12	0.12	0.23	2,465
Total	1.21	1.09	1.15	8.56	0.02	0.02	2.19	2.21	0.02	0.56	0.57	—	2,426	2,426	0.12	0.12	0.23	2,465
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.21	0.19	0.21	1.58	< 0.005	< 0.005	0.39	0.39	< 0.005	0.10	0.10	—	397	397	0.02	0.02	0.62	404
Total	0.21	0.19	0.21	1.58	< 0.005	< 0.005	0.39	0.39	< 0.005	0.10	0.10	—	397	397	0.02	0.02	0.62	404

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	355	355	0.02	< 0.005	—	356
Total	—	—	—	—	—	—	—	—	—	—	—	—	355	355	0.02	< 0.005	—	356
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	355	355	0.02	< 0.005	—	356
Total	—	—	—	—	—	—	—	—	—	—	—	—	355	355	0.02	< 0.005	—	356
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	58.8	58.8	< 0.005	< 0.005	—	59.0
Total	—	—	—	—	—	—	—	—	—	—	—	—	58.8	58.8	< 0.005	< 0.005	—	59.0

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.03	0.01	0.25	0.11	< 0.005	0.02	—	0.02	0.02	—	0.02	—	321	321	0.03	< 0.005	—	322

Total	0.03	0.01	0.25	0.11	< 0.005	0.02	—	0.02	0.02	—	0.02	—	321	321	0.03	< 0.005	—	322
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.03	0.01	0.25	0.11	< 0.005	0.02	—	0.02	0.02	—	0.02	—	321	321	0.03	< 0.005	—	322
Total	0.03	0.01	0.25	0.11	< 0.005	0.02	—	0.02	0.02	—	0.02	—	321	321	0.03	< 0.005	—	322
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.01	< 0.005	0.05	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	53.1	53.1	< 0.005	< 0.005	—	53.3
Total	0.01	< 0.005	0.05	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	53.1	53.1	< 0.005	< 0.005	—	53.3

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	2.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.17	0.16	0.02	1.81	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.85	4.85	< 0.005	< 0.005	—	4.87
Total	0.17	2.43	0.02	1.81	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.85	4.85	< 0.005	< 0.005	—	4.87

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	2.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	2.27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.38	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.03	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.02	0.02	< 0.005	0.23	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.55	0.55	< 0.005	< 0.005	—	0.55
Total	0.02	0.43	< 0.005	0.23	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.55	0.55	< 0.005	< 0.005	—	0.55

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	2.56	22.1	24.7	0.26	0.01	—	33.2
Total	—	—	—	—	—	—	—	—	—	—	—	2.56	22.1	24.7	0.26	0.01	—	33.2
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	2.56	22.1	24.7	0.26	0.01	—	33.2
Total	—	—	—	—	—	—	—	—	—	—	—	2.56	22.1	24.7	0.26	0.01	—	33.2
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	0.42	3.67	4.09	0.04	< 0.005	—	5.50
Total	—	—	—	—	—	—	—	—	—	—	—	0.42	3.67	4.09	0.04	< 0.005	—	5.50

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	16.7	0.00	16.7	1.67	0.00	—	58.4
Total	—	—	—	—	—	—	—	—	—	—	—	16.7	0.00	16.7	1.67	0.00	—	58.4
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	16.7	0.00	16.7	1.67	0.00	—	58.4
Total	—	—	—	—	—	—	—	—	—	—	—	16.7	0.00	16.7	1.67	0.00	—	58.4
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	2.76	0.00	2.76	0.28	0.00	—	9.66
Total	—	—	—	—	—	—	—	—	—	—	—	2.76	0.00	2.76	0.28	0.00	—	9.66

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.70	0.70
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.70	0.70
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.70	0.70
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.70	0.70
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.12	0.12
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.12	0.12

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Desert Willow	—	-0.01	> -0.005	—	> -0.005	-0.01	-0.01	-0.02	> -0.005	> -0.005	> -0.005	—	-8.84	-8.84	—	—	—	-8.84
Fruitless Olive	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	—	—	0.00
Blue Wattle	—	> -0.005	> -0.005	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	-0.24	-0.24	—	—	—	-0.24
Subtotal	—	-0.01	> -0.005	—	> -0.005	-0.01	-0.01	-0.02	> -0.005	> -0.005	> -0.005	—	-9.08	-9.08	—	—	—	-9.08
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Desert Willow	—	—	—	—	—	—	—	—	—	—	—	—	-9.43	-9.43	—	—	—	-9.43
Fruitless Olive	—	—	—	—	—	—	—	—	—	—	—	—	-2.58	-2.58	—	—	—	-2.58
Blue Wattle	—	—	—	—	—	—	—	—	—	—	—	—	-0.08	-0.08	—	—	—	-0.08
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	-12.1	-12.1	—	—	—	-12.1
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Desert Willow	—	—	> -0.005	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	—	—	—	—	—	—
Fruitless Olive	—	—	> -0.005	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	—	—	—	—	—	—
Blue Wattle	—	—	> -0.005	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	—	—	—	—	—	—
Subtotal	—	—	-0.01	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	—	—	—	—	—	—

—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	-0.01	-0.01	—	> -0.005	-0.01	-0.01	-0.02	> -0.005	> -0.005	> -0.005	—	-21.2	-21.2	—	—	—	-21.2
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Desert Willow	—	-0.01	> -0.005	—	> -0.005	-0.01	-0.01	-0.02	> -0.005	> -0.005	> -0.005	—	-8.84	-8.84	—	—	—	-8.84
Fruitless Olive	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	—	—	0.00
Blue Wattle	—	> -0.005	> -0.005	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	-0.24	-0.24	—	—	—	-0.24
Subtotal	—	-0.01	> -0.005	—	> -0.005	-0.01	-0.01	-0.02	> -0.005	> -0.005	> -0.005	—	-9.08	-9.08	—	—	—	-9.08
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Desert Willow	—	—	—	—	—	—	—	—	—	—	—	—	-9.43	-9.43	—	—	—	-9.43
Fruitless Olive	—	—	—	—	—	—	—	—	—	—	—	—	-2.58	-2.58	—	—	—	-2.58
Blue Wattle	—	—	—	—	—	—	—	—	—	—	—	—	-0.08	-0.08	—	—	—	-0.08
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	-12.1	-12.1	—	—	—	-12.1
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Desert Willow	—	—	> -0.005	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	—	—	—	—	—	—
Fruitless Olive	—	—	> -0.005	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	—	—	—	—	—	—
Blue Wattle	—	—	> -0.005	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	—	—	—	—	—	—
Subtotal	—	—	-0.01	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	-0.01	-0.01	—	> -0.005	-0.01	-0.01	-0.02	> -0.005	> -0.005	> -0.005	—	-21.2	-21.2	—	—	—	-21.2
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Desert Willow	—	> -0.005	> -0.005	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	-1.46	-1.46	—	—	—	-1.46
Fruitless Olive	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	—	—	0.00
Blue Wattle	—	> -0.005	> -0.005	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	-0.04	-0.04	—	—	—	-0.04
Subtotal	—	> -0.005	> -0.005	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	-1.50	-1.50	—	—	—	-1.50
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Desert Willow	—	—	—	—	—	—	—	—	—	—	—	—	-1.56	-1.56	—	—	—	-1.56
Fruitless Olive	—	—	—	—	—	—	—	—	—	—	—	—	-0.43	-0.43	—	—	—	-0.43
Blue Wattle	—	—	—	—	—	—	—	—	—	—	—	—	-0.01	-0.01	—	—	—	-0.01
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	-2.00	-2.00	—	—	—	-2.00
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Desert Willow	—	—	> -0.005	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	—	—	—	—	—	—
Fruitless Olive	—	—	> -0.005	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	—	—	—	—	—	—
Blue Wattle	—	—	> -0.005	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	—	—	—	—	—	—
Subtotal	—	—	> -0.005	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	> -0.005	> -0.005	—	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	> -0.005	—	-3.51	-3.51	—	—	—	-3.51

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Preparation	Site Preparation	11/30/2024	12/14/2024	5.00	10.0	—
Grading	Grading	12/15/2024	1/24/2025	5.00	30.0	—
Building Construction	Building Construction	1/27/2025	3/20/2026	5.00	300	—
Paving	Paving	3/23/2026	4/18/2026	5.00	20.0	—
Architectural Coating	Architectural Coating	4/20/2026	5/15/2026	5.00	20.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Grading	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29
Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37

Paving	Pavers	Diesel	Average	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	—	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	15.0	18.5	LDA,LDT1,LDT2
Grading	Vendor	—	10.2	HHDT,MHDT
Grading	Hauling	33.0	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	11.5	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	3.42	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT

Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	2.30	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Control Strategies Applied	PM10 Reduction	PM2.5 Reduction
Water unpaved roads twice daily	55%	55%
Limit vehicle speeds on unpaved roads to 25 mph	44%	44%
Sweep paved roads once per month	9%	9%

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	198,729	66,243	0.00	0.00	—

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Preparation	—	—	15.0	0.00	—
Grading	—	7,921	30.0	0.00	—

Paving	0.00	0.00	0.00	0.00	0.35

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Single Family Housing	0.35	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2024	0.00	532	0.03	< 0.005
2025	0.00	532	0.03	< 0.005
2026	0.00	532	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Single Family Housing	302	305	274	108,941	3,061	3,093	2,772	1,103,877

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
198729.44999999998	66,243	0.00	0.00	—

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	250

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Single Family Housing	243,508	532	0.0330	0.0040	1,001,271

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Single Family Housing	1,333,798	1,152,074

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)

Single Family Housing	30.9	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Single Family Housing	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Single Family Housing	Household refrigerators and/or freezers	R-134a	1,430	0.12	0.60	0.00	1.00

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)
Desert Willow	42.0	189,591	116
Fruitless Olive	11.0	0.00	0.00
Blue Wattle	1.00	5,256	3.20

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	28.9	annual days of extreme heat
Extreme Precipitation	12.8	annual days with precipitation above 20 mm

Sea Level Rise	—	meters of inundation depth
Wildfire	26.9	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters

Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.

The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.

The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score

Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.

The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.

The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	99.1
AQ-PM	56.8
AQ-DPM	62.1
Drinking Water	67.6
Lead Risk Housing	8.34
Pesticides	0.00
Toxic Releases	50.4

Traffic	74.5
Effect Indicators	—
CleanUp Sites	68.9
Groundwater	39.6
Haz Waste Facilities/Generators	8.76
Impaired Water Bodies	0.00
Solid Waste	35.7
Sensitive Population	—
Asthma	82.2
Cardio-vascular	92.2
Low Birth Weights	39.0
Socioeconomic Factor Indicators	—
Education	18.8
Housing	21.1
Linguistic	6.27
Poverty	30.0
Unemployment	29.4

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	75.99127422
Employed	85.57679969
Median HI	85.82060824
Education	—
Bachelor's or higher	50.58385731

High school enrollment	100
Preschool enrollment	29.34684974
Transportation	—
Auto Access	85.40998332
Active commuting	6.249197998
Social	—
2-parent households	65.59733094
Voting	69.29295522
Neighborhood	—
Alcohol availability	81.21390992
Park access	35.03143847
Retail density	8.340818683
Supermarket access	8.097010137
Tree canopy	11.5616579
Housing	—
Homeownership	98.04953163
Housing habitability	99.35839856
Low-inc homeowner severe housing cost burden	82.22764019
Low-inc renter severe housing cost burden	99.08892596
Uncrowded housing	74.48992686
Health Outcomes	—
Insured adults	75.63197742
Arthritis	70.7
Asthma ER Admissions	13.2
High Blood Pressure	80.7
Cancer (excluding skin)	49.7
Asthma	58.2

Coronary Heart Disease	83.6
Chronic Obstructive Pulmonary Disease	81.8
Diagnosed Diabetes	79.4
Life Expectancy at Birth	16.0
Cognitively Disabled	25.4
Physically Disabled	38.4
Heart Attack ER Admissions	16.5
Mental Health Not Good	67.2
Chronic Kidney Disease	85.5
Obesity	56.2
Pedestrian Injuries	64.2
Physical Health Not Good	77.4
Stroke	84.7
Health Risk Behaviors	—
Binge Drinking	7.9
Current Smoker	68.2
No Leisure Time for Physical Activity	81.2
Climate Change Exposures	—
Wildfire Risk	48.9
SLR Inundation Area	0.0
Children	31.0
Elderly	45.2
English Speaking	95.2
Foreign-born	21.4
Outdoor Workers	61.4
Climate Change Adaptive Capacity	—
Impervious Surface Cover	87.3

Traffic Density	76.2
Traffic Access	23.0
Other Indices	—
Hardship	24.7
Other Decision Support	—
2016 Voting	71.0

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	52.0
Healthy Places Index Score for Project Location (b)	73.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification

Land Use	Project area - 11.11 gross acres/9.69 net acres. Residential portion minus public roadways - 8.57 acres Total square footage of buildings - 98,138 square feet Landscaped areas - 58,696 square feet
Construction: Construction Phases	Estimated construction schedules.
Operations: Hearths	No wood stoves or fireplaces proposed.

Appendix C Geotechnical Evaluation

GEOTECHNICAL EVALUATION

PROPOSED SINGLE-FAMILY RESIDENTIAL DEVELOPMENT
TENTATIVE TRACT NO. 20539
WEST MEYERS ROAD AND MAGNOLIA AVENUE
SAN BERNARDINO, SAN BERNARDINO COUNTY, CALIFORNIA

PREPARED FOR

AURORA BUILDERS, LLC
9987 FOX MEADOWS ROAD
SAN DIEGO, CALIFORNIA 92127

PREPARED BY

GEOTEK, INC.
1548 NORTH MAPLE STREET
CORONA, CALIFORNIA 92878

PROJECT NO. 3190-CR **MAY 24, 2022**

GeoTek, Inc.
1548 North Maple Street, Corona, California 92878
(951) 710-1160 Office (951) 710-1167 Fax www.geotekusa.com

May 24, 2022
Project No. 3190-CR

Aurora Builders, LLC
9987 Fox Meadows Road
San Diego, California 92127

Attention: - Mr. Srihari Mupparaju

Subject: - **Geotechnical Evaluation**
Proposed Single-Family Residential Development
Tentative Tract No. 20539
West Meyers Road and Magnolia Avenue
Fontana, San Bernardino County, California

Dear Mr. Mupparaju:

GeoTek, Inc. (GeoTek) is pleased to provide the results of this Geotechnical Evaluation for the proposed single-family residential development project located to be located adjacent to the northwest corner of West Meyers Road and Magnolia Avenue, in the City of San Bernardino, San Bernardino County, California. This report presents the results of GeoTek's evaluation, discussion of findings, and provides geotechnical recommendations for foundation design and construction.

Based upon review and evaluation, site development appears feasible from a geotechnical viewpoint provided that the recommendations included in this report are incorporated into the design and construction phases of the project.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to contact GeoTek.

Respectfully submitted,
GeoTek, Inc.

BRUCE A. HICK
No. GE2284 22
Exp. 12/31/16

EDWARD H. LaMONT
No. 1892
Exp.

Bruce a. Hick

Bruce A. Hick
GE 2284, Exp. 12/31/22 -
Geotechnical Engineer

Edward H. LaMont
CEG 1892, Exp. 07/31/22
Principal Geologist

Anna M. Scott

Anna M. Scott
Project Geologist

Distribution: (1) Addressee via email (one PDF file)

G:\Projects\3151 to 3200\3190CR Aurora Builders LLC Tentative Tract Map No. 20539 San Bernardino\Geotechnical Evaluation\3190CR Geotechnical Evaluation Tract No. 20539.doc

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1. PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to evaluate the geotechnical engineering and geologic conditions at the project site, as outlined in GeoTek's proposal P-0400722-CR, dated April 20, 2022. Services provided for this study included the following:

- Research and review of available geologic data and general information pertinent to the site,
- Site exploration consisting of the excavation, logging, and sampling of five (5) exploratory test borings extending to depths ranging from 15.5 to 51.5 feet below grade,
- Laboratory testing of soil samples collected during the field investigation,
- Review and evaluation of site seismicity, and
- Preparation of this geotechnical report which presents GeoTek's findings, conclusions, and recommendations for this site.

2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

2.1 SITE DESCRIPTION

The approximate 11-acre square-shaped shaped project site is located northwesterly of the intersection of West Meyers Road and Magnolia Avenue, in the City of San Bernardino, San Bernardino County, California (See Figure 1). Access to the site is available from West Meyers Road, Magnolia Avenue and Ohio Avenue, all paved improved streets located adjacent to the southern, eastern and northern boundaries of the site, respectively. A poorly maintained dirt road approximates the western boundary of the site. Single-family residential developments are located adjacent to the northern, eastern and southern boundaries of the site. Vacant land borders the western boundary of the site; North Verdemont Elementary School borders the southwest corner of the site.

Topographically, the site slopes gently downward to the south at an approximate five percent gradient with approximately 45 feet of elevation differential across the site. Site drainage is predominatly by sheetflow to the south. A shallow drainage course trends approximately east-west through the central portion of the site. The site was vegetated with weeds and low grass with a single tree located in the center-east edge of the property.

2.2 PROJECT DESCRIPTION

Based upon review of Tentative Tract Map No. 20539 prepared by S. D. Engineering and Associates (undated), GeoTek understands the subject property is to be developed with about 32 single-family residential lots and associated infrastructure improvements. Stormwater disposal is to be by means of stormwater management facilities.

The proposed residential structures are anticipated to be of wood-frame construction, one- to two-stories in height, and incorporate conventional shallow foundations and slab-on-grade floors. Sewage disposal will be by a public sewer. For the purposes of this report, it is assumed maximum column and wall loads will be about 75 kips and 2.5 kips per foot, respectively. Once actual loads are known that information should be provided to GeoTek to determine if modifications to the recommendations presented in this report are warranted.

If site development differs from the assumptions made herein, the recommendations included in this report should be subject to further review and evaluation. Site development plans should be reviewed by GeoTek when they become available.

3. FIELD EXPLORATION AND LABORATORY TESTING

3.1 FIELD EXPLORATION

The field exploration for this report was conducted on May 3, 2022 and consisted of excavating five (5) geotechnical exploratory borings with a hollow-stem drill rig to depths ranging from about 15.5 to 51.5 feet below grade at the boring locations. The approximate locations of the GeoTek excavations are shown on the Boring and Infiltration Test Location Map (Figure 2). An engineer from GeoTek logged the excavations and collected soil samples for use in subsequent laboratory testing. The logs of the exploratory borings are included in Appendix A.

Relatively undisturbed soil samples were recovered at various intervals in the geotechnical borings with a California sampler. The California sampler is a 3-inch outside diameter, 2.5-inch inside diameter, split barrel sampler lined with brass rings. The sampler was 18 inches long.

The sampler conformed to the requirements of ASTM D 3550. A 140-pound automatic trip hammer was utilized, dropping 30 inches for each blow. The relatively undisturbed samples, together with bulk samples of representative soil types, were returned to the laboratory for testing and evaluation. The California sampler test data are presented on the boring logs in Appendix A.

In Boring B-1 standard penetration tests (SPT) were performed with a 2.0-inch outside diameter, 1.5-inch inside diameter, split-barrel sampler. The sampler was 18 inches long. The inside diameter of the sampler shoe was 1.4 inches. The sampler was unlined. The sampler conformed to the requirements of ASTM D 1586. A 140-pound automatic trip hammer was utilized, dropping 30 inches for each blow. The sampler penetration test data are presented on the Log for Boring for Boring B-1.

3.2 LABORATORY TESTING

Laboratory testing was performed on selected relatively undisturbed ring and bulk samples collected during the field exploration. The purpose of the laboratory testing was to confirm the field classification of the materials encountered and to evaluate their physical properties for use in the engineering design and analysis. Results of the laboratory testing program along with a brief description and relevant information regarding testing procedures are included on the exploratory borings logs included in Appendix A and in Appendix B.

4. GEOLOGIC AND SOILS CONDITIONS

4.1 REGIONAL SETTING

The subject property is situated in the Peninsular Ranges geomorphic province. The Peninsular Ranges province is one of the largest geomorphic units in western North America. It extends approximately 975 miles south of the Transverse Ranges geomorphic province to the tip of Baja California. This province varies in width from about 30 to 100 miles. It is bounded on the west by the Pacific Ocean, on the south by the Gulf of California and on the east by the Colorado Desert Province.

The Peninsular Ranges are essentially a series of northwest-southeast oriented fault blocks. Several major fault zones are found in this province. The Elsinore Fault zone and the San Jacinto Fault zone trend northwest-southeast and are found near the middle of the province. The San Andreas Fault zone borders the northeasterly margin of the province.

More specific to the subject property, the site is located in an area geologically mapped to be underlain by alluvial fan deposits (Dibblee, T.W. and Minch, J.A., 2004).

4.2 GENERAL SOIL CONDITIONS

A brief description of the earth materials encountered is presented in the following section. Based on the site reconnaissance, the exploratory excavations and review of published geologic maps, the area investigated is locally underlain by alluvial fan deposits.

4.2.1 Alluvial Fan Deposits

Alluvial fan deposits were encountered in all the borings and extended to the maximum depth explored (51.5 feet in Boring B-1). As encountered in the borings, the alluvial fan deposits consisted of interbedded layers of silty sands, clayey sand and sand (SM, SC and SP soil types).

Based on the laboratory test results, the near surface soils have a “very low” expansion potential (ASTM D 4829). Based on the laboratory test results, the near surface soils have a soluble sulfate content of less than 0.1 percent (ASTM D 4327). Based upon the collapse tests performed, the upper approximate site soils are anticipated to have a very low potential for hydroconsolidation (settlement due to the addition of water with or without additional loading). The laboratory test results are provided in Appendix B.

4.3 SURFACE WATER AND GROUNDWATER

4.3.1 Surface Water

If encountered during earthwork operations, surface water on this site will likely be the result of precipitation or possibly some minor surface run-off from the surrounding areas. Natural drainage at the site is interpreted to be to the southwest following the existing site topography in the area. Provisions for surface drainage will need to be accounted for by the project civil engineer.

4.3.2 Groundwater

Groundwater was not encountered within any of the exploratory borings drilled at the site to the maximum depth drilled of 51.5 below the existing ground surface. Based on a review of groundwater depths noted on the State Department of Water Resources Water Data Library website, it is estimated the historic high groundwater depth is in excess of 100 feet below existing grade at the site. Based on the results of the field exploration, review of site area geomorphology and geology, groundwater is not anticipated to adversely affect the proposed improvements.

4.4 FAULTING AND SEISMICITY

4.4.1 Faulting

The geologic structure of the entire California area is dominated mainly by northwest-trending faults associated with the San Andreas system. The site is in a seismically active region. However, the site is not situated within a State of California designated *"Alquist-Priolo"* Earthquake Fault Zone or a County of San Bernardino Designated Fault Zone. The subject property is not located within a State of California Seismic Hazard Zone for earthquake-induced landsliding. The nearest zoned fault is the San Andreas fault, located approximately 0.5-mile northeast of the site.

4.4.2 Seismic Design Parameters

The site is located at approximately 34.2059 degrees West Latitude and -117.3639 degrees North Longitude. Site spectral accelerations (S_a and S_1) for 0.2 and 1.0 second periods for a Class "D" site, was determined from the SEAOC/OSHPD web interface that utilizes the USGS web services and retrieves the seismic design data and presents that information in a report format. Using the ASCE 7-16 option on the SEAOC/OSHPD website results in the values for S_{M1} and S_{D1} reported as "null-See Section 11.4.8" (of ASCE 7-16). As noted in ASCE 7-16, Section 11.4.8, a site-specific ground motion procedure is recommended for Site Class D when the value S_1 exceeds 0.2. The value S_1 for the subject site exceeds 0.2.

For a site Class D, an exception to performing a site-specific ground motion analysis is allowed in ASCE 7-16 where S_1 exceeds 0.2 provided the value of the seismic response coefficient, Cs, is conservatively calculated by Eq 12.8-2 of ASCE 7-16 for values of $T \leq 1.5Ts$ and taken as equal to 1.5 times the value computed in accordance with either Eq. 12.8-3 for $T_L \geq T > 1.5Ts$ or Eq. 12.8-4 for $T > T_L$.

The results, based on the 2015 NEHRP and the 2019 CBC, are presented in the following table assuming that the exception as allowed in ASCE 7-16 is applicable. If the exception is deemed not appropriate, a site-specific ground motion analysis will be required.

SITE SEISMIC PARAMETERS	
Mapped 0.2 sec Period Spectral Acceleration, S_S	2.418g
Mapped 1.0 sec Period Spectral Acceleration, S_1	1.029g
Site Coefficient for Site Class "D", F_a	1.0
Site Coefficient for Site Class "D", F_v	1.7
Maximum Considered Earthquake Spectral Response Acceleration for 0.2 Second, S_{MS}	2.418g
Maximum Considered Earthquake Spectral Response Acceleration for 1.0 Second, S_{M1}	1.749g
5% Damped Design Spectral Response Acceleration Parameter at 0.2 Second, S_{DS}	1.612g
5% Damped Design Spectral Response Acceleration Parameter at 1 second, S_{D1}	1.166g
Peak Ground Acceleration (PGA_M)	1.143g
Seismic Design Category	E

Final selection of the appropriate seismic design coefficients should be made by the project structural engineer based upon the local practices and ordinances, expected building response and desired level of conservatism.

4.5 LIQUEFACTION

Liquefaction describes a phenomenon in which cyclic stresses, produced by earthquake-induced ground motion, create excess pore pressures in relatively cohesionless soils. These soils may thereby acquire a high degree of mobility, which can lead to lateral movement, sliding, consolidation and settlement of loose sediments, sand boils and other damaging deformations. This phenomenon occurs only below the water table, but, after liquefaction has developed, the effects can propagate upward into overlying non-saturated soil as excess pore water dissipates.

The factors known to influence liquefaction potential include soil type and grain size, relative density, groundwater level, confining pressures, and both intensity and duration of ground shaking. In general, materials that are susceptible to liquefaction are loose, saturated granular soils having low fines content under low confining pressures.

The project site is not located within an area mapped by the State of California for liquefaction potential. The County of San Bernardino Land Use Services (Geologic Hazard Maps) has designated the site as not having a potential for liquefaction. Based on the current mapping and the depth to groundwater, it is GeoTek's opinion that the liquefaction potential at the site is very low.

4.6 OTHER SEISMIC HAZARDS

Due to the dense nature of the underlying alluvial fan deposits, seismic-induced ("dry sand") settlements are estimated to be minimal.

Due to the general flat terrain, the potential for seismic induced landslides or lateral spreading is considered nil. The potential for secondary seismic hazards such as a seiche and tsunami is considered negligible due to site elevation and distance from an open body of water.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 GENERAL

Development of the site appears feasible from a geotechnical engineering viewpoint. The following recommendations should be incorporated into the design and construction phases of development.

5.2 EARTHWORK CONSIDERATIONS

5.2.1 General

Earthwork and grading should be performed in accordance with the applicable grading ordinances of the City of San Bernardino, the 2019 California Building Code (CBC), and recommendations contained in this report. The Grading Guidelines included in Appendix C outline general procedures and do not anticipate all site-specific situations. In the event of conflict, the recommendations presented in the text of this report should supersede those contained in Appendix C.

5.2.2 Site Clearing

Initial site preparation should commence with removal of debris, existing structures, pavements, foundations, vegetation, trees (including root balls), underground utilities, foundations, slabs-on-grade, and other deleterious materials within the limits of the planned improvements. Existing utilities, not planned for re-use, should be capped off at the property boundaries and removed. All materials generated by demolition and site clearing operations should be properly disposed of off-site. Voids resulting from removing any materials should be replaced with engineered fill materials with expansion characteristics similar to the onsite materials.

5.2.3 Site Preparation

Following site clearing operations and lowering of site grades where planned, it is recommended that the soils be removed beneath the planned building footprints to a depth of at least five (5) feet below exposed grade, or three (3) feet below the base of the proposed foundations, whichever is greater. The lateral extent of this recommended over-excavation should extend at least five (5) feet beyond the building limits. Removal bottoms should be relatively uniform in soil type which is not visibly porous and having an in-place density of at least 85 percent of the soil's maximum dry density as determined by ASTM D 1557 test procedures.

The earth materials soils where pavement improvements (roadways, streets, hardscaping, etc.) or new fill is planned should be over-excavated to a depth of at least two (2) feet below existing grades. Removal bottoms should be relatively uniform in soil type which is not visibly porous and having an in-place density of at least 85 percent of the soil's maximum dry density as determined by ASTM D 1557 test procedures. Following over-excavation, the exposed materials should be scarified to a depth of about 12 inches, be moisture conditioned to slightly above the soil's optimum moisture content and then be compacted to at least 90 percent of the soil's maximum dry density as determined by ASTM D-1557 test procedures.

Following remedial grading operations, it is recommended that the exposed subgrade soils beneath all surface improvements be proof rolled with a heavy rubber-tired piece of construction equipment approved by and in the presence of the geotechnical engineering representative. The proof rolling equipment should possess a minimum weight of 15 tons and proof rolling should include at least 4 passes, two in each perpendicular direction. All soil that ruts or excessively deflects during proof rolling should be removed as recommended by the GeoTek representative. Following proof rolling and removal of any unsuitable bearing soil, the exposed subgrade should be scarified to a depth of about 12 inches, be moisture conditioned to slightly above the soil's optimum moisture content and then be compacted to at least 90 percent of the soil's maximum dry density as determined by ASTM D-1557 test procedures.

5.2.4 Engineered Fill

The on-site soils are generally considered suitable for reuse as engineered fill provided they are free from vegetation (including roots), debris, oversized materials (6 inch diameter or greater) and other deleterious material. Existing site concrete and asphalt may be utilized in site fill areas if properly crushed and placed in accordance with recommendations provided within this report. All/any reinforcement and/or deleterious materials should be removed and disposed of offsite. All areas should be brought to final subgrade elevations with fill materials that are placed and compacted in general accordance with minimum project standards. Engineered fill should be placed in 6-to-8-inch loose lifts, moisture conditioned to slightly above the optimum moisture content and compacted to a minimum relative compaction of 90 percent as determined by ASTM D-1557 test procedures.

If wet soils are encountered during remedial grading, methods for drying soils such as stockpiling or mixing with dry soils may be required to bring the soils to the required moisture content for placement as engineered fill. Placement of engineered fill should be observed and tested on a full-time basis by a GeoTek representative during grading activities.

5.2.5 Transition Lot Condition

Building pads graded with a cut/fill transition should be undercut to reduce the potential for differential settlement. The cut portion of the cut/fill transition should be undercut to a depth of at least five (5) feet from natural grade and be backfilled with a properly compacted engineered fill. The bottom of the undercut should be sloped at a minimum of 1 percent toward the adjacent street.

5.2.6 Oversized Rock Disposal

Although unlikely, oversized cobbles, boulders and rock fragments may be encountered during rough grading and utility trench operations. If encountered, on-site disposal of oversized materials is possible, provided the oversized materials are placed as recommended on Plate 4 within Appendix C. Alternatively, over-sized materials can be exported from the site.

5.2.7 Excavation Characteristics

Excavations in the on-site alluvial fan deposits should be readily accomplished with heavy-duty earthmoving or excavating equipment in good operating condition. All excavations should be formed in accordance with current Cal-OSHA requirements.

5.2.8 Trench Excavations and Backfill

Temporary trench excavations within the on-site materials should be stable at a 1:1 inclination for short durations during construction and where cuts do not exceed 15 feet in height. Deeper temporary excavations should be reviewed by GeoTek prior to their planned excavation to determine if supplemental recommendations or analysis are warranted. It is anticipated that temporary cuts to a maximum height of 4 feet can be excavated vertically.

Trench excavations should conform to Cal-OSHA regulations. The contractor should have a competent person, per OSHA requirements, on site during construction to observe conditions and to make the appropriate recommendations.

Utility trench backfill should be compacted to at least 90 percent relative compaction (as determined by ASTM D-1557 test procedures). Under-slab trenches should also be compacted to project specifications. Where applicable, based on jurisdictional requirements, the top 12 inches of backfill below subgrade for road pavements should be compacted to at least 95 percent relative compaction. On-site materials may not be suitable for use as bedding material but should be suitable as backfill provided particles larger than 6 inches are removed.

Compaction should be achieved with a mechanical compaction device. Ponding or jetting of trench backfill is not recommended. If backfill soils have dried out, they should be properly moisture conditioned prior to placement in trenches.

5.2.9 Slope Construction

Fill and cut slopes constructed at gradients of 2:1 (h:v) or flatter, in accordance with industry standards, are anticipated to be both grossly and surficially stable. Fill slopes, fill over natural slopes and fill over cut slopes, should be constructed with a keyway at the toe of slope and subsequent horizontal benches. The keyway should possess a minimum width of 15 feet, or generally half the slope height for slopes higher than 20 feet, with a minimum depth into competent material of 2 feet. The keyway should be inclined at least 2 percent back into the slope. Fill placed on slopes should be properly benched into competent soils per the recommendations of the geotechnical engineer. Any cut slopes should be observed by a geotechnical engineer/engineering geologist to approve the exposed conditions upon excavation.

Swales should be constructed at the top of all slopes to collect and divert drainage away from the slope face. Drainage should be directed to an approved drainage discharge location. Swales should be constructed with concrete, shotcrete or approved non-erosive material. Swales should be cleaned of loose soil and debris on an on-going basis.

Fill slopes should be overfilled by at least 3 feet during construction and then cut back to expose fully compacted soil. As an alternate, the fill slopes may be constructed as designed provided that the slope face is back-rolled with a sheepsfoot rolled at vertical intervals not exceeding 4 feet. The final slope face should be compacted as needed such that the slope face material is compacted to at least 90 percent of the soil's maximum dry density per ASTM D1557. Berms should be constructed and maintained at the top of all fill slopes to divert drainage away from the slope faces. An abatement program to control ground-burrowing rodents should be implemented and maintained. Burrowing rodents can decrease the long-term performance of slopes.

5.2.10 Shrinkage and Bulking

For planning purposes, a shrinkage loss of about 7 to 12 percent is anticipated for excavations within the alluvial materials at the site. Several factors will impact earthwork balancing on the site, including shrinkage, trench spoil from utilities and footing excavations, as well as the accuracy of topography. Shrinkage and bulking are primarily dependent upon the degree of compactive effort achieved during construction, depth of fill and underlying site conditions.

A subsidence loss of up to about 0.2 foot is estimated for the site.

Site balance areas should be available in order to adjust project grades, depending on actual field conditions at the conclusion of earthwork construction.

5.2.11 Grading Plan Review

Upon completion of the site grading plans, it is recommended that those plans be provided to GeoTek for review. Based on that review, some modifications to the recommendations provided in this report may be necessary.

5.3 DESIGN RECOMMENDATIONS

5.3.1 Foundation Design Criteria

Foundation design criteria for a conventional foundation system, in general conformance with the 2019 CBC, are presented below. The soils are classified as having a “very low” expansion potential in accordance with ASTM D 4829. Typical design criteria for the site based upon a “very low” expansion index is tabulated below. These are minimal recommendations and are not intended to supersede the design by the project structural engineer. Once structural loading information is provided, revisions to the recommendations provided in this report may be necessary.

The conventional foundation elements for the proposed buildings should bear entirely in engineered fill soils. Foundations should be designed in accordance with the 2019 CBC.

Expansion index and soluble sulfate evaluation of the soils should be performed during construction to evaluate the as-graded conditions. Final recommendations should be based upon the as-graded soils conditions.

A summary of the foundation design recommendations is presented in the following table:

GEOTECHNICAL RECOMMENDATIONS FOR FOUNDATION DESIGN

Design Parameter	"Very Low" Expansion Index
Foundation Depth or Minimum Perimeter Beam Depth (inches below lowest adjacent grade)	12 – One- and two-stories
Minimum Foundation Width (Inches)*	12 – One- and two-stories
Minimum Slab Thickness (actual)	4 – Actual
Minimum Slab Reinforcing	6" x 6" – W1.4/W1.4 welded wire fabric, or No. 3 bars at 24 inch centers, placed in middle of slab
Minimum Footing Reinforcement	Two No. 4 reinforcing bars, one placed near the top and one near the bottom
Effective Plasticity Index	N/A
Presaturation of Subgrade Soil (Percent of Optimum)	Minimum of 100% of the optimum moisture content to a depth of at least 12 inches prior to placing concrete

*Code minimums per Table 1809.7 of the 2019 CBC should be complied with.

5.3.1.1 - An allowable bearing capacity of 2,000 pounds per square foot (psf) may be used for design of continuous and perimeter footings 12 inches deep and 12 inches wide, and pad footings 24 inches square and 18 inches deep. This allowable soil bearing capacity may be increased by 300 psf for each additional foot of footing depth and 300 psf for each additional foot of footing width to a maximum value of 3,000 psf. An increase of one-third may be applied when considering short-term live loads (e.g., seismic and wind loads).

5.3.1.2 - Structural foundations should be designed in accordance with the 2019 CBC, and to withstand a total static settlement of 1 inch and maximum differential static settlement of one-half of the total settlement over a horizontal distance of 40 feet.

5.3.1.3 - The passive earth pressure may be computed as an equivalent fluid having a density of 350 psf per foot of depth, to a maximum earth pressure of 3,500 psf for footings founded on engineered fill or competent native soil. A coefficient of friction between soil and concrete of 0.35 may be used with dead load forces. Passive pressure and frictional resistance may be combined without reduction. The upper one foot of soil should be ignored in the passive pressure calculations unless the surface is covered with pavements.

5.3.1.4 - A grade beam, a minimum of 12 inches wide and 12 inches deep, should be utilized across large entrances. The base of the grade beam should be at the same elevation as the bottom of the adjoining footings.

5.3.1.5 - A moisture and vapor retarding system should be placed below slabs-on-grade where moisture migration through the slab is undesirable. Guidelines for these are provided in the 2019 California Green Building Standards Code (CALGreen) Section 4.505.2, the 2019 CBC Section 1907.1 and ACI 360R-10. The vapor retarder design and construction should also meet the requirements of ASTM E 1643. A portion of the vapor retarder design should be the implementation of a moisture vapor retardant membrane.

It should be realized that the effectiveness of the vapor retarding membrane can be adversely impacted as a result of construction related punctures (e.g., stake penetrations, tears, punctures from walking on the vapor retarder placed atop the underlying aggregate layer, etc.). These occurrences should be limited as much as possible during construction. Thicker membranes are generally more resistant to accidental puncture than thinner ones. Products specifically designed for use as moisture/vapor retarders may also be more puncture resistant. Although the CBC specifies a 6-mil vapor retarder membrane, it is GeoTek's opinion that a minimum 10 mil thick membrane with joints properly overlapped and sealed should be considered, unless otherwise specified by the slab design professional. The membrane should consist of Stego wrap or the equivalent.

Moisture and vapor retarding systems are intended to provide a certain level of resistance to vapor and moisture transmission through the concrete, but do not eliminate it. The acceptable level of moisture transmission through the slab is to a large extent based on the type of flooring used and environmental conditions. Ultimately, the vapor retarding system should be comprised of suitable elements to limited migration of water and reduce transmission of water vapor through the slab to acceptable levels. The selected elements should have suitable properties (i.e., thickness, composition, strength, and permeability) to achieve the desired performance level.

Moisture retarders can reduce, but not eliminate, moisture vapor rise from the underlying soils up through the slab. Moisture retarder systems should be designed and constructed in accordance with applicable American Concrete Institute, Portland Cement Association, Post-Tensioning Concrete Institute, ASTM and California Building Code requirements and guidelines.

GeoTek recommends that a qualified person, such as the flooring contractor, structural engineer, architect, and/or other experts specializing in moisture control within the building be consulted to evaluate the general and specific moisture and vapor transmission paths and associated potential impact on the proposed construction. That person (or persons) should provide recommendations relative to the slab moisture and vapor retarder systems and for migration of potential adverse impact of moisture vapor transmission on various components of the structures, as deemed appropriate.

In addition, the recommendations in this report and GeoTek's services in general are not intended to address mold prevention; since GeoTek, along with geotechnical consultants in general, do not practice in the area of mold prevention. If specific recommendations addressing potential mold issues are desired, then a professional mold prevention consultant should be contacted.

5.3.1.6 - It is recommended that control joints be placed in two directions spaced approximately 24 to 36 times the thickness of the slab in inches. These joints are a widely accepted means to control cracks and should be reviewed by the project structural engineer.

5.3.2 Miscellaneous Foundation Recommendations

5.3.2.1 - To reduce moisture penetration beneath the slab on grade areas, utility trench excavations should be backfilled with engineered fill, lean concrete or concrete slurry where they intercept the perimeter footing or thickened slab edge.

5.3.2.2 - Soils from the footing excavations should not be placed in the slab-on-grade areas unless properly compacted and tested. The excavations should be free of loose/sloughed materials and be neatly trimmed at the time of concrete placement.

5.3.3 Foundation Setbacks

Minimum setbacks for all foundations should comply with the 2019 CBC or City of San Bernardino requirements, whichever is more stringent. Improvements not conforming to these setbacks are subject to the increased likelihood of excessive lateral movements and/or differential settlements. If large enough, these movements can compromise the integrity of the improvements. The top outside edge of all footings should be set back a minimum of H/3 (where H is the slope height) from the face of any descending slope. The setback should be at least five feet and need not exceed 40 feet.

5.3.4 Soil Corrosivity

The soil resistivity at this site was tested in the laboratory on a sample collected during the field investigation. The results of the testing indicate that the on-site soils are considered "essentially non-corrosive" (Roberge, 2000) to buried ferrous metal in accordance with current standards used by corrosion engineers. Recommendations for protection of buried ferrous metal should be provided by a corrosion engineer. Additional corrosion testing should be performed at the time of site grading to assess the corrosion of potential of the as-graded soils.

5.3.5 Soil Sulfate Content

The sulfate content was determined in the laboratory on one (1) sample collected during the field investigation. The results indicate that the water-soluble sulfate result is less than 0.1 percent by weight, which is considered "negligible" as per Table 4.2.1 of ACI 318. Based on the test results and Table 4.3.1 of ACI 318, no special recommendations for concrete are required for this project due to soil sulfate exposure.

5.4 RETAINING AND GARDEN WALL DESIGN AND CONSTRUCTION

5.4.1.1 General Design Criteria

Recommendations presented in this report apply to typical masonry or concrete vertical retaining walls to a maximum height of up to six (6) feet. Additional review and recommendations should be requested for higher walls. These are typical design criteria and are not intended to supersede the design by the structural engineer.

Retaining wall foundations should be embedded a minimum of 18 inches into engineered fill. Retaining wall foundations should be designed in accordance with Section 5.3 of this report. Structural needs may govern and should be evaluated by the project structural engineer.

All earth retention structure plans, as applicable, should be reviewed by this office prior to finalization.

Earthwork considerations, site clearing and remedial earthwork for all earth retention structures should meet the requirements of this report, unless specifically provided otherwise, or more stringent requirements or recommendations are made by the designer. The backfill material placement for all earth retention structures should meet the requirement of Section 5.2.4 in this report.

In general, cantilever earth retention structures, which are designed to yield at least 0.001H, where H is equal to the height of the earth retention structure, may be designed using the "active" condition. Rigid earth retention structures (including but not limited to rigid walls, and walls braced at top, such as typical basement walls) should be designed using the "at-rest" condition.

In addition to the design lateral forces due to retained earth, surcharges due to improvements, such as an adjacent building or traffic loading, should be considered in the design of the earth retention structures. Loads applied within a 1:1 (horizontal: vertical) projection from the surcharge on the stem of the earth retention structure should be considered in the design.

Final selection of the appropriate design parameters should be made by the designer of the earth retention structures.

5.4.1.2 Cantilevered Walls

The recommendations presented below are for cantilevered retaining walls up to six (6) feet high. Active earth pressure may be used for retaining wall design, provided the top of the wall is not restrained from minor deflections. An equivalent fluid pressure approach may be used to compute the horizontal pressure against the wall. Appropriate fluid unit weights are given below for specific slope gradients of the retained material. These do not include other superimposed loading conditions such as traffic, structures, seismic events, or adverse geologic conditions.

ACTIVE EARTH PRESSURES

Surface Slope of Retained Materials (horizontal:vertical)	Equivalent Fluid Pressure (pcf) Select Backfill* and Native Soils
Level	42
2:1	63

*The design pressures assume the backfill material has an expansion index less than or equal to 20. Backfill zone includes area between back of the wall to a plane (1:1 horizontal: vertical) up from bottom of the wall foundation (on the backside of the wall) to the ground surface.

For walls with a retained height greater than 6 feet, an incremental seismic pressure should be included into the wall design. Where needed, it is recommended that an equivalent fluid pressure of 35 pcf be included into the wall design to account for seismic loading conditions. This pressure may be applied as an inverted triangular distribution.

5.4.1.3 Retaining Wall Backfill and Drainage

The wall backfill should also include a minimum one (1) foot wide section of ¾- to 1-inch clean crushed rock (or an approved equivalent). The rock should be placed immediately adjacent to the back of the wall and extend up from a back drain to within approximately 24 inches of the finish grade. The upper 24 inches should consist of compacted on-site materials. The rock should be separated from the earth with filter fabric. The presence of other materials might necessitate revision to the parameters provided and modification of the wall designs. The backfill materials should be placed in lifts no greater than eight (8) inches in thickness and compacted to a minimum of 90% relative compaction as determined by ASTM D 1557 test procedures. Proper surface drainage needs to be provided and maintained.

As an alternative to the drain, rock and fabric, a pre-manufactured wall drainage product (example: Mira Drain 6000 or approved equivalent) may be used behind the retaining wall. The wall drainage product should extend from the base of the wall to within two (2) feet of the ground surface. The subdrain should be placed in direct contact with the wall drainage product.

Retaining walls should be provided with an adequate pipe and gravel back drain system to help prevent buildup of hydrostatic pressures. Backdrains should consist of a four (4)-inch diameter perforated collector pipe (Schedule 40, SDR 35, or approved equivalent) embedded in a minimum of one (1) cubic foot per linear foot of ¾- to 1-inch clean crushed rock or an approved equivalent, wrapped in filter fabric (Mirafi 140N or an approved equivalent). The drain system should be connected to a suitable outlet. Waterproofing of site walls should be performed where moisture migration through the walls is undesirable.

5.4.1.4 Restrained Retaining Walls

Retaining walls that will be restrained at the top that support level backfill or that have reentrant or male corners, should be designed for an equivalent at-rest fluid pressure of 63 pcf, plus any applicable surcharge loading. For areas of male or reentrant corners, the restrained wall design should extend a minimum distance of twice the height of the wall laterally from the corner, or a distance otherwise determined by the project structural engineer.

5.4.1.5 Other Design Considerations

- Wall design should consider the additional surcharge loads from superjacent slopes and/or footings, where appropriate.
- No backfill should be placed against concrete until minimum design strengths are evident by compression tests of cylinders.
- The retaining wall footing excavations, backcuts, and backfill materials should be approved by the project geotechnical engineer or their authorized representative.
- Positive separations should be provided in garden walls at horizontal distances not exceeding 20 feet.

5.5 PRELIMINARY PAVEMENT DESIGN RECOMMENDATIONS

Although planned final grades beneath the street improvements within the site are not yet known, the following preliminary pavement design recommendations are based on Traffic Indexes of 4.5 for non-continuous local streets and 5.5 for continuous local streets as designated by the City of San Bernardino. Preliminary pavement thickness design is based on the CalTrans Highway Design Manual (2018). An R-value of 40 has been assumed for the preliminary design of the project pavement sections. Once the traffic loading information becomes more defined, revision to the pavement design recommendations may be warranted. It is recommended that the final pavement design be based on R-value testing of the as-graded subgrade soils within the pavement areas.

Based on the assumptions noted above the following preliminary pavement recommendations are provided for the site:

PRELIMINARY MINIMUM PAVEMENT SECTION		
Traffic Index	Thickness of Asphalt Concrete (inches)	Thickness of Aggregate Base (inches)
4.5	3.0	4.0
5.5	3.0	5.0

Traffic Indices (TIs) used in the pavement design are designated by the City of San Bernardino and should provide a pavement life of approximately 20 years with a normal amount of flexible pavement maintenance. Irrigation adjacent to pavements, without a deep curb or other cutoff to separate landscaping from the paving may result in premature pavement failure. Traffic parameters used for design were selected based upon engineering judgment and not upon information furnished to us such as an equivalent wheel load analysis or a traffic study.

All base material and the upper 12 inches of subgrade should be compacted to at least 95 percent of the material's maximum dry density as determined by ASTM D 1557 test procedures. All materials and methods of construction should conform to the requirements of the City of San Bernardino.

5.6 CONCRETE CONSTRUCTION

5.6.1 General

Concrete construction should follow the 2019 CBC and ACI guidelines regarding design, mix placement and curing of the concrete. If desired, GeoTek could provide quality control testing of the concrete during construction.

5.6.2 Concrete Mix Design

As discussed in Section 5.3.5, no special recommendations for concrete are required for this project due to soil sulfate exposure. Additional testing should be performed during grading so that specific recommendations can be formulated based on the as-graded conditions.

5.6.3 Concrete Flatwork

Exterior concrete flatwork is often one of the most visible aspects of site development. They are typically given the least level of quality control, being considered "non-structural" components. Cracking of these features is common due to various factors. While cracking usually does not affect the structural performance of the concrete, it is unsightly. It is recommended that the same standards of care be applied to these features as to the structure itself.

Flatwork should consist of a minimum four-inch (actual) thick concrete and the use of temperature and shrinkage control reinforcement is suggested. The project structural engineer should provide final design recommendations.

5.6.4 Concrete Performance

Concrete cracks should be expected. These cracks can vary from sizes that are hairline to more than 1/8 inch in width. Most cracks in concrete while unsightly do not significantly impact long-term performance. While it is possible to take measures (proper concrete mix, placement, curing, control joints, etc.) to reduce the extent and size of cracks that occur, some cracking will occur despite the best efforts to minimize it. Concrete undergoes chemical processes that are dependent on a wide range of variables, which are difficult, at best, to control. Concrete, while seemingly a stable material, is subject to internal expansion and contraction due to external changes over time.

One of the simplest means to control cracking is to provide weakened control joints for cracking to occur along. These do not prevent cracks from developing; they simply provide a relief point for the stresses that develop. These joints are a widely accepted means to control cracks but are not always effective. Control joints are more effective the more closely spaced they are. GeoTek suggests that control joints be placed in two orthogonal directions and located a distance apart approximately equal to 24 to 36 times the slab thickness.

5.7 PLAN REVIEW AND CONSTRUCTION OBSERVATIONS

It is recommended that site grading, specifications, and foundation plans be reviewed by this office prior to construction to check for conformance with the recommendations of this report. It is also recommended that GeoTek representatives be present during site grading and foundation construction to observe and document for proper implementation of the geotechnical recommendations. The owner/developer should have GeoTek perform at least the following duties:

- Observe site clearing and grubbing operations for proper removal of all unsuitable materials.
- Observe and test bottom of removals prior to fill placement.
- Evaluate the suitability of on-site and import materials for fill placement and collect soil samples for laboratory testing where necessary.
- Observe the fill for uniformity during placement, including utility trench excavation backfill. Also, test the fill for density, relative compaction and moisture content.
- Observe and probe foundation excavations to confirm suitability of bearing materials with respect to density.

If requested, a construction observation and compaction report can be provided by GeoTek which can comply with the requirements of the governmental agencies having jurisdiction over the project. It is recommended that these agencies be notified prior to commencement of construction so that necessary grading permits can be obtained.

6. INTENT

It is the intent of this report to aid in the design and construction of the proposed development. Implementation of the advice presented in this report is intended to reduce risk associated with construction projects. The professional opinions and geotechnical advice contained in this report are not intended to imply total performance of the project or guarantee that unusual or variable conditions will not be discovered during or after construction.

The scope of GeoTek's evaluation is limited to the area explored that is shown on the Boring and Infiltration Test Location Map (Figure 2). This evaluation does not and should in no way be construed to encompass any areas beyond the specific area of the proposed construction as indicated to GeoTek by the client. Further, no evaluation of any existing site improvements is included. The scope is based on GeoTek's understanding of the project and the client's needs, GeoTek's proposal (Proposal No. P-0400722-CR) dated April 20, 2022, and geotechnical engineering standards normally used on similar projects in this region.

7. LIMITATIONS

GeoTek's findings are based on site conditions observed and the stated sources. Thus, GeoTek's comments are professional opinions that are limited to the extent of the available data.

GeoTek has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering at this time and location and science professions currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report.

Since GeoTek's recommendations are based on the site conditions observed and encountered at the stated times and laboratory testing. Thus, GeoTek's conclusions and recommendations are professional opinions that are limited to the extent of the available data. Observations during construction are important to allow for any change in recommendations found to be warranted. These opinions have been derived in accordance with current standards of practice and no warranty of any kind is expressed or implied. Standards of care/practice are subject to change with time.

8. SELECTED REFERENCES

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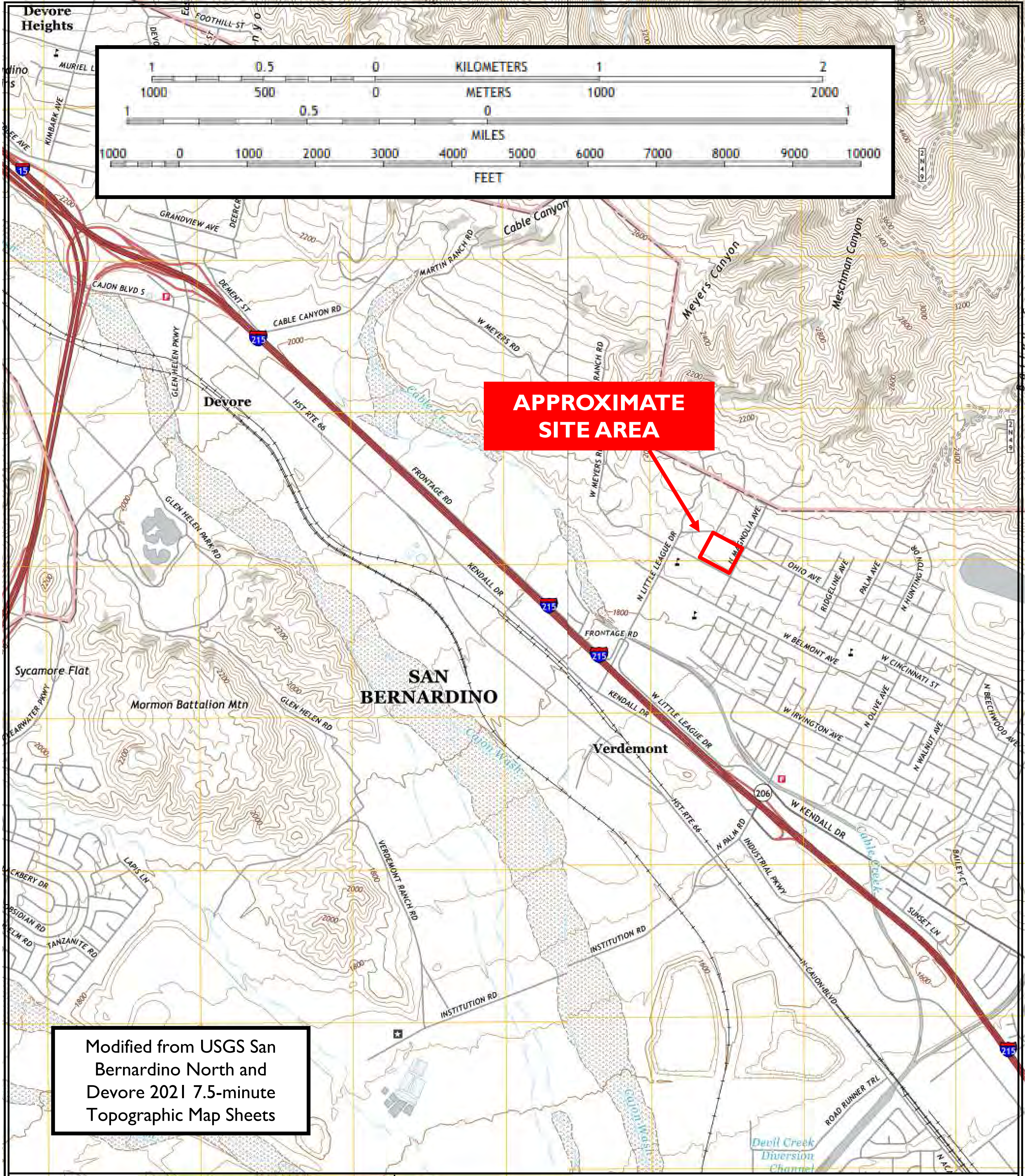

Modified from USGS San Bernardino North and Devore 2021 7.5-minute Topographic Map Sheets

Aurora Builders, Inc.
Tract No. 20539
San Bernardino, San Bernardino County, California

Project No. 3190-CR

NORTH

Figure 1

Site Location Map

GEOTEK

Aurora Builders, LLC
Tract Map No. 20539
San Bernardino, San Bernardino County, California

GeoTek Project No. 3190-CR

Scale As Shown

NORTH

Figure 2

Boring Location Map

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APPENDIX A

LOGS OF EXPLORATORY BORINGS

Proposed Single-Family Residential Development
Tentative Tract No. 20539
San Bernardino, San Bernardino County, California
Project No. 3190-CR

GEOTEK

A - FIELD TESTING AND SAMPLING PROCEDURES

The Modified Split-Barrel Sampler (Ring)

The Ring sampler is driven into the ground at various depths in accordance with ASTM D 3550 test procedures. The sampler, with an external diameter of 3.0 inches, is lined with 1-inch long, thin brass rings with inside diameters of approximately 2.4 inches. The sampler is typically driven into the ground 12 or 18 inches with a 140-pound hammer free falling from a height of 30 inches. Blow counts are recorded for every 6 inches of penetration as indicated on the log of boring. The samples are removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

The Standard Penetration Test (SPT) Sampler

Standard penetration tests (SPT) were performed with a 2.0-inch outside diameter, 1.5-inch inside diameter, split-barrel sampler. The sampler was 18 inches long. The inside diameter of the sampler shoe was 1.4 inches. The sampler was unlined. The sampler conformed to the requirements of ASTM D 1586. A 140-pound automatic trip hammer was utilized, dropping 30 inches for each blow. Blow counts are recorded for every 6 inches of penetration as indicated on the log of boring. Disturbed samples are removed from the sample barrel, sealed in a plastic bag, and transported to the laboratory for testing.

Bulk Samples (Large) -

These samples are normally large bags of earth materials over 20 pounds in weight collected from the - field by means of hand digging or exploratory cuttings. -

Bulk Samples (Small) -

These are plastic bag samples which are normally airtight and contain less than 5 pounds in weight of - earth materials collected from the field by means of hand digging or exploratory cuttings. These - samples are primarily used for determining natural moisture content and classification indices. -

B - BORING LOG LEGEND

The following abbreviations and symbols often appear in the classification and description of soil and rock on the log of borings:

SOILS	
USCS	Unified Soil Classification System
f-c	Fine to coarse
f-m	Fine to medium
GEOLOGIC	
B: Attitudes	Bedding: strike/dip
J: Attitudes	Joint: strike/dip
C: Contact line	
……….. -	Dashed line denotes USCS material change
———	Solid Line denotes unit / formational change
———	Thick solid line denotes end of boring

(Additional denotations and symbols are provided on the boring logs)

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Aurora Builders LLC	**DRILLER:**	2R Drilling	**LOGGED BY:**	C. Diaz
PROJECT NAME:	Tract No. 20539	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jerry
PROJECT NO.:	3190-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	San Bernardino, CA			**DATE:**	5/5/2022

Boring No.: B-1

Depth (ft)	SAMPLES			USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
0	☒				**Alluvium:**			
	■	16 21 24	R1	SM	Silty f-m SAND, orange-brown, slightly moist, dense	4.7	122.7	
5	■	8 18 23	R2	SM-SP	Silty f-m SAND to f-m SAND, brown, slightly moist, medium dense	7.3	119.6	
	■	6 8 9	R3	SM	Silty f-m SAND, orange-brown, slightly moist, medium dense	9.8	113.6	
10	■	10 17 50	R4		Silty f-c SAND, orange-brown, slightly moist, very dense			
15	■	13 26 30	R5			8.6	117.7	
	■	16 18 27	R6		Silty f-m SAND, brown, slightly moist, medium dense			
20								
	■	18 24 33	R7	SM/SC	Silty/Clayey f-m SAND, orange-brown, slightly moist, dense	15.2	119.6	
25	▮	14 18 21	S1	SM	Silty f-c SAND, orange-brown, slightly moist, dense	10.2		
30	▮	11 17 22	S2					

LEGEND

Sample type: ■ ---Ring ▮ ---SPT ⧄ ---Small Bulk ☒ ---Large Bulk ☐ ---No Recovery ▽ ---Water Table

Lab testing:

AL = Atterberg Limits
EI = Expansion Index
SA = Sieve Analysis
RV = R-Value Test
SR = Sulfate/Resisitivity Test
SH = Shear Test
HC= Consolidation
MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT: Aurora Builders LLC
PROJECT NAME: Tract No. 20539
PROJECT NO.: 3190-CR
LOCATION: San Bernardino, CA
DRILLER: 2R Drilling
DRILL METHOD: Hollow Stem
HAMMER: 140#/30"
LOGGED BY: C. Diaz
OPERATOR: Jerry
RIG TYPE: CME 75
DATE: 5/5/2022

Depth (ft)	SAMPLES Sample Type	 Blows/ 6 in	 Sample Number	USCS Symbol	**Boring No.: B-1 (continued)** **MATERIAL DESCRIPTION AND COMMENTS**	Laboratory Testing Water Content (%)	 Dry Density (pcf)	 Others
35	▮	12 22 28	S3	SP	F-c SAND, slight silt, yellow-brown, slightly moist, dense	5.8		
40	▮	14 22 38	S4	SM	Silty f-c SAND, yellow-brown, slightly moist, very dense			
45	▮	16 24 27	S5			6.7		
50	▮	16 28 36			trace clay			
					BORING TERMINATED AT 51.5 FEET No groundwater encountered Boring backfilled with soil cuttings			

LEGEND

Sample type: ■ ---Ring ▮ ---SPT ◩ ---Small Bulk ☒ ---Large Bulk ☐ ---No Recovery ▽ ---Water Table

Lab testing:
AL = Atterberg Limits
EI = Expansion Index
SA = Sieve Analysis
RV = R-Value Test
SR = Sulfate/Resisitivity Test
SH = Shear Test
HC= Consolidation
MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY BORING

CLIENT:	Aurora Builders LLC	**DRILLER:**	2R Drilling	**LOGGED BY:**	C. Diaz
PROJECT NAME:	Tract No. 20539	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jerry
PROJECT NO.:	3190-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	San Bernardino, CA			**DATE:**	5/5/2022

Boring No.: B-2

Depth (ft)	SAMPLES Sample Type	Blows/ 6 in	Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing Water Content (%)	Dry Density (pcf)	Others
0					**Alluvium:**			
	▨	9 11 15	R1	SM	Silty f-m SAND, orange-brown, slightly moist, medium dense	6.7	123.9	
5	▨	6 8 10	R2	SM/SC	Silty/Clayey f-m SAND, orange-brown, slightly moist, medium dense	6.0	114.3	Collapse
	▨	7 8 12	R3	SM	Silty f-m SAND, orange-brown, slightly moist, medium dense	8.8	116.8	
10	▨	5 14 20	R4			9.2	118.5	
15		50/4	R5					
					BORING TERMINATED AT 15.5 FEET No groundwater encountered, refusal at 15.5 feet Boring backfilled with soil cuttings			
20								
25								
30								

LEGEND

Sample type: ▨ ---Ring ▨ ---SPT ⧄ ---Small Bulk ☒ ---Large Bulk ☐ ---No Recovery ⊻ ---Water Table

Lab testing:
AL = Atterberg Limits
EI = Expansion Index
SA = Sieve Analysis
RV = R-Value Test
SR = Sulfate/Resisitivity Test
SH = Shear Test
HC= Consolidation
MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY BORING

CLIENT:	Aurora Builders LLC	**DRILLER:**	2R Drilling	**LOGGED BY:**	C. Diaz
PROJECT NAME:	Tract No. 20539	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jerry
PROJECT NO.:	3190-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	San Bernardino, CA			**DATE:**	5/5/2022

Boring No.: B-3

Depth (ft)	SAMPLES Sample Type	Blows/ 6 in	Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing Water Content (%)	Dry Density (pcf)	Others
0	☒				**Alluvium:**			
	☒ ▨	16 19 13	R1	SM	Silty f-m SAND, orange-brown, slightly moist, medium dense, minor pinhole porosity	4.8	112.0	MD, EI, SH
5	☒ ▨	5 8 9	R2		Silty f-m SAND, orange-brown, slightly moist, medium dense	8.5	121.7	
	▨	2 7 13	R3			11.2	124.0	
10	▨	10 17 28	R4	SM/SC	Silty/Clayey f-c SAND, yellow-brown, slightly moist, medium dense	4.8	131.3	
15	▨	36 50/4	R5	SP	F-c SAND, yellow-brown, slightly moist, very dense, trace gravel			
	▨	17 26 33	R6	SM	Silty f-m SAND, brown, slightly moist, dense	9.3	128.5	
20					**BORING TERMINATED AT 19.5 FEET** No groundwater encountered Boring backfilled with soil cuttings			
25								
30								

LEGEND

Sample type: ▨ ---Ring ▨ ---SPT ◩ ---Small Bulk ☒ ---Large Bulk ☐ ---No Recovery ⊻ ---Water Table

Lab testing:

AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test
SR = Sulfate/Resisitivity Test	SH = Shear Test	HC= Consolidation	MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Aurora Builders LLC	**DRILLER:**	2R Drilling	**LOGGED BY:**	C. Diaz
PROJECT NAME:	Tract No. 20539	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jerry
PROJECT NO.:	3190-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	San Bernardino, CA			**DATE:**	5/5/2022

	SAMPLES				**Boring No.: B-4**	Laboratory Testing		
Depth (ft)	Sample Type	Blows/ 6 in	Sample Number	USCS Symbol	**MATERIAL DESCRIPTION AND COMMENTS**	Water Content (%)	Dry Density (pcf)	Others
0					**Alluvium:**			
	■	13 18 20	R1	SM	Silty f-m SAND, orange-brown, slightly moist, medium dense	5.3	112.3	
5	■	20 25 30	R2		Silty f-c SAND, brown, slightly moist, dense, trace gravel	7.3	110.3	
	■	15 17 19	R3			4.9	114.5	Collapse
10	■	9 15 16	R4	SP	F-c SAND, trace silt, yellow-brown, slightly moist, medium dense			
15	■	9 11 19	R5	SM/SC	Silty/Clayey f-c SAND, brown, moist, medium dense	17.6	113.3	
20	■	25 41 50/5		SM	Silty f-c SAND, brown, slightly moist, very dense			
					BORING TERMINATED AT 21.5 FEET No groundwater encountered Boring backfilled with soil cuttings			
25								
30								

LEGEND

Sample type: ■ ---Ring ▮ ---SPT ⧄ ---Small Bulk ☒ ---Large Bulk ☐ ---No Recovery ⊻ ---Water Table

Lab testing:

AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test
SR = Sulfate/Resisitivity Test	SH = Shear Test	HC= Consolidation	MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Aurora Builders LLC	**DRILLER:**	2R Drilling	**LOGGED BY:**	C. Diaz
PROJECT NAME:	Tract No. 20539	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jerry
PROJECT NO.:	3190-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	San Bernardino, CA			**DATE:**	5/5/2022

Boring No.: B-5

Depth (ft)	SAMPLES Sample Type	Blows/ 6 in	Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing Water Content (%)	Dry Density (pcf)	Others
0	☒				**Alluvium:**			
	▨	10 18 26	R1	SM	Silty f-m SAND, orange-brown, slightly moist, medium dense	4.8	110.2	SR
	▨	50/3	R2		Very dense			
5								
	▨	15 20 24	R3		Silty f-c SAND, orange-brown, slightly moist, medium dense	4.7	122.4	
	▨	18 50/5	R4	SP	F-c SAND, orange-brown, slightly moist, very dense			
10								
	▨	18 33 50	R5	SM	Silty f-m SAND, orange-brown, slightly moist, very dense	6.4	115.4	
15								
	▨	18 50/5	R6					
20					**BORING TERMINATED AT 19 FEET** No groundwater encountered Boring backfilled with soil cuttings			
25								
30								

LEGEND

Sample type: ▨ ---Ring ▮ ---SPT ⧄ ---Small Bulk ☒ ---Large Bulk ☐ ---No Recovery ▽ ---Water Table

Lab testing:

AL = Atterberg Limits
EI = Expansion Index
SA = Sieve Analysis
RV = R-Value Test
SR = Sulfate/Resisitivity Test
SH = Shear Test
HC= Consolidation
MD = Maximum Density

APPENDIX B

LABORATORY TEST RESULTS

Proposed Single-Family Residential Development
Tentative Tract No. 20539
San Bernardino, San Bernardino County, California
Project No. 3190-CR

GEOTEK

SUMMARY OF LABORATORY TESTING

Classification

Soils were classified visually in general accordance with the Unified Soil Classification System (ASTM Test Method D 2487). The soil classifications are shown on the logs of borings in Appendix A.

Collapse Test

Collapse tests were performed on selected samples of the site soils in general accordance with ASTM D 5333 test procedures. The results of this test are presented graphically in Appendix B.

Direct Shear

Shear testing was performed in a direct shear machine of the strain-control type in general accordance with ASTM D 3080 test procedures. The rate of deformation was approximately 0.035 inch per minute. The sample was sheared under varying confining loads in order to determine the coulomb shear strength parameters, angle of internal friction and cohesion. The tests were performed on soil samples remolded to approximately 90 percent of maximum dry density as determined by ASTM D 1557 test procedures. The shear test results are presented graphically in Appendix B.

Expansion Index

Expansion Index testing was performed one (1) soil sample obtained from the field exploration. Testing was performed in general accordance with ASTM D 4829 test procedures. The results of the testing are provided below and in Appendix B.

Boring No.	Depth (ft.)	Description	Expansion Index	Classification
B-3	0-5	Silty Sand (SM)	0	Very Low

In-Situ Moisture and Density

The natural water content of sampled soils was determined in general accordance with ASTM D 2216 test procedures on samples of the materials recovered from the subsurface exploration. In addition, in-place dry density of the sampled soils was determined in general accordance with ASTM D 2937 test procedures on relatively undisturbed samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the boring logs at the appropriate sample depths in Appendix A.

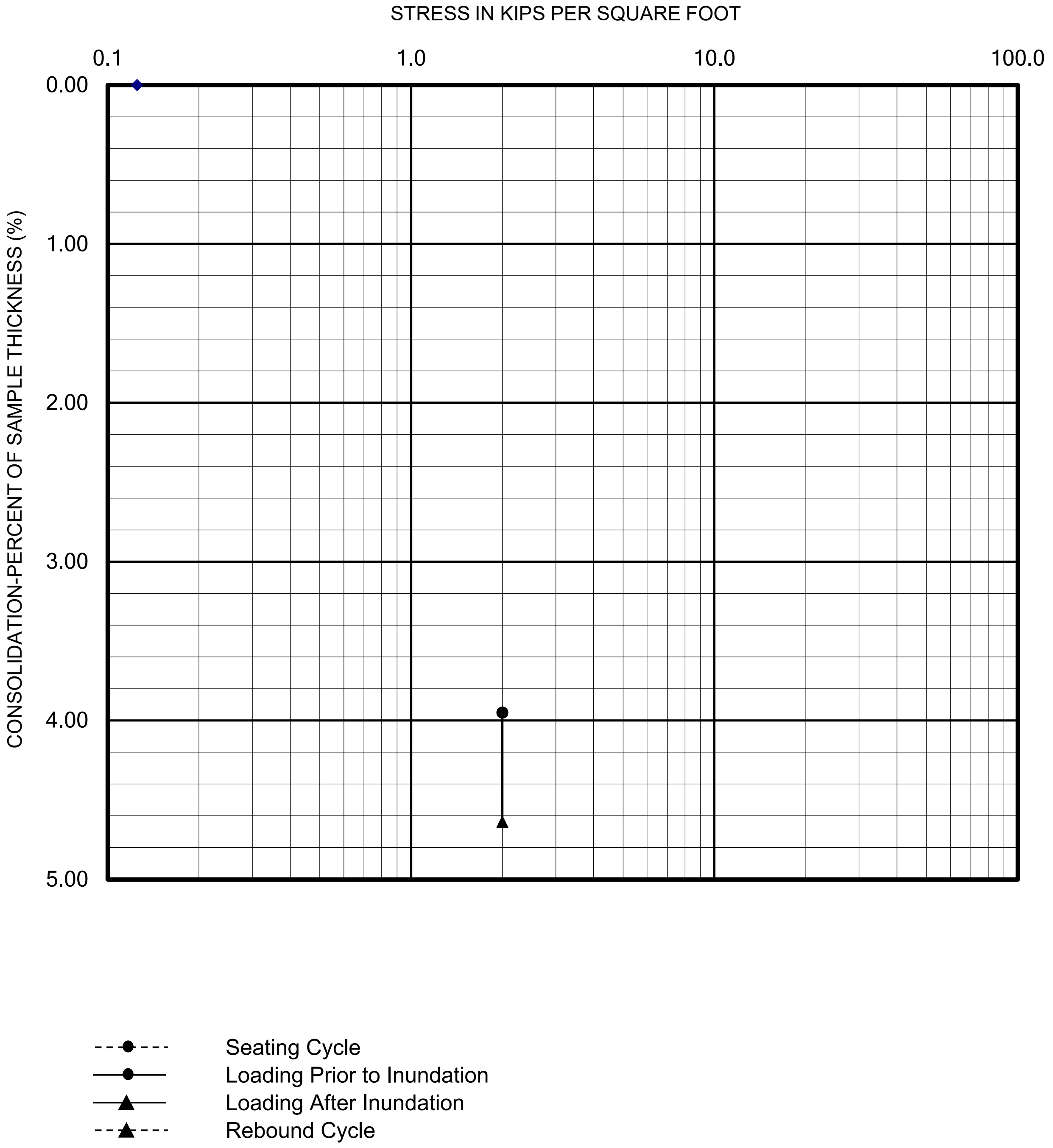
Moisture-Density Relationship

Laboratory testing was performed on one (1) sample collected during the subsurface exploration. The laboratory maximum dry density and optimum moisture content for the soil was determined in general accordance with ASTM D 1557 test procedures. The results are presented graphically in Appendix B.

Sulfate Content, Resistivity and Chloride Content

Testing to determine the water-soluble sulfate content was performed in general accordance with ASTM D4327 test procedures. Resistivity testing was completed in general accordance with ASTM G187 test procedures. Testing to determine the chloride content was performed in general accordance with ASTM D4327 test procedures. The results of the testing are provided below and in Appendix B.

Boring #	Depth (ft.)	pH ASTM D4972	Chloride ASTM D4327 (mg/kg)	Sulfate ASTM D4327 (% by weight)	Resistivity ASTM G187 (ohm-cm)
B-5	0-5	7.9	53.2	0.0089	37,520



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

GEOTEK

CHECKED BY: DA

Lab: Corona

PROJECT NO.: 3190-CR

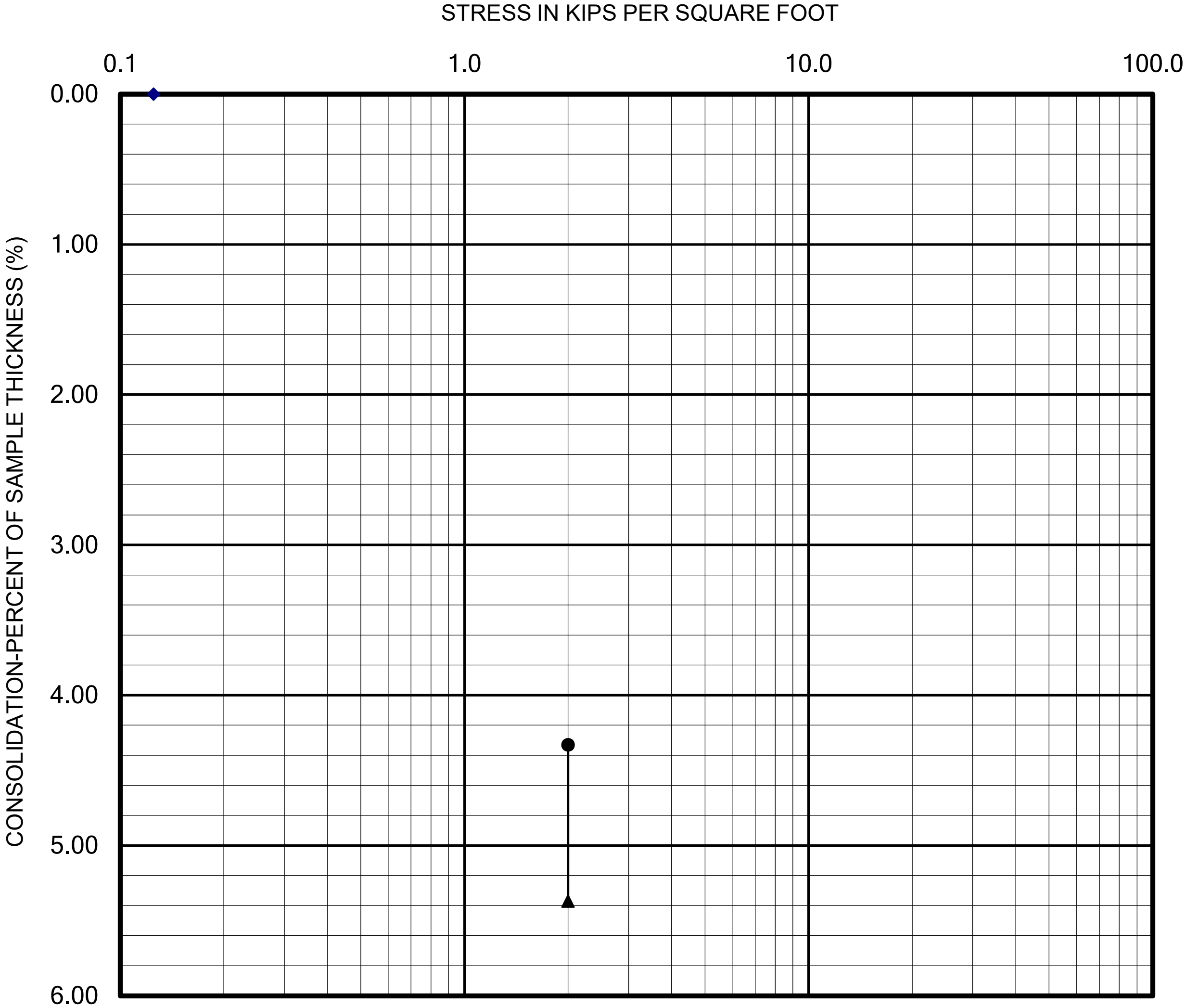
Date: 5/12/2022

COLLAPSE REPORT

Sample: B-2 @ 5 feet

Tract No. 20539
San Bernardino, California

Plate B-1



- - -●- - - Seating Cycle
—●— Loading Prior to Inundation
—▲— Loading After Inundation
- - -▲- - - Rebound Cycle

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

GEOTEK

CHECKED BY: DA	Lab: Corona
PROJECT NO.: 3190-CR	Date: 5/12/2022

COLLAPSE REPORT

Sample: B-4 @ 7 feet

Tract No. 20539
San Bernardino, California

Plate B-2

GEOTEK

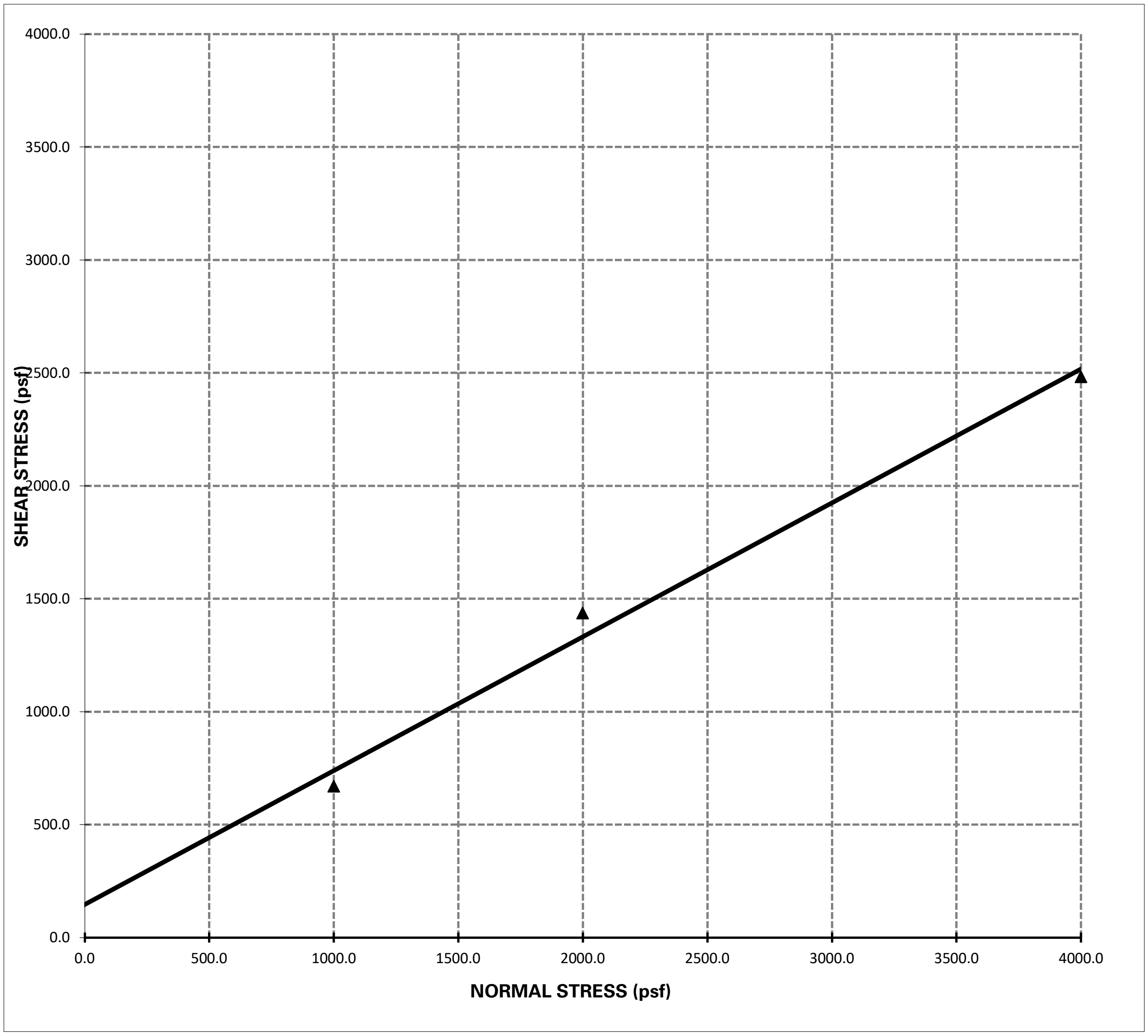
DIRECT SHEAR TEST

Project Name: Tentative Tract Map 20539

Project Number: 3190-CR

Sample Location: B-3 @ 0-5 feet

Date Tested: 5/19/2022



Shear Strength: Φ = 31 ° C = 146 psf

Notes: 1 - The soil specimen used in the shear box was a ring sample remolded to approximately 90% relative compaction from a bulk sample collected during the field investigation.

2 - The above reflect direct shear strength at saturated conditions.

3 - The tests were run at a shear rate of 0.035 in/min.

GEOTEK

EXPANSION INDEX TEST

(ASTM D4829)

Client:	Aurora Builders, LLC	***Tested/ Checked By:***	KG Lab No Corona
Project Number:	3190-CR	***Date Tested:***	5/19/2022
Project Location:	Tentative Tract Map No. 20539	***Sample Source:***	B-3 @ 0-5 feet
		Sample Description:	

Ring #:______ Ring Dia. : 4.01" Ring Ht.:1"

DENSITY DETERMINATION

Weight of compacted sample & ring (gm)	781.9
Weight of ring (gm)	369.7
Net weight of sample (gm)	**412.2**
Wet Density, lb / ft3 (C*0.3016)	**124.3**
Dry Density, lb / ft3 (D/1.F)	**114.1**

SATURATION DETERMINATION

Moisture Content, %	9.0
Specific Gravity, assumed	**2.70**
Unit Wt. of Water @ 20 °C, (pcf)	**62.4**
% Saturation	**50.9**

READINGS			
DATE	TIME	READING	
5/19/2022		0.4050	Initial
5/19/2022		0.4030	10 min/Dry
5/20/2022		0.4030	Final

FINAL MOISTURE	
Final Weight of wet sample & tare	% Moisture
789.4	**10.8**

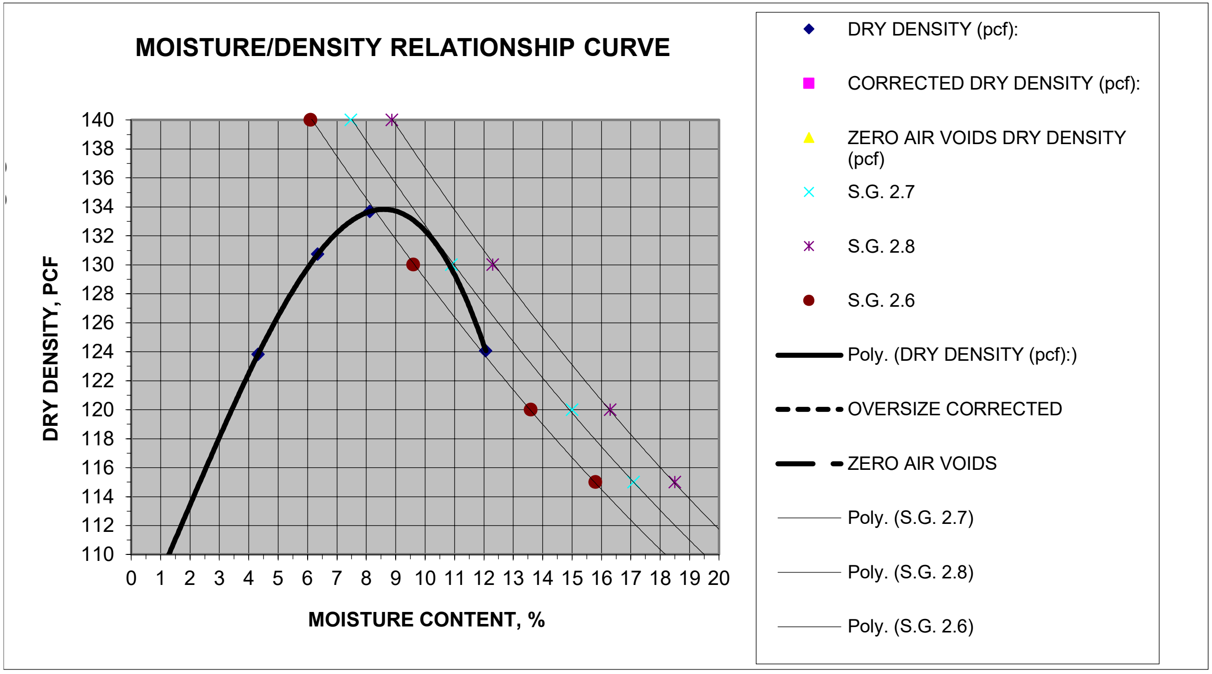
EXPANSION INDEX = 0

GEOTEK

MOISTURE/DENSITY RELATIONSHIP

Client: Aurora Builders LLC
Job No.: 3190-CR
Project: Tentative Tract Map No. 20539
Lab No.: Corona
Location: San Bernardino
Material Type: Brown fine to coarse sand with few silt
Material Supplier: -
Material Source: -
Sample Location: B-3 @ 0-5 feet
-
Sampled By: CD
Date Sampled: -
Received By: MP
Date Received: 5/5/2022
Tested By: MP
Date Tested: 5/17/2022
Reviewed By: DA
Date Reviewed: 5/20/2022

Test Procedure: ASTM D1557
Method: A
Oversized Material (%): 8.7
Correction Required: ☐ **yes** ☐ **no**



MOISTURE DENSITY RELATIONSHIP VALUES

Maximum Dry Density, pcf 134.0 **@ Optimum Moisture, %** 8.5
Corrected Maximum Dry Density, pcf **@ Optimum Moisture, %**

MATERIAL DESCRIPTION

Grain Size Distribution:
% Gravel (retained on No. 4)
% Sand (Passing No. 4, Retained on No. 200)
% Silt and Clay (Passing No. 200)

Atterberg Limits:
Liquid Limit, %
Plastic Limit, %
Plasticity Index, %

Classification:
Unified Soils Classification:
AASHTO Soils Classification:

Project X
Corrosion Engineering
Corrosion Control – Soil, Water, Metallurgy Testing Lab

Results Only Soil Testing for Tentative Tract Map No. 20539

May 13, 2022

Prepared for:
Anna Scott
GeoTek, Inc.
1548 North Maple Street
Corona, CA 92280
ascott@geotekusa.com

Project X Job#: S220511F
Client Job or PO#: 3190-CR Aurora Builders LLC

Respectfully Submitted,

Eduardo Hernandez, M.Sc., P.E.
Sr. Corrosion Consultant
NACE Corrosion Technologist #16592
Professional Engineer
California No. M37102
ehernandez@projectxcorrosion.com

No. M37102

Soil Analysis Lab Results

Client: GeoTek, Inc.
Job Name: Tentative Tract Map No. 20539
Client Job Number: 3190-CR Aurora Builders LLC
Project X Job Number: S220511F
May 13, 2022

	Method	ASTM D4327		ASTM D4327		ASTM G187		ASTM G51	ASTM G200	SM 4500-D	ASTM D4327	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D4327	ASTM D4327
Bore# / Description	**Depth**	**Sulfates**		**Chlorides**		**Resistivity**		**pH**	**Redox**	**Sulfide**	**Nitrate**	**Ammonium**	**Lithium**	**Sodium**	**Potassium**	**Magnesium**	**Calcium**	**Fluoride**	**Phosphate**
		SO_4^{2-}		Cl^-		**As Rec'd**	**Minimum**			S^{2-}	NO_3^-	NH_4^+	Li^+	Na^+	K^+	Mg^{2+}	Ca^{2+}	F_2^{--}	PO_4^{3-}
	(ft)	**(mg/kg)**	**(wt%)**	**(mg/kg)**	**(wt%)**	**(Ohm-cm)**	**(Ohm-cm)**		**(mV)**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**
B5	0-5	89.4	0.0089	53.2	0.0053	234,500	37,520	7.9	124	1.44	3.2	15.2	NT.	NT.	NT.	NT.	NT.	1.2	4.6

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography
mg/kg = milligrams per kilogram (parts per million) of dry soil weight
ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown
Chemical Analysis performed on 1:3 Soil-To-Water extract
PPM = mg/kg (soil) = mg/L (Liquid)

APPENDIX C

GENERAL EARTHWORK GRADING GUIDELINES

Proposed Single-Family Residential Development
Tentative Tract No. 20539
San Bernardino, San Bernardino County, California
Project No. 3190-CR

GENERAL GRADING GUIDELINES

Guidelines presented herein are intended to address general construction procedures for earthwork construction. Specific situations and conditions often arise which cannot reasonably be discussed in general guidelines, when anticipated these are discussed in the text of the report. Often unanticipated conditions are encountered which may necessitate modification or changes to these guidelines. It is our hope that these will assist the contractor to more efficiently complete the project by providing a reasonable understanding of the procedures that would be expected during earthwork and the testing and observation used to evaluate those procedures.

General

Grading should be performed to at least the minimum requirements of governing agencies, Chapters 18 and 33 of the Uniform Building Code, CBC (2019) and the guidelines presented below.

Preconstruction Meeting

A preconstruction meeting should be held prior to site earthwork. Any questions the contractor has regarding our recommendations, general site conditions, apparent discrepancies between reported and actual conditions and/or differences in procedures the contractor intends to use should be brought up at that meeting. The contractor (including the main onsite representative) should review our report and these guidelines in advance of the meeting. Any comments the contractor may have regarding these guidelines should be brought up at that meeting.

Grading Observation and Testing

1. Observation of the fill placement should be provided by our representative during grading. Verbal communication during the course of each day will be used to inform the contractor of test results. The contractor should receive a copy of the "Daily Field Report" indicating results of field density tests that day. If our representative does not provide the contractor with these reports, our office should be notified.
2. Testing and observation procedures are, by their nature, specific to the work or area observed and location of the tests taken, variability may occur in other locations. The contractor is responsible for the uniformity of the grading operations; our observations and test results are intended to evaluate the contractor's overall level of efforts during grading. The contractor's personnel are the only individuals participating in all aspect of site work. Compaction testing and observation should not be considered as relieving the contractor's responsibility to properly compact the fill.
3. Cleanouts, processed ground to receive fill, key excavations, and subdrains should be observed by our representative prior to placing any fill. It will be the contractor's responsibility to notify our representative or office when such areas are ready for observation.

4. Density tests may be made on the surface material to receive fill, as considered warranted by this firm.
5. In general, density tests would be made at maximum intervals of two feet of fill height or every 1,000 cubic yards of fill placed. Criteria will vary depending on soil conditions and size of the fill. More frequent testing may be performed. In any case, an adequate number of field density tests should be made to evaluate the required compaction and moisture content is generally being obtained.
6. Laboratory testing to support field test procedures will be performed, as considered warranted, based on conditions encountered (e.g. change of material sources, types, etc.) Every effort will be made to process samples in the laboratory as quickly as possible and in progress construction projects are our first priority. However, laboratory workloads may cause in delays and some soils may require a **minimum of 48 to 72 hours to complete test procedures**. Whenever possible, our representative(s) should be informed in advance of operational changes that might result in different source areas for materials.
7. Procedures for testing of fill slopes are as follows:
    a) Density tests should be taken periodically during grading on the flat surface of the fill, three to five feet horizontally from the face of the slope.
    b) If a method other than over building and cutting back to the compacted core is to be employed, slope compaction testing during construction should include testing the outer six inches to three feet in the slope face to determine if the required compaction is being achieved.
8. Finish grade testing of slopes and pad surfaces should be performed after construction is complete.

Site Clearing

1. All vegetation, and other deleterious materials, should be removed from the site. If material is not immediately removed from the site it should be stockpiled in a designated area(s) well outside of all current work areas and delineated with flagging or other means. Site clearing should be performed in advance of any grading in a specific area.
2. Efforts should be made by the contractor to remove all organic or other deleterious material from the fill, as even the most diligent efforts may result in the incorporation of some materials. This is especially important when grading is occurring near the natural grade. All equipment operators should be aware of these efforts. Laborers may be required as root pickers.
3. Nonorganic debris or concrete may be placed in deeper fill areas provided the procedures used are observed and found acceptable by our representative.

Treatment of Existing Ground

1. Following site clearing, all surficial deposits of alluvium and colluvium as well as weathered or creep effected bedrock, should be removed unless otherwise specifically indicated in the text of this report.
2. In some cases, removal may be recommended to a specified depth (e.g. flat sites where partial alluvial removals may be sufficient). The contractor should not exceed these depths unless directed otherwise by our representative.
3. Groundwater existing in alluvial areas may make excavation difficult. Deeper removals than indicated in the text of the report may be necessary due to saturation during winter months.
4. Subsequent to removals, the natural ground should be processed to a depth of six inches, moistened to near optimum moisture conditions and compacted to fill standards.
5. Exploratory back hoe or dozer trenches still remaining after site removal should be excavated and filled with compacted fill if they can be located.

Fill Placement

1. Unless otherwise indicated, all site soil and bedrock may be reused for compacted fill; however, some special processing or handling may be required (see text of report).
2. Material used in the compacting process should be evenly spread, moisture conditioned, processed, and compacted in thin lifts six (6) to eight (8) inches in compacted thickness to obtain a uniformly dense layer. The fill should be placed and compacted on a nearly horizontal plane, unless otherwise found acceptable by our representative.
3. If the moisture content or relative density varies from that recommended by this firm, the contractor should rework the fill until it is in accordance with the following:
    a) Moisture content of the fill should be at or above optimum moisture. Moisture should be evenly distributed without wet and dry pockets. Pre-watering of cut or removal areas should be considered in addition to watering during fill placement, particularly in clay or dry surficial soils. The ability of the contractor to obtain the proper moisture content will control production rates.
    b) Each six-inch layer should be compacted to at least 90 percent of the maximum dry density in compliance with the testing method specified by the controlling governmental agency. In most cases, the testing method is ASTM Test Designation D 1557.
4. Rock fragments less than eight inches in diameter may be utilized in the fill, provided:
    a) They are not placed in concentrated pockets;
    b) There is a sufficient percentage of fine-grained material to surround the rocks;
    c) The distribution of the rocks is observed by, and acceptable to, our representative.

5. Rocks exceeding eight (8) inches in diameter should be taken off site, broken into smaller fragments, or placed in accordance with recommendations of this firm in areas designated suitable for rock disposal. On projects where significant large quantities of oversized materials are anticipated, alternate guidelines for placement may be included. If significant oversize materials are encountered during construction, these guidelines should be requested.
6. In clay soil, dry or large chunks or blocks are common. If in excess of eight (8) inches minimum dimension, then they are considered as oversized. Sheepsfoot compactors or other suitable methods should be used to break up blocks. When dry, they should be moisture conditioned to provide a uniform condition with the surrounding fill.

Slope Construction

1. The contractor should obtain a minimum relative compaction of 90 percent out to the finished slope face of fill slopes. This may be achieved by either overbuilding the slope and cutting back to the compacted core, or by direct compaction of the slope face with suitable equipment.
2. Slopes trimmed to the compacted core should be overbuilt by at least three (3) feet with compaction efforts out to the edge of the false slope. Failure to properly compact the outer edge results in trimming not exposing the compacted core and additional compaction after trimming may be necessary.
3. If fill slopes are built "at grade" using direct compaction methods, then the slope construction should be performed so that a constant gradient is maintained throughout construction. Soil should not be "spilled" over the slope face nor should slopes be "pushed out" to obtain grades. Compaction equipment should compact each lift along the immediate top of slope. Slopes should be back rolled or otherwise compacted at approximately every 4 feet vertically as the slope is built.
4. Corners and bends in slopes should have special attention during construction as these are the most difficult areas to obtain proper compaction.
5. Cut slopes should be cut to the finished surface. Excessive undercutting and smoothing of the face with fill may necessitate stabilization.

UTILITY TRENCH CONSTRUCTION AND BACKFILL

Utility trench excavation and backfill is the contractors responsibility. The geotechnical consultant typically provides periodic observation and testing of these operations. While efforts are made to make sufficient observations and tests to verify that the contractors' methods and procedures are adequate to achieve proper compaction, it is typically impractical to observe all backfill procedures. As such, it is critical that the contractor use consistent backfill procedures.

Compaction methods vary for trench compaction and experience indicates many methods can be successful. However, procedures that "worked" on previous projects may or may not prove effective on a given site. The contractor(s) should outline the procedures proposed, so that we may discuss them **prior** to construction. We will offer comments based on our knowledge of site conditions and experience.

1. Utility trench backfill in slopes, structural areas, in streets and beneath flat work or hardscape should be brought to at least optimum moisture and compacted to at least 90 percent of the laboratory standard. Soil should be moisture conditioned prior to placing in the trench.
2. Flooding and jetting are not typically recommended or acceptable for native soils. Flooding or jetting may be used with select sand having a Sand Equivalent (SE) of 30 or higher. This is typically limited to the following uses:
    a) shallow (12 + inches) under slab interior trenches and,
    b) as bedding in pipe zone.

    The water should be allowed to dissipate prior to pouring slabs or completing trench compaction.
3. Care should be taken not to place soils at high moisture content within the upper three feet of the trench backfill in street areas, as overly wet soils may impact subgrade preparation. Moisture may be reduced to 2% below optimum moisture in areas to be paved within the upper three feet below sub grade.
4. Sand backfill should not be allowed in exterior trenches adjacent to and within an area extending below a 1:1 projection from the outside bottom edge of a footing, unless it is similar to the surrounding soil.
5. Trench compaction testing is generally at the discretion of the geotechnical consultant. Testing frequency will be based on trench depth and the contractors procedures. A probing rod would be used to assess the consistency of compaction between tested areas and untested areas. If zones are found that are considered less compact than other areas, this would be brought to the contractors attention.

JOB SAFETY

General

Personnel safety is a primary concern on all job sites. The following summaries are safety considerations for use by all our employees on multi-employer construction sites. On ground personnel are at highest risk of injury and possible fatality on grading construction projects. The company recognizes that construction activities will vary on each site and that job site safety is the contractor's responsibility. However, it is, imperative that all personnel be safety conscious to avoid accidents and potential injury.

In an effort to minimize risks associated with geotechnical testing and observation, the following precautions are to be implemented for the safety of our field personnel on grading and construction projects.

1. Safety Meetings: Our field personnel are directed to attend the contractor's regularly scheduled safety meetings.
2. Safety Vests: Safety vests are provided for and are to be worn by our personnel while on the job site.
3. Safety Flags: Safety flags are provided to our field technicians; one is to be affixed to the vehicle when on site, the other is to be placed atop the spoil pile on all test pits.

In the event that the contractor's representative observes any of our personnel not following the above, we request that it be brought to the attention of our office.

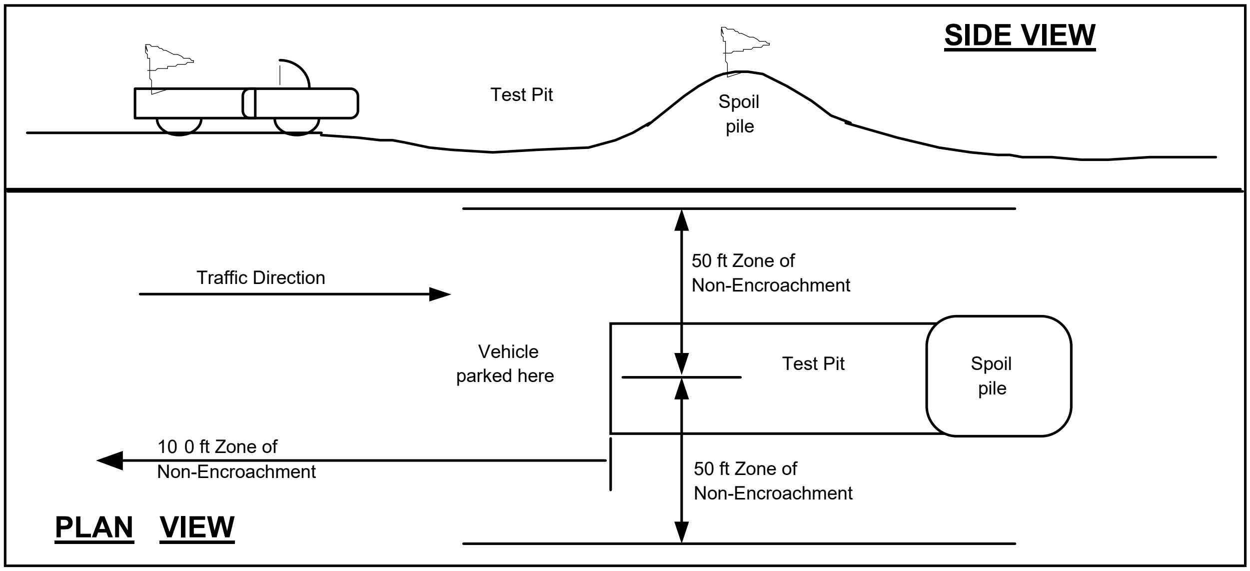
Test Pits Location, Orientation and Clearance

The technician is responsible for selecting test pit locations. The primary concern is the technician's safety. However, it is necessary to take sufficient tests at various locations to obtain a representative sampling of the fill. As such, efforts will be made to coordinate locations with the grading contractors authorized representatives (e.g. dump man, operator, supervisor, grade checker, etc.), and to select locations following or behind the established traffic pattern, preferably outside of current traffic. The contractors authorized representative should direct excavation of the pit and safety during the test period. Again, safety is the paramount concern.

Test pits should be excavated so that the spoil pile is placed away from oncoming traffic. The technician's vehicle is to be placed next to the test pit, opposite the spoil pile. This necessitates that the fill be maintained in a drivable condition. Alternatively, the contractor may opt to park a piece of equipment in front of test pits, particularly in small fill areas or those with limited access.

A zone of non-encroachment should be established for all test pits (see diagram below). No grading equipment should enter this zone during the test procedure. The zone should extend outward to the sides approximately 50 feet from the center of the test pit and 100 feet in the direction of traffic flow. This zone is established both for safety and to avoid excessive ground vibration, which typically decreases test results.

TEST PIT SAFETY PLAN



Slope Tests

When taking slope tests, the technician should park their vehicle directly above or below the test location on the slope. The contractor's representative should effectively keep all equipment at a safe operation distance (e.g. 50 feet) away from the slope during testing.

The technician is directed to withdraw from the active portion of the fill as soon as possible following testing. The technician's vehicle should be parked at the perimeter of the fill in a highly visible location.

Trench Safety

It is the contractor's responsibility to provide safe access into trenches where compaction testing is needed. Trenches for all utilities should be excavated in accordance with CAL-OSHA and any other applicable safety standards. Safe conditions will be required to enable compaction testing of the trench backfill.

All utility trench excavations in excess of 5 feet deep, which a person enters, are to be shored or laid back. Trench access should be provided in accordance with OSHA standards. Our personnel are directed not to enter any trench by being lowered or "riding down" on the equipment.

Our personnel are directed not to enter any excavation which;

1. is 5 feet or deeper unless shored or laid back,
2. exit points or ladders are not provided,
3. displays any evidence of instability, has any loose rock or other debris which could fall into the trench, or

4. displays any other evidence of any unsafe conditions regardless of depth.

If the contractor fails to provide safe access to trenches for compaction testing, our company policy requires that the soil technician withdraws and notifies their supervisor. The contractors representative will then be contacted in an effort to effect a solution. All backfill not tested due to safety concerns or other reasons is subject to reprocessing and/or removal.

Procedures

In the event that the technician's safety is jeopardized or compromised as a result of the contractor's failure to comply with any of the above, the technician is directed to inform both the developer's and contractor's representatives. If the condition is not rectified, the technician is required, by company policy, to immediately withdraw and notify their supervisor. The contractor’s representative will then be contacted in an effort to effect a solution. No further testing will be performed until the situation is rectified. Any fill placed in the interim can be considered unacceptable and subject to reprocessing, recompaction or removal.

In the event that the soil technician does not comply with the above or other established safety guidelines, we request that the contractor bring this to technicians attention and notify our project manager or office. Effective communication and coordination between the contractors' representative and the field technician(s) is strongly encouraged in order to implement the above safety program and safety in general.

The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

Appendix D Hydrology Report

Tract 20539

APN 0261-0062-15 & 16
Meyers Road
San Bernardino, CA 92407

Hydrology Report

Prepared By:
S.D. Engineering and Associates
242 E. Airport Drive, Suite 212
San Bernardino, CA 92408
909-215-3451

Original: March 24, 2024

Prepared under the supervision of:

Suresh Doddiah R.C.E 36361

Table of Contents

Discussion

OVERVIEW

Tract 20539 is proposed residential tract development in the City of San Bernardino, California, on the northwest corner of the intersection between Meyers Road and Magnolia Avenue intersection. The site is currently undeveloped with mixed grasses covering the site and is proposed to be developed into 30 single-family residential lots with two remainder lots where infiltration basins will be proposed. The site has no offsite tributary drainage as Ohio Avene to the north and Magnolia Avenue to the east route offsite flows around the perimeter of the proposed tract.

The site is relatively steep and drains to the south with an average slope of 7%. According to Websoil Survey the soils consist of Hydrologic Soil Type A. Soils consist of Tujunga gravelly loamy sand with saturated hydraulic conductivity (Ksat) values of 6-20 inches an hour. Given the high saturated hydraulic conductivity values, the site soils shall support adequate infiltration to make infiltration basins feasible for stormwater treatment and peak flow and volume mitigation. According to FEMA this site is located in Zone X which are areas not in a 100- or 500-year floodplain and experience a low risk of flooding.

Onsite flows drain from north to south across the site. A flow line along the west property boundary conveys site runoff to Meyers Road. Onsite drainage generally comprises of sheet flow and shallow concentrated flow that drains to Meyers Road. In the proposed condition existing drainage patterns will be preserved and the project will be divided into 2 separate drainage areas (DA1 & DA2). Each drainage area will drain to an infiltration basin. DA1 will drain to Lot A Basin and DA2 will drain to Lot B Basin. Catch basins are proposed at the southerly end of Barque Court and Antique Court to intercept street flow and discharge to the infiltration basins. The infiltration basins will be sized adequately to reduce the post developed flow to less than predevelopment flow. A parkway drain is proposed as the overflow for each basin and will discharge flow to Meyers Road.

PURPOSE

This report has 2 main purposes:

1) Provide the hydrology calculations that demonstrate that post developed flow is reduced to less than the predevelopment flow

2) Quantify the 10-year and 100-year flow rate that is generated by the onsite drainage areas and size drainage improvements to convey the flows in a safe manner. Rational method hydrology will be applied to the drainage area to determine the 10 year and 100-year flow rate. Hydrographs will be developed for predeveloped and post developed conditions. Post developed hydrographs will be routed through each infiltration basin to verify adequate mitigation is provided. Hydraulic calculations will be provided for street capacity, catch basin sizing, storm drain sizing and overflow parkway drains.

CRITERIA

The criteria utilized in this report for hydrology-based calculations are set forth by the San Bernardino County Hydrology Manual. AES software was used to perform computations. A rational method was applied to drainage areas to predict peak flow rates. Hydrograohs were developed to predict flow volume. Hydraulic calculations were then applied to drainage improvements to size adequately for the 100-year storm event.

RESULTS

Rational method and hydrograph analysis results are provided below in the summary table. Calculations indicate the peak flow and volume is reduced for the 10 year and 100-year storm events.

Pre Developed vs Post Developed Flow Summary Table

Condition	Total Volume (ft3)	Peak Flow (cfs)
Pre Q10	**208208**	**27.98**
Pre Q100	**412822**	**51.03**
Post DA1 Q10	86785	20.28
Post DA2 Q10	85940	20.19
Post DA1 Q100	167274	34.92
Post DA2 Q100	164879	34.76
Post DA1 Q10 Routed	72236	10.84
Post DA2 Q10 Routed	69284	11.12
Total	**141520**	**21.96**
Post DA1 Q100 Routed	152725	12.54
Post DA2 Q100 Routed	148222.5	12.54
Total	**300947.5**	**25.08**

Condition	**Total Volume (ft3)**	**Peak Flow (cfs)**
Pre Q10	**208208**	**27.98**
Pre Q100	**412822**	**51.03**
Post Q10	**141520**	**21.96**
Post Q100	**300948**	**25.08**

Proposed improvements will include 2 infiltration basins, 4-10 ft catch basins, and two 3 ft storm drainpipes. The Q100 flow in the interior streets is less than the top of curb and flows at a depth of 0.42 ft. Two 6 ft parkway drains are proposed as overflow from the basin and have a maximum conveyance capacity of 12.54 cfs each. Calculations and exhibits accompany this discussion to further illustrate findings.

Reference Material

VICINITY MAP

Image © 2024 Airbus

NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: CA

Data description

Data type: Precipitation depth **Units:** English **Time series type:** Partial duration

Select location

1) Manually:

a) By location (decimal degrees, use "-" for S and W): Latitude: Longitude: Submit

b) By station (list of CA stations): Select station

c) By address Search

2) Use map:

a) Select location
Move crosshair or double click

b) Click on station icon
☐ Show stations on map

Location information:
Name: San Bernardino, California, USA*
Latitude: 34.2058°
Longitude: -117.3639°
Elevation: 1893 ft **

* Source: ESRI Maps
** Source: USGS

POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION
NOAA Atlas 14, Volume 6, Version 2

PF tabular PF graphical Supplementary information Print page

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.161** (0.133-0.195)	**0.222** (0.184-0.270)	**0.301** (0.249-0.368)	**0.366** (0.300-0.450)	**0.453** (0.359-0.577)	**0.521** (0.404-0.678)	**0.590** (0.447-0.787)	**0.662** (0.487-0.909)	**0.762** (0.537-1.09)	**0.841** (0.573-1.25)
10-min	**0.230** (0.191-0.280)	**0.318** (0.264-0.387)	**0.432** (0.357-0.527)	**0.524** (0.430-0.645)	**0.649** (0.515-0.827)	**0.746** (0.579-0.971)	**0.846** (0.640-1.13)	**0.949** (0.698-1.30)	**1.09** (0.770-1.56)	**1.20** (0.821-1.79)
15-min	**0.278** (0.231-0.338)	**0.384** (0.319-0.468)	**0.522** (0.432-0.637)	**0.634** (0.520-0.780)	**0.785** (0.623-1.00)	**0.903** (0.701-1.17)	**1.02** (0.774-1.36)	**1.15** (0.845-1.58)	**1.32** (0.931-1.89)	**1.46** (0.993-2.16)
30-min	**0.414** (0.344-0.504)	**0.572** (0.475-0.697)	**0.777** (0.643-0.949)	**0.944** (0.774-1.16)	**1.17** (0.927-1.49)	**1.34** (1.04-1.75)	**1.52** (1.15-2.03)	**1.71** (1.26-2.35)	**1.97** (1.39-2.82)	**2.17** (1.48-3.22)
60-min	**0.629** (0.523-0.765)	**0.870** (0.722-1.06)	**1.18** (0.977-1.44)	**1.43** (1.18-1.76)	**1.78** (1.41-2.26)	**2.04** (1.58-2.66)	**2.31** (1.75-3.09)	**2.60** (1.91-3.56)	**2.99** (2.11-4.28)	**3.30** (2.25-4.89)
2-hr	**0.964** (0.801-1.17)	**1.28** (1.06-1.55)	**1.68** (1.39-2.05)	**2.00** (1.64-2.47)	**2.45** (1.94-3.12)	**2.79** (2.17-3.63)	**3.14** (2.38-4.19)	**3.50** (2.58-4.81)	**4.00** (2.82-5.74)	**4.40** (3.00-6.53)
3-hr	**1.23** (1.02-1.50)	**1.60** (1.33-1.95)	**2.08** (1.73-2.54)	**2.48** (2.03-3.05)	**3.00** (2.38-3.82)	**3.41** (2.65-4.44)	**3.82** (2.90-5.10)	**4.25** (3.13-5.84)	**4.84** (3.42-6.93)	**5.30** (3.61-7.87)
6-hr	**1.84** (1.53-2.24)	**2.36** (1.96-2.88)	**3.04** (2.51-3.71)	**3.58** (2.94-4.41)	**4.31** (3.42-5.49)	**4.87** (3.78-6.34)	**5.44** (4.12-7.26)	**6.02** (4.43-8.27)	**6.82** (4.81-9.76)	**7.44** (5.06-11.0)
12-hr	**2.51** (2.08-3.05)	**3.23** (2.68-3.93)	**4.16** (3.44-5.08)	**4.91** (4.03-6.04)	**5.90** (4.68-7.51)	**6.65** (5.16-8.66)	**7.41** (5.61-9.88)	**8.17** (6.02-11.2)	**9.20** (6.49-13.2)	**10.0** (6.81-14.8)
24-hr	**3.44** (3.04-3.96)	**4.51** (3.99-5.20)	**5.88** (5.19-6.80)	**6.98** (6.11-8.13)	**8.43** (7.14-10.2)	**9.52** (7.90-11.7)	**10.6** (8.60-13.4)	**11.7** (9.24-15.2)	**13.2** (9.99-17.8)	**14.3** (10.5-20.0)
2-day	**4.25** (3.76-4.90)	**5.70** (5.04-6.57)	**7.58** (6.68-8.76)	**9.09** (7.96-10.6)	**11.1** (9.44-13.4)	**12.7** (10.5-15.6)	**14.3** (11.6-18.0)	**15.9** (12.6-20.6)	**18.1** (13.7-24.5)	**19.9** (14.5-27.7)
3-day	**4.51** (3.99-5.19)	**6.15** (5.44-7.09)	**8.30** (7.32-9.60)	**10.1** (8.80-11.7)	**12.5** (10.6-15.0)	**14.4** (11.9-17.6)	**16.3** (13.2-20.5)	**18.3** (14.4-23.7)	**21.0** (15.9-28.4)	**23.2** (17.0-32.4)
4-day	**4.82** (4.27-5.55)	**6.65** (5.88-7.66)	**9.06** (7.99-10.5)	**11.1** (9.68-12.9)	**13.8** (11.7-16.6)	**16.0** (13.2-19.6)	**18.2** (14.7-22.9)	**20.5** (16.2-26.6)	**23.7** (18.0-32.0)	**26.3** (19.2-36.7)
7-day	**5.44** (4.82-6.27)	**7.65** (6.77-8.82)	**10.6** (9.34-12.2)	**13.0** (11.4-15.2)	**16.4** (13.9-19.7)	**19.0** (15.8-23.4)	**21.8** (17.7-27.5)	**24.7** (19.5-32.0)	**28.8** (21.8-38.8)	**32.0** (23.4-44.7)
10-day	**5.84** (5.18-6.73)	**8.30** (7.34-9.57)	**11.6** (10.2-13.4)	**14.3** (12.5-16.7)	**18.1** (15.3-21.8)	**21.1** (17.5-26.0)	**24.3** (19.6-30.6)	**27.6** (21.7-35.7)	**32.2** (24.4-43.5)	**35.9** (26.3-50.2)
20-day	**7.11** (6.30-8.19)	**10.2** (9.04-11.8)	**14.4** (12.7-16.7)	**18.0** (15.8-21.0)	**23.0** (19.5-27.7)	**27.0** (22.4-33.2)	**31.2** (25.3-39.3)	**35.7** (28.2-46.3)	**42.1** (31.9-56.8)	**47.3** (34.6-66.0)
30-day	**8.33** (7.38-9.59)	**12.0** (10.6-13.8)	**16.9** (14.9-19.6)	**21.2** (18.5-24.7)	**27.2** (23.0-32.7)	**32.0** (26.6-39.4)	**37.1** (30.1-46.8)	**42.7** (33.6-55.3)	**50.6** (38.3-68.2)	**57.1** (41.7-79.6)
45-day	**10.1** (8.91-11.6)	**14.3** (12.6-16.5)	**20.1** (17.8-23.3)	**25.1** (22.0-29.3)	**32.3** (27.4-38.9)	**38.1** (31.7-46.9)	**44.4** (36.0-55.9)	**51.2** (40.3-66.3)	**61.0** (46.1-82.3)	**69.1** (50.5-96.5)
60-day	**11.8** (10.5-13.6)	**16.5** (14.6-19.1)	**23.1** (20.3-26.7)	**28.7** (25.1-33.5)	**36.9** (31.2-44.4)	**43.6** (36.1-53.6)	**50.8** (41.1-63.9)	**58.7** (46.2-76.0)	**70.1** (53.0-94.6)	**79.7** (58.3-111)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Hydrologic Soil Group—San Bernardino County Southwestern Part, California

Map Scale: 1:2,350 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

□ Area of Interest (AOI)

Soils

Soil Rating Polygons

■ A

■ A/D

■ B

■ B/D

■ C

■ C/D

■ D

□ Not rated or not available

Soil Rating Lines

∿ A

∿ A/D

∿ B

∿ B/D

∿ C

∿ C/D

∿ D

∿ Not rated or not available

Soil Rating Points

■ A

■ A/D

■ B

■ B/D

■ C

■ C/D

■ D

□ Not rated or not available

Water Features

∿ Streams and Canals

Transportation

┿┿┿ Rails

∿ Interstate Highways

∿ US Routes

∿ Major Roads

∿ Local Roads

Background

■ Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Bernardino County Southwestern Part, California
Survey Area Data: Version 15, Aug 30, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 17, 2022—Jun 12, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
TvC	Tujunga gravelly loamy sand, 0 to 9 percent slopes	A	10.4	100.0%
Totals for Area of Interest			**10.4**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

San Bernardino County Southwestern Part, California

TvC—Tujunga gravelly loamy sand, 0 to 9 percent slopes

Map Unit Setting

National map unit symbol: hcl2
Elevation: 10 to 1,500 feet
Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 250 to 350 days
Farmland classification: Not prime farmland

Map Unit Composition

Tujunga and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tujunga

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 36 inches: gravelly loamy sand
H2 - 36 to 60 inches: gravelly sand

Properties and qualities

Slope: 0 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R019XG912CA - Sandy Fan
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 5 percent
Landform: Drainageways
Hydric soil rating: Yes

Soboba, gravelly loamy sand

Percent of map unit: 5 percent
Hydric soil rating: No

Delhi, fine sand

Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: San Bernardino County Southwestern Part, California
Survey Area Data: Version 15, Aug 30, 2023

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

National Flood Hazard Layer FIRMette

FEMA

117°22'9"W 34°12'36"N

117°21'31"W 34°12'6"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	🟦	Without Base Flood Elevation (BFE) *Zone A, V, A99* With BFE or Depth *Zone AE, AO, AH, VE, AR*
	▨	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	🟧	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	▨	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	▨	Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
	▨	Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN	Area of Minimal Flood Hazard *Zone X*
	▭	Effective LOMRs
	🟧	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	— — —	Channel, Culvert, or Storm Sewer
	ııııııı	Levee, Dike, or Floodwall
OTHER FEATURES	Ⓑ 20.2 17.5	Cross Sections with 1% Annual Chance Water Surface Elevation
	8 — — —	Coastal Transect
	~~ 513 ~~~	Base Flood Elevation Line (BFE)
	—	Limit of Study
	—	Jurisdiction Boundary
	— - —	Coastal Transect Baseline
	—	Profile Baseline
	—	Hydrographic Feature
MAP PANELS	☐	Digital Data Available
	☐	No Digital Data Available
	☒	Unmapped

📍 The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/24/2024 at 1:42 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Rational Methods

```
____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
         (c) Copyright 1983-2011 Advanced Engineering Software (aes)
             Ver. 18.0  Release Date: 07/01/2011  License ID 1501

                           Analysis prepared by:







 ************************** DESCRIPTION OF STUDY **************************
* Tract 20539                                                              *
* Predeveloped Condition                                                   *
* 10 Year Storm Event                                                      *
 **************************************************************************

  FILE NAME: 20539EX.DAT
  TIME/DATE OF STUDY: 14:52 05/24/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.4300

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED
```

```
*****************************************************************************
  FLOW PROCESS FROM NODE      0.00 TO NODE      1.00 IS CODE =  21
-----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   995.00
  ELEVATION DATA: UPSTREAM(FEET) =   1923.10  DOWNSTREAM(FEET) =   1867.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   14.759
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.817
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    A        9.66      0.60     1.000    67   14.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     27.98
  TOTAL AREA(ACRES) =      9.66   PEAK FLOW RATE(CFS) =     27.98
=============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        9.7  TC(MIN.) =     14.76
  EFFECTIVE AREA(ACRES) =      9.66  AREA-AVERAGED Fm(INCH/HR)=  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =     27.98
=============================================================================
=============================================================================
  END OF RATIONAL METHOD ANALYSIS

↑
```

```
____________________________________________________________________________
****************************************************************************
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             Ver. 18.0  Release Date: 07/01/2011  License ID 1501

                           Analysis prepared by:







 ************************** DESCRIPTION OF STUDY **************************
* Tract 20539                                                              *
* Predeveloped Condition                                                   *
* 100 Year Storm Event                                                     *
 **************************************************************************

  FILE NAME: 20539EX.DAT
  TIME/DATE OF STUDY: 14:53 05/24/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 2.3100

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED
```

```
*****************************************************************************
  FLOW PROCESS FROM NODE      0.00 TO NODE      1.00 IS CODE =  21
-----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   995.00
  ELEVATION DATA: UPSTREAM(FEET) =   1923.10  DOWNSTREAM(FEET) =   1867.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   14.759
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.166
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    A        9.66      0.30     1.000    85   14.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     51.03
  TOTAL AREA(ACRES) =      9.66   PEAK FLOW RATE(CFS) =     51.03
=============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        9.7  TC(MIN.) =     14.76
  EFFECTIVE AREA(ACRES) =      9.66  AREA-AVERAGED Fm(INCH/HR)=  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      51.03
=============================================================================
=============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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         (c) Copyright 1983-2011 Advanced Engineering Software (aes)
             Ver. 18.0  Release Date: 07/01/2011  License ID 1501

                           Analysis prepared by:








 ************************** DESCRIPTION OF STUDY **************************
* Tract 20539                                                              *
* Post Developed Condition                                                 *
* 10 Year Storm Event                                                      *
 **************************************************************************

  FILE NAME: 20539P.DAT
  TIME/DATE OF STUDY: 13:55 05/23/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.4300

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   670.00
  ELEVATION DATA: UPSTREAM(FEET) =    123.70  DOWNSTREAM(FEET) =     72.07

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.289
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  5.278
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       A        2.44      0.98     0.600    32    9.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.98
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =     10.31
  TOTAL AREA(ACRES) =      2.44   PEAK FLOW RATE(CFS) =     10.31

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    72.07  DOWNSTREAM(FEET) =    71.91
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.96
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.31
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    9.41
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     706.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.41
  RAINFALL INTENSITY(INCH/HR) =   5.23
  AREA-AVERAGED Fm(INCH/HR) =  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.98
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.44
```

```
  TOTAL STREAM AREA(ACRES) =       2.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.31

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   670.00
  ELEVATION DATA: UPSTREAM(FEET) =    116.00  DOWNSTREAM(FEET) =     71.91

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.587
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  5.163
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       A        2.43      0.98     0.600    32    9.59
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.98
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =     10.01
  TOTAL AREA(ACRES) =      2.43   PEAK FLOW RATE(CFS) =     10.01

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.59
  RAINFALL INTENSITY(INCH/HR) =   5.16
  AREA-AVERAGED Fm(INCH/HR) =  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.98
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.43
  TOTAL STREAM AREA(ACRES) =       2.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.01

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.31    9.41    5.230  0.98( 0.59) 0.60       2.4      10.00
      2       10.01    9.59    5.163  0.98( 0.59) 0.60       2.4      12.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       20.28    9.41    5.230  0.98( 0.59) 0.60       4.8      10.00
      2       20.17    9.59    5.163  0.98( 0.59) 0.60       4.9      12.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.28    Tc(MIN.) =     9.41
  EFFECTIVE AREA(ACRES) =       4.83   AREA-AVERAGED Fm(INCH/HR) =  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.98  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     706.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   670.00
  ELEVATION DATA: UPSTREAM(FEET) =    123.70  DOWNSTREAM(FEET) =     71.07

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.253
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  5.292
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       A        2.37      0.98     0.600    32    9.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.98
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =     10.04
  TOTAL AREA(ACRES) =      2.37   PEAK FLOW RATE(CFS) =     10.04

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    71.07  DOWNSTREAM(FEET) =    70.80
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.97
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.04
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    9.35
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     706.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.35
  RAINFALL INTENSITY(INCH/HR) =   5.25
  AREA-AVERAGED Fm(INCH/HR) =  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.98
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.37
  TOTAL STREAM AREA(ACRES) =       2.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.04

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   670.00
  ELEVATION DATA: UPSTREAM(FEET) =    120.20  DOWNSTREAM(FEET) =     70.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.371
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  5.245
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       A        2.42      0.98     0.600    32    9.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.97
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =     10.15
  TOTAL AREA(ACRES) =      2.42   PEAK FLOW RATE(CFS) =     10.15

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.37
  RAINFALL INTENSITY(INCH/HR) =   5.25
  AREA-AVERAGED Fm(INCH/HR) =  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.97
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.42
```

```
  TOTAL STREAM AREA(ACRES) =       2.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.15

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.04    9.35    5.252  0.98( 0.59) 0.60       2.4      20.00
      2       10.15    9.37    5.245  0.97( 0.59) 0.60       2.4      22.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       20.19    9.35    5.252  0.98( 0.59) 0.60       4.8      20.00
      2       20.18    9.37    5.245  0.98( 0.59) 0.60       4.8      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.19    Tc(MIN.) =     9.35
  EFFECTIVE AREA(ACRES) =       4.79   AREA-AVERAGED Fm(INCH/HR) =  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.98  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.8
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     706.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.8  TC(MIN.) =      9.35
  EFFECTIVE AREA(ACRES) =      4.79  AREA-AVERAGED Fm(INCH/HR)=  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.98  AREA-AVERAGED Ap = 0.600
  PEAK FLOW RATE(CFS)   =      20.19

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       20.19    9.35    5.252  0.98( 0.59) 0.60       4.8      20.00
      2       20.18    9.37    5.245  0.98( 0.59) 0.60       4.8      22.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

↑
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____________________________________________________________________________
****************************************************************************
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             Ver. 18.0  Release Date: 07/01/2011  License ID 1501

                           Analysis prepared by:







 ************************** DESCRIPTION OF STUDY **************************
* Tract 20539                                                              *
* Post Developed Condition                                                 *
* 100 Year Storm Event                                                     *
 **************************************************************************

  FILE NAME: 20539P.DAT
  TIME/DATE OF STUDY: 14:51 05/21/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 2.3100

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   670.00
  ELEVATION DATA: UPSTREAM(FEET) =    123.70  DOWNSTREAM(FEET) =     72.07

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.289
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  8.526
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       A        2.44      0.74     0.600    52    9.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =     17.75
  TOTAL AREA(ACRES) =      2.44   PEAK FLOW RATE(CFS) =     17.75

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    72.07  DOWNSTREAM(FEET) =    71.91
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.58
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.75
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    9.40
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     706.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.40
  RAINFALL INTENSITY(INCH/HR) =   8.46
  AREA-AVERAGED Fm(INCH/HR) =  0.45
  AREA-AVERAGED Fp(INCH/HR) =  0.74
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.44
```

```
  TOTAL STREAM AREA(ACRES) =       2.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      17.75

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   670.00
  ELEVATION DATA: UPSTREAM(FEET) =    116.00  DOWNSTREAM(FEET) =     71.91

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.587
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  8.340
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       A        2.43      0.74     0.600    52    9.59
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =     17.27
  TOTAL AREA(ACRES) =      2.43   PEAK FLOW RATE(CFS) =     17.27

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.59
  RAINFALL INTENSITY(INCH/HR) =   8.34
  AREA-AVERAGED Fm(INCH/HR) =  0.45
  AREA-AVERAGED Fp(INCH/HR) =  0.74
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.43
  TOTAL STREAM AREA(ACRES) =       2.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      17.27

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       17.75    9.40    8.458  0.74( 0.45) 0.60       2.4      10.00
      2       17.27    9.59    8.340  0.74( 0.45) 0.60       2.4      12.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.92    9.40    8.458  0.74( 0.45) 0.60       4.8      10.00
      2       34.75    9.59    8.340  0.74( 0.45) 0.60       4.9      12.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      34.92    Tc(MIN.) =     9.40
  EFFECTIVE AREA(ACRES) =       4.82   AREA-AVERAGED Fm(INCH/HR) =  0.45
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     706.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   670.00
  ELEVATION DATA: UPSTREAM(FEET) =    123.70  DOWNSTREAM(FEET) =     71.07

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.253
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  8.549
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       A        2.37      0.74     0.600    52    9.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =     17.29
  TOTAL AREA(ACRES) =      2.37   PEAK FLOW RATE(CFS) =     17.29

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    71.07  DOWNSTREAM(FEET) =    70.80
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.72
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.29
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.34
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     706.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.34
  RAINFALL INTENSITY(INCH/HR) =   8.49
  AREA-AVERAGED Fm(INCH/HR) =  0.45
  AREA-AVERAGED Fp(INCH/HR) =  0.74
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.37
  TOTAL STREAM AREA(ACRES) =       2.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      17.29

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   670.00
  ELEVATION DATA: UPSTREAM(FEET) =    120.20  DOWNSTREAM(FEET) =     70.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.371
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  8.473
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       A        2.42      0.74     0.600    52    9.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =     17.49
  TOTAL AREA(ACRES) =      2.42   PEAK FLOW RATE(CFS) =     17.49

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.37
  RAINFALL INTENSITY(INCH/HR) =   8.47
  AREA-AVERAGED Fm(INCH/HR) =  0.45
  AREA-AVERAGED Fp(INCH/HR) =  0.74
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.42
```

```
  TOTAL STREAM AREA(ACRES) =       2.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      17.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       17.29    9.34    8.492  0.74( 0.45) 0.60       2.4      20.00
      2       17.49    9.37    8.473  0.74( 0.45) 0.60       2.4      22.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.76    9.34    8.492  0.74( 0.45) 0.60       4.8      20.00
      2       34.73    9.37    8.473  0.74( 0.45) 0.60       4.8      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      34.76    Tc(MIN.) =     9.34
  EFFECTIVE AREA(ACRES) =       4.78   AREA-AVERAGED Fm(INCH/HR) =  0.45
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.8
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     706.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.8  TC(MIN.) =      9.34
  EFFECTIVE AREA(ACRES) =      4.78  AREA-AVERAGED Fm(INCH/HR)=  0.45
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap = 0.600
  PEAK FLOW RATE(CFS)   =      34.76

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.76    9.34    8.492  0.74( 0.45) 0.60       4.8      20.00
      2       34.73    9.37    8.473  0.74( 0.45) 0.60       4.8      22.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

↑
```

Hydrographs

Predeveloped Condition 10 Year Storm Event

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==============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
   AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

   TOTAL 24-HOUR DURATION RAINFALL DEPTH =    6.98 (inches)

   SOIL-COVER    AREA     PERCENT OF    SCS CURVE    LOSS RATE
     TYPE      (Acres)   PERVIOUS AREA    NUMBER    Fp(in./hr.)   YIELD
       1         9.66      100.00          67.       0.598       0.471

   TOTAL AREA (Acres) =     9.66
                    _
   AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.598
                          _
   AREA-AVERAGED LOW LOSS FRACTION, Y = 0.529
==============================================================================
----------------------------------------------------------------------------



   RATIONAL METHOD CALIBRATION COEFFICIENT = 1.00
   TOTAL CATCHMENT AREA(ACRES) =    9.66
   SOIL-LOSS RATE, Fm,(INCH/HR) =  0.598
   LOW LOSS FRACTION = 0.529
   TIME OF CONCENTRATION(MIN.) = 19.85
   SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
   USER SPECIFIED RAINFALL VALUES ARE USED
   RETURN FREQUENCY(YEARS) =  10
     5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.37
    30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.94
     1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.43
     3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.48
     6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.58
    24-HOUR   POINT RAINFALL VALUE(INCHES) =  6.98

----------------------------------------------------------------------------

   TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     3.44
   TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     2.18

******************************************************************************
 TIME     VOLUME      Q    0.      7.5     15.0     30.0     45.0
(HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
 0.12     0.0000     0.00  Q       .       .       .       .
```

```
 0.45   0.0108   0.79 .Q    .    .    .    .
 0.78   0.0325   0.80 .Q    .    .    .    .
 1.11   0.0544   0.81 .Q    .    .    .    .
 1.44   0.0766   0.81 .Q    .    .    .    .
 1.77   0.0990   0.83 .Q    .    .    .    .
 2.10   0.1217   0.83 .Q    .    .    .    .
 2.44   0.1446   0.85 .Q    .    .    .    .
 2.77   0.1679   0.85 .Q    .    .    .    .
 3.10   0.1914   0.87 .Q    .    .    .    .
 3.43   0.2153   0.88 .Q    .    .    .    .
 3.76   0.2395   0.89 .Q    .    .    .    .
 4.09   0.2640   0.90 .Q    .    .    .    .
 4.42   0.2888   0.92 .Q    .    .    .    .
 4.75   0.3141   0.93 .Q    .    .    .    .
 5.08   0.3397   0.95 .Q    .    .    .    .
 5.41   0.3657   0.96 .Q    .    .    .    .
 5.74   0.3921   0.98 .Q    .    .    .    .
 6.07   0.4189   0.99 .Q    .    .    .    .
 6.41   0.4462   1.01 .Q    .    .    .    .
 6.74   0.4740   1.02 .Q    .    .    .    .
 7.07   0.5023   1.05 .Q    .    .    .    .
 7.40   0.5311   1.06 .Q    .    .    .    .
 7.73   0.5605   1.09 .Q    .    .    .    .
 8.06   0.5904   1.10 .Q    .    .    .    .
 8.39   0.6211   1.14 .Q    .    .    .    .
 8.72   0.6523   1.15 .Q    .    .    .    .
 9.05   0.6843   1.19 .Q    .    .    .    .
 9.38   0.7171   1.21 .Q    .    .    .    .
 9.71   0.7507   1.25 .Q    .    .    .    .
10.05    0.7852   1.27 .Q    .    .    .    .
10.38    0.8206   1.32 .Q    .    .    .    .
10.71    0.8571   1.35 .Q    .    .    .    .
11.04    0.8948   1.41 .Q    .    .    .    .
11.37    0.9337   1.44 .Q    .    .    .    .
11.70    0.9740   1.51 . Q   .    .    .    .
12.03    1.0158   1.55 . Q   .    .    .    .
12.36    1.0615   1.80 . Q   .    .    .    .
12.69    1.1114   1.85 . Q   .    .    .    .
13.02    1.1635   1.97 . Q   .    .    .    .
13.35    1.2182   2.03 . Q   .    .    .    .
13.68    1.2759   2.19 . Q   .    .    .    .
14.02    1.3372   2.29 .  Q  .    .    .    .
14.35    1.4012   2.40 .  Q  .    .    .    .
14.68    1.4688   2.55 .  Q  .    .    .    .
15.01    1.5444   2.98 .  Q  .    .    .    .
```

```
   15.34    1.6301    3.29 .  Q   .     .     .     .
   15.67    1.7468    5.24 .   Q  .     .     .     .
   16.00    1.9006    6.01 .    Q .     .     .     .
   16.33    2.2580   27.98 .     .    .   Q  .      .
   16.66    2.5845    3.76 .  Q   .     .     .     .
   16.99    2.6733    2.74 . Q    .     .     .     .
   17.32    2.7434    2.39 . Q    .     .     .     .
   17.65    2.8049    2.11 . Q    .     .     .     .
   17.98    2.8597    1.90 . Q    .     .     .     .
   18.32    2.9078    1.61 . Q    .     .     .     .
   18.65    2.9500    1.47 .Q     .     .     .     .
   18.98    2.9889    1.38 .Q     .     .     .     .
   19.31    3.0255    1.30 .Q     .     .     .     .
   19.64    3.0600    1.23 .Q     .     .     .     .
   19.97    3.0928    1.17 .Q     .     .     .     .
   20.30    3.1241    1.12 .Q     .     .     .     .
   20.63    3.1540    1.07 .Q     .     .     .     .
   20.96    3.1829    1.03 .Q     .     .     .     .
   21.29    3.2107    1.00 .Q     .     .     .     .
   21.62    3.2375    0.97 .Q     .     .     .     .
   21.95    3.2635    0.94 .Q     .     .     .     .
   22.29    3.2887    0.91 .Q     .     .     .     .
   22.62    3.3133    0.88 .Q     .     .     .     .
   22.95    3.3371    0.86 .Q     .     .     .     .
   23.28    3.3604    0.84 .Q     .     .     .     .
   23.61    3.3831    0.82 .Q     .     .     .     .
   23.94    3.4052    0.80 .Q     .     .     .     .
   24.27    3.4269    0.79 .Q     .     .     .     .
   24.60    3.4377    0.00 Q      .     .     .     .                                         149715.7
  ------------------------------------------------------------------------------
 ----------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated             Duration
      Peak Flow Rate                   (minutes)
    ========================           =========
          0%                  1449.1
         10%                   277.9
         20%                    59.6
         30%                    19.9
         40%                    19.9
         50%                    19.9
         60%                    19.9
```

70%	19.9
80%	19.9
90%	19.9

Predeveloped Condition 100 Year Storm Event

```
============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
  AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

  TOTAL 24-HOUR DURATION RAINFALL DEPTH =   10.60 (inches)

  SOIL-COVER    AREA     PERCENT OF    SCS CURVE    LOSS RATE
    TYPE     (Acres)  PERVIOUS AREA    NUMBER   Fp(in./hr.)   YIELD
      1        9.66     100.00      67.(AMC II)    0.296      0.825

  TOTAL AREA (Acres) =     9.66
                 _
  AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.296
                    _
  AREA-AVERAGED LOW LOSS FRACTION, Y = 0.175
============================================================================
----------------------------------------------------------------------------



  RATIONAL METHOD CALIBRATION COEFFICIENT = 1.00
  TOTAL CATCHMENT AREA(ACRES) =    9.66
  SOIL-LOSS RATE, Fm,(INCH/HR) =  0.296
  LOW LOSS FRACTION = 0.175
  TIME OF CONCENTRATION(MIN.) =  14.76
  SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
  USER SPECIFIED RAINFALL VALUES ARE USED
  RETURN FREQUENCY(YEARS) = 100
    5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.59
   30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.52
    1-HOUR   POINT RAINFALL VALUE(INCHES) =  2.31
    3-HOUR   POINT RAINFALL VALUE(INCHES) =  3.82
    6-HOUR   POINT RAINFALL VALUE(INCHES) =  5.44
   24-HOUR   POINT RAINFALL VALUE(INCHES) = 10.60

----------------------------------------------------------------------------

  TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     7.08
  TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     1.45

****************************************************************************
 TIME    VOLUME     Q   0.     15.0     30.0     45.0     60.0
(HOURS)   (AF)     (CFS)
----------------------------------------------------------------------------
 0.12    0.0082    1.70  .Q       .        .        .        .
```

```
0.25    0.0276    1.70 .Q     .     .     .     .
0.39    0.0470    1.71 .Q     .     .     .     .
0.53    0.0666    1.72 .Q     .     .     .     .
0.67    0.0862    1.73 .Q     .     .     .     .
0.81    0.1060    1.73 .Q     .     .     .     .
0.95    0.1258    1.74 .Q     .     .     .     .
1.08    0.1457    1.75 .Q     .     .     .     .
1.22    0.1657    1.76 .Q     .     .     .     .
1.36    0.1858    1.76 .Q     .     .     .     .
1.50    0.2061    1.78 .Q     .     .     .     .
1.64    0.2264    1.78 .Q     .     .     .     .
1.77    0.2468    1.79 .Q     .     .     .     .
1.91    0.2673    1.80 .Q     .     .     .     .
2.05    0.2879    1.81 .Q     .     .     .     .
2.19    0.3086    1.82 .Q     .     .     .     .
2.33    0.3295    1.83 .Q     .     .     .     .
2.46    0.3504    1.84 .Q     .     .     .     .
2.60    0.3715    1.85 .Q     .     .     .     .
2.74    0.3926    1.86 .Q     .     .     .     .
2.88    0.4139    1.87 .Q     .     .     .     .
3.02    0.4353    1.88 .Q     .     .     .     .
3.16    0.4568    1.89 .Q     .     .     .     .
3.29    0.4784    1.90 .Q     .     .     .     .
3.43    0.5002    1.91 .Q     .     .     .     .
3.57    0.5220    1.92 .Q     .     .     .     .
3.71    0.5440    1.93 .Q     .     .     .     .
3.85    0.5662    1.94 .Q     .     .     .     .
3.98    0.5884    1.96 .Q     .     .     .     .
4.12    0.6108    1.96 .Q     .     .     .     .
4.26    0.6333    1.98 .Q     .     .     .     .
4.40    0.6560    1.99 .Q     .     .     .     .
4.54    0.6788    2.01 .Q     .     .     .     .
4.67    0.7017    2.01 .Q     .     .     .     .
4.81    0.7248    2.03 .Q     .     .     .     .
4.95    0.7480    2.04 .Q     .     .     .     .
5.09    0.7714    2.06 .Q     .     .     .     .
5.23    0.7949    2.07 .Q     .     .     .     .
5.37    0.8186    2.08 .Q     .     .     .     .
5.50    0.8424    2.09 .Q     .     .     .     .
5.64    0.8664    2.11 .Q     .     .     .     .
5.78    0.8906    2.12 .Q     .     .     .     .
5.92    0.9150    2.14 .Q     .     .     .     .
6.06    0.9395    2.15 .Q     .     .     .     .
6.19    0.9642    2.17 .Q     .     .     .     .
6.33    0.9890    2.18 .Q     .     .     .     .
```

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 6.47   1.0141   2.20 .Q     .     .     .     .
 6.61   1.0393   2.22 .Q     .     .     .     .
 6.75   1.0647   2.24 .Q     .     .     .     .
 6.88   1.0903   2.25 .Q     .     .     .     .
 7.02   1.1162   2.27 .Q     .     .     .     .
 7.16   1.1422   2.29 .Q     .     .     .     .
 7.30   1.1684   2.31 .Q     .     .     .     .
 7.44   1.1949   2.32 .Q     .     .     .     .
 7.57   1.2215   2.35 .Q     .     .     .     .
 7.71   1.2484   2.36 .Q     .     .     .     .
 7.85   1.2755   2.39 .Q     .     .     .     .
 7.99   1.3029   2.40 .Q     .     .     .     .
 8.13   1.3305   2.43 .Q     .     .     .     .
 8.27   1.3583   2.45 .Q     .     .     .     .
 8.40   1.3864   2.48 .Q     .     .     .     .
 8.54   1.4148   2.49 .Q     .     .     .     .
 8.68   1.4435   2.52 .Q     .     .     .     .
 8.82   1.4724   2.54 .Q     .     .     .     .
 8.96   1.5016   2.57 .Q     .     .     .     .
 9.09   1.5311   2.59 .Q     .     .     .     .
 9.23   1.5608   2.63 .Q     .     .     .     .
 9.37   1.5910   2.65 .Q     .     .     .     .
 9.51   1.6214   2.68 .Q     .     .     .     .
 9.65   1.6521   2.70 .Q     .     .     .     .
 9.78   1.6832   2.75 .Q     .     .     .     .
 9.92   1.7147   2.77 .Q     .     .     .     .
10.06   1.7465   2.81 .Q     .     .     .     .
10.20   1.7787   2.83 .Q     .     .     .     .
10.34   1.8113   2.88 .Q     .     .     .     .
10.48   1.8443   2.90 .Q     .     .     .     .
10.61   1.8778   2.95 .Q     .     .     .     .
10.75   1.9116   2.98 .Q     .     .     .     .
10.89   1.9459   3.03 . Q    .     .     .     .
11.03   1.9807   3.06 . Q    .     .     .     .
11.17   2.0160   3.12 . Q    .     .     .     .
11.30   2.0518   3.15 . Q    .     .     .     .
11.44   2.0882   3.22 . Q    .     .     .     .
11.58   2.1250   3.25 . Q    .     .     .     .
11.72   2.1625   3.32 . Q    .     .     .     .
11.86   2.2006   3.36 . Q    .     .     .     .
11.99   2.2394   3.43 . Q    .     .     .     .
12.13   2.2793   3.57 . Q    .     .     .     .
12.27   2.3212   3.77 . Q    .     .     .     .
12.41   2.3645   3.81 . Q    .     .     .     .
12.55   2.4086   3.91 . Q    .     .     .     .
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12.69   2.4535    3.96 .Q        .         .         .         .
12.82   2.4993    4.07 .Q        .         .         .         .
12.96   2.5461    4.13 .Q        .         .         .         .
13.10   2.5939    4.25 .Q        .         .         .         .
13.24   2.6428    4.31 .Q        .         .         .         .
13.38   2.6928    4.45 .Q        .         .         .         .
13.51   2.7441    4.53 . Q       .         .         .         .
13.65   2.7967    4.70 . Q       .         .         .         .
13.79   2.8509    4.78 . Q       .         .         .         .
13.93   2.9066    4.98 . Q       .         .         .         .
14.07   2.9640    5.09 . Q       .         .         .         .
14.20   3.0204    4.79 . Q       .         .         .         .
14.34   3.0759    4.93 . Q       .         .         .         .
14.48   3.1339    5.22 . Q       .         .         .         .
14.62   3.1945    5.39 . Q       .         .         .         .
14.76   3.2583    5.79 . Q       .         .         .         .
14.90   3.3256    6.01 .  Q      .         .         .         .
15.03   3.3974    6.56 .  Q      .         .         .         .
15.17   3.4741    6.89 .  Q      .         .         .         .
15.31   3.5576    7.73 .   Q     .         .         .         .
15.45   3.6526    8.92 .   Q     .         .         .         .
15.59   3.7743   12.40 .       Q .         .         .         .
15.72   3.9218   13.44 .       Q .         .         .         .
15.86   4.0881   15.70 .          Q        .         .         .
16.00   4.2973   20.96 .         .   Q     .         .         .
16.14   4.7082   51.03 .         .         .         .    Q    .
16.28   5.0781   13.79 .        Q.         .         .         .
16.41   5.2230   11.61 .      Q  .         .         .         .
16.55   5.3308    7.28 .  Q      .         .         .         .
16.69   5.4081    6.27 .  Q      .         .         .         .
16.83   5.4758    5.58 . Q       .         .         .         .
16.97   5.5366    5.07 . Q       .         .         .         .
17.10   5.5930    4.82 . Q       .         .         .         .
17.24   5.6484    4.88 . Q       .         .         .         .
17.38   5.7025    4.61 . Q       .         .         .         .
17.52   5.7539    4.38 .Q        .         .         .         .
17.66   5.8028    4.19 .Q        .         .         .         .
17.80   5.8496    4.01 .Q        .         .         .         .
17.93   5.8945    3.86 .Q        .         .         .         .
18.07   5.9378    3.73 .Q        .         .         .         .
18.21   5.9784    3.39 .Q        .         .         .         .
18.35   6.0165    3.28 .Q        .         .         .         .
18.49   6.0535    3.18 .Q        .         .         .         .
18.62   6.0893    3.09 .Q        .         .         .         .
18.76   6.1241    3.01 .Q        .         .         .         .
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 18.90   6.1579   2.93 .Q     .     .     .     .
 19.04   6.1909   2.86 .Q     .     .     .     .
 19.18   6.2231   2.79 .Q     .     .     .     .
 19.31   6.2546   2.72 .Q     .     .     .     .
 19.45   6.2854   2.67 .Q     .     .     .     .
 19.59   6.3155   2.61 .Q     .     .     .     .
 19.73   6.3450   2.56 .Q     .     .     .     .
 19.87   6.3739   2.51 .Q     .     .     .     .
 20.01   6.4023   2.46 .Q     .     .     .     .
 20.14   6.4301   2.42 .Q     .     .     .     .
 20.28   6.4575   2.38 .Q     .     .     .     .
 20.42   6.4844   2.34 .Q     .     .     .     .
 20.56   6.5108   2.30 .Q     .     .     .     .
 20.70   6.5368   2.26 .Q     .     .     .     .
 20.83   6.5625   2.23 .Q     .     .     .     .
 20.97   6.5877   2.19 .Q     .     .     .     .
 21.11   6.6126   2.16 .Q     .     .     .     .
 21.25   6.6371   2.13 .Q     .     .     .     .
 21.39   6.6612   2.10 .Q     .     .     .     .
 21.52   6.6851   2.07 .Q     .     .     .     .
 21.66   6.7086   2.05 .Q     .     .     .     .
 21.80   6.7318   2.02 .Q     .     .     .     .
 21.94   6.7548   2.00 .Q     .     .     .     .
 22.08   6.7774   1.97 .Q     .     .     .     .
 22.22   6.7998   1.95 .Q     .     .     .     .
 22.35   6.8220   1.93 .Q     .     .     .     .
 22.49   6.8438   1.91 .Q     .     .     .     .
 22.63   6.8655   1.88 .Q     .     .     .     .
 22.77   6.8868   1.86 .Q     .     .     .     .
 22.91   6.9080   1.84 .Q     .     .     .     .
 23.04   6.9289   1.82 .Q     .     .     .     .
 23.18   6.9497   1.81 .Q     .     .     .     .
 23.32   6.9702   1.79 .Q     .     .     .     .
 23.46   6.9905   1.77 .Q     .     .     .     .
 23.60   7.0106   1.75 .Q     .     .     .     .
 23.73   7.0305   1.74 .Q     .     .     .     .
 23.87   7.0503   1.72 .Q     .     .     .     .
 24.01   7.0698   1.71 .Q     .     .     .     .
 24.15   7.0796   0.00 Q      .     .     .     .                                  308387.4
-----------------------------------------------------------------------
-------------------------------------------------------------------------
  TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
  (Note: 100% of Peak Flow Rate estimate assumed to have
  an instantaneous time duration)
```

```
Percentile of Estimated     Duration
   Peak Flow Rate          (minutes)
=======================    =========
        0%                  1441.9
       10%                   149.2
       20%                    58.0
       30%                    24.9
       40%                    16.6
       50%                     8.3
       60%                     8.3
       70%                     8.3
       80%                     8.3
       90%                     8.3
```

DA 1 Post Developed Condition 10 Year Storm Event

```
============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
  AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

  TOTAL 24-HOUR DURATION RAINFALL DEPTH =    6.98 (inches)

  SOIL-COVER    AREA     PERCENT OF    SCS CURVE    LOSS RATE
    TYPE      (Acres)  PERVIOUS AREA    NUMBER   Fp(in./hr.)   YIELD
      1        2.16       0.00          98.      0.000      0.966
      2        2.71     100.00          67.      0.598      0.471

  TOTAL AREA (Acres) =     4.87
                       _
  AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.333
                          _
  AREA-AVERAGED LOW LOSS FRACTION, Y = 0.309
============================================================================
----------------------------------------------------------------------------



  RATIONAL METHOD CALIBRATION COEFFICIENT = 1.00
  TOTAL CATCHMENT AREA(ACRES) =    4.87
  SOIL-LOSS RATE, Fm,(INCH/HR) =  0.333
  LOW LOSS FRACTION = 0.309
  TIME OF CONCENTRATION(MIN.) =  9.41
  SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
  USER SPECIFIED RAINFALL VALUES ARE USED
  RETURN FREQUENCY(YEARS) =  10
    5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.37
   30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.94
    1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.43
    3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.48
    6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.58
   24-HOUR   POINT RAINFALL VALUE(INCHES) =  6.98

----------------------------------------------------------------------------

  TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.99
  TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.84

****************************************************************************
 TIME    VOLUME     Q    0.      7.5     15.0     22.5     30.0
(HOURS)   (AF)    (CFS)
----------------------------------------------------------------------------
```

```
 0.08    0.0016    0.47  Q      .      .      .      .
 0.17    0.0049    0.47  Q      .      .      .      .
 0.25    0.0081    0.47  Q      .      .      .      .
 0.33    0.0114    0.48  Q      .      .      .      .
 0.42    0.0147    0.48  Q      .      .      .      .
 0.50    0.0180    0.48  Q      .      .      .      .
 0.58    0.0213    0.48  Q      .      .      .      .
 0.67    0.0246    0.48  Q      .      .      .      .
 0.75    0.0279    0.48  Q      .      .      .      .
 0.83    0.0312    0.48  Q      .      .      .      .
 0.92    0.0346    0.49  Q      .      .      .      .
 1.00    0.0379    0.49  Q      .      .      .      .
 1.08    0.0413    0.49  Q      .      .      .      .
 1.17    0.0446    0.49  Q      .      .      .      .
 1.25    0.0480    0.49  Q      .      .      .      .
 1.33    0.0514    0.49  Q      .      .      .      .
 1.42    0.0548    0.49  Q      .      .      .      .
 1.50    0.0582    0.49  Q      .      .      .      .
 1.58    0.0616    0.50  Q      .      .      .      .
 1.67    0.0650    0.50  Q      .      .      .      .
 1.75    0.0684    0.50  Q      .      .      .      .
 1.83    0.0719    0.50  Q      .      .      .      .
 1.92    0.0753    0.50  Q      .      .      .      .
 2.00    0.0788    0.50  Q      .      .      .      .
 2.08    0.0823    0.51  Q      .      .      .      .
 2.17    0.0858    0.51  Q      .      .      .      .
 2.25    0.0893    0.51  Q      .      .      .      .
 2.33    0.0928    0.51  Q      .      .      .      .
 2.42    0.0963    0.51  Q      .      .      .      .
 2.50    0.0998    0.51  Q      .      .      .      .
 2.58    0.1034    0.52  Q      .      .      .      .
 2.67    0.1069    0.52  Q      .      .      .      .
 2.75    0.1105    0.52  Q      .      .      .      .
 2.83    0.1141    0.52  Q      .      .      .      .
 2.92    0.1176    0.52  Q      .      .      .      .
 3.00    0.1212    0.52  Q      .      .      .      .
 3.08    0.1248    0.53  Q      .      .      .      .
 3.17    0.1285    0.53  Q      .      .      .      .
 3.25    0.1321    0.53  Q      .      .      .      .
 3.33    0.1358    0.53  Q      .      .      .      .
 3.42    0.1394    0.53  Q      .      .      .      .
 3.50    0.1431    0.53  Q      .      .      .      .
 3.58    0.1468    0.54  Q      .      .      .      .
 3.67    0.1505    0.54  Q      .      .      .      .
 3.75    0.1542    0.54  Q      .      .      .      .
```

```
 3.83   0.1579   0.54 Q    .    .    .    .
 3.92   0.1616   0.54 Q    .    .    .    .
 4.00   0.1654   0.55 Q    .    .    .    .
 4.08   0.1692   0.55 Q    .    .    .    .
 4.17   0.1729   0.55 Q    .    .    .    .
 4.25   0.1767   0.55 Q    .    .    .    .
 4.33   0.1805   0.55 Q    .    .    .    .
 4.42   0.1844   0.56 Q    .    .    .    .
 4.50   0.1882   0.56 Q    .    .    .    .
 4.58   0.1920   0.56 Q    .    .    .    .
 4.67   0.1959   0.56 Q    .    .    .    .
 4.75   0.1998   0.56 Q    .    .    .    .
 4.83   0.2037   0.57 Q    .    .    .    .
 4.92   0.2076   0.57 Q    .    .    .    .
 5.00   0.2115   0.57 Q    .    .    .    .
 5.08   0.2154   0.57 Q    .    .    .    .
 5.17   0.2194   0.57 Q    .    .    .    .
 5.25   0.2234   0.58 Q    .    .    .    .
 5.33   0.2273   0.58 Q    .    .    .    .
 5.42   0.2313   0.58 Q    .    .    .    .
 5.50   0.2354   0.58 Q    .    .    .    .
 5.58   0.2394   0.59 Q    .    .    .    .
 5.67   0.2434   0.59 Q    .    .    .    .
 5.75   0.2475   0.59 Q    .    .    .    .
 5.83   0.2516   0.59 Q    .    .    .    .
 5.92   0.2557   0.60 Q    .    .    .    .
 6.00   0.2598   0.60 Q    .    .    .    .
 6.08   0.2639   0.60 Q    .    .    .    .
 6.17   0.2681   0.60 Q    .    .    .    .
 6.25   0.2723   0.61 Q    .    .    .    .
 6.33   0.2765   0.61 Q    .    .    .    .
 6.42   0.2807   0.61 Q    .    .    .    .
 6.50   0.2849   0.61 Q    .    .    .    .
 6.58   0.2891   0.62 Q    .    .    .    .
 6.67   0.2934   0.62 Q    .    .    .    .
 6.75   0.2977   0.62 Q    .    .    .    .
 6.83   0.3020   0.63 Q    .    .    .    .
 6.92   0.3063   0.63 Q    .    .    .    .
 7.00   0.3107   0.63 Q    .    .    .    .
 7.08   0.3150   0.64 Q    .    .    .    .
 7.17   0.3194   0.64 Q    .    .    .    .
 7.25   0.3238   0.64 Q    .    .    .    .
 7.33   0.3283   0.64 Q    .    .    .    .
 7.42   0.3327   0.65 Q    .    .    .    .
 7.50   0.3372   0.65 Q    .    .    .    .
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```
  7.58     0.3417     0.66  Q       .       .       .       .
  7.67     0.3462     0.66  Q       .       .       .       .
  7.75     0.3508     0.66  Q       .       .       .       .
  7.83     0.3553     0.66  Q       .       .       .       .
  7.92     0.3599     0.67  Q       .       .       .       .
  8.00     0.3645     0.67  Q       .       .       .       .
  8.08     0.3692     0.68  Q       .       .       .       .
  8.17     0.3739     0.68  Q       .       .       .       .
  8.25     0.3785     0.68  Q       .       .       .       .
  8.33     0.3833     0.69  Q       .       .       .       .
  8.42     0.3880     0.69  Q       .       .       .       .
  8.50     0.3928     0.69  Q       .       .       .       .
  8.58     0.3976     0.70  Q       .       .       .       .
  8.67     0.4024     0.70  Q       .       .       .       .
  8.75     0.4073     0.71  Q       .       .       .       .
  8.83     0.4121     0.71  Q       .       .       .       .
  8.92     0.4171     0.72  Q       .       .       .       .
  9.00     0.4220     0.72  Q       .       .       .       .
  9.08     0.4270     0.73  Q       .       .       .       .
  9.17     0.4320     0.73  Q       .       .       .       .
  9.25     0.4370     0.73  Q       .       .       .       .
  9.33     0.4421     0.74  Q       .       .       .       .
  9.42     0.4472     0.74  Q       .       .       .       .
  9.50     0.4523     0.75  Q       .       .       .       .
  9.58     0.4575     0.75  .Q      .       .       .       .
  9.67     0.4627     0.76  .Q      .       .       .       .
  9.75     0.4679     0.76  .Q      .       .       .       .
  9.83     0.4732     0.77  .Q      .       .       .       .
  9.92     0.4785     0.77  .Q      .       .       .       .
 10.00     0.4838     0.78  .Q      .       .       .       .
 10.08     0.4892     0.79  .Q      .       .       .       .
 10.17     0.4947     0.79  .Q      .       .       .       .
 10.25     0.5001     0.80  .Q      .       .       .       .
 10.33     0.5056     0.80  .Q      .       .       .       .
 10.42     0.5112     0.81  .Q      .       .       .       .
 10.50     0.5168     0.81  .Q      .       .       .       .
 10.58     0.5224     0.82  .Q      .       .       .       .
 10.67     0.5281     0.83  .Q      .       .       .       .
 10.75     0.5338     0.84  .Q      .       .       .       .
 10.83     0.5396     0.84  .Q      .       .       .       .
 10.92     0.5454     0.85  .Q      .       .       .       .
 11.00     0.5512     0.85  .Q      .       .       .       .
 11.08     0.5572     0.86  .Q      .       .       .       .
 11.17     0.5631     0.87  .Q      .       .       .       .
 11.25     0.5691     0.88  .Q      .       .       .       .
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 11.33    0.5752    0.88  .Q      .      .      .      .
 11.42    0.5814    0.90  .Q      .      .      .      .
 11.50    0.5875    0.90  .Q      .      .      .      .
 11.58    0.5938    0.91  .Q      .      .      .      .
 11.67    0.6001    0.92  .Q      .      .      .      .
 11.75    0.6065    0.93  .Q      .      .      .      .
 11.83    0.6129    0.94  .Q      .      .      .      .
 11.92    0.6194    0.95  .Q      .      .      .      .
 12.00    0.6260    0.96  .Q      .      .      .      .
 12.08    0.6329    1.07  .Q      .      .      .      .
 12.17    0.6403    1.07  .Q      .      .      .      .
 12.25    0.6477    1.09  .Q      .      .      .      .
 12.33    0.6553    1.10  .Q      .      .      .      .
 12.42    0.6629    1.11  .Q      .      .      .      .
 12.50    0.6706    1.12  .Q      .      .      .      .
 12.58    0.6783    1.14  .Q      .      .      .      .
 12.67    0.6862    1.15  .Q      .      .      .      .
 12.75    0.6941    1.16  .Q      .      .      .      .
 12.83    0.7022    1.17  .Q      .      .      .      .
 12.92    0.7103    1.19  .Q      .      .      .      .
 13.00    0.7186    1.20  .Q      .      .      .      .
 13.08    0.7269    1.22  .Q      .      .      .      .
 13.17    0.7354    1.23  .Q      .      .      .      .
 13.25    0.7439    1.26  .Q      .      .      .      .
 13.33    0.7526    1.27  .Q      .      .      .      .
 13.42    0.7615    1.29  .Q      .      .      .      .
 13.50    0.7704    1.31  .Q      .      .      .      .
 13.58    0.7795    1.33  .Q      .      .      .      .
 13.67    0.7887    1.35  .Q      .      .      .      .
 13.75    0.7981    1.38  .Q      .      .      .      .
 13.83    0.8077    1.39  .Q      .      .      .      .
 13.92    0.8174    1.43  .Q      .      .      .      .
 14.00    0.8273    1.45  .Q      .      .      .      .
 14.08    0.8371    1.40  .Q      .      .      .      .
 14.17    0.8468    1.42  .Q      .      .      .      .
 14.25    0.8568    1.47  .Q      .      .      .      .
 14.33    0.8670    1.49  .Q      .      .      .      .
 14.42    0.8774    1.54  . Q     .      .      .      .
 14.50    0.8881    1.57  . Q     .      .      .      .
 14.58    0.8991    1.62  . Q     .      .      .      .
 14.67    0.9104    1.66  . Q     .      .      .      .
 14.75    0.9220    1.72  . Q     .      .      .      .
 14.83    0.9340    1.76  . Q     .      .      .      .
 14.92    0.9465    1.85  . Q     .      .      .      .
 15.00    0.9593    1.89  . Q     .      .      .      .
```

```
15.08   0.9727    2.00 . Q         .         .         .         .
15.17   0.9867    2.06 . Q         .         .         .         .
15.25   1.0014    2.19 . Q         .         .         .         .
15.33   1.0167    2.27 .  Q        .         .         .         .
15.42   1.0347    2.93 .  Q        .         .         .         .
15.50   1.0553    3.04 .   Q       .         .         .         .
15.58   1.0771    3.31 .   Q       .         .         .         .
15.67   1.1005    3.48 .   Q       .         .         .         .
15.75   1.1245    3.47 .   Q       .         .         .         .
15.83   1.1498    3.90 .    Q      .         .         .         .
15.92   1.1829    5.71 .       Q   .         .         .         .
16.00   1.2295    7.82 .           Q         .         .         .
16.08   1.3253   20.28 .           .         .    Q    .         .
16.17   1.4101    4.61 .     Q     .         .         .         .
16.25   1.4387    3.72 .   Q       .         .         .         .
16.33   1.4624    3.17 .   Q       .         .         .         .
16.42   1.4815    2.36 .  Q        .         .         .         .
16.50   1.4969    2.12 . Q         .         .         .         .
16.58   1.5109    1.94 . Q         .         .         .         .
16.67   1.5238    1.80 . Q         .         .         .         .
16.75   1.5359    1.69 . Q         .         .         .         .
16.83   1.5472    1.59 . Q         .         .         .         .
16.92   1.5579    1.51 . Q         .         .         .         .
17.00   1.5681    1.45 .Q          .         .         .         .
17.08   1.5781    1.46 .Q          .         .         .         .
17.17   1.5880    1.41 .Q          .         .         .         .
17.25   1.5975    1.36 .Q          .         .         .         .
17.33   1.6068    1.32 .Q          .         .         .         .
17.42   1.6157    1.28 .Q          .         .         .         .
17.50   1.6244    1.24 .Q          .         .         .         .
17.58   1.6329    1.21 .Q          .         .         .         .
17.67   1.6411    1.18 .Q          .         .         .         .
17.75   1.6492    1.15 .Q          .         .         .         .
17.83   1.6570    1.13 .Q          .         .         .         .
17.92   1.6647    1.10 .Q          .         .         .         .
18.00   1.6722    1.08 .Q          .         .         .         .
18.08   1.6793    0.96 .Q          .         .         .         .
18.17   1.6859    0.94 .Q          .         .         .         .
18.25   1.6923    0.92 .Q          .         .         .         .
18.33   1.6986    0.91 .Q          .         .         .         .
18.42   1.7048    0.89 .Q          .         .         .         .
18.50   1.7109    0.87 .Q          .         .         .         .
18.58   1.7168    0.86 .Q          .         .         .         .
18.67   1.7227    0.84 .Q          .         .         .         .
18.75   1.7285    0.83 .Q          .         .         .         .
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18.83    1.7341    0.82 .Q      .      .      .      .
18.92    1.7397    0.81 .Q      .      .      .      .
19.00    1.7452    0.79 .Q      .      .      .      .
19.08    1.7507    0.78 .Q      .      .      .      .
19.17    1.7560    0.77 .Q      .      .      .      .
19.25    1.7613    0.76 .Q      .      .      .      .
19.33    1.7665    0.75 .Q      .      .      .      .
19.42    1.7716    0.74 Q       .      .      .      .
19.50    1.7767    0.73 Q       .      .      .      .
19.58    1.7817    0.72 Q       .      .      .      .
19.67    1.7866    0.71 Q       .      .      .      .
19.75    1.7915    0.70 Q       .      .      .      .
19.83    1.7963    0.70 Q       .      .      .      .
19.92    1.8011    0.69 Q       .      .      .      .
20.00    1.8058    0.68 Q       .      .      .      .
20.08    1.8105    0.67 Q       .      .      .      .
20.17    1.8151    0.67 Q       .      .      .      .
20.25    1.8197    0.66 Q       .      .      .      .
20.33    1.8242    0.65 Q       .      .      .      .
20.42    1.8287    0.65 Q       .      .      .      .
20.50    1.8331    0.64 Q       .      .      .      .
20.58    1.8375    0.63 Q       .      .      .      .
20.67    1.8418    0.63 Q       .      .      .      .
20.75    1.8462    0.62 Q       .      .      .      .
20.83    1.8504    0.62 Q       .      .      .      .
20.92    1.8546    0.61 Q       .      .      .      .
21.00    1.8588    0.61 Q       .      .      .      .
21.08    1.8630    0.60 Q       .      .      .      .
21.17    1.8671    0.60 Q       .      .      .      .
21.25    1.8712    0.59 Q       .      .      .      .
21.33    1.8752    0.59 Q       .      .      .      .
21.42    1.8793    0.58 Q       .      .      .      .
21.50    1.8832    0.58 Q       .      .      .      .
21.58    1.8872    0.57 Q       .      .      .      .
21.67    1.8911    0.57 Q       .      .      .      .
21.75    1.8950    0.56 Q       .      .      .      .
21.83    1.8989    0.56 Q       .      .      .      .
21.92    1.9027    0.55 Q       .      .      .      .
22.00    1.9065    0.55 Q       .      .      .      .
22.08    1.9103    0.55 Q       .      .      .      .
22.17    1.9140    0.54 Q       .      .      .      .
22.25    1.9178    0.54 Q       .      .      .      .
22.33    1.9215    0.54 Q       .      .      .      .
22.42    1.9251    0.53 Q       .      .      .      .
22.50    1.9288    0.53 Q       .      .      .      .
```

```
 22.58     1.9324     0.52  Q       .       .       .       .
 22.67     1.9360     0.52  Q       .       .       .       .
 22.75     1.9396     0.52  Q       .       .       .       .
 22.83     1.9431     0.51  Q       .       .       .       .
 22.92     1.9467     0.51  Q       .       .       .       .
 23.00     1.9502     0.51  Q       .       .       .       .
 23.08     1.9537     0.50  Q       .       .       .       .
 23.17     1.9571     0.50  Q       .       .       .       .
 23.25     1.9606     0.50  Q       .       .       .       .
 23.33     1.9640     0.50  Q       .       .       .       .
 23.42     1.9674     0.49  Q       .       .       .       .
 23.50     1.9708     0.49  Q       .       .       .       .
 23.58     1.9741     0.49  Q       .       .       .       .
 23.67     1.9775     0.48  Q       .       .       .       .
 23.75     1.9808     0.48  Q       .       .       .       .
 23.83     1.9841     0.48  Q       .       .       .       .
 23.92     1.9874     0.48  Q       .       .       .       .
 24.00     1.9907     0.47  Q       .       .       .       .
 24.08     1.9923     0.00  Q       .       .       .       .
 ----------------------------------------------------------------------------
-------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated              Duration
     Peak Flow Rate                   (minutes)
   =======================             =========
          0%                       1440.0
         10%                         85.0
         20%                         20.0
         30%                         10.0
         40%                          5.0
         50%                          5.0
         60%                          5.0
         70%                          5.0
         80%                          5.0
         90%                          5.0
```

DA 2 Post Developed Condition 10 Year Storm Event

```
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
   AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

   TOTAL 24-HOUR DURATION RAINFALL DEPTH =    6.98 (inches)

   SOIL-COVER    AREA      PERCENT OF    SCS CURVE    LOSS RATE
     TYPE     (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
       1        2.18       0.00          98.      0.000      0.966
       2        2.61     100.00           67.      0.598      0.471

   TOTAL AREA (Acres) =     4.79
                   _
   AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.326
                        _
   AREA-AVERAGED LOW LOSS FRACTION, Y = 0.304
==========================================================================
----------------------------------------------------------------------------



   RATIONAL METHOD CALIBRATION COEFFICIENT = 1.00
   TOTAL CATCHMENT AREA(ACRES) =    4.79
   SOIL-LOSS RATE, Fm,(INCH/HR) =  0.326
   LOW LOSS FRACTION = 0.304
   TIME OF CONCENTRATION(MIN.) =  9.35
   SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
   USER SPECIFIED RAINFALL VALUES ARE USED
   RETURN FREQUENCY(YEARS) =  10
     5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.37
    30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.94
     1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.43
     3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.48
     6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.58
    24-HOUR   POINT RAINFALL VALUE(INCHES) =  6.98

----------------------------------------------------------------------------

   TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.97
   TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.81

**************************************************************************
 TIME    VOLUME      Q    0.       5.0     10.0     15.0     20.0
(HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
```

```
0.08    0.0016    0.47 Q      .     .     .     .
0.17    0.0048    0.47 Q      .     .     .     .
0.25    0.0081    0.47 Q      .     .     .     .
0.33    0.0113    0.47 Q      .     .     .     .
0.42    0.0146    0.47 Q      .     .     .     .
0.50    0.0178    0.47 Q      .     .     .     .
0.58    0.0211    0.48 Q      .     .     .     .
0.67    0.0244    0.48 Q      .     .     .     .
0.75    0.0276    0.48 Q      .     .     .     .
0.83    0.0309    0.48 Q      .     .     .     .
0.92    0.0342    0.48 Q      .     .     .     .
1.00    0.0375    0.48 Q      .     .     .     .
1.08    0.0409    0.48 Q      .     .     .     .
1.17    0.0442    0.48 Q      .     .     .     .
1.25    0.0475    0.49 Q      .     .     .     .
1.33    0.0509    0.49 Q      .     .     .     .
1.42    0.0543    0.49 Q      .     .     .     .
1.50    0.0576    0.49 Q      .     .     .     .
1.58    0.0610    0.49 Q      .     .     .     .
1.67    0.0644    0.49 Q      .     .     .     .
1.75    0.0678    0.49 Q      .     .     .     .
1.83    0.0712    0.50 Q      .     .     .     .
1.92    0.0746    0.50 Q      .     .     .     .
2.00    0.0781    0.50 Q      .     .     .     .
2.08    0.0815    0.50 .Q     .     .     .     .
2.17    0.0850    0.50 .Q     .     .     .     .
2.25    0.0884    0.50 .Q     .     .     .     .
2.33    0.0919    0.51 .Q     .     .     .     .
2.42    0.0954    0.51 .Q     .     .     .     .
2.50    0.0989    0.51 .Q     .     .     .     .
2.58    0.1024    0.51 .Q     .     .     .     .
2.67    0.1059    0.51 .Q     .     .     .     .
2.75    0.1094    0.51 .Q     .     .     .     .
2.83    0.1130    0.51 .Q     .     .     .     .
2.92    0.1165    0.52 .Q     .     .     .     .
3.00    0.1201    0.52 .Q     .     .     .     .
3.08    0.1237    0.52 .Q     .     .     .     .
3.17    0.1273    0.52 .Q     .     .     .     .
3.25    0.1309    0.52 .Q     .     .     .     .
3.33    0.1345    0.53 .Q     .     .     .     .
3.42    0.1381    0.53 .Q     .     .     .     .
3.50    0.1418    0.53 .Q     .     .     .     .
3.58    0.1454    0.53 .Q     .     .     .     .
3.67    0.1491    0.53 .Q     .     .     .     .
3.75    0.1527    0.54 .Q     .     .     .     .
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  3.83    0.1564    0.54  .Q     .     .     .     .
  3.92    0.1601    0.54  .Q     .     .     .     .
  4.00    0.1639    0.54  .Q     .     .     .     .
  4.08    0.1676    0.54  .Q     .     .     .     .
  4.17    0.1713    0.54  .Q     .     .     .     .
  4.25    0.1751    0.55  .Q     .     .     .     .
  4.33    0.1789    0.55  .Q     .     .     .     .
  4.42    0.1826    0.55  .Q     .     .     .     .
  4.50    0.1864    0.55  .Q     .     .     .     .
  4.58    0.1902    0.55  .Q     .     .     .     .
  4.67    0.1941    0.56  .Q     .     .     .     .
  4.75    0.1979    0.56  .Q     .     .     .     .
  4.83    0.2018    0.56  .Q     .     .     .     .
  4.92    0.2056    0.56  .Q     .     .     .     .
  5.00    0.2095    0.56  .Q     .     .     .     .
  5.08    0.2134    0.57  .Q     .     .     .     .
  5.17    0.2173    0.57  .Q     .     .     .     .
  5.25    0.2213    0.57  .Q     .     .     .     .
  5.33    0.2252    0.57  .Q     .     .     .     .
  5.42    0.2292    0.58  .Q     .     .     .     .
  5.50    0.2332    0.58  .Q     .     .     .     .
  5.58    0.2372    0.58  .Q     .     .     .     .
  5.67    0.2412    0.58  .Q     .     .     .     .
  5.75    0.2452    0.59  .Q     .     .     .     .
  5.83    0.2492    0.59  .Q     .     .     .     .
  5.92    0.2533    0.59  .Q     .     .     .     .
  6.00    0.2574    0.59  .Q     .     .     .     .
  6.08    0.2615    0.60  .Q     .     .     .     .
  6.17    0.2656    0.60  .Q     .     .     .     .
  6.25    0.2697    0.60  .Q     .     .     .     .
  6.33    0.2739    0.60  .Q     .     .     .     .
  6.42    0.2781    0.61  .Q     .     .     .     .
  6.50    0.2822    0.61  .Q     .     .     .     .
  6.58    0.2865    0.61  .Q     .     .     .     .
  6.67    0.2907    0.61  .Q     .     .     .     .
  6.75    0.2949    0.62  .Q     .     .     .     .
  6.83    0.2992    0.62  .Q     .     .     .     .
  6.92    0.3035    0.62  .Q     .     .     .     .
  7.00    0.3078    0.63  .Q     .     .     .     .
  7.08    0.3121    0.63  .Q     .     .     .     .
  7.17    0.3165    0.63  .Q     .     .     .     .
  7.25    0.3208    0.64  .Q     .     .     .     .
  7.33    0.3252    0.64  .Q     .     .     .     .
  7.42    0.3296    0.64  .Q     .     .     .     .
  7.50    0.3341    0.64  .Q     .     .     .     .
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  7.58    0.3385    0.65  .Q     .     .     .     .
  7.67    0.3430    0.65  .Q     .     .     .     .
  7.75    0.3475    0.66  .Q     .     .     .     .
  7.83    0.3520    0.66  .Q     .     .     .     .
  7.92    0.3566    0.66  .Q     .     .     .     .
  8.00    0.3612    0.67  .Q     .     .     .     .
  8.08    0.3658    0.67  .Q     .     .     .     .
  8.17    0.3704    0.67  .Q     .     .     .     .
  8.25    0.3750    0.68  .Q     .     .     .     .
  8.33    0.3797    0.68  .Q     .     .     .     .
  8.42    0.3844    0.69  .Q     .     .     .     .
  8.50    0.3891    0.69  .Q     .     .     .     .
  8.58    0.3939    0.69  .Q     .     .     .     .
  8.67    0.3987    0.70  .Q     .     .     .     .
  8.75    0.4035    0.70  .Q     .     .     .     .
  8.83    0.4083    0.70  .Q     .     .     .     .
  8.92    0.4132    0.71  .Q     .     .     .     .
  9.00    0.4181    0.71  .Q     .     .     .     .
  9.08    0.4230    0.72  .Q     .     .     .     .
  9.17    0.4280    0.72  .Q     .     .     .     .
  9.25    0.4329    0.73  .Q     .     .     .     .
  9.33    0.4380    0.73  .Q     .     .     .     .
  9.42    0.4430    0.74  .Q     .     .     .     .
  9.50    0.4481    0.74  .Q     .     .     .     .
  9.58    0.4532    0.75  .Q     .     .     .     .
  9.67    0.4584    0.75  .Q     .     .     .     .
  9.75    0.4636    0.76  .Q     .     .     .     .
  9.83    0.4688    0.76  .Q     .     .     .     .
  9.92    0.4740    0.77  .Q     .     .     .     .
 10.00    0.4793    0.77  .Q     .     .     .     .
 10.08    0.4847    0.78  .Q     .     .     .     .
 10.17    0.4901    0.78  .Q     .     .     .     .
 10.25    0.4955    0.79  .Q     .     .     .     .
 10.33    0.5009    0.79  .Q     .     .     .     .
 10.42    0.5064    0.80  .Q     .     .     .     .
 10.50    0.5119    0.81  .Q     .     .     .     .
 10.58    0.5175    0.81  .Q     .     .     .     .
 10.67    0.5232    0.82  .Q     .     .     .     .
 10.75    0.5288    0.83  .Q     .     .     .     .
 10.83    0.5345    0.83  .Q     .     .     .     .
 10.92    0.5403    0.84  .Q     .     .     .     .
 11.00    0.5461    0.85  .Q     .     .     .     .
 11.08    0.5520    0.86  .Q     .     .     .     .
 11.17    0.5579    0.86  .Q     .     .     .     .
 11.25    0.5638    0.87  .Q     .     .     .     .
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 11.33    0.5699    0.88  .Q     .     .     .     .
 11.42    0.5759    0.89  .Q     .     .     .     .
 11.50    0.5821    0.89  .Q     .     .     .     .
 11.58    0.5883    0.90  .Q     .     .     .     .
 11.67    0.5945    0.91  .Q     .     .     .     .
 11.75    0.6008    0.92  .Q     .     .     .     .
 11.83    0.6072    0.93  .Q     .     .     .     .
 11.92    0.6136    0.94  .Q     .     .     .     .
 12.00    0.6201    0.95  .Q     .     .     .     .
 12.08    0.6270    1.06  . Q    .     .     .     .
 12.17    0.6343    1.06  . Q    .     .     .     .
 12.25    0.6417    1.08  . Q    .     .     .     .
 12.33    0.6492    1.09  . Q    .     .     .     .
 12.42    0.6567    1.10  . Q    .     .     .     .
 12.50    0.6643    1.11  . Q    .     .     .     .
 12.58    0.6720    1.13  . Q    .     .     .     .
 12.67    0.6798    1.13  . Q    .     .     .     .
 12.75    0.6877    1.15  . Q    .     .     .     .
 12.83    0.6956    1.16  . Q    .     .     .     .
 12.92    0.7037    1.18  . Q    .     .     .     .
 13.00    0.7119    1.19  . Q    .     .     .     .
 13.08    0.7201    1.21  . Q    .     .     .     .
 13.17    0.7285    1.22  . Q    .     .     .     .
 13.25    0.7370    1.24  . Q    .     .     .     .
 13.33    0.7456    1.26  . Q    .     .     .     .
 13.42    0.7544    1.28  . Q    .     .     .     .
 13.50    0.7632    1.29  . Q    .     .     .     .
 13.58    0.7722    1.32  . Q    .     .     .     .
 13.67    0.7814    1.34  . Q    .     .     .     .
 13.75    0.7907    1.37  . Q    .     .     .     .
 13.83    0.8002    1.38  . Q    .     .     .     .
 13.92    0.8098    1.41  . Q    .     .     .     .
 14.00    0.8196    1.43  . Q    .     .     .     .
 14.08    0.8293    1.39  . Q    .     .     .     .
 14.17    0.8389    1.41  . Q    .     .     .     .
 14.25    0.8488    1.45  . Q    .     .     .     .
 14.33    0.8589    1.48  . Q    .     .     .     .
 14.42    0.8692    1.53  .  Q   .     .     .     .
 14.50    0.8798    1.55  .  Q   .     .     .     .
 14.58    0.8907    1.61  .  Q   .     .     .     .
 14.67    0.9019    1.64  .  Q   .     .     .     .
 14.75    0.9134    1.71  .  Q   .     .     .     .
 14.83    0.9253    1.75  .  Q   .     .     .     .
 14.92    0.9377    1.83  .  Q   .     .     .     .
 15.00    0.9504    1.88  .  Q   .     .     .     .
```

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15.08   0.9637    1.98 .   Q        .         .         .         .
15.17   0.9775    2.04 .    Q       .         .         .         .
15.25   0.9920    2.17 .    Q       .         .         .         .
15.33   1.0073    2.25 .    Q       .         .         .         .
15.42   1.0250    2.91 .     Q      .         .         .         .
15.50   1.0454    3.01 .      Q     .         .         .         .
15.58   1.0671    3.28 .      Q     .         .         .         .
15.67   1.0903    3.45 .      Q     .         .         .         .
15.75   1.1140    3.43 .      Q     .         .         .         .
15.83   1.1391    3.87 .       Q    .         .         .         .
15.92   1.1719    5.65 .         .Q          .         .         .
16.00   1.2180    7.73 .         .      Q     .         .         .
16.08   1.3124   20.19 .         .         .         .         Q.
16.17   1.3960    4.57 .          Q.          .         .         .
16.25   1.4245    3.69 .       Q    .         .         .         .
16.33   1.4480    3.14 .      Q     .         .         .         .
16.42   1.4668    2.34 .    Q       .         .         .         .
16.50   1.4821    2.10 .    Q       .         .         .         .
16.58   1.4960    1.93 .   Q        .         .         .         .
16.67   1.5088    1.79 .   Q        .         .         .         .
16.75   1.5207    1.67 .   Q        .         .         .         .
16.83   1.5319    1.58 .   Q        .         .         .         .
16.92   1.5425    1.50 .   Q        .         .         .         .
17.00   1.5526    1.43 .  Q         .         .         .         .
17.08   1.5625    1.45 .  Q         .         .         .         .
17.17   1.5723    1.40 .  Q         .         .         .         .
17.25   1.5818    1.35 .  Q         .         .         .         .
17.33   1.5910    1.31 .  Q         .         .         .         .
17.42   1.5998    1.27 .  Q         .         .         .         .
17.50   1.6084    1.23 .  Q         .         .         .         .
17.58   1.6168    1.20 .  Q         .         .         .         .
17.67   1.6250    1.17 .  Q         .         .         .         .
17.75   1.6330    1.14 .  Q         .         .         .         .
17.83   1.6408    1.12 .  Q         .         .         .         .
17.92   1.6484    1.09 .  Q         .         .         .         .
18.00   1.6558    1.07 .  Q         .         .         .         .
18.08   1.6628    0.95 .Q           .         .         .         .
18.17   1.6693    0.93 .Q           .         .         .         .
18.25   1.6757    0.92 .Q           .         .         .         .
18.33   1.6819    0.90 .Q           .         .         .         .
18.42   1.6881    0.88 .Q           .         .         .         .
18.50   1.6941    0.87 .Q           .         .         .         .
18.58   1.7000    0.85 .Q           .         .         .         .
18.67   1.7058    0.84 .Q           .         .         .         .
18.75   1.7115    0.82 .Q           .         .         .         .
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```
18.83    1.7171    0.81  .Q      .      .      .      .
18.92    1.7227    0.80  .Q      .      .      .      .
19.00    1.7281    0.79  .Q      .      .      .      .
19.08    1.7335    0.77  .Q      .      .      .      .
19.17    1.7388    0.76  .Q      .      .      .      .
19.25    1.7440    0.75  .Q      .      .      .      .
19.33    1.7492    0.74  .Q      .      .      .      .
19.42    1.7543    0.73  .Q      .      .      .      .
19.50    1.7593    0.72  .Q      .      .      .      .
19.58    1.7642    0.72  .Q      .      .      .      .
19.67    1.7691    0.71  .Q      .      .      .      .
19.75    1.7740    0.70  .Q      .      .      .      .
19.83    1.7788    0.69  .Q      .      .      .      .
19.92    1.7835    0.68  .Q      .      .      .      .
20.00    1.7882    0.68  .Q      .      .      .      .
20.08    1.7928    0.67  .Q      .      .      .      .
20.17    1.7974    0.66  .Q      .      .      .      .
20.25    1.8019    0.65  .Q      .      .      .      .
20.33    1.8064    0.65  .Q      .      .      .      .
20.42    1.8108    0.64  .Q      .      .      .      .
20.50    1.8152    0.63  .Q      .      .      .      .
20.58    1.8195    0.63  .Q      .      .      .      .
20.67    1.8238    0.62  .Q      .      .      .      .
20.75    1.8281    0.62  .Q      .      .      .      .
20.83    1.8323    0.61  .Q      .      .      .      .
20.92    1.8365    0.61  .Q      .      .      .      .
21.00    1.8407    0.60  .Q      .      .      .      .
21.08    1.8448    0.59  .Q      .      .      .      .
21.17    1.8489    0.59  .Q      .      .      .      .
21.25    1.8529    0.58  .Q      .      .      .      .
21.33    1.8569    0.58  .Q      .      .      .      .
21.42    1.8609    0.58  .Q      .      .      .      .
21.50    1.8649    0.57  .Q      .      .      .      .
21.58    1.8688    0.57  .Q      .      .      .      .
21.67    1.8727    0.56  .Q      .      .      .      .
21.75    1.8765    0.56  .Q      .      .      .      .
21.83    1.8803    0.55  .Q      .      .      .      .
21.92    1.8841    0.55  .Q      .      .      .      .
22.00    1.8879    0.55  .Q      .      .      .      .
22.08    1.8916    0.54  .Q      .      .      .      .
22.17    1.8954    0.54  .Q      .      .      .      .
22.25    1.8991    0.53  .Q      .      .      .      .
22.33    1.9027    0.53  .Q      .      .      .      .
22.42    1.9064    0.53  .Q      .      .      .      .
22.50    1.9100    0.52  .Q      .      .      .      .
```

```
 22.58    1.9136    0.52  .Q      .      .      .      .
 22.67    1.9171    0.52  .Q      .      .      .      .
 22.75    1.9207    0.51  .Q      .      .      .      .
 22.83    1.9242    0.51  .Q      .      .      .      .
 22.92    1.9277    0.51  .Q      .      .      .      .
 23.00    1.9312    0.50  .Q      .      .      .      .
 23.08    1.9346    0.50  Q       .      .      .      .
 23.17    1.9380    0.50  Q       .      .      .      .
 23.25    1.9415    0.49  Q       .      .      .      .
 23.33    1.9449    0.49  Q       .      .      .      .
 23.42    1.9482    0.49  Q       .      .      .      .
 23.50    1.9516    0.49  Q       .      .      .      .
 23.58    1.9549    0.48  Q       .      .      .      .
 23.67    1.9582    0.48  Q       .      .      .      .
 23.75    1.9615    0.48  Q       .      .      .      .
 23.83    1.9648    0.47  Q       .      .      .      .
 23.92    1.9680    0.47  Q       .      .      .      .
 24.00    1.9713    0.47  Q       .      .      .      .
 24.08    1.9729    0.00  Q       .      .      .      .
-----------------------------------------------------------------------------
------------------------------------------------------------------------------
  TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
  (Note: 100% of Peak Flow Rate estimate assumed to have
  an instantaneous time duration)

  Percentile of Estimated              Duration
     Peak Flow Rate                   (minutes)
  =======================             =========
          0%                        1440.0
         10%                          90.0
         20%                          20.0
         30%                          10.0
         40%                           5.0
         50%                           5.0
         60%                           5.0
         70%                           5.0
         80%                           5.0
         90%                           5.0
```

DA 1 Post Developed Condition 100 Year Storm Event

```
============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
  AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

  TOTAL 24-HOUR DURATION RAINFALL DEPTH =    10.60 (inches)

  SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
    TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
      1         2.16        0.00      98.(AMC II)    0.000       0.977
      2         2.71     100.00       67.(AMC II)     0.296       0.825

  TOTAL AREA (Acres) =     4.87
                    _
  AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.165
                       _
  AREA-AVERAGED LOW LOSS FRACTION, Y = 0.108
============================================================================
----------------------------------------------------------------------------



  RATIONAL METHOD CALIBRATION COEFFICIENT = 1.00
  TOTAL CATCHMENT AREA(ACRES) =    4.87
  SOIL-LOSS RATE, Fm,(INCH/HR) =  0.165
  LOW LOSS FRACTION = 0.108
  TIME OF CONCENTRATION(MIN.) =  5.00
  SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
  USER SPECIFIED RAINFALL VALUES ARE USED
  RETURN FREQUENCY(YEARS) = 100
    5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.59
   30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.52
    1-HOUR   POINT RAINFALL VALUE(INCHES) =  2.31
    3-HOUR   POINT RAINFALL VALUE(INCHES) =  3.82
    6-HOUR   POINT RAINFALL VALUE(INCHES) =  5.44
   24-HOUR   POINT RAINFALL VALUE(INCHES) = 10.60

----------------------------------------------------------------------------

  TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     3.84
  TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.46

****************************************************************************
 TIME     VOLUME      Q    0.      10.0     20.0     30.0     40.0
(HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
```

```
0.08    0.0032    0.92  Q       .       .       .       .
0.17    0.0096    0.93  Q       .       .       .       .
0.25    0.0159    0.93  Q       .       .       .       .
0.33    0.0223    0.93  Q       .       .       .       .
0.42    0.0288    0.93  Q       .       .       .       .
0.50    0.0352    0.94  Q       .       .       .       .
0.58    0.0417    0.94  Q       .       .       .       .
0.67    0.0481    0.94  Q       .       .       .       .
0.75    0.0546    0.94  Q       .       .       .       .
0.83    0.0611    0.95  Q       .       .       .       .
0.92    0.0677    0.95  Q       .       .       .       .
1.00    0.0742    0.95  Q       .       .       .       .
1.08    0.0808    0.96  Q       .       .       .       .
1.17    0.0874    0.96  Q       .       .       .       .
1.25    0.0940    0.96  Q       .       .       .       .
1.33    0.1006    0.96  Q       .       .       .       .
1.42    0.1073    0.97  Q       .       .       .       .
1.50    0.1139    0.97  Q       .       .       .       .
1.58    0.1206    0.97  Q       .       .       .       .
1.67    0.1273    0.97  Q       .       .       .       .
1.75    0.1340    0.98  Q       .       .       .       .
1.83    0.1408    0.98  Q       .       .       .       .
1.92    0.1476    0.98  Q       .       .       .       .
2.00    0.1543    0.99  Q       .       .       .       .
2.08    0.1611    0.99  Q       .       .       .       .
2.17    0.1680    0.99  Q       .       .       .       .
2.25    0.1748    1.00  Q       .       .       .       .
2.33    0.1817    1.00  Q       .       .       .       .
2.42    0.1886    1.00  .Q      .       .       .       .
2.50    0.1955    1.01  .Q      .       .       .       .
2.58    0.2024    1.01  .Q      .       .       .       .
2.67    0.2094    1.01  .Q      .       .       .       .
2.75    0.2164    1.02  .Q      .       .       .       .
2.83    0.2234    1.02  .Q      .       .       .       .
2.92    0.2304    1.02  .Q      .       .       .       .
3.00    0.2375    1.02  .Q      .       .       .       .
3.08    0.2445    1.03  .Q      .       .       .       .
3.17    0.2516    1.03  .Q      .       .       .       .
3.25    0.2588    1.04  .Q      .       .       .       .
3.33    0.2659    1.04  .Q      .       .       .       .
3.42    0.2731    1.04  .Q      .       .       .       .
3.50    0.2803    1.05  .Q      .       .       .       .
3.58    0.2875    1.05  .Q      .       .       .       .
3.67    0.2947    1.05  .Q      .       .       .       .
3.75    0.3020    1.06  .Q      .       .       .       .
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```
 3.83    0.3093    1.06  .Q      .      .      .      .
 3.92    0.3166    1.07  .Q      .      .      .      .
 4.00    0.3240    1.07  .Q      .      .      .      .
 4.08    0.3313    1.07  .Q      .      .      .      .
 4.17    0.3387    1.08  .Q      .      .      .      .
 4.25    0.3462    1.08  .Q      .      .      .      .
 4.33    0.3536    1.08  .Q      .      .      .      .
 4.42    0.3611    1.09  .Q      .      .      .      .
 4.50    0.3686    1.09  .Q      .      .      .      .
 4.58    0.3761    1.10  .Q      .      .      .      .
 4.67    0.3837    1.10  .Q      .      .      .      .
 4.75    0.3913    1.11  .Q      .      .      .      .
 4.83    0.3989    1.11  .Q      .      .      .      .
 4.92    0.4066    1.11  .Q      .      .      .      .
 5.00    0.4143    1.12  .Q      .      .      .      .
 5.08    0.4220    1.12  .Q      .      .      .      .
 5.17    0.4297    1.13  .Q      .      .      .      .
 5.25    0.4375    1.13  .Q      .      .      .      .
 5.33    0.4453    1.13  .Q      .      .      .      .
 5.42    0.4531    1.14  .Q      .      .      .      .
 5.50    0.4610    1.14  .Q      .      .      .      .
 5.58    0.4689    1.15  .Q      .      .      .      .
 5.67    0.4768    1.15  .Q      .      .      .      .
 5.75    0.4848    1.16  .Q      .      .      .      .
 5.83    0.4928    1.16  .Q      .      .      .      .
 5.92    0.5008    1.17  .Q      .      .      .      .
 6.00    0.5089    1.17  .Q      .      .      .      .
 6.08    0.5170    1.18  .Q      .      .      .      .
 6.17    0.5251    1.18  .Q      .      .      .      .
 6.25    0.5333    1.19  .Q      .      .      .      .
 6.33    0.5415    1.19  .Q      .      .      .      .
 6.42    0.5498    1.20  .Q      .      .      .      .
 6.50    0.5581    1.20  .Q      .      .      .      .
 6.58    0.5664    1.21  .Q      .      .      .      .
 6.67    0.5747    1.22  .Q      .      .      .      .
 6.75    0.5831    1.22  .Q      .      .      .      .
 6.83    0.5916    1.23  .Q      .      .      .      .
 6.92    0.6000    1.23  .Q      .      .      .      .
 7.00    0.6086    1.24  .Q      .      .      .      .
 7.08    0.6171    1.25  .Q      .      .      .      .
 7.17    0.6257    1.25  .Q      .      .      .      .
 7.25    0.6343    1.26  .Q      .      .      .      .
 7.33    0.6430    1.26  .Q      .      .      .      .
 7.42    0.6518    1.27  .Q      .      .      .      .
 7.50    0.6605    1.28  .Q      .      .      .      .
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  7.58    0.6693    1.28 .Q     .     .     .     .
  7.67    0.6782    1.29 .Q     .     .     .     .
  7.75    0.6871    1.30 .Q     .     .     .     .
  7.83    0.6961    1.30 .Q     .     .     .     .
  7.92    0.7050    1.31 .Q     .     .     .     .
  8.00    0.7141    1.32 .Q     .     .     .     .
  8.08    0.7232    1.33 .Q     .     .     .     .
  8.17    0.7323    1.33 .Q     .     .     .     .
  8.25    0.7415    1.34 .Q     .     .     .     .
  8.33    0.7508    1.34 .Q     .     .     .     .
  8.42    0.7601    1.35 .Q     .     .     .     .
  8.50    0.7694    1.36 .Q     .     .     .     .
  8.58    0.7788    1.37 .Q     .     .     .     .
  8.67    0.7883    1.38 .Q     .     .     .     .
  8.75    0.7978    1.39 .Q     .     .     .     .
  8.83    0.8074    1.39 .Q     .     .     .     .
  8.92    0.8170    1.40 .Q     .     .     .     .
  9.00    0.8267    1.41 .Q     .     .     .     .
  9.08    0.8364    1.42 .Q     .     .     .     .
  9.17    0.8462    1.43 .Q     .     .     .     .
  9.25    0.8561    1.44 .Q     .     .     .     .
  9.33    0.8660    1.44 .Q     .     .     .     .
  9.42    0.8760    1.46 .Q     .     .     .     .
  9.50    0.8861    1.46 .Q     .     .     .     .
  9.58    0.8962    1.48 .Q     .     .     .     .
  9.67    0.9064    1.48 .Q     .     .     .     .
  9.75    0.9166    1.50 .Q     .     .     .     .
  9.83    0.9270    1.50 .Q     .     .     .     .
  9.92    0.9374    1.52 .Q     .     .     .     .
 10.00    0.9478    1.52 .Q     .     .     .     .
 10.08    0.9584    1.54 .Q     .     .     .     .
 10.17    0.9690    1.55 .Q     .     .     .     .
 10.25    0.9797    1.56 .Q     .     .     .     .
 10.33    0.9905    1.57 .Q     .     .     .     .
 10.42    1.0014    1.59 .Q     .     .     .     .
 10.50    1.0123    1.59 .Q     .     .     .     .
 10.58    1.0234    1.61 .Q     .     .     .     .
 10.67    1.0345    1.62 .Q     .     .     .     .
 10.75    1.0457    1.64 .Q     .     .     .     .
 10.83    1.0570    1.65 .Q     .     .     .     .
 10.92    1.0684    1.66 .Q     .     .     .     .
 11.00    1.0799    1.67 .Q     .     .     .     .
 11.08    1.0915    1.69 .Q     .     .     .     .
 11.17    1.1032    1.70 .Q     .     .     .     .
 11.25    1.1150    1.72 .Q     .     .     .     .
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11.33    1.1269    1.73 .Q      .      .      .      .
11.42    1.1389    1.75 .Q      .      .      .      .
11.50    1.1510    1.77 .Q      .      .      .      .
11.58    1.1633    1.79 .Q      .      .      .      .
11.67    1.1756    1.80 .Q      .      .      .      .
11.75    1.1881    1.82 .Q      .      .      .      .
11.83    1.2007    1.84 .Q      .      .      .      .
11.92    1.2134    1.86 .Q      .      .      .      .
12.00    1.2263    1.88 .Q      .      .      .      .
12.08    1.2397    2.02 . Q     .      .      .      .
12.17    1.2536    2.03 . Q     .      .      .      .
12.25    1.2677    2.06 . Q     .      .      .      .
12.33    1.2819    2.07 . Q     .      .      .      .
12.42    1.2963    2.10 . Q     .      .      .      .
12.50    1.3109    2.12 . Q     .      .      .      .
12.58    1.3256    2.15 . Q     .      .      .      .
12.67    1.3405    2.17 . Q     .      .      .      .
12.75    1.3555    2.21 . Q     .      .      .      .
12.83    1.3708    2.22 . Q     .      .      .      .
12.92    1.3863    2.26 . Q     .      .      .      .
13.00    1.4019    2.28 . Q     .      .      .      .
13.08    1.4178    2.32 . Q     .      .      .      .
13.17    1.4338    2.35 . Q     .      .      .      .
13.25    1.4501    2.39 . Q     .      .      .      .
13.33    1.4667    2.41 . Q     .      .      .      .
13.42    1.4835    2.46 . Q     .      .      .      .
13.50    1.5005    2.49 . Q     .      .      .      .
13.58    1.5179    2.54 . Q     .      .      .      .
13.67    1.5355    2.57 . Q     .      .      .      .
13.75    1.5534    2.63 . Q     .      .      .      .
13.83    1.5716    2.66 . Q     .      .      .      .
13.92    1.5902    2.73 . Q     .      .      .      .
14.00    1.6091    2.77 . Q     .      .      .      .
14.08    1.6274    2.55 . Q     .      .      .      .
14.17    1.6451    2.59 . Q     .      .      .      .
14.25    1.6633    2.68 . Q     .      .      .      .
14.33    1.6819    2.72 . Q     .      .      .      .
14.42    1.7010    2.82 . Q     .      .      .      .
14.50    1.7206    2.87 . Q     .      .      .      .
14.58    1.7408    2.99 . Q     .      .      .      .
14.67    1.7616    3.05 .  Q    .      .      .      .
14.75    1.7831    3.19 .  Q    .      .      .      .
14.83    1.8053    3.27 .  Q    .      .      .      .
14.92    1.8284    3.44 .  Q    .      .      .      .
15.00    1.8524    3.53 .  Q    .      .      .      .
```

```
15.08   1.8775    3.74  .  Q      .         .         .         .
15.17   1.9037    3.87  .  Q      .         .         .         .
15.25   1.9313    4.15  .   Q     .         .         .         .
15.33   1.9604    4.31  .   Q     .         .         .         .
15.42   1.9965    6.16  .     Q   .         .         .         .
15.50   2.0397    6.39  .     Q   .         .         .         .
15.58   2.0858    6.99  .     Q   .         .         .         .
15.67   2.1352    7.38  .      Q  .         .         .         .
15.75   2.1860    7.35  .      Q  .         .         .         .
15.83   2.2394    8.17  .       Q .         .         .         .
15.92   2.3056   11.07  .         .Q        .         .         .
16.00   2.3935   14.44  .         . Q       .         .         .
16.08   2.5592   34.92  .         .         .         . Q       .
16.17   2.7072    9.30  .        Q.         .         .         .
16.25   2.7663    7.86  .      Q  .         .         .         .
16.33   2.8163    6.65  .     Q   .         .         .         .
16.42   2.8546    4.49  .   Q     .         .         .         .
16.50   2.8839    4.00  .  Q      .         .         .         .
16.58   2.9102    3.63  .  Q      .         .         .         .
16.67   2.9342    3.35  .  Q      .         .         .         .
16.75   2.9565    3.12  .  Q      .         .         .         .
16.83   2.9773    2.93  . Q       .         .         .         .
16.92   2.9970    2.77  . Q       .         .         .         .
17.00   3.0156    2.63  . Q       .         .         .         .
17.08   3.0343    2.80  . Q       .         .         .         .
17.17   3.0532    2.70  . Q       .         .         .         .
17.25   3.0715    2.60  . Q       .         .         .         .
17.33   3.0891    2.52  . Q       .         .         .         .
17.42   3.1062    2.44  . Q       .         .         .         .
17.50   3.1227    2.37  . Q       .         .         .         .
17.58   3.1388    2.30  . Q       .         .         .         .
17.67   3.1544    2.24  . Q       .         .         .         .
17.75   3.1697    2.19  . Q       .         .         .         .
17.83   3.1846    2.14  . Q       .         .         .         .
17.92   3.1991    2.09  . Q       .         .         .         .
18.00   3.2134    2.04  . Q       .         .         .         .
18.08   3.2269    1.89  .Q        .         .         .         .
18.17   3.2398    1.85  .Q        .         .         .         .
18.25   3.2524    1.81  .Q        .         .         .         .
18.33   3.2647    1.78  .Q        .         .         .         .
18.42   3.2769    1.74  .Q        .         .         .         .
18.50   3.2888    1.71  .Q        .         .         .         .
18.58   3.3005    1.68  .Q        .         .         .         .
18.67   3.3120    1.66  .Q        .         .         .         .
18.75   3.3233    1.63  .Q        .         .         .         .
```

```
  18.83      3.3344      1.60  .Q       .       .       .       .
  18.92      3.3453      1.58  .Q       .       .       .       .
  19.00      3.3561      1.55  .Q       .       .       .       .
  19.08      3.3668      1.53  .Q       .       .       .       .
  19.17      3.3772      1.51  .Q       .       .       .       .
  19.25      3.3876      1.49  .Q       .       .       .       .
  19.33      3.3978      1.47  .Q       .       .       .       .
  19.42      3.4078      1.45  .Q       .       .       .       .
  19.50      3.4177      1.43  .Q       .       .       .       .
  19.58      3.4275      1.41  .Q       .       .       .       .
  19.67      3.4372      1.40  .Q       .       .       .       .
  19.75      3.4468      1.38  .Q       .       .       .       .
  19.83      3.4563      1.37  .Q       .       .       .       .
  19.92      3.4656      1.35  .Q       .       .       .       .
  20.00      3.4748      1.33  .Q       .       .       .       .
  20.08      3.4840      1.32  .Q       .       .       .       .
  20.17      3.4930      1.31  .Q       .       .       .       .
  20.25      3.5020      1.29  .Q       .       .       .       .
  20.33      3.5108      1.28  .Q       .       .       .       .
  20.42      3.5196      1.27  .Q       .       .       .       .
  20.50      3.5283      1.25  .Q       .       .       .       .
  20.58      3.5369      1.24  .Q       .       .       .       .
  20.67      3.5454      1.23  .Q       .       .       .       .
  20.75      3.5538      1.22  .Q       .       .       .       .
  20.83      3.5622      1.21  .Q       .       .       .       .
  20.92      3.5705      1.20  .Q       .       .       .       .
  21.00      3.5787      1.19  .Q       .       .       .       .
  21.08      3.5868      1.18  .Q       .       .       .       .
  21.17      3.5949      1.17  .Q       .       .       .       .
  21.25      3.6029      1.16  .Q       .       .       .       .
  21.33      3.6108      1.15  .Q       .       .       .       .
  21.42      3.6187      1.14  .Q       .       .       .       .
  21.50      3.6265      1.13  .Q       .       .       .       .
  21.58      3.6343      1.12  .Q       .       .       .       .
  21.67      3.6419      1.11  .Q       .       .       .       .
  21.75      3.6496      1.10  .Q       .       .       .       .
  21.83      3.6571      1.09  .Q       .       .       .       .
  21.92      3.6646      1.09  .Q       .       .       .       .
  22.00      3.6721      1.08  .Q       .       .       .       .
  22.08      3.6795      1.07  .Q       .       .       .       .
  22.17      3.6868      1.06  .Q       .       .       .       .
  22.25      3.6941      1.06  .Q       .       .       .       .
  22.33      3.7014      1.05  .Q       .       .       .       .
  22.42      3.7086      1.04  .Q       .       .       .       .
  22.50      3.7157      1.03  .Q       .       .       .       .
```

```
 22.58    3.7228    1.03  .Q      .       .       .       .
 22.67    3.7299    1.02  .Q      .       .       .       .
 22.75    3.7369    1.01  .Q      .       .       .       .
 22.83    3.7438    1.01  .Q      .       .       .       .
 22.92    3.7507    1.00  .Q      .       .       .       .
 23.00    3.7576    0.99  Q       .       .       .       .
 23.08    3.7644    0.99  Q       .       .       .       .
 23.17    3.7712    0.98  Q       .       .       .       .
 23.25    3.7780    0.98  Q       .       .       .       .
 23.33    3.7847    0.97  Q       .       .       .       .
 23.42    3.7913    0.96  Q       .       .       .       .
 23.50    3.7980    0.96  Q       .       .       .       .
 23.58    3.8046    0.95  Q       .       .       .       .
 23.67    3.8111    0.95  Q       .       .       .       .
 23.75    3.8176    0.94  Q       .       .       .       .
 23.83    3.8241    0.94  Q       .       .       .       .
 23.92    3.8305    0.93  Q       .       .       .       .
 24.00    3.8369    0.93  Q       .       .       .       .
 24.08    3.8401    0.00  Q       .       .       .       .
----------------------------------------------------------------------------
-------------------------------------------------------------------------------
  TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
  (Note: 100% of Peak Flow Rate estimate assumed to have
  an instantaneous time duration)

  Percentile of Estimated              Duration
    Peak Flow Rate                   (minutes)
  =======================             =========
         0%                      1440.0
        10%                       105.0
        20%                        45.0
        30%                        15.0
        40%                        10.0
        50%                         5.0
        60%                         5.0
        70%                         5.0
        80%                         5.0
        90%                         5.0
```

DA 2 Post Developed Condition 100 Year Storm Event

```
============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
   AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

   TOTAL 24-HOUR DURATION RAINFALL DEPTH =    10.60 (inches)

   SOIL-COVER     AREA     PERCENT OF    SCS CURVE    LOSS RATE
     TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
       1         2.18       0.00      98.(AMC II)    0.000      0.977
       2         2.61     100.00      67.(AMC II)    0.296      0.825

   TOTAL AREA (Acres) =     4.79
                     _
   AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.161
                          _
   AREA-AVERAGED LOW LOSS FRACTION, Y = 0.106
============================================================================
----------------------------------------------------------------------------



   RATIONAL METHOD CALIBRATION COEFFICIENT = 1.00
   TOTAL CATCHMENT AREA(ACRES) =    4.79
   SOIL-LOSS RATE, Fm,(INCH/HR) =  0.161
   LOW LOSS FRACTION = 0.106
   TIME OF CONCENTRATION(MIN.) =  5.00
   SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
   USER SPECIFIED RAINFALL VALUES ARE USED
   RETURN FREQUENCY(YEARS) = 100
     5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.59
    30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.52
     1-HOUR   POINT RAINFALL VALUE(INCHES) =  2.31
     3-HOUR   POINT RAINFALL VALUE(INCHES) =  3.82
     6-HOUR   POINT RAINFALL VALUE(INCHES) =  5.44
    24-HOUR   POINT RAINFALL VALUE(INCHES) = 10.60

----------------------------------------------------------------------------

   TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     3.79
   TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.45

****************************************************************************
 TIME     VOLUME      Q   0.      10.0     20.0     30.0     40.0
(HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
```

```
0.08   0.0031   0.91  Q      .      .      .      .
0.17   0.0094   0.91  Q      .      .      .      .
0.25   0.0157   0.92  Q      .      .      .      .
0.33   0.0220   0.92  Q      .      .      .      .
0.42   0.0284   0.92  Q      .      .      .      .
0.50   0.0347   0.92  Q      .      .      .      .
0.58   0.0411   0.93  Q      .      .      .      .
0.67   0.0475   0.93  Q      .      .      .      .
0.75   0.0539   0.93  Q      .      .      .      .
0.83   0.0603   0.93  Q      .      .      .      .
0.92   0.0667   0.94  Q      .      .      .      .
1.00   0.0732   0.94  Q      .      .      .      .
1.08   0.0797   0.94  Q      .      .      .      .
1.17   0.0861   0.94  Q      .      .      .      .
1.25   0.0927   0.95  Q      .      .      .      .
1.33   0.0992   0.95  Q      .      .      .      .
1.42   0.1057   0.95  Q      .      .      .      .
1.50   0.1123   0.95  Q      .      .      .      .
1.58   0.1189   0.96  Q      .      .      .      .
1.67   0.1255   0.96  Q      .      .      .      .
1.75   0.1321   0.96  Q      .      .      .      .
1.83   0.1388   0.97  Q      .      .      .      .
1.92   0.1455   0.97  Q      .      .      .      .
2.00   0.1521   0.97  Q      .      .      .      .
2.08   0.1589   0.98  Q      .      .      .      .
2.17   0.1656   0.98  Q      .      .      .      .
2.25   0.1723   0.98  Q      .      .      .      .
2.33   0.1791   0.98  Q      .      .      .      .
2.42   0.1859   0.99  Q      .      .      .      .
2.50   0.1927   0.99  Q      .      .      .      .
2.58   0.1996   1.00  Q      .      .      .      .
2.67   0.2064   1.00  Q      .      .      .      .
2.75   0.2133   1.00  .Q     .      .      .      .
2.83   0.2202   1.00  .Q     .      .      .      .
2.92   0.2271   1.01  .Q     .      .      .      .
3.00   0.2341   1.01  .Q     .      .      .      .
3.08   0.2411   1.01  .Q     .      .      .      .
3.17   0.2481   1.02  .Q     .      .      .      .
3.25   0.2551   1.02  .Q     .      .      .      .
3.33   0.2621   1.02  .Q     .      .      .      .
3.42   0.2692   1.03  .Q     .      .      .      .
3.50   0.2763   1.03  .Q     .      .      .      .
3.58   0.2834   1.04  .Q     .      .      .      .
3.67   0.2905   1.04  .Q     .      .      .      .
3.75   0.2977   1.04  .Q     .      .      .      .
```

```
3.83  0.3049   1.05 .Q   .    .    .    .
3.92  0.3121   1.05 .Q   .    .    .    .
4.00  0.3194   1.05 .Q   .    .    .    .
4.08  0.3266   1.06 .Q   .    .    .    .
4.17  0.3339   1.06 .Q   .    .    .    .
4.25  0.3412   1.07 .Q   .    .    .    .
4.33  0.3486   1.07 .Q   .    .    .    .
4.42  0.3560   1.07 .Q   .    .    .    .
4.50  0.3634   1.08 .Q   .    .    .    .
4.58  0.3708   1.08 .Q   .    .    .    .
4.67  0.3783   1.08 .Q   .    .    .    .
4.75  0.3857   1.09 .Q   .    .    .    .
4.83  0.3933   1.09 .Q   .    .    .    .
4.92  0.4008   1.10 .Q   .    .    .    .
5.00  0.4084   1.10 .Q   .    .    .    .
5.08  0.4160   1.11 .Q   .    .    .    .
5.17  0.4236   1.11 .Q   .    .    .    .
5.25  0.4313   1.12 .Q   .    .    .    .
5.33  0.4390   1.12 .Q   .    .    .    .
5.42  0.4467   1.12 .Q   .    .    .    .
5.50  0.4544   1.13 .Q   .    .    .    .
5.58  0.4622   1.13 .Q   .    .    .    .
5.67  0.4701   1.14 .Q   .    .    .    .
5.75  0.4779   1.14 .Q   .    .    .    .
5.83  0.4858   1.15 .Q   .    .    .    .
5.92  0.4937   1.15 .Q   .    .    .    .
6.00  0.5017   1.16 .Q   .    .    .    .
6.08  0.5097   1.16 .Q   .    .    .    .
6.17  0.5177   1.17 .Q   .    .    .    .
6.25  0.5257   1.17 .Q   .    .    .    .
6.33  0.5338   1.18 .Q   .    .    .    .
6.42  0.5420   1.18 .Q   .    .    .    .
6.50  0.5501   1.19 .Q   .    .    .    .
6.58  0.5583   1.19 .Q   .    .    .    .
6.67  0.5666   1.20 .Q   .    .    .    .
6.75  0.5748   1.21 .Q   .    .    .    .
6.83  0.5832   1.21 .Q   .    .    .    .
6.92  0.5915   1.22 .Q   .    .    .    .
7.00  0.5999   1.22 .Q   .    .    .    .
7.08  0.6083   1.23 .Q   .    .    .    .
7.17  0.6168   1.23 .Q   .    .    .    .
7.25  0.6253   1.24 .Q   .    .    .    .
7.33  0.6339   1.24 .Q   .    .    .    .
7.42  0.6425   1.25 .Q   .    .    .    .
7.50  0.6511   1.26 .Q   .    .    .    .
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```
 7.58    0.6598    1.27 .Q      .      .      .      .
 7.67    0.6686    1.27 .Q      .      .      .      .
 7.75    0.6773    1.28 .Q      .      .      .      .
 7.83    0.6862    1.28 .Q      .      .      .      .
 7.92    0.6950    1.29 .Q      .      .      .      .
 8.00    0.7039    1.30 .Q      .      .      .      .
 8.08    0.7129    1.31 .Q      .      .      .      .
 8.17    0.7219    1.31 .Q      .      .      .      .
 8.25    0.7310    1.32 .Q      .      .      .      .
 8.33    0.7401    1.33 .Q      .      .      .      .
 8.42    0.7493    1.34 .Q      .      .      .      .
 8.50    0.7585    1.34 .Q      .      .      .      .
 8.58    0.7677    1.35 .Q      .      .      .      .
 8.67    0.7771    1.36 .Q      .      .      .      .
 8.75    0.7864    1.37 .Q      .      .      .      .
 8.83    0.7959    1.37 .Q      .      .      .      .
 8.92    0.8054    1.38 .Q      .      .      .      .
 9.00    0.8149    1.39 .Q      .      .      .      .
 9.08    0.8245    1.40 .Q      .      .      .      .
 9.17    0.8342    1.41 .Q      .      .      .      .
 9.25    0.8439    1.42 .Q      .      .      .      .
 9.33    0.8537    1.42 .Q      .      .      .      .
 9.42    0.8635    1.44 .Q      .      .      .      .
 9.50    0.8735    1.44 .Q      .      .      .      .
 9.58    0.8834    1.46 .Q      .      .      .      .
 9.67    0.8935    1.46 .Q      .      .      .      .
 9.75    0.9036    1.48 .Q      .      .      .      .
 9.83    0.9138    1.48 .Q      .      .      .      .
 9.92    0.9240    1.50 .Q      .      .      .      .
10.00    0.9344    1.50 .Q      .      .      .      .
10.08    0.9448    1.52 .Q      .      .      .      .
10.17    0.9552    1.52 .Q      .      .      .      .
10.25    0.9658    1.54 .Q      .      .      .      .
10.33    0.9764    1.55 .Q      .      .      .      .
10.42    0.9871    1.56 .Q      .      .      .      .
10.50    0.9979    1.57 .Q      .      .      .      .
10.58    1.0088    1.59 .Q      .      .      .      .
10.67    1.0198    1.60 .Q      .      .      .      .
10.75    1.0308    1.61 .Q      .      .      .      .
10.83    1.0420    1.62 .Q      .      .      .      .
10.92    1.0532    1.64 .Q      .      .      .      .
11.00    1.0645    1.65 .Q      .      .      .      .
11.08    1.0760    1.67 .Q      .      .      .      .
11.17    1.0875    1.68 .Q      .      .      .      .
11.25    1.0991    1.70 .Q      .      .      .      .
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 11.33    1.1109    1.71 .Q     .     .     .     .
 11.42    1.1227    1.73 .Q     .     .     .     .
 11.50    1.1347    1.74 .Q     .     .     .     .
 11.58    1.1467    1.76 .Q     .     .     .     .
 11.67    1.1589    1.77 .Q     .     .     .     .
 11.75    1.1712    1.80 .Q     .     .     .     .
 11.83    1.1836    1.81 .Q     .     .     .     .
 11.92    1.1962    1.84 .Q     .     .     .     .
 12.00    1.2089    1.85 .Q     .     .     .     .
 12.08    1.2221    1.99 .Q     .     .     .     .
 12.17    1.2358    2.00 . Q    .     .     .     .
 12.25    1.2497    2.03 . Q    .     .     .     .
 12.33    1.2637    2.04 . Q    .     .     .     .
 12.42    1.2779    2.07 . Q    .     .     .     .
 12.50    1.2922    2.09 . Q    .     .     .     .
 12.58    1.3067    2.12 . Q    .     .     .     .
 12.67    1.3214    2.14 . Q    .     .     .     .
 12.75    1.3363    2.17 . Q    .     .     .     .
 12.83    1.3513    2.19 . Q    .     .     .     .
 12.92    1.3665    2.23 . Q    .     .     .     .
 13.00    1.3820    2.25 . Q    .     .     .     .
 13.08    1.3976    2.29 . Q    .     .     .     .
 13.17    1.4134    2.31 . Q    .     .     .     .
 13.25    1.4295    2.36 . Q    .     .     .     .
 13.33    1.4458    2.38 . Q    .     .     .     .
 13.42    1.4624    2.43 . Q    .     .     .     .
 13.50    1.4792    2.45 . Q    .     .     .     .
 13.58    1.4963    2.51 . Q    .     .     .     .
 13.67    1.5136    2.53 . Q    .     .     .     .
 13.75    1.5313    2.59 . Q    .     .     .     .
 13.83    1.5493    2.63 . Q    .     .     .     .
 13.92    1.5676    2.69 . Q    .     .     .     .
 14.00    1.5862    2.73 . Q    .     .     .     .
 14.08    1.6043    2.52 . Q    .     .     .     .
 14.17    1.6217    2.55 . Q    .     .     .     .
 14.25    1.6396    2.64 . Q    .     .     .     .
 14.33    1.6579    2.68 . Q    .     .     .     .
 14.42    1.6768    2.78 . Q    .     .     .     .
 14.50    1.6961    2.83 . Q    .     .     .     .
 14.58    1.7160    2.95 . Q    .     .     .     .
 14.67    1.7365    3.01 .  Q   .     .     .     .
 14.75    1.7577    3.15 .  Q   .     .     .     .
 14.83    1.7797    3.22 .  Q   .     .     .     .
 14.92    1.8024    3.39 .  Q   .     .     .     .
 15.00    1.8261    3.48 .  Q   .     .     .     .
```

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15.08    1.8508    3.69 .  Q     .      .       .      .
15.17    1.8766    3.81 .  Q     .      .       .      .
15.25    1.9038    4.09 .   Q    .      .       .      .
15.33    1.9325    4.25 .   Q    .      .       .      .
15.42    1.9681    6.08 .    Q   .      .       .      .
15.50    2.0107    6.30 .    Q   .      .       .      .
15.58    2.0561    6.89 .    Q   .      .       .      .
15.67    2.1049    7.28 .     Q  .      .       .      .
15.75    2.1549    7.25 .     Q  .      .       .      .
15.83    2.2076    8.05 .      Q .      .       .      .
15.92    2.2729   10.91 .        Q      .       .      .
16.00    2.3594   14.22 .        . Q    .       .      .
16.08    2.5225   34.76 .        .      .       . Q    .
16.17    2.6682    9.17 .       Q.      .       .      .
16.25    2.7265    7.75 .     Q  .      .       .      .
16.33    2.7758    6.56 .    Q   .      .       .      .
16.42    2.8137    4.43 .   Q    .      .       .      .
16.50    2.8425    3.94 .  Q     .      .       .      .
16.58    2.8684    3.58 .  Q     .      .       .      .
16.67    2.8921    3.30 .  Q     .      .       .      .
16.75    2.9141    3.08 .  Q     .      .       .      .
16.83    2.9346    2.89 . Q      .      .       .      .
16.92    2.9540    2.73 . Q      .      .       .      .
17.00    2.9723    2.60 . Q      .      .       .      .
17.08    2.9908    2.76 . Q      .      .       .      .
17.17    3.0094    2.66 . Q      .      .       .      .
17.25    3.0274    2.56 . Q      .      .       .      .
17.33    3.0448    2.48 . Q      .      .       .      .
17.42    3.0616    2.40 . Q      .      .       .      .
17.50    3.0779    2.33 . Q      .      .       .      .
17.58    3.0937    2.27 . Q      .      .       .      .
17.67    3.1092    2.21 . Q      .      .       .      .
17.75    3.1242    2.16 . Q      .      .       .      .
17.83    3.1389    2.11 . Q      .      .       .      .
17.92    3.1532    2.06 . Q      .      .       .      .
18.00    3.1673    2.01 . Q      .      .       .      .
18.08    3.1806    1.86 .Q       .      .       .      .
18.17    3.1933    1.82 .Q       .      .       .      .
18.25    3.2057    1.79 .Q       .      .       .      .
18.33    3.2179    1.75 .Q       .      .       .      .
18.42    3.2299    1.72 .Q       .      .       .      .
18.50    3.2416    1.69 .Q       .      .       .      .
18.58    3.2531    1.66 .Q       .      .       .      .
18.67    3.2645    1.63 .Q       .      .       .      .
18.75    3.2756    1.60 .Q       .      .       .      .
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 18.83     3.2866     1.58  .Q      .      .      .      .
 18.92     3.2974     1.56  .Q      .      .      .      .
 19.00     3.3080     1.53  .Q      .      .      .      .
 19.08     3.3185     1.51  .Q      .      .      .      .
 19.17     3.3288     1.49  .Q      .      .      .      .
 19.25     3.3390     1.47  .Q      .      .      .      .
 19.33     3.3490     1.45  .Q      .      .      .      .
 19.42     3.3590     1.43  .Q      .      .      .      .
 19.50     3.3687     1.41  .Q      .      .      .      .
 19.58     3.3784     1.39  .Q      .      .      .      .
 19.67     3.3880     1.38  .Q      .      .      .      .
 19.75     3.3974     1.36  .Q      .      .      .      .
 19.83     3.4067     1.35  .Q      .      .      .      .
 19.92     3.4159     1.33  .Q      .      .      .      .
 20.00     3.4250     1.32  .Q      .      .      .      .
 20.08     3.4340     1.30  .Q      .      .      .      .
 20.17     3.4430     1.29  .Q      .      .      .      .
 20.25     3.4518     1.27  .Q      .      .      .      .
 20.33     3.4605     1.26  .Q      .      .      .      .
 20.42     3.4692     1.25  .Q      .      .      .      .
 20.50     3.4777     1.24  .Q      .      .      .      .
 20.58     3.4862     1.22  .Q      .      .      .      .
 20.67     3.4946     1.21  .Q      .      .      .      .
 20.75     3.5029     1.20  .Q      .      .      .      .
 20.83     3.5111     1.19  .Q      .      .      .      .
 20.92     3.5193     1.18  .Q      .      .      .      .
 21.00     3.5274     1.17  .Q      .      .      .      .
 21.08     3.5354     1.16  .Q      .      .      .      .
 21.17     3.5434     1.15  .Q      .      .      .      .
 21.25     3.5513     1.14  .Q      .      .      .      .
 21.33     3.5591     1.13  .Q      .      .      .      .
 21.42     3.5668     1.12  .Q      .      .      .      .
 21.50     3.5745     1.11  .Q      .      .      .      .
 21.58     3.5822     1.10  .Q      .      .      .      .
 21.67     3.5897     1.10  .Q      .      .      .      .
 21.75     3.5973     1.09  .Q      .      .      .      .
 21.83     3.6047     1.08  .Q      .      .      .      .
 21.92     3.6121     1.07  .Q      .      .      .      .
 22.00     3.6195     1.06  .Q      .      .      .      .
 22.08     3.6268     1.06  .Q      .      .      .      .
 22.17     3.6340     1.05  .Q      .      .      .      .
 22.25     3.6412     1.04  .Q      .      .      .      .
 22.33     3.6483     1.03  .Q      .      .      .      .
 22.42     3.6554     1.03  .Q      .      .      .      .
 22.50     3.6625     1.02  .Q      .      .      .      .
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 22.58    3.6695    1.01 .Q      .      .      .      .
 22.67    3.6764    1.01 .Q      .      .      .      .
 22.75    3.6833    1.00 Q       .      .      .      .
 22.83    3.6902    0.99 Q       .      .      .      .
 22.92    3.6970    0.99 Q       .      .      .      .
 23.00    3.7038    0.98 Q       .      .      .      .
 23.08    3.7105    0.97 Q       .      .      .      .
 23.17    3.7172    0.97 Q       .      .      .      .
 23.25    3.7238    0.96 Q       .      .      .      .
 23.33    3.7305    0.96 Q       .      .      .      .
 23.42    3.7370    0.95 Q       .      .      .      .
 23.50    3.7436    0.95 Q       .      .      .      .
 23.58    3.7500    0.94 Q       .      .      .      .
 23.67    3.7565    0.93 Q       .      .      .      .
 23.75    3.7629    0.93 Q       .      .      .      .
 23.83    3.7693    0.92 Q       .      .      .      .
 23.92    3.7757    0.92 Q       .      .      .      .
 24.00    3.7820    0.91 Q       .      .      .      .
 24.08    3.7851    0.00 Q       .      .      .      .
-----------------------------------------------------------------------------
----------------------------------------------------------------------------------
  TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
  (Note: 100% of Peak Flow Rate estimate assumed to have
  an instantaneous time duration)

  Percentile of Estimated          Duration
    Peak Flow Rate              (minutes)
  =======================          =========
        0%                  1440.0
       10%                   105.0
       20%                    45.0
       30%                    15.0
       40%                    10.0
       50%                     5.0
       60%                     5.0
       70%                     5.0
       80%                     5.0
       90%                     5.0
```

DA 1 Post Developed Condition 10 Year Storm Event Routed

```
============================================================================
   FLOW-THROUGH DETENTION BASIN MODEL

   SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
   CONSTANT HYDROGRAPH TIME UNIT(MINUTES) =    5.000
   DEAD STORAGE(AF) =       0.00
   SPECIFIED DEAD STORAGE(AF) FILLED =       0.00
   ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN =    0.00


             INFLOW
               |
               |
               |
               V            __effective depth
          -------------       |   (and volume)
          |          |    |    |
          | detention |    |....V............
          |   basin   |<-->|        outflow
          |          |    |.........________
          -------------   |        |   \
               |        | storage |     basin outlet
               V        -----------
             OUTFLOW


   DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
   TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES =   5
   *BASIN-DEPTH  STORAGE    OUTFLOW  **BASIN-DEPTH  STORAGE    OUTFLOW  *
   *   (FEET)  (ACRE-FEET)   (CFS)   **   (FEET)  (ACRE-FEET)   (CFS)   *
   *     0.000     0.000     0.000**     1.000     0.100     0.010*
   *     2.000     0.200     0.010**     3.000     0.330    12.540*
   *     4.000     0.490    12.540**
---------------------------------------------------------------------------
   BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:
    INTERVAL   DEPTH   {S-O*DT/2}  {S+O*DT/2}
     NUMBER   (FEET)   (ACRE-FEET)  (ACRE-FEET)
        1    0.00      0.00000     0.00000
        2    1.00      0.09997     0.10003
        3    2.00      0.19997     0.20003
        4    3.00      0.28682     0.37318
        5    4.00      0.44682     0.53318
   WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)
---------------------------------------------------------------------------
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   DETENTION BASIN ROUTING RESULTS:
   NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES
      OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE
      AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

     TIME  DEAD-STORAGE  INFLOW  EFFECTIVE  OUTFLOW  EFFECTIVE
    (HRS)   FILLED(AF)    (CFS)  DEPTH(FT)   (CFS)   VOLUME(AF)
--------------------------------------------------------------------------
    0.083      0.000   0.47    0.03   0.00     0.003
    0.167      0.000   0.47    0.07   0.00     0.007
    0.250      0.000   0.47    0.10   0.00     0.010
    0.333      0.000   0.48    0.13   0.00     0.013
    0.417      0.000   0.48    0.16   0.00     0.016
    0.500      0.000   0.48    0.20   0.00     0.020
    0.583      0.000   0.48    0.23   0.00     0.023
    0.667      0.000   0.48    0.26   0.00     0.026
    0.750      0.000   0.48    0.29   0.00     0.029
    0.833      0.000   0.48    0.33   0.00     0.033
    0.917      0.000   0.49    0.36   0.00     0.036
    1.000      0.000   0.49    0.39   0.00     0.039
    1.083      0.000   0.49    0.43   0.00     0.043
    1.167      0.000   0.49    0.46   0.00     0.046
    1.250      0.000   0.49    0.49   0.00     0.049
    1.333      0.000   0.49    0.53   0.01     0.053
    1.417      0.000   0.49    0.56   0.01     0.056
    1.500      0.000   0.49    0.60   0.01     0.060
    1.583      0.000   0.50    0.63   0.01     0.063
    1.667      0.000   0.50    0.66   0.01     0.066
    1.750      0.000   0.50    0.70   0.01     0.070
    1.833      0.000   0.50    0.73   0.01     0.073
    1.917      0.000   0.50    0.76   0.01     0.076
    2.000      0.000   0.50    0.80   0.01     0.080
    2.083      0.000   0.51    0.83   0.01     0.083
    2.167      0.000   0.51    0.87   0.01     0.087
    2.250      0.000   0.51    0.90   0.01     0.090
    2.333      0.000   0.51    0.94   0.01     0.094
    2.417      0.000   0.51    0.97   0.01     0.097
    2.500      0.000   0.51    1.01   0.01     0.101
    2.583      0.000   0.52    1.04   0.01     0.104
    2.667      0.000   0.52    1.08   0.01     0.108
    2.750      0.000   0.52    1.11   0.01     0.111
    2.833      0.000   0.52    1.15   0.01     0.115
    2.917      0.000   0.52    1.18   0.01     0.118
    3.000      0.000   0.52    1.22   0.01     0.122
    3.083      0.000   0.53    1.25   0.01     0.125
```

3.167	0.000	0.53	1.29	0.01	0.129
3.250	0.000	0.53	1.32	0.01	0.132
3.333	0.000	0.53	1.36	0.01	0.136
3.417	0.000	0.53	1.39	0.01	0.139
3.500	0.000	0.53	1.43	0.01	0.143
3.583	0.000	0.54	1.47	0.01	0.147
3.667	0.000	0.54	1.50	0.01	0.150
3.750	0.000	0.54	1.54	0.01	0.154
3.833	0.000	0.54	1.58	0.01	0.158
3.917	0.000	0.54	1.61	0.01	0.161
4.000	0.000	0.55	1.65	0.01	0.165
4.083	0.000	0.55	1.69	0.01	0.169
4.167	0.000	0.55	1.72	0.01	0.172
4.250	0.000	0.55	1.76	0.01	0.176
4.333	0.000	0.55	1.80	0.01	0.180
4.417	0.000	0.56	1.84	0.01	0.184
4.500	0.000	0.56	1.87	0.01	0.187
4.583	0.000	0.56	1.91	0.01	0.191
4.667	0.000	0.56	1.95	0.01	0.195
4.750	0.000	0.56	1.99	0.01	0.199
4.833	0.000	0.57	2.02	0.11	0.202
4.917	0.000	0.57	2.03	0.29	0.204
5.000	0.000	0.57	2.04	0.43	0.205
5.083	0.000	0.57	2.04	0.50	0.205
5.167	0.000	0.57	2.04	0.54	0.206
5.250	0.000	0.58	2.04	0.56	0.206
5.333	0.000	0.58	2.04	0.57	0.206
5.417	0.000	0.58	2.05	0.57	0.206
5.500	0.000	0.58	2.05	0.58	0.206
5.583	0.000	0.59	2.05	0.58	0.206
5.667	0.000	0.59	2.05	0.59	0.206
5.750	0.000	0.59	2.05	0.59	0.206
5.833	0.000	0.59	2.05	0.59	0.206
5.917	0.000	0.60	2.05	0.59	0.206
6.000	0.000	0.60	2.05	0.60	0.206
6.083	0.000	0.60	2.05	0.60	0.206
6.167	0.000	0.60	2.05	0.60	0.206
6.250	0.000	0.61	2.05	0.60	0.206
6.333	0.000	0.61	2.05	0.61	0.206
6.417	0.000	0.61	2.05	0.61	0.206
6.500	0.000	0.61	2.05	0.61	0.206
6.583	0.000	0.62	2.05	0.61	0.206
6.667	0.000	0.62	2.05	0.62	0.206
6.750	0.000	0.62	2.05	0.62	0.206
6.833	0.000	0.63	2.05	0.62	0.206

6.917	0.000	0.63	2.05	0.63	0.206
7.000	0.000	0.63	2.05	0.63	0.206
7.083	0.000	0.64	2.05	0.63	0.206
7.167	0.000	0.64	2.05	0.63	0.206
7.250	0.000	0.64	2.05	0.64	0.207
7.333	0.000	0.64	2.05	0.64	0.207
7.417	0.000	0.65	2.05	0.64	0.207
7.500	0.000	0.65	2.05	0.65	0.207
7.583	0.000	0.66	2.05	0.65	0.207
7.667	0.000	0.66	2.05	0.65	0.207
7.750	0.000	0.66	2.05	0.66	0.207
7.833	0.000	0.66	2.05	0.66	0.207
7.917	0.000	0.67	2.05	0.66	0.207
8.000	0.000	0.67	2.05	0.67	0.207
8.083	0.000	0.68	2.05	0.67	0.207
8.167	0.000	0.68	2.05	0.67	0.207
8.250	0.000	0.68	2.05	0.68	0.207
8.333	0.000	0.69	2.05	0.68	0.207
8.417	0.000	0.69	2.05	0.69	0.207
8.500	0.000	0.69	2.05	0.69	0.207
8.583	0.000	0.70	2.05	0.69	0.207
8.667	0.000	0.70	2.05	0.70	0.207
8.750	0.000	0.71	2.06	0.70	0.207
8.833	0.000	0.71	2.06	0.70	0.207
8.917	0.000	0.72	2.06	0.71	0.207
9.000	0.000	0.72	2.06	0.71	0.207
9.083	0.000	0.73	2.06	0.72	0.207
9.167	0.000	0.73	2.06	0.72	0.207
9.250	0.000	0.73	2.06	0.73	0.207
9.333	0.000	0.74	2.06	0.73	0.208
9.417	0.000	0.74	2.06	0.74	0.208
9.500	0.000	0.75	2.06	0.74	0.208
9.583	0.000	0.75	2.06	0.75	0.208
9.667	0.000	0.76	2.06	0.75	0.208
9.750	0.000	0.76	2.06	0.76	0.208
9.833	0.000	0.77	2.06	0.76	0.208
9.917	0.000	0.77	2.06	0.77	0.208
10.000	0.000	0.78	2.06	0.77	0.208
10.083	0.000	0.79	2.06	0.78	0.208
10.167	0.000	0.79	2.06	0.78	0.208
10.250	0.000	0.80	2.06	0.79	0.208
10.333	0.000	0.80	2.06	0.79	0.208
10.417	0.000	0.81	2.06	0.80	0.208
10.500	0.000	0.81	2.06	0.81	0.208
10.583	0.000	0.82	2.06	0.81	0.208

10.667	0.000	0.83	2.06	0.82	0.208
10.750	0.000	0.84	2.07	0.82	0.208
10.833	0.000	0.84	2.07	0.83	0.209
10.917	0.000	0.85	2.07	0.84	0.209
11.000	0.000	0.85	2.07	0.84	0.209
11.083	0.000	0.86	2.07	0.85	0.209
11.167	0.000	0.87	2.07	0.86	0.209
11.250	0.000	0.88	2.07	0.87	0.209
11.333	0.000	0.88	2.07	0.87	0.209
11.417	0.000	0.90	2.07	0.88	0.209
11.500	0.000	0.90	2.07	0.89	0.209
11.583	0.000	0.91	2.07	0.90	0.209
11.667	0.000	0.92	2.07	0.91	0.209
11.750	0.000	0.93	2.07	0.92	0.209
11.833	0.000	0.94	2.07	0.92	0.210
11.917	0.000	0.95	2.07	0.93	0.210
12.000	0.000	0.96	2.07	0.94	0.210
12.083	0.000	1.07	2.08	0.98	0.210
12.167	0.000	1.07	2.08	1.02	0.211
12.250	0.000	1.09	2.08	1.05	0.211
12.333	0.000	1.10	2.09	1.07	0.211
12.417	0.000	1.11	2.09	1.09	0.211
12.500	0.000	1.12	2.09	1.10	0.211
12.583	0.000	1.14	2.09	1.12	0.212
12.667	0.000	1.15	2.09	1.13	0.212
12.750	0.000	1.16	2.09	1.14	0.212
12.833	0.000	1.17	2.09	1.15	0.212
12.917	0.000	1.19	2.09	1.17	0.212
13.000	0.000	1.20	2.09	1.18	0.212
13.083	0.000	1.22	2.10	1.20	0.212
13.167	0.000	1.23	2.10	1.21	0.213
13.250	0.000	1.26	2.10	1.23	0.213
13.333	0.000	1.27	2.10	1.25	0.213
13.417	0.000	1.29	2.10	1.26	0.213
13.500	0.000	1.31	2.10	1.28	0.213
13.583	0.000	1.33	2.10	1.30	0.214
13.667	0.000	1.35	2.11	1.32	0.214
13.750	0.000	1.38	2.11	1.34	0.214
13.833	0.000	1.39	2.11	1.36	0.214
13.917	0.000	1.43	2.11	1.39	0.214
14.000	0.000	1.45	2.11	1.41	0.215
14.083	0.000	1.40	2.11	1.42	0.215
14.167	0.000	1.42	2.11	1.42	0.215
14.250	0.000	1.47	2.11	1.43	0.215
14.333	0.000	1.49	2.12	1.45	0.215

14.417	0.000	1.54	2.12	1.48	0.215
14.500	0.000	1.57	2.12	1.52	0.216
14.583	0.000	1.62	2.13	1.56	0.216
14.667	0.000	1.66	2.13	1.60	0.217
14.750	0.000	1.72	2.13	1.64	0.217
14.833	0.000	1.76	2.14	1.69	0.218
14.917	0.000	1.85	2.14	1.75	0.218
15.000	0.000	1.89	2.15	1.81	0.219
15.083	0.000	2.00	2.15	1.88	0.220
15.167	0.000	2.06	2.16	1.95	0.221
15.250	0.000	2.19	2.17	2.04	0.222
15.333	0.000	2.27	2.17	2.14	0.223
15.417	0.000	2.93	2.20	2.37	0.226
15.500	0.000	3.04	2.22	2.68	0.229
15.583	0.000	3.31	2.24	2.93	0.232
15.667	0.000	3.48	2.26	3.16	0.234
15.750	0.000	3.47	2.27	3.32	0.235
15.833	0.000	3.90	2.29	3.50	0.238
15.917	0.000	5.71	2.37	4.15	0.248
16.000	0.000	7.82	2.50	5.45	0.265
16.083	0.000	20.28	3.05	9.39	0.338
16.167	0.000	4.61	2.73	10.84	0.295
16.250	0.000	3.72	2.51	7.79	0.267
16.333	0.000	3.17	2.38	5.62	0.250
16.417	0.000	2.36	2.29	4.20	0.237
16.500	0.000	2.12	2.23	3.22	0.230
16.583	0.000	1.94	2.19	2.63	0.225
16.667	0.000	1.80	2.17	2.25	0.222
16.750	0.000	1.69	2.15	2.00	0.220
16.833	0.000	1.59	2.14	1.82	0.218
16.917	0.000	1.51	2.13	1.69	0.217
17.000	0.000	1.45	2.12	1.58	0.216
17.083	0.000	1.46	2.12	1.52	0.215
17.167	0.000	1.41	2.12	1.48	0.215
17.250	0.000	1.36	2.11	1.43	0.215
17.333	0.000	1.32	2.11	1.39	0.214
17.417	0.000	1.28	2.10	1.34	0.214
17.500	0.000	1.24	2.10	1.30	0.213
17.583	0.000	1.21	2.10	1.27	0.213
17.667	0.000	1.18	2.10	1.23	0.213
17.750	0.000	1.15	2.09	1.20	0.212
17.833	0.000	1.13	2.09	1.17	0.212
17.917	0.000	1.10	2.09	1.14	0.212
18.000	0.000	1.08	2.09	1.12	0.211
18.083	0.000	0.96	2.08	1.07	0.211

18.167	0.000	0.94	2.08	1.01	0.210
18.250	0.000	0.92	2.08	0.97	0.210
18.333	0.000	0.91	2.07	0.94	0.210
18.417	0.000	0.89	2.07	0.92	0.209
18.500	0.000	0.87	2.07	0.90	0.209
18.583	0.000	0.86	2.07	0.88	0.209
18.667	0.000	0.84	2.07	0.87	0.209
18.750	0.000	0.83	2.07	0.85	0.209
18.833	0.000	0.82	2.07	0.84	0.209
18.917	0.000	0.81	2.06	0.83	0.208
19.000	0.000	0.79	2.06	0.81	0.208
19.083	0.000	0.78	2.06	0.80	0.208
19.167	0.000	0.77	2.06	0.79	0.208
19.250	0.000	0.76	2.06	0.78	0.208
19.333	0.000	0.75	2.06	0.77	0.208
19.417	0.000	0.74	2.06	0.76	0.208
19.500	0.000	0.73	2.06	0.75	0.208
19.583	0.000	0.72	2.06	0.74	0.207
19.667	0.000	0.71	2.06	0.73	0.207
19.750	0.000	0.70	2.06	0.72	0.207
19.833	0.000	0.70	2.06	0.71	0.207
19.917	0.000	0.69	2.05	0.70	0.207
20.000	0.000	0.68	2.05	0.69	0.207
20.083	0.000	0.67	2.05	0.69	0.207
20.167	0.000	0.67	2.05	0.68	0.207
20.250	0.000	0.66	2.05	0.67	0.207
20.333	0.000	0.65	2.05	0.66	0.207
20.417	0.000	0.65	2.05	0.66	0.207
20.500	0.000	0.64	2.05	0.65	0.207
20.583	0.000	0.63	2.05	0.64	0.207
20.667	0.000	0.63	2.05	0.64	0.206
20.750	0.000	0.62	2.05	0.63	0.206
20.833	0.000	0.62	2.05	0.63	0.206
20.917	0.000	0.61	2.05	0.62	0.206
21.000	0.000	0.61	2.05	0.61	0.206
21.083	0.000	0.60	2.05	0.61	0.206
21.167	0.000	0.60	2.05	0.60	0.206
21.250	0.000	0.59	2.05	0.60	0.206
21.333	0.000	0.59	2.05	0.59	0.206
21.417	0.000	0.58	2.05	0.59	0.206
21.500	0.000	0.58	2.05	0.58	0.206
21.583	0.000	0.57	2.05	0.58	0.206
21.667	0.000	0.57	2.04	0.57	0.206
21.750	0.000	0.56	2.04	0.57	0.206
21.833	0.000	0.56	2.04	0.57	0.206

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    21.917     0.000    0.55    2.04   0.56    0.206
    22.000     0.000    0.55    2.04   0.56    0.206
    22.083     0.000    0.55    2.04   0.55    0.206
    22.167     0.000    0.54    2.04   0.55    0.206
    22.250     0.000    0.54    2.04   0.54    0.206
    22.333     0.000    0.54    2.04   0.54    0.205
    22.417     0.000    0.53    2.04   0.54    0.205
    22.500     0.000    0.53    2.04   0.53    0.205
    22.583     0.000    0.52    2.04   0.53    0.205
    22.667     0.000    0.52    2.04   0.53    0.205
    22.750     0.000    0.52    2.04   0.52    0.205
    22.833     0.000    0.51    2.04   0.52    0.205
    22.917     0.000    0.51    2.04   0.52    0.205
    23.000     0.000    0.51    2.04   0.51    0.205
    23.083     0.000    0.50    2.04   0.51    0.205
    23.167     0.000    0.50    2.04   0.51    0.205
    23.250     0.000    0.50    2.04   0.50    0.205
    23.333     0.000    0.50    2.04   0.50    0.205
    23.417     0.000    0.49    2.04   0.50    0.205
    23.500     0.000    0.49    2.04   0.49    0.205
    23.583     0.000    0.49    2.04   0.49    0.205
    23.667     0.000    0.48    2.04   0.49    0.205
    23.750     0.000    0.48    2.04   0.49    0.205
    23.833     0.000    0.48    2.04   0.48    0.205
    23.917     0.000    0.48    2.04   0.48    0.205
    24.000     0.000    0.47    2.04   0.48    0.205
    24.083     0.000    0.00    2.02   0.36    0.202
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DA 2 Post Developed Condition 10 Year Storm Event Routed

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==============================================================================
   FLOW-THROUGH DETENTION BASIN MODEL

   SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
   CONSTANT HYDROGRAPH TIME UNIT(MINUTES) =    5.000
   DEAD STORAGE(AF) =       0.00
   SPECIFIED DEAD STORAGE(AF) FILLED =       0.00
   ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN =    0.00


            INFLOW
              |
              |
              |
              V            __effective depth
         -------------       |   (and volume)
         |          |    |    |
         | detention |    |....V............
         |   basin   |<-->|        outflow
         |          |    |.........________
         -------------   |        |   \
              |        | storage |    basin outlet
              V        -----------
           OUTFLOW


   DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
   TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES =   5
   *BASIN-DEPTH  STORAGE    OUTFLOW  **BASIN-DEPTH  STORAGE    OUTFLOW  *
   *   (FEET)  (ACRE-FEET)   (CFS)   **   (FEET)  (ACRE-FEET)   (CFS)   *
   *     0.000     0.000     0.000**     1.000     0.100     0.010*
   *     2.000     0.200     0.010**     3.000     0.300    12.540*
   *     4.000     0.400    12.540**
---------------------------------------------------------------------------
   BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:
    INTERVAL   DEPTH   {S-O*DT/2}  {S+O*DT/2}
     NUMBER   (FEET)   (ACRE-FEET)  (ACRE-FEET)
        1    0.00     0.00000     0.00000
        2    1.00     0.09997     0.10003
        3    2.00     0.19997     0.20003
        4    3.00     0.25682     0.34318
        5    4.00     0.35682     0.44318
   WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)
---------------------------------------------------------------------------
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   DETENTION BASIN ROUTING RESULTS:
   NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES
      OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE
      AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

     TIME  DEAD-STORAGE  INFLOW  EFFECTIVE  OUTFLOW  EFFECTIVE
    (HRS)   FILLED(AF)    (CFS)  DEPTH(FT)   (CFS)   VOLUME(AF)
-----------------------------------------------------------------------------
    0.083      0.000    0.47    0.03    0.00     0.003
    0.167      0.000    0.47    0.06    0.00     0.006
    0.250      0.000    0.47    0.10    0.00     0.010
    0.333      0.000    0.47    0.13    0.00     0.013
    0.417      0.000    0.47    0.16    0.00     0.016
    0.500      0.000    0.47    0.19    0.00     0.019
    0.583      0.000    0.48    0.23    0.00     0.023
    0.667      0.000    0.48    0.26    0.00     0.026
    0.750      0.000    0.48    0.29    0.00     0.029
    0.833      0.000    0.48    0.32    0.00     0.032
    0.917      0.000    0.48    0.36    0.00     0.036
    1.000      0.000    0.48    0.39    0.00     0.039
    1.083      0.000    0.48    0.42    0.00     0.042
    1.167      0.000    0.48    0.46    0.00     0.046
    1.250      0.000    0.49    0.49    0.00     0.049
    1.333      0.000    0.49    0.52    0.01     0.052
    1.417      0.000    0.49    0.56    0.01     0.056
    1.500      0.000    0.49    0.59    0.01     0.059
    1.583      0.000    0.49    0.62    0.01     0.062
    1.667      0.000    0.49    0.66    0.01     0.066
    1.750      0.000    0.49    0.69    0.01     0.069
    1.833      0.000    0.50    0.72    0.01     0.072
    1.917      0.000    0.50    0.76    0.01     0.076
    2.000      0.000    0.50    0.79    0.01     0.079
    2.083      0.000    0.50    0.83    0.01     0.083
    2.167      0.000    0.50    0.86    0.01     0.086
    2.250      0.000    0.50    0.89    0.01     0.089
    2.333      0.000    0.51    0.93    0.01     0.093
    2.417      0.000    0.51    0.96    0.01     0.096
    2.500      0.000    0.51    1.00    0.01     0.100
    2.583      0.000    0.51    1.03    0.01     0.103
    2.667      0.000    0.51    1.07    0.01     0.107
    2.750      0.000    0.51    1.10    0.01     0.110
    2.833      0.000    0.51    1.13    0.01     0.113
    2.917      0.000    0.52    1.17    0.01     0.117
    3.000      0.000    0.52    1.20    0.01     0.120
    3.083      0.000    0.52    1.24    0.01     0.124
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3.167	0.000	0.52	1.28	0.01	0.128
3.250	0.000	0.52	1.31	0.01	0.131
3.333	0.000	0.53	1.35	0.01	0.135
3.417	0.000	0.53	1.38	0.01	0.138
3.500	0.000	0.53	1.42	0.01	0.142
3.583	0.000	0.53	1.45	0.01	0.145
3.667	0.000	0.53	1.49	0.01	0.149
3.750	0.000	0.54	1.53	0.01	0.153
3.833	0.000	0.54	1.56	0.01	0.156
3.917	0.000	0.54	1.60	0.01	0.160
4.000	0.000	0.54	1.63	0.01	0.163
4.083	0.000	0.54	1.67	0.01	0.167
4.167	0.000	0.54	1.71	0.01	0.171
4.250	0.000	0.55	1.75	0.01	0.175
4.333	0.000	0.55	1.78	0.01	0.178
4.417	0.000	0.55	1.82	0.01	0.182
4.500	0.000	0.55	1.86	0.01	0.186
4.583	0.000	0.55	1.89	0.01	0.189
4.667	0.000	0.56	1.93	0.01	0.193
4.750	0.000	0.56	1.97	0.01	0.197
4.833	0.000	0.56	2.01	0.04	0.201
4.917	0.000	0.56	2.03	0.22	0.203
5.000	0.000	0.56	2.04	0.43	0.204
5.083	0.000	0.57	2.04	0.51	0.204
5.167	0.000	0.57	2.04	0.55	0.204
5.250	0.000	0.57	2.04	0.56	0.204
5.333	0.000	0.57	2.04	0.57	0.204
5.417	0.000	0.58	2.05	0.57	0.205
5.500	0.000	0.58	2.05	0.58	0.205
5.583	0.000	0.58	2.05	0.58	0.205
5.667	0.000	0.58	2.05	0.58	0.205
5.750	0.000	0.59	2.05	0.58	0.205
5.833	0.000	0.59	2.05	0.59	0.205
5.917	0.000	0.59	2.05	0.59	0.205
6.000	0.000	0.59	2.05	0.59	0.205
6.083	0.000	0.60	2.05	0.59	0.205
6.167	0.000	0.60	2.05	0.60	0.205
6.250	0.000	0.60	2.05	0.60	0.205
6.333	0.000	0.60	2.05	0.60	0.205
6.417	0.000	0.61	2.05	0.60	0.205
6.500	0.000	0.61	2.05	0.61	0.205
6.583	0.000	0.61	2.05	0.61	0.205
6.667	0.000	0.61	2.05	0.61	0.205
6.750	0.000	0.62	2.05	0.61	0.205
6.833	0.000	0.62	2.05	0.62	0.205

6.917	0.000	0.62	2.05	0.62	0.205
7.000	0.000	0.63	2.05	0.62	0.205
7.083	0.000	0.63	2.05	0.63	0.205
7.167	0.000	0.63	2.05	0.63	0.205
7.250	0.000	0.64	2.05	0.63	0.205
7.333	0.000	0.64	2.05	0.64	0.205
7.417	0.000	0.64	2.05	0.64	0.205
7.500	0.000	0.64	2.05	0.64	0.205
7.583	0.000	0.65	2.05	0.64	0.205
7.667	0.000	0.65	2.05	0.65	0.205
7.750	0.000	0.66	2.05	0.65	0.205
7.833	0.000	0.66	2.05	0.65	0.205
7.917	0.000	0.66	2.05	0.66	0.205
8.000	0.000	0.67	2.05	0.66	0.205
8.083	0.000	0.67	2.05	0.67	0.205
8.167	0.000	0.67	2.05	0.67	0.205
8.250	0.000	0.68	2.05	0.67	0.205
8.333	0.000	0.68	2.05	0.68	0.205
8.417	0.000	0.69	2.05	0.68	0.205
8.500	0.000	0.69	2.05	0.68	0.205
8.583	0.000	0.69	2.05	0.69	0.205
8.667	0.000	0.70	2.05	0.69	0.205
8.750	0.000	0.70	2.05	0.70	0.205
8.833	0.000	0.70	2.06	0.70	0.206
8.917	0.000	0.71	2.06	0.70	0.206
9.000	0.000	0.71	2.06	0.71	0.206
9.083	0.000	0.72	2.06	0.71	0.206
9.167	0.000	0.72	2.06	0.72	0.206
9.250	0.000	0.73	2.06	0.72	0.206
9.333	0.000	0.73	2.06	0.73	0.206
9.417	0.000	0.74	2.06	0.73	0.206
9.500	0.000	0.74	2.06	0.74	0.206
9.583	0.000	0.75	2.06	0.74	0.206
9.667	0.000	0.75	2.06	0.74	0.206
9.750	0.000	0.76	2.06	0.75	0.206
9.833	0.000	0.76	2.06	0.76	0.206
9.917	0.000	0.77	2.06	0.76	0.206
10.000	0.000	0.77	2.06	0.77	0.206
10.083	0.000	0.78	2.06	0.77	0.206
10.167	0.000	0.78	2.06	0.78	0.206
10.250	0.000	0.79	2.06	0.78	0.206
10.333	0.000	0.79	2.06	0.79	0.206
10.417	0.000	0.80	2.06	0.79	0.206
10.500	0.000	0.81	2.06	0.80	0.206
10.583	0.000	0.81	2.06	0.81	0.206

10.667	0.000	0.82	2.06	0.81	0.206
10.750	0.000	0.83	2.06	0.82	0.206
10.833	0.000	0.83	2.07	0.83	0.207
10.917	0.000	0.84	2.07	0.83	0.207
11.000	0.000	0.85	2.07	0.84	0.207
11.083	0.000	0.86	2.07	0.85	0.207
11.167	0.000	0.86	2.07	0.85	0.207
11.250	0.000	0.87	2.07	0.86	0.207
11.333	0.000	0.88	2.07	0.87	0.207
11.417	0.000	0.89	2.07	0.88	0.207
11.500	0.000	0.89	2.07	0.88	0.207
11.583	0.000	0.90	2.07	0.89	0.207
11.667	0.000	0.91	2.07	0.90	0.207
11.750	0.000	0.92	2.07	0.91	0.207
11.833	0.000	0.93	2.07	0.92	0.207
11.917	0.000	0.94	2.07	0.93	0.207
12.000	0.000	0.95	2.07	0.94	0.207
12.083	0.000	1.06	2.08	0.98	0.208
12.167	0.000	1.06	2.08	1.03	0.208
12.250	0.000	1.08	2.08	1.05	0.208
12.333	0.000	1.09	2.09	1.07	0.209
12.417	0.000	1.10	2.09	1.08	0.209
12.500	0.000	1.11	2.09	1.10	0.209
12.583	0.000	1.13	2.09	1.11	0.209
12.667	0.000	1.13	2.09	1.12	0.209
12.750	0.000	1.15	2.09	1.13	0.209
12.833	0.000	1.16	2.09	1.15	0.209
12.917	0.000	1.18	2.09	1.16	0.209
13.000	0.000	1.19	2.09	1.18	0.209
13.083	0.000	1.21	2.09	1.19	0.209
13.167	0.000	1.22	2.10	1.21	0.210
13.250	0.000	1.24	2.10	1.22	0.210
13.333	0.000	1.26	2.10	1.24	0.210
13.417	0.000	1.28	2.10	1.26	0.210
13.500	0.000	1.29	2.10	1.28	0.210
13.583	0.000	1.32	2.10	1.29	0.210
13.667	0.000	1.34	2.10	1.31	0.210
13.750	0.000	1.37	2.11	1.34	0.211
13.833	0.000	1.38	2.11	1.36	0.211
13.917	0.000	1.41	2.11	1.38	0.211
14.000	0.000	1.43	2.11	1.41	0.211
14.083	0.000	1.39	2.11	1.41	0.211
14.167	0.000	1.41	2.11	1.40	0.211
14.250	0.000	1.45	2.11	1.42	0.211
14.333	0.000	1.48	2.12	1.45	0.212

14.417	0.000	1.53	2.12	1.48	0.212
14.500	0.000	1.55	2.12	1.52	0.212
14.583	0.000	1.61	2.13	1.55	0.213
14.667	0.000	1.64	2.13	1.60	0.213
14.750	0.000	1.71	2.13	1.64	0.213
14.833	0.000	1.75	2.14	1.69	0.214
14.917	0.000	1.83	2.14	1.75	0.214
15.000	0.000	1.88	2.15	1.81	0.215
15.083	0.000	1.98	2.15	1.88	0.215
15.167	0.000	2.04	2.16	1.96	0.216
15.250	0.000	2.17	2.17	2.05	0.217
15.333	0.000	2.25	2.17	2.15	0.217
15.417	0.000	2.91	2.21	2.41	0.221
15.500	0.000	3.01	2.23	2.74	0.223
15.583	0.000	3.28	2.25	2.99	0.225
15.667	0.000	3.45	2.26	3.21	0.226
15.750	0.000	3.43	2.27	3.35	0.227
15.833	0.000	3.87	2.29	3.53	0.229
15.917	0.000	5.65	2.39	4.27	0.239
16.000	0.000	7.73	2.53	5.73	0.253
16.083	0.000	20.19	3.22	9.57	0.322
16.167	0.000	4.57	2.77	11.12	0.277
16.250	0.000	3.69	2.48	7.88	0.248
16.333	0.000	3.14	2.34	5.19	0.234
16.417	0.000	2.34	2.25	3.71	0.225
16.500	0.000	2.10	2.20	2.81	0.220
16.583	0.000	1.93	2.17	2.33	0.217
16.667	0.000	1.79	2.15	2.04	0.215
16.750	0.000	1.67	2.14	1.86	0.214
16.833	0.000	1.58	2.13	1.72	0.213
16.917	0.000	1.50	2.12	1.61	0.212
17.000	0.000	1.43	2.12	1.52	0.212
17.083	0.000	1.45	2.12	1.47	0.212
17.167	0.000	1.40	2.11	1.44	0.211
17.250	0.000	1.35	2.11	1.40	0.211
17.333	0.000	1.31	2.11	1.36	0.211
17.417	0.000	1.27	2.10	1.32	0.210
17.500	0.000	1.23	2.10	1.28	0.210
17.583	0.000	1.20	2.10	1.24	0.210
17.667	0.000	1.17	2.09	1.21	0.209
17.750	0.000	1.14	2.09	1.18	0.209
17.833	0.000	1.12	2.09	1.15	0.209
17.917	0.000	1.09	2.09	1.12	0.209
18.000	0.000	1.07	2.09	1.10	0.209
18.083	0.000	0.95	2.08	1.05	0.208

18.167	0.000	0.93	2.08	0.99	0.208
18.250	0.000	0.92	2.07	0.95	0.207
18.333	0.000	0.90	2.07	0.92	0.207
18.417	0.000	0.88	2.07	0.90	0.207
18.500	0.000	0.87	2.07	0.89	0.207
18.583	0.000	0.85	2.07	0.87	0.207
18.667	0.000	0.84	2.07	0.85	0.207
18.750	0.000	0.82	2.07	0.84	0.207
18.833	0.000	0.81	2.06	0.83	0.206
18.917	0.000	0.80	2.06	0.81	0.206
19.000	0.000	0.79	2.06	0.80	0.206
19.083	0.000	0.77	2.06	0.79	0.206
19.167	0.000	0.76	2.06	0.78	0.206
19.250	0.000	0.75	2.06	0.77	0.206
19.333	0.000	0.74	2.06	0.76	0.206
19.417	0.000	0.73	2.06	0.75	0.206
19.500	0.000	0.72	2.06	0.74	0.206
19.583	0.000	0.72	2.06	0.73	0.206
19.667	0.000	0.71	2.06	0.72	0.206
19.750	0.000	0.70	2.06	0.71	0.206
19.833	0.000	0.69	2.05	0.70	0.205
19.917	0.000	0.68	2.05	0.69	0.205
20.000	0.000	0.68	2.05	0.68	0.205
20.083	0.000	0.67	2.05	0.68	0.205
20.167	0.000	0.66	2.05	0.67	0.205
20.250	0.000	0.65	2.05	0.66	0.205
20.333	0.000	0.65	2.05	0.65	0.205
20.417	0.000	0.64	2.05	0.65	0.205
20.500	0.000	0.63	2.05	0.64	0.205
20.583	0.000	0.63	2.05	0.64	0.205
20.667	0.000	0.62	2.05	0.63	0.205
20.750	0.000	0.62	2.05	0.62	0.205
20.833	0.000	0.61	2.05	0.62	0.205
20.917	0.000	0.61	2.05	0.61	0.205
21.000	0.000	0.60	2.05	0.61	0.205
21.083	0.000	0.59	2.05	0.60	0.205
21.167	0.000	0.59	2.05	0.60	0.205
21.250	0.000	0.58	2.05	0.59	0.205
21.333	0.000	0.58	2.05	0.59	0.205
21.417	0.000	0.58	2.05	0.58	0.205
21.500	0.000	0.57	2.05	0.58	0.205
21.583	0.000	0.57	2.04	0.57	0.204
21.667	0.000	0.56	2.04	0.57	0.204
21.750	0.000	0.56	2.04	0.56	0.204
21.833	0.000	0.55	2.04	0.56	0.204

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    21.917     0.000   0.55    2.04   0.55    0.204
    22.000     0.000   0.55    2.04   0.55    0.204
    22.083     0.000   0.54    2.04   0.55    0.204
    22.167     0.000   0.54    2.04   0.54    0.204
    22.250     0.000   0.53    2.04   0.54    0.204
    22.333     0.000   0.53    2.04   0.53    0.204
    22.417     0.000   0.53    2.04   0.53    0.204
    22.500     0.000   0.52    2.04   0.53    0.204
    22.583     0.000   0.52    2.04   0.52    0.204
    22.667     0.000   0.52    2.04   0.52    0.204
    22.750     0.000   0.51    2.04   0.52    0.204
    22.833     0.000   0.51    2.04   0.51    0.204
    22.917     0.000   0.51    2.04   0.51    0.204
    23.000     0.000   0.50    2.04   0.51    0.204
    23.083     0.000   0.50    2.04   0.50    0.204
    23.167     0.000   0.50    2.04   0.50    0.204
    23.250     0.000   0.49    2.04   0.50    0.204
    23.333     0.000   0.49    2.04   0.49    0.204
    23.417     0.000   0.49    2.04   0.49    0.204
    23.500     0.000   0.49    2.04   0.49    0.204
    23.583     0.000   0.48    2.04   0.49    0.204
    23.667     0.000   0.48    2.04   0.48    0.204
    23.750     0.000   0.48    2.04   0.48    0.204
    23.833     0.000   0.47    2.04   0.48    0.204
    23.917     0.000   0.47    2.04   0.47    0.204
    24.000     0.000   0.47    2.04   0.47    0.204
    24.083     0.000   0.00    2.01   0.33    0.201
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DA 1 Post Developed Condition 100 Year Storm Event Routed

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============================================================================
   FLOW-THROUGH DETENTION BASIN MODEL

   SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
   CONSTANT HYDROGRAPH TIME UNIT(MINUTES) =    5.000
   DEAD STORAGE(AF) =       0.00
   SPECIFIED DEAD STORAGE(AF) FILLED =       0.00
   ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN =    0.00


            INFLOW
              |
              |
              |
              V            __effective depth
         -------------        |   (and volume)
         |          |    |    |
         | detention |    |....V............
         |   basin   |<-->|        outflow
         |          |    |.........________
         -------------    |        |   \
              |        | storage |    basin outlet
              V        -----------
           OUTFLOW


   DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
   TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES =   5
   *BASIN-DEPTH  STORAGE    OUTFLOW  **BASIN-DEPTH  STORAGE    OUTFLOW  *
   *   (FEET)  (ACRE-FEET)   (CFS)   **   (FEET)  (ACRE-FEET)   (CFS)   *
   *     0.000     0.000     0.000**     1.000     0.100     0.010*
   *     2.000     0.200     0.010**     3.000     0.330    12.540*
   *     4.000     0.490    12.540**
----------------------------------------------------------------------------
   BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:
    INTERVAL   DEPTH   {S-O*DT/2}  {S+O*DT/2}
     NUMBER   (FEET)   (ACRE-FEET)  (ACRE-FEET)
        1    0.00      0.00000     0.00000
        2    1.00      0.09997     0.10003
        3    2.00      0.19997     0.20003
        4    3.00      0.28682     0.37318
        5    4.00      0.44682     0.53318
   WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)
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  DETENTION BASIN ROUTING RESULTS:
  NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES
     OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE
     AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

    TIME  DEAD-STORAGE  INFLOW  EFFECTIVE  OUTFLOW  EFFECTIVE
   (HRS)   FILLED(AF)    (CFS)  DEPTH(FT)   (CFS)   VOLUME(AF)
--------------------------------------------------------------------------
   0.083      0.000    0.92     0.06    0.00      0.006
   0.167      0.000    0.93     0.13    0.00      0.013
   0.250      0.000    0.93     0.19    0.00      0.019
   0.333      0.000    0.93     0.26    0.00      0.026
   0.417      0.000    0.93     0.32    0.00      0.032
   0.500      0.000    0.94     0.38    0.00      0.038
   0.583      0.000    0.94     0.45    0.00      0.045
   0.667      0.000    0.94     0.51    0.00      0.051
   0.750      0.000    0.94     0.58    0.01      0.058
   0.833      0.000    0.95     0.64    0.01      0.064
   0.917      0.000    0.95     0.71    0.01      0.071
   1.000      0.000    0.95     0.77    0.01      0.077
   1.083      0.000    0.96     0.84    0.01      0.084
   1.167      0.000    0.96     0.90    0.01      0.090
   1.250      0.000    0.96     0.97    0.01      0.097
   1.333      0.000    0.96     1.03    0.01      0.103
   1.417      0.000    0.97     1.10    0.01      0.110
   1.500      0.000    0.97     1.17    0.01      0.117
   1.583      0.000    0.97     1.23    0.01      0.123
   1.667      0.000    0.97     1.30    0.01      0.130
   1.750      0.000    0.98     1.37    0.01      0.137
   1.833      0.000    0.98     1.43    0.01      0.143
   1.917      0.000    0.98     1.50    0.01      0.150
   2.000      0.000    0.99     1.57    0.01      0.157
   2.083      0.000    0.99     1.63    0.01      0.163
   2.167      0.000    0.99     1.70    0.01      0.170
   2.250      0.000    1.00     1.77    0.01      0.177
   2.333      0.000    1.00     1.84    0.01      0.184
   2.417      0.000    1.00     1.91    0.01      0.191
   2.500      0.000    1.01     1.97    0.01      0.197
   2.583      0.000    1.01     2.02    0.17      0.203
   2.667      0.000    1.01     2.05    0.49      0.207
   2.750      0.000    1.02     2.07    0.75      0.209
   2.833      0.000    1.02     2.07    0.88      0.210
   2.917      0.000    1.02     2.08    0.95      0.210
   3.000      0.000    1.02     2.08    0.99      0.210
   3.083      0.000    1.03     2.08    1.01      0.210
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3.167	0.000	1.03	2.08	1.02	0.211
3.250	0.000	1.04	2.08	1.03	0.211
3.333	0.000	1.04	2.08	1.03	0.211
3.417	0.000	1.04	2.08	1.04	0.211
3.500	0.000	1.05	2.08	1.04	0.211
3.583	0.000	1.05	2.08	1.04	0.211
3.667	0.000	1.05	2.08	1.05	0.211
3.750	0.000	1.06	2.08	1.05	0.211
3.833	0.000	1.06	2.08	1.06	0.211
3.917	0.000	1.07	2.08	1.06	0.211
4.000	0.000	1.07	2.08	1.06	0.211
4.083	0.000	1.07	2.08	1.07	0.211
4.167	0.000	1.08	2.08	1.07	0.211
4.250	0.000	1.08	2.09	1.07	0.211
4.333	0.000	1.08	2.09	1.08	0.211
4.417	0.000	1.09	2.09	1.08	0.211
4.500	0.000	1.09	2.09	1.09	0.211
4.583	0.000	1.10	2.09	1.09	0.211
4.667	0.000	1.10	2.09	1.09	0.211
4.750	0.000	1.11	2.09	1.10	0.211
4.833	0.000	1.11	2.09	1.10	0.211
4.917	0.000	1.11	2.09	1.11	0.211
5.000	0.000	1.12	2.09	1.11	0.211
5.083	0.000	1.12	2.09	1.12	0.211
5.167	0.000	1.13	2.09	1.12	0.212
5.250	0.000	1.13	2.09	1.12	0.212
5.333	0.000	1.13	2.09	1.13	0.212
5.417	0.000	1.14	2.09	1.13	0.212
5.500	0.000	1.14	2.09	1.14	0.212
5.583	0.000	1.15	2.09	1.14	0.212
5.667	0.000	1.15	2.09	1.15	0.212
5.750	0.000	1.16	2.09	1.15	0.212
5.833	0.000	1.16	2.09	1.16	0.212
5.917	0.000	1.17	2.09	1.16	0.212
6.000	0.000	1.17	2.09	1.17	0.212
6.083	0.000	1.18	2.09	1.17	0.212
6.167	0.000	1.18	2.09	1.18	0.212
6.250	0.000	1.19	2.09	1.18	0.212
6.333	0.000	1.19	2.09	1.19	0.212
6.417	0.000	1.20	2.09	1.19	0.212
6.500	0.000	1.20	2.09	1.20	0.212
6.583	0.000	1.21	2.10	1.20	0.212
6.667	0.000	1.22	2.10	1.21	0.212
6.750	0.000	1.22	2.10	1.21	0.213
6.833	0.000	1.23	2.10	1.22	0.213

6.917	0.000	1.23	2.10	1.22	0.213
7.000	0.000	1.24	2.10	1.23	0.213
7.083	0.000	1.25	2.10	1.24	0.213
7.167	0.000	1.25	2.10	1.24	0.213
7.250	0.000	1.26	2.10	1.25	0.213
7.333	0.000	1.26	2.10	1.25	0.213
7.417	0.000	1.27	2.10	1.26	0.213
7.500	0.000	1.28	2.10	1.27	0.213
7.583	0.000	1.28	2.10	1.27	0.213
7.667	0.000	1.29	2.10	1.28	0.213
7.750	0.000	1.30	2.10	1.29	0.213
7.833	0.000	1.30	2.10	1.29	0.213
7.917	0.000	1.31	2.10	1.30	0.213
8.000	0.000	1.32	2.10	1.31	0.213
8.083	0.000	1.33	2.10	1.31	0.214
8.167	0.000	1.33	2.10	1.32	0.214
8.250	0.000	1.34	2.11	1.33	0.214
8.333	0.000	1.34	2.11	1.33	0.214
8.417	0.000	1.35	2.11	1.34	0.214
8.500	0.000	1.36	2.11	1.35	0.214
8.583	0.000	1.37	2.11	1.36	0.214
8.667	0.000	1.38	2.11	1.37	0.214
8.750	0.000	1.39	2.11	1.37	0.214
8.833	0.000	1.39	2.11	1.38	0.214
8.917	0.000	1.40	2.11	1.39	0.214
9.000	0.000	1.41	2.11	1.40	0.214
9.083	0.000	1.42	2.11	1.41	0.215
9.167	0.000	1.43	2.11	1.41	0.215
9.250	0.000	1.44	2.11	1.42	0.215
9.333	0.000	1.44	2.11	1.43	0.215
9.417	0.000	1.46	2.11	1.44	0.215
9.500	0.000	1.46	2.12	1.45	0.215
9.583	0.000	1.48	2.12	1.46	0.215
9.667	0.000	1.48	2.12	1.47	0.215
9.750	0.000	1.50	2.12	1.48	0.215
9.833	0.000	1.50	2.12	1.49	0.215
9.917	0.000	1.52	2.12	1.50	0.216
10.000	0.000	1.52	2.12	1.51	0.216
10.083	0.000	1.54	2.12	1.52	0.216
10.167	0.000	1.55	2.12	1.53	0.216
10.250	0.000	1.56	2.12	1.54	0.216
10.333	0.000	1.57	2.12	1.55	0.216
10.417	0.000	1.59	2.12	1.57	0.216
10.500	0.000	1.59	2.13	1.58	0.216
10.583	0.000	1.61	2.13	1.59	0.216

10.667	0.000	1.62	2.13	1.60	0.217
10.750	0.000	1.64	2.13	1.62	0.217
10.833	0.000	1.65	2.13	1.63	0.217
10.917	0.000	1.66	2.13	1.64	0.217
11.000	0.000	1.67	2.13	1.66	0.217
11.083	0.000	1.69	2.13	1.67	0.217
11.167	0.000	1.70	2.13	1.68	0.217
11.250	0.000	1.72	2.14	1.70	0.218
11.333	0.000	1.73	2.14	1.71	0.218
11.417	0.000	1.75	2.14	1.73	0.218
11.500	0.000	1.77	2.14	1.74	0.218
11.583	0.000	1.79	2.14	1.76	0.218
11.667	0.000	1.80	2.14	1.78	0.218
11.750	0.000	1.82	2.14	1.79	0.219
11.833	0.000	1.84	2.14	1.81	0.219
11.917	0.000	1.86	2.15	1.83	0.219
12.000	0.000	1.88	2.15	1.85	0.219
12.083	0.000	2.02	2.15	1.90	0.220
12.167	0.000	2.03	2.16	1.96	0.220
12.250	0.000	2.06	2.16	2.00	0.221
12.333	0.000	2.07	2.16	2.03	0.221
12.417	0.000	2.10	2.16	2.06	0.221
12.500	0.000	2.12	2.17	2.09	0.222
12.583	0.000	2.15	2.17	2.11	0.222
12.667	0.000	2.17	2.17	2.14	0.222
12.750	0.000	2.21	2.17	2.16	0.222
12.833	0.000	2.22	2.17	2.19	0.223
12.917	0.000	2.26	2.18	2.22	0.223
13.000	0.000	2.28	2.18	2.24	0.223
13.083	0.000	2.32	2.18	2.27	0.224
13.167	0.000	2.35	2.18	2.30	0.224
13.250	0.000	2.39	2.19	2.34	0.224
13.333	0.000	2.41	2.19	2.37	0.225
13.417	0.000	2.46	2.19	2.40	0.225
13.500	0.000	2.49	2.20	2.44	0.225
13.583	0.000	2.54	2.20	2.48	0.226
13.667	0.000	2.57	2.20	2.52	0.226
13.750	0.000	2.63	2.21	2.56	0.227
13.833	0.000	2.66	2.21	2.60	0.227
13.917	0.000	2.73	2.21	2.65	0.228
14.000	0.000	2.77	2.22	2.70	0.228
14.083	0.000	2.55	2.21	2.68	0.227
14.167	0.000	2.59	2.21	2.63	0.227
14.250	0.000	2.68	2.21	2.63	0.227
14.333	0.000	2.72	2.21	2.66	0.228

14.417	0.000	2.82	2.22	2.72	0.228
14.500	0.000	2.87	2.22	2.78	0.229
14.583	0.000	2.99	2.23	2.86	0.230
14.667	0.000	3.05	2.24	2.94	0.231
14.750	0.000	3.19	2.25	3.03	0.232
14.833	0.000	3.27	2.25	3.13	0.233
14.917	0.000	3.44	2.26	3.24	0.234
15.000	0.000	3.53	2.27	3.36	0.235
15.083	0.000	3.74	2.29	3.50	0.237
15.167	0.000	3.87	2.30	3.65	0.239
15.250	0.000	4.15	2.31	3.83	0.241
15.333	0.000	4.31	2.33	4.03	0.243
15.417	0.000	6.16	2.41	4.63	0.253
15.500	0.000	6.39	2.46	5.45	0.260
15.583	0.000	6.99	2.51	6.07	0.266
15.667	0.000	7.38	2.55	6.62	0.271
15.750	0.000	7.35	2.57	6.99	0.274
15.833	0.000	8.17	2.61	7.38	0.279
15.917	0.000	11.07	2.75	8.49	0.297
16.000	0.000	14.44	2.95	10.62	0.323
16.083	0.000	34.92	3.88	12.21	0.471
16.167	0.000	9.30	3.74	12.54	0.449
16.250	0.000	7.86	3.54	12.54	0.417
16.333	0.000	6.65	3.29	12.54	0.376
16.417	0.000	4.49	2.95	12.20	0.323
16.500	0.000	4.00	2.63	9.90	0.282
16.583	0.000	3.63	2.46	6.87	0.260
16.667	0.000	3.35	2.36	5.18	0.247
16.750	0.000	3.12	2.31	4.21	0.240
16.833	0.000	2.93	2.27	3.62	0.235
16.917	0.000	2.77	2.25	3.24	0.232
17.000	0.000	2.63	2.23	2.97	0.230
17.083	0.000	2.80	2.23	2.84	0.229
17.167	0.000	2.70	2.22	2.80	0.229
17.250	0.000	2.60	2.21	2.72	0.228
17.333	0.000	2.52	2.21	2.64	0.227
17.417	0.000	2.44	2.20	2.56	0.226
17.500	0.000	2.37	2.19	2.48	0.225
17.583	0.000	2.30	2.19	2.41	0.225
17.667	0.000	2.24	2.18	2.34	0.224
17.750	0.000	2.19	2.18	2.28	0.223
17.833	0.000	2.14	2.17	2.22	0.223
17.917	0.000	2.09	2.17	2.17	0.222
18.000	0.000	2.04	2.17	2.12	0.222
18.083	0.000	1.89	2.16	2.04	0.221

18.167	0.000	1.85	2.15	1.96	0.220
18.250	0.000	1.81	2.15	1.89	0.219
18.333	0.000	1.78	2.14	1.84	0.219
18.417	0.000	1.74	2.14	1.80	0.218
18.500	0.000	1.71	2.14	1.77	0.218
18.583	0.000	1.68	2.14	1.73	0.218
18.667	0.000	1.66	2.13	1.70	0.217
18.750	0.000	1.63	2.13	1.67	0.217
18.833	0.000	1.60	2.13	1.64	0.217
18.917	0.000	1.58	2.13	1.62	0.217
19.000	0.000	1.55	2.13	1.59	0.216
19.083	0.000	1.53	2.12	1.57	0.216
19.167	0.000	1.51	2.12	1.54	0.216
19.250	0.000	1.49	2.12	1.52	0.216
19.333	0.000	1.47	2.12	1.50	0.215
19.417	0.000	1.45	2.12	1.48	0.215
19.500	0.000	1.43	2.12	1.46	0.215
19.583	0.000	1.41	2.11	1.44	0.215
19.667	0.000	1.40	2.11	1.42	0.215
19.750	0.000	1.38	2.11	1.41	0.214
19.833	0.000	1.37	2.11	1.39	0.214
19.917	0.000	1.35	2.11	1.37	0.214
20.000	0.000	1.33	2.11	1.36	0.214
20.083	0.000	1.32	2.11	1.34	0.214
20.167	0.000	1.31	2.10	1.33	0.214
20.250	0.000	1.29	2.10	1.31	0.213
20.333	0.000	1.28	2.10	1.30	0.213
20.417	0.000	1.27	2.10	1.29	0.213
20.500	0.000	1.25	2.10	1.27	0.213
20.583	0.000	1.24	2.10	1.26	0.213
20.667	0.000	1.23	2.10	1.25	0.213
20.750	0.000	1.22	2.10	1.24	0.213
20.833	0.000	1.21	2.10	1.23	0.213
20.917	0.000	1.20	2.10	1.21	0.212
21.000	0.000	1.19	2.09	1.20	0.212
21.083	0.000	1.18	2.09	1.19	0.212
21.167	0.000	1.17	2.09	1.18	0.212
21.250	0.000	1.16	2.09	1.17	0.212
21.333	0.000	1.15	2.09	1.16	0.212
21.417	0.000	1.14	2.09	1.15	0.212
21.500	0.000	1.13	2.09	1.14	0.212
21.583	0.000	1.12	2.09	1.13	0.212
21.667	0.000	1.11	2.09	1.12	0.212
21.750	0.000	1.10	2.09	1.12	0.211
21.833	0.000	1.09	2.09	1.11	0.211

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    21.917     0.000   1.09    2.09   1.10    0.211
    22.000     0.000   1.08    2.09   1.09    0.211
    22.083     0.000   1.07    2.09   1.08    0.211
    22.167     0.000   1.06    2.08   1.07    0.211
    22.250     0.000   1.06    2.08   1.07    0.211
    22.333     0.000   1.05    2.08   1.06    0.211
    22.417     0.000   1.04    2.08   1.05    0.211
    22.500     0.000   1.03    2.08   1.04    0.211
    22.583     0.000   1.03    2.08   1.04    0.211
    22.667     0.000   1.02    2.08   1.03    0.211
    22.750     0.000   1.01    2.08   1.02    0.210
    22.833     0.000   1.01    2.08   1.02    0.210
    22.917     0.000   1.00    2.08   1.01    0.210
    23.000     0.000   0.99    2.08   1.00    0.210
    23.083     0.000   0.99    2.08   1.00    0.210
    23.167     0.000   0.98    2.08   0.99    0.210
    23.250     0.000   0.98    2.08   0.99    0.210
    23.333     0.000   0.97    2.08   0.98    0.210
    23.417     0.000   0.96    2.08   0.97    0.210
    23.500     0.000   0.96    2.08   0.97    0.210
    23.583     0.000   0.95    2.08   0.96    0.210
    23.667     0.000   0.95    2.08   0.96    0.210
    23.750     0.000   0.94    2.07   0.95    0.210
    23.833     0.000   0.94    2.07   0.95    0.210
    23.917     0.000   0.93    2.07   0.94    0.210
    24.000     0.000   0.93    2.07   0.94    0.210
    24.083     0.000   0.00    2.04   0.70    0.205
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DA 2 Post Developed Condition 100 Year Storm Event Routed

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================================================================================
    FLOW-THROUGH DETENTION BASIN MODEL

    SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
    CONSTANT HYDROGRAPH TIME UNIT(MINUTES) =    5.000
    DEAD STORAGE(AF) =       0.00
    SPECIFIED DEAD STORAGE(AF) FILLED =       0.00
    ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN =    0.00


              INFLOW
                |
                |
                |
                V             __effective depth
           -------------       |   (and volume)
           |          |    |    |
           | detention |    |....V............
           |   basin   |<-->|        outflow
           |          |    |.........________
           -------------    |        |   \
                |        | storage |     basin outlet
                V        -----------
             OUTFLOW


    DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
    TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES =   5
    *BASIN-DEPTH  STORAGE    OUTFLOW  **BASIN-DEPTH  STORAGE    OUTFLOW  *
    *   (FEET)  (ACRE-FEET)   (CFS)   **   (FEET)  (ACRE-FEET)   (CFS)   *
    *     0.000     0.000     0.000**     1.000     0.100     0.010*
    *     2.000     0.200     0.010**     3.000     0.300    12.540*
    *     4.000     0.400    12.540**
--------------------------------------------------------------------------
    BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:
     INTERVAL   DEPTH   {S-O*DT/2}  {S+O*DT/2}
      NUMBER   (FEET)   (ACRE-FEET)  (ACRE-FEET)
        1    0.00      0.00000     0.00000
        2    1.00      0.09997     0.10003
        3    2.00      0.19997     0.20003
        4    3.00      0.25682     0.34318
        5    4.00      0.35682     0.44318
    WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)
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  DETENTION BASIN ROUTING RESULTS:
  NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES
     OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE
     AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

    TIME  DEAD-STORAGE  INFLOW  EFFECTIVE  OUTFLOW  EFFECTIVE
   (HRS)   FILLED(AF)   (CFS)  DEPTH(FT)   (CFS)   VOLUME(AF)
-----------------------------------------------------------------------------
   0.083      0.000   0.91    0.06   0.00    0.006
   0.167      0.000   0.91    0.13   0.00    0.013
   0.250      0.000   0.92    0.19   0.00    0.019
   0.333      0.000   0.92    0.25   0.00    0.025
   0.417      0.000   0.92    0.31   0.00    0.031
   0.500      0.000   0.92    0.38   0.00    0.038
   0.583      0.000   0.93    0.44   0.00    0.044
   0.667      0.000   0.93    0.51   0.00    0.051
   0.750      0.000   0.93    0.57   0.01    0.057
   0.833      0.000   0.93    0.63   0.01    0.063
   0.917      0.000   0.94    0.70   0.01    0.070
   1.000      0.000   0.94    0.76   0.01    0.076
   1.083      0.000   0.94    0.83   0.01    0.083
   1.167      0.000   0.94    0.89   0.01    0.089
   1.250      0.000   0.95    0.95   0.01    0.095
   1.333      0.000   0.95    1.02   0.01    0.102
   1.417      0.000   0.95    1.08   0.01    0.108
   1.500      0.000   0.95    1.15   0.01    0.115
   1.583      0.000   0.96    1.21   0.01    0.121
   1.667      0.000   0.96    1.28   0.01    0.128
   1.750      0.000   0.96    1.35   0.01    0.135
   1.833      0.000   0.97    1.41   0.01    0.141
   1.917      0.000   0.97    1.48   0.01    0.148
   2.000      0.000   0.97    1.54   0.01    0.154
   2.083      0.000   0.98    1.61   0.01    0.161
   2.167      0.000   0.98    1.68   0.01    0.168
   2.250      0.000   0.98    1.74   0.01    0.174
   2.333      0.000   0.98    1.81   0.01    0.181
   2.417      0.000   0.99    1.88   0.01    0.188
   2.500      0.000   0.99    1.95   0.01    0.195
   2.583      0.000   1.00    2.01   0.07    0.201
   2.667      0.000   1.00    2.05   0.39    0.205
   2.750      0.000   1.00    2.07   0.76    0.207
   2.833      0.000   1.00    2.07   0.91    0.207
   2.917      0.000   1.01    2.08   0.97    0.208
   3.000      0.000   1.01    2.08   0.99    0.208
   3.083      0.000   1.01    2.08   1.00    0.208
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3.167	0.000	1.02	2.08	1.01	0.208
3.250	0.000	1.02	2.08	1.02	0.208
3.333	0.000	1.02	2.08	1.02	0.208
3.417	0.000	1.03	2.08	1.02	0.208
3.500	0.000	1.03	2.08	1.03	0.208
3.583	0.000	1.04	2.08	1.03	0.208
3.667	0.000	1.04	2.08	1.03	0.208
3.750	0.000	1.04	2.08	1.04	0.208
3.833	0.000	1.05	2.08	1.04	0.208
3.917	0.000	1.05	2.08	1.05	0.208
4.000	0.000	1.05	2.08	1.05	0.208
4.083	0.000	1.06	2.08	1.05	0.208
4.167	0.000	1.06	2.08	1.06	0.208
4.250	0.000	1.07	2.08	1.06	0.208
4.333	0.000	1.07	2.08	1.06	0.208
4.417	0.000	1.07	2.08	1.07	0.208
4.500	0.000	1.08	2.08	1.07	0.208
4.583	0.000	1.08	2.09	1.08	0.209
4.667	0.000	1.08	2.09	1.08	0.209
4.750	0.000	1.09	2.09	1.08	0.209
4.833	0.000	1.09	2.09	1.09	0.209
4.917	0.000	1.10	2.09	1.09	0.209
5.000	0.000	1.10	2.09	1.10	0.209
5.083	0.000	1.11	2.09	1.10	0.209
5.167	0.000	1.11	2.09	1.11	0.209
5.250	0.000	1.12	2.09	1.11	0.209
5.333	0.000	1.12	2.09	1.11	0.209
5.417	0.000	1.12	2.09	1.12	0.209
5.500	0.000	1.13	2.09	1.12	0.209
5.583	0.000	1.13	2.09	1.13	0.209
5.667	0.000	1.14	2.09	1.13	0.209
5.750	0.000	1.14	2.09	1.14	0.209
5.833	0.000	1.15	2.09	1.14	0.209
5.917	0.000	1.15	2.09	1.15	0.209
6.000	0.000	1.16	2.09	1.15	0.209
6.083	0.000	1.16	2.09	1.16	0.209
6.167	0.000	1.17	2.09	1.16	0.209
6.250	0.000	1.17	2.09	1.17	0.209
6.333	0.000	1.18	2.09	1.17	0.209
6.417	0.000	1.18	2.09	1.18	0.209
6.500	0.000	1.19	2.09	1.18	0.209
6.583	0.000	1.19	2.09	1.19	0.209
6.667	0.000	1.20	2.09	1.19	0.209
6.750	0.000	1.21	2.10	1.20	0.210
6.833	0.000	1.21	2.10	1.20	0.210

6.917	0.000	1.22	2.10	1.21	0.210
7.000	0.000	1.22	2.10	1.22	0.210
7.083	0.000	1.23	2.10	1.22	0.210
7.167	0.000	1.23	2.10	1.23	0.210
7.250	0.000	1.24	2.10	1.23	0.210
7.333	0.000	1.24	2.10	1.24	0.210
7.417	0.000	1.25	2.10	1.24	0.210
7.500	0.000	1.26	2.10	1.25	0.210
7.583	0.000	1.27	2.10	1.26	0.210
7.667	0.000	1.27	2.10	1.26	0.210
7.750	0.000	1.28	2.10	1.27	0.210
7.833	0.000	1.28	2.10	1.28	0.210
7.917	0.000	1.29	2.10	1.28	0.210
8.000	0.000	1.30	2.10	1.29	0.210
8.083	0.000	1.31	2.10	1.30	0.210
8.167	0.000	1.31	2.10	1.30	0.210
8.250	0.000	1.32	2.10	1.31	0.210
8.333	0.000	1.33	2.10	1.32	0.210
8.417	0.000	1.34	2.11	1.33	0.211
8.500	0.000	1.34	2.11	1.33	0.211
8.583	0.000	1.35	2.11	1.34	0.211
8.667	0.000	1.36	2.11	1.35	0.211
8.750	0.000	1.37	2.11	1.36	0.211
8.833	0.000	1.37	2.11	1.36	0.211
8.917	0.000	1.38	2.11	1.37	0.211
9.000	0.000	1.39	2.11	1.38	0.211
9.083	0.000	1.40	2.11	1.39	0.211
9.167	0.000	1.41	2.11	1.40	0.211
9.250	0.000	1.42	2.11	1.41	0.211
9.333	0.000	1.42	2.11	1.42	0.211
9.417	0.000	1.44	2.11	1.42	0.211
9.500	0.000	1.44	2.11	1.43	0.211
9.583	0.000	1.46	2.11	1.44	0.211
9.667	0.000	1.46	2.12	1.45	0.212
9.750	0.000	1.48	2.12	1.46	0.212
9.833	0.000	1.48	2.12	1.47	0.212
9.917	0.000	1.50	2.12	1.48	0.212
10.000	0.000	1.50	2.12	1.49	0.212
10.083	0.000	1.52	2.12	1.50	0.212
10.167	0.000	1.52	2.12	1.51	0.212
10.250	0.000	1.54	2.12	1.53	0.212
10.333	0.000	1.55	2.12	1.54	0.212
10.417	0.000	1.56	2.12	1.55	0.212
10.500	0.000	1.57	2.12	1.56	0.212
10.583	0.000	1.59	2.13	1.57	0.213

10.667	0.000	1.60	2.13	1.58	0.213
10.750	0.000	1.61	2.13	1.60	0.213
10.833	0.000	1.62	2.13	1.61	0.213
10.917	0.000	1.64	2.13	1.62	0.213
11.000	0.000	1.65	2.13	1.64	0.213
11.083	0.000	1.67	2.13	1.65	0.213
11.167	0.000	1.68	2.13	1.66	0.213
11.250	0.000	1.70	2.13	1.68	0.213
11.333	0.000	1.71	2.13	1.69	0.213
11.417	0.000	1.73	2.14	1.71	0.214
11.500	0.000	1.74	2.14	1.73	0.214
11.583	0.000	1.76	2.14	1.74	0.214
11.667	0.000	1.77	2.14	1.76	0.214
11.750	0.000	1.80	2.14	1.78	0.214
11.833	0.000	1.81	2.14	1.79	0.214
11.917	0.000	1.84	2.14	1.81	0.214
12.000	0.000	1.85	2.15	1.83	0.215
12.083	0.000	1.99	2.15	1.88	0.215
12.167	0.000	2.00	2.16	1.95	0.216
12.250	0.000	2.03	2.16	1.99	0.216
12.333	0.000	2.04	2.16	2.02	0.216
12.417	0.000	2.07	2.16	2.04	0.216
12.500	0.000	2.09	2.16	2.07	0.216
12.583	0.000	2.12	2.17	2.09	0.217
12.667	0.000	2.14	2.17	2.11	0.217
12.750	0.000	2.17	2.17	2.14	0.217
12.833	0.000	2.19	2.17	2.17	0.217
12.917	0.000	2.23	2.18	2.19	0.218
13.000	0.000	2.25	2.18	2.22	0.218
13.083	0.000	2.29	2.18	2.25	0.218
13.167	0.000	2.31	2.18	2.28	0.218
13.250	0.000	2.36	2.19	2.31	0.219
13.333	0.000	2.38	2.19	2.35	0.219
13.417	0.000	2.43	2.19	2.38	0.219
13.500	0.000	2.45	2.19	2.42	0.219
13.583	0.000	2.51	2.20	2.45	0.220
13.667	0.000	2.53	2.20	2.49	0.220
13.750	0.000	2.59	2.20	2.54	0.220
13.833	0.000	2.63	2.21	2.58	0.221
13.917	0.000	2.69	2.21	2.63	0.221
14.000	0.000	2.73	2.21	2.68	0.221
14.083	0.000	2.52	2.21	2.64	0.221
14.167	0.000	2.55	2.20	2.58	0.220
14.250	0.000	2.64	2.21	2.59	0.221
14.333	0.000	2.68	2.21	2.63	0.221

14.417	0.000	2.78	2.22	2.69	0.222
14.500	0.000	2.83	2.22	2.76	0.222
14.583	0.000	2.95	2.23	2.84	0.223
14.667	0.000	3.01	2.24	2.92	0.224
14.750	0.000	3.15	2.24	3.02	0.224
14.833	0.000	3.22	2.25	3.12	0.225
14.917	0.000	3.39	2.26	3.23	0.226
15.000	0.000	3.48	2.27	3.35	0.227
15.083	0.000	3.69	2.28	3.49	0.228
15.167	0.000	3.81	2.30	3.65	0.230
15.250	0.000	4.09	2.31	3.83	0.231
15.333	0.000	4.25	2.33	4.03	0.233
15.417	0.000	6.08	2.42	4.71	0.242
15.500	0.000	6.30	2.47	5.60	0.247
15.583	0.000	6.89	2.52	6.20	0.252
15.667	0.000	7.28	2.56	6.73	0.256
15.750	0.000	7.25	2.57	7.05	0.257
15.833	0.000	8.05	2.61	7.41	0.261
15.917	0.000	10.91	2.77	8.66	0.277
16.000	0.000	14.22	2.99	11.01	0.299
16.083	0.000	34.76	3.95	12.47	0.441
16.167	0.000	9.17	3.81	12.54	0.418
16.250	0.000	7.75	3.56	12.54	0.385
16.333	0.000	6.56	3.44	12.54	0.344
16.417	0.000	4.43	2.92	12.02	0.292
16.500	0.000	3.94	2.55	9.22	0.255
16.583	0.000	3.58	2.39	5.93	0.239
16.667	0.000	3.30	2.31	4.43	0.231
16.750	0.000	3.08	2.27	3.68	0.227
16.833	0.000	2.89	2.25	3.26	0.225
16.917	0.000	2.73	2.23	2.99	0.223
17.000	0.000	2.60	2.22	2.79	0.222
17.083	0.000	2.76	2.22	2.72	0.222
17.167	0.000	2.66	2.21	2.72	0.221
17.250	0.000	2.56	2.21	2.65	0.221
17.333	0.000	2.48	2.20	2.57	0.220
17.417	0.000	2.40	2.20	2.49	0.220
17.500	0.000	2.33	2.19	2.42	0.219
17.583	0.000	2.27	2.18	2.35	0.218
17.667	0.000	2.21	2.18	2.28	0.218
17.750	0.000	2.16	2.17	2.22	0.217
17.833	0.000	2.11	2.17	2.17	0.217
17.917	0.000	2.06	2.17	2.12	0.217
18.000	0.000	2.01	2.16	2.07	0.216
18.083	0.000	1.86	2.15	1.99	0.215

18.167	0.000	1.82	2.15	1.90	0.215
18.250	0.000	1.79	2.14	1.84	0.214
18.333	0.000	1.75	2.14	1.80	0.214
18.417	0.000	1.72	2.14	1.76	0.214
18.500	0.000	1.69	2.14	1.73	0.214
18.583	0.000	1.66	2.13	1.69	0.213
18.667	0.000	1.63	2.13	1.66	0.213
18.750	0.000	1.60	2.13	1.64	0.213
18.833	0.000	1.58	2.13	1.61	0.213
18.917	0.000	1.56	2.12	1.58	0.212
19.000	0.000	1.53	2.12	1.56	0.212
19.083	0.000	1.51	2.12	1.54	0.212
19.167	0.000	1.49	2.12	1.51	0.212
19.250	0.000	1.47	2.12	1.49	0.212
19.333	0.000	1.45	2.12	1.47	0.212
19.417	0.000	1.43	2.11	1.45	0.211
19.500	0.000	1.41	2.11	1.43	0.211
19.583	0.000	1.39	2.11	1.42	0.211
19.667	0.000	1.38	2.11	1.40	0.211
19.750	0.000	1.36	2.11	1.38	0.211
19.833	0.000	1.35	2.11	1.36	0.211
19.917	0.000	1.33	2.11	1.35	0.211
20.000	0.000	1.32	2.11	1.33	0.211
20.083	0.000	1.30	2.10	1.32	0.210
20.167	0.000	1.29	2.10	1.30	0.210
20.250	0.000	1.27	2.10	1.29	0.210
20.333	0.000	1.26	2.10	1.28	0.210
20.417	0.000	1.25	2.10	1.26	0.210
20.500	0.000	1.24	2.10	1.25	0.210
20.583	0.000	1.22	2.10	1.24	0.210
20.667	0.000	1.21	2.10	1.23	0.210
20.750	0.000	1.20	2.10	1.22	0.210
20.833	0.000	1.19	2.09	1.20	0.209
20.917	0.000	1.18	2.09	1.19	0.209
21.000	0.000	1.17	2.09	1.18	0.209
21.083	0.000	1.16	2.09	1.17	0.209
21.167	0.000	1.15	2.09	1.16	0.209
21.250	0.000	1.14	2.09	1.15	0.209
21.333	0.000	1.13	2.09	1.14	0.209
21.417	0.000	1.12	2.09	1.13	0.209
21.500	0.000	1.11	2.09	1.12	0.209
21.583	0.000	1.10	2.09	1.11	0.209
21.667	0.000	1.10	2.09	1.11	0.209
21.750	0.000	1.09	2.09	1.10	0.209
21.833	0.000	1.08	2.09	1.09	0.209

```
     21.917     0.000    1.07    2.09   1.08    0.209
     22.000     0.000    1.06    2.08   1.07    0.208
     22.083     0.000    1.06    2.08   1.06    0.208
     22.167     0.000    1.05    2.08   1.06    0.208
     22.250     0.000    1.04    2.08   1.05    0.208
     22.333     0.000    1.03    2.08   1.04    0.208
     22.417     0.000    1.03    2.08   1.03    0.208
     22.500     0.000    1.02    2.08   1.03    0.208
     22.583     0.000    1.01    2.08   1.02    0.208
     22.667     0.000    1.01    2.08   1.01    0.208
     22.750     0.000    1.00    2.08   1.01    0.208
     22.833     0.000    0.99    2.08   1.00    0.208
     22.917     0.000    0.99    2.08   0.99    0.208
     23.000     0.000    0.98    2.08   0.99    0.208
     23.083     0.000    0.97    2.08   0.98    0.208
     23.167     0.000    0.97    2.08   0.98    0.208
     23.250     0.000    0.96    2.08   0.97    0.208
     23.333     0.000    0.96    2.08   0.96    0.208
     23.417     0.000    0.95    2.08   0.96    0.208
     23.500     0.000    0.95    2.07   0.95    0.207
     23.583     0.000    0.94    2.07   0.95    0.207
     23.667     0.000    0.93    2.07   0.94    0.207
     23.750     0.000    0.93    2.07   0.94    0.207
     23.833     0.000    0.92    2.07   0.93    0.207
     23.917     0.000    0.92    2.07   0.93    0.207
     24.000     0.000    0.91    2.07   0.92    0.207
     24.083     0.000    0.00    2.03   0.64    0.203
-----------------------------------------------------------------------------
```

Hydraulic Calculations

West Side Baroque Court - Street Capacity Q100

```
****************************************************************************
>>>>STREETFLOW MODEL INPUT INFORMATION<<<<
----------------------------------------------------------------------------
  CONSTANT STREET GRADE(FEET/FEET) = 0.080000
  CONSTANT STREET FLOW(CFS) =   17.75
  AVERAGE STREETFLOW FRICTION FACTOR(MANNING) = 0.015000
  CONSTANT SYMMETRICAL STREET HALF-WIDTH(FEET) =   18.50
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =    9.00
  INTERIOR STREET CROSSFALL(DECIMAL) = 0.020000
  OUTSIDE  STREET CROSSFALL(DECIMAL) = 0.020000
  CONSTANT SYMMETRICAL CURB HEIGHT(FEET) =   0.50
  CONSTANT SYMMETRICAL GUTTER-WIDTH(FEET) =   1.50
  CONSTANT SYMMETRICAL GUTTER-LIP(FEET) =  0.03125
  CONSTANT SYMMETRICAL GUTTER-HIKE(FEET) =  0.12500
  FLOW ASSUMED TO FILL STREET ON ONE SIDE, AND THEN SPLITS
============================================================================
  STREET FLOW MODEL RESULTS:
----------------------------------------------------------------------------
  STREET FLOW DEPTH(FEET) =  0.42
  HALFSTREET FLOOD WIDTH(FEET) =   14.52
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.98
  PRODUCT OF DEPTH&VELOCITY =    3.32
============================================================================
```

East Side Baroque Court - Street Capacity Q100

```
****************************************************************************
>>>>STREETFLOW MODEL INPUT INFORMATION<<<<
----------------------------------------------------------------------------
  CONSTANT STREET GRADE(FEET/FEET) = 0.080000
  CONSTANT STREET FLOW(CFS) =   17.27
  AVERAGE STREETFLOW FRICTION FACTOR(MANNING) = 0.015000
  CONSTANT SYMMETRICAL STREET HALF-WIDTH(FEET) =   18.50
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =    9.00
  INTERIOR STREET CROSSFALL(DECIMAL) = 0.020000
  OUTSIDE  STREET CROSSFALL(DECIMAL) = 0.020000
  CONSTANT SYMMETRICAL CURB HEIGHT(FEET) =   0.50
  CONSTANT SYMMETRICAL GUTTER-WIDTH(FEET) =   1.50
  CONSTANT SYMMETRICAL GUTTER-LIP(FEET) =  0.03125
  CONSTANT SYMMETRICAL GUTTER-HIKE(FEET) =  0.12500
  FLOW ASSUMED TO FILL STREET ON ONE SIDE, AND THEN SPLITS
============================================================================
  STREET FLOW MODEL RESULTS:
----------------------------------------------------------------------------
  STREET FLOW DEPTH(FEET) =  0.42
  HALFSTREET FLOOD WIDTH(FEET) =   14.52
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.76
  PRODUCT OF DEPTH&VELOCITY =    3.23
============================================================================
```

West Side Antique Court - Street Capacity Q100

```
****************************************************************************
>>>>STREETFLOW MODEL INPUT INFORMATION<<<<
----------------------------------------------------------------------------
   CONSTANT STREET GRADE(FEET/FEET) = 0.080000
   CONSTANT STREET FLOW(CFS) =   17.49
   AVERAGE STREETFLOW FRICTION FACTOR(MANNING) = 0.015000
   CONSTANT SYMMETRICAL STREET HALF-WIDTH(FEET) =   18.50
   DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =    9.00
   INTERIOR STREET CROSSFALL(DECIMAL) = 0.020000
   OUTSIDE  STREET CROSSFALL(DECIMAL) = 0.020000
   CONSTANT SYMMETRICAL CURB HEIGHT(FEET) =   0.50
   CONSTANT SYMMETRICAL GUTTER-WIDTH(FEET) =   1.50
   CONSTANT SYMMETRICAL GUTTER-LIP(FEET) =  0.03125
   CONSTANT SYMMETRICAL GUTTER-HIKE(FEET) =  0.12500
   FLOW ASSUMED TO FILL STREET ON ONE SIDE, AND THEN SPLITS
============================================================================
   STREET FLOW MODEL RESULTS:
----------------------------------------------------------------------------
   STREET FLOW DEPTH(FEET) =  0.42
   HALFSTREET FLOOD WIDTH(FEET) =   14.52
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.86
   PRODUCT OF DEPTH&VELOCITY =    3.27
============================================================================
```

East Side Antique Court - Street Capacity Q100

```
****************************************************************************
>>>>STREETFLOW MODEL INPUT INFORMATION<<<<
----------------------------------------------------------------------------
   CONSTANT STREET GRADE(FEET/FEET) = 0.080000
   CONSTANT STREET FLOW(CFS) =   17.29
   AVERAGE STREETFLOW FRICTION FACTOR(MANNING) = 0.015000
   CONSTANT SYMMETRICAL STREET HALF-WIDTH(FEET) =   18.50
   DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =    9.00
   INTERIOR STREET CROSSFALL(DECIMAL) = 0.020000
   OUTSIDE  STREET CROSSFALL(DECIMAL) = 0.020000
   CONSTANT SYMMETRICAL CURB HEIGHT(FEET) =   0.50
   CONSTANT SYMMETRICAL GUTTER-WIDTH(FEET) =   1.50
   CONSTANT SYMMETRICAL GUTTER-LIP(FEET) =  0.03125
   CONSTANT SYMMETRICAL GUTTER-HIKE(FEET) =  0.12500
   FLOW ASSUMED TO FILL STREET ON ONE SIDE, AND THEN SPLITS
============================================================================
   STREET FLOW MODEL RESULTS:
----------------------------------------------------------------------------
   STREET FLOW DEPTH(FEET) =  0.42
   HALFSTREET FLOOD WIDTH(FEET) =   14.52
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.77
   PRODUCT OF DEPTH&VELOCITY =    3.24
============================================================================
```

West Side Baroque Court -Catch Basin Capacity Q100

```
****************************************************************************
>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<
------------------------------------------------------------------------------


   Curb Inlet Capacities are approximated based on the Bureau of
   Public Roads nomograph plots for flowby basins and sump basins.


   BASIN INFLOW(CFS) =   17.75
   BASIN OPENING(FEET) =  0.70                    0.5 Curb Height + 0.2 Local Depression
   DEPTH OF WATER(FEET) =  0.70

   >>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) =      9.82

============================================================================
```

West Side Baroque Court -Catch Basin Capacity Q100

```
****************************************************************************
>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<
------------------------------------------------------------------------------


   Curb Inlet Capacities are approximated based on the Bureau of
   Public Roads nomograph plots for flowby basins and sump basins.


   BASIN INFLOW(CFS) =   17.27
   BASIN OPENING(FEET) =  0.70
   DEPTH OF WATER(FEET) =  0.70

   >>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) =      9.55

============================================================================
```

West Side Antique Court - Catch Basin Capacity Q100

```
****************************************************************************
>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<
----------------------------------------------------------------------------


   Curb Inlet Capacities are approximated based on the Bureau of
   Public Roads nomograph plots for flowby basins and sump basins.


   BASIN INFLOW(CFS) =   17.49
   BASIN OPENING(FEET) =  0.70
   DEPTH OF WATER(FEET) =  0.70

   >>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) =     9.67

============================================================================
```

East Side Antique Court - Catch Basin Capacity Q100

```
****************************************************************************
>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<
----------------------------------------------------------------------------


   Curb Inlet Capacities are approximated based on the Bureau of
   Public Roads nomograph plots for flowby basins and sump basins.


   BASIN INFLOW(CFS) =   17.29
   BASIN OPENING(FEET) =  0.70
   DEPTH OF WATER(FEET) =  0.70

   >>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) =     9.56

============================================================================
```

Baroque Court Storm Drain Capacity Q100

```
************************************************************************
>>>>PIPEFLOW HYDRAULIC INPUT INFORMATION<<<<
----------------------------------------------------------------------------
  PIPE DIAMETER(FEET) =  3.000
  PIPE SLOPE(FEET/FEET) =  0.0050
  PIPEFLOW(CFS) =      34.92
  MANNINGS FRICTION FACTOR = 0.013000
============================================================================
  CRITICAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
  CRITICAL DEPTH(FEET) =     1.92
  CRITICAL FLOW AREA(SQUARE FEET) =    4.778
  CRITICAL FLOW TOP-WIDTH(FEET) =  2.880
  CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =        744.14
  CRITICAL FLOW VELOCITY(FEET/SEC.) =    7.309
  CRITICAL FLOW VELOCITY HEAD(FEET) =         0.83
  CRITICAL FLOW HYDRAULIC DEPTH(FEET) =     1.66
  CRITICAL FLOW SPECIFIC ENERGY(FEET) =         2.75
============================================================================
  NORMAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
  NORMAL DEPTH(FEET) =     1.92
  FLOW AREA(SQUARE FEET) =     4.78
  FLOW TOP-WIDTH(FEET) =    2.879
  FLOW PRESSURE + MOMENTUM(POUNDS) =        744.14
  FLOW VELOCITY(FEET/SEC.) =        7.304
  FLOW VELOCITY HEAD(FEET) =        0.828
  HYDRAULIC DEPTH(FEET) =     1.66
  FROUDE NUMBER =    0.999
  SPECIFIC ENERGY(FEET) =         2.75
============================================================================
```

Antique Court Storm Drain Capacity Q100

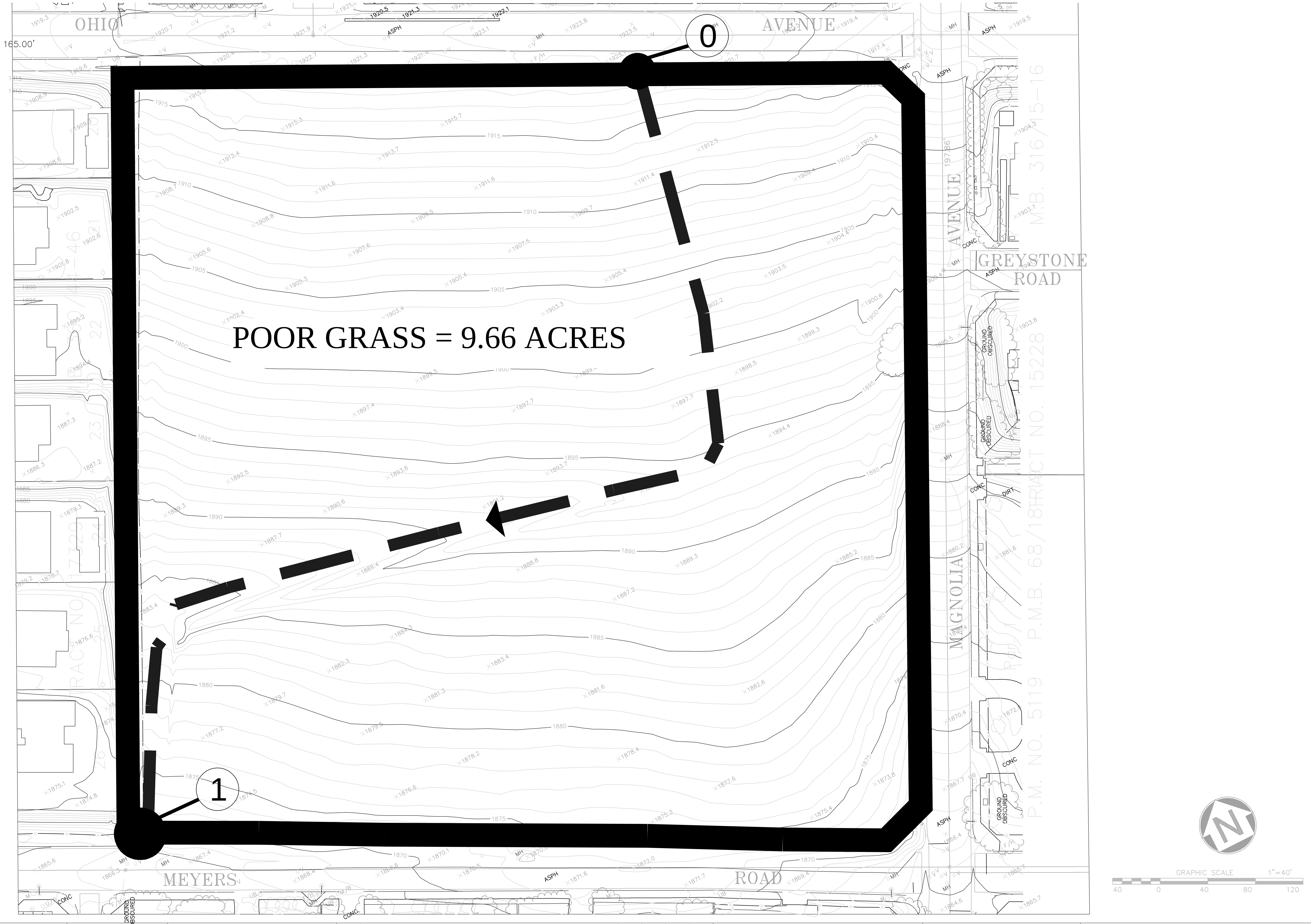
```
************************************************************************
>>>>PIPEFLOW HYDRAULIC INPUT INFORMATION<<<<
----------------------------------------------------------------------------
  PIPE DIAMETER(FEET) =  3.000
  PIPE SLOPE(FEET/FEET) =  0.0050
  PIPEFLOW(CFS) =      34.76
  MANNINGS FRICTION FACTOR = 0.013000
============================================================================
  CRITICAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
  CRITICAL DEPTH(FEET) =     1.92
  CRITICAL FLOW AREA(SQUARE FEET) =    4.765
  CRITICAL FLOW TOP-WIDTH(FEET) =  2.883
  CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =        739.61
  CRITICAL FLOW VELOCITY(FEET/SEC.) =    7.295
  CRITICAL FLOW VELOCITY HEAD(FEET) =         0.83
  CRITICAL FLOW HYDRAULIC DEPTH(FEET) =     1.65
  CRITICAL FLOW SPECIFIC ENERGY(FEET) =         2.74
============================================================================
  NORMAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
  NORMAL DEPTH(FEET) =     1.92
  FLOW AREA(SQUARE FEET) =     4.76
  FLOW TOP-WIDTH(FEET) =    2.883
  FLOW PRESSURE + MOMENTUM(POUNDS) =        739.61
  FLOW VELOCITY(FEET/SEC.) =        7.297
  FLOW VELOCITY HEAD(FEET) =        0.827
  HYDRAULIC DEPTH(FEET) =     1.65
  FROUDE NUMBER =    1.000
  SPECIFIC ENERGY(FEET) =         2.74
============================================================================
```

Parkway Drain Capacity Calculation

```
****************************************************************************
>>>>CHANNEL INPUT INFORMATION<<<<
----------------------------------------------------------------------------
   NORMAL DEPTH(FEET) =   0.33
   CHANNEL Z1(HORIZONTAL/VERTICAL) =    0.00
         Z2(HORIZONTAL/VERTICAL) =    0.00
   BASEWIDTH(FEET) =    6.00
   CONSTANT CHANNEL SLOPE(FEET/FEET) = 0.020000
   MANNINGS FRICTION FACTOR = 0.0150
============================================================================
   NORMAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
   >>>>> NORMAL DEPTH FLOW(CFS) =     12.54
   FLOW TOP-WIDTH(FEET) =        6.00
   FLOW AREA(SQUARE FEET) =         2.00
   HYDRAULIC DEPTH(FEET) =    0.33
   FLOW AVERAGE VELOCITY(FEET/SEC.) =    6.27
   UNIFORM FROUDE NUMBER =    1.916
   PRESSURE + MOMENTUM(POUNDS) =         173.20
   AVERAGED VELOCITY HEAD(FEET) =     0.611
   SPECIFIC ENERGY(FEET) =     0.944
============================================================================
   CRITICAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
   CRITICAL FLOW TOP-WIDTH(FEET) =        6.00
   CRITICAL FLOW AREA(SQUARE FEET) =         3.08
   CRITICAL FLOW HYDRAULIC DEPTH(FEET) =    0.51
   CRITICAL FLOW AVERAGE VELOCITY(FEET/SEC.) =    4.07
   CRITICAL DEPTH(FEET) =    0.51
   CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =         148.22
   AVERAGED CRITICAL FLOW VELOCITY HEAD(FEET) =     0.257
   CRITICAL FLOW SPECIFIC ENERGY(FEET) =     0.771
============================================================================
```

Hydrology Exhibits

PRE DEVELOPMENT HYDROLOGY EXHIBIT



Node	Area (ft2)	Area (Ac)	Flow Length (ft)	High (ft)	Low (ft)	Q10 (cfs)	Q100 (cfs)
0to1	420701.54	9.66	995	1923.1	1867	27.98	51.03

S.D. ENGINEERING AND ASSOCIATES
LAND PLANNING AND CIVIL ENGINEERING
242 E. AIRPORT DRIVE, SUITE 212 – SAN BERNARDINO, CALIF. 92408
PHONE (909) 215–3451 EMAIL: SURESH@SDENGINEERING.NET

SURESH DODDIAH R.C.E. 36361 DATE

REGISTERED PROFESSIONAL ENGINEER
SURESH DODDIAH
NO. 36361
EXP. 6-30-24
CIVIL
STATE OF CALIFORNIA

DIGALERT
DIAL BEFORE YOU DIG
TOLL FREE
TWO WORKING DAYS BEFORE YOU DIG
1-800-227-2600
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

CITY OF SAN BERNARDINO, CALIFORNIA

TRACT NO. 20539

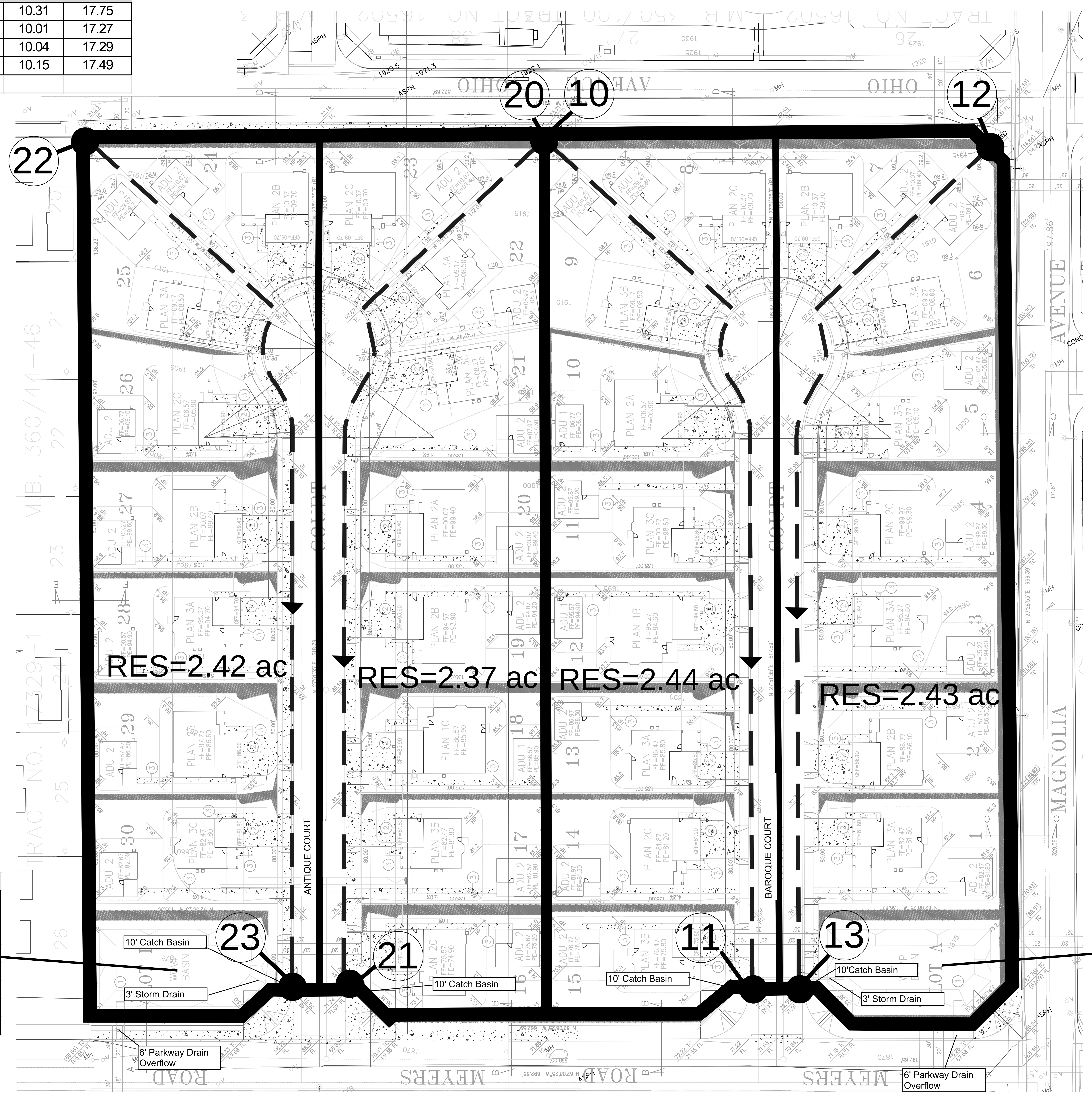
DRAWN BY: EB
DESIGNED BY: EB
CHECKED BY: SD

PRE–DEVELOPMENT PLAN
MEYERS ROAD
SAN BERNARDINO, CA

SCALE: AS SHOWN
DATE: 10/23/2017
DRAWING NO: 1 / 1

POST DEVELOPMENT HYDROLOGY EXHIBIT

Node	Area (ft2)	Area (Ac)	Flow Length (ft)	High (ft)	Low (ft)	Q10 (cfs)	Q100 (cfs)
10to11	106299.79	2.44	670	123.7	72.07	10.31	17.75
12to13	105707.45	2.43	670	116	71.91	10.01	17.27
20to21	103267.72	2.37	670	123.71	71.07	10.04	17.29
22to23	105426.58	2.42	670	120.23	70.81	10.15	17.49
		9.66					



SCALE 1" =40'

Lot B Basin Storage Summary Table

ELEV (FT)	AREA (FT2)	VOLUME (FT3)	TOTAL VOLUME (FT3)	TOTAL VOLUME (AC/FT)
69	2565	0	0	0.0
70	3307	2936	2936	0.1
71	4114	3710.5	6646.5	0.2
72	4989	4551.5	11198	0.3
73	5928	5458.5	16656.5	0.4

Lot A Basin Storage Summary Table

ELEV (FT)	AREA (FT2)	VOLUME (FT3)	TOTAL VOLUME (FT3)	TOTAL VOLUME (AC/FT)
70.8	3609	0	0	0.0
71.8	4401	4005	4005	0.1
72.8	5256	4828.5	8833.5	0.2
73.8	6174	5715	14548.5	0.3
74.8	7149	6661.5	21210	0.5

Appendix E Traffic Impact Analysis

Tentative Tract Map No. 20539
Traffic Impact Analysis

San Bernardino, California

March 28, 2023

Prepared by:

TJW ENGINEERING, INC.
9841 Irvine Center Drive, Suite 200 -
Irvine, CA 92618 -
949.878.3509 | www.tjwengineering.com -

TJW ENGINEERING, INC.
TRAFFIC ENGINEERING &
TRANSPORTATION PLANNING
CONSULTANTS

March 28, 2023

Mr. Srihari Mupparaju
AURORA BUILDERS LLC
9987 Fox Meadow Road
San Diego, CA 92127

Subject: Tentative Tract Map No. 20539 Traffic Impact Analysis, City of San Bernardino

Dear Mr. Mupparaju:

TJW ENGINEERING, INC. (TJW) is pleased to present you with this traffic impact analysis for the proposed Tentative Tract Map No. 20539 located northwest corner of Magnolia Avenue and Meyers Road in the City of San Bernardino.

This traffic study has been prepared to meet the traffic study requirements for the City of San Bernardino and assesses the forecast traffic operations associated with the proposed project and its impact on the local street network. This report is being submitted to you for review and forwarding to the City of San Bernardino.

Please contact us at (949) 878-3509 if you have any questions regarding this analysis.

Sincerely,

Thomas Wheat, PE, TE
President

Registered Civil Engineer *#69467*
Registered Traffic Engineer *#2565*

REGISTERED PROFESSIONAL ENGINEER
THOMAS JOSEPH WHEAT
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Exp. 06/30/22
TRAFFIC
STATE OF CALIFORNIA

David Chew, PTP
Transportation Planner

Daniel Flores, EIT
Project Engineer

Tentative Tract Map No. 20539
Traffic Impact Analysis

San Bernardino, California

March 28, 2023

Prepared for:

Mr. Srihari Mupparaju
AURORA BUILDERS LLC
9987 Fox Meadow Road
San Diego, CA 92127

Prepared by:

Thomas Wheat, PE, TE
David Chew, PTP
Daniel Flores, EIT

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Appendices

1.0 EXECUTIVE SUMMARY

This traffic impact analysis (TIA) analyzes the projected traffic operations associated with the development of Tentative Tract Map No. 20539 located northwest corner of Magnolia Avenue and Meyers Drive in the City of San Bernardino. The purpose of this TIA is to evaluate potential circulation system deficiencies that may result from development of the proposed project, and to recommend improvements to achieve acceptable operations, if applicable. This analysis has been prepared in coordination with the City of San Bernardino via a scoping agreement (See **Appendix B**) and is pursuant to applicable City of San Bernardino traffic impact analysis guidelines.

The proposed project consists of constructing 32 single-family detached homes. Site access is planned via two full-access driveways on Meyers Road. The site is currently classified as Residential Low (RL) in the City of San Bernardino General Plan Land Use Plan.

The proposed project is anticipated to be fully built and generating trips in 2023. To account for ambient growth on *Existing* traffic volumes have been increased by a growth rate of 2% per year over a one-year period for Project Opening Year conditions.

The proposed project is projected to generate 302 daily trips, 22 AM peak hour trips, and 30 PM peak hour trips.

The following 7 intersections in the vicinity of the project site have been included in the intersection level of service (LOS) analysis:

1. - Magnolia Avenue / Meyers Road
2. - Little League Drive / Meyers Road
3. - Little League Drive / Belmont Avenue
4. - Magnolia Avenue / Belmont Avenue
5. - Palm Avenue / Belmont Avenue
6. - East Project Driveway / Meyers Road
7. - West Project Driveway / Meyers Road

The study intersections have been analyzed for the following study scenarios:

- Existing Year 2022 Traffic Conditions ("*Existing*")
- Project Opening Year 2023 Base Traffic Conditions ("*Opening Year*")
  - Existing + Ambient
- Project Opening Year 2023 Base plus Cumulative Projects Traffic Conditions ("*Opening Year Cumulative*") -
  - Existing + Ambient + Cumulative

- Project Opening Year 2023 Base plus Cumulative Projects plus Project Traffic Conditions ("*Opening Year Cumulative With Project*")
    - Existing + Ambient + Cumulative + Project

1.1 SUMMARY OF LEVEL OF SERVICE ANALYSIS RESULTS

Table ES-1 summarizes the results of the intersection LOS analysis based on the City of San Bernardino thresholds of significance for analyzing transportation deficiencies.

Table ES-1

Summary of Transportation Deficiencies at Study Intersections

Intersection			Opening Year Cumulative With Project
1	Magnolia Avenue	Meyers Road	No Deficiencies
2	Little League Drive	Meyers Road	No Deficiencies
3	Little League Drive	Belmont Avenue	No Deficiencies
4	Magnolia Avenue	Belmont Avenue	No Deficiencies
5	Palm Avenue	Belmont Avenue	No Deficiencies
6	East Project Driveway	Meyers Road	No Deficiencies
7	West Project Driveway	Meyers Road	No Deficiencies

Existing Conditions

The City of San Bernardino study intersections currently operate at an acceptable LOS during the AM and PM peak hours for *Existing* conditions.

Opening Year Conditions

The City of San Bernardino study intersections are projected to operate at an acceptable LOS during the AM and PM peak hours for *Opening Year* conditions.

Opening Year Cumulative Conditions

The City of San Bernardino study intersections are projected to operate at an acceptable LOS during the AM and PM peak hours for *Opening Year Cumulative* conditions.

Opening Year Cumulative With Project Conditions

The City of San Bernardino study intersections are projected to operate at an acceptable LOS during the AM and PM peak hours for *Opening Year Cumulative With Project* conditions.

1.2 ON-SITE ROADWAY AND SITE ACCESS IMPROVEMENTS

Wherever necessary, roadways adjacent to the proposed project site and site access points will be constructed in compliance with recommended roadway classifications and respective cross-sections in the City of San Bernardino General Plan or as directed by the City Engineer.

Sight distance at each project access point should be reviewed with respect to standard Caltrans and City sight distance standards at the time of final grading, landscaping and street improvement plans.

Signing/striping should be implemented in conjunction with detailed construction plans for the project site.

1.3 SUMMARY OF VEHICLE MILES TRAVELED ANALYSIS

Senate Bill (SB) 743 was adopted in 2013 requiring the Governor's Office of Planning and Research (OPR) to identify new metrics for identifying and mitigating transportation impacts within the California Environmental Quality Act (CEQA). For land use projects, OPR has identified VMT as the new metric for transportation analysis under CEQA. The regulatory changes to the CEQA guidelines that implement SB 743 were approved on December 28th, 2018 with an implementation date of July 1st, 2020 as the new metric.

The VMT analysis has been submitted in a separate document from this report.

2.0 INTRODUCTION

This traffic impact analysis (TIA) analyzes the projected traffic operations associated with the development of Tentative Tract Map No. 20539 located northwest corner of Magnolia Avenue and Meyers Drive in the City of San Bernardino. The purpose of this TIA is to evaluate potential circulation system deficiencies that may result from development of the proposed project, and to recommend improvements to achieve acceptable operations, if applicable. This analysis has been prepared in coordination with the City of San Bernardino via a scoping agreement (See **Appendix B**) and is pursuant to applicable City of San Bernardino traffic impact analysis guidelines.

2.1 PROJECT DESCRIPTION

The proposed project consists of constructing 32 single-family detached homes. Site access is planned via two full-access driveways on Meyers Road. The site is currently classified as Residential Low (RL) in the City of San Bernardino General Plan Land Use Plan.

The proposed project is anticipated to be fully built and generating trips in 2023. To account for ambient growth on *Existing* traffic volumes have been increased by a growth rate of 2% per year over a one-year period for Project Opening Year conditions.

Exhibit 1 shows the project site location and study area. **Exhibit 2** shows the proposed project site plan.

2.2 STUDY AREA

The following 7 intersections in the vicinity of the project site have been included in the intersection level of service (LOS) analysis:

1. Magnolia Avenue / Meyers Road
2. Little League Drive / Meyers Road
3. Little League Drive / Belmont Avenue
4. Magnolia Avenue / Belmont Avenue
5. Palm Avenue / Belmont Avenue
6. East Project Driveway / Meyers Road
7. West Project Driveway / Meyers Road

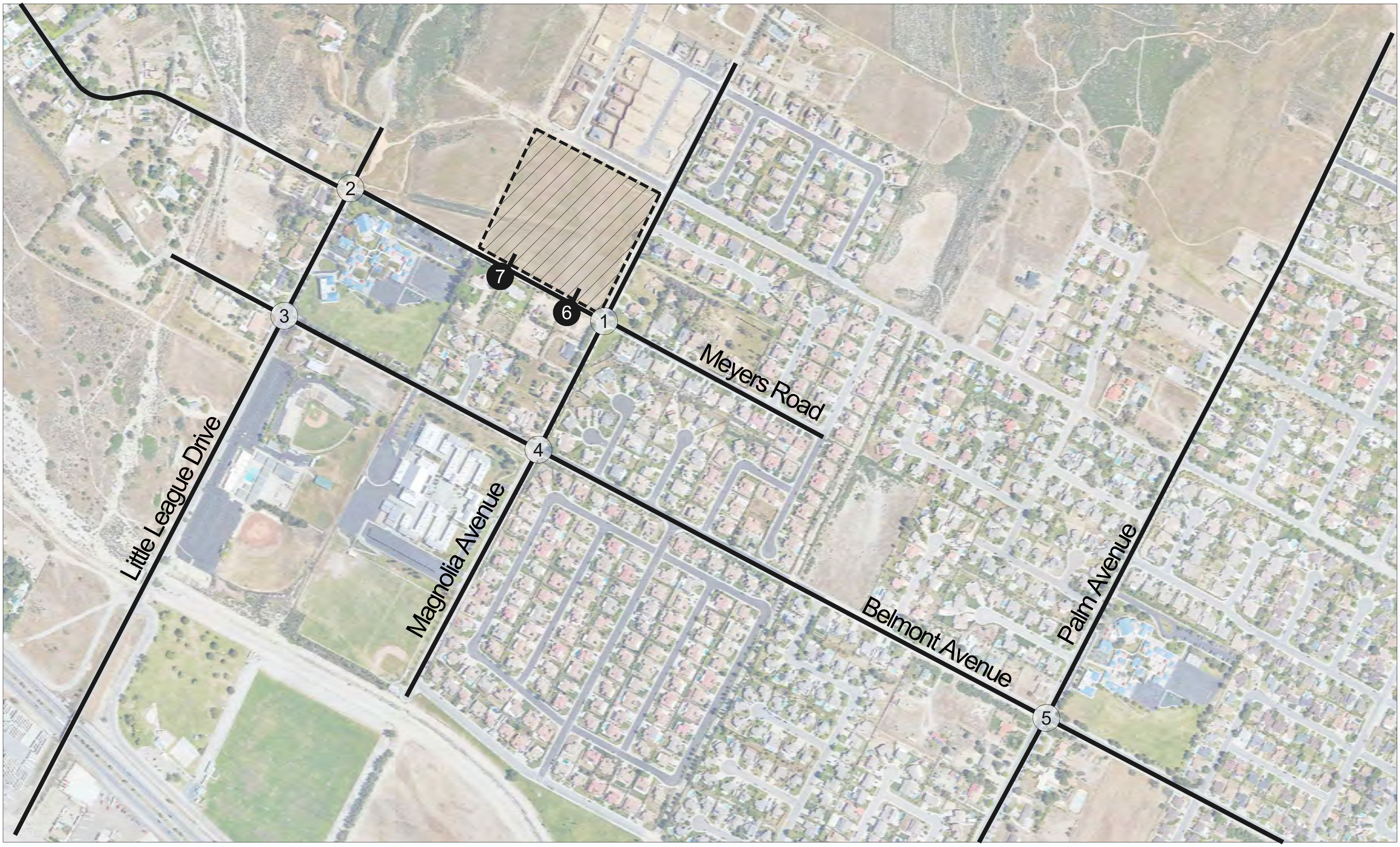
This traffic analysis follows the *City of San Bernardino Traffic Impact Analysis Guidelines (August 2020).*

Exhibit 1 shows the location of the study intersections and roadway segments which are analyzed for the following study scenarios:

- Existing Year 2022 Traffic Conditions ("*Existing*")
- Project Opening Year 2023 Base Traffic Conditions ("*Opening Year*")
    - Existing + Ambient
- Project Opening Year 2023 Base plus Cumulative Projects Traffic Conditions ("*Opening Year Cumulative*")
    - Existing + Ambient + Cumulative
- Project Opening Year 2023 Base plus Cumulative Projects plus Project Traffic Conditions ("*Opening Year Cumulative With Project*")
    - Existing + Ambient + Cumulative + Project

Traffic operations are evaluated for the following time periods:

- Weekday AM Peak Hour occurring within 7:00 AM to 9:00 AM
- Weekday PM Peak Hour occurring within 4:00 PM to 6:00 PM



Legend:

----	Project Site
#	Study Intersection Location
XX%	Percent Trip Distribution

Exhibit 1: Project Location and Study Area

Tentative Tract Map No. 20539 Traffic Impact Analysis

SDE-22-001

TJW ENGINEERING, INC.

Not to Scale

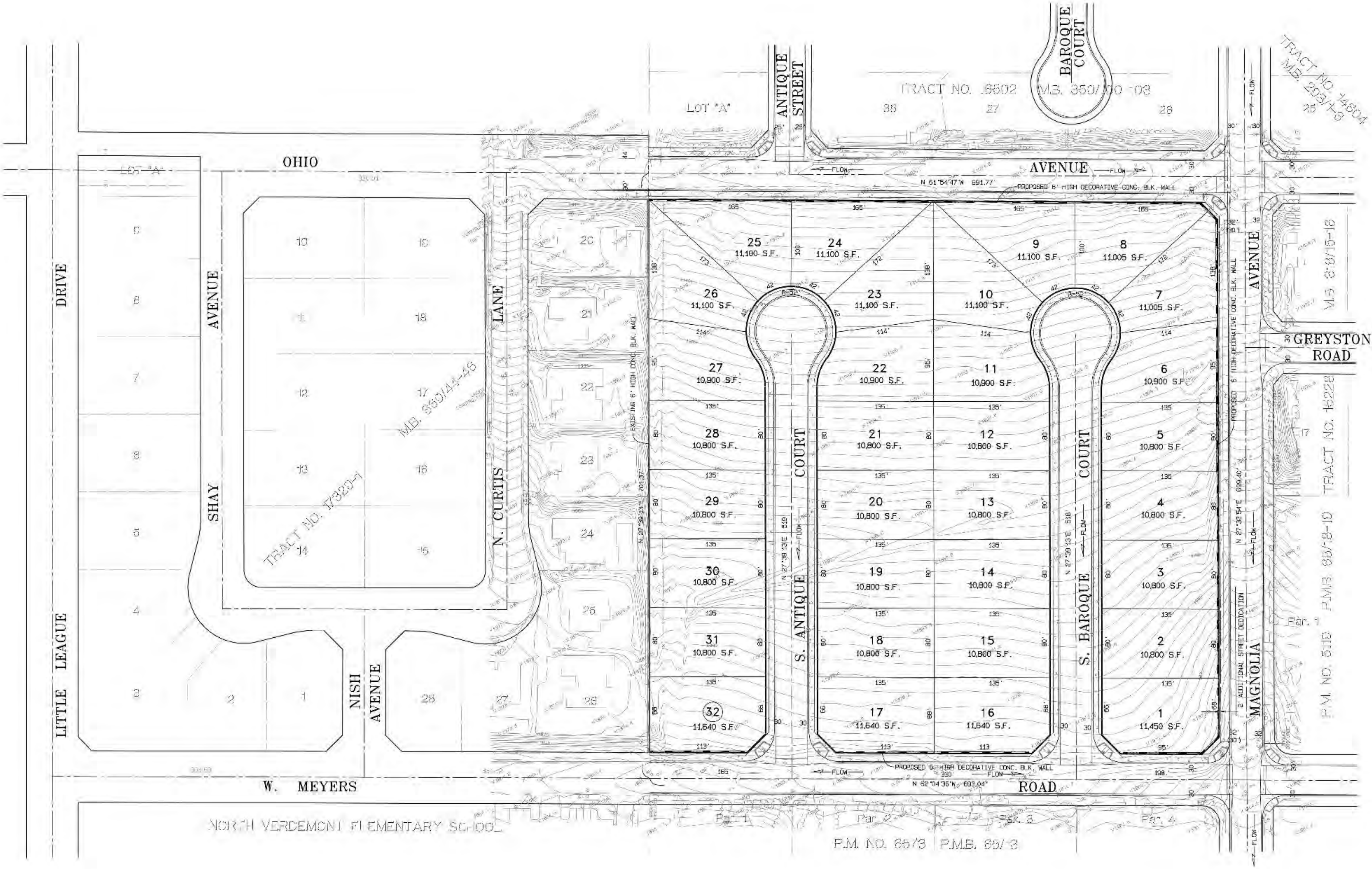


Exhibit 2: Project Site Plan

3.0 METHODOLOGY

3.1 INTERSECTION ANALYSIS METHODOLOGY

Level of Service (LOS) is commonly used to describe the quality of flow on roadways and at intersections using a range of LOS from LOS A (free flow with little congestion) to LOS F (severely congested conditions). The definitions for LOS for interruption of traffic flow differ depending on the type of traffic control (traffic signal, unsignalized intersection with side street stops, unsignalized intersection with all-way stops). The *Highway Capacity Manual (HCM) 6* (Transportation Research Board, 2016) methodology expresses the LOS of an intersection in terms of delay time for the intersection approaches. The HCM methodology utilizes different procedures for different types of intersection control.

The City of San Bernardino traffic impact study guidelines require signalized intersection operations be analyzed utilizing the HCM 6th Edition methodology. Intersection LOS for signalized intersections is based on the intersections average control delay for all movements at the intersection during the peak hour. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Table 1 describes the general characteristics of traffic flow and accompanying delay ranges at signalized intersections.

Table 1

HCM – LOS & Delay Ranges – Signalized Intersections

Level of Service	Description	Delay (in seconds)
A	Very favorable progression; most vehicles arrive during green signal and do not stop. Short cycle lengths.	0 – 10.00
B	Good progression, short cycle lengths. More vehicles stop than for LOS A.	10.01 – 20.00
C	Fair progression; longer cycle lengths. Individual cycle failures may begin to appear. The number of vehicles stopping is significant, though many vehicles still pass through without stopping.	20.01 – 35.00
D	Progression less favorable, longer cycle length and high flow/capacity ratio. The proportion of vehicles that pass through without stopping diminishes. Individual cycle failures are obvious.	35.01 – 55.00
E	Severe congestion with some long-standing queues on critical approaches. Poor progression, long cycle lengths and high flow/capacity ratio. Individual cycle failures are frequent.	55.01 – 80.00
F	Very poor progression, long cycle lengths and many individual cycle failures. Arrival flow rates exceed capacity of intersection.	> 80.01

Source: Transportation Research Board, *Highway Capacity Manual*, HCM6 Edition (Washington D.C., 2016).

Collected peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. It is a common practice in LOS analysis to conservatively use a peak 15-minute flow rate applied to the entire hour to derive flow rates in vehicles per hour that are used in the LOS analysis. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume.

PHF = [Hourly Volume]/ [4 * Peak 15-Minute Volume]

The use of a 15-minute PHF produces a more detailed and conservative analysis compared to analyzing vehicles per hour. Existing PHFs obtained from the existing traffic counts have been used for all analysis scenarios in this study.

The City of San Bernardino traffic study guidelines also require unsignalized intersection operations be analyzed utilizing the HCM 6th Edition methodology. Intersection operation for unsignalized intersections is based on the weighted average control delay expressed in seconds per vehicle.

At a two-way or side-street stop-controlled intersections, LOS is calculated for each stop-controlled minor street movement, for the left-turn movement(s) from the major street, and for the intersection as a whole. For approaches consisting of a single lane, the delay is calculated as the average of all movements in that lane. For all-way stop-controlled intersection, LOS is computed for the intersection as a whole.

Table 2 describes the general characteristics of traffic flow and accompanying delay ranges at unsignalized intersections.

Table 2

HCM – LOS & Delay Ranges – Unsignalized Intersections

Level Of Service	Description	Delay (in seconds)
A	Little or no delays.	0 – 10.00
B	Short traffic delays.	10.01 – 15.00
C	Average traffic delays.	15.01 – 25.00
D	Long traffic delays. Multiple vehicles in queue.	25.01 – 35.00
E	Very long delays. Demand approaching capacity of intersection	35.01 – 50.00
F	Very constrained flow with extreme delays and intersection capacity exceeded.	> 50.01

Source: Transportation Research Board, *Highway Capacity Manual*, HCM6 Edition (Washington D.C., 2016).

This analysis utilizes *PTV Vistro 2022* analysis software for all signalized and unsignalized intersections. Vistro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis specified in Chapter 16 of the HCM. The level of service and capacity analysis performed within Vistro takes the optimization and coordination of signalized intersections within a network into consideration.

3.2 CITY OF SAN BERNARDINO PERFORMANCE CRITERIA

For the purposes of analyzing transportation deficiencies, the City of San Bernardino identifies deficiencies through a comparison of “without project” and “with project” traffic conditions. While the City of San Bernardino determines an intersection’s level of service using the HCM 6 methodology, the determination of a deficiency at an intersection is based on a project’s contribution to the intersection’s volume-to-capacity (V/C) ratio as defined below in **Table 3**.

Table 3

City of San Bernardino Thresholds of Significance

Level of Service Without Project	Significant Impact Threshold
C	Increase in V/C > 0.0400
D	Increase in V/C > 0.0200
E, F	Increase in V/C > 0.0100

4.0 EXISTING CONDITIONS

4.1 EXISTING CIRCULATION NETWORK/STUDY AREA CONDITIONS

The characteristics of the roadway system in the vicinity of the proposed project are described in **Table 4.**

Table 4

Roadway Characteristics within Study Area

Roadway	Classification[1]	Jurisdiction	Direction	Existing Travel Lanes	Median Type[2]	Speed Limit (mph)	On-Street Parking
Meyers Road	Collector	City of San Bernardino	East-West	2	NM	25	No
Belmont Avenue	Collector	City of San Bernardino	East-West	2	NM	25	Yes
Little League Drive	Secondary Arterial	City of San Bernardino	North-South	2	NM	25	Yes
Magnolia Avenue	Collector	City of San Bernardino	North-South	2	NM	25	Yes
Palm Avenue	Secondary Arterial	City of San Bernardino	North-South	2-4	NM	45	Yes

1: Source: City of San Bernardino General Plan (November 2005)
2: NM = No Median.

Exhibit 3 shows *Existing* conditions lane geometry and intersection controls.

4.2 CITY OF SAN BERNARDINO GENERAL PLAN CIRCULATION PLAN

The proposed project site is located within the City of San Bernardino. **Appendix C** contains the current *City of San Bernardino General Plan Circulation Plan* and an explanation of roadway cross sections.

4.3 EXISTING BICYCLE AND PEDESTRIAN FACILITIES

An off-street, multipurpose trail is currently provided Magnolia Avenue, and existing bicycle routes are provided on Palm Avenue. **Appendix C** contains the City of San Bernardino General Plan Conceptual Trail System.

4.4 EXISTING PUBLIC TRANSIT SERVICES

The City of San Bernardino is served by Omnitrans, which provides bus service throughout 15 cities in the San Bernardino Valley region. **Appendix C** shows the Omnitrans routes in the vicinity of the project site.

Omnitrans Route SBX and Route 2 runs along Kendall Drive within the study area. The nearest Route SBX and Route 2 stops to the project site are located southeast the intersection of Palm Avenue/Kendall Drive. This stop is approximately 1.5 miles away from the proposed project.

4.5 EXISTING TRAFFIC VOLUMES

To determine the existing operation of the study intersections, AM and PM peak period traffic volumes were based on new traffic counts collected on Wednesday October 19, 2022. Detailed traffic count data is provided in **Appendix D**.

Exhibit 4 shows *Existing* AM and PM peak hour volumes at the study intersections.

4.6 EXISTING CONDITIONS INTERSECTION LEVEL OF SERVICE ANALYSIS

Existing conditions AM and PM peak hour intersection analysis is shown in **Table 5**. Calculations are based on the existing geometrics at the study area intersections as shown in **Exhibit 3**. HCM analysis sheets are provided in **Appendix E**.

Table 5

Intersection Analysis – Existing Conditions

Intersection			Jurisdiction	Control Type	Peak Hour	Existing Conditions	
						Delay[1]	LOS
1	Magnolia Avenue	Meyers Road	City of San Bernardino	AWSC	AM	8.5	A
					PM	7.2	B
2	Little League Drive	Meyers Road	City of San Bernardino	TWSC[2]	AM	11.5	B
					PM	9.8	A
3	Little League Drive	Belmont Avenue	City of San Bernardino	AWSC	AM	10.3	B
					PM	7.5	A
4	Magnolia Avenue	Belmont Avenue	City of San Bernardino	AWSC	AM	11.9	B
					PM	7.4	A
5	Palm Avenue	Belmont Avenue	City of San Bernardino	AWSC	AM	15.9	C
					PM	10.6	B

Note: AWSC = All-Way Stop Controlled; TWSC = Two-Way Stop Controlled.

1: Delay is shown in seconds per vehicle. Per the Highway Capacity Manual 6th Edition, overall average delay and LOS are shown for signalized and all-way stop-controlled intersections. For intersections with one-or-two-way stop-control, the delay and LOS for the worst individual movement is shown.

2: Intersection #2 is an existing Three-Way Stop Control however due to the limitations of HCM and PTV Vistro the intersection was analyzed as a TWSC.

As shown in **Table 5**, the study intersections are currently operating at an acceptable LOS during the AM and PM peak hours for *Existing* conditions.

Exhibit 3: Lane Geometry and Intersection Controls

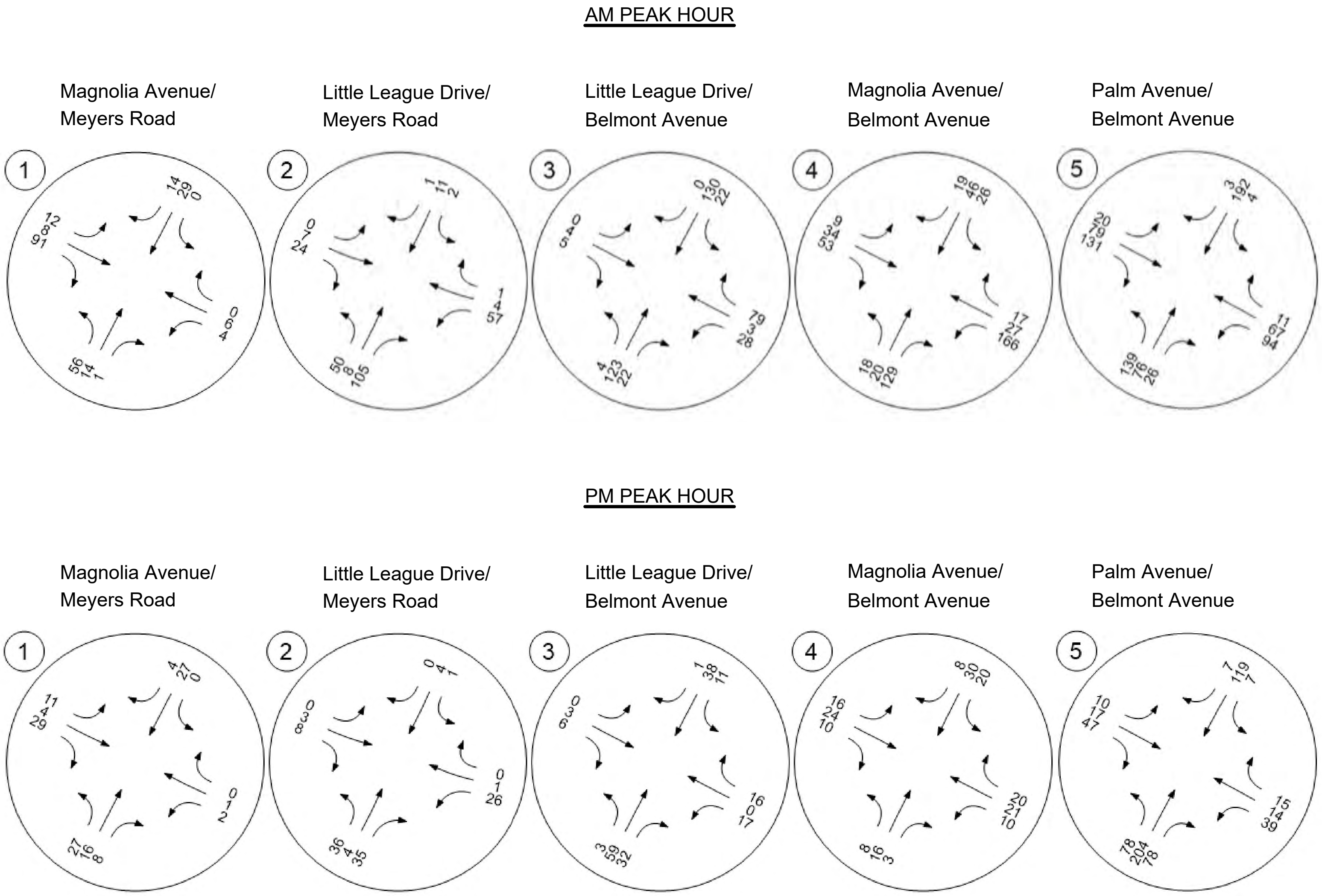


Exhibit 4: Existing AM and PM Peak Hour Volumes

Not to Scale

5.0 PROPOSED PROJECT

5.1 PROJECT DESCRIPTION

The proposed project consists of constructing 32 single-family detached homes. Site access is planned via two full-access driveways on Meyers Road. The site is currently classified as Residential Low (RL) in the City of San Bernardino General Plan Land Use Plan.

The proposed project is anticipated to be fully built and generating trips in 2023. To account for ambient growth on *Existing* traffic volumes have been increased by a growth rate of 2% per year over a one-year period for Project Opening Year conditions.

5.2 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic, both inbound and outbound, produced by a development. Determining trip generation for a proposed project is based on projecting the amount of traffic that the specific land uses being proposed will produce. Industry standard *Institute of Transportation Engineers (ITE) Trip Generation Manual (11th Edition, 2021)* trip generation rates were used to determine trip generation of for the proposed project land use.

Table 6 summarizes the projected AM peak hour, PM peak hour and daily trip generation of the proposed project. The proposed project is projected to generate 302 daily trips, 22 AM peak hour trips, and 30 PM peak hour trips.

5.3 PROJECT TRIP DISTRIBUTION

Projecting trip distribution involves the process of identifying probable destinations and traffic routes that will be utilized by the proposed project's traffic. The potential interaction between the proposed land use and surrounding regional access routes are considered to identify the probable routes onto which project traffic would distribute. The projected trip distribution for the proposed project is based on anticipated travel patterns to and from the project site.

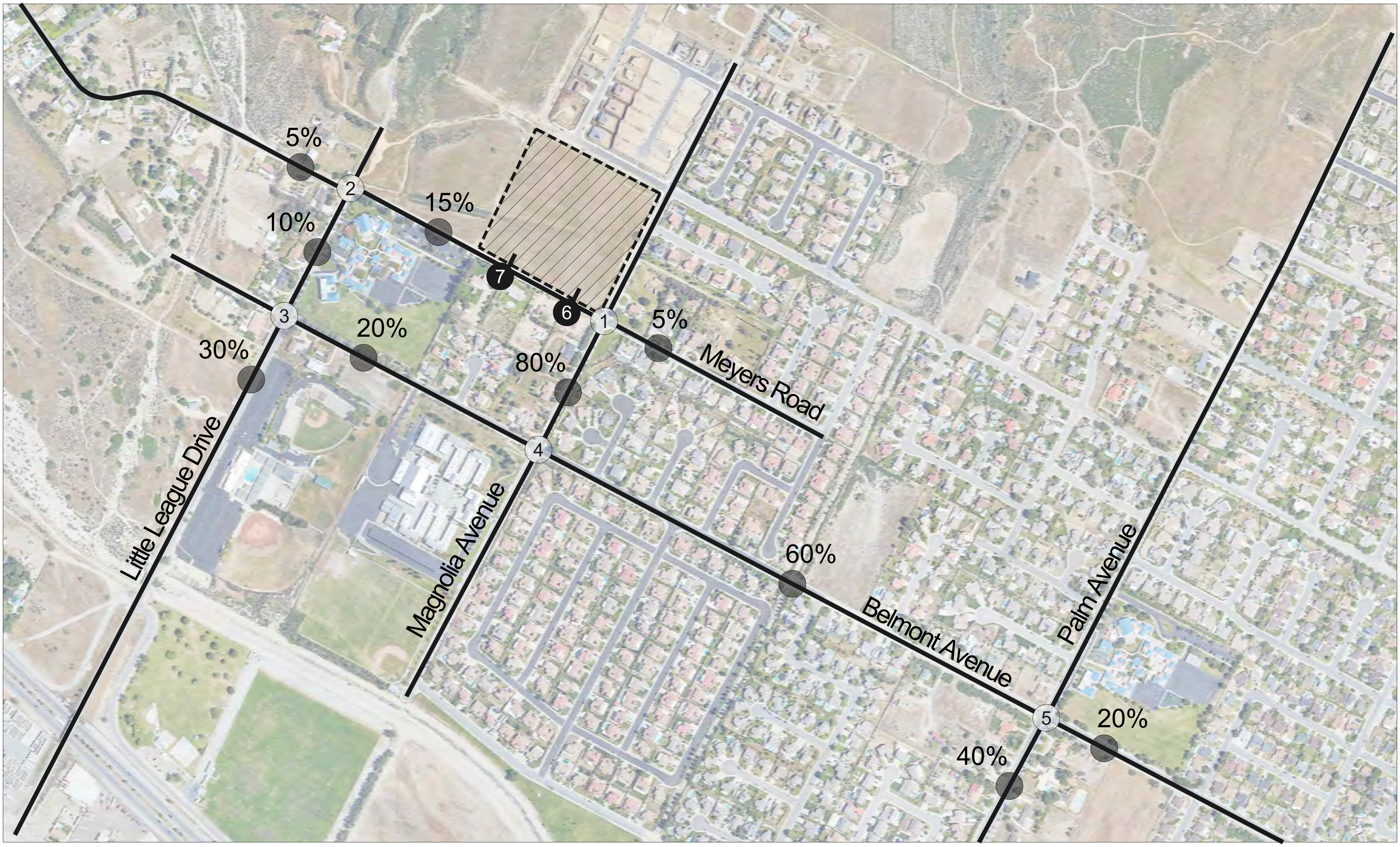
Exhibit 5 shows the projected trip distribution of proposed project trips.

Table 6

Proposed Project Trip Generation

Proposed Land Use[1]	Qty	Unit[2]	Daily Trips (ADTs)		AM Peak Hour					PM Peak Hour				
			Rate	Volume	Rate	In:Out Split	Volume			Rate	In:Out Split	Volume		
							In	Out	Total			In	Out	Total
Single-Family Detached Housing (210)	32	DU	9.43	302	0.70	26:74	5	17	22	0.94	63:37	19	11	30
Total				**302**			**5**	**17**	**22**			**19**	**11**	**30**

1: Rates from ITE Trip Generation (11th Edition, 2021)
2: DU = Dwelling Units



Legend:

- - - - Project Site

(#) Study Intersection Location

XX% Percent Trip Distribution

Exhibit 5: Proposed Trip Distribution

Tentative Tract Map No. 20539 Traffic Impact Analysis

SDE-22-001

TJW Engineering, Inc.

Not to Scale

6.0 OPENING YEAR CONDITIONS

Opening Year traffic conditions analysis is intended to identify baseline conditions in the near-term without the proposed project and without cumulative projects.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for the *Opening Year* scenario are consistent with those previously shown in **Exhibit 3**.

6.2 OPENING YEAR TRAFFIC VOLUMES

Opening Year volumes include background traffic. Since the proposed project is expected to be built and generating trips in 2023, *Opening Year* volumes include a growth rate of 2% per year for one year applied to *Existing* volumes.

Opening Year Volumes = *Existing* (2022) Counts * 1.02^1

Exhibit 6 shows *Opening Year* AM and PM peak hour volumes at the study intersections.

6.3 OPENING YEAR LEVEL OF SERVICE ANALYSIS

Opening Year AM and PM peak hour intersection analysis is shown in **Table 7**. HCM analysis sheets are provided in **Appendix E**.

Table 7

Intersection Analysis – Opening Year Conditions

Intersection			Jurisdiction	Control Type	Peak Hour	Existing Conditions	
						Delay[1]	LOS
1	Magnolia Avenue	Meyers Road	City of San Bernardino	AWSC	AM	8.5	A
					PM	7.2	A
2	Little League Drive	Meyers Road	City of San Bernardino	TWSC[2]	AM	11.6	B
					PM	9.9	A
3	Little League Drive	Belmont Avenue	City of San Bernardino	AWSC	AM	10.4	B
					PM	7.5	A
4	Magnolia Avenue	Belmont Avenue	City of San Bernardino	AWSC	AM	12.1	B
					PM	7.4	A
5	Palm Avenue	Belmont Avenue	City of San Bernardino	AWSC	AM	16.6	C
					PM	10.7	B

Note: AWSC = All-Way Stop Controlled; TWSC = Two-Way Stop Controlled.

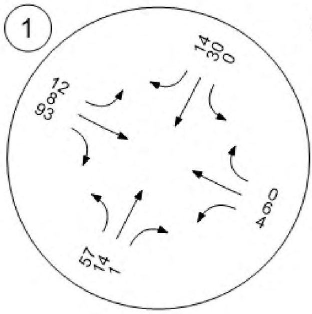
1: Delay is shown in seconds per vehicle. Per the Highway Capacity Manual 6th Edition, overall average delay and LOS are shown for signalized and all-way stop-controlled intersections. For intersections with one-or-two-way stop-control, the delay and LOS for the worst individual movement is shown.

2: Intersection #2 is an existing Three-Way Stop Control however due to the limitations of HCM and PTV Vistro the intersection was analyzed as a TWSC.

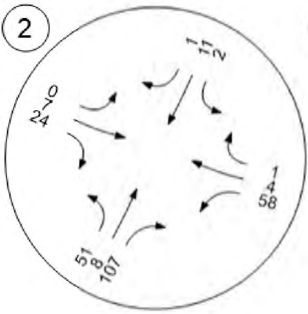
As shown in **Table 7,** the study intersections are projected to continue to operate at an acceptable LOS during the AM and PM peak hours for *Opening Year* conditions.

AM PEAK HOUR

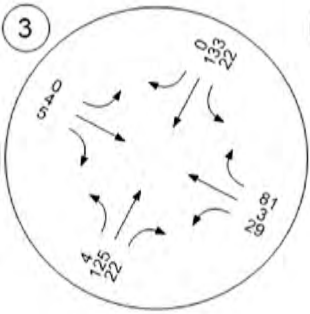
Magnolia Avenue/
Meyers Road



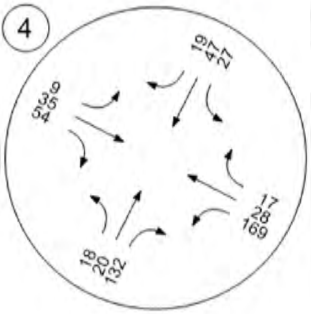
Little League Drive/
Meyers Road



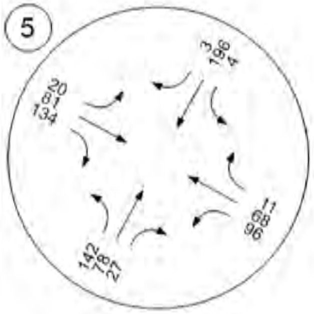
Little League Drive/
Belmont Avenue



Magnolia Avenue/
Belmont Avenue

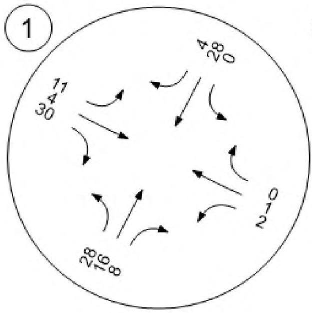


Palm Avenue/
Belmont Avenue

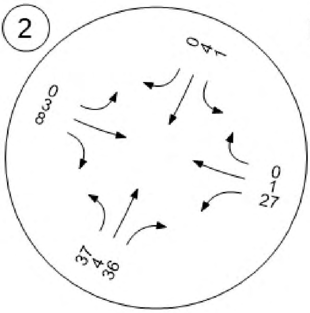


PM PEAK HOUR

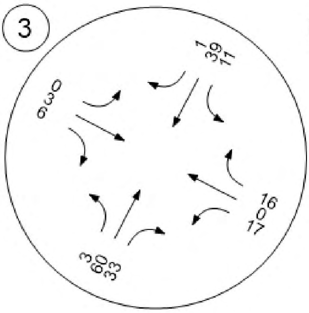
Magnolia Avenue/
Meyers Road



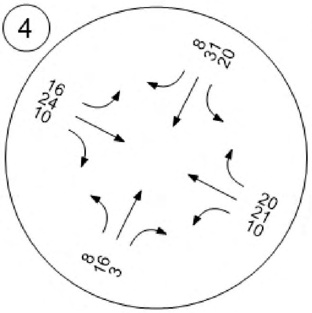
Little League Drive/
Meyers Road



Little League Drive/
Belmont Avenue



Magnolia Avenue/
Belmont Avenue



Palm Avenue/
Belmont Avenue

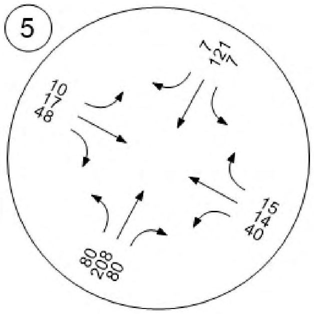


Exhibit 6: Opening Year AM and PM Peak Hour Volumes

Not to Scale

7.0 OPENING YEAR CUMULATIVE CONDITIONS

Opening Year Cumulative conditions analysis is intended to identify baseline conditions in the near-term without the proposed project.

7.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for the *Opening Year Cumulative* scenario are consistent with those previously shown in **Exhibit 3**.

7.2 OPENING YEAR CUMULATIVE TRAFFIC VOLUMES

Opening Year Cumulative volumes include background traffic plus the addition of traffic projected to be generated by nearby cumulative projects. Cumulative developments are projects which are in various stages of planning, entitlement and construction. Since the proposed project is expected to be fully completed and generating trips in 2023, *Opening Year Cumulative* volumes include an ambient growth rate of 2% per year for one year applied to *Existing* volumes**.**

Opening Year Cumulative Volumes = (*Existing* (2022) Counts * 1.02^1) + Cumulative Projects Volume

A list of cumulative projects was developed for this analysis through consultation with City of San Bernardino staff and current development status reports. A summary of cumulative project land uses is shown in **Table 9**. A cumulative project map is shown in **Exhibit 7**.

The list of cumulative projects provided by the City of San Bernardino are anticipated not to impact the proposed study intersections.

Exhibit 8 shows the *Opening Year Cumulative* AM and PM peak hour volumes at the study intersections.

7.3 OPENING YEAR CUMULATIVE INTERSECTION LEVEL OF SERVICE ANALYSIS

Opening Year Cumulative conditions AM and PM peak hour intersection analysis is shown in **Table 8.** HCM analysis sheets are provided in **Appendix E**.

Table 8

Intersection Analysis – Opening Year Cumulative Conditions

Intersection			Jurisdiction	Control Type	Peak Hour	Existing Conditions	
						Delay[1]	LOS
1	Magnolia Avenue	Meyers Road	City of San Bernardino	AWSC	AM	8.5	A
					PM	7.3	A
2	Little League Drive	Meyers Road	City of San Bernardino	TWSC[2]	AM	11.6	B
					PM	9.9	A
3	Little League Drive	Belmont Avenue	City of San Bernardino	AWSC	AM	10.4	B
					PM	7.5	A
4	Magnolia Avenue	Belmont Avenue	City of San Bernardino	AWSC	AM	12.2	B
					PM	7.4	A
5	Palm Avenue	Belmont Avenue	City of San Bernardino	AWSC	AM	16.7	C
					PM	10.8	B

Note: AWSC = All-Way Stop Controlled; TWSC = Two-Way Stop Controlled.

1: Delay is shown in seconds per vehicle. Per the Highway Capacity Manual 6th Edition, overall average delay and LOS are shown for signalized and all-way stop-controlled intersections. For intersections with one-or-two-way stop-control, the delay and LOS for the worst individual movement is shown.

2: Intersection #2 is an existing Three-Way Stop Control however due to the limitations of HCM and PTV Vistro the intersection was analyzed as a TWSC.

As shown in **Table 8**, the study intersections within the City of Colton are projected to continue to operate at an acceptable LOS during the AM and PM peak hours for *Opening Year Cumulative* conditions. For intersections within the City of San Bernardino, transportation deficiencies will be determined based on *Opening Year Cumulative With Project* conditions in comparison to *Opening Year Cumulative* conditions.

Table 9

Cumulative Projects List

Project[1]		Land Use[2]	Qty	Units[3]	AM Peak Hour			PM Peak Hour			Daily
					In	Out	Total	In	Out	Total	
1	DCA (ZMA) 21-03 & DP-D 21-15	110	52.16	TSF	34	5	39	5	29	34	254
2	DCA (ZMA) 21-05 & SUB 21-11	210	25	DU	5	13	18	15	9	24	236
3	DP-D 20-14	150	211.70	TSF	28	8	36	11	27	38	362
4	DP-D 22-01	150	341.11	TSF	45	13	58	17	44	61	583
6	SUB 19-10 & CUP 18-15	934	2.50	TSF	57	55	112	43	40	83	1,169
7	SUB 22-06 & DP-D 22-14	150	105.50	TSF	14	4	18	5	14	19	180
Total					**183**	**98**	**281**	**96**	**163**	**259**	**2,784**

1: List of cumulative projects provided by the City of San Bernardino.

2: Source: Institute of Transportation Engineers, Trip Generation Manual, 11th Edition, 2021.

3: DU = Dwelling Units; TSF = Thousand Square Feet.

Legend:

Ⓧ Approximate Cumulative Project Locations

▨ Project Site

Exhibit 7: Cumulative Projects Map

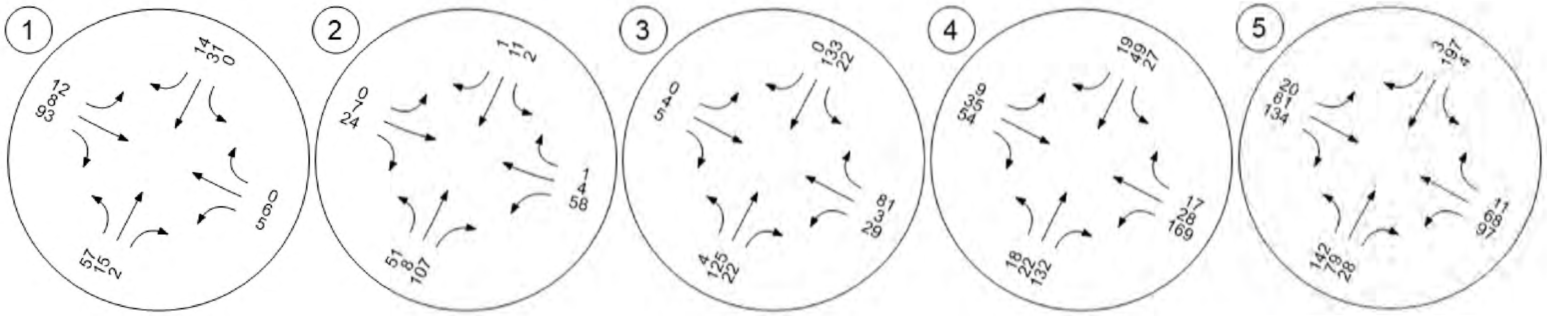
Tentative Tract Map No. 20539 Traffic Impact Analysis

SDE-22-001

TJW Engineering, Inc.

Not to Scale

AM PEAK HOUR



Magnolia Avenue/
Meyers Road

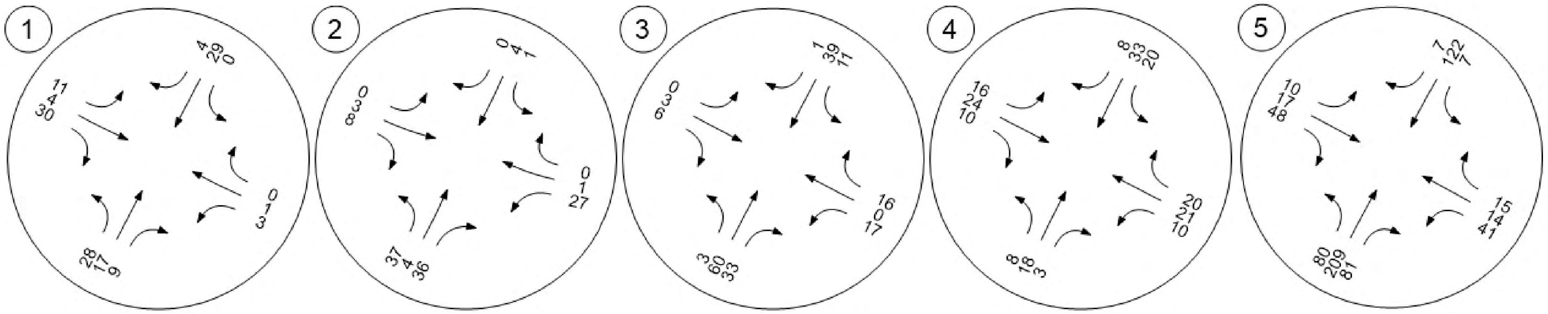
Little League Drive/
Meyers Road

Little League Drive/
Belmont Avenue

Magnolia Avenue/
Belmont Avenue

Palm Avenue/
Belmont Avenue

PM PEAK HOUR



Magnolia Avenue/
Meyers Road

Little League Drive/
Meyers Road

Little League Drive/
Belmont Avenue

Magnolia Avenue/
Belmont Avenue

Palm Avenue/
Belmont Avenue

Exhibit 8: Opening Year Cumulative AM and PM Peak Hour Volumes

Not to Scale

8.0 OPENING YEAR CUMULATIVE WITH PROJECT CONDITIONS

Opening Year Cumulative With Project conditions analysis is intended to identify the project-related impacts on the planned near-term circulation system.

8.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for the *Opening Year Cumulative With Project* scenario are consistent with those previously shown in **Exhibit 3**.

8.2 OPENING YEAR CUMULATIVE WITH PROJECT TRAFFIC VOLUMES

Opening Year Cumulative With Project volumes include background traffic plus the addition of traffic projected to be generated by nearby cumulative projects plus the addition of the traffic projected to be generated by the proposed project. Cumulative developments are projects which are in various stages of planning, entitlement and construction. Since the proposed project is expected to be fully completed and generating trips in 2023, *Opening Year Cumulative With Project* volumes include an ambient growth rate of 2% per year for one year applied to *Existing* volumes**.**

Opening Year Cumulative Volumes = (*Existing* (2022) Counts * 1.02^1) + Cumulative Projects Volume + Project Volume

Exhibit 9 and **Exhibit 10** show *Opening Year Cumulative With Project* AM and PM peak hour volumes at the study intersections.

8.3 OPENING YEAR CUMULATIVE WITH PROJECT INTERSECTION LEVEL OF SERVICE ANALYSIS

Opening Year Cumulative With Project conditions AM and PM peak hour intersection analysis is shown in **Table 10.** HCM analysis sheets are provided in **Appendix E**.

Table 10
Intersection Analysis – Opening Year Cumulative With Project Conditions

Intersection			Jurisdiction	Control Type	Peak Hour	Opening Year Cumulative Conditions		Opening Year Cumulative With Project Conditions	
						Delay[1]	LOS	Delay[1]	LOS
1	Magnolia Avenue	Meyers Road	City of San Bernardino	AWSC	AM	8.5	A	8.8	A
					PM	7.3	A	7.4	A
2	Little League Drive	Meyers Road	City of San Bernardino	TWSC[2]	AM	11.6	B	11.6	B
					PM	9.9	A	9.9	A
3	Little League Drive	Belmont Avenue	City of San Bernardino	AWSC	AM	10.4	B	10.6	B
					PM	7.5	A	7.5	A
4	Magnolia Avenue	Belmont Avenue	City of San Bernardino	AWSC	AM	12.2	B	12.5	B
					PM	7.4	A	7.4	A
5	Palm Avenue	Belmont Avenue	City of San Bernardino	AWSC	AM	16.7	C	17.2	C
					PM	10.8	B	11.0	B
6	East Project Driveway	Meyers Road	City of San Bernardino	TWSC	AM	-	-	9.5	A
					PM	-	-	9.0	A
7	West Project Driveway	Meyers Road	City of San Bernardino	TWSC	AM	-	-	9.4	A
					PM	-	-	8.9	A

Note: AWSC = All-Way Stop Controlled; TWSC = Two-Way Stop Controlled.

1: Delay is shown in seconds per vehicle. Per the Highway Capacity Manual 6th Edition, overall average delay and LOS are shown for signalized and all-way stop-controlled intersections. For intersections with one-or-two-way stop-control, the delay and LOS for the worst individual movement is shown.

2: Intersection #2 is an existing Three-Way Stop Control however due to the limitations of HCM and PTV Vistro the intersection was analyzed as a TWSC.

As shown in **Table 10**, the study intersections within the City of San Bernardino are projected to continue to operate at an acceptable LOS during the AM and PM peak hours for *Opening Year Cumulative* conditions.

As described in Section 3.3, the City of San Bernardino identifies deficiencies through a comparison of "without project" and "with project" traffic conditions using V/C. V/C for intersections within City of San Bernardino operating at LOS C or worse in pre-project conditions is shown in **Table 11**.

Table 11
V/C – Opening Year Cumulative With Project Conditions

Intersection			Peak Hour	Opening Year Cumulative V/C	Opening Year Cumulative With Project V/C	Change	Threshold	Impact?
5	Palm Avenue	Belmont Avenue	AM	0.592	0.602	0.016	0.040	No
			PM	0.502	0.520	0.018	0.040	No

As shown in **Table 11**, the project increases V/C by less than the thresholds identified in Section 3.3. Therefore, the project does not cause a deficiency and no improvements are required.

8.4 SIGHT DISTANCE ANALYSIS

A sight distance analysis for the proposed driveway at Meyers Road has been prepared based on the "stopping sight distance" requirements determined by Topic 201 and Table 201.1 of the *Caltrans Highway Design Manual (HDM),* last edition.

In this analysis, the movements being analyzed at the Project Driveways, intersection #6 and #7 are movements from the proposed project onto Meyers Road. Based on the posted speed limit of 25 miles per hour on Meyers Road, a corner sight distance of 240 feet is required for right-turns and 275 feet is required for left-turns per HDM standards. The results of this analysis are shown in **Exhibit 11**.

8.5 OPENING YEAR CUMULATIVE WITH PROJECT SIGNAL WARRANT ANALYSIS

Traffic signal warrants for Opening Year Cumulative With Project conditions have been prepared based on peak-hour intersection volumes at the project site access location. The purpose of this signal warrant analysis is to review the peak hour volumes and determine if the signal warrants are satisfied.

Table 12

Signal Warrant Analysis Opening Year plus Cumulative With Project Conditions

Intersection			Peak Hour Signal Warrant Met?	
			AM Peak Hour	PM Peak Hour
1	Magnolia Avenue	Meyers Road	No	No
2	Little League Drive	Meyers Road	No	No
3	Little League Drive	Belmont Avenue	No	No
4	Magnolia Avenue	Belmont Avenue	No	No
5	Palm Avenue	Belmont Avenue	No	No

AM PEAK HOUR

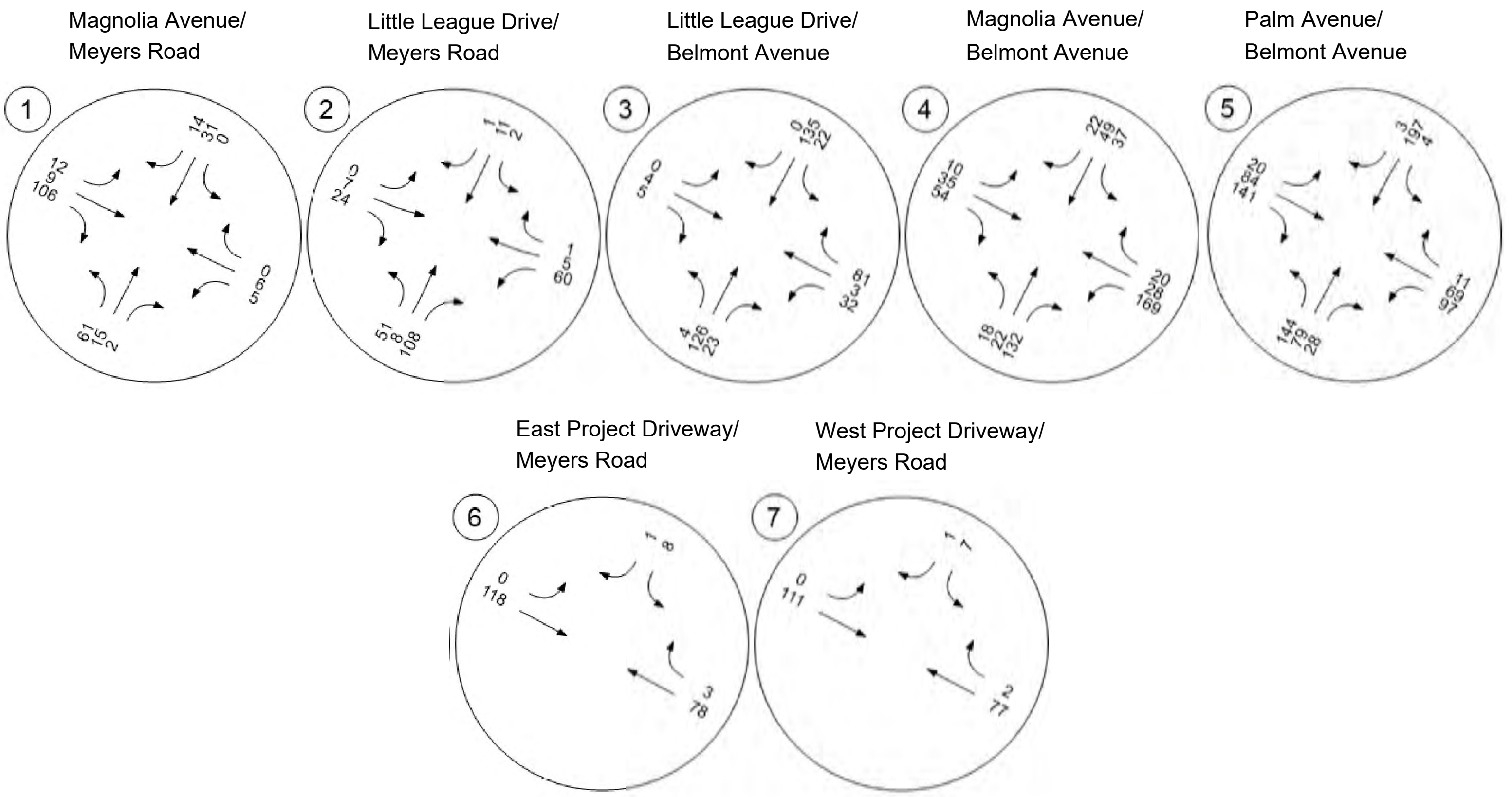
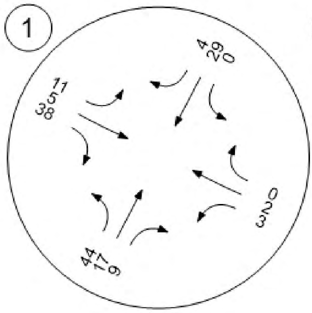


Exhibit 9: Opening Year Cumulative with Project AM Peak Hour Volumes

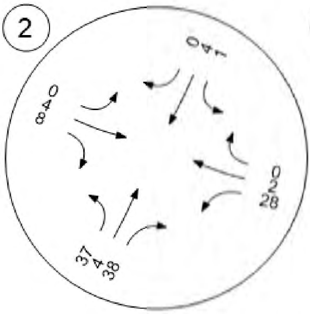
Not to Scale

PM PEAK HOUR

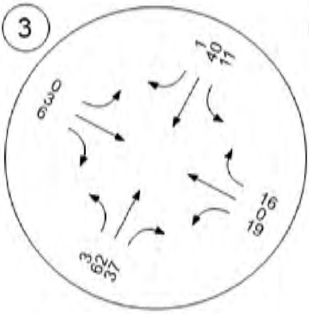
Magnolia Avenue/
Meyers Road



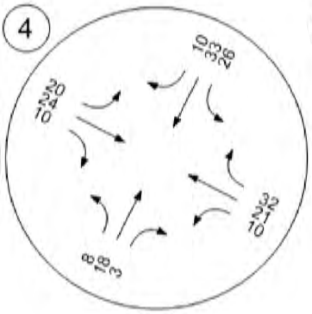
Little League Drive/
Meyers Road



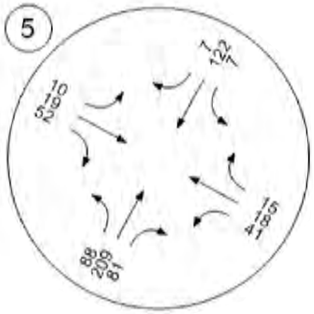
Little League Drive/
Belmont Avenue



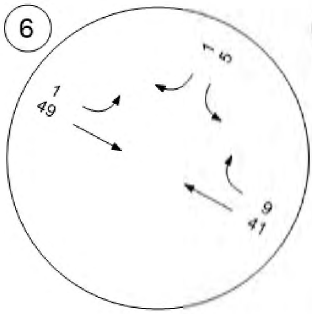
Magnolia Avenue/
Belmont Avenue



Palm Avenue/
Belmont Avenue



East Project Driveway/
Meyers Road



West Project Driveway/
Meyers Road

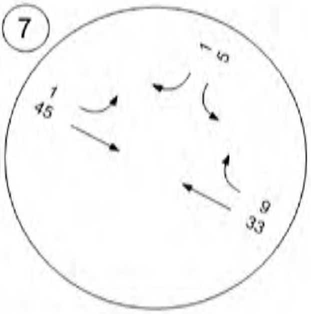


Exhibit 10: Opening Year Cumulative with Project PM Peak Hour Volume

Not to Scale

FOR PRIVATE ROAD/RURAL DRIVEWAYS, THE HIGHWAY DESIGN MANUAL (HDM) RECOMMENDS CORNER SIGHT DISTANCE EQUAL (1.47)(Vm)(Tg).

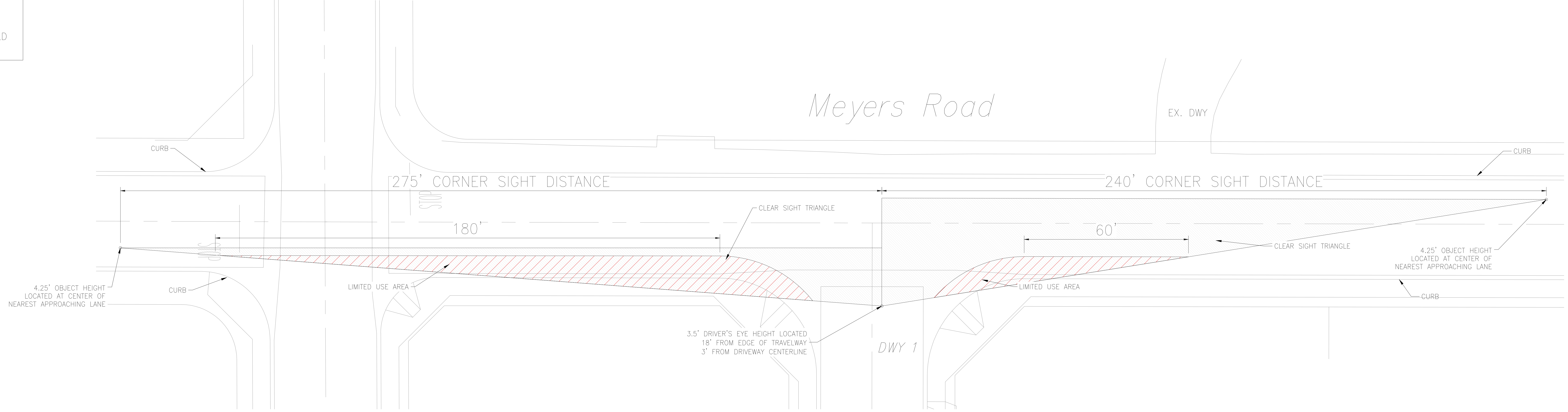
DWY 1&2
RIGHT-TURN: Vm=25MPH, Tg=6.5
CORNER SIGHT DISTANCE: 240'

LEFT-TURN: Vm=25MPH, Tg=7.5
CORNER SIGHT DISTANCE: 275'

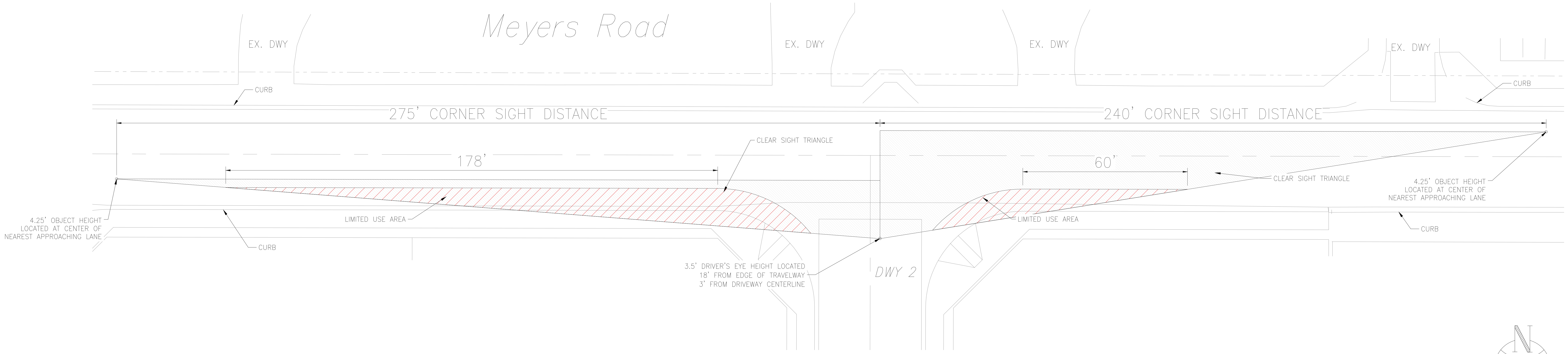
NOTE: FOR URBAN DRIVEWAYS, SECTION 405.1 OF THE HDM RECOMMENDS PARKING RESTRICTIONS BE SET PER CA MUTCD SECTION 3B.19.

* SECTION 3B.19 RECOMMENDS A CLEARANCE OF **6-FEET** MEASURED FROM CURB RETURN SHOULD BE PROVIDED AT BOTH SIDES OF A DRIVEWAY.

Intersection #6 – East Project Driveway



Intersection #7 – West Project Driveway



Not to Scale

EXHIBIT 11: SIGHT DISTANCE ANALYSIS
TTM NO. 20539 Traffic Impact Analysis
Date: 10/17/22

APPENDIX

APPENDIX A

GLOSSARY OF TERMS

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.

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.

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.

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.

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.

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.

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.

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.

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.

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 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.

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.

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

SCOPING AGREEMENT

City of San Bernardino Public Works / Traffic Engineering Department
Traffic Scope Approval Form

To be completed by applicant consultant and approved by Public Works prior to start of study

---

Project Tentative Tract Map No. 20539
Name: Project APN: 0261-062-15 and 0261-062-16
Address: Project North Corner of Magnolia Avenue and Meyers Road
Description: 32 single- family detached homes
Developer's Name: S.D. Engineering and Associates
Address:
Telephone No. 909-215-3451 **Email address:** suresh@sdengineering.net

---

Trip Generation Rates from ITE Latest Edition (11th Edition)

Land Use (1) Single Family Detached Housing
Development Sq Ft 32 Units
ITE Land Use Code 210
Daily Trips 302
AM Peak Hour Trips
Inbound 5
Outbound 17
Total 22
PM Peak Hour Trips
Inbound 19
Outbound 11
Total 30

Land Use (2)
Development Sq Ft
ITE Land Use Code
Daily Trips
AM Peak Hour Trips
Inbound
Outbound
Total
PM Peak Hour Trips
Inbound
Outbound
Total

(Use Additional Sheet(s), if necessary)

Pass-by Trips (%), if applicable: N/A **%**

Land Use (1)
ITE Land Use Code
Daily Trips
AM Peak Hour Trips
Inbound
Outbound
Total
PM Peak Hour Trips:
Inbound
Outbound
Total

Land Use (2)
ITE Land Use Code
Daily Trips
AM Peak Hour Trips
Inbound
Outbound
Total
PM Peak Hour Trips:
Inbound
Outbound
Total

Project Opening Year: ~~2024~~ 2023
Build-out Year:

Study Intersections:
1 Magnolia Ave/Meyers Rd
2 Project Dwy East/Meyers Rd
3 Project Dwy West/Meyers Rd
4 Magnolia Ave/Belmont Ave
5 Little League Dr/Belmont Ave
6 Little League Dr/Meyers Rd
7 Palm Ave/Belmont Ave
8
9
10

(Use Additional Sheet(s) and Maps to show project Boundaries & Attach memo for project Description)

Provide approved cumulative projects list

Analysis Scenarios:
1 - Existing Conditions
2 - Project Opening Year
3 - Project Opening Year Plus Cumulative Projects
4 - Project Opening Year Plus Cumulative Projects Plus Proposed Project

City of San Bernardino Public Works / Traffic Engineering Department

Traffic Scope Approval Form

To be completed by applicant consultant and approved by Public Works prior to start of study

---

Study Roadway Segments: 1 ______ 2 ______
3 ______ 4 ______
5 ______ 6 ______

Proposed Development Use: ☒ Residential ☐ Commercial ☐ Mixed Use ☐ Other

Software Methodology: ☐ Synchro ☐ HCS ☒ Vistro

Additional issues to be considered:
☐ Traffic calming measures
☐ Queuing Analysis
☐ Bike/Ped Accommodations
☐ Merge Analysis
☐ Gap Analysis
☐ Actuation/Coordination
☐ Safety Analysis
☒ Sight Distance Analysis

Is the project screened from VMT assessment? ☐ Yes ☒ No

VMT Screening Justification: VMT analysis was has already been submitted.

Ambient Growth Rate: 2 %

(see Exhibit 1) **Trip Distribution:** East ______ % West ______ % North ______ % South ______ %

Consultant Preparer's Name: TJW Engineering

Address: 9841 Irvine Center Drive, Suite 200

Telephone No. 949-878-3509 PE / TE License #: ______

Email Address: Daniel@tjwengineering.com

Signature: ______ Date: 07-14-2022

Approved By (Public Works Department):

Signature: ______ Date: 8/4/2022

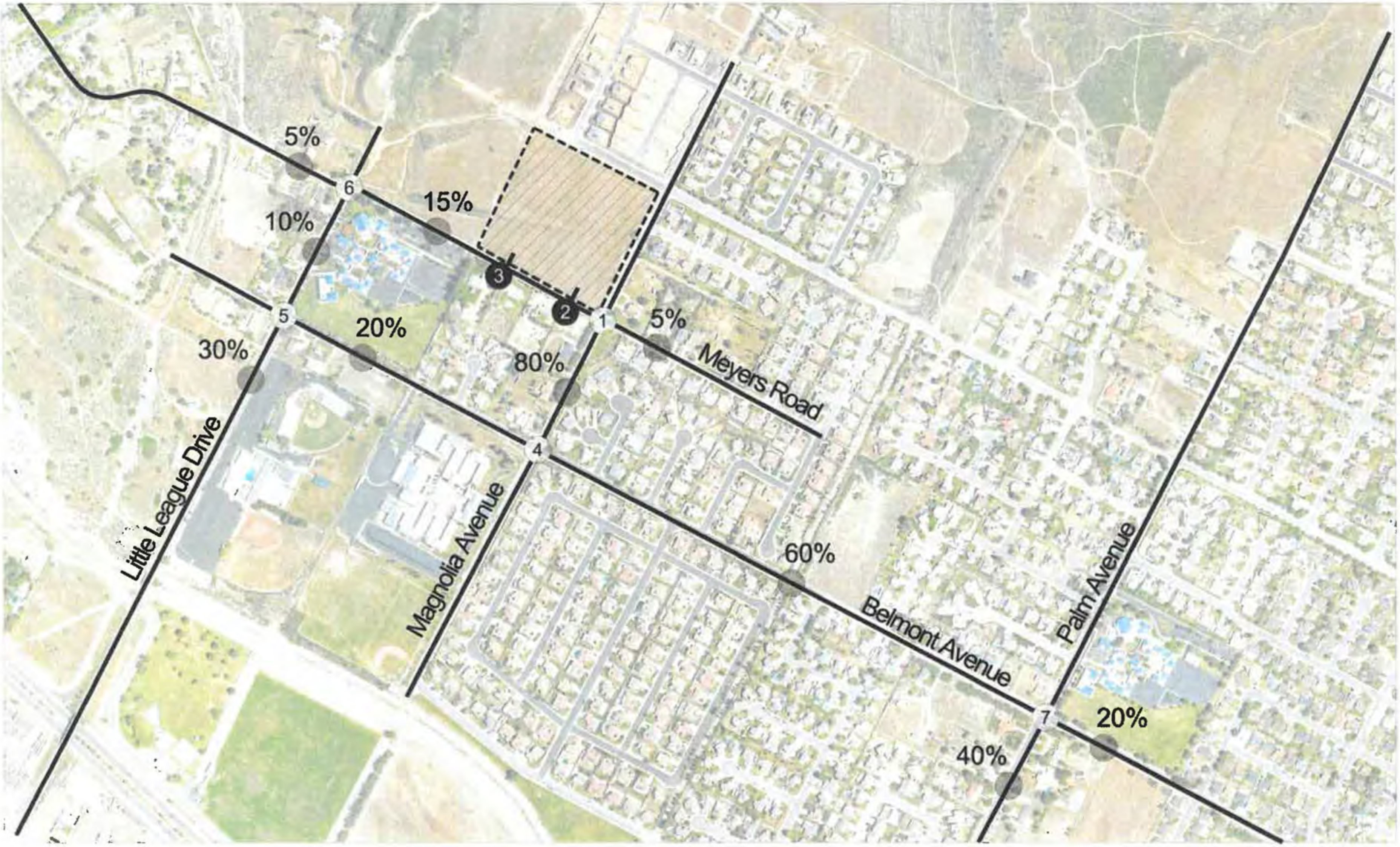
Name: Azzam Jabsheh Title: Traffic Engineer

Submit a TIA

Proposed Land Use[1]	Qty	Unit[3]	Daily Trips (ADTs)		AM Peak Hour					PM Peak Hour				
			Rate	Volume	Rate	In:Out Split	Volume			Rate	In:Out Split	Volume		
							In	Out	Total			In	Out	Total
Single Family (210)	32	DU	9.43	302	0.70	26:74	5	17	22	0.94	63:37	19	11	30
Total				302			5	17	22			19	11	30

1: Rates from ITE Trip Generation (11th Edition, 2021)

2: DU = Dwelling Units



Legend:

---- Project Site

\# Study Intersection Location

XX% Percent Trip Distribution

Exhibit 1: Project Location

Not to Scale

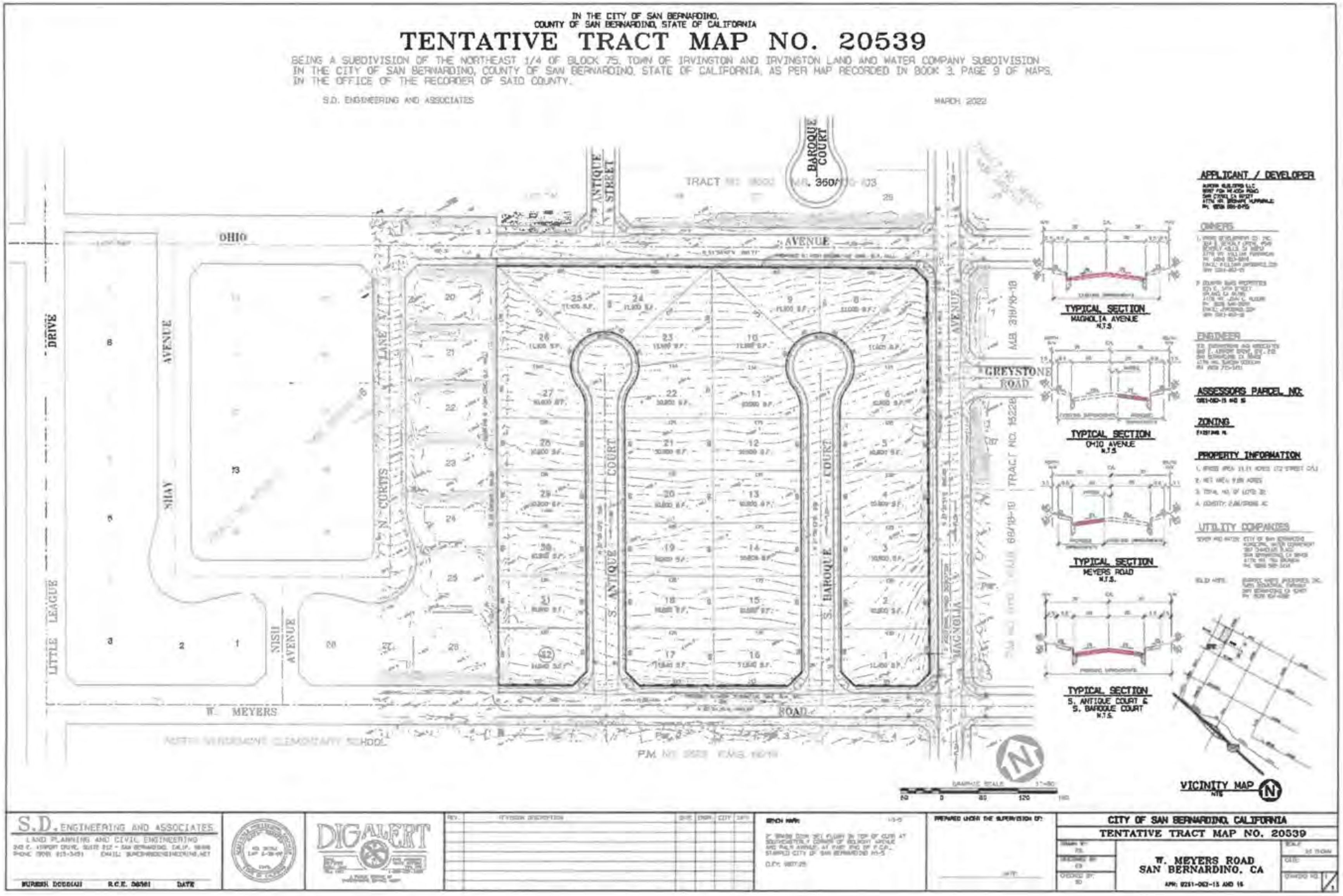


Exhibit 2: Proposed Project Site Plan

Tentative Tract Map No. 20539 Traffic Impact Analysis

SDE-22-001

Not to Scale

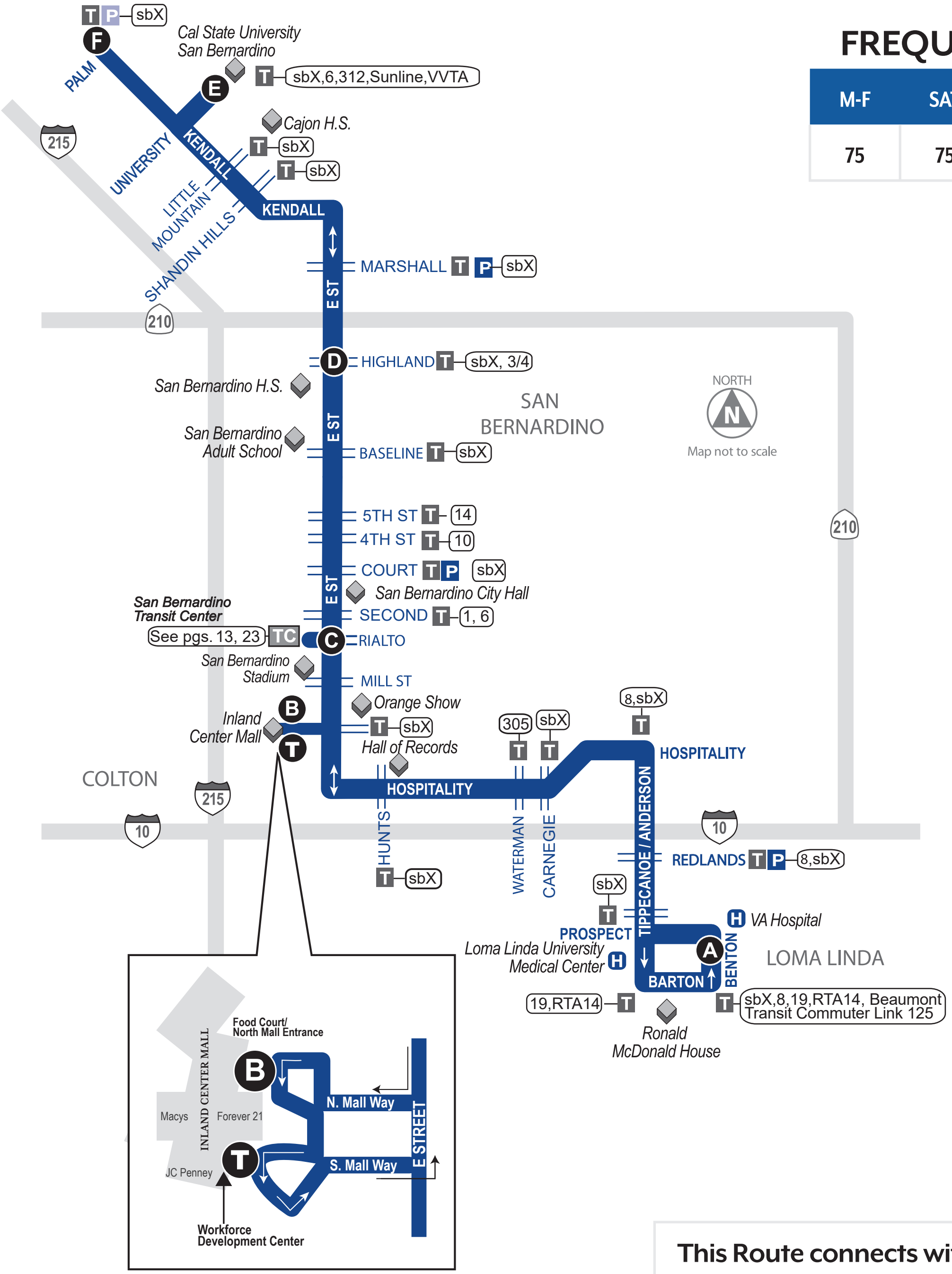
APPENDIX C

CITY OF SAN BERNARDINO PLANS AND TRANSIT

2

KENDALL & PALM - CAL STATE- E STREET - LOMA LINDA

▬	Bus Route
‖‖‖‖	Tripper Service
A	Timepoint - Look for the matching symbol in the timetable section.
🚆	Metrolink Station
P	Park-and-Ride
◆	Point of interest
H	Medical Center
T	Transfer Point
1,2	Connection Route(s)
TC	Transit/Transfer Center



FREQUENCY

M-F	SAT	SUN
75	75	75

This Route connects with Arrow Rail, Metrolink and sbX!

ROUTE 2: MONDAY - FRIDAY

Kendall & Palm	Cal State University	E St. & Highland	SBTC*	Inland Center Mall	WDC**	Benton & Prospect	Benton & Prospect	Inland Center Mall	WDC**	SBTC*	E St. & Highland	Cal State University	Kendall & Palm
F	E	D	C	B	T	A	A	B	T	C	D	E	F
SOUTHBOUND							**NORTHBOUND**						
							4:55	5:11		5:18	5:28	5:38	5:43
4:29	4:36	4:49	5:00	5:06		5:22	5:33	5:50		5:57	6:08	6:19	6:24
5:49	5:56	6:09	6:20	6:26		6:46	7:01	7:20	7:22	7:31	7:42	7:53	7:59
6:42	6:50	7:03	7:14	7:20	7:22	7:45	8:04	8:24		8:32	8:43	8:55	9:01
8:04	8:11	8:24	8:35	8:41		9:03	9:08	9:29		9:37	9:48	10:00	10:05
9:14	9:22	9:37	9:49	9:55		10:18	10:25	**10:50**		**10:59**	**11:10**	**11:24**	**11:30**
10:19	10:27	**10:42**	**10:54**	**11:01**		**11:25**	**11:35**	**12:00**		**12:10**	**12:22**	**12:36**	**12:42**
11:40	**11:48**	**12:03**	**12:16**	**12:23**		**12:50**	**12:55**	**1:21**		**1:32**	**1:44**	**1:58**	**2:04**
12:50	**12:58**	**1:13**	**1:26**	**1:33**		**2:00**	**2:10**	**2:36**		**2:47**	**2:59**	**3:15**	**3:21**
2:05	**2:13**	**2:28**	**2:41**	**2:48**		**3:15**	**3:30**	**3:56**		**4:07**	**4:19**	**4:35**	**4:41**
3:25	**3:33**	**3:48**	**4:01**	**4:08**		**4:35**	**4:40**	**5:07**	**5:09**	**5:21**	**5:33**	**5:49**	**5:55**
4:45	**4:53**	**5:08**	**5:20**	**5:27**	**5:29**	**5:55**	**6:03**	**6:28**		**6:37**	**6:49**	**7:04**	**7:10**
6:00	**6:07**	**6:22**	**6:33**	**6:39**		**7:01**	**7:03**	**7:24**		**7:32**	**7:43**	**7:55**	**8:00**
7:15	**7:23**	**7:36**	**7:47**	**7:53**		**8:15**	**8:23**	**8:44**		**8:52**	**9:03**	**9:15**	**9:20**
8:25	**8:33**	**8:46**	**8:57**	**9:03**		**9:23**	**9:33**	**9:53**		**10:01**	**10:12**	**10:24**	**10:29**
9:42	**9:49**	**10:02**	**10:12**	**10:18**		**10:37**							
10:47	**10:54**	**11:06**	**11:15**										

ROUTE 2: SATURDAY

F	E	D	C		B	A	A	B	C		D	E	F
SOUTHBOUND							**NORTHBOUND**						
							6:04	6:21	6:27	6:28	6:38	6:49	6:54
6:30	6:37	6:50	7:00	7:01	7:08	7:27	7:34	7:51	7:57	7:58	8:09	8:20	8:25
7:17	7:24	7:37	7:47	7:48	7:56	8:15	8:21	8:39	8:45	8:46	8:57	9:10	9:15
8:30	8:37	8:50	9:00	9:01	9:09	9:29	9:34	9:54	10:01	10:02	10:13	10:25	10:30
9:40	9:47	10:02	10:13	10:14	10:22	10:45	10:49	11:09	11:16	11:17	11:28	11:42	11:47
10:50	10:57	11:12	11:23	11:24	11:32	11:55	**12:00**	**12:21**	**12:28**	**12:29**	**12:40**	**12:54**	**1:00**
12:05	**12:12**	**12:27**	**12:40**	**12:41**	**12:49**	**1:12**	**1:15**	**1:36**	**1:43**	**1:44**	**1:55**	**2:09**	**2:15**
1:20	**1:27**	**1:42**	**1:55**	**1:56**	**2:04**	**2:27**	**2:30**	**2:51**	**2:58**	**2:59**	**3:10**	**3:24**	**3:30**
2:30	**2:37**	**2:52**	**3:05**	**3:06**	**3:14**	**3:37**	**3:40**	**4:01**	**4:08**	**4:09**	**4:20**	**4:34**	**4:40**
3:40	**3:47**	**4:02**	**4:15**	**4:16**	**4:24**	**4:47**	**4:50**	**5:11**	**5:18**	**5:19**	**5:30**	**5:44**	**5:50**
4:50	**4:57**	**5:12**	**5:25**	**5:26**	**5:34**	**5:57**	**6:00**	**6:21**	**6:28**	**6:29**	**6:40**	**6:54**	**7:00**
6:00	**6:07**	**6:22**	**6:34**	**6:35**	**6:43**	**7:05**	**7:30**	**7:51**	**7:58**	**7:59**	**8:10**	**8:24**	**8:30**
7:15	**7:22**	**7:35**	**7:44**	**7:45**	**7:53**	**8:15**	**8:47**	**9:08**	**9:15**	**9:16**	**9:27**	**9:41**	**9:46**
8:35	**8:42**	**8:55**	**9:04**	**9:05**	**9:13**	**9:35**							

ROUTE 2: SUNDAY

F	E	D	C		B	A	A	B	C		D	E	F
SOUTHBOUND							**NORTHBOUND**						
							6:19	6:36	6:42	6:43	6:53	7:03	7:08
6:30	6:37	6:49	6:59	7:00	7:07	7:26	7:34	7:51	7:57	7:58	8:08	8:20	8:25
7:19	7:26	7:38	7:48	7:49	7:56	8:15	8:22	8:39	8:45	8:46	8:56	9:08	9:13
8:31	8:38	8:53	9:03	9:04	9:11	9:31	9:34	9:54	10:01	10:02	10:14	10:28	10:33
9:41	9:48	10:03	10:13	10:14	10:22	10:42	10:44	**11:04**	**11:11**	**11:12**	**11:24**	**11:38**	**11:43**
10:51	**10:58**	**11:13**	**11:25**	**11:26**	**11:34**	**11:57**	**11:59**	**12:20**	**12:27**	**12:28**	**12:40**	**12:54**	**1:00**
12:04	**12:11**	**12:26**	**12:38**	**12:39**	**12:47**	**1:10**	**1:11**	**1:35**	**1:42**	**1:43**	**1:55**	**2:09**	**2:15**
1:19	**1:26**	**1:41**	**1:53**	**1:54**	**2:02**	**2:25**	**2:26**	**2:50**	**2:57**	**2:58**	**3:10**	**3:25**	**3:31**
2:29	**2:36**	**2:51**	**3:03**	**3:04**	**3:12**	**3:35**	**3:36**	**4:00**	**4:07**	**4:08**	**4:20**	**4:35**	**4:41**
3:39	**3:46**	**4:01**	**4:13**	**4:14**	**4:22**	**4:45**	**4:46**	**5:10**	**5:17**	**5:18**	**5:30**	**5:45**	**5:51**
4:51	**4:58**	**5:13**	**5:25**	**5:26**	**5:34**	**5:57**	**5:58**	**6:22**	**6:29**	**6:30**	**6:42**	**6:57**	**7:03**
6:05	**6:12**	**6:25**	**6:34**	**6:35**	**6:43**	**7:05**	**7:17**	**7:38**	**7:44**	**7:45**	**7:57**	**8:09**	**8:15**

* SBTC - San Bernardino Transit Center
** San Bernardino County Workforce Development Center

APPENDIX D

EXISTING TRAFFIC COUNTS

T218

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Wed, Oct 19, 22	LOCATION:	San Bernardino	PROJECT #:	SC3597
	NORTH & SOUTH:	Magnolia	LOCATION #:	1
	EAST & WEST:	Meyers	CONTROL:	STOP ALL

NOTES:

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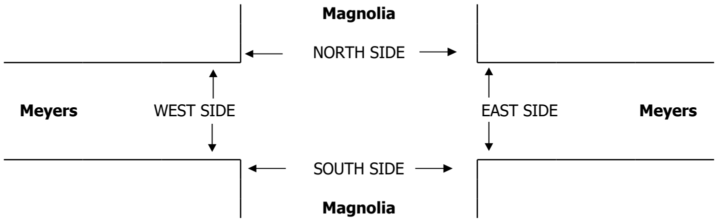
☑ Add U-Turns to Left Turns

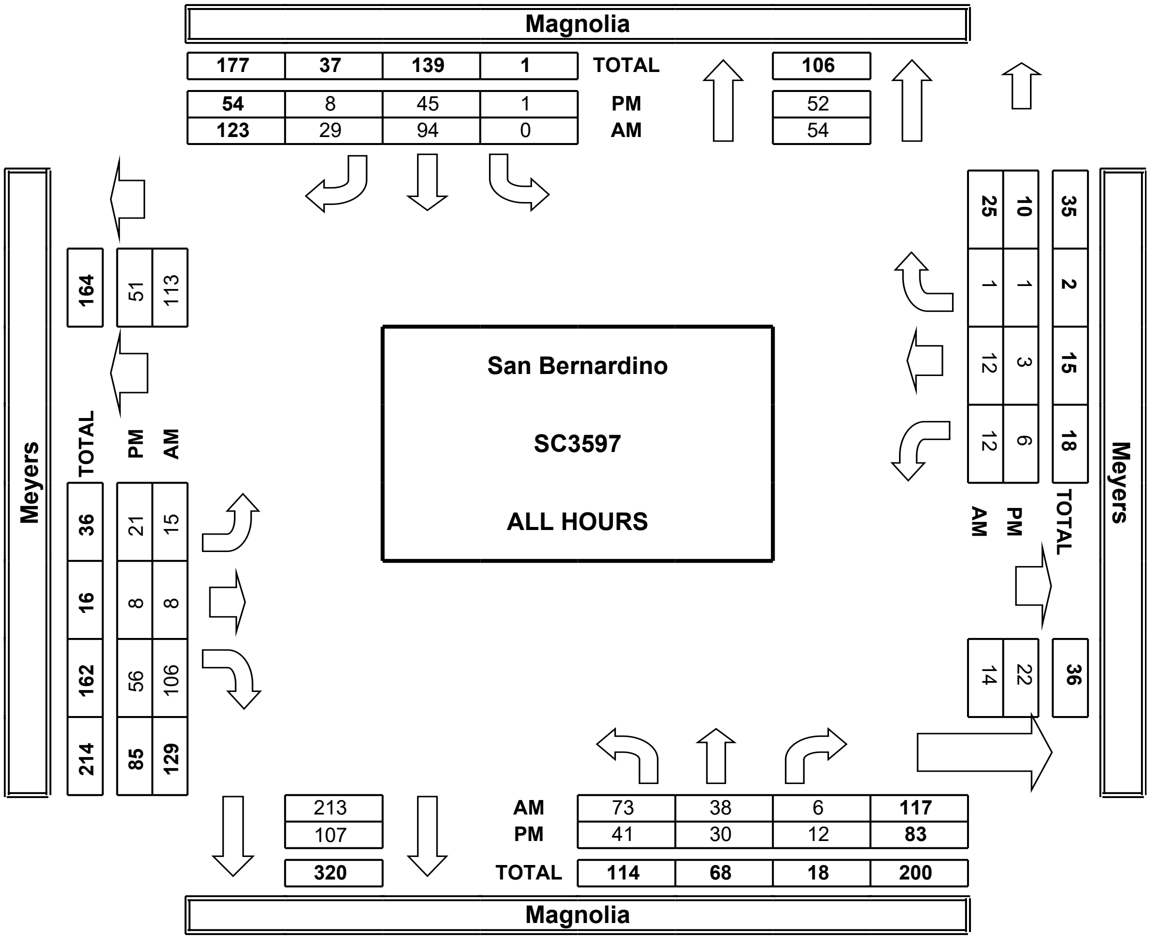
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND				U-TURNS				
			Magnolia			Magnolia			Meyers			Meyers							
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	0	1	0	0	1	0	0	1	0	0	1	0		0	0	0	0	
AM	7:00 AM	3	5	2	0	12	2	0	0	3	2	3	0	32	1	0	0	0	1
	7:15 AM	3	6	1	0	30	7	1	0	6	0	1	0	55	0	0	0	0	0
	7:30 AM	6	8	1	0	21	3	2	0	2	6	1	0	50	0	0	0	0	0
	7:45 AM	5	5	1	0	2	3	0	0	4	0	1	1	22	0	0	0	0	0
	8:00 AM	5	2	0	0	8	1	1	0	4	0	1	0	22	0	0	0	0	0
	8:15 AM	11	4	0	0	7	2	2	1	4	2	0	0	33	0	0	0	0	0
	8:30 AM	29	3	0	0	11	8	8	6	52	1	5	0	123	0	0	0	0	0
	8:45 AM	11	5	1	0	3	3	1	1	31	1	0	0	57	0	0	0	0	0
	VOLUMES	73	38	6	0	94	29	15	8	106	12	12	1	394	1	0	0	0	1
	APPROACH %	62%	32%	5%	0%	76%	24%	12%	6%	82%	48%	48%	4%						
	APP/DEPART	117	/	54	123	/	213	129	/	14	25	/	113	0					
	BEGIN PEAK HR		8:00 AM																
	VOLUMES	56	14	1	0	29	14	12	8	91	4	6	0	235					
	APPROACH %	79%	20%	1%	0%	67%	33%	11%	7%	82%	40%	60%	0%						
	PEAK HR FACTOR		0.555			0.566			0.420			0.417		0.478					
	APP/DEPART	71	/	26	43	/	124	111	/	9	10	/	76	0					
PM	4:00 PM	1	7	1	0	5	1	2	0	6	0	0	1	24	0	0	0	0	0
	4:15 PM	3	0	1	0	6	1	4	1	4	1	1	0	22	0	0	0	1	1
	4:30 PM	5	2	1	0	5	1	3	0	9	0	1	0	27	0	0	0	0	0
	4:45 PM	5	5	1	1	2	1	1	3	8	3	0	0	30	0	0	0	0	0
	5:00 PM	9	5	6	0	5	1	4	1	12	0	0	0	43	1	0	0	0	1
	5:15 PM	4	6	1	0	8	0	2	0	2	0	1	0	24	0	0	0	0	0
	5:30 PM	5	3	1	0	8	2	1	1	6	1	0	0	28	0	0	0	0	0
	5:45 PM	9	2	0	0	6	1	4	2	9	1	0	0	34	0	0	0	0	0
	VOLUMES	41	30	12	1	45	8	21	8	56	6	3	1	232	1	0	0	1	2
	APPROACH %	49%	36%	14%	2%	83%	15%	25%	9%	66%	60%	30%	10%						
	APP/DEPART	83	/	52	54	/	107	85	/	22	10	/	51	0					
	BEGIN PEAK HR		5:00 PM																
	VOLUMES	27	16	8	0	27	4	11	4	29	2	1	0	129					
	APPROACH %	53%	31%	16%	0%	87%	13%	25%	9%	66%	67%	33%	0%						
	PEAK HR FACTOR		0.638			0.775			0.647			0.750		0.750					
	APP/DEPART	51	/	27	31	/	59	44	/	12	3	/	31	0					



		PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0
	7:15 AM	0	1	2	0	3	0	1	2	0	3	0	0	0	0	0
	7:30 AM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
	7:45 AM	1	0	4	0	5	1	0	4	0	5	0	0	0	0	0
	8:00 AM	0	1	3	0	4	0	1	3	0	4	0	0	0	0	0
	8:15 AM	0	6	4	0	10	0	6	4	0	10	0	0	0	0	0
	8:30 AM	0	3	6	0	9	0	3	6	0	9	0	0	0	0	0
	8:45 AM	0	2	1	0	3	0	2	1	0	3	0	0	0	0	0
	TOTAL	2	13	21	0	36	2	13	21	0	36	0	0	0	0	0
AM BEGIN PEAK HR				8:00 AM			0	12	14	0	26					
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	1	0	3	1	5	1	0	3	1	5	0	0	0	0	0
	4:45 PM	0	2	3	0	5	0	2	3	0	5	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	1	1	0	2	0	1	1	0	2	0	0	0	0	0
	5:30 PM	0	0	3	0	3	0	0	3	0	3	0	0	0	0	0
	5:45 PM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0
	TOTAL	1	4	10	1	16	1	4	10	1	16	0	0	0	0	0
PM BEGIN PEAK HR				5:00 PM			0	2	4	0	6					

AimTD LLC

TURNING MOVEMENT COUNTS



San Bernardino

SC3597

ALL HOURS

Magnolia (north leg)

177	37	139	1	TOTAL
54	8	45	1	PM
123	29	94	0	AM

106	TOTAL
52	PM
54	AM

Meyers (west leg)

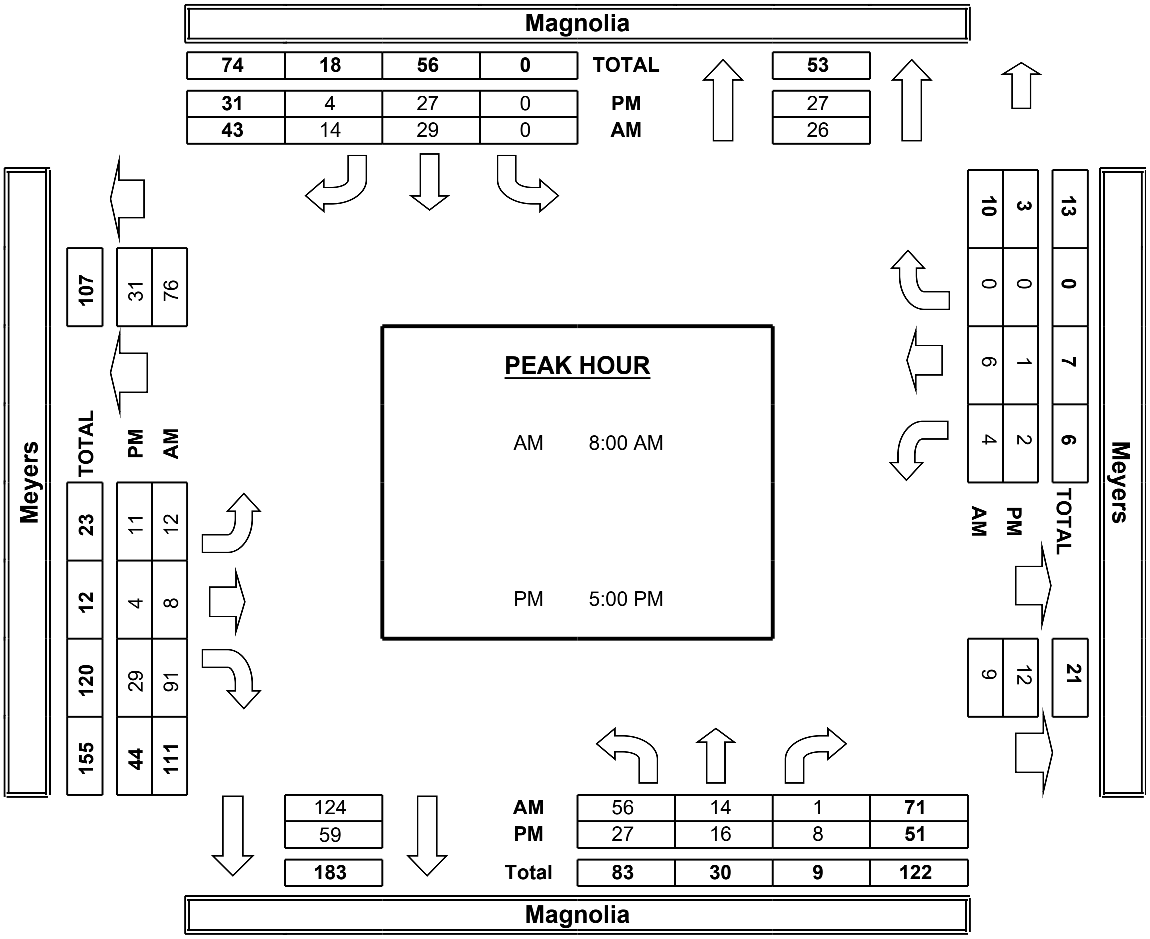
TOTAL	PM	AM
164	51	113
36	21	15
16	8	8
162	56	106
214	85	129

Meyers (east leg)

AM	PM	TOTAL
25	10	35
1	1	2
12	3	15
12	6	18
14	22	36

Magnolia (south leg)

213	AM	73	38	6	117
107	PM	41	30	12	83
320	TOTAL	114	68	18	200



PEAK HOUR

AM 8:00 AM

PM 5:00 PM

Magnolia (north leg)

74	18	56	0	TOTAL
31	4	27	0	PM
43	14	29	0	AM

53	TOTAL
27	PM
26	AM

Meyers (west leg)

TOTAL	PM	AM
107	31	76
23	11	12
12	4	8
120	29	91
155	44	111

Meyers (east leg)

AM	PM	TOTAL
10	3	13
0	0	0
6	1	7
4	2	6
9	12	21

Magnolia (south leg)

124	AM	56	14	1	71
59	PM	27	16	8	51
183	Total	83	30	9	122

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Wed, Oct 19, 22	LOCATION:	San Bernardino	PROJECT #:	SC3597
	NORTH & SOUTH:	Little League	LOCATION #:	2
	EAST & WEST:	Meyers	CONTROL:	STOP ALL

NOTES:

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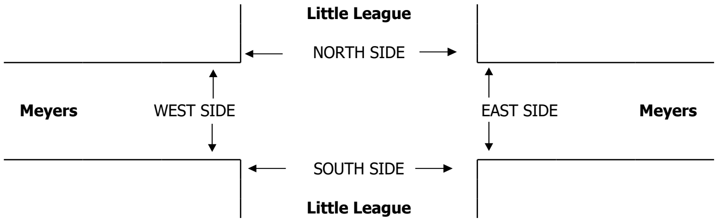
☑ Add U-Turns to Left Turns

		NORTHBOUND Little League			SOUTHBOUND Little League			EASTBOUND Meyers			WESTBOUND Meyers			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	0	1	0	0	1	0	0	1	0	0	1	0	
	7:00 AM	1	6	3	1	4	0	0	0	8	5	0	3	31
	7:15 AM	0	5	10	0	0	0	0	0	6	11	1	1	34
	7:30 AM	2	2	5	0	2	0	0	0	9	7	1	1	29
	7:45 AM	3	3	8	0	2	0	0	0	3	5	0	1	25
	8:00 AM	8	0	9	0	3	0	0	0	8	13	0	0	41
	8:15 AM	6	5	19	2	2	1	0	2	6	12	1	0	56
	8:30 AM	23	1	41	0	3	0	0	2	5	14	1	1	91
	8:45 AM	13	2	36	0	3	0	0	3	5	18	2	0	82
AM	VOLUMES	56	24	131	3	19	1	0	7	50	85	6	7	389
	APPROACH %	27%	11%	62%	13%	83%	4%	0%	12%	88%	87%	6%	7%	
	APP/DEPART	211	/	32	23	/	188	57	/	140	98	/	29	0
	BEGIN PEAK HR		8:00 AM											
	VOLUMES	50	8	105	2	11	1	0	7	24	57	4	1	270
	APPROACH %	31%	5%	64%	14%	79%	7%	0%	23%	77%	92%	6%	2%	
	PEAK HR FACTOR		0.627			0.700			0.969			0.775		0.742
	APP/DEPART	163	/	10	14	/	126	31	/	113	62	/	21	0
	4:00 PM	7	0	5	0	1	0	0	1	7	7	0	1	29
	4:15 PM	3	0	7	2	2	0	0	0	2	4	0	0	20
	4:30 PM	9	0	9	0	0	0	0	2	1	6	0	0	27
	4:45 PM	8	1	12	0	0	0	0	0	1	7	0	0	29
	5:00 PM	8	1	9	0	3	0	0	1	3	5	1	0	31
	5:15 PM	11	2	5	1	1	0	0	0	3	8	0	0	31
	5:30 PM	7	0	6	0	3	0	0	0	5	2	1	0	24
	5:45 PM	3	2	7	1	0	0	0	0	3	6	0	0	22
PM	VOLUMES	56	6	60	4	10	0	0	4	25	45	2	1	213
	APPROACH %	46%	5%	49%	29%	71%	0%	0%	14%	86%	94%	4%	2%	
	APP/DEPART	122	/	7	14	/	81	29	/	69	48	/	56	0
	BEGIN PEAK HR		4:30 PM											
	VOLUMES	36	4	35	1	4	0	0	3	8	26	1	0	118
	APPROACH %	48%	5%	47%	20%	80%	0%	0%	27%	73%	96%	4%	0%	
	PEAK HR FACTOR		0.893			0.417			0.688			0.844		0.952
	APP/DEPART	75	/	4	5	/	40	11	/	39	27	/	35	0

U-TURNS				
NB	SB	EB	WB	TTL
0	0	0	0	
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
2	0	0	0	2
3	1	0	0	4
20	0	0	0	20
9	0	0	0	9
34	1	0	0	35
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	0	0	0	1
1	0	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	1	1
2	0	0	1	3



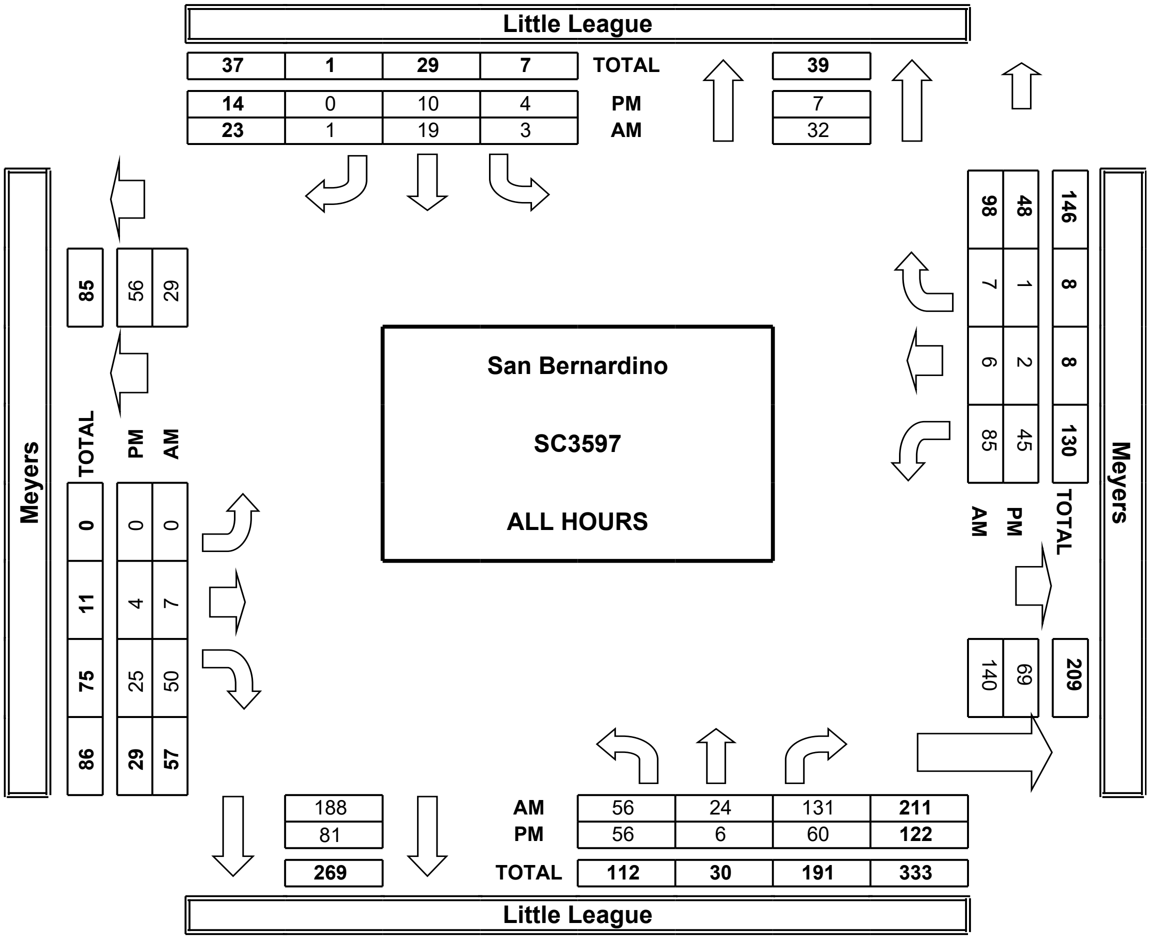
		PEDESTRIAN + BIKE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL
AM	7:00 AM	0	0	0	0	0
	7:15 AM	0	0	0	0	0
	7:30 AM	0	0	0	0	0
	7:45 AM	0	0	0	0	0
	8:00 AM	0	2	0	0	2
	8:15 AM	0	1	0	0	1
	8:30 AM	0	0	1	0	1
	8:45 AM	0	0	3	0	3
	TOTAL	0	3	4	0	7
AM BEGIN PEAK HR				8:00 AM		
PM	4:00 PM	0	0	0	0	0
	4:15 PM	0	0	0	0	0
	4:30 PM	0	0	0	0	0
	4:45 PM	0	0	0	0	0
	5:00 PM	0	0	0	0	0
	5:15 PM	0	0	0	0	0
	5:30 PM	0	0	0	0	0
	5:45 PM	0	0	0	0	0
	TOTAL	0	0	0	0	0
PM BEGIN PEAK HR				4:30 PM		

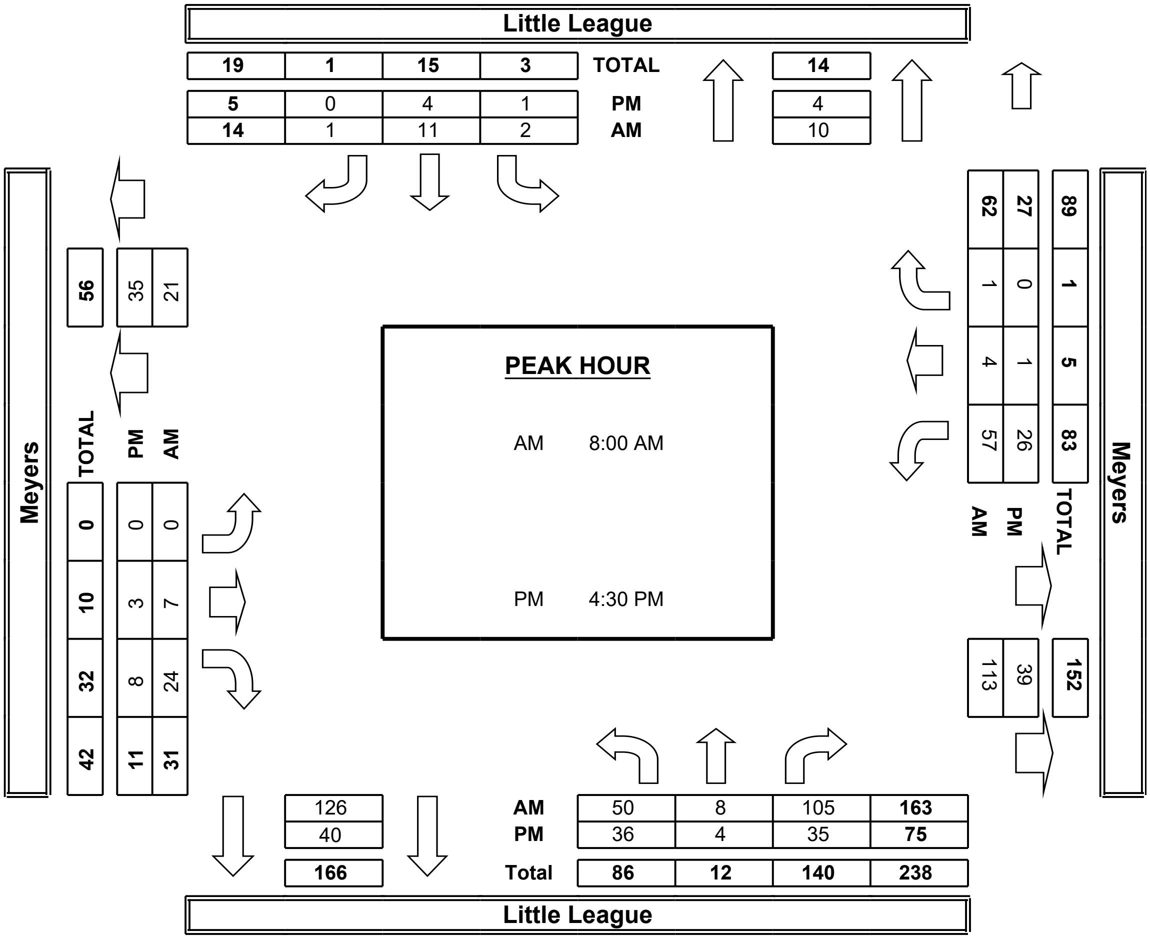
		PEDESTRIAN CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL
AM	7:00 AM	0	0	0	0	0
	7:15 AM	0	0	0	0	0
	7:30 AM	0	0	0	0	0
	7:45 AM	0	0	0	0	0
	8:00 AM	0	1	0	0	1
	8:15 AM	0	1	0	0	1
	8:30 AM	0	0	1	0	1
	8:45 AM	0	0	3	0	3
	TOTAL	0	2	4	0	6
AM BEGIN PEAK HR		0	2	4	0	6
PM	4:00 PM	0	0	0	0	0
	4:15 PM	0	0	0	0	0
	4:30 PM	0	0	0	0	0
	4:45 PM	0	0	0	0	0
	5:00 PM	0	0	0	0	0
	5:15 PM	0	0	0	0	0
	5:30 PM	0	0	0	0	0
	5:45 PM	0	0	0	0	0
	TOTAL	0	0	0	0	0
PM BEGIN PEAK HR		0	0	0	0	0

		BICYCLE CROSSINGS				
		NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	0	0	0
	7:15 AM	0	0	0	0	0
	7:30 AM	0	0	0	0	0
	7:45 AM	0	0	0	0	0
	8:00 AM	0	1	0	0	1
	8:15 AM	0	0	0	0	0
	8:30 AM	0	0	0	0	0
	8:45 AM	0	0	0	0	0
	TOTAL	0	1	0	0	1
AM BEGIN PEAK HR						
PM	4:00 PM	0	0	0	0	0
	4:15 PM	0	0	0	0	0
	4:30 PM	0	0	0	0	0
	4:45 PM	0	0	0	0	0
	5:00 PM	0	0	0	0	0
	5:15 PM	0	0	0	0	0
	5:30 PM	0	0	0	0	0
	5:45 PM	0	0	0	0	0
	TOTAL	0	0	0	0	0
PM BEGIN PEAK HR						

AimTD LLC

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Wed, Oct 19, 22	LOCATION:	San Bernardino	PROJECT #:	SC3597
	NORTH & SOUTH:	Little League	LOCATION #:	3
	EAST & WEST:	Belmont	CONTROL:	STOP ALL

NOTES:

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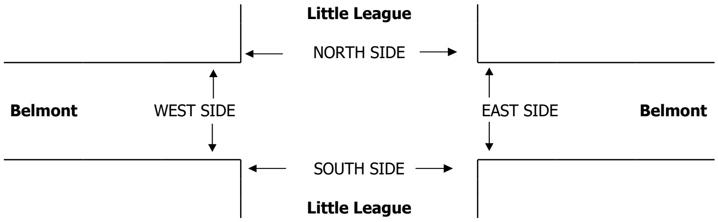
☑ Add U-Turns to Left Turns

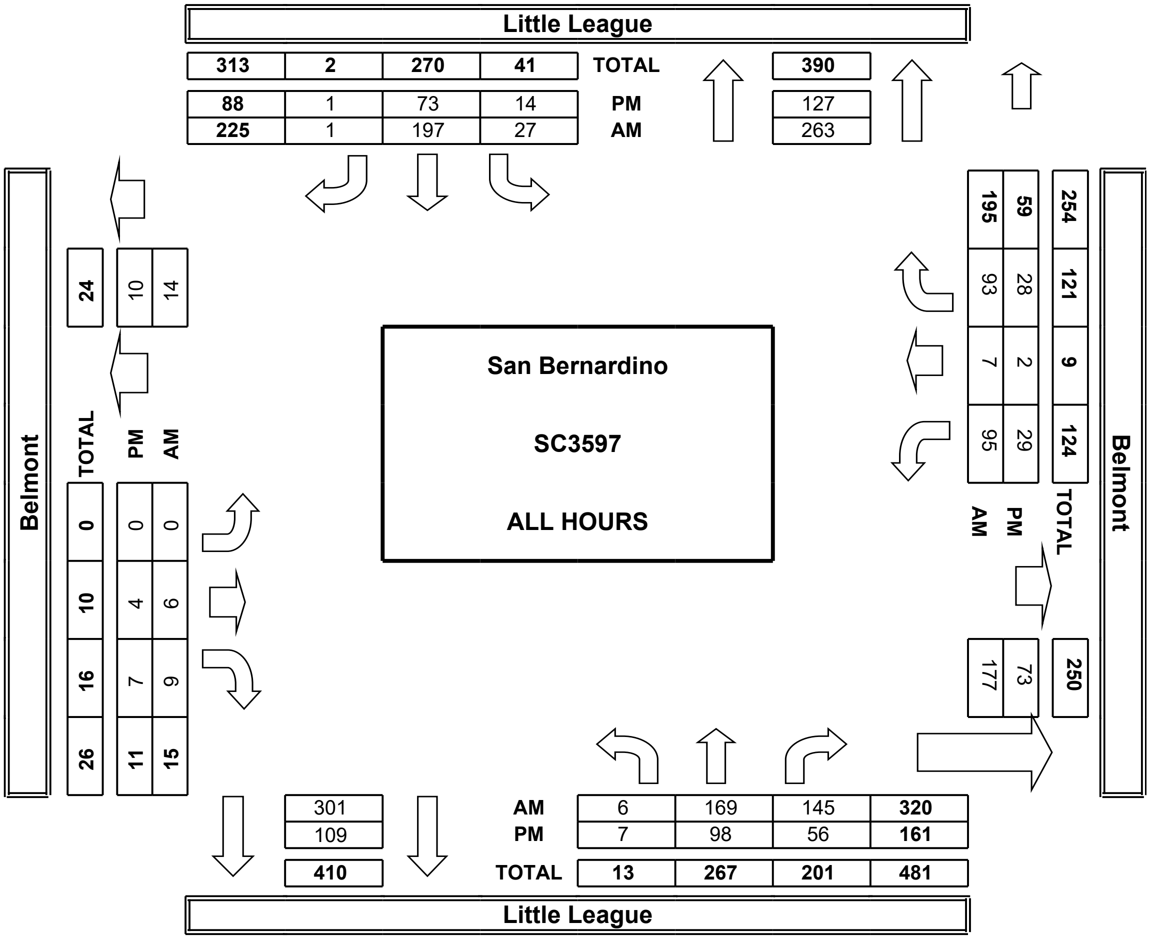
	NORTHBOUND Little League			SOUTHBOUND Little League			EASTBOUND Belmont			WESTBOUND Belmont				U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
LANES:	0	1	1	0	1	0	0	1	0	0	1	0		0	0	0	0	
AM 7:00 AM	1	9	26	1	16	1	0	1	4	9	2	3	73	0	0	0	0	0
7:15 AM	0	11	42	1	19	0	0	1	0	27	1	6	108	0	0	0	0	0
7:30 AM	0	8	44	2	23	0	0	0	0	23	0	2	102	0	0	0	0	0
7:45 AM	1	18	11	1	9	0	0	0	0	8	1	3	52	0	0	0	0	0
8:00 AM	0	16	2	0	19	0	0	2	2	10	1	2	54	0	0	0	0	0
8:15 AM	2	30	6	3	11	0	0	0	0	2	0	17	71	0	1	0	0	1
8:30 AM	1	52	10	15	59	0	0	0	2	9	0	41	189	0	0	0	0	0
8:45 AM	1	25	4	4	41	0	0	2	1	7	2	19	106	0	0	0	0	0
VOLUMES	6	169	145	27	197	1	0	6	9	95	7	93	755	0	1	0	0	1
APPROACH %	2%	53%	45%	12%	88%	0%	0%	40%	60%	49%	4%	48%						
APP/DEPART	320	/	263	225	/	301	15	/	177	195	/	14	0					
BEGIN PEAK HR		8:00 AM																
VOLUMES	4	123	22	22	130	0	0	4	5	28	3	79	420					
APPROACH %	3%	83%	15%	14%	86%	0%	0%	44%	56%	25%	3%	72%						
PEAK HR FACTOR		0.591			0.514			0.563			0.550		0.556					
APP/DEPART	149	/	203	152	/	163	9	/	47	110	/	7	0					
PM 4:00 PM	1	10	12	2	14	0	0	1	0	2	1	1	44	0	0	0	0	0
4:15 PM	1	9	2	0	8	0	0	0	1	5	0	2	28	0	0	0	0	0
4:30 PM	1	12	7	1	5	0	0	0	0	2	1	6	35	0	1	0	0	1
4:45 PM	0	19	9	5	5	1	0	0	4	3	0	9	55	0	0	0	0	0
5:00 PM	0	15	8	4	13	0	0	0	0	3	0	1	44	0	0	0	0	0
5:15 PM	2	15	4	0	11	0	0	2	0	4	0	3	41	0	0	0	0	0
5:30 PM	1	10	11	2	9	0	0	1	2	7	0	3	46	0	0	0	0	0
5:45 PM	1	8	3	0	8	0	0	0	0	3	0	3	26	0	0	0	0	0
VOLUMES	7	98	56	14	73	1	0	4	7	29	2	28	319	0	1	0	0	1
APPROACH %	4%	61%	35%	16%	83%	1%	0%	36%	64%	49%	3%	47%						
APP/DEPART	161	/	127	88	/	109	11	/	73	59	/	10	0					
BEGIN PEAK HR		4:45 PM																
VOLUMES	3	59	32	11	38	1	0	3	6	17	0	16	186					
APPROACH %	3%	63%	34%	22%	76%	2%	0%	33%	67%	52%	0%	48%						
PEAK HR FACTOR		0.839			0.735			0.563			0.688		0.845					
APP/DEPART	94	/	75	50	/	61	9	/	46	33	/	4	0					

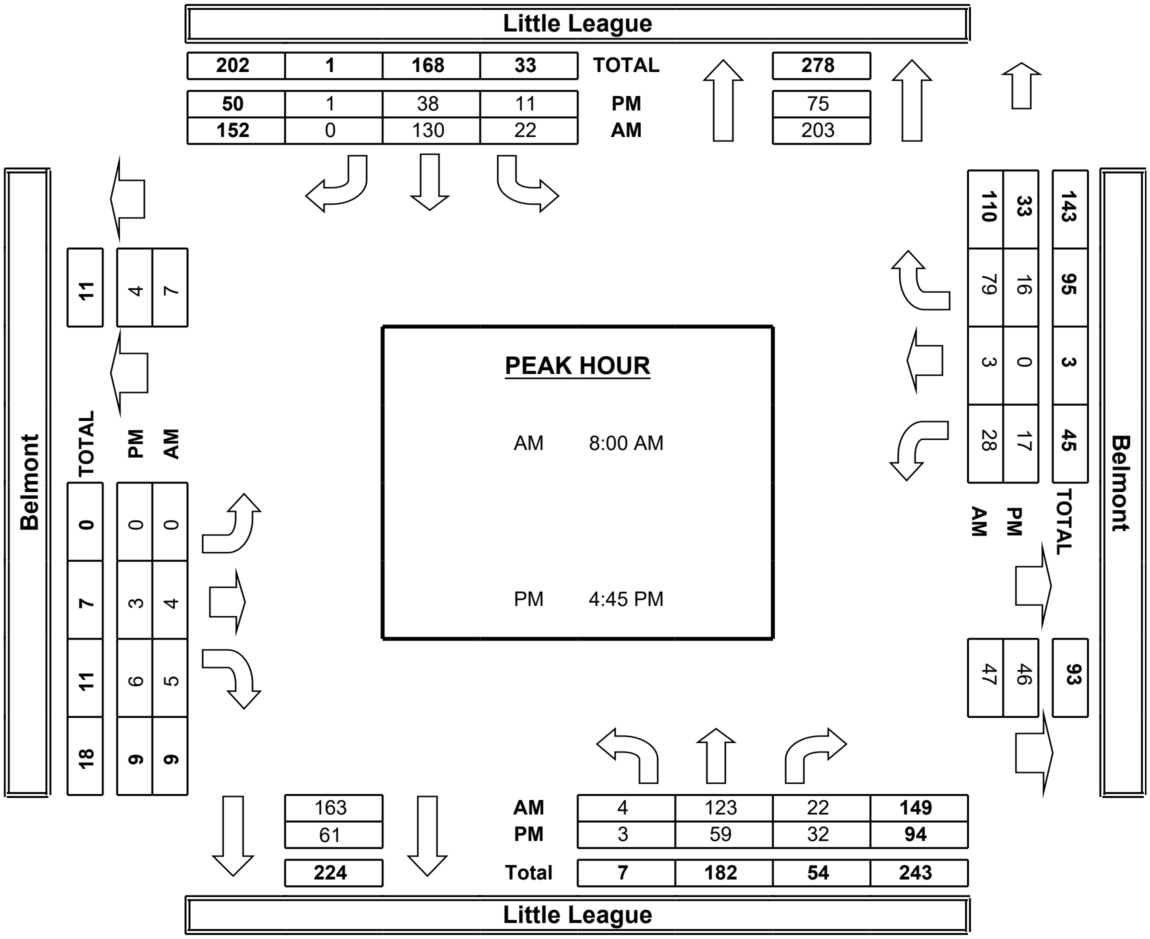


	PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM 7:00 AM	0	1	1	0	2	0	1	1	0	2	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
7:45 AM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	4	0	4	0	0	4	0	4	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
TOTAL	0	2	6	1	9	0	2	6	1	9	0	0	0	0	0
AM BEGIN PEAK HR			8:00 AM			0	0	5	0	5					
PM 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM BEGIN PEAK HR			4:45 PM			0	0	0	0	0					

AimTD LLC

TURNING MOVEMENT COUNTS





T218

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Wed, Oct 19, 22	LOCATION:	San Bernardino	PROJECT #:	SC3597
	NORTH & SOUTH:	Magnolia	LOCATION #:	4
	EAST & WEST:	Belmont	CONTROL:	STOP ALL

NOTES:

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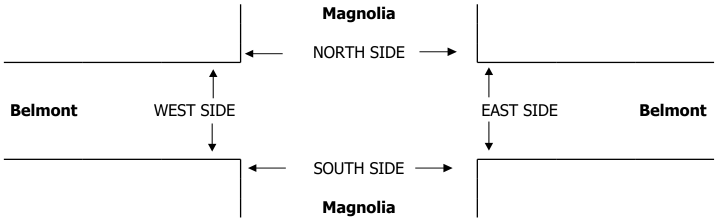
☑ Add U-Turns to Left Turns

		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
			Magnolia			Magnolia			Belmont			Belmont		
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	0	1	0	0	1	0	0	1	0	0	1	0	
AM	7:00 AM	5	5	7	7	9	5	2	6	6	35	5	3	95
	7:15 AM	6	3	48	8	15	7	1	11	21	56	10	5	191
	7:30 AM	7	7	66	8	20	5	4	11	24	67	5	5	229
	7:45 AM	0	5	8	3	2	2	2	6	2	8	7	4	49
	8:00 AM	3	1	1	3	5	4	1	6	0	6	8	5	43
	8:15 AM	7	6	1	3	5	4	2	3	3	1	17	7	59
	8:30 AM	21	14	0	17	37	8	3	12	10	1	22	15	160
	8:45 AM	8	9	0	9	26	3	3	7	4	0	8	6	83
	VOLUMES	57	50	131	58	119	38	18	62	70	174	82	50	909
	APPROACH %	24%	21%	55%	27%	55%	18%	12%	41%	47%	57%	27%	16%	
	APP/DEPART	238	/	118	215	/	363	150	/	251	306	/	177	0
	BEGIN PEAK HR		7:00 AM											
	VOLUMES	18	20	129	26	46	19	9	34	53	166	27	17	564
	APPROACH %	11%	12%	77%	29%	51%	21%	9%	35%	55%	79%	13%	8%	
	PEAK HR FACTOR		0.522			0.689			0.615			0.682		0.616
	APP/DEPART	167	/	46	91	/	265	96	/	189	210	/	64	0
PM	4:00 PM	1	4	0	7	6	0	4	7	5	6	3	2	45
	4:15 PM	0	1	1	5	3	2	1	2	0	0	5	3	23
	4:30 PM	1	1	3	5	4	3	1	3	3	1	5	6	36
	4:45 PM	3	7	1	4	7	3	6	4	1	1	6	0	43
	5:00 PM	0	3	0	8	9	2	5	7	4	1	3	10	52
	5:15 PM	3	3	1	2	7	1	1	4	1	7	4	7	41
	5:30 PM	2	3	1	6	7	2	4	9	4	1	8	3	50
	5:45 PM	1	6	3	4	10	1	1	3	0	3	5	5	42
	VOLUMES	11	28	10	41	53	14	23	39	18	20	39	36	332
	APPROACH %	22%	57%	20%	38%	49%	13%	29%	49%	23%	21%	41%	38%	
	APP/DEPART	49	/	87	108	/	91	80	/	90	95	/	64	0
	BEGIN PEAK HR		4:45 PM											
	VOLUMES	8	16	3	20	30	8	16	24	10	10	21	20	186
	APPROACH %	30%	59%	11%	34%	52%	14%	32%	48%	20%	20%	41%	39%	
	PEAK HR FACTOR		0.614			0.763			0.735			0.708		0.894
	APP/DEPART	27	/	52	58	/	50	50	/	47	51	/	37	0

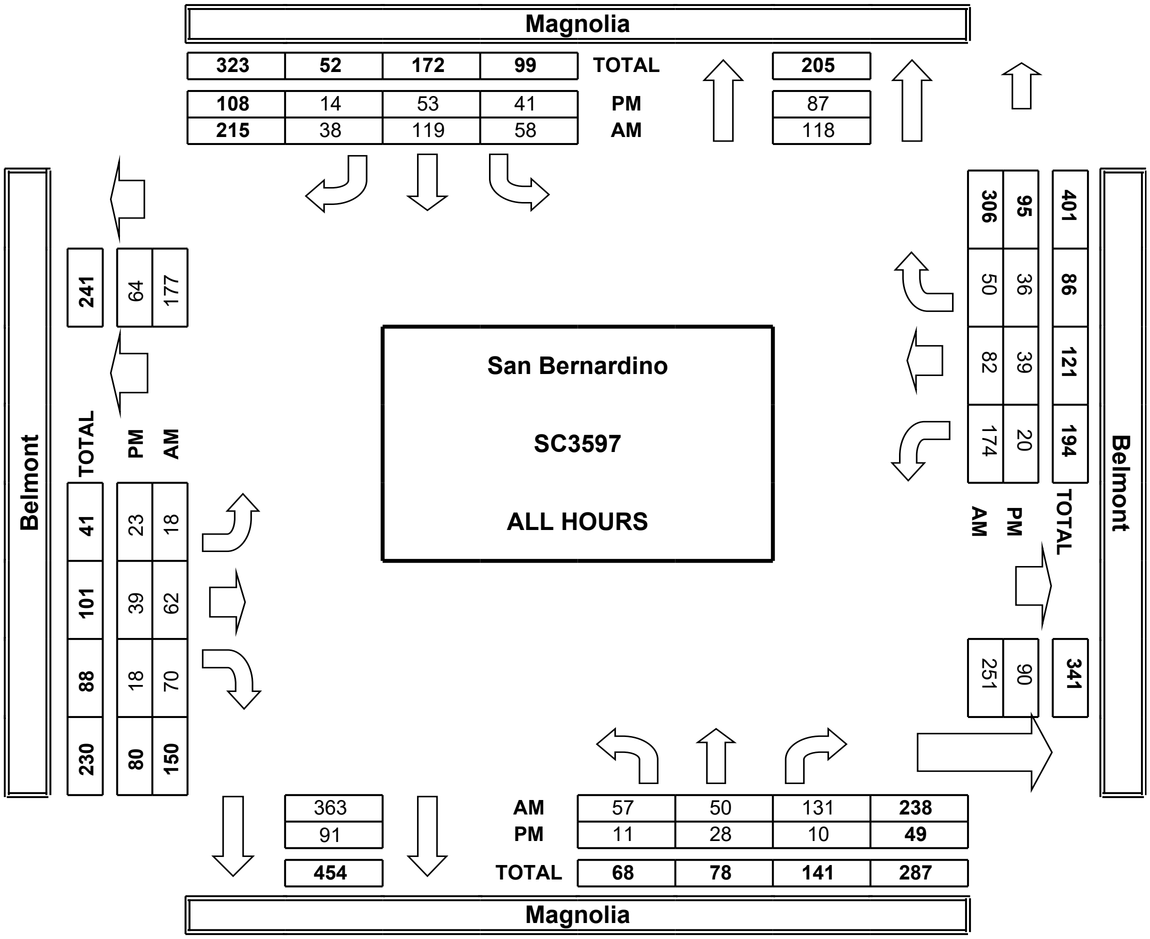
U-TURNS				
NB	SB	EB	WB	TTL
0	0	0	0	
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

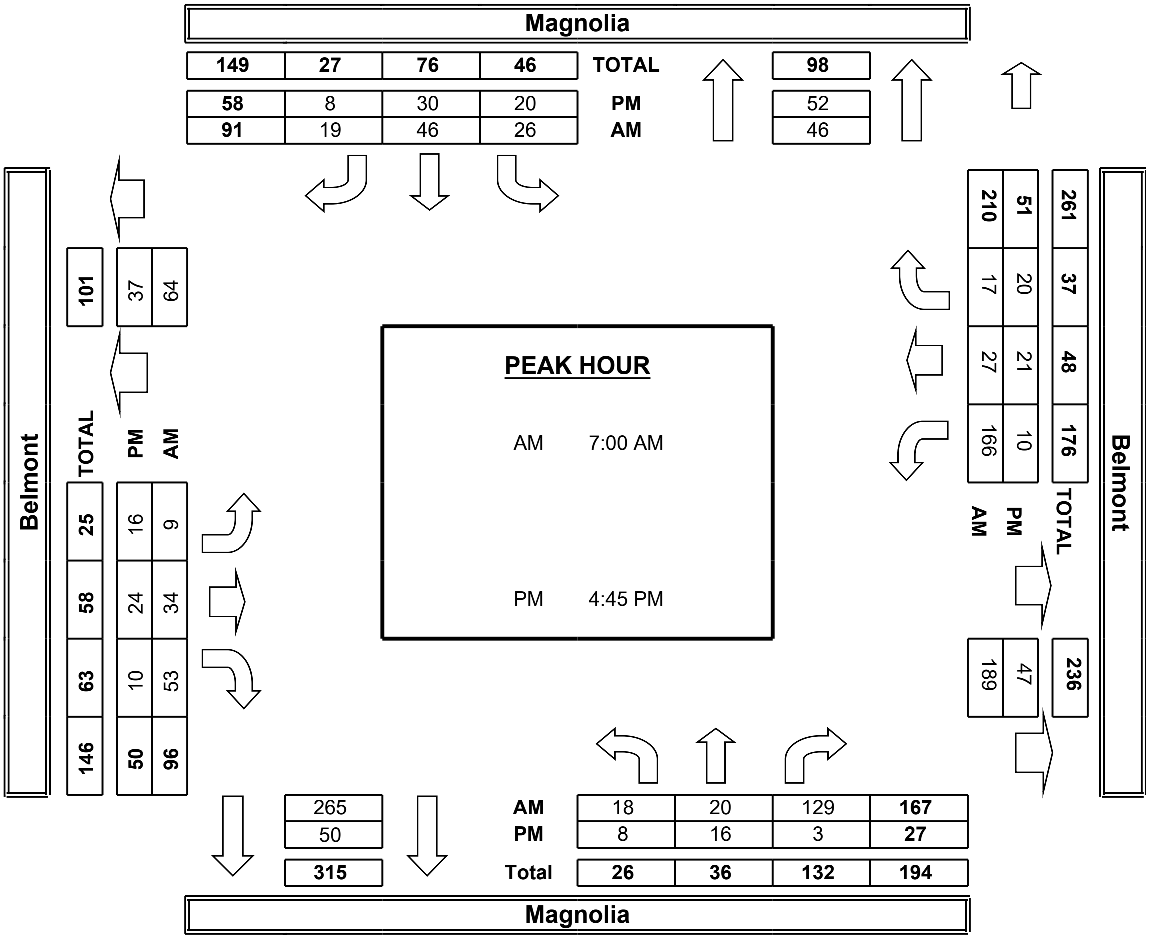


		PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	1	2	0	0	3	1	2	0	0	3	0	0	0	0	0
	7:15 AM	6	2	0	21	29	6	2	0	21	29	0	0	0	0	0
	7:30 AM	4	5	1	18	28	4	5	1	18	28	0	0	0	0	0
	7:45 AM	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0
	8:00 AM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0
	8:15 AM	0	6	0	0	6	0	3	0	0	3	0	3	0	0	3
	8:30 AM	3	0	1	0	4	3	0	1	0	4	0	0	0	0	0
	8:45 AM	2	1	0	0	3	2	1	0	0	3	0	0	0	0	0
	TOTAL	17	17	2	39	75	17	14	2	39	72	0	3	0	0	3
AM BEGIN PEAK HR				7:00 AM			12	9	1	39	61					
PM	4:00 PM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
	4:15 PM	0	1	1	0	2	0	1	1	0	2	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	1	1	0	2	0	1	1	0	2	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	2	3	0	5	0	2	3	0	5	0	0	0	0	0
	5:45 PM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
	TOTAL	0	4	6	1	11	0	4	6	1	11	0	0	0	0	0
PM BEGIN PEAK HR				4:45 PM			0	3	4	0	7					

AimTD LLC

TURNING MOVEMENT COUNTS





T218

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Wed, Oct 19, 22	LOCATION:	San Bernardino	PROJECT #:	SC3597
	NORTH & SOUTH:	Palm	LOCATION #:	5
	EAST & WEST:	Belmont	CONTROL:	STOP ALL

NOTES:

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☑ Add U-Turns to Left Turns

		NORTHBOUND Palm			SOUTHBOUND Palm			EASTBOUND Belmont			WESTBOUND Belmont			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	0	1	1	0	1	0	0	1	0	0	1	0	
AM	7:00 AM	28	18	5	1	46	2	3	10	14	24	11	1	163
	7:15 AM	57	18	9	0	67	0	4	20	40	33	29	4	281
	7:30 AM	39	21	6	2	48	0	11	38	58	26	20	1	270
	7:45 AM	15	19	6	1	31	1	2	11	19	11	7	5	128
	8:00 AM	10	28	7	2	41	1	1	5	6	13	6	4	124
	8:15 AM	14	43	9	1	42	3	3	1	13	13	6	10	158
	8:30 AM	24	45	9	3	55	3	9	11	21	41	8	12	241
	8:45 AM	11	33	9	6	43	4	4	1	18	18	3	10	160
	VOLUMES	198	225	60	16	373	14	37	97	189	179	90	47	1,525
	APPROACH %	41%	47%	12%	4%	93%	3%	11%	30%	59%	57%	28%	15%	
	APP/DEPART	483	/	310	403	/	741	323	/	172	316	/	302	0
	BEGIN PEAK HR		7:00 AM											
	VOLUMES	139	76	26	4	192	3	20	79	131	94	67	11	842
	APPROACH %	58%	32%	11%	2%	96%	2%	9%	34%	57%	55%	39%	6%	
	PEAK HR FACTOR		0.717			0.743			0.537			0.652		0.749
	APP/DEPART	241	/	108	199	/	417	230	/	108	172	/	209	0
PM	4:00 PM	21	35	17	1	19	0	3	2	14	8	3	5	128
	4:15 PM	15	38	13	2	32	0	1	1	10	8	2	2	124
	4:30 PM	20	40	18	9	32	3	6	3	8	10	1	5	155
	4:45 PM	8	64	15	2	24	0	1	2	14	11	2	1	144
	5:00 PM	17	59	19	1	36	2	5	5	16	6	3	4	173
	5:15 PM	18	48	14	0	25	1	1	1	7	8	2	2	127
	5:30 PM	21	54	25	5	33	3	1	6	15	15	5	5	188
	5:45 PM	22	43	20	1	25	1	3	5	9	10	4	4	147
	VOLUMES	142	381	141	21	226	10	21	25	93	76	22	28	1,186
	APPROACH %	21%	57%	21%	8%	88%	4%	15%	18%	67%	60%	17%	22%	
	APP/DEPART	664	/	431	257	/	395	139	/	186	126	/	174	0
	BEGIN PEAK HR		5:00 PM											
	VOLUMES	78	204	78	7	119	7	10	17	47	39	14	15	635
	APPROACH %	22%	57%	22%	5%	89%	5%	14%	23%	64%	57%	21%	22%	
	PEAK HR FACTOR		0.900			0.811			0.712			0.680		0.844
	APP/DEPART	360	/	229	133	/	205	74	/	102	68	/	99	0

U-TURNS				
NB	SB	EB	WB	TTL
0	0	0	0	
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	1	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	1	0	0	1
0	0	0	0	0
0	0	0	0	0
0	1	0	0	1
0	0	0	0	0
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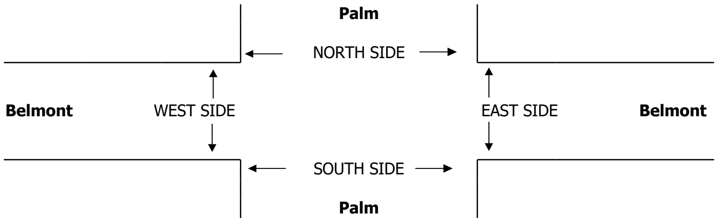
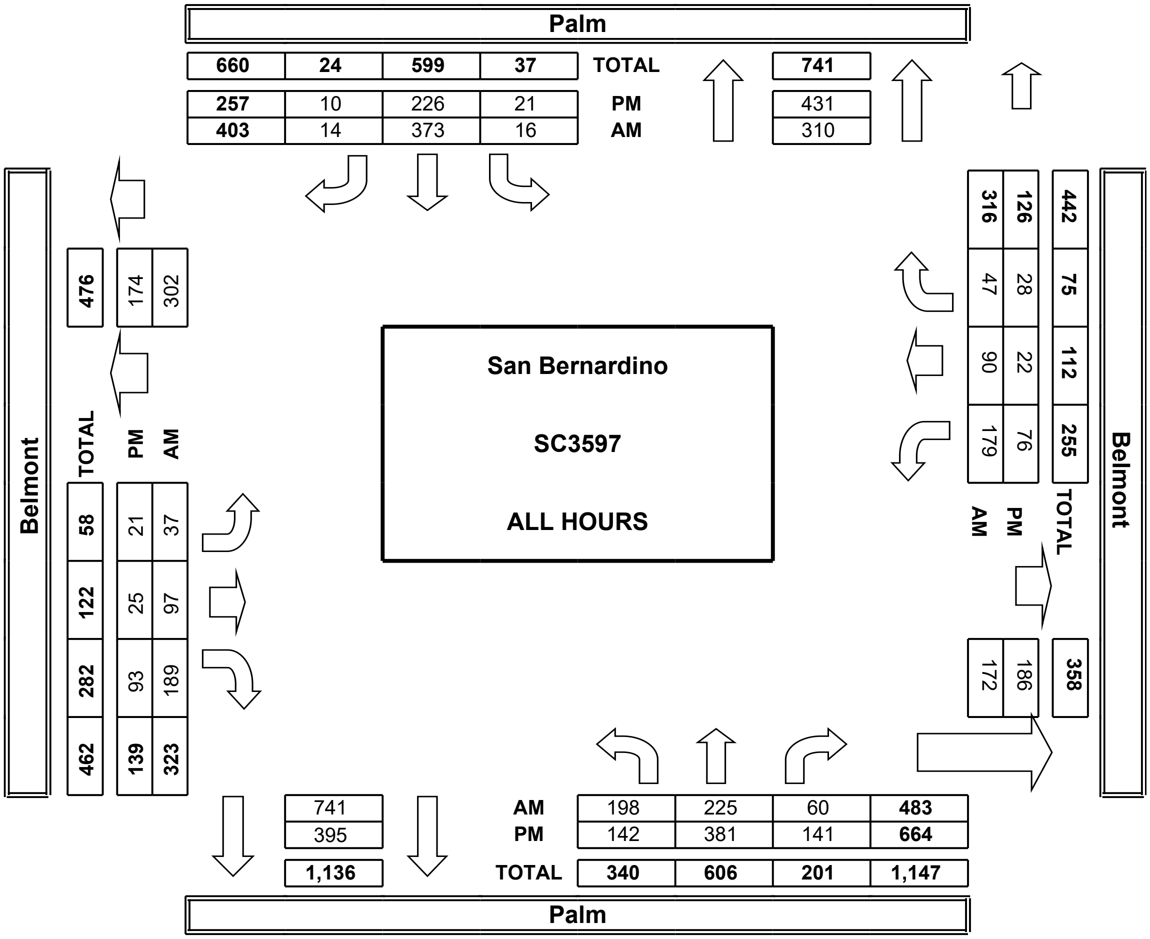
0	0	0	0	0
0	0	0	0	0
0	1	0	0	1

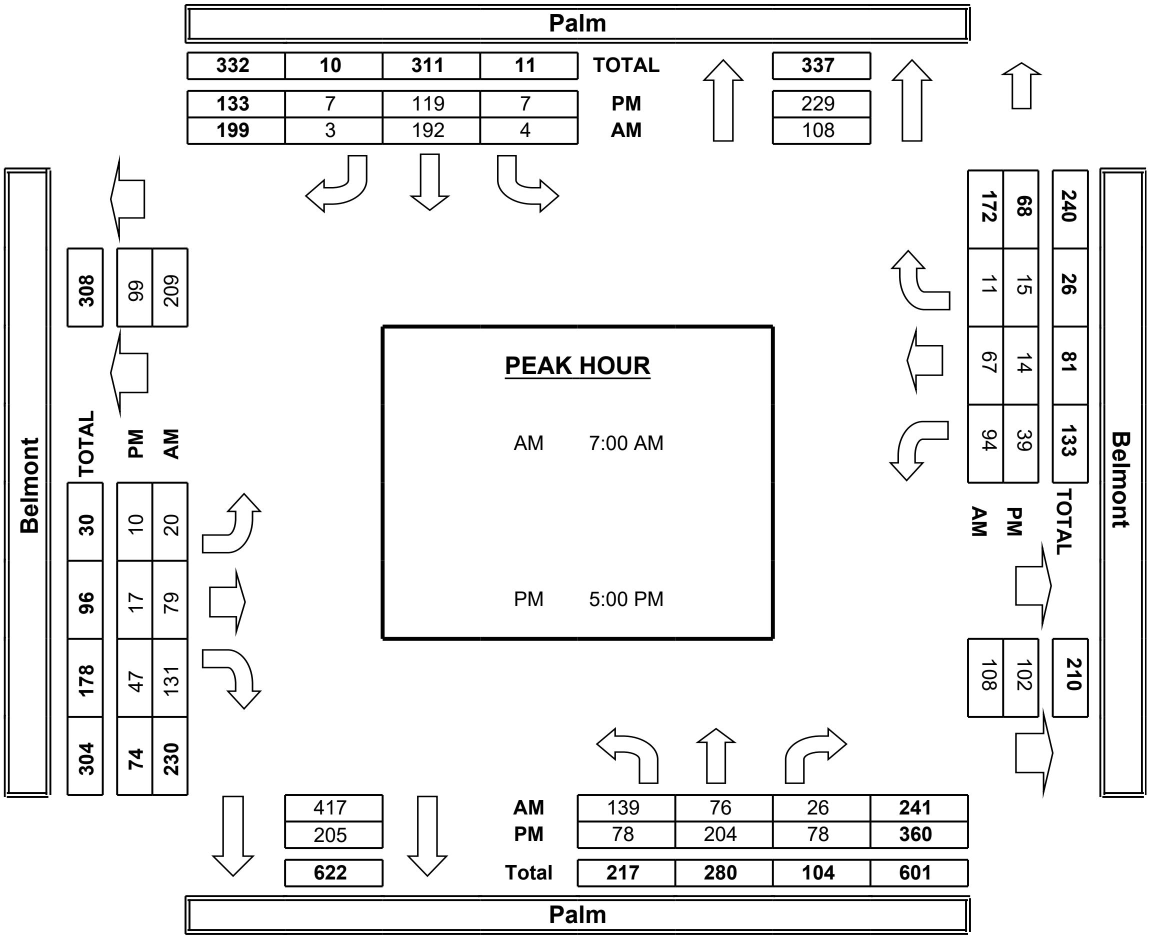


		PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	2	1	0	1	4	2	1	0	0	3	0	0	0	1	1
	7:15 AM	4	0	0	1	5	3	0	0	1	4	1	0	0	0	1
	7:30 AM	1	0	1	1	3	1	0	1	1	3	0	0	0	0	0
	7:45 AM	2	0	0	0	2	2	0	0	0	2	0	0	0	0	0
	8:00 AM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
	8:15 AM	4	0	1	1	6	4	0	1	1	6	0	0	0	0	0
	8:30 AM	3	0	2	0	5	3	0	2	0	5	0	0	0	0	0
	8:45 AM	5	1	4	0	10	5	1	4	0	10	0	0	0	0	0
	TOTAL	21	2	9	4	36	20	2	9	3	34	1	0	0	1	2
	AM BEGIN PEAK HR			7:00 AM			8	1	1	2	12					
PM	4:00 PM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
	4:15 PM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
	4:30 PM	0	0	2	0	2	0	0	2	0	2	0	0	0	0	0
	4:45 PM	1	0	1	1	3	1	0	1	1	3	0	0	0	0	0
	5:00 PM	0	0	0	3	3	0	0	0	3	3	0	0	0	0	0
	5:15 PM	0	0	2	0	2	0	0	2	0	2	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	1	0	7	4	12	1	0	7	4	12	0	0	0	0	0
	PM BEGIN PEAK HR			5:00 PM			0	0	2	3	5					

AimTD LLC

TURNING MOVEMENT COUNTS





APPENDIX E

HCM ANALYSIS WORKSHEETS

EXISTING (2022) CONDITIONS

TTM 20539

Vistro File: C:\...\SDE22001 Base.vistro
Report File: C:\...\E AM.pdf

Scenario 1 E AM
3/28/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Magnolia Ave/Meyers Rd	All-way stop	HCM 6th Edition	NB Left	0.260	8.5	A
2	Little League Dr/Meyers Rd	Two-way stop	HCM 6th Edition	WB Thru	0.008	11.5	B
3	Little League Dr/Belmont Ave	All-way stop	HCM 6th Edition	SB Thru	0.375	10.3	B
4	Magnolia Ave/Belmont Ave	All-way stop	HCM 6th Edition	WB Left	0.512	11.9	B
5	Palm Ave/Belmont Ave	All-way stop	HCM 6th Edition	NB Left	0.567	15.9	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Magnolia Ave/Meyers Rd

Control Type:	All-way stop	Delay (sec / veh):	8.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.260

Intersection Setup

Name	Magnolia Avenue			Magnolia Avenue			Meyers Road			Meyers Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✛			✛			✛			✛		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Magnolia Avenue			Magnolia Avenue			Meyers Road			Meyers Road		
Base Volume Input [veh/h]	56	14	1	0	29	14	12	8	91	4	6	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	56	14	1	0	29	14	12	8	91	4	6	0
Peak Hour Factor	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	7	1	0	15	7	6	4	48	2	3	0
Total Analysis Volume [veh/h]	117	29	2	0	61	29	25	17	190	8	13	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	765	811	894	750
Degree of Utilization, x	0.19	0.11	0.26	0.03

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.71	0.37	1.04	0.09
95th-Percentile Queue Length [ft]	17.83	9.33	25.96	2.16
Approach Delay [s/veh]	8.83	7.99	8.43	7.94
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	8.45			
Intersection LOS	A			

Intersection Level Of Service Report

Intersection 2: Little League Dr/Meyers Rd

Control Type:	Two-way stop	Delay (sec / veh):	11.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.008

Intersection Setup

Name	Little League Drive			Little League Drive			Meyers Road			Meyers Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✛			✛			✛			✛		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Little League Drive			Little League Drive			Meyers Road			Meyers Road		
Base Volume Input [veh/h]	50	8	105	2	11	1	0	7	24	57	4	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	50	8	105	2	11	1	0	7	24	57	4	1
Peak Hour Factor	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	3	35	1	4	0	0	2	8	19	1	0
Total Analysis Volume [veh/h]	67	11	142	3	15	1	0	9	32	77	5	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.12	0.01	0.00
d_M, Delay for Movement [s/veh]	7.33	0.00	0.00	7.51	0.00	0.00	10.43	11.40	8.56	11.39	11.49	9.48
Movement LOS	A	A	A	A	A	A	B	B	A	B	B	A
95th-Percentile Queue Length [veh/ln]	0.13	0.13	0.13	0.01	0.01	0.01	0.14	0.14	0.14	0.44	0.44	0.44
95th-Percentile Queue Length [ft/ln]	3.24	3.24	3.24	0.16	0.16	0.16	3.57	3.57	3.57	10.96	10.96	10.96
d_A, Approach Delay [s/veh]	2.23			1.19			9.18			11.37		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	5.05											
Intersection LOS	B											

Intersection Level Of Service Report

Intersection 3: Little League Dr/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	10.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.375

Intersection Setup

Name	Little League Drive			Little League Drive			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┤┌			╋			╋			╋		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Little League Drive			Little League Drive			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	4	123	22	22	130	0	0	4	5	28	3	79
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	123	22	22	130	0	0	4	5	28	3	79
Peak Hour Factor	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	55	10	10	58	0	0	2	2	13	1	36
Total Analysis Volume [veh/h]	7	221	40	40	234	0	0	7	9	50	5	142
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	674	779	730	692	742
Degree of Utilization, x	0.34	0.05	0.38	0.02	0.27

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.49	0.16	1.75	0.07	1.07
95th-Percentile Queue Length [ft]	37.35	4.05	43.68	1.78	26.70
Approach Delay [s/veh]	10.27		10.86	8.33	9.60
Approach LOS	B		B	A	A
Intersection Delay [s/veh]	10.27				
Intersection LOS	B				

Intersection Level Of Service Report

Intersection 4: Magnolia Ave/Belmont Ave

Control Type: All-way stop
Analysis Method: HCM 6th Edition
Analysis Period: 15 minutes
Delay (sec / veh): 11.9
Level Of Service: B
Volume to Capacity (v/c): 0.512

Intersection Setup

Name	Magnolia Avenue			Magnolia Avenue			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✛			✛			✛			✛		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Magnolia Avenue			Magnolia Avenue			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	18	20	129	26	46	19	9	34	53	166	27	17
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	18	20	129	26	46	19	9	34	53	166	27	17
Peak Hour Factor	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	8	52	11	19	8	4	14	22	67	11	7
Total Analysis Volume [veh/h]	29	32	209	42	75	31	15	55	86	269	44	28
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	707	636	678	667
Degree of Utilization, x	0.38	0.23	0.23	0.51

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.80	0.90	0.88	2.93
95th-Percentile Queue Length [ft]	44.88	22.42	22.11	73.32
Approach Delay [s/veh]	11.21	10.37	9.89	13.93
Approach LOS	B	B	A	B
Intersection Delay [s/veh]	11.86			
Intersection LOS	B			

Intersection Level Of Service Report
Intersection 5: Palm Ave/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	15.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.567

Intersection Setup

Name	Palm Avenue			Palm Avenue			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┫┏			╋			╋			╋		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Palm Avenue			Palm Avenue			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	139	76	26	4	192	3	20	79	131	94	67	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	139	76	26	4	192	3	20	79	131	94	67	11
Peak Hour Factor	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	46	25	9	1	64	1	7	26	44	31	22	4
Total Analysis Volume [veh/h]	186	101	35	5	256	4	27	105	175	126	89	15
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	507	594	552	593	543
Degree of Utilization, x	0.57	0.06	0.48	0.52	0.42

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	3.48	0.19	2.59	2.98	2.09
95th-Percentile Queue Length [ft]	87.10	4.69	64.67	74.40	52.27
Approach Delay [s/veh]	17.67		15.41	15.42	14.40
Approach LOS	C		C	C	B
Intersection Delay [s/veh]	15.85				
Intersection LOS	C				

TTM 20539

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Report File: C:\...\E PM.pdf

Scenario 2 E PM
3/28/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Magnolia Ave/Meyers Rd	All-way stop	HCM 6th Edition	NB Left	0.077	7.2	A
2	Little League Dr/Meyers Rd	Two-way stop	HCM 6th Edition	EB Thru	0.004	9.8	A
3	Little League Dr/Belmont Ave	All-way stop	HCM 6th Edition	NB Thru	0.096	7.5	A
4	Magnolia Ave/Belmont Ave	All-way stop	HCM 6th Edition	SB Thru	0.075	7.4	A
5	Palm Ave/Belmont Ave	All-way stop	HCM 6th Edition	NB Thru	0.487	10.6	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Magnolia Ave/Meyers Rd

Control Type: All-way stop
Analysis Method: HCM 6th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 7.2
Level Of Service: A
Volume to Capacity (v/c): 0.077

Intersection Setup

Name	Magnolia Avenue			Magnolia Avenue			Meyers Road			Meyers Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✛			✛			✛			✛		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Magnolia Avenue			Magnolia Avenue			Meyers Road			Meyers Road		
Base Volume Input [veh/h]	27	16	8	0	27	4	11	4	29	2	1	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	16	8	0	27	4	11	4	29	2	1	0
Peak Hour Factor	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	5	3	0	9	1	4	1	10	1	0	0
Total Analysis Volume [veh/h]	36	21	11	0	36	5	15	5	39	3	1	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	883	895	950	830
Degree of Utilization, x	0.08	0.05	0.06	0.00

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.25	0.14	0.20	0.01
95th-Percentile Queue Length [ft]	6.24	3.59	4.96	0.36
Approach Delay [s/veh]	7.41	7.21	7.04	7.36
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	7.24			
Intersection LOS	A			

Intersection Level Of Service Report

Intersection 2: Little League Dr/Meyers Rd

Control Type:	Two-way stop	Delay (sec / veh):	9.8
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.004

Intersection Setup

Name	Little League Drive			Little League Drive			Meyers Road			Meyers Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✚			✚			✚			✚		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Little League Drive			Little League Drive			Meyers Road			Meyers Road		
Base Volume Input [veh/h]	36	4	35	1	4	0	0	3	8	26	1	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	36	4	35	1	4	0	0	3	8	26	1	0
Peak Hour Factor	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	1	9	0	1	0	0	1	2	7	0	0
Total Analysis Volume [veh/h]	38	4	37	1	4	0	0	3	8	27	1	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00
d_M, Delay for Movement [s/veh]	7.26	0.00	0.00	7.28	0.00	0.00	9.22	9.83	8.36	9.39	9.82	8.54
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.07	0.00	0.00	0.00	0.03	0.03	0.03	0.10	0.10	0.10
95th-Percentile Queue Length [ft/ln]	1.79	1.79	1.79	0.05	0.05	0.05	0.86	0.86	0.86	2.57	2.57	2.57
d_A, Approach Delay [s/veh]	3.49			1.46			8.76			9.41		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	5.23											
Intersection LOS	A											

Intersection Level Of Service Report
Intersection 3: Little League Dr/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	7.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.096

Intersection Setup

Name	Little League Drive			Little League Drive			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┤┌			┼			┼			┼		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Little League Drive			Little League Drive			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	3	59	32	11	38	1	0	3	6	17	0	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	59	32	11	38	1	0	3	6	17	0	16
Peak Hour Factor	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	17	9	3	11	0	0	1	2	5	0	5
Total Analysis Volume [veh/h]	4	70	38	13	45	1	0	4	7	20	0	19
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	769	912	846	915	879
Degree of Utilization, x	0.10	0.04	0.07	0.01	0.04

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.32	0.13	0.22	0.04	0.14
95th-Percentile Queue Length [ft]	7.95	3.26	5.61	0.91	3.48
Approach Delay [s/veh]	7.52		7.57	6.98	7.29
Approach LOS	A		A	A	A
Intersection Delay [s/veh]	7.46				
Intersection LOS	A				

Intersection Level Of Service Report

Intersection 4: Magnolia Ave/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	7.4
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.075

Intersection Setup

Name	Magnolia Avenue			Magnolia Avenue			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✛			✛			✛			✛		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Magnolia Avenue			Magnolia Avenue			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	8	16	3	20	30	8	16	24	10	10	21	20
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	16	3	20	30	8	16	24	10	10	21	20
Peak Hour Factor	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	4	1	6	8	2	4	7	3	3	6	6
Total Analysis Volume [veh/h]	9	18	3	22	34	9	18	27	11	11	23	22
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	857	867	877	908
Degree of Utilization, x	0.04	0.07	0.06	0.06

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.11	0.24	0.20	0.20
95th-Percentile Queue Length [ft]	2.72	6.06	5.11	4.92
Approach Delay [s/veh]	7.36	7.49	7.39	7.23
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	7.37			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 5: Palm Ave/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	10.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.487

Intersection Setup

Name	Palm Avenue			Palm Avenue			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↰↑ ↱			↰↑↱			↰↑↱			↰↑↱		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Palm Avenue			Palm Avenue			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	78	204	78	7	119	7	10	17	47	39	14	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	78	204	78	7	119	7	10	17	47	39	14	15
Peak Hour Factor	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	23	60	23	2	35	2	3	5	14	12	4	4
Total Analysis Volume [veh/h]	92	242	92	8	141	8	12	20	56	46	17	18
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	686	817	728	714	669
Degree of Utilization, x	0.49	0.11	0.22	0.12	0.12

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	2.68	0.38	0.81	0.42	0.41
95th-Percentile Queue Length [ft]	67.12	9.48	20.36	10.49	10.28
Approach Delay [s/veh]	11.72		9.29	8.75	9.12
Approach LOS	B		A	A	A
Intersection Delay [s/veh]	10.58				
Intersection LOS	B				

OPENING YEAR (2023) CONDITIONS

TTM 20539

Vistro File: C:\...\SDE22001 Base.vistro
Report File: C:\...\OY AM.pdf

Scenario 3 OY AM
3/28/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Magnolia Ave/Meyers Rd	All-way stop	HCM 6th Edition	NB Left	0.266	8.5	A
2	Little League Dr/Meyers Rd	Two-way stop	HCM 6th Edition	WB Thru	0.008	11.6	B
3	Little League Dr/Belmont Ave	All-way stop	HCM 6th Edition	SB Thru	0.384	10.4	B
4	Magnolia Ave/Belmont Ave	All-way stop	HCM 6th Edition	WB Left	0.525	12.1	B
5	Palm Ave/Belmont Ave	All-way stop	HCM 6th Edition	NB Left	0.588	16.6	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Magnolia Ave/Meyers Rd

Control Type:	All-way stop	Delay (sec / veh):	8.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.266

Intersection Setup

Name	Magnolia Avenue			Magnolia Avenue			Meyers Road			Meyers Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✛			✛			✛			✛		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Magnolia Avenue			Magnolia Avenue			Meyers Road			Meyers Road		
Base Volume Input [veh/h]	56	14	1	0	29	14	12	8	91	4	6	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	57	14	1	0	30	14	12	8	93	4	6	0
Peak Hour Factor	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	30	7	1	0	16	7	6	4	49	2	3	0
Total Analysis Volume [veh/h]	119	29	2	0	63	29	25	17	195	8	13	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	763	807	892	747
Degree of Utilization, x	0.20	0.11	0.27	0.03

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.73	0.38	1.07	0.09
95th-Percentile Queue Length [ft]	18.20	9.61	26.79	2.17
Approach Delay [s/veh]	8.88	8.03	8.49	7.96
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	8.50			
Intersection LOS	A			

Intersection Level Of Service Report

Intersection 2: Little League Dr/Meyers Rd

Control Type:	Two-way stop	Delay (sec / veh):	11.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.008

Intersection Setup

Name	Little League Drive			Little League Drive			Meyers Road			Meyers Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✚			✚			✚			✚		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Little League Drive			Little League Drive			Meyers Road			Meyers Road		
Base Volume Input [veh/h]	50	8	105	2	11	1	0	7	24	57	4	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	51	8	107	2	11	1	0	7	24	58	4	1
Peak Hour Factor	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	3	36	1	4	0	0	2	8	20	1	0
Total Analysis Volume [veh/h]	69	11	144	3	15	1	0	9	32	78	5	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.12	0.01	0.00
d_M, Delay for Movement [s/veh]	7.33	0.00	0.00	7.51	0.00	0.00	10.48	11.46	8.56	11.47	11.56	9.51
Movement LOS	A	A	A	A	A	A	B	B	A	B	B	A
95th-Percentile Queue Length [veh/ln]	0.13	0.13	0.13	0.01	0.01	0.01	0.14	0.14	0.14	0.45	0.45	0.45
95th-Percentile Queue Length [ft/ln]	3.35	3.35	3.35	0.16	0.16	0.16	3.58	3.58	3.58	11.22	11.22	11.22
d_A, Approach Delay [s/veh]	2.26			1.19			9.19			11.45		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	5.07											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 3: Little League Dr/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	10.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.384

Intersection Setup

Name	Little League Drive			Little League Drive			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┫┏			╋			╋			╋		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Little League Drive			Little League Drive			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	4	123	22	22	130	0	0	4	5	28	3	79
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	125	22	22	133	0	0	4	5	29	3	81
Peak Hour Factor	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	56	10	10	60	0	0	2	2	13	1	36
Total Analysis Volume [veh/h]	7	225	40	40	239	0	0	7	9	52	5	146
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	671	775	727	686	738
Degree of Utilization, x	0.35	0.05	0.38	0.02	0.28

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.54	0.16	1.81	0.07	1.12
95th-Percentile Queue Length [ft]	38.59	4.08	45.29	1.79	28.01
Approach Delay [s/veh]	10.40		11.01	8.37	9.72
Approach LOS	B		B	A	A
Intersection Delay [s/veh]	10.40				
Intersection LOS	B				

Intersection Level Of Service Report

Intersection 4: Magnolia Ave/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	12.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.525

Intersection Setup

Name	Magnolia Avenue			Magnolia Avenue			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✛			✛			✛			✛		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Magnolia Avenue			Magnolia Avenue			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	18	20	129	26	46	19	9	34	53	166	27	17
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	18	20	132	27	47	19	9	35	54	169	28	17
Peak Hour Factor	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	8	54	11	19	8	4	14	22	69	11	7
Total Analysis Volume [veh/h]	29	32	214	44	76	31	15	57	88	274	45	28
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	701	629	671	661
Degree of Utilization, x	0.39	0.24	0.24	0.52

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.87	0.93	0.92	3.07
95th-Percentile Queue Length [ft]	46.81	23.31	23.12	76.85
Approach Delay [s/veh]	11.42	10.52	10.03	14.30
Approach LOS	B	B	B	B
Intersection Delay [s/veh]	12.11			
Intersection LOS	B			

Intersection Level Of Service Report
Intersection 5: Palm Ave/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	16.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.588

Intersection Setup

Name	Palm Avenue			Palm Avenue			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┫┏			╋			╋			╋		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Palm Avenue			Palm Avenue			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	139	76	26	4	192	3	20	79	131	94	67	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	142	78	27	4	196	3	20	81	134	96	68	11
Peak Hour Factor	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	47	26	9	1	65	1	7	27	45	32	23	4
Total Analysis Volume [veh/h]	190	104	36	5	262	4	27	108	179	128	91	15
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	500	585	543	584	535
Degree of Utilization, x	0.59	0.06	0.50	0.54	0.44

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	3.74	0.20	2.76	3.20	2.21
95th-Percentile Queue Length [ft]	93.53	4.91	69.10	79.88	55.20
Approach Delay [s/veh]	18.54		16.05	16.14	14.88
Approach LOS	C		C	C	B
Intersection Delay [s/veh]	16.55				
Intersection LOS	C				

TTM 20539

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Report File: C:\...\OY PM.pdf

Scenario 4 OY PM
3/28/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Magnolia Ave/Meyers Rd	All-way stop	HCM 6th Edition	NB Left	0.078	7.2	A
2	Little League Dr/Meyers Rd	Two-way stop	HCM 6th Edition	EB Thru	0.004	9.9	A
3	Little League Dr/Belmont Ave	All-way stop	HCM 6th Edition	NB Thru	0.097	7.5	A
4	Magnolia Ave/Belmont Ave	All-way stop	HCM 6th Edition	SB Thru	0.076	7.4	A
5	Palm Ave/Belmont Ave	All-way stop	HCM 6th Edition	NB Thru	0.498	10.7	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Magnolia Ave/Meyers Rd

Control Type:	All-way stop	Delay (sec / veh):	7.2
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.078

Intersection Setup

Name	Magnolia Avenue			Magnolia Avenue			Meyers Road			Meyers Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┼			┼			┼			┼		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Magnolia Avenue			Magnolia Avenue			Meyers Road			Meyers Road		
Base Volume Input [veh/h]	27	16	8	0	27	4	11	4	29	2	1	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	16	8	0	28	4	11	4	30	2	1	0
Peak Hour Factor	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	5	3	0	9	1	4	1	10	1	0	0
Total Analysis Volume [veh/h]	37	21	11	0	37	5	15	5	40	3	1	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	882	894	949	829
Degree of Utilization, x	0.08	0.05	0.06	0.00

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.25	0.15	0.20	0.01
95th-Percentile Queue Length [ft]	6.35	3.69	5.05	0.36
Approach Delay [s/veh]	7.43	7.22	7.05	7.36
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	7.25			
Intersection LOS	A			

Intersection Level Of Service Report

Intersection 2: Little League Dr/Meyers Rd

Control Type:	Two-way stop	Delay (sec / veh):	9.9
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.004

Intersection Setup

Name	Little League Drive			Little League Drive			Meyers Road			Meyers Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✚			✚			✚			✚		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Little League Drive			Little League Drive			Meyers Road			Meyers Road		
Base Volume Input [veh/h]	36	4	35	1	4	0	0	3	8	26	1	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	37	4	36	1	4	0	0	3	8	27	1	0
Peak Hour Factor	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	1	9	0	1	0	0	1	2	7	0	0
Total Analysis Volume [veh/h]	39	4	38	1	4	0	0	3	8	28	1	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00
d_M, Delay for Movement [s/veh]	7.26	0.00	0.00	7.28	0.00	0.00	9.24	9.85	8.36	9.42	9.85	8.55
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.07	0.00	0.00	0.00	0.03	0.03	0.03	0.11	0.11	0.11
95th-Percentile Queue Length [ft/ln]	1.84	1.84	1.84	0.05	0.05	0.05	0.86	0.86	0.86	2.67	2.67	2.67
d_A, Approach Delay [s/veh]	3.50			1.46			8.77			9.43		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	5.24											
Intersection LOS	A											

Intersection Level Of Service Report

Intersection 3: Little League Dr/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	7.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.097

Intersection Setup

Name	Little League Drive			Little League Drive			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┫┏			✚			✚			✚		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Little League Drive			Little League Drive			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	3	59	32	11	38	1	0	3	6	17	0	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	60	33	11	39	1	0	3	6	17	0	16
Peak Hour Factor	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	18	10	3	12	0	0	1	2	5	0	5
Total Analysis Volume [veh/h]	4	71	39	13	46	1	0	4	7	20	0	19
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	770	912	846	913	877
Degree of Utilization, x	0.10	0.04	0.07	0.01	0.04

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.32	0.13	0.23	0.04	0.14
95th-Percentile Queue Length [ft]	8.07	3.35	5.71	0.91	3.49
Approach Delay [s/veh]	7.52		7.58	6.99	7.29
Approach LOS	A		A	A	A
Intersection Delay [s/veh]	7.47				
Intersection LOS	A				

Intersection Level Of Service Report

Intersection 4: Magnolia Ave/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	7.4
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.076

Intersection Setup

Name	Magnolia Avenue			Magnolia Avenue			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✛			✛			✛			✛		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Magnolia Avenue			Magnolia Avenue			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	8	16	3	20	30	8	16	24	10	10	21	20
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	16	3	20	31	8	16	24	10	10	21	20
Peak Hour Factor	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	4	1	6	9	2	4	7	3	3	6	6
Total Analysis Volume [veh/h]	9	18	3	22	35	9	18	27	11	11	23	22
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	856	867	876	907
Degree of Utilization, x	0.04	0.08	0.06	0.06

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.11	0.25	0.20	0.20
95th-Percentile Queue Length [ft]	2.72	6.17	5.11	4.93
Approach Delay [s/veh]	7.36	7.49	7.39	7.23
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	7.38			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 5: Palm Ave/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	10.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.498

Intersection Setup

Name	Palm Avenue			Palm Avenue			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┤┌			┼			┼			┼		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Palm Avenue			Palm Avenue			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	78	204	78	7	119	7	10	17	47	39	14	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	80	208	80	7	121	7	10	17	48	40	14	15
Peak Hour Factor	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	24	62	24	2	36	2	3	5	14	12	4	4
Total Analysis Volume [veh/h]	95	246	95	8	143	8	12	20	57	47	17	18
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	684	815	726	710	665
Degree of Utilization, x	0.50	0.12	0.22	0.13	0.12

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	2.80	0.39	0.83	0.43	0.42
95th-Percentile Queue Length [ft]	69.98	9.86	20.80	10.69	10.50
Approach Delay [s/veh]	11.91		9.35	8.80	9.18
Approach LOS	B		A	A	A
Intersection Delay [s/veh]	10.72				
Intersection LOS	B				

OPENING YEAR (2023) CUMULATIVE CONDITIONS

TTM 20539

Vistro File: C:\...\SDE22001 Base.vistro
Report File: C:\...\OYC AM.pdf

Scenario 5 OYC AM
3/28/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Magnolia Ave/Meyers Rd	All-way stop	HCM 6th Edition	NB Left	0.267	8.5	A
2	Little League Dr/Meyers Rd	Two-way stop	HCM 6th Edition	WB Thru	0.008	11.6	B
3	Little League Dr/Belmont Ave	All-way stop	HCM 6th Edition	SB Thru	0.384	10.4	B
4	Magnolia Ave/Belmont Ave	All-way stop	HCM 6th Edition	WB Left	0.528	12.2	B
5	Palm Ave/Belmont Ave	All-way stop	HCM 6th Edition	NB Left	0.592	16.7	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Magnolia Ave/Meyers Rd

Control Type:	All-way stop	Delay (sec / veh):	8.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.267

Intersection Setup

Name	Magnolia Avenue			Magnolia Avenue			Meyers Road			Meyers Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✚			✚			✚			✚		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Magnolia Avenue			Magnolia Avenue			Meyers Road			Meyers Road		
Base Volume Input [veh/h]	56	14	1	0	29	14	12	8	91	4	6	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	1	1	0	1	0	0	0	0	1	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	57	15	2	0	31	14	12	8	93	5	6	0
Peak Hour Factor	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	30	8	1	0	16	7	6	4	49	3	3	0
Total Analysis Volume [veh/h]	119	31	4	0	65	29	25	17	195	10	13	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	763	804	888	742
Degree of Utilization, x	0.20	0.12	0.27	0.03

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.75	0.40	1.08	0.10
95th-Percentile Queue Length [ft]	18.79	9.88	26.94	2.40
Approach Delay [s/veh]	8.91	8.07	8.52	8.00
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	8.53			
Intersection LOS	A			

Intersection Level Of Service Report

Intersection 2: Little League Dr/Meyers Rd

Control Type:	Two-way stop	Delay (sec / veh):	11.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.008

Intersection Setup

Name	Little League Drive			Little League Drive			Meyers Road			Meyers Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✛			✛			✛			✛		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Little League Drive			Little League Drive			Meyers Road			Meyers Road		
Base Volume Input [veh/h]	50	8	105	2	11	1	0	7	24	57	4	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	51	8	107	2	11	1	0	7	24	58	4	1
Peak Hour Factor	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	3	36	1	4	0	0	2	8	20	1	0
Total Analysis Volume [veh/h]	69	11	144	3	15	1	0	9	32	78	5	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.12	0.01	0.00
d_M, Delay for Movement [s/veh]	7.33	0.00	0.00	7.51	0.00	0.00	10.48	11.46	8.56	11.47	11.56	9.51
Movement LOS	A	A	A	A	A	A	B	B	A	B	B	A
95th-Percentile Queue Length [veh/ln]	0.13	0.13	0.13	0.01	0.01	0.01	0.14	0.14	0.14	0.45	0.45	0.45
95th-Percentile Queue Length [ft/ln]	3.35	3.35	3.35	0.16	0.16	0.16	3.58	3.58	3.58	11.22	11.22	11.22
d_A, Approach Delay [s/veh]	2.26			1.19			9.19			11.45		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	5.07											
Intersection LOS	B											

Intersection Level Of Service Report

Intersection 3: Little League Dr/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	10.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.384

Intersection Setup

Name	Little League Drive			Little League Drive			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┤┌			┼			┼			┼		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Little League Drive			Little League Drive			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	4	123	22	22	130	0	0	4	5	28	3	79
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	125	22	22	133	0	0	4	5	29	3	81
Peak Hour Factor	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	56	10	10	60	0	0	2	2	13	1	36
Total Analysis Volume [veh/h]	7	225	40	40	239	0	0	7	9	52	5	146
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	671	775	727	686	738
Degree of Utilization, x	0.35	0.05	0.38	0.02	0.28

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.54	0.16	1.81	0.07	1.12
95th-Percentile Queue Length [ft]	38.59	4.08	45.29	1.79	28.01
Approach Delay [s/veh]	10.40		11.01	8.37	9.72
Approach LOS	B		B	A	A
Intersection Delay [s/veh]	10.40				
Intersection LOS	B				

Intersection Level Of Service Report

Intersection 4: Magnolia Ave/Belmont Ave

Control Type: All-way stop
Analysis Method: HCM 6th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 12.2
Level Of Service: B
Volume to Capacity (v/c): 0.528

Intersection Setup

Name	Magnolia Avenue			Magnolia Avenue			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✛			✛			✛			✛		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Magnolia Avenue			Magnolia Avenue			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	18	20	129	26	46	19	9	34	53	166	27	17
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	0	0	2	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	18	22	132	27	49	19	9	35	54	169	28	17
Peak Hour Factor	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	9	54	11	20	8	4	14	22	69	11	7
Total Analysis Volume [veh/h]	29	36	214	44	80	31	15	57	88	274	45	28
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	697	627	667	658
Degree of Utilization, x	0.40	0.25	0.24	0.53

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.93	0.97	0.93	3.10
95th-Percentile Queue Length [ft]	48.22	24.22	23.31	77.60
Approach Delay [s/veh]	11.56	10.61	10.09	14.43
Approach LOS	B	B	B	B
Intersection Delay [s/veh]	12.21			
Intersection LOS	B			

Intersection Level Of Service Report
Intersection 5: Palm Ave/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	16.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.592

Intersection Setup

Name	Palm Avenue			Palm Avenue			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┫┏			╋			╋			╋		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Palm Avenue			Palm Avenue			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	139	76	26	4	192	3	20	79	131	94	67	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	1	1	0	1	0	0	0	0	1	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	142	79	28	4	197	3	20	81	134	97	68	11
Peak Hour Factor	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	47	26	9	1	66	1	7	27	45	32	23	4
Total Analysis Volume [veh/h]	190	105	37	5	263	4	27	108	179	130	91	15
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	499	583	541	581	533
Degree of Utilization, x	0.59	0.06	0.50	0.54	0.44

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	3.78	0.20	2.80	3.22	2.25
95th-Percentile Queue Length [ft]	94.58	5.07	69.93	80.40	56.23
Approach Delay [s/veh]	18.66		16.17	16.23	15.02
Approach LOS	C		C	C	C
Intersection Delay [s/veh]	16.67				
Intersection LOS	C				

TTM 20539

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Report File: C:\...\OYC PM.pdf

Scenario 6 OYC PM
3/28/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Magnolia Ave/Meyers Rd	All-way stop	HCM 6th Edition	NB Left	0.082	7.3	A
2	Little League Dr/Meyers Rd	Two-way stop	HCM 6th Edition	EB Thru	0.004	9.9	A
3	Little League Dr/Belmont Ave	All-way stop	HCM 6th Edition	NB Thru	0.097	7.5	A
4	Magnolia Ave/Belmont Ave	All-way stop	HCM 6th Edition	SB Thru	0.078	7.4	A
5	Palm Ave/Belmont Ave	All-way stop	HCM 6th Edition	NB Thru	0.502	10.8	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Magnolia Ave/Meyers Rd

Control Type:	All-way stop	Delay (sec / veh):	7.3
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.082

Intersection Setup

Name	Magnolia Avenue			Magnolia Avenue			Meyers Road			Meyers Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✛			✛			✛			✛		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Magnolia Avenue			Magnolia Avenue			Meyers Road			Meyers Road		
Base Volume Input [veh/h]	27	16	8	0	27	4	11	4	29	2	1	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	1	1	0	1	0	0	0	0	1	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	17	9	0	29	4	11	4	30	3	1	0
Peak Hour Factor	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	6	3	0	10	1	4	1	10	1	0	0
Total Analysis Volume [veh/h]	37	23	12	0	39	5	15	5	40	4	1	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	882	893	946	825
Degree of Utilization, x	0.08	0.05	0.06	0.01

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.27	0.16	0.20	0.02
95th-Percentile Queue Length [ft]	6.64	3.88	5.07	0.46
Approach Delay [s/veh]	7.44	7.24	7.06	7.39
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	7.26			
Intersection LOS	A			

Intersection Level Of Service Report

Intersection 2: Little League Dr/Meyers Rd

Control Type:	Two-way stop	Delay (sec / veh):	9.9
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.004

Intersection Setup

Name	Little League Drive			Little League Drive			Meyers Road			Meyers Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✚			✚			✚			✚		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Little League Drive			Little League Drive			Meyers Road			Meyers Road		
Base Volume Input [veh/h]	36	4	35	1	4	0	0	3	8	26	1	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	37	4	36	1	4	0	0	3	8	27	1	0
Peak Hour Factor	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	1	9	0	1	0	0	1	2	7	0	0
Total Analysis Volume [veh/h]	39	4	38	1	4	0	0	3	8	28	1	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00
d_M, Delay for Movement [s/veh]	7.26	0.00	0.00	7.28	0.00	0.00	9.24	9.85	8.36	9.42	9.85	8.55
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.07	0.00	0.00	0.00	0.03	0.03	0.03	0.11	0.11	0.11
95th-Percentile Queue Length [ft/ln]	1.84	1.84	1.84	0.05	0.05	0.05	0.86	0.86	0.86	2.67	2.67	2.67
d_A, Approach Delay [s/veh]	3.50			1.46			8.77			9.43		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	5.24											
Intersection LOS	A											

Intersection Level Of Service Report

Intersection 3: Little League Dr/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	7.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.097

Intersection Setup

Name	Little League Drive			Little League Drive			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↰↑ ↱			↰↑↱			↰↑↱			↰↑↱		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Little League Drive			Little League Drive			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	3	59	32	11	38	1	0	3	6	17	0	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	60	33	11	39	1	0	3	6	17	0	16
Peak Hour Factor	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	18	10	3	12	0	0	1	2	5	0	5
Total Analysis Volume [veh/h]	4	71	39	13	46	1	0	4	7	20	0	19
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	770	912	846	913	877
Degree of Utilization, x	0.10	0.04	0.07	0.01	0.04

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.32	0.13	0.23	0.04	0.14
95th-Percentile Queue Length [ft]	8.07	3.35	5.71	0.91	3.49
Approach Delay [s/veh]	7.52		7.58	6.99	7.29
Approach LOS	A		A	A	A
Intersection Delay [s/veh]	7.47				
Intersection LOS	A				

Intersection Level Of Service Report

Intersection 4: Magnolia Ave/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	7.4
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.078

Intersection Setup

Name	Magnolia Avenue			Magnolia Avenue			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✛			✛			✛			✛		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Magnolia Avenue			Magnolia Avenue			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	8	16	3	20	30	8	16	24	10	10	21	20
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	0	0	2	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	18	3	20	33	8	16	24	10	10	21	20
Peak Hour Factor	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	5	1	6	9	2	4	7	3	3	6	6
Total Analysis Volume [veh/h]	9	20	3	22	37	9	18	27	11	11	23	22
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	856	866	874	905
Degree of Utilization, x	0.04	0.08	0.06	0.06

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.12	0.25	0.20	0.20
95th-Percentile Queue Length [ft]	2.91	6.37	5.12	4.94
Approach Delay [s/veh]	7.37	7.51	7.40	7.24
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	7.39			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 5: Palm Ave/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	10.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.502

Intersection Setup

Name	Palm Avenue			Palm Avenue			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┥┏			╋			╋			╋		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Palm Avenue			Palm Avenue			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	78	204	78	7	119	7	10	17	47	39	14	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	1	1	0	1	0	0	0	0	1	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	80	209	81	7	122	7	10	17	48	41	14	15
Peak Hour Factor	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	24	62	24	2	36	2	3	5	14	12	4	4
Total Analysis Volume [veh/h]	95	248	96	8	145	8	12	20	57	49	17	18
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	683	813	724	708	663
Degree of Utilization, x	0.50	0.12	0.22	0.13	0.13

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	2.84	0.40	0.85	0.43	0.43
95th-Percentile Queue Length [ft]	70.95	10.00	21.19	10.73	10.83
Approach Delay [s/veh]	11.98		9.39	8.82	9.22
Approach LOS	B		A	A	A
Intersection Delay [s/veh]	10.78				
Intersection LOS	B				

OPENING YEAR (2023) CUMULATIVE WITH PROJECT CONDITIONS

TTM 20539

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Scenario 7 OYCP AM
3/28/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Magnolia Ave/Meyers Rd	All-way stop	HCM 6th Edition	NB Left	0.301	8.8	A
2	Little League Dr/Meyers Rd	Two-way stop	HCM 6th Edition	WB Thru	0.011	11.6	B
3	Little League Dr/Belmont Ave	All-way stop	HCM 6th Edition	SB Thru	0.393	10.6	B
4	Magnolia Ave/Belmont Ave	All-way stop	HCM 6th Edition	WB Left	0.541	12.5	B
5	Palm Ave/Belmont Ave	All-way stop	HCM 6th Edition	NB Left	0.602	17.2	C
6	East Project Dwy/Meyers Rd	Two-way stop	HCM 6th Edition	SB Left	0.010	9.6	A
7	West Project Dwy/Meyers Rd	Two-way stop	HCM 6th Edition	SB Left	0.009	9.5	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Magnolia Ave/Meyers Rd

Control Type: All-way stop
Analysis Method: HCM 6th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 8.8
Level Of Service: A
Volume to Capacity (v/c): 0.301

Intersection Setup

Name	Magnolia Avenue			Magnolia Avenue			Meyers Road			Meyers Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✛			✛			✛			✛		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Magnolia Avenue			Magnolia Avenue			Meyers Road			Meyers Road		
Base Volume Input [veh/h]	56	14	1	0	29	14	12	8	91	4	6	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	4	1	1	0	1	0	0	1	13	1	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	61	15	2	0	31	14	12	9	106	5	6	0
Peak Hour Factor	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780	0.4780
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	32	8	1	0	16	7	6	5	55	3	3	0
Total Analysis Volume [veh/h]	128	31	4	0	65	29	25	19	222	10	13	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	751	790	883	732
Degree of Utilization, x	0.22	0.12	0.30	0.03

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.82	0.40	1.27	0.10
95th-Percentile Queue Length [ft]	20.56	10.09	31.80	2.43
Approach Delay [s/veh]	9.12	8.18	8.82	8.08
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	8.77			
Intersection LOS	A			

Intersection Level Of Service Report

Intersection 2: Little League Dr/Meyers Rd

Control Type:	Two-way stop	Delay (sec / veh):	11.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.011

Intersection Setup

Name	Little League Drive			Little League Drive			Meyers Road			Meyers Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✚			✚			✚			✚		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Little League Drive			Little League Drive			Meyers Road			Meyers Road		
Base Volume Input [veh/h]	50	8	105	2	11	1	0	7	24	57	4	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	1	0	0	0	0	0	0	2	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	51	8	108	2	11	1	0	7	24	60	5	1
Peak Hour Factor	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420	0.7420
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	3	36	1	4	0	0	2	8	20	2	0
Total Analysis Volume [veh/h]	69	11	146	3	15	1	0	9	32	81	7	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.13	0.01	0.00
d_M, Delay for Movement [s/veh]	7.33	0.00	0.00	7.51	0.00	0.00	10.51	11.48	8.56	11.54	11.63	9.58
Movement LOS	A	A	A	A	A	A	B	B	A	B	B	A
95th-Percentile Queue Length [veh/ln]	0.13	0.13	0.13	0.01	0.01	0.01	0.14	0.14	0.14	0.48	0.48	0.48
95th-Percentile Queue Length [ft/ln]	3.35	3.35	3.35	0.16	0.16	0.16	3.58	3.58	3.58	12.02	12.02	12.02
d_A, Approach Delay [s/veh]	2.24			1.19			9.20			11.52		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	5.15											
Intersection LOS	B											

Intersection Level Of Service Report

Intersection 3: Little League Dr/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	10.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.393

Intersection Setup

Name	Little League Drive			Little League Drive			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┫┏			╋			╋			╋		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Little League Drive			Little League Drive			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	4	123	22	22	130	0	0	4	5	28	3	79
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	1	1	0	2	0	0	0	0	3	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	126	23	22	135	0	0	4	5	32	3	81
Peak Hour Factor	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560	0.5560
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	57	10	10	61	0	0	2	2	14	1	36
Total Analysis Volume [veh/h]	7	227	41	40	243	0	0	7	9	58	5	146
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	666	768	720	678	729
Degree of Utilization, x	0.35	0.05	0.39	0.02	0.29

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.58	0.17	1.88	0.07	1.18
95th-Percentile Queue Length [ft]	39.53	4.22	46.89	1.81	29.60
Approach Delay [s/veh]	10.52		11.19	8.44	9.91
Approach LOS	B		B	A	A
Intersection Delay [s/veh]	10.56				
Intersection LOS	B				

Intersection Level Of Service Report

Intersection 4: Magnolia Ave/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	12.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.541

Intersection Setup

Name	Magnolia Avenue			Magnolia Avenue			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✛			✛			✛			✛		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Magnolia Avenue			Magnolia Avenue			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	18	20	129	26	46	19	9	34	53	166	27	17
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	0	10	2	3	1	0	0	0	0	3
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	18	22	132	37	49	22	10	35	54	169	28	20
Peak Hour Factor	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160	0.6160
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	9	54	15	20	9	4	14	22	69	11	8
Total Analysis Volume [veh/h]	29	36	214	60	80	36	16	57	88	274	45	32
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	687	621	655	648
Degree of Utilization, x	0.41	0.28	0.25	0.54

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.98	1.16	0.96	3.26
95th-Percentile Queue Length [ft]	49.42	29.03	24.09	81.38
Approach Delay [s/veh]	11.78	11.07	10.29	14.91
Approach LOS	B	B	B	B
Intersection Delay [s/veh]	12.54			
Intersection LOS	B			

Intersection Level Of Service Report
Intersection 5: Palm Ave/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	17.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.602

Intersection Setup

Name	Palm Avenue			Palm Avenue			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┤┌			┼			┼			┼		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Palm Avenue			Palm Avenue			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	139	76	26	4	192	3	20	79	131	94	67	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	1	1	0	1	0	0	3	7	1	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	144	79	28	4	197	3	20	84	141	97	69	11
Peak Hour Factor	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490	0.7490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	48	26	9	1	66	1	7	28	47	32	23	4
Total Analysis Volume [veh/h]	192	105	37	5	263	4	27	112	188	130	92	15
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	494	576	535	578	527
Degree of Utilization, x	0.60	0.06	0.51	0.57	0.45

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	3.91	0.21	2.86	3.52	2.30
95th-Percentile Queue Length [ft]	97.73	5.13	71.44	87.93	57.61
Approach Delay [s/veh]	19.18		16.50	17.04	15.29
Approach LOS	C		C	C	C
Intersection Delay [s/veh]	17.17				
Intersection LOS	C				

Intersection Level Of Service Report
Intersection 6: East Project Dwy/Meyers Rd

Control Type:	Two-way stop	Delay (sec / veh):	9.6
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.010

Intersection Setup

Name	West Project Driveway		Meyers Road		Meyers Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration	┬		┤		├	
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	West Project Driveway		Meyers Road		Meyers Road	
Base Volume Input [veh/h]	0	0	0	111	62	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	7	1	0	7	2	2
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	1	0	0	0	14	1
Total Hourly Volume [veh/h]	8	1	0	118	78	3
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	0	0	30	20	1
Total Analysis Volume [veh/h]	8	1	0	118	78	3
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.57	8.70	7.35	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.03	0.03	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.84	0.84	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.48		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.41					
Intersection LOS	A					

Intersection Level Of Service Report

Intersection 7: West Project Dwy/Meyers Rd

Control Type:	Two-way stop	Delay (sec / veh):	9.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.009

Intersection Setup

Name	East Project Driveway		Meyers Road		Meyers Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration	┳		┫		┣	
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	East Project Driveway		Meyers Road		Meyers Road	
Base Volume Input [veh/h]	0	0	0	111	62	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	7	1	0	0	1	2
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	14	0
Total Hourly Volume [veh/h]	7	1	0	111	77	2
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	0	0	28	19	1
Total Analysis Volume [veh/h]	7	1	0	111	77	2
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.52	8.69	7.35	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.03	0.03	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.74	0.74	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.41		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.38					
Intersection LOS	A					

TTM 20539

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Scenario 8 OYCP PM
3/28/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Magnolia Ave/Meyers Rd	All-way stop	HCM 6th Edition	NB Left	0.108	7.4	A
2	Little League Dr/Meyers Rd	Two-way stop	HCM 6th Edition	EB Thru	0.005	9.9	A
3	Little League Dr/Belmont Ave	All-way stop	HCM 6th Edition	NB Thru	0.100	7.5	A
4	Magnolia Ave/Belmont Ave	All-way stop	HCM 6th Edition	SB Thru	0.090	7.4	A
5	Palm Ave/Belmont Ave	All-way stop	HCM 6th Edition	NB Thru	0.520	11.0	B
6	East Project Dwy/Meyers Rd	Two-way stop	HCM 6th Edition	SB Left	0.006	9.0	A
7	West Project Dwy/Meyers Rd	Two-way stop	HCM 6th Edition	SB Left	0.005	8.9	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Magnolia Ave/Meyers Rd

Control Type:	All-way stop	Delay (sec / veh):	7.4
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.108

Intersection Setup

Name	Magnolia Avenue			Magnolia Avenue			Meyers Road			Meyers Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	╋			╋			╋			╋		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Magnolia Avenue			Magnolia Avenue			Meyers Road			Meyers Road		
Base Volume Input [veh/h]	27	16	8	0	27	4	11	4	29	2	1	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	16	1	1	0	1	0	0	1	8	1	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	44	17	9	0	29	4	11	5	38	3	2	0
Peak Hour Factor	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	6	3	0	10	1	4	2	13	1	1	0
Total Analysis Volume [veh/h]	59	23	12	0	39	5	15	7	51	4	3	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	866	881	940	821
Degree of Utilization, x	0.11	0.05	0.08	0.01

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.36	0.16	0.25	0.03
95th-Percentile Queue Length [ft]	9.09	3.94	6.30	0.64
Approach Delay [s/veh]	7.66	7.30	7.15	7.42
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	7.41			
Intersection LOS	A			

Intersection Level Of Service Report

Intersection 2: Little League Dr/Meyers Rd

Control Type:	Two-way stop	Delay (sec / veh):	9.9
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.005

Intersection Setup

Name	Little League Drive			Little League Drive			Meyers Road			Meyers Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✛			✛			✛			✛		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Little League Drive			Little League Drive			Meyers Road			Meyers Road		
Base Volume Input [veh/h]	36	4	35	1	4	0	0	3	8	26	1	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	2	0	0	0	0	1	0	1	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	37	4	38	1	4	0	0	4	8	28	2	0
Peak Hour Factor	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520	0.9520
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	1	10	0	1	0	0	1	2	7	1	0
Total Analysis Volume [veh/h]	39	4	40	1	4	0	0	4	8	29	2	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.03	0.00	0.00
d_M, Delay for Movement [s/veh]	7.26	0.00	0.00	7.28	0.00	0.00	9.26	9.87	8.37	9.44	9.87	8.57
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.07	0.00	0.00	0.00	0.04	0.04	0.04	0.12	0.12	0.12
95th-Percentile Queue Length [ft/ln]	1.84	1.84	1.84	0.05	0.05	0.05	0.97	0.97	0.97	2.88	2.88	2.88
d_A, Approach Delay [s/veh]	3.41			1.46			8.87			9.47		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	5.27											
Intersection LOS	A											

Intersection Level Of Service Report
Intersection 3: Little League Dr/Belmont Ave

Control Type: All-way stop
Analysis Method: HCM 6th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 7.5
Level Of Service: A
Volume to Capacity (v/c): 0.100

Intersection Setup

Name	Little League Drive			Little League Drive			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┫┏			╋			╋			╋		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Little League Drive			Little League Drive			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	3	59	32	11	38	1	0	3	6	17	0	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	4	0	1	0	0	0	0	2	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	62	37	11	40	1	0	3	6	19	0	16
Peak Hour Factor	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450	0.8450
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	18	11	3	12	0	0	1	2	6	0	5
Total Analysis Volume [veh/h]	4	73	44	13	47	1	0	4	7	22	0	19
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	769	910	843	909	870
Degree of Utilization, x	0.10	0.05	0.07	0.01	0.05

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.33	0.15	0.23	0.04	0.15
95th-Percentile Queue Length [ft]	8.31	3.80	5.83	0.92	3.71
Approach Delay [s/veh]	7.52		7.60	7.01	7.34
Approach LOS	A		A	A	A
Intersection Delay [s/veh]	7.49				
Intersection LOS	A				

Intersection Level Of Service Report

Intersection 4: Magnolia Ave/Belmont Ave

Control Type:	All-way stop	Delay (sec / veh):	7.4
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.090

Intersection Setup

Name	Magnolia Avenue			Magnolia Avenue			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✛			✛			✛			✛		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Magnolia Avenue			Magnolia Avenue			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	8	16	3	20	30	8	16	24	10	10	21	20
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	0	6	2	2	4	0	0	0	0	12
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	18	3	26	33	10	20	24	10	10	21	32
Peak Hour Factor	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940	0.8940
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	5	1	7	9	3	6	7	3	3	6	9
Total Analysis Volume [veh/h]	9	20	3	29	37	11	22	27	11	11	23	36
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	846	858	863	917
Degree of Utilization, x	0.04	0.09	0.07	0.08

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.12	0.29	0.22	0.25
95th-Percentile Queue Length [ft]	2.94	7.37	5.59	6.18
Approach Delay [s/veh]	7.42	7.61	7.48	7.25
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	7.45			
Intersection LOS	A			

Intersection Level Of Service Report

Intersection 5: Palm Ave/Belmont Ave

Control Type: All-way stop
Analysis Method: HCM 6th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 11.0
Level Of Service: B
Volume to Capacity (v/c): 0.520

Intersection Setup

Name	Palm Avenue			Palm Avenue			Belmont Avenue			Belmont Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┤┌			┼			┼			┼		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Palm Avenue			Palm Avenue			Belmont Avenue			Belmont Avenue		
Base Volume Input [veh/h]	78	204	78	7	119	7	10	17	47	39	14	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	8	1	1	0	1	0	0	2	4	1	4	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	88	209	81	7	122	7	10	19	52	41	18	15
Peak Hour Factor	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440	0.8440
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	26	62	24	2	36	2	3	6	15	12	5	4
Total Analysis Volume [veh/h]	104	248	96	8	145	8	12	23	62	49	21	18
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	677	806	716	702	656
Degree of Utilization, x	0.52	0.12	0.22	0.14	0.13

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	3.03	0.40	0.86	0.48	0.46
95th-Percentile Queue Length [ft]	75.70	10.10	21.50	11.95	11.54
Approach Delay [s/veh]	12.39		9.48	8.95	9.33
Approach LOS	B		A	A	A
Intersection Delay [s/veh]	11.04				
Intersection LOS	B				

Intersection Level Of Service Report

Intersection 6: East Project Dwy/Meyers Rd

Control Type: Two-way stop
Analysis Method: HCM 6th Edition
Analysis Period: 15 minutes
Delay (sec / veh): 9.0
Level Of Service: A
Volume to Capacity (v/c): 0.006

Intersection Setup

Name	West Project Driveway		Meyers Road		Meyers Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration	┬		┤		├	
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	West Project Driveway		Meyers Road		Meyers Road	
Base Volume Input [veh/h]	0	0	0	44	27	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	1	1	5	9	9
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	5	0
Total Hourly Volume [veh/h]	5	1	1	49	41	9
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	0	12	10	2
Total Analysis Volume [veh/h]	5	1	1	49	41	9
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.99	8.52	7.30	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.02	0.02	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.49	0.49	0.05	0.05	0.00	0.00
d_A, Approach Delay [s/veh]	8.92		0.15		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.57					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 7: West Project Dwy/Meyers Rd

Control Type:	Two-way stop	Delay (sec / veh):	8.9
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.005

Intersection Setup

Name	East Project Driveway		Meyers Road		Meyers Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration	┬		┤		├	
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	East Project Driveway		Meyers Road		Meyers Road	
Base Volume Input [veh/h]	0	0	0	44	27	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	1	1	1	1	9
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	5	0
Total Hourly Volume [veh/h]	5	1	1	45	33	9
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	0	11	8	2
Total Analysis Volume [veh/h]	5	1	1	45	33	9
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.93	8.48	7.28	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.02	0.02	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.48	0.48	0.05	0.05	0.00	0.00
d_A, Approach Delay [s/veh]	8.86		0.16		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.64					
Intersection LOS	A					

SIGNAL WARRANTS

PEAK HOUR VOLUME WARRANT
URBAN CONDITIONS

Peak Hour: AM

Scenario: OYCP

Major Street: Magnolia Avenue

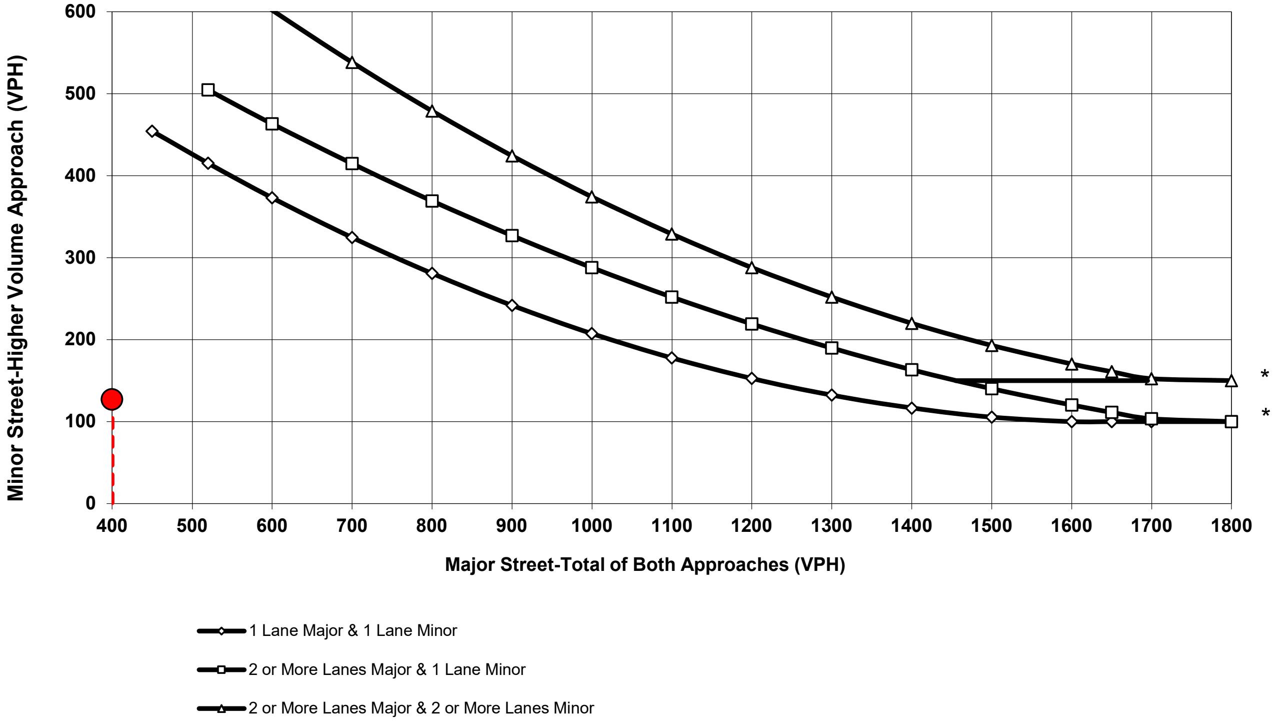
Minor Street: Meyers Road

Total of Both Approaches (VPH): 123
Number of Approach Lanes: 1

Higher Volume Approach (VPH): 127
Number of Approach Lanes: 1

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2014 California Supplement Including Revision 3 (March 9, 2018)

OYCP Conditions
AM Peak Hour Volume Warrant
Magnolia Avenue / Meyers Road

PEAK HOUR VOLUME WARRANT
URBAN CONDITIONS

Peak Hour: PM

Scenario: OYCP

Major Street: Magnolia Avenue

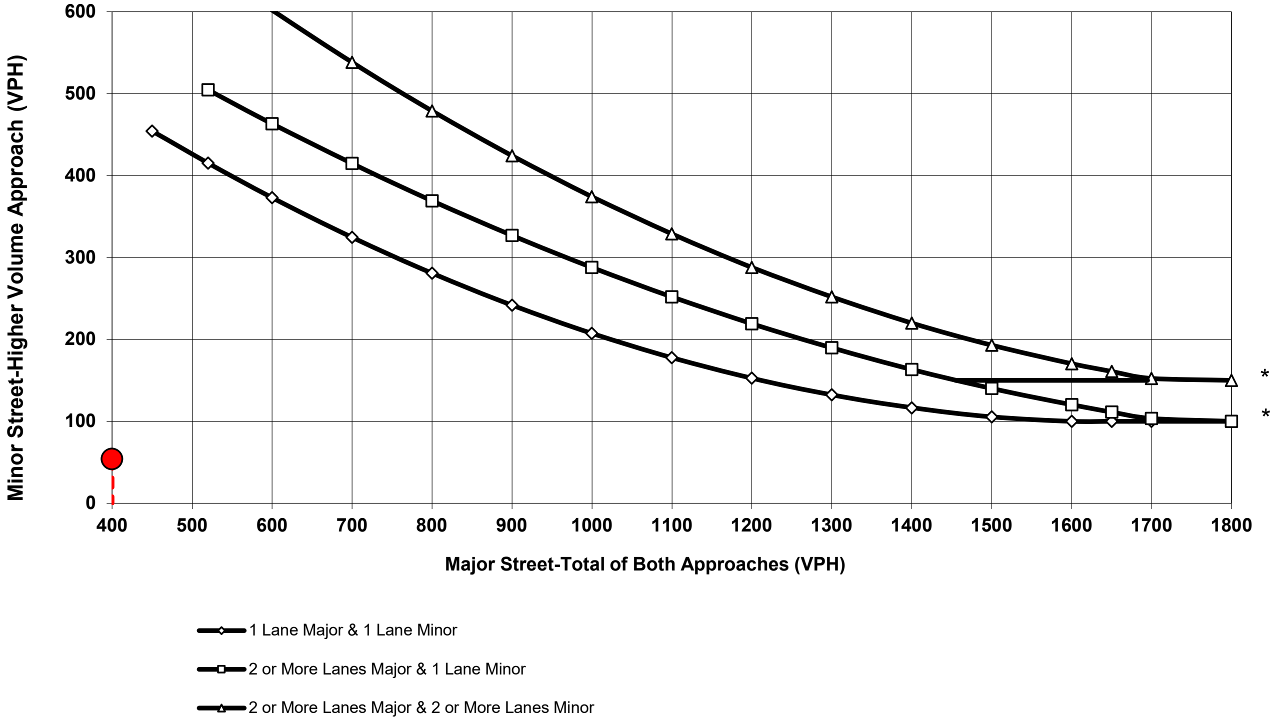
Minor Street: Meyers Road

Total of Both Approaches (VPH): 103
Number of Approach Lanes: 1

Higher Volume Approach (VPH): 54
Number of Approach Lanes: 1

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2014 California Supplement Including Revision 3 (March 9, 2018)

OYCP Conditions
PM Peak Hour Volume Warrant
Magnolia Avenue / Meyers Road

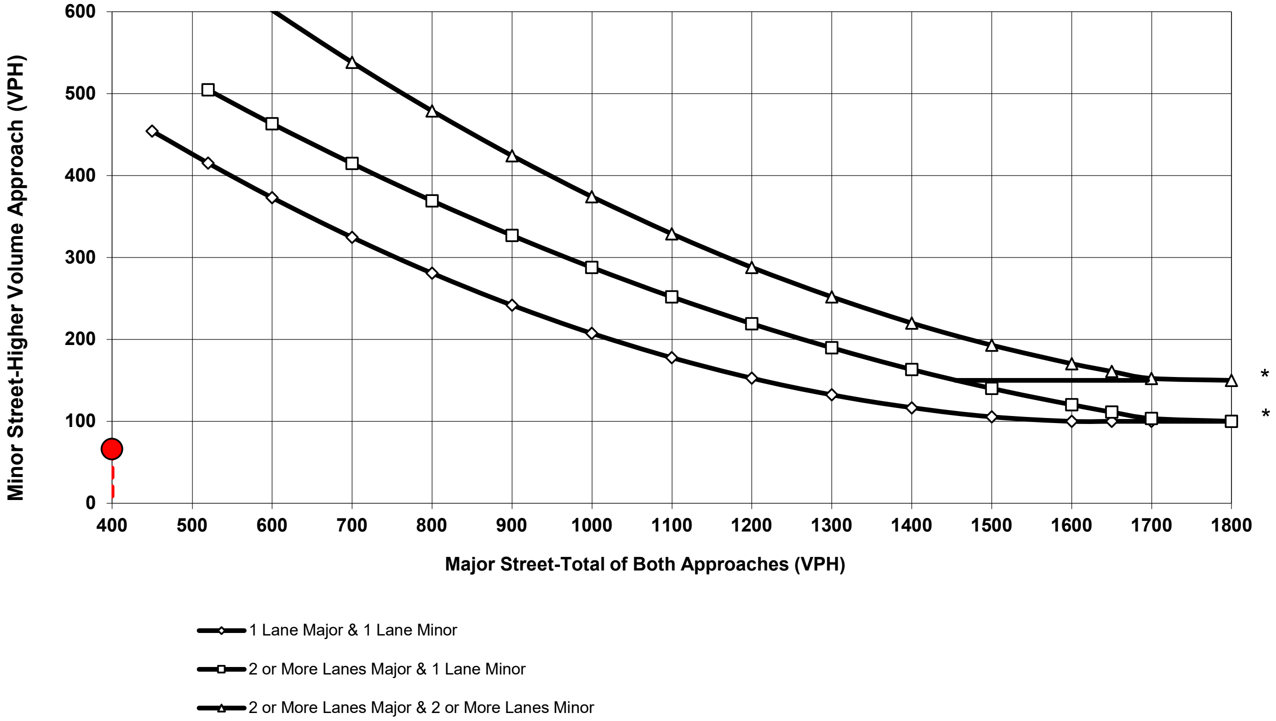
3/15/2023

PEAK HOUR VOLUME WARRANT
URBAN CONDITIONS

Peak Hour:	**AM**	**Scenario:**	**OYCP**
Major Street:	**Little League Drive**	**Minor Street:**	**Meyers Road**
Total of Both Approaches (VPH):	**310**	Higher Volume Approach (VPH):	**66**
Number of Approach Lanes:	**1**	Number of Approach Lanes:	**1**

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2014 California Supplement Including Revision 3 (March 9, 2018)

OYCP Conditions
AM Peak Hour Volume Warrant
Little League Drive / Meyers Road

PEAK HOUR VOLUME WARRANT
URBAN CONDITIONS

Peak Hour: PM

Scenario: OYCP

Major Street: Little League Drive

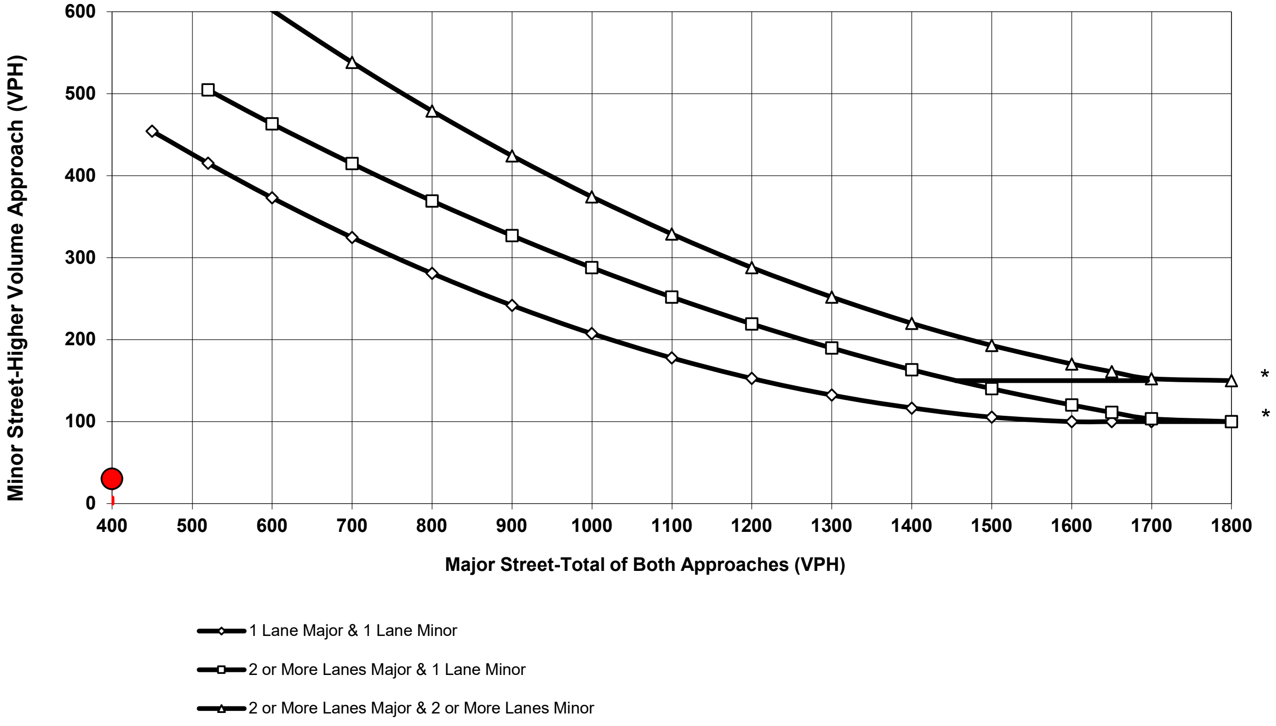
Minor Street: Meyers Road

Total of Both Approaches (VPH): 84
Number of Approach Lanes: 1

Higher Volume Approach (VPH): 30
Number of Approach Lanes: 1

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2014 California Supplement Including Revision 3 (March 9, 2018)

OYCP Conditions
PM Peak Hour Volume Warrant
Little League Drive / Meyers Road

PEAK HOUR VOLUME WARRANT
URBAN CONDITIONS

Peak Hour: AM

Scenario: OYCP

Major Street: Little League Drive

Minor Street: Belmont Avenue

Total of Both Approaches (VPH):	310
Number of Approach Lanes:	1
Higher Volume Approach (VPH):	66
Number of Approach Lanes:	1

SIGNAL WARRANT NOT SATISFIED

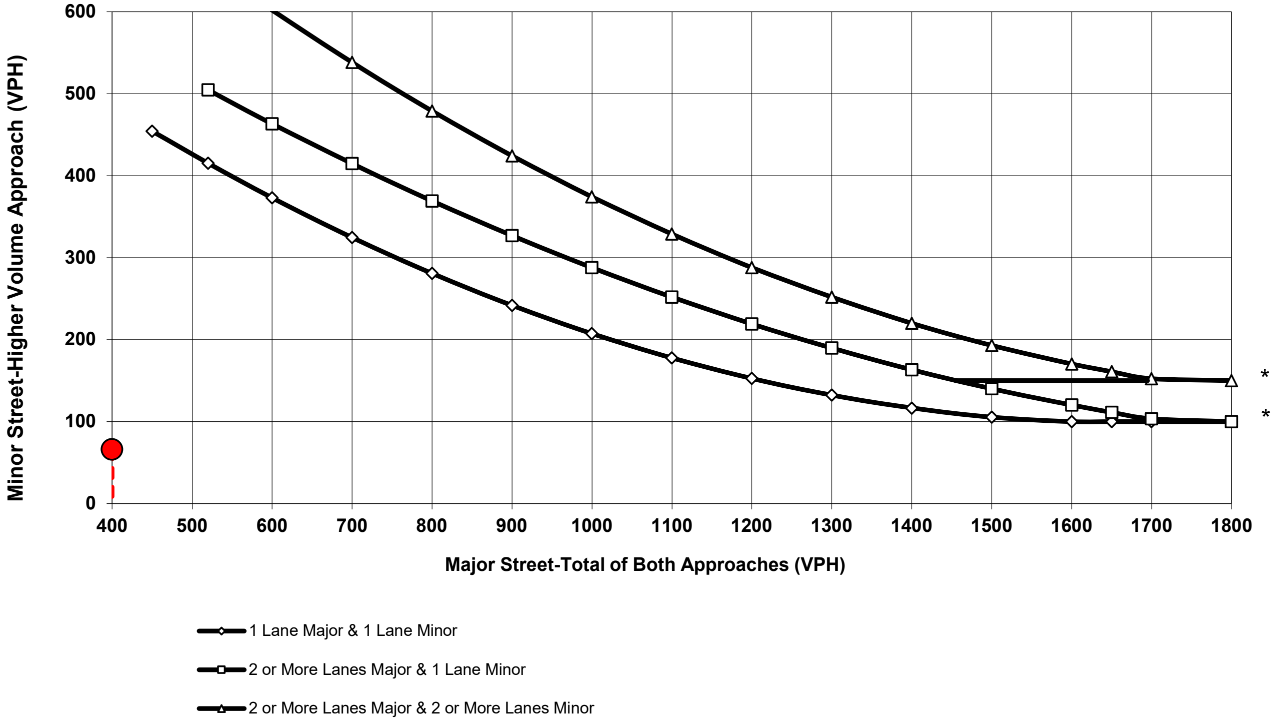


Figure 4C-3. Peak Hour Warrant (Urban)

* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2014 California Supplement Including Revision 3 (March 9, 2018)

OYCP Conditions
AM Peak Hour Volume Warrant
Little League Drive / Belmont Avenue

PEAK HOUR VOLUME WARRANT
URBAN CONDITIONS

Peak Hour: PM

Scenario: OYCP

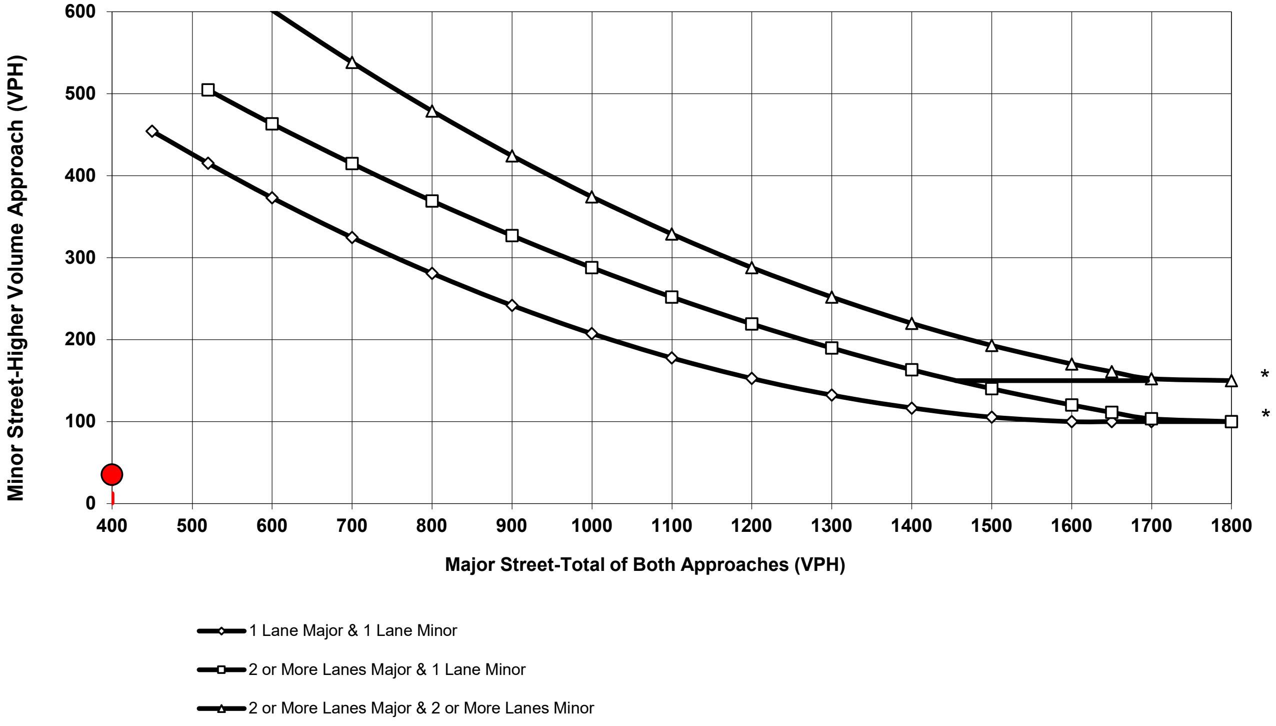
Major Street: Little League Drive

Minor Street: Belmont Avenue

Total of Both Approaches (VPH):	154	Higher Volume Approach (VPH):	35
Number of Approach Lanes:	1	Number of Approach Lanes:	1

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2014 California Supplement Including Revision 3 (March 9, 2018)

OYCP Conditions
PM Peak Hour Volume Warrant
Little League Drive / Belmont Avenue

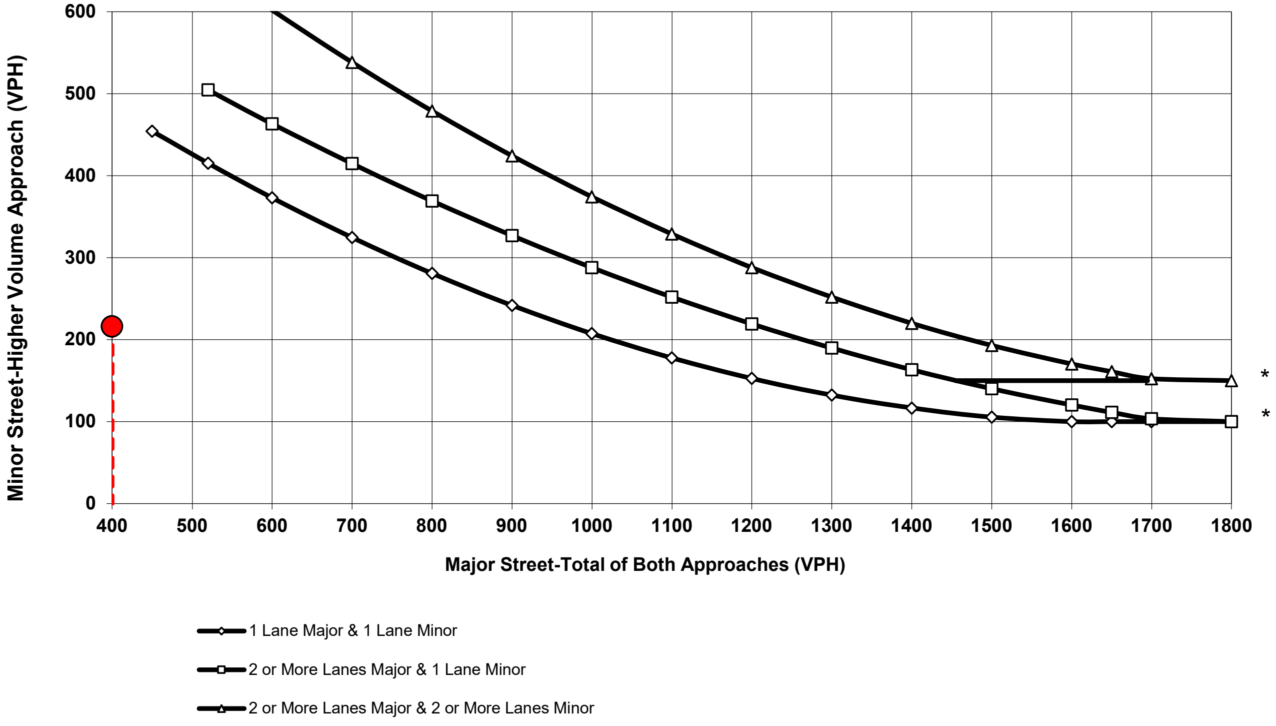
PEAK HOUR VOLUME WARRANT
URBAN CONDITIONS

Peak Hour:	**AM**	**Scenario:**	**OYCP**
Major Street:	**Magnolia Avenue**	**Minor Street:**	**Belmont Avenue**

Total of Both Approaches (VPH):	**280**	Higher Volume Approach (VPH):	**216**
Number of Approach Lanes:	**1**	Number of Approach Lanes:	**1**

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2014 California Supplement Including Revision 3 (March 9, 2018)

OYCP Conditions
AM Peak Hour Volume Warrant
Magnolia Avenue / Belmont Avenue

PEAK HOUR VOLUME WARRANT
URBAN CONDITIONS

Peak Hour: AM

Scenario: OYCP

Major Street: Magnolia Avenue

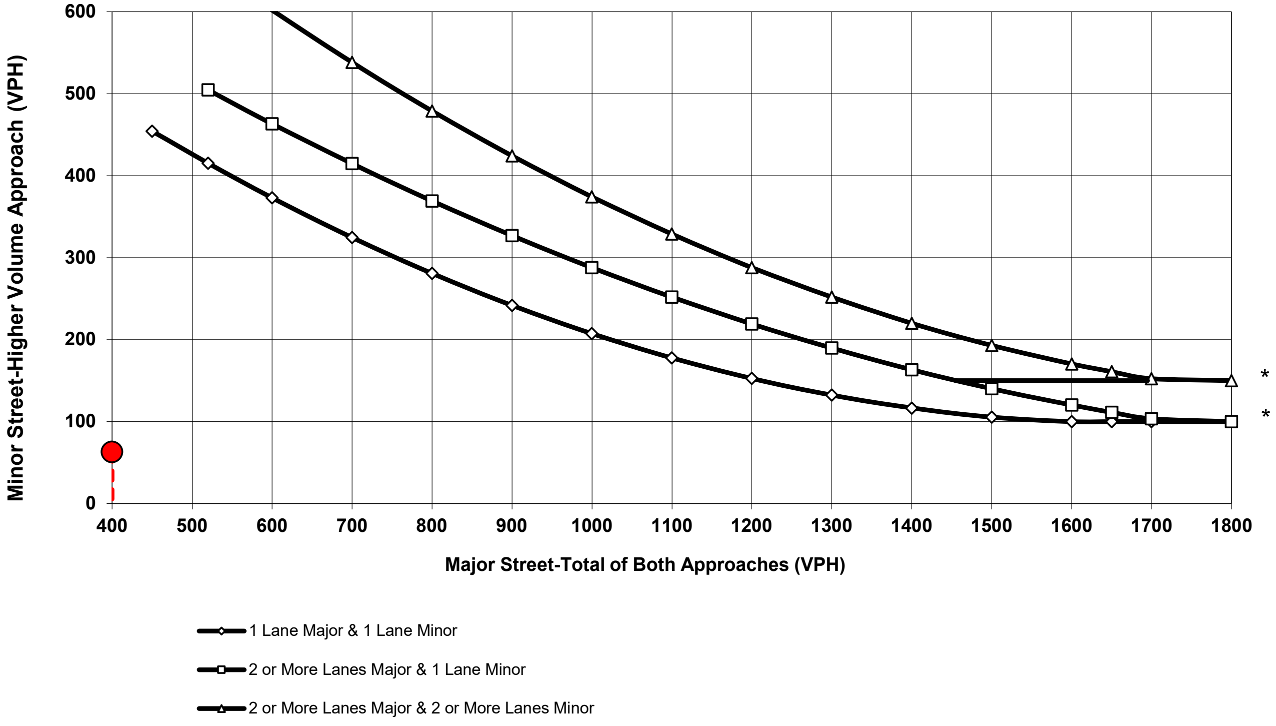
Minor Street: Belmont Avenue

Total of Both Approaches (VPH): 98
Number of Approach Lanes: 1

Higher Volume Approach (VPH): 63
Number of Approach Lanes: 1

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2014 California Supplement Including Revision 3 (March 9, 2018)

OYCP Conditions
AM Peak Hour Volume Warrant
Magnolia Avenue / Belmont Avenue

3/15/2023

PEAK HOUR VOLUME WARRANT
URBAN CONDITIONS

Peak Hour: **AM**

Scenario: **OYCP**

Major Street: **Palm Avenue**

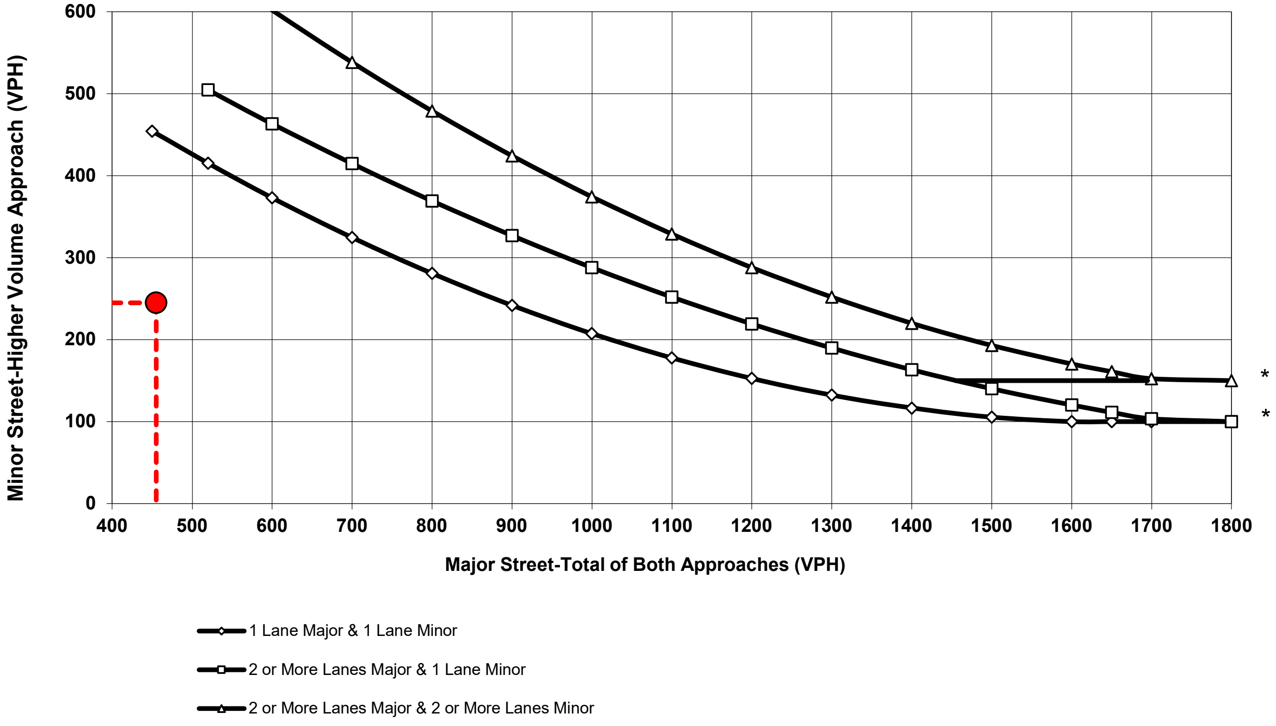
Minor Street: **Belmont Avenue**

Total of Both Approaches (VPH): **455**
Number of Approach Lanes: **1**

Higher Volume Approach (VPH): **245**
Number of Approach Lanes: **1**

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:
150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2014 California Supplement Including Revision 3 (March 9, 2018)

OYCP Conditions
AM Peak Hour Volume Warrant
Palm Avenue / Belmont Avenue

3/15/2023

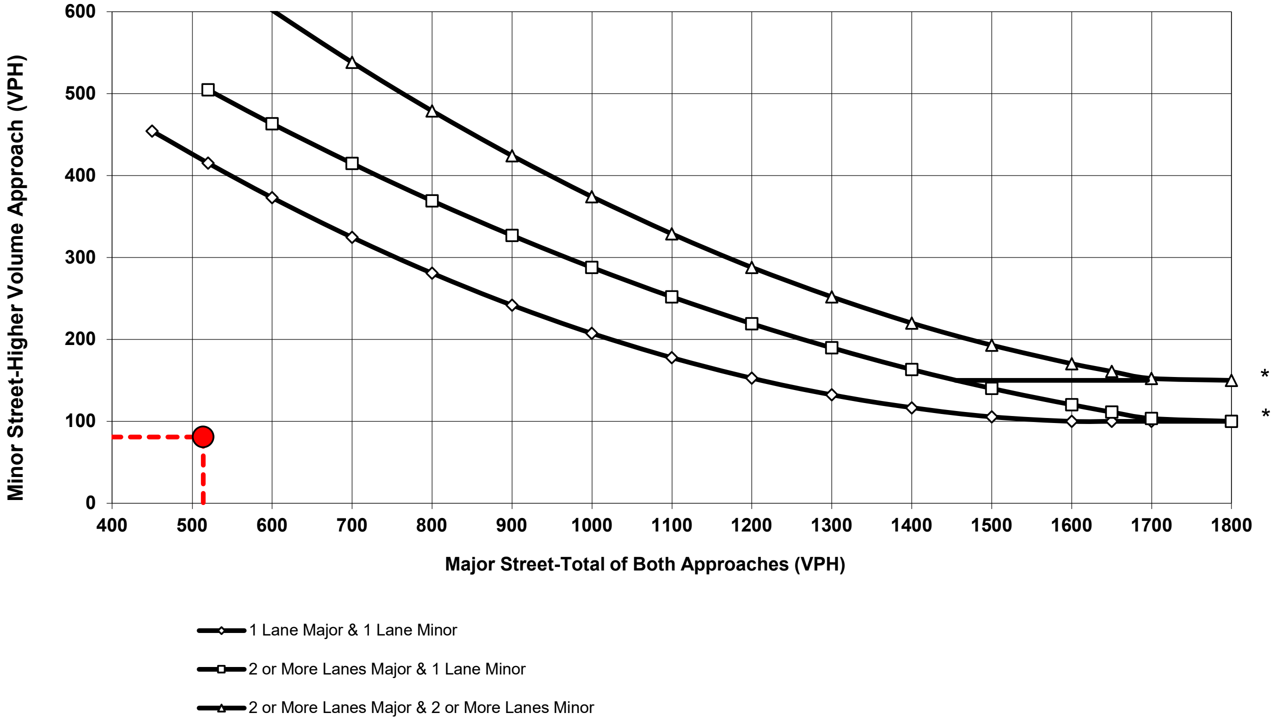
PEAK HOUR VOLUME WARRANT
URBAN CONDITIONS

Peak Hour:	PM	**Scenario:**	OYCP
Major Street:	Palm Avenue	**Minor Street:**	Belmont Avenue

Total of Both Approaches (VPH):	514	Higher Volume Approach (VPH):	81
Number of Approach Lanes:	1	Number of Approach Lanes:	1

SIGNAL WARRANT NOT SATISFIED

Figure 4C-3. Peak Hour Warrant (Urban)



* Note:

150 vph Applies as the Lower Threshold Volume for a Minor Street Approach with Two or More Lanes and 100 vph Applies as the Lower Threshold Volume for a Minor Street Approach with One Lane.

Source: MUTCD 2014 California Supplement Including Revision 3 (March 9, 2018)

OYCP Conditions
PM Peak Hour Volume Warrant
Palm Avenue / Belmont Avenue

Appendix F Vehicle Miles Traveled (VMT) Analysis

TJW ENGINEERING, INC.
TRAFFIC ENGINEERING &
TRANSPORTATION PLANNING
CONSULTANTS

October 18, 2022

Mr. Srihari Mupparaju
AURORA BUILDERS LLC
9987 Fox Meadow Road
San Diego, CA 92127

SUBJECT: Tentative Tract Map No. 20539 Vehicle Miles Traveled (VMT) Analysis

Dear Mr. Mupparaju,

*TJW Engineering, Inc. (*TJW*)* is pleased to submit this Vehicle Miles Traveled (VMT) Analysis for the proposed single-family project located at the northwest corner of Magnolia Avenue and West Meyers Road in the City of San Bernardino. The purpose of this memorandum is to satisfy the requirements for disclosure of potential impacts and mitigation measures per the California Environmental Quality Act (CEQA). This analysis has been conducted using guidance from the City of San Bernardino presented in *Traffic Impact Analysis Guidelines* (August 2020).

PROJECT DESCRIPTION

The proposed project is located at the northwest corner of Magnolia Avenue and West Meyers Road in the City of San Bernardino. The proposed project will include 32 single-family homes and is projected to be completed in 2023. Project access will be provided on West Meyers Road via two new roads with cul-de-sacs (South Antique Court and South Baroque Court). The project site plan and vicinity map are attached for reference.

BACKGROUND

Senate Bill 743 (SB-743), which was codified in Public Resources Code section 21099, was signed by the Governor in 2013 and directed the Governor's OPR to identify alternative metrics for evaluating transportation impacts under CEQA. Based on this, delay-based analysis (level of service) has been replaced by VMT. Pursuant to Section 21099, the criteria for determining the significance of transportation impacts must "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." Recently adopted changes to the CEQA Guidelines in response to Section 21099 include a new section (15064.3) that specifies that VMT is the most appropriate measure of transportation impacts. A separate Technical Advisory issued by OPR provides additional technical details on calculating VMT and assessing transportation impacts for various types of projects.

METHODOLOGY

A VMT analysis was prepared using the City's guidelines for VMT analysis. The analysis was prepared using the San Bernardino County Transportation Analysis Model (SBTAM) hereafter referred to as "Model".

The project is located within Traffic Analysis Zone 53746202, referred to as "Zone" hereafter. A model plot showing the Zone location is attached for reference. The potential population generated by the project was calculated using a population of 3.340 per household as noted in the City of San Bernardino General Plan, Appendix 5 – Methodology Report, November 1, 2005. Based on this data, the proposed project would have a population of 107 persons (32 single family dwelling units X 3.340 persons per household). The project population and households were entered into the project Zone in both the 2016 and 2040 models.

It should be noted that the socioeconomic data (SED) in the SBTAM model is based on demographic and economic data derived for the 2012 SCAG model with applied growth from the SANBAG GIS-based growth model. Since the time that the SED for Zone 53746202 was developed, additional residential units have been constructed in the project zone. The number of existing dwelling units in the zone was confirmed using aerial imagery and was corrected in the model. The SBTAM 2016 SED included 295 households, whereas 356 households were counted from aerial imagery. To model accurate with-project conditions, a total of 388 households were coded into Zone 53746202 in the 2016 condition (356 existing single-family homes plus 32 project single-family homes). The 2040 Zone SED included 550 households. The 2040 with-project condition was modeled by adding the proposed 32 units to the 550 households included in the 2040 model.

In addition to the SED, the model network was updated to represent access more realistically to Zone 53746202. The SBTAM network only includes access from the zone to the intersection of Little League Drive/Belmont Avenue. In actuality, vehicles can also access Belmont Avenue and Palm Avenue from Zone 53746202. In fact, Palm Avenue provides direct access to the I-215 interchange and would more likely be used by residents traveling to and from the freeway. Model plots are attached for reference which show the roadway network serving Zone 53746202, as well as the modifications that were made to provide more realistic access to the project Zone.

The model includes validated scenarios for 2016 and 2040. These scenarios have been validated using existing 2016 traffic counts. The San Bernardino County Transportation Analysis Model – SBTAM Model Development and Validation Report and User's Guide (December 2012) states, "For validation purposes, the difference between model-estimated traffic volumes and ground counts are evaluated against the maximum allowable deviation prescribed by Federal Highway Administration (FHWA) and National Cooperative Highway Research Program (NCHRP) 255 guidelines. All screenlines fall within acceptable local and industry standards as prescribed by NCHRP 255 guidelines."

Data for years between 2016 and 2040 can be extrapolated using linear interpolation between the 2016 and 2040 model output. The model was run for the base year (2016) and future year (2040) without and with-project conditions (i.e. four full model runs). VMT was then evaluated using the Origin-Destination (OD) matrices as required by the City's guidelines. The OD matrices do not include trip purpose, but are broken down by vehicle type (i.e. passenger vehicles, light heavy-duty trucks, heavy heavy-duty trucks).

As noted under the discussion of thresholds, the City threshold is based on the OD data. To determine VMT, the OD trips were multiplied by the trip lengths to determine the VMT. The OD VMT is divided by the service population (employment plus population) to determine the OD VMT per service population.

It should be noted that the results of the VMT analysis may be different than those provided by the City's VMT screening tool. This is due to the roadway network and SED being modified to appropriately reflect more detailed roadway conditions and project SED within the project and nearby TAZs. The City's screening tool/criteria is solely used for screening purposes and is not indicative of the results of a full VMT analysis.

THRESHOLDS

A project would result in a significant project generated VMT impact if either of the following conditions are satisfied:

- The baseline (2022) project generated VMT per service population exceeds the City of San Bernardino General Plan Buildout VMT per service population, calculated as of 31.6 VMT per service population, or
- The cumulative project generated VMT per service population exceeds the City of San Bernardino General Plan Buildout VMT per service population, calculated as 31.6 VMT per service population.

The project's effect on VMT would be considered significant if it resulted in the following condition:

- The cumulative link-level boundary VMT per service population within the City of San Bernardino increases under the plus project condition compared to the no project condition.

The guidelines note that for projects located near the City limit, a larger boundary should be applied to ensure that the true project effect on VMT is not truncated. The guidelines recommend doubling the average trip length to and from the site to establish an appropriate boundary. The average trip length of the project was found to be 5.44 miles. Therefore, the project's effect on VMT was calculated both for the Citywide link-level VMT as well as the link level VMT within an 11-mile radius of the project Zone.

PROJECT VMT EVALUATION

The VMT analysis results are shown in Tables 1 and 2. As shown in Table 1, the project would have a less than significant impact on VMT in the baseline and cumulative conditions. The year 2022 project VMT per service population would be 20.7, which is 34.5 percent below the City's threshold of 31.6. The Cumulative project VMT per service population would be 21.5, which is 31.83 percent below the City's threshold of 31.6.

The project's effect on VMT would not be considered significant as both the Citywide roadway VMT and the roadway VMT within an 11-mile radius would be reduced with the implementation of the project. The project effect on VMT is shown in Table 3. It should be noted that the link-level VMT within an 11-mile radius is much higher than within the City boundary because there are segments of I-215, I-15, I-10, and SR-60 located within the 11-mile radius boundary.

Table 1: VMT Analysis of Project Impact

	2016	**2040**	**2022**
Project Zone VMT	29,390	41,384	32,388
TAZ 53746202 Population	1,384	1,793	1,486
TAZ 53746202 Employment	62	128	79
TAZ 53746202 Service Population	1,446	1,921	1,565
Project VMT/SP	20.3	21.5	20.7
City of San Bernardino VMT	9,348,412	11,847,266	9,973,125
City Population	221,358	248,002	228,019
City Employment	100,467	127,540	107,235
City Service Population	321,825	375,542	335,254
City VMT/SP	29.1	31.6	29.8
Baseline Threshold[1]	**Baseline Project VMT/SP**	**% Above/Below Threshold**	**Baseline VMT Impact?**
31.6	20.7	-34.50%	No
Cumulative Threshold[1]	**Cumulative Project VMT/SP**	**% Above/Below Threshold**	**Cumulative VMT Impact?**
31.6	21.5	-31.83%	No

Source: *TTM 20539 Vehicle Miles Traveled Analysis* (EPD Solutions, May 27, 2022).

[1] The Baseline and Cumulative Thresholds of 31.6 VMT per service population are based on the City of San Bernardino General Plan Buildout VMT per service population, which is reflected in the SBTAM Year 2040 model.

Table 2: 2040 Project Effect on VMT

	Without Project	**With Project**	**VMT Impact?**
Citywide Roadway VMT	4,875,262	4,315,289	No
Within 11-Mile Radius	16,075,947	16,063,808	No

CONCLUSION

In summary, because the baseline and cumulative VMT per service population is below the City's threshold of 31.6 and the project would result in a lower link-level VMT when measured within the City boundary and within an 11-mile radius, the project would have a less than significant impact on VMT.

Please contact us at (949) 878-3509 if you have any questions regarding this analysis.

Sincerely,

Thomas Wheat, PE, TE
President

Registered Civil Engineer *#69467*
Registered Traffic Engineer *#2565*

THOMAS JOSEPH WHEAT
No. 69467
Exp. 6/30/24
CIVIL

THOMAS JOSEPH WHEAT
No. 2565
Exp. 6/30/24
TRAFFIC

David Chew, PTP
Transportation Planner

Brandon Alvarado, EIT
Transportation Planner

Figure 1: Project Site Plan

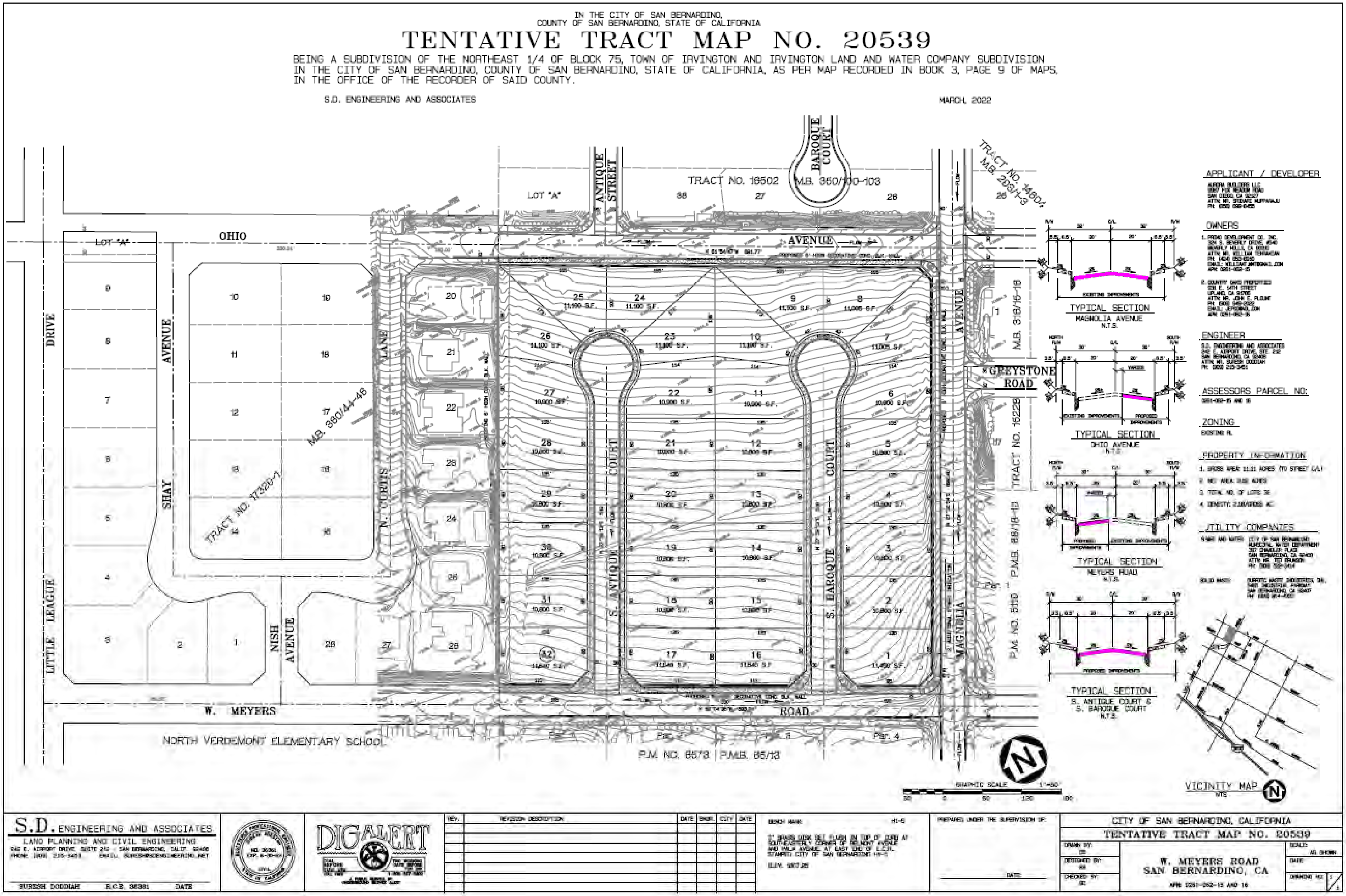
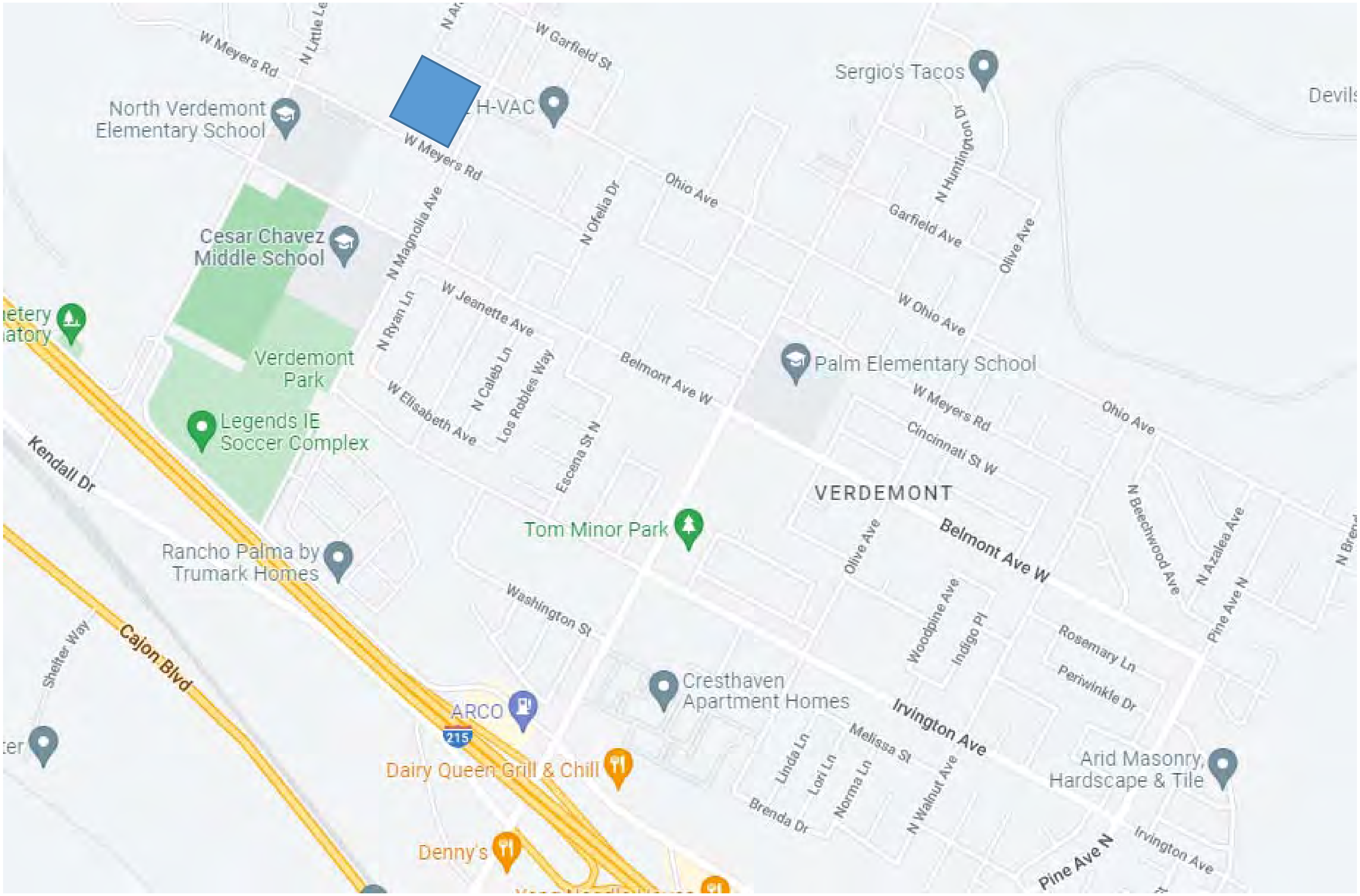


Figure 2. Existing Roadway Network



🟦 = **Project Site**

Source: Google Maps

Figure 3. SBTAM Network (without modification)

Figure 4. SBTAM Network (as modified for project analysis)