



CONTRA COSTA COUNTY

AGENDA

Contra Costa County Zoning Administrator

Monday, May 4, 2026

1:30 PM

30 Muir Road, Martinez

Zoom: <https://cccounty-us.zoom.us/j/85491390617>

Webinar ID: 854 9139 0617 Call in: (855) 758-1310 or (408) 961-3928

The Zoning Administrator meeting will be accessible in-person, via telephone, and via live-streaming to all members of the public. Zoning Administrator meetings can be viewed live online at: http://contra-costa.granicus.com/ViewPublisher.php?view_id=13.

Persons who wish to address the Zoning Administrator during public comment or with respect to an item on the agenda may comment in person or may call in during the meeting by dialing (855)758-1310 US Toll Free or (408) 961-3928. A caller should indicate they wish to speak on an agenda item, by pushing "#2" on their phone. Access via Zoom is also available using the following link <https://cccounty-us.zoom.us/j/85491390617> Webinar ID: 854 9139 0617.

Those participating via Zoom should indicate they wish to speak on an agenda item by using the “raise your hand” feature in the Zoom app. Public comments may also be submitted before the meeting by email at planninghearing@dcd.cccounty.us or by voicemail at (925) 655-2860.

Commenters will generally be limited to three (3) minutes each. Comments submitted by email or voicemail will be included in the record of the meeting but will not be read or played aloud during the meeting. The Zoning Administrator may reduce the amount of time allotted per commenter at the beginning of each item or public comment period depending on the number of commenters and the business of the day. The Zoning Administrator may alter the order of agenda items at the meeting. Your patience is appreciated.

The Community Development Division of the Department of Conservation and Development will provide reasonable accommodations to those persons needing translation services and for persons with disabilities who wish to participate in Zoning Administrator meetings. Please contact Hiliana Li at least 48 hours before the meeting at (925) 655-2860.

1. PUBLIC COMMENTS
2. VARIANCE: CONTINUED PUBLIC HEARING

BACILIA MACIAS, BACILIA MACIAS ARCHITECTURE (APPLICANT) & EDUARDO LANDEROS (OWNER), County File CDVR24-01044: The applicant requests approval of a Variance to allow a 9-foot front yard setback (where 20 feet is the minimum required) and a Tree Permit for the removal of two code-protected Coast Live Oak trees, for the construction of a 2,128-square-foot two-story single-family residence on a vacant lot. The application includes Small Lot Design Review of the new single-family residence on a lot that is substandard in area and average width. The project site is located at 1518 Barth Avenue in the San Pablo area of unincorporated Contra Costa County. (Zoning: R-6 Single-Family Residential District) (Assessor's Parcel Number: 419-192-015)
CONTINUED FROM APRIL 20, 2026 DL

[26-1851](#)

Attachments: [Attachment A - CDVR24-01044 Findings and Conditions \(Continued\)](#)
[Attachment B - Project Plans](#)
[Attachment C - Geotechnical Report & Peer Review](#)

PLEASE NOTE: THE NEXT MEETING OF THE CONTRA COSTA COUNTY ZONING ADMINISTRATOR WILL BE HELD ON MONDAY, MAY 18, 2026.



CONTRA COSTA COUNTY

1025 ESCOBAR STREET
MARTINEZ, CA 94553

Staff Report

File #: 26-1851

Agenda Date: 5/4/2026

Agenda #:

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| Project Title: | 1518 Barth Avenue Variance, Tree Permit, and Small Lot Design Review |
| County File(s): | CDVR24-01044 |
| Applicant: Owner: | Bacilia Macias, Bacilia Macias Architecture (Applicant) Eduardo Landeros |
| Zoning/General Plan: | R-6 Single-Family Residential District / RM Residential Medium Density |
| Site Address/Location: | 1518 Barth Avenue in the San Pablo area of unincorporated Contra Costa County (Assessor's Parcel Number: 419-192-015) |
| California Environmental Quality Act (CEQA) Status: | The proposed project is exempt under CEQA Guidelines Section 15303(a) New Construction - One Single Family Residence. |
| Project Planner: | Diana Lecca, Project Planner (925) 655-2869 Diana.Lecca@dcd.cccounty.us |
| Staff Recommendation: | Approve (See Section II for Full Recommendation) |

I. PROJECT SUMMARY

The applicant requests approval of a Variance to allow a 9-foot front yard setback (where 20 feet is the minimum required) and a Tree Permit for the removal of two code-protected Coast Live Oak trees, for the construction of a 2,128 square-foot two-story single-family residence on a vacant lot. The application includes Small Lot Design Review of the new single-family residence on a lot that is substandard in area and average width.

II. RECOMMENDATION

Department of Conservation and Development, Community Development Division (CDD) staff recommends that the Zoning Administrator:

- A. FIND that the project is categorically exempt from CEQA under Section 15303(a) of the CEQA

Guidelines.

- B. APPROVE Variance Permit, Tree Permit, and Small Lot Design Review CDVR24-01044 for construction of a 2,128 square-foot two-story single-family residence on a vacant lot, based on the attached findings and subject to the attached conditions of approval.

- C. DIRECT Staff to file a Notice of Exemption with the County Clerk.

III. BACKGROUND

This Variance and Small Lot Design Review application was considered by the Zoning Administrator during a noticed public hearing held on April 20, 2026. During the meeting, the Zoning Administrator opened the public hearing and heard testimony from the applicant in support of the project, numerous neighboring property owners who appeared in opposition to the proposed residence, as well as a few neighbors in support. After discussion, the Zoning Administrator determined that additional information and geotechnical consultation was necessary before proceeding. Therefore, the Zoning Administrator continued the item as an open public hearing for additional consideration at the May 4, 2026, meeting.

IV. ADDITIONAL INFORMATION

At the direction of the Zoning Administrator, Staff consulted with the County Geologist to further assess the submitted geotechnical report prepared by John Campbell + Associates, as well as further review of a previous geotechnical report prepared by Cal Engineering & Geology (CEG), given the difference in foundation recommendations and overall preliminary recommendations for the project. As a result, the County Geologist has provided a second Geologic Peer Review letter identifying additional conditions and comments, which have been included as conditions of approval in an updated version of *Attachment A - Findings and Conditions of Approval*. The second Geologic Peer Review has been included as part of *Attachment C - Geotechnical Report and Peer Review*.

Staff also reached out to the City of Richmond's Planning and Public Works departments to inquire about any comments or concerns they may have, given that the primary access road to the proposed project, Barth Avenue, is under the jurisdiction of the City of Richmond. City Staff responded indicating that their planning team had no comments, and their Public Works department recommended a geotechnical evaluation by a licensed geotechnical engineer should be provided to assess on-site slope stability and potential off-site impacts, and to ensure no adverse effects to the public right-of-way or City-maintained facilities, which is in alignment to the recommendations already set by County Staff.

In order to maintain the integrity of Barth Avenue, two separate conditions requiring road surveillance of Barth Avenue have also been added as COAs #20 and #21.

Additionally, due to the property being located within a Very High Fire Hazard Severity Zone in the Local Responsibility Area (LRA), an additional condition of approval (COA #19) has been included to ensure proper evacuation measures in case of an emergency during construction periods.

V. CONCLUSION

Staff recommends that the Zoning Administrator APPROVE County file #CDVR24-01044 based on the attached findings and updated conditions of approval.

FINDINGS AND CONDITIONS OF APPROVAL FOR COUNTY FILE CDVR25-01044; BACILIA MACIAS, BACILIA MACIAS ARCHITECTURE (APPLICANT) EDUARDO LANDEROS (OWNER)

FINDINGS

A. Variance Findings

1. *Required Finding: That any variance authorized shall not constitute a grant of special privilege inconsistent with the limitations of other properties in the vicinity and the respective land use district in which the subject property is located.*

Project Finding: The project site located in the R-6 Single Family Residential District, which requires a minimum lot size of 6,000 square feet and a minimum front yard setback of 20 feet. The parcel is a 4,709 square-foot trapezoidal lot that is substandard in area for the R-6 District, and the project is the construction of a new approximately 2,128 square-foot single-family residence located at 9 feet from the front property line, within the front yard setback. Development on the parcel is severely constrained by the substandard lot area and the severe slope and variation of topography (the property declines from approximately 490 feet above mean sea level at the southern portion of the parcel to 462 feet above mean sea level at the north of the parcel). These physical constraints severely limit the viable buildable area on the parcel and force any construction to be located closer to the front which has flatter areas. The variance for a 9-foot front yard setback rather than the required minimum 20-foot front yard setback allows for the reasonable placement of the residence in an area that is flatter and will have less impact on the steeper portions of the parcel. Variances for reduced front setbacks are common occurrences within areas of the County where steep topography is present. Additionally, this variance is consistent with the intent of the zoning code to allow flexibility in unique situations, ensuring that all property owners have the opportunity to develop their land in a reasonable manner and does not constitute a grant of special privilege.

2. *Required Finding: That because of special circumstances applicable to the subject property because of its size, shape, topography, location, or surroundings, the strict application of the respective zoning regulations is found to deprive the subject property of rights enjoyed by other properties in the vicinity and within the identical land use district.*

Project Finding: The project site has special circumstances, including its substandard size, configuration and changes in topography. These circumstances combine to create a severely constrained buildable area on the parcel. The new residence has been designed to utilize the flatter portions of the property, and although its construction will require additional geotechnical support to mitigate the steep topography, its placement

minimizes disturbing the steeper slopes located towards the back of the parcel, as shown on the Topographic Survey. Lots in the R-6 District have a minimum lot size requirement of 6,000 square feet. The project site is 4,709 square feet, which is approximately 22% less than the 6,000 square-foot required minimum. Therefore, the strict application of the front yard setback regulation combined with the parcel's substandard size and topography, deprive the subject property of the right to pursue any reasonable type of development near the front of the parcel, a right enjoyed by other properties in the R-6 District that are not burdened by such unique physical constraints.

3. *Required Finding: That any variance authorized substantially meets the intent and purpose of the respective land use district in which the subject property is located.*

Project Finding: The proposed development with the front yard setback variance substantially meets the intent and purpose of the R-6 Single-Family Residential District. The purpose of any front yard setback is to provide for a consistent streetscape, ensure adequate light and air, and maintain separation between structures and public rights-of-way. The reduction in the front setback will not compromise these objectives and will allow the property owner to develop their property with a new single-family residence which is a permitted use within the R-6 District. Therefore, the variance substantially meets the intent of the zoning ordinance.

B. Tree Permit Findings

1. Required Factors for Granting Tree Permit: The Zoning Administrator is satisfied that the following factors, as provided by County Code Section 816-6.8010 for granting a tree permit, have been satisfied:

Section 816-6.8010(2)(G): Reasonable development of the property would require removal and/or work within the dripline of code-protected trees and this development could not be reasonably accommodated on another area of the lot.

The removal of the two Coast Live Oak trees is necessary in order to construct the new residence. Based on Sheet A.0.1 of the plans drafted by Bacilia Macias Architecture and Arborist Report provided by Kevin Pineda ISA Certified Arborist and Donald Cox ISA Certified Arborist, the trees are in fair condition but are recommended for removal due to their locations conflicting with the proposed residence. There are no other trees assessed in the property. Due to the size and topographical constraints of the lot, the residence will impact the trees regardless of any location. It is not possible to relocate the residence to avoid tree impact, and therefore staff recommends approval for the removal of the two Coast Live Oak trees.

2. Required Factors for Denying a Tree Permit: The Zoning Administrator is satisfied none of the factors for denying a tree permit as provided by County Code Section 816-6.8010 apply.

C. Small Lot Design Review Findings

County Code Section 82-10.002(c) states that all of the following findings must be made to approve the Small Lot Design Review permit application.

1. Location: The proposed 2,128 square-foot new single-family residence is appropriately sited given the unique physical constraints of the subject property and the established character of the surrounding neighborhood. While the residence is located within the front yard setback, this placement is necessitated by significant topographic constraints, as well as the size constraints of the lot. Specifically, the site's steep upward slope from north to south limits the buildable area to the southernmost portion of the property.

Residence placement in the neighborhood varies significantly due to the variety of lot sizes, as well as the different development standards within the City of Richmond's jurisdiction and County residential development standards. The subject parcel is adjacent to the City of Richmond border, and therefore residences in the vicinity follow different requirements in terms of frontage. The proposed residence is placed closer to the street than some other residences in the neighborhood; however, the location is dictated by the unique geometry and topography of the lot. Based on these constraints and the larger neighborhood, the residence remains compatible with the neighborhood's established land use character.

2. Size: Home sizes in this neighborhood range between 860 square feet to 3,300 square feet; however, the majority of larger sized homes in the neighborhood are under the City of Richmond jurisdiction, which may differ in terms of residential development standards. Residences within the County jurisdiction have a narrower range, between 864 square feet and 1,252 square feet. Although the residence is on the larger side, at approximately 2,128 square feet, it will not significantly stand out, as it is designed to utilize the slope to minimize its apparent bulk. Thus, the new residence will be compatible with the surrounding neighborhood as it will remain in line with other residences in the overall vicinity, both in terms of City of Richmond residences and County residences.
3. Height: The proposed two-story residence will be approximately 25 feet in height, at the rear and tallest point, which is below the 35-foot maximum height allowed for residential structures in the R-6 District. The front of the residence facing Barth Avenue holds a total height of approximately 15 feet in height, which is not uncommon for one-story residences in the area. Thus, in terms of height, the project will be compatible with the

surrounding neighborhood.

4. Design: The surrounding neighborhood along Barth Avenue, Harbor View Avenue, and North Arlington Boulevard have a variety of one-story and two-story residences with ranch styled homes, low pitched gable or hipped roofs, stucco exteriors, and some include attached garages. The new residence is of a two-story design; however, at street-level, it is shown to be only as a one-story home mimicking the design of other residences in the neighborhood. Therefore, the new residence will be consistent with the design of other houses in the neighborhood.

D. California Environmental Quality Act (CEQA) Findings:

This CDVR24-01044 project is categorically exempt from CEQA pursuant to CEQA Guidelines Section 15303(a), New Construction of Small Structures, which provides a Class 3 exemption for construction of a single-family residence. There is no substantial evidence that the project involves unusual circumstances, including future activities resulting in, or which might reasonably result in, significant impact which threaten the environment. None of the exceptions in CEQA guidelines section 15300.2 apply.

CONDITIONS OF APPROVAL FOR COUNTY FILE CDVR24-01044:

Project Approvals

1. A Variance Permit to allow a 9-foot front yard setback (where 20 feet is the minimum required) for the construction of a new 2,128 square-foot two-story single-family residence on a vacant lot is APPROVED.
2. A Tree Permit for the removal of two code-protected Coast Live Oak trees, including an 8-inch diameter tree in the middle of the lot and a 12-inch tree located mid-slope near the eastern property boundary, for the construction of the new single-family residence is APPROVED.
3. Small Lot Design Review for the construction of the new single-family residence is APPROVED.
4. The project approvals described above are granted based on, or as generally shown on, the following documents:
 - Application materials submitted to the Department of Conservation and Development, Community Development Division (CDD) on September 23, 2024.
 - Revised project plans received by the CDD on September 23, 2025.

- *Arborist Report, Tree Inventory, Property Development Project, 1518 Barth Ave., San Pablo, CA; Kevin Pineda, ISA Certified Arborist and Donald Cox, ISA Certified Arborist, November 8, 2024, received by the CDD on November 12, 2024*
 - *Geotechnical Investigation, Proposed Residence, 1518 Barth Ave., San Pablo CA; John Campbell + Associates, October 30, 2024, received by the CDD on November 11, 2025*
5. Any deviation from the approved plans shall require review and approval by the CDD and may require the filing of a new Variance Permit, Tree Permit, and/or Small Lot Design Review application.
 6. Tree removal shall only occur with an approved grading or building permit.

Application Costs

7. The application was subject to an initial application deposit of \$3,250.00 that was paid with the application submittal, plus time and material costs if the application review expenses exceed the initial deposit. Any additional fee due must be paid prior to issuance of a building permit, or 60 days of the effective date of this permit, whichever occurs first. The fees include costs through permit issuance and final file preparation. Pursuant to Contra Costa County Board of Supervisors Resolution Number 2019/553, where a fee payment is over 60 days past due, the application shall be charged interest at a rate of ten percent (10%) from the date of approval. The applicant may obtain current costs by contacting the project planner. A bill will be mailed to the applicant shortly after permit issuance in the event that additional fees are due.

Building Permits

8. No construction is approved with this permit. Any construction at the project site will require issuance of building and grading permits from the Department of Conservation and Development, Building Inspection Division, prior to commencement of work.

Child Care

9. Prior to issuance of a grading or building permit for the single-family residence, whichever comes first, the applicant is required to pay a fee toward childcare facility needs in the area as established by the Board of Supervisors. The current childcare fee is \$400.00 per parcel. However, the actual fee amount collected will be that which is applicable at the time of building permit issuance.

Park Impact / Park Dedication Fee

10. Prior to the issuance of building permits for the single-family residence, the applicant shall pay a Park Impact / Park Dedication fee for park and recreation improvements in the area as established by the Board of Supervisors. The current park dedication / park impact fee is \$9,584.00, however, the actual fee amount collected will be that which is applicable at the time of the building permit issuance.

Tree Removal Activities

11. The applicant shall be responsible for all arborist expenses related to the work authorized by this permit.

Required Restitution for Approved Tree Removal

12. The following measure is intended to provide restitution for the removal of 2 code-protected trees:
 - A. Tree Restitution Planting and Irrigation Plan: **Prior to CDD stamp of approval for the issuance of a grading or building permit, or the removal of trees, whichever occurs first**, the applicant shall submit a tree planting and irrigation plan prepared by a licensed arborist or landscape architect for the review and approval of CDD. The plan shall provide for the planting of **two (2)** trees, minimum 25-gallon size. The selected tree species should have a canopy that provides a buffer to the properties located on the downhill northern portion of parcel for privacy screening. The plan shall comply with the County's Water Efficient Landscapes Ordinance. Verification of compliance with the Ordinance shall accompany the plan. The plan shall also include an estimate prepared by a licensed landscape architect, arborist, or landscape contractor of the materials and labor costs to complete the improvements (accounting for supply, delivery, and installation of trees and irrigation).
 - B. A security shall be provided to ensure that the approved planting and irrigation plan is implemented. **Prior to CDD stamp of approval for the issuance of a grading or building permit, or the removal of trees, whichever occurs first**, the applicant shall submit a security that is acceptable to the CDD. The security shall be the amount of the approved cost estimate described in Section 8.A above, plus a 20% inflation surcharge.
 - C. Initial Fee Deposit for Processing a Security: The County ordinance requires that the applicant pay fees for all time and material costs of staff for processing a landscape improvement security (Code S-060B). At time of submittal of the security, the applicant shall pay an initial deposit of \$200.

- D. Duration of Security: When the replacement trees and irrigation have been installed, the applicant shall submit a letter to the Department of Conservation and Development, Community Development Division, composed by the landscape architect, arborist, or landscape contractor, verifying that the installation has been done in accordance with the approved planting and irrigation plan. The security shall be retained by the County for a minimum of 12 months up to 24 months beyond the date of receipt of this letter. A prerequisite of releasing the bond between 12 and 24 months shall be to have the applicant arrange for the consulting arborist to inspect the trees and to prepare a report on the trees' health. In the event that CDD determines that the tree(s) intended to be protected has been damaged by development activity, and CDD determines that the applicant has not been diligent in providing reasonable restitution of the damaged trees, then CDD may require that all part of the security be used to provide for mitigation of the damaged trees.

Geology and Soils

The recommendations in the *Geologic Peer Review / CDVR24-01044*, Darwin Myers Associates, April 28, 2026 are applied as Geology and Soils Conditions of Approval.

13. GEO-1: There shall be no a) clearing of the site, b) grading, c) tree removal, or d) instillation of utilities prior to the issuance of construction permits.
14. GEO-2: All grading, excavation and filling shall be conducted during the dry season (April 15 through October 15) only, and all areas of exposed soils shall be revegetated to minimize erosion and subsequent sedimentation. After October 15, only erosion control work shall be allowed. Any modification to the above schedule shall be subject to review by the BID Grading Inspector, and the review / approval of the Zoning Administrator.
15. GEO-3: At least 45 days prior to the issuance of Construction Permits, or Site Clearing, the project proponent shall submit an updated geotechnical report that provides adequate subsurface and laboratory test data. The expectations of the County for the scope of the investigation include the following:
 - A. The project geotechnical engineer shall review design-level grading, drainage and foundation plans, referencing the date of the plans reviewed.
 - B. The geotechnical engineer shall excavate and log boring or test pits at/near the four corners of the area proposed for grading to establish the depth to bedrock, characterize. Ther report shall include logs showing the details of the earth materials penetrated. The logs shall not be diagrammatic or generalized. Representative samples shall be retrieved

for laboratory testing. The logs should show the weathering profile, and comment on the effect of weathering on engineering properties of the units penetrated.

- C. Samples of the samples collected shall be subject to laboratory testing moisture/density, compressive strength, shear strength, expansion potential, gradation testing of native soils, and corrosion potential testing of soil and bedrock and gradation),
 - D. Provide an original geologic map of the site that represents the geotechnical engineer's and/or engineering geologist's interpretation of site conditions (i.e., bedrock stratigraphy, presence of any significant features (shear zones, bedding, deeply weathered zones, properties of native soils).
 - E. The geotechnical update report shall provide mitigation measures for any significant impacts that are confirmed to be present of the site,
 - F. Restate recommendation for geotechnical monitoring and testing during the construction period.
16. GEO-4: The geotechnical report shall be subject to review by the County's peer review geologist, and review/approval of the Zoning Administrator. Improvement, grading and building plans shall carry out the recommendations of the approved report.
17. GEO-5: The geotechnical report required by GEO-3 routinely includes recommended geotechnical observation and testing services during construction. These services are essential to the success of the project. They allow the geotechnical engineer to (i) ensure geotechnical recommendations for the project are properly interpreted and implemented by contractors, (ii) allow the geotechnical engineer to view exposed conditions during construction to ensure that field conditions match those that were the basis of the design recommendations in the approved report, and (iii) provide the opportunity for field modifications of geotechnical recommendations (with BID approval), based on exposed conditions. The monitoring shall commence during clearing, and extend through grading, installation of recommended drainage facilities and foundation related work, including retaining wall construction. A **hard hold** shall be place on the "final" building inspection, pending submittal of a report(s) from the project geotechnical engineer that documents their observation and testing services, including the testing of any required backfill (e.g., backfilling of utility trenches) . The monitoring report shall also include the geotechnical engineer's opinion on the compliance of the as graded, as-built project with all recommendations in the design level report.
18. GEO-6: The project proponent shall record a deed disclosure that is intended to (i) identify the project geotechnical engineers and reference all reports and letters issued by the

geotechnical engineers (i.e., provide full bibliographic citation to these documents), (ii) provide information that explains on how an interested party could access these documents, (ii) provide information that explains on how an interested party could access these documents (iii) state that no changes to site grading or drainage can be allowed without prior review and approval of the Department of Conservation and Development. Note that DCD's review/approval may require justification from the property owners geotechnical engineer, and (iv) explain that the property owner assumes monitoring and maintenance responsibility for all drainage improvements on the parcel. A draft of the proposed Deed Disclosure language must be reviewed and approved by the Community Development Division (CDD) prior to recordation; after the Deed Disclosure is recorded, the project proponent must provide CDD with a copy of the recoded document to serve as evidence the requirements of GEO- were satisfied.

New Development within a Very High Fire Hazard Area

19. Prior to the issuance of building permits, the project proponent shall prepare a traffic control plan to ensure that construction equipment or activities do not block roadways or interfere with evacuation plans. This plan shall be reviewed and approved by the Contra Costa Fire Protection District.

Roadway Condition Surveillance

20. Applicant shall survey the pavement condition on Barth Avenue prior to the commencement of any work on site. The survey shall include a photo/video of the roadway. Applicant shall complete any remedial work prior to initiation of use; OR, provide a bonded agreement assuring completion of the remedial work.
21. Applicant shall provide a pavement analysis for the road along the proposed project or any alternate route(s) that are proposed to be utilized during the construction period. This study shall analyze the existing pavement conditions, and determine what impact the operation will have over the life of the project. The study shall provide recommendations to mitigate identified impacts

Construction Period Restrictions and Requirements

All construction activity shall comply with the following restrictions, which shall be included in the construction drawings.

22. The applicant shall make a good faith effort to minimize project-related disruptions to adjacent properties, and to uses on the site. This shall be communicated to all project-related contractors.

23. The applicant shall require their contractors and subcontractors to fit all internal combustion engines with mufflers which are in good condition and shall locate stationary noise-generating equipment such as air compressors as far away from existing residences as possible.
24. The site shall be maintained in an orderly fashion. Following the cessation of construction activity, all construction debris shall be removed from the site.
25. A publicly visible sign shall be posted on the property with the telephone number and person to contact regarding construction-related complaints. This person shall respond and take corrective action within 24 hours. The CDD phone number shall also be visible to ensure compliance with applicable regulations.
26. Unless specifically approved otherwise via prior authorization from the Zoning Administrator, all construction activities shall be limited to the hours of 7:30 A.M. to 5:00 P.M., Monday through Friday, and are prohibited on State and Federal holidays on the calendar dates that these holidays are observed by the State or Federal government as listed below:
 - New Year's Day (State and Federal)
 - Birthday of Martin Luther King, Jr. (State and Federal)
 - Washington's Birthday (Federal)
 - Lincoln's Birthday (State)
 - President's Day (State)
 - Cesar Chavez Day (State)
 - Memorial Day (State and Federal)
 - Juneteenth National Independence Holiday (Federal)
 - Independence Day (State and Federal)
 - Labor Day (State and Federal)
 - Columbus Day (Federal)
 - Veterans Day (State and Federal)
 - Thanksgiving Day (State and Federal)
 - Day after Thanksgiving (State)
 - Christmas Day (State and Federal)

For specific details on the actual date the State and Federal holidays occur, please visit the following websites:

Federal Holidays: [Federal Holidays \(opm.gov\)](https://www.opm.gov)

California Holidays: [State Holidays \(ca.gov\)](https://www.ca.gov)

27. Large trucks and heavy equipment are subject to the same restrictions that are imposed on construction activities, except that the hours are limited to 9:00 AM to 4:00 PM.

ADVISORY NOTES

PLEASE NOTE ADVISORY NOTES ARE ATTACHED TO THE CONDITIONS OF APPROVAL BUT ARE NOT A PART OF THE CONDITIONS OF APPROVAL. ADVISORY NOTES ARE PROVIDED FOR THE PURPOSE OF INFORMING THE APPLICANT OF ADDITIONAL ORDINANCE AND OTHER LEGAL REQUIREMENTS THAT MUST BE MET IN ORDER TO PROCEED WITH DEVELOPMENT.

- A. NOTICE OF OPPORTUNITY TO PROTEST FEES, ASSESSMENTS, DEDICATIONS, RESERVATIONS OR OTHER EXACTIONS PERTAINING TO THE APPROVAL OF THIS PERMIT.

This notice is intended to advise the applicant that pursuant to Government Code Section 66000, et. seq, the applicant has the opportunity to protest fees, dedications, reservations, and/or exactions required as part of this project approval. The opportunity to protest is limited to a ninety-day (90) period after the project is approved.

The 90-day period in which you may protest the amount of any fee or imposition of any dedication, reservation, or other exaction required by this approved permit, begins on the date this permit was approved. To be valid, a protest must be in writing pursuant to Government Code Section 66020 and delivered to the CDD within 90-days of the approval date of this permit.

- B. Prior to applying for a building permit, the applicant is strongly encouraged to contact the following agencies to determine if additional requirements and/or additional permits are required as part of the proposed project:
- Department of Conservation and Development, Building Inspection Division
 - Contra Costa County Public Works Department
 - Contra Costa County Fire Protection District
 - West County Wastewater District
 - East Bay Municipal Utility District

The applicant is strongly encouraged to review these agencies' requirements prior to continuing with the project.

GENERAL NOTES

All work shall comply with the CRC and all other codes and requirements, in their most recent edition.
 Building Inspection Dept. ordinances
 California State Building Code
 California Title 24 Energy codes
 NEC Amendments of the California plumbing, mechanical and electrical codes.

Contractor is to obtain any required permits for this work.

Contractor shall be responsible for all electrical, plumbing and fire protection work required by the Bldg. Dept.

Contractor shall verify all dimensions and existing conditions prior to starting work. Any discrepancies shall be reported to the designer for review.

Do not scale drawings. Dimensions shall take precedence over scale.

Contractor shall visit site prior to submission of bid to review scope of work, demolition, etc.

Dimensions are to face of finish, unless otherwise noted (U.O.N)

Cutting and demolition shall be done by methods which will not jeopardize structural integrity of existing construction and will not damage portions to remain.

Contractor shall remove, cut, cap and repair as necessary any utilities, including by not limited to : electrical, mechanical plumbing and fire sprinkler, where partitions are scheduled for demolition or are no longer operational or in service. All other existing utilities are are to remain fully operational.

Contractor is to provide all necessary dust protection and/or barricading required to protect adjacent spaces and existing finishes. Contractor is responsible to repair any damages caused by contractor or their subcontractors.

Patch and repair any damages to floor, walls, ceilings, hardware, fixtures, windows, etc. as a result of the construction process. Match existing adjacent finishes as closely as possible. Align and sand smooth.

In general, the Owner reserves the right to retain all material and equipment removed from the project. Any item or material not desired by the Owner are to be removed from the site by Contractor at Contractor's expense.

If any questions arise as to the installation of any materials and/or equipment, or with the construction documents, the Contractor shall clarify the point with the Architect or Designer before proceeding.

If any questions arise due to existing conditions apparent discrepancy between construction documents or any other reason, the contractor will immediately notify the Architect or Designer and clarify the point with the architect or designer.

Safety Measures: At all times the Contractor shall be solely and completely responsible for conditions of th job site including safety of persons and property.

Total thickness of new walls shall match that of adjacent walls. U.O.N.

Construction of new walls, ceilings utilities, etc. shall be modified with Architect's/Designer's approval, when in conflict with existing conditions.

Dimensions noted clear(clr) are not adjustable without approval by Architect/Designer.

The Contractor shall do all cutting, fitting or patching of work that may be required to make all parts fit together properly and shall not endanger any other work by cutting excavation or otherwise altering the total work or any part of it. All patching, repairing and replacing of materials and surfaced replaced will, upon completion, match surrounding similar surfaces.

Install backing at walls as required for all wall mounted items including plumbing fixtures, cabinet work, etc.

All exterior openings are to be weather-stripped.

Studs and furring shall provide plumb, true straight and rigid framing for support of collateral materials.

Install metal corner beads at all exposed outside gypsum board edges. All gypsum wallboard shall be 3-coat finished, taped, topped and sanded between coats. Finished surfaces shall be plumb, level and planes, plied vertically with joints on bearings. All gypsum wallboard shall be mill finished 48" by5/8" thick, unless otherwise noted by maximum length to minimize horizontal joints and tapered edges.

Contractor is responsible for all construction clean up. The building site shall be kept free of debris and cleaned up daily

No wall telephone or electrical outlets shall be mounted back to back.

The American with Disabilities Act (ADA) is subject to various and possibly contradictory interpretations. These plans and any accompanying specifications ("plan") represent the Designer's opinion regarding it's interpretation of the ADA as it applies to the subject project. It is not in any way a warranty or guarantee that said plans comply with any or all possible interpretations of the ADA by others.

ABBREVIATIONS

| | | | |
|---------|------------------------|---------------|------------------------|
| A.B. | ANCHOR BOLT | HORIZ | HORIZONTAL |
| ADJ. | ADJACENT | HT. | HEIGHT |
| A.F.F | ABOVE FINISHED FLOOR | H | HOT WATER HEATER |
| ALUM. | ALUMINUM | INSUL | INSULATION |
| & | AND | JST | JOIST |
| A.P. | ACCESS PANEL | LAV | LAVATORY |
| APPROX. | APPROXIMATELY | LT | LIGHT |
| @ | AT | MAX | MAXIMUM |
| BD. | BOARD | MB | MACHINE BOLT |
| BLDG. | BUILDING | MEZZ | MEZZANINE |
| BLKG. | BLOCKING | MFR | MANUFACTURER |
| BM. | BEAM | MIN | MINIMUM |
| B.O. | BOTTOM OF | (N) | NEW |
| BTW. | BETWEEN | N.I.C. | NOT IN CONTRACT |
| C.B | CATCH BASIN | NTS | NOT TO SCALE |
| C.J.T. | CONTROL JOINT | # | NUMBER |
| CL. | CLOSET | O.C. | ON CENTER |
| C | CENTER LINE | OPNG | OPENING |
| CLG | CEILING | OVHD | OVERHEAD |
| CLR | CLEAR | PL | PLATE |
| C.M.T | CERAMIC MOSAIC TILE | PROPERTY LINE | |
| CNTR. | CONTRACTOR | +/- | PLUS OR MINUS |
| COL. | COLUMN | PLYWD | PLYWOOD |
| CONC. | CONCRETE | PNTD | PAINTED |
| CONN. | CONNECTION | RAD | RADIUS |
| CONST. | CONSTRUCTION | RC | REINFORCED CONCRETE |
| CONT. | CONTINUOUS | RD | ROOF DRAIN |
| C.O.S. | CHECK ON SITE | REQ | REQUIRED |
| C.T. | CERAMIC TILE | RM | ROOM |
| C.T.R. | CENTER | RWL | RAIN WATER LEADER |
| D. | DRAIN | SC | SOLID CORE |
| DBL. | DOUBLE | SFGL | SAFETY GLASS |
| DEMO | DEMOLISH OR DEMOLITION | SHEET | |
| DET | DETAIL | SHWR | SHOWER |
| DF | DRINKING FOUNTAINS | SIMR | SIMILAR |
| DIA | DIAMETER | SLDG | SLIDING |
| DIM | DIMENSION | S.F. | SQUARE FEET |
| DN | DOWN | SSTL. | SEE STRUCTURAL DWGS. |
| DR | DOOR | SSD | STAINLESS STEEL |
| D.S. | DOWNSPOUT | STL | STEEL |
| DWG. | DRAWING | STOR | STORAGE |
| (E) | EXISTING | THR | THRESHOLD |
| EA. | EACH | TO | TOP OF |
| ELEC | ELECTRICAL | TOS | TOP OF SLAB |
| EQ | EQUAL | TOW | TOP OF WALL |
| EXIST | EXISTING | TPD | TOILET PAPER DISPENSER |
| EXP | EXPOSED | TYP. | TYPICAL |
| EXT | EXTERIOR | UR | URINAL |
| F.D | FLOOR DRAIN | UON | UNLESS OTHERWISE NOTED |
| FFL | FINISH FLOOR LEVEL | VERT | VERTICAL |
| FIN | FINISH | VT | VINYL TILE |
| FLASH | FLASHING | W/ | WITH |
| FLR | FLOOR | WC | WATER CLOSET |
| FND | FOUNDATION | WD | WOOD |
| F.O.F | FACE OF FINISH | WDW | WINDOW |
| F.O.S | FACE OF STUD | WPM | WATERPROOF MEMBRANE |
| FT | FOOT OR FEET | WSCT | WAINSCOT |
| FTG | FOOTING | | |
| GA | GAGE, GAUGE | | |
| GALV. | GALVANIZED | | |
| GL. | GLASS | | |
| GLB | GLU-LAM BEAM | | |
| GND | GROUND | | |
| GRD | GRADE | | |
| GSM | GALVANIZED SHEET METAL | | |
| GCT | GLAZED CERAMIC TILE | | |
| GYP. | BD.:YPSUM BD | | |
| GVL. | GRAVEL | | |
| H.B | HOSE BIB | | |
| H.C | HOLLOW CORE | | |
| HDR. | HEADER | | |
| HDWD | HARDWOOD | | |

ADDITIONAL NOTES

FIRE SAFETY

Portable Fire Extinguishers: Structures under construction, alteration or demolition shall be provided with approved fire extinguishers in accordance with CBC §906 and sized for not less than ordinary hazard as follows per CBC §3309.1. Revise the plans to show the location of the required fire extinguisher as follows: 3.1. At each stairway on all floor levels where combustible materials are accumulated.
 · In every storage and construction shed.
 · Additional portable fire extinguishers shall be provided where special hazard exist, such as the storage and use of flammable and combustible liquids.
 · Minimum 2-A-10-B-C rating fire extinguishers shall be provided throughout the building under construction, alteration, or demolition with a maximum travel distance of 75-feet.

Fire Safety during Construction:

· Smoking shall be prohibited except in designated areas with approved ashtrays. All other areas must have "No Smoking" signage posted around construction areas in accordance with CFC§310. [CFC§3304.1]
 · Combustible debris shall not be accumulated within building. Combustible debris, rubbish and waste material shall be removed from building at the end of each shift of work. [CFC §3304.2]
 · Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a listed disposal container. [CFC §3304.2.4]
 · Operations involving the use of cutting and welding shall be done in accordance with CFC Chapter 35 [CFC §3304.6]
 · During construction, the construction site or area must be clean up at the end of the day in order to provide firefighter access in the building in an event of a fire.

PROPOSED AREA SUMMARY

| FLOOR | AREA |
|---------------------------|-------------------|
| FIRST FLOOR | 723 SQ FT. |
| LOWER FLOOR | 963 SQ FT. |
| TOTAL LIVING SPACE | 1686 SQ FT |
| GARAGE | 442 SQ FT |
| TOTAL HOUSE AREA | 2128 SQ FT |

PROJECT INFORMATION

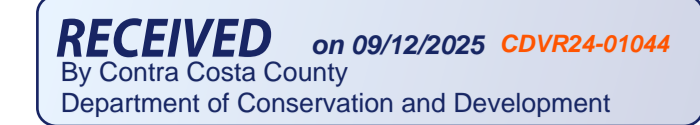
| | |
|--------------------------|---|
| PROJECT NAME | 1518 BARTH AVE |
| PROJECT ADDRESS | 1518 BARTH AVE, SAN PABLO, CA 94806 |
| OCCUPANCY | R-3 |
| CONSTRUCTION TYPE | V-B NON-RATED |
| SPRINKLERS | YES |
| ZONNING | R-6 |
| LOT SIZE | 4709 SF |
| LOT COVERAGE | PROPOSED 26.5% = 1250 SQ.FT. |
| APN | 419192015 |
| SETBACK | FRONT SETBACK REQUIRED 20FT / PROPOSED 9FT SIDE SETBACK REQUIRED 15 FT TOTAL(5 FT MIN SIDE) REAR SETBACK 15FT |
| PARKING SPACE | 2 CAR PARKING |
| HEIGHT ALLOWED | 35' MAX OR 2.5 STORIES PROPOSED 25'-0"+/- IN REAR PROPOSED 15'-6"+/- IN FRONT |

SYMBOLS LEGEND

| | |
|-------------|-------------------------|
| | ELEVATION TAG |
| | SECTION TAG |
| | INTERIOR ELEVATION TAG |
| | DOOR TAG |
| | WINDOW TAG |
| | KEYNOTES |
| | LIGHTING FIXTURE TAG |
| ROOM | ROOM NAME |
| | CEILING HEIGHT |
| | WALL TO REMAIN |
| | ITEM TO BE DEMOLISHED |
| | NEW WALL - 1 HOUR RATED |
| | NEW EXTERIOR WALL |

PROJECT SCOPE

NEW RESIDENCE ON VACANT LOT



DRAWING INDEX

| SHEET NO. | SHEET NAME |
|-----------|-------------------------------|
| A.0.0 | COVER PAGE |
| A.0.1 | EXISTING SITE PLAN |
| A.0.2 | PROPOSED SITE PLAN |
| A.0.3 | SURVEY |
| A.1.0 | IMAGES OF MODEL ON SITE |
| A.1.4 | PROPOSED FLOOR PLANS |
| A.1.8 | PROPOSED ROOF PLAN & SECTIONS |
| A.2.3 | PROPOSED EXTERIOR ELEVATIONS |
| A.2.4 | PROPOSED EXTERIOR ELEVATIONS |



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| REVISIONS | DATE |
|-----------|------|
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 SAN PABLO, CA 94806
 PH: 415-531-6111

PLANNING SET

CODES

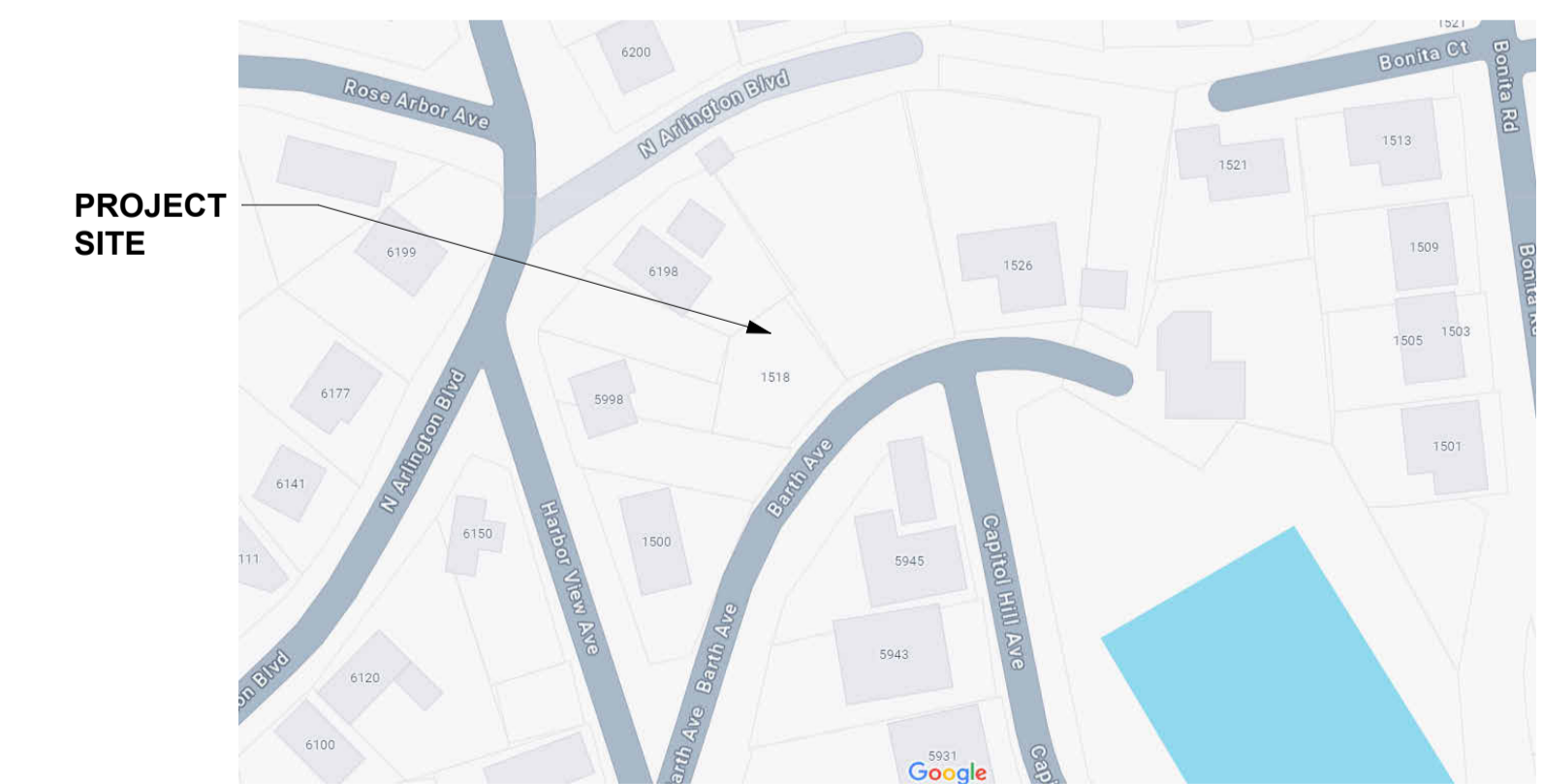
2022 CALIFORNIA PLUMBING CODE (CPC)
 2022 CALIFORNIA MECHANICAL CODE (CMC)
 2022 NATIONAL ELECTRICAL CODE (NEC)
 2022 CALIFORNIA FIRE CODE
 2022 CALIFORNIA RESIDENTIAL CODE
 2022 CALIFORNIA ENERGY CODE
 2022 CALIFORNIA EXISTING BUILDING CODE
 (AS APPLICABLE AND AMENDED BY CONTRA COSTA COUNTY)

PROJECT TEAM

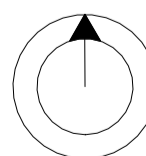
ARCHITECT
 BACILIA MACIAS ARCHITECTURE
 6007 NE SACRAMENTO ST
 PORTLAND, OR 97213
 (510)929-0727
 BACILIA@BMARCH.NET
 WWW.BACILIAMACIAS.COM

STRUCTURAL ENGINEER
 TBD

VICINITY MAP



NORTH



DRAWN BY: BM

DATE: 4 / 1 /2025



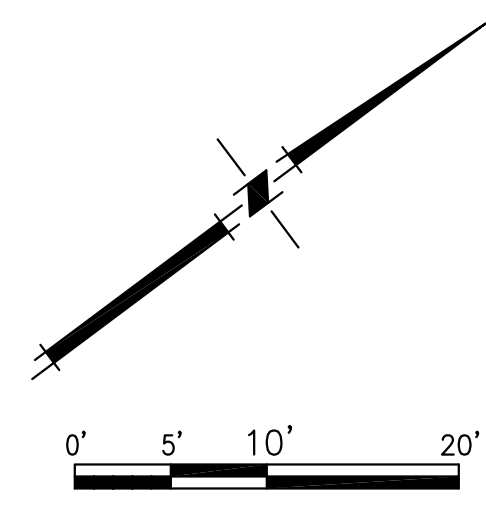
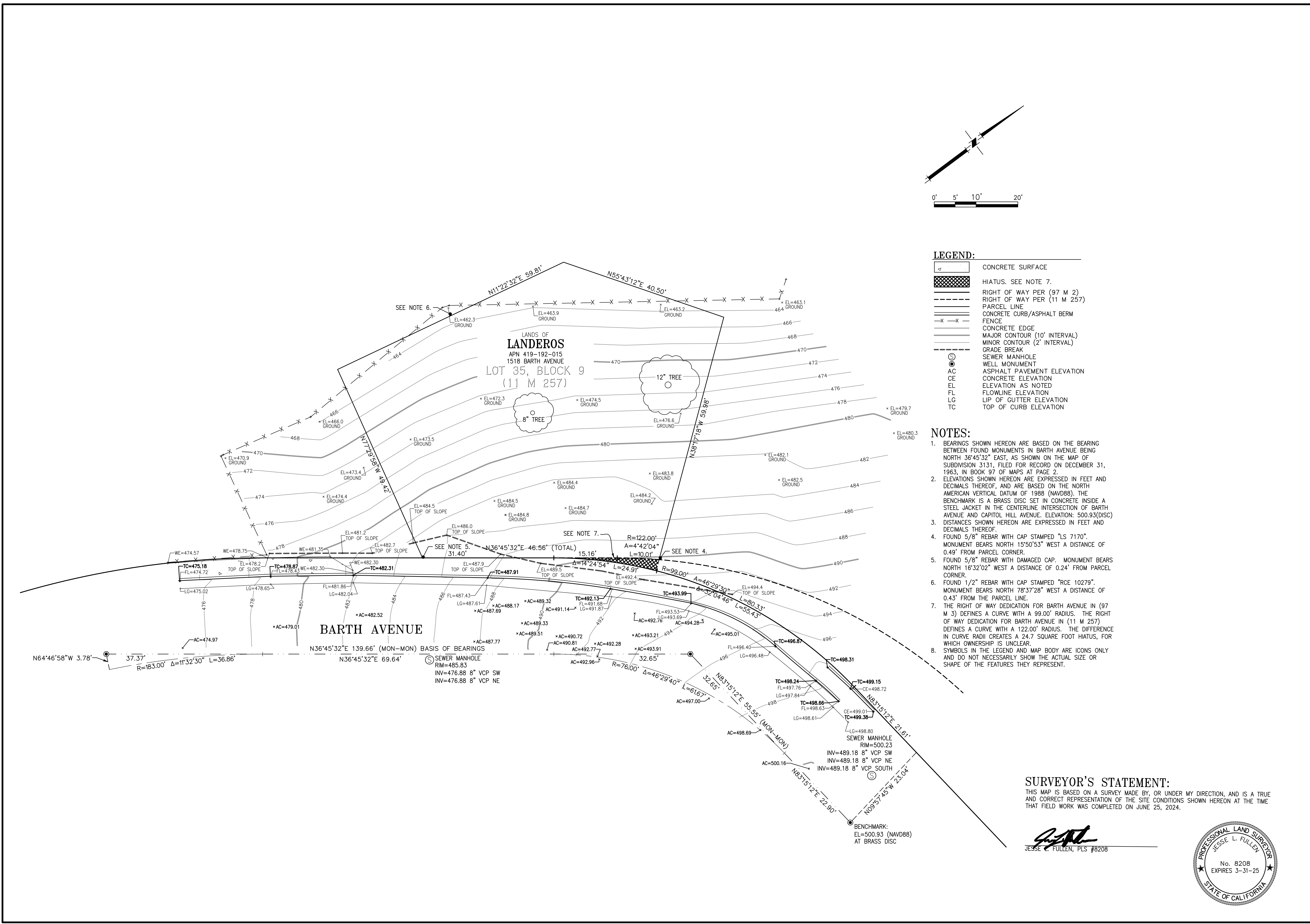
SHEET TITLE:

COVER PAGE

SHEET NO:

A.0.0

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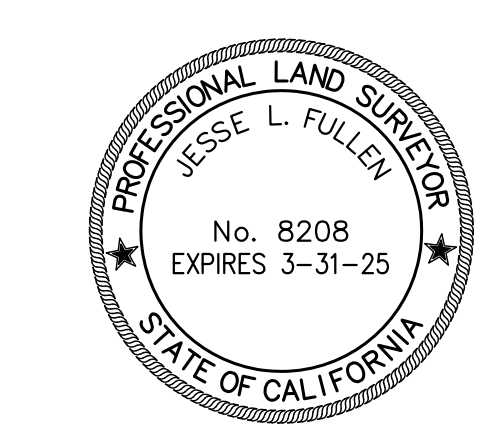
LEGEND:

| | |
|--|------------------------------|
| | CONCRETE SURFACE |
| | HIATUS. SEE NOTE 7. |
| | RIGHT OF WAY PER (97 M 2) |
| | RIGHT OF WAY PER (11 M 257) |
| | PARCEL LINE |
| | CONCRETE CURB/ASPHALT BERM |
| | FENCE |
| | CONCRETE EDGE |
| | MAJOR CONTOUR (10' INTERVAL) |
| | MINOR CONTOUR (2' INTERVAL) |
| | GRADE BREAK |
| | SEWER MANHOLE |
| | WELL MONUMENT |
| | ASPHALT PAVEMENT ELEVATION |
| | CONCRETE ELEVATION |
| | ELEVATION AS NOTED |
| | FLOWLINE ELEVATION |
| | LIP OF GUTTER ELEVATION |
| | TOP OF CURB ELEVATION |

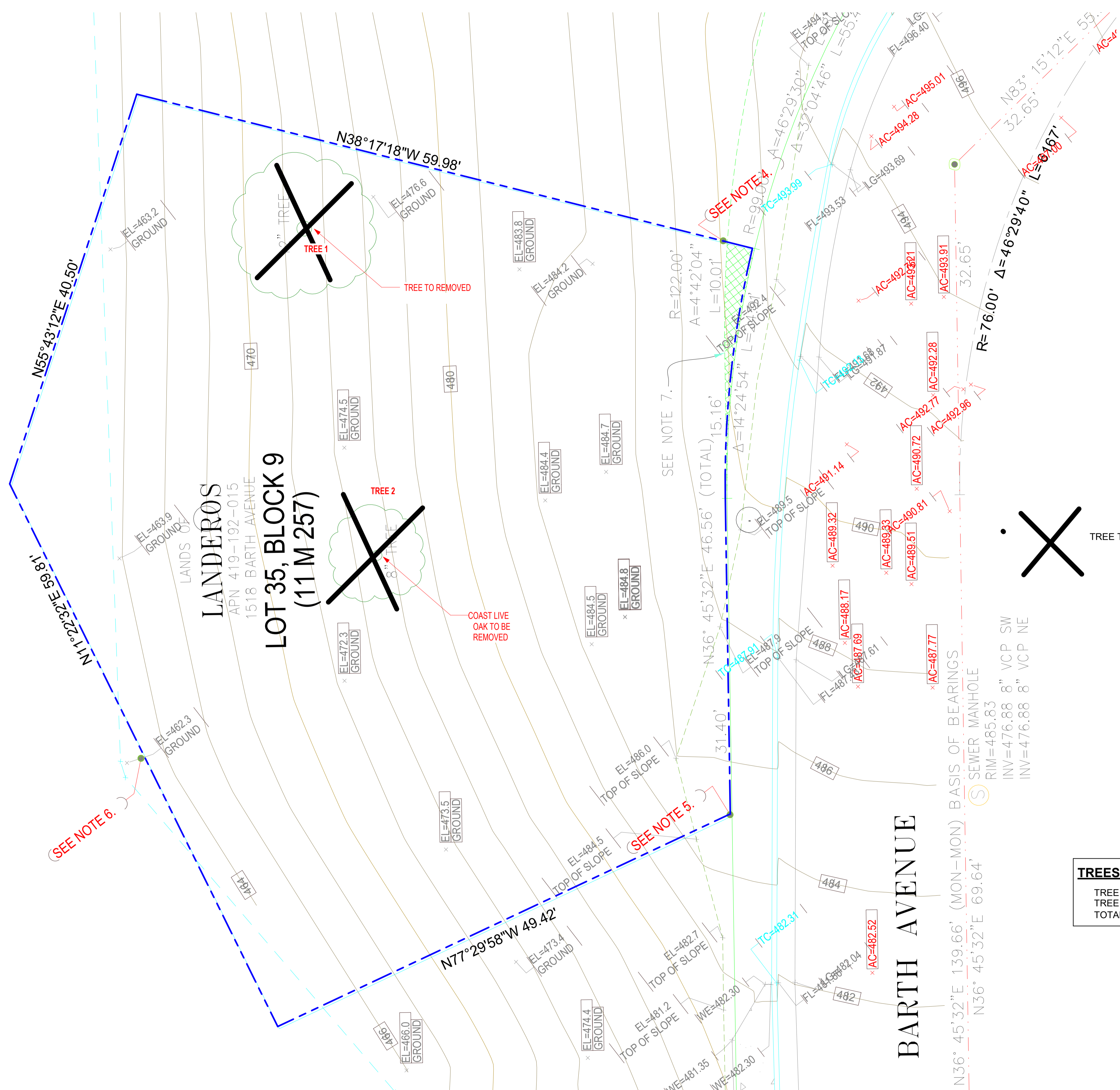
- NOTES:**
- BEARINGS SHOWN HEREON ARE BASED ON THE BEARING BETWEEN FOUND MONUMENTS IN BARTH AVENUE BEING NORTH 36°45'32" EAST, AS SHOWN ON THE MAP OF SUBDIVISION 3131, FILED FOR RECORD ON DECEMBER 31, 1963, IN BOOK 97 OF MAPS AT PAGE 2.
 - ELEVATIONS SHOWN HEREON ARE EXPRESSED IN FEET AND DECIMALS THEREOF, AND ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). THE BENCHMARK IS A BRASS DISC SET IN CONCRETE INSIDE A STEEL JACKET IN THE CENTERLINE INTERSECTION OF BARTH AVENUE AND CAPITOL HILL AVENUE. ELEVATION: 500.93(DISC)
 - DISTANCES SHOWN HEREON ARE EXPRESSED IN FEET AND DECIMALS THEREOF.
 - FOUND 5/8" REBAR WITH CAP STAMPED "LS 7170". MONUMENT BEARS NORTH 15°50'53" WEST A DISTANCE OF 0.49' FROM PARCEL CORNER.
 - FOUND 5/8" REBAR WITH DAMAGED CAP. MONUMENT BEARS NORTH 16°32'02" WEST A DISTANCE OF 0.24' FROM PARCEL CORNER.
 - FOUND 1/2" REBAR WITH CAP STAMPED "RCE 10279". MONUMENT BEARS NORTH 78°37'28" WEST A DISTANCE OF 0.43' FROM THE PARCEL LINE.
 - THE RIGHT OF WAY DEDICATION FOR BARTH AVENUE (IN 97 M 3) DEFINES A CURVE WITH A 99.00' RADIUS. THE RIGHT OF WAY DEDICATION FOR BARTH AVENUE (IN 11 M 257) DEFINES A CURVE WITH A 122.00' RADIUS. THE DIFFERENCE IN CURVE RADI CREATES A 24.7' SQUARE FOOT HIATUS, FOR WHICH OWNERSHIP IS UNCLEAR.
 - SYMBOLS IN THE LEGEND AND MAP BODY ARE ICONS ONLY AND DO NOT NECESSARILY SHOW THE ACTUAL SIZE OR SHAPE OF THE FEATURES THEY REPRESENT.

SURVEYOR'S STATEMENT:
 THIS MAP IS BASED ON A SURVEY MADE BY, OR UNDER MY DIRECTION, AND IS A TRUE AND CORRECT REPRESENTATION OF THE SITE CONDITIONS SHOWN HEREON AT THE TIME THAT FIELD WORK WAS COMPLETED ON JUNE 25, 2024.

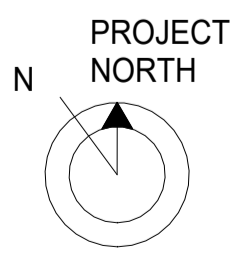
Jesse L. Fullen
 JESSE L. FULLEN, PLS #8208



| | | | | | |
|---|-------------------|--------------------|-----|----|------|
| SCALE: 1"=10' | DATE: 25/JUL/2024 | FIELD CREW: DP/JFF | NO. | BY | DATE |
| 1518 BARTH AVENUE ~ ASSESSOR'S PARCEL NUMBER 419-192-015 TOPOGRAPHIC SURVEY AND RECORD BOUNDARY MAP SAN PABLO CONTRA COSTA COUNTY CALIFORNIA | | | | | |
| SHEET NO. 1 OF 1 SHEETS JOB No. BMAC0001 | | | | | |



TREES TO BE REMOVED
 TREE 1: 12" TRUNK COAST LIVE OAK
 TREE 2: 8" TRUNK COAST LIVE OAK
 TOTAL TREES REMOVED: 2



1 EXISTING SITEPLAN
 3/16" = 1'-0"



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 bacilia@bmacarch.net
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| REVISIONS | DATE |
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 SAN PABLO, CA 94806
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PLANNING SET

NEW RESIDENCE
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 APN 419192015

DRAWN BY: BM
 DATE: 4 / 1 / 2025



SHEET TITLE:

EXISTING SITE PLAN

SHEET NO:
 A.0.1

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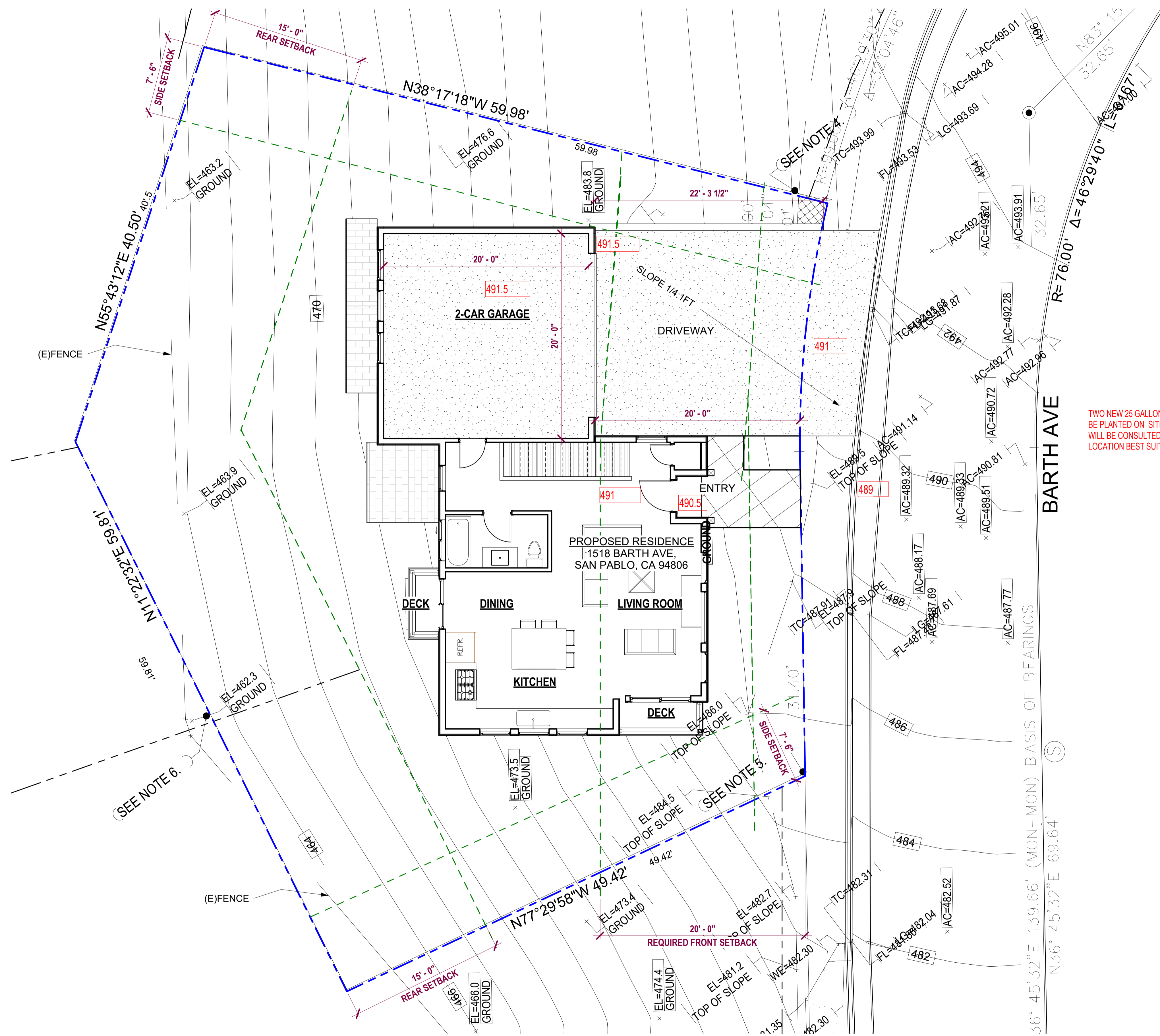
SHEET TITLE:

PROPOSED SITE PLAN

SHEET NO:

A.0.2

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TWO NEW 25 GALLON TREES TO BE PLANTED ON SITE. ARBORIST WILL BE CONSULTED FOR SPECIES AND LOCATION BEST SUITED FOR TREES.

1 PROPOSED SITE PLAN
3/16" = 1'-0"



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SHEET TITLE:

PROPOSED SITE PLAN WITH PHOTO OVERLAY

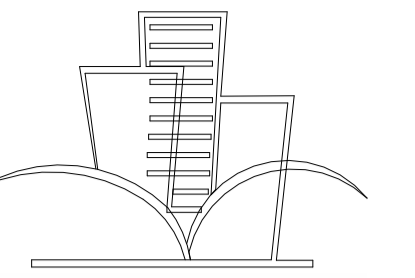
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1 PROPOSED SITE PLAN-PHOTO OVERLAY
 1" = 10'-0"



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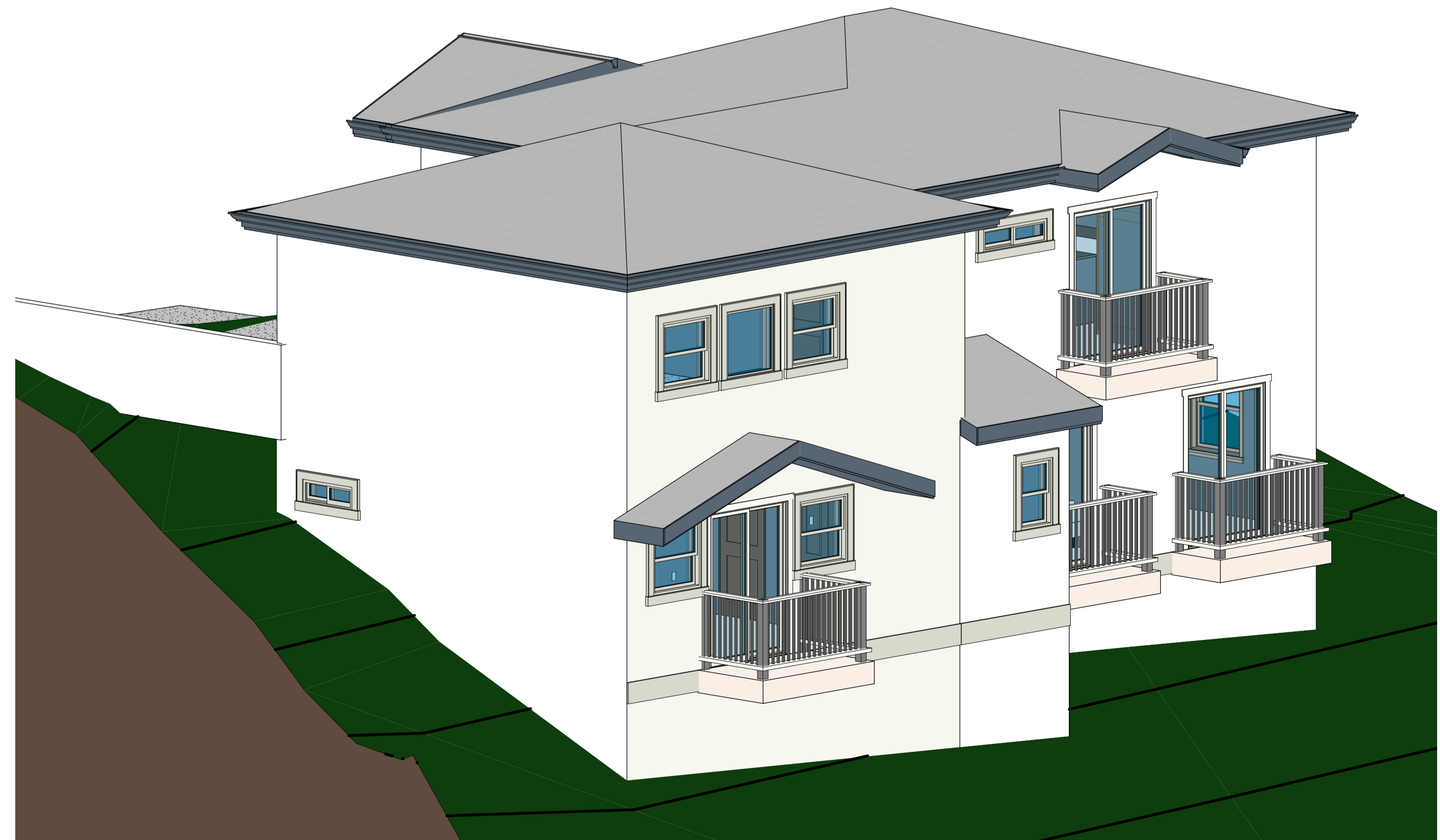
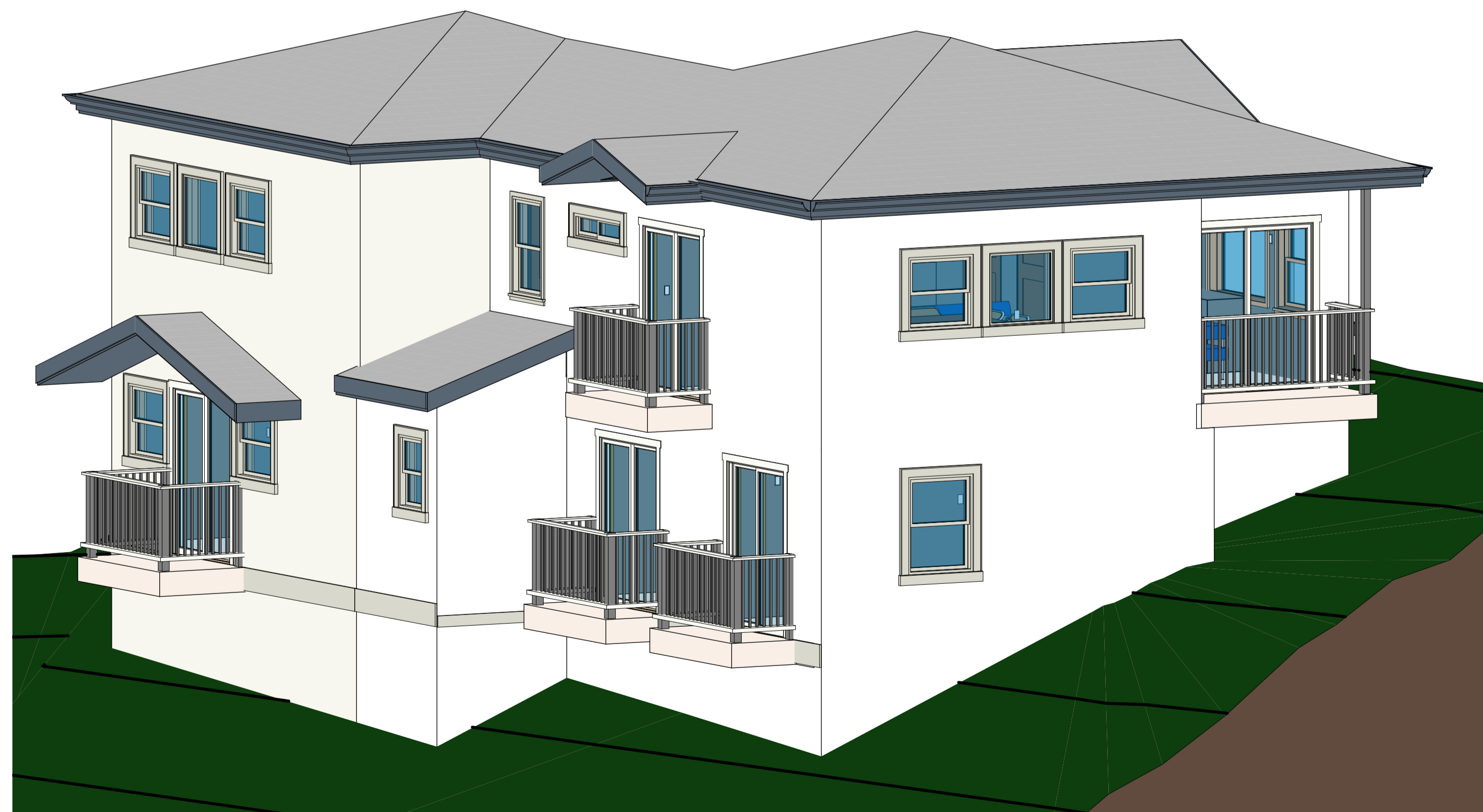
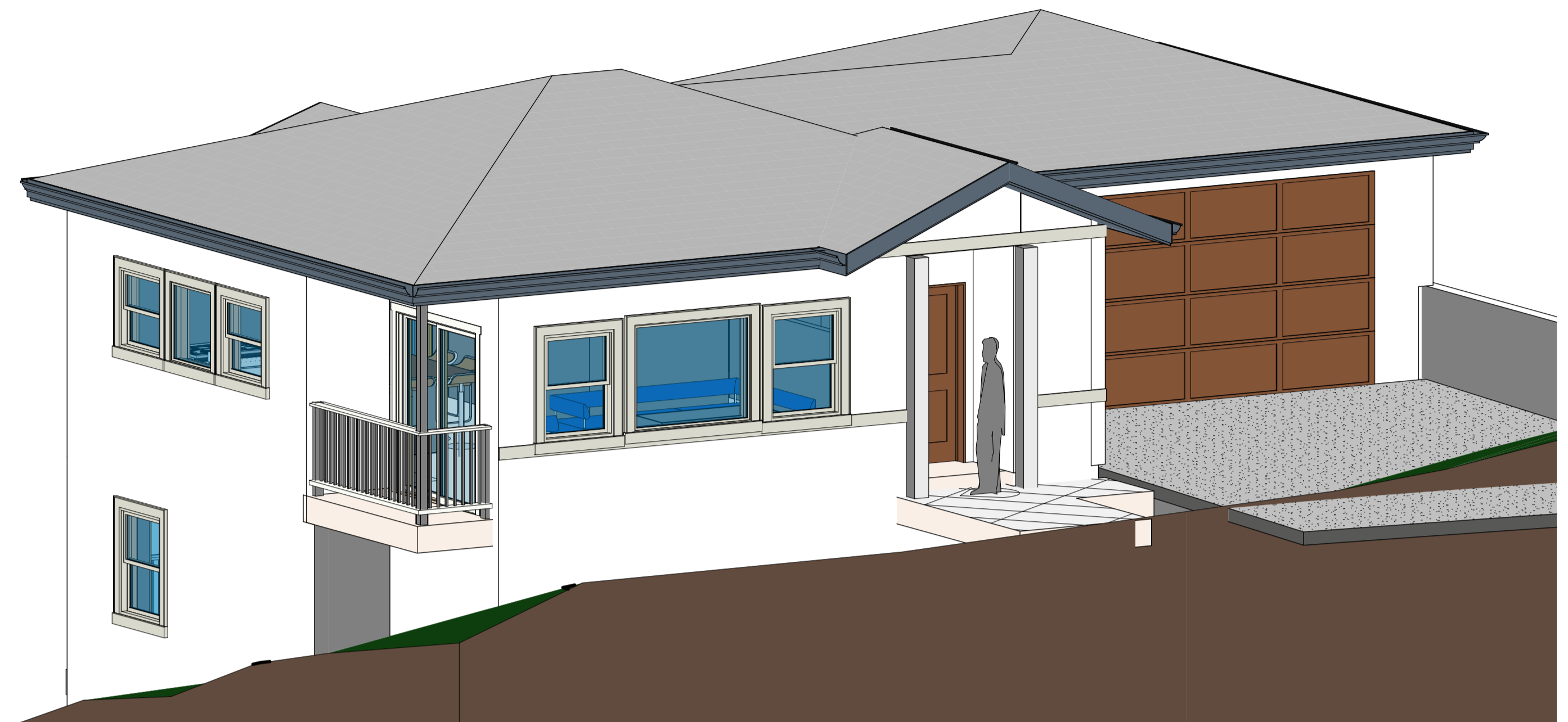
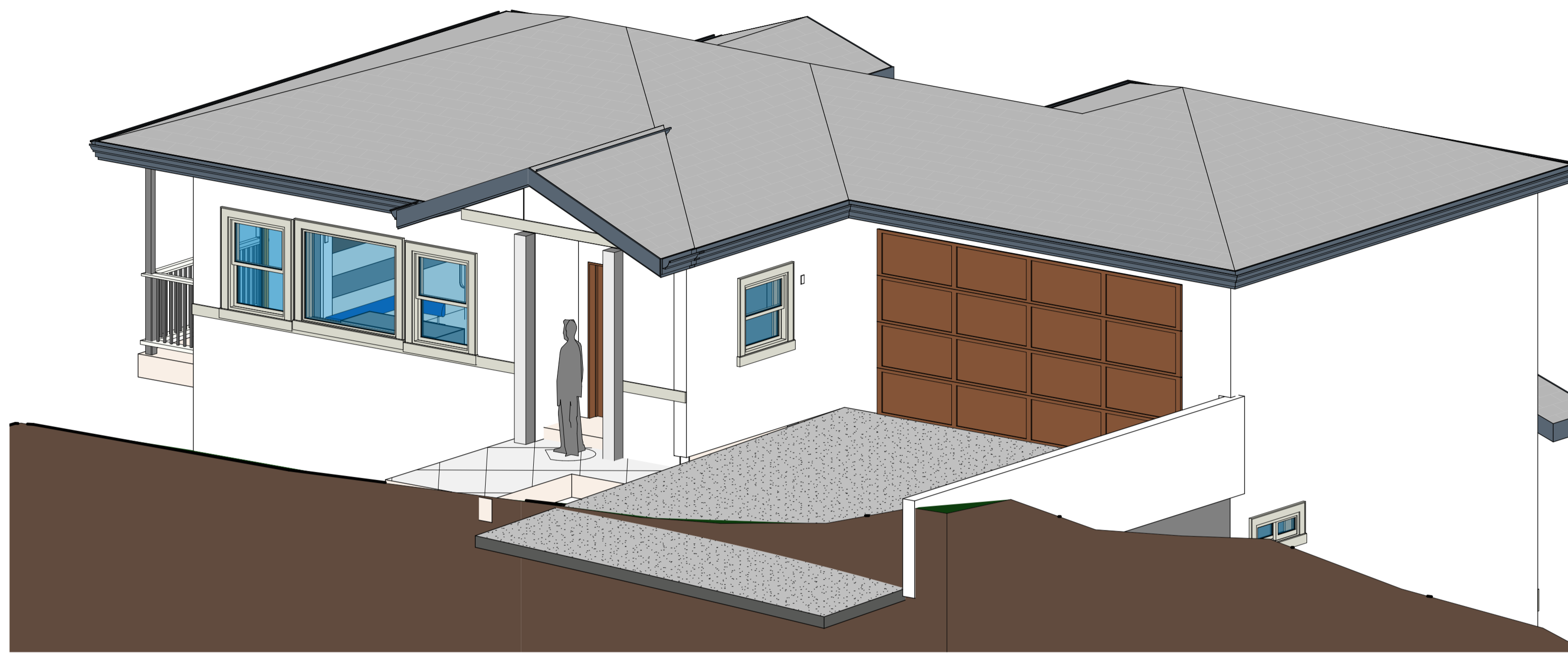
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SHEET TITLE:

IMAGES OF
MODEL ON SITE

SHEET NO.:

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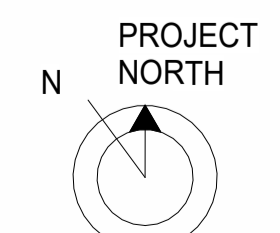
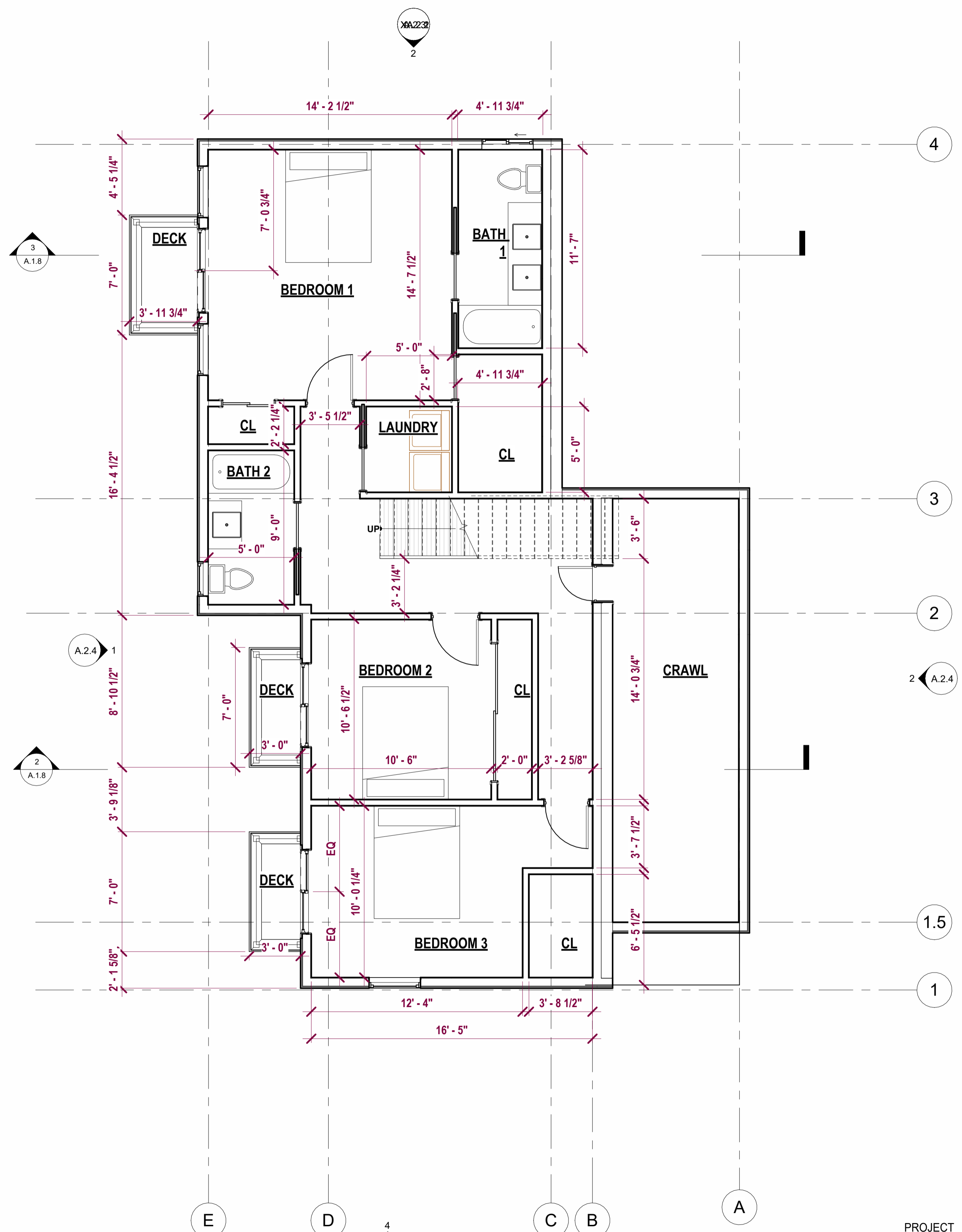
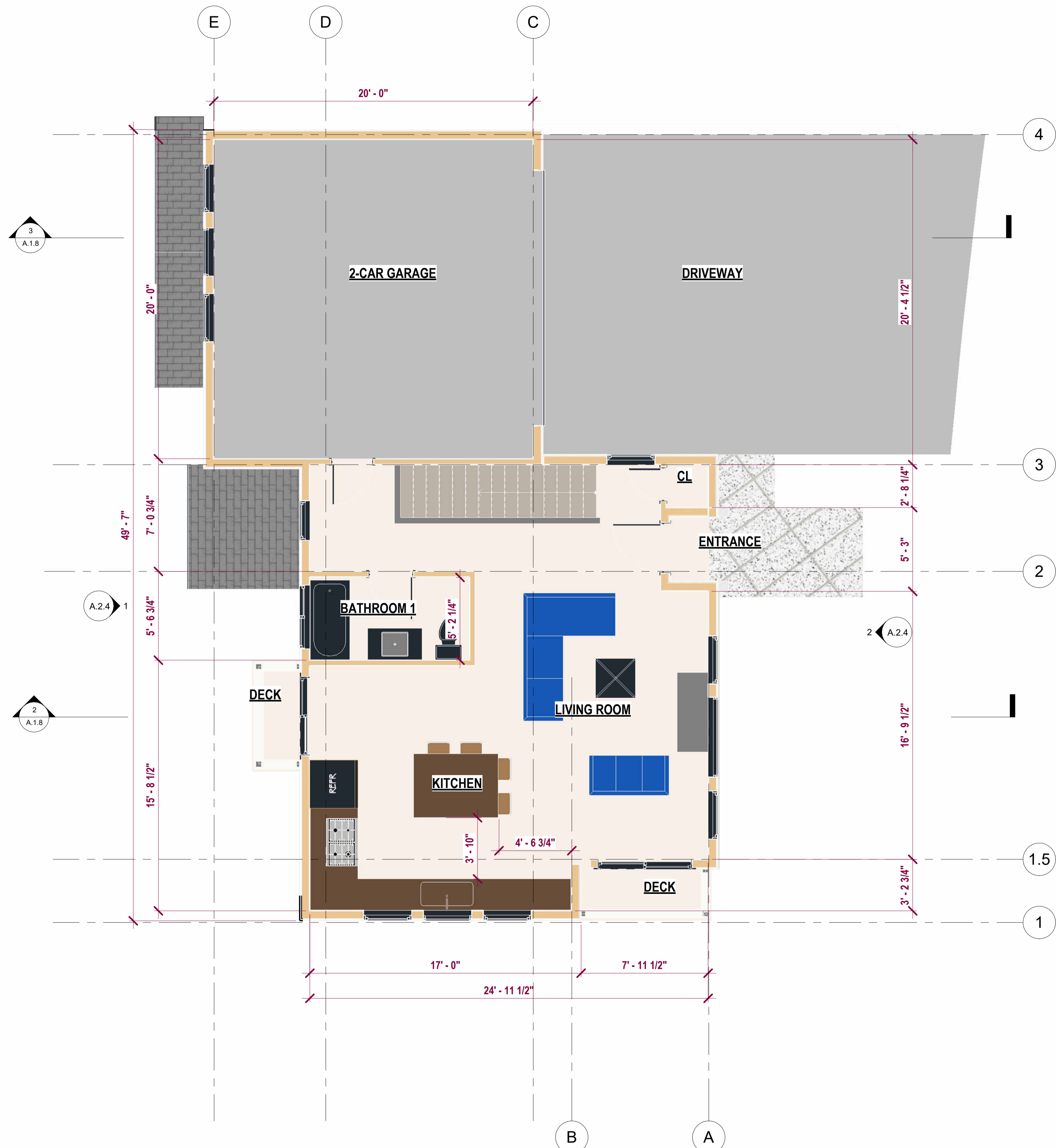


SHEET TITLE:

PROPOSED
FLOOR PLANS

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APN 419192015

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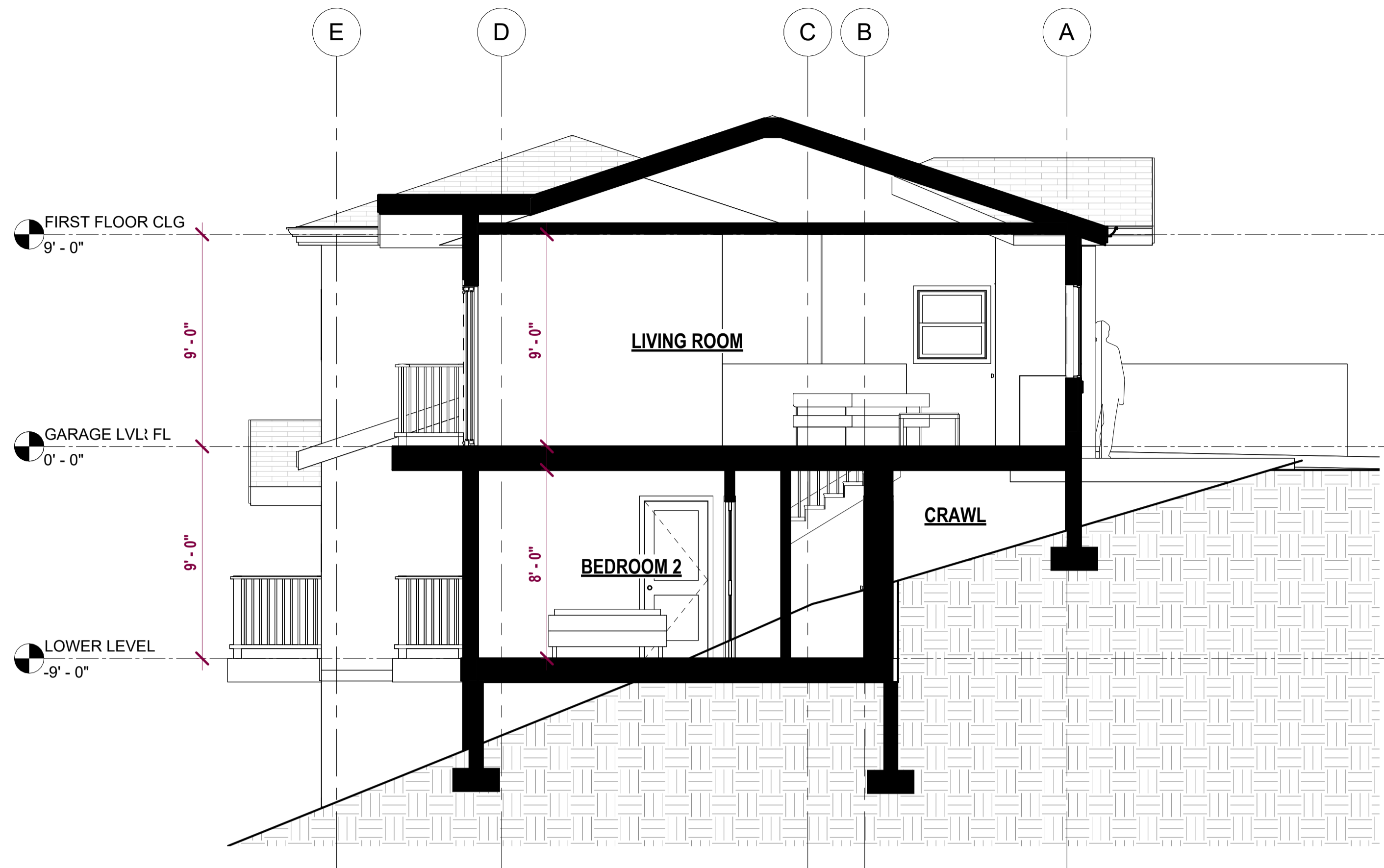
SHEET TITLE:

PROPOSED ROOF
PLAN & SECTIONS

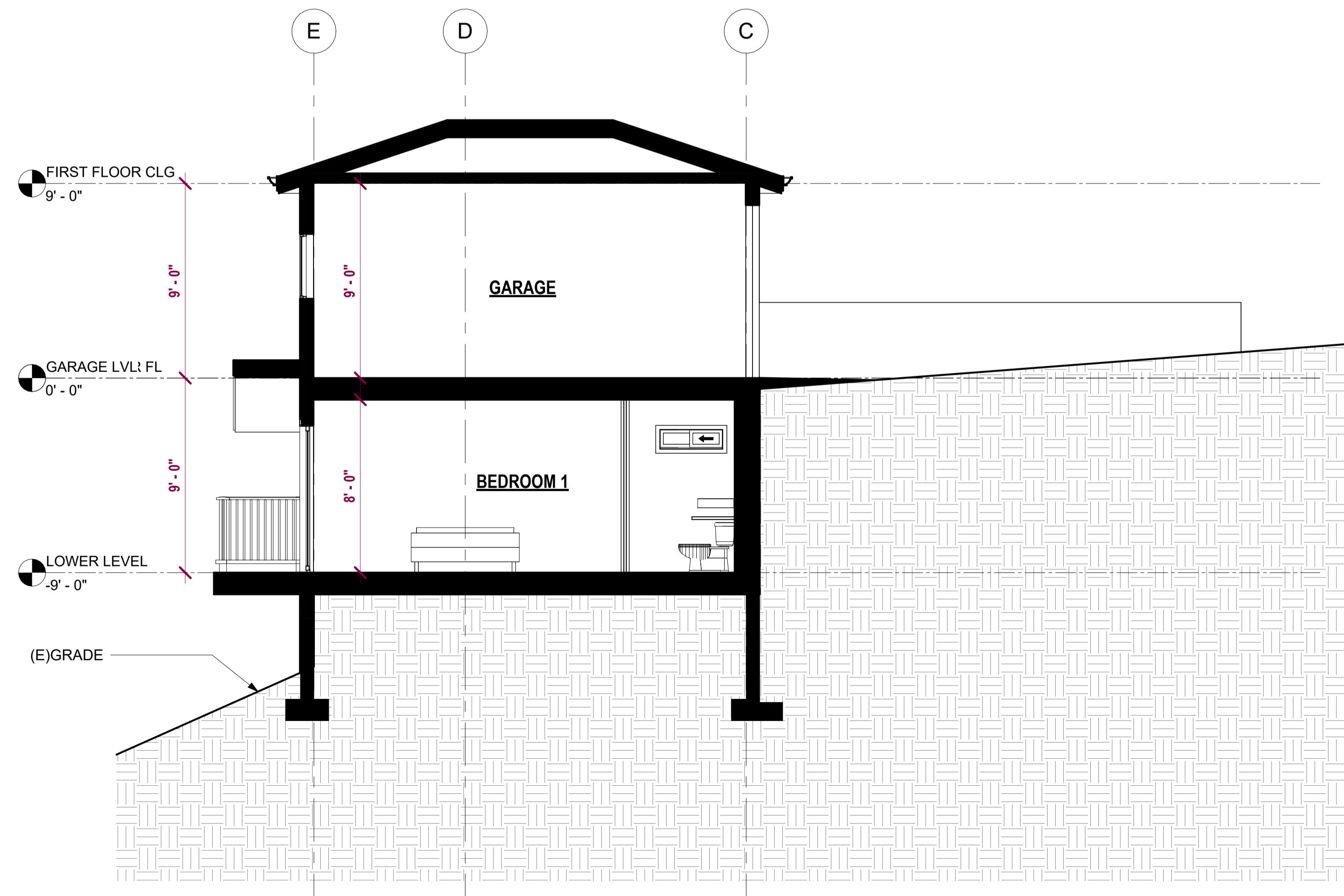
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A.1.8

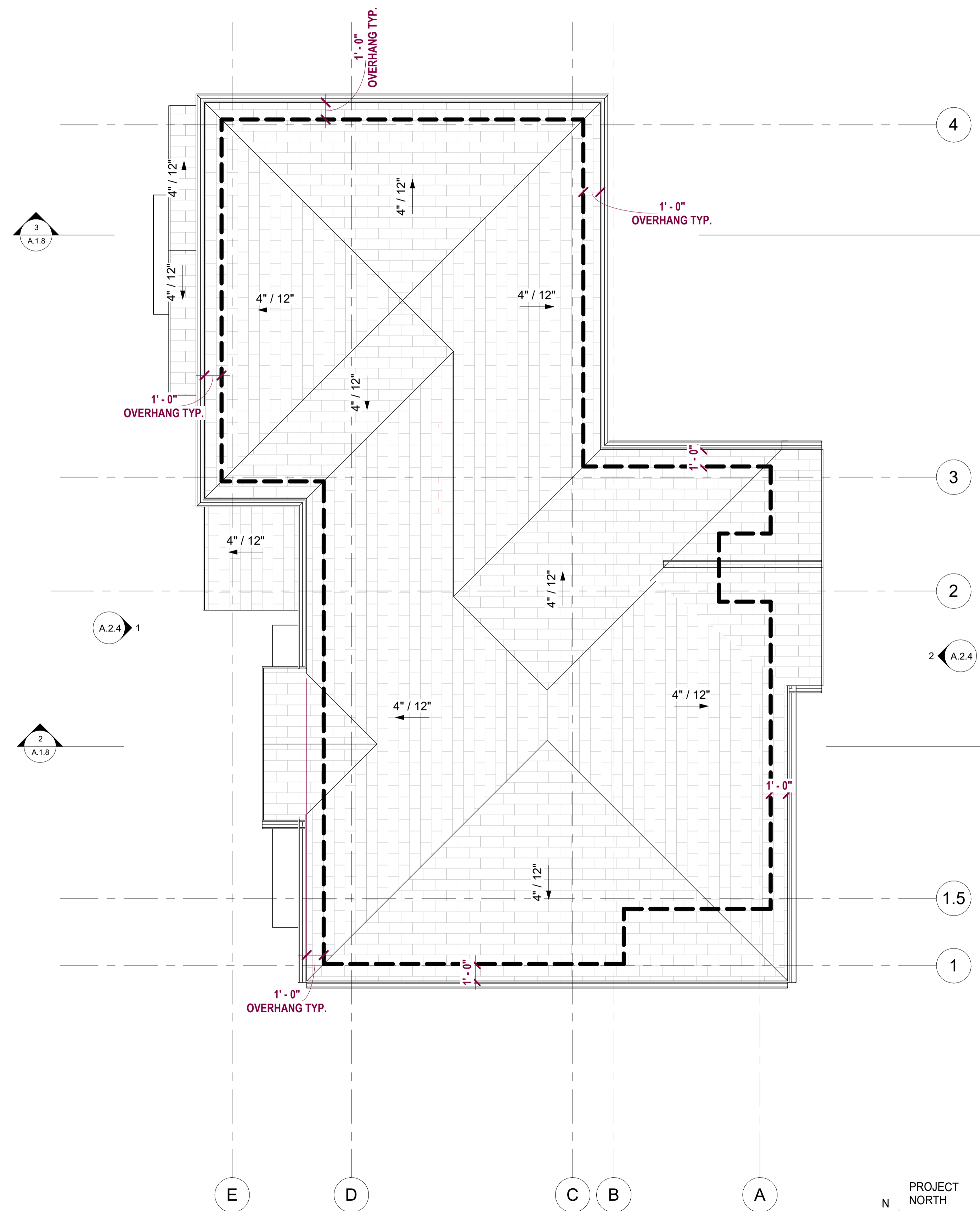
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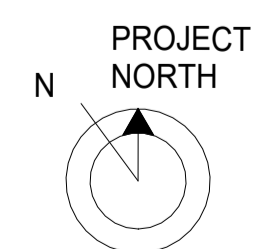
2 BUILDING SECTION 01
1/4" = 1'-0"



3 BUILDING SECTION 02
1/4" = 1'-0"



1 PROPOSED ROOF PLAN
1/4" = 1'-0"



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APN 419192015

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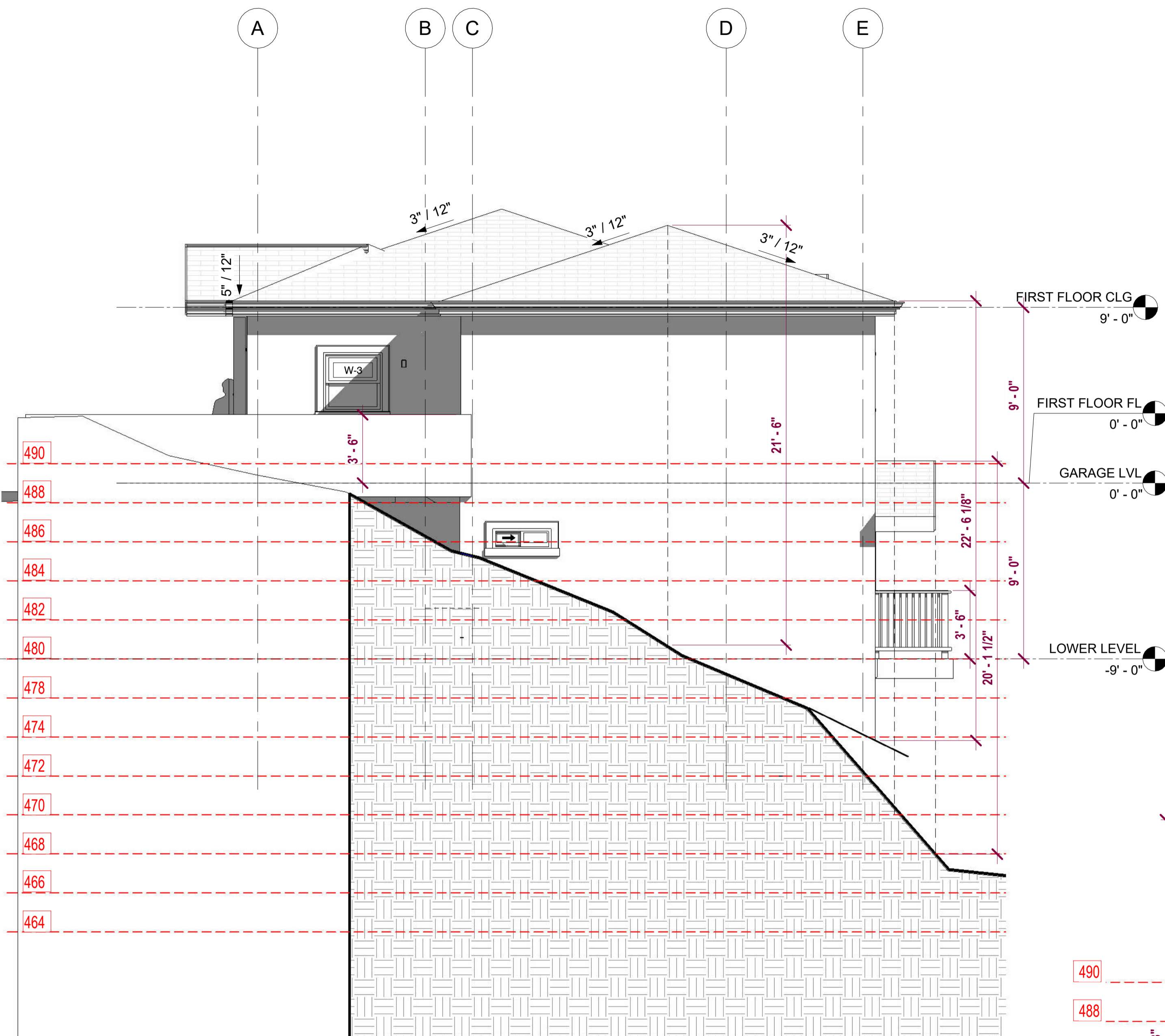
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PROPOSED
EXTERIOR
ELEVATIONS

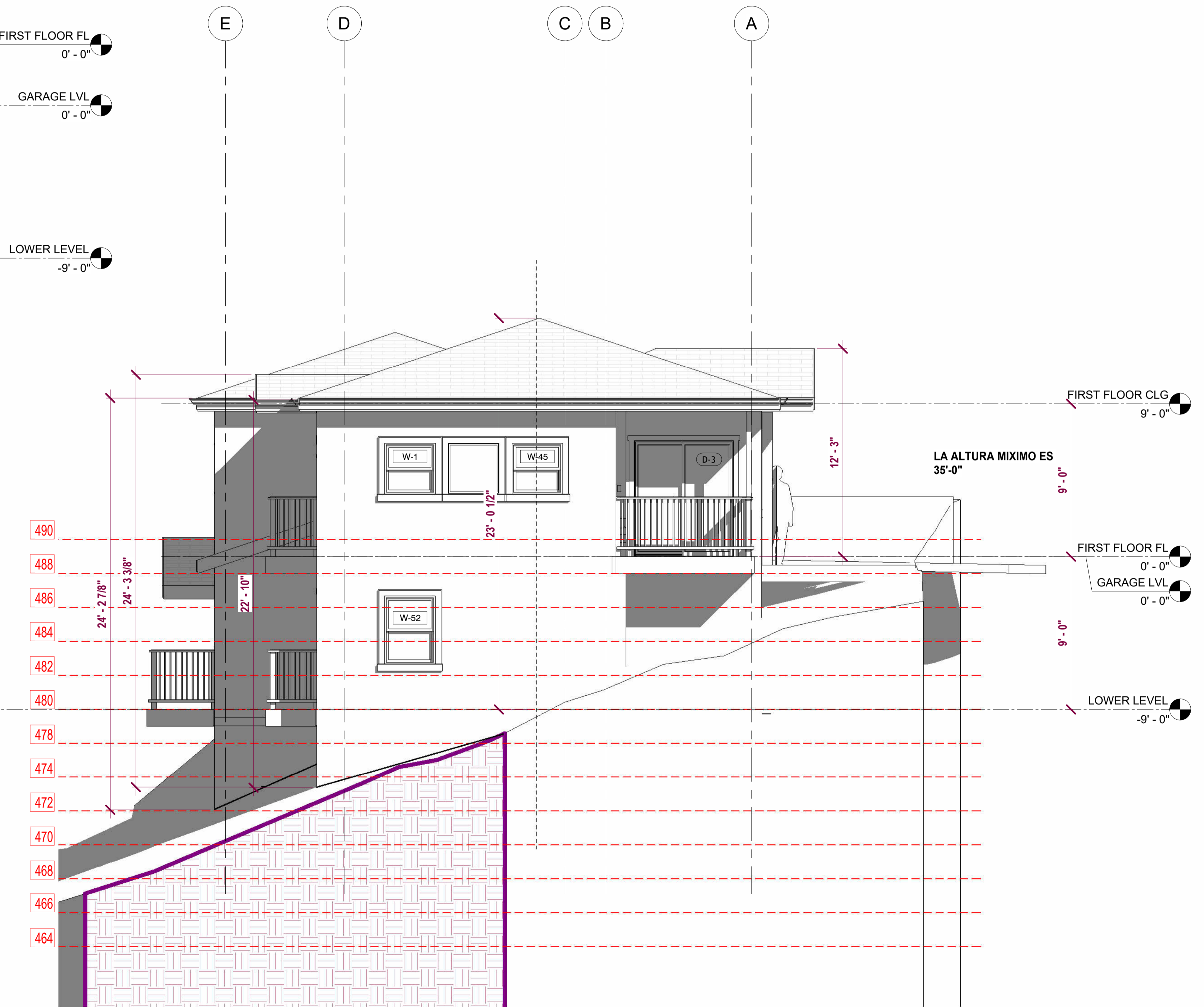
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2 NORTH ELEVATION
1/4" = 1'-0"



4 SOUTH ELEVATION
1/4" = 1'-0"

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DATE: 4 / 1 / 2025

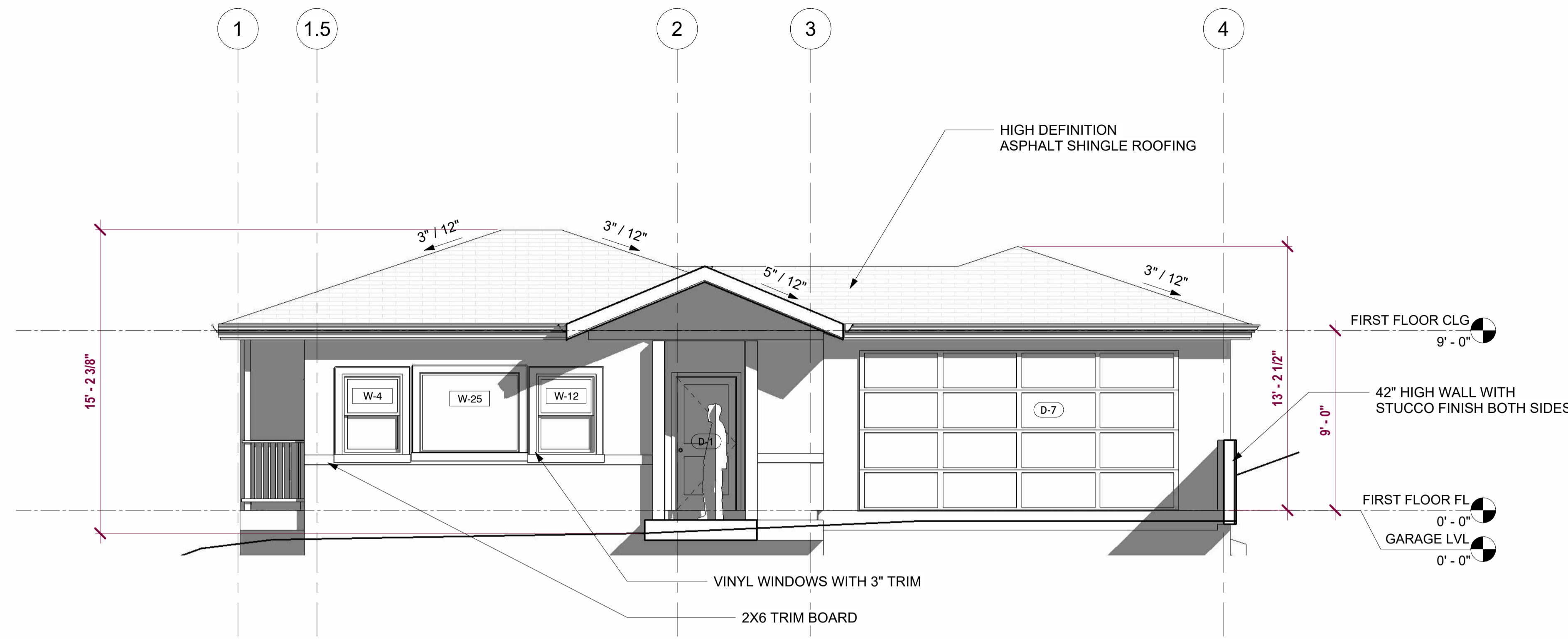


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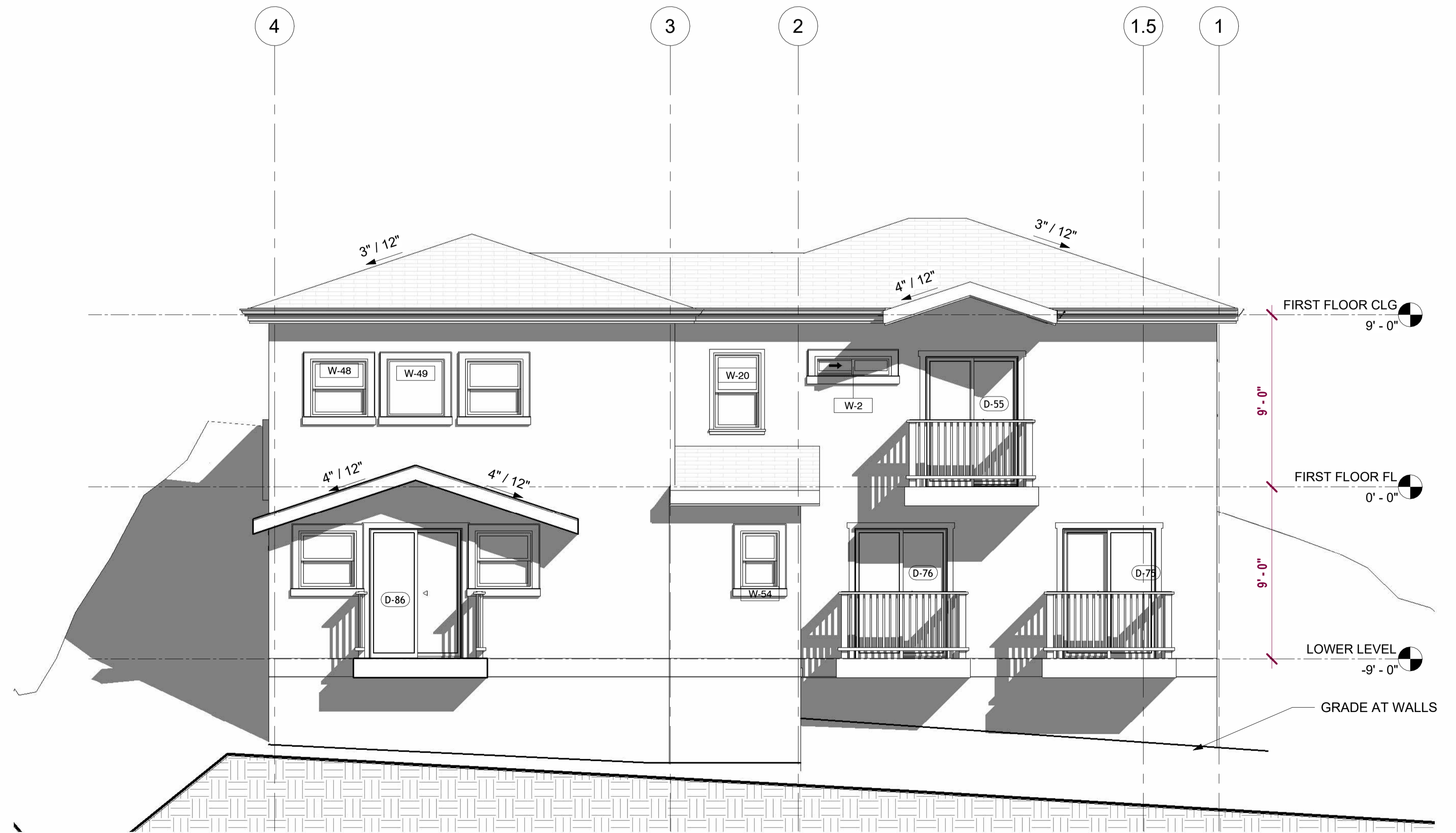
PROPOSED
EXTERIOR
ELEVATIONS

SHEET NO:
A.2.4

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2 EAST ELEVATION
1/4" = 1'-0"



1 WEST ELEVATION
1/4" = 1'-0"



6007 NE Sacramento St.
Portland, OR 97213
bacilia@bmarch.net
www.baciliamacias.com
P: 510.929-0727



REVISIONS DATE

OWNER:
EDUARDO LANDEROS
2204 PINE AVE
SAN PABLO, CA 94806
PH: 415-531-6111

PLANNING SET

NEW RESIDENCE
1518 BARTH AVE, SAN PABLO, CA 94806
APN 419192015

DRAWN BY: BM

DATE: 4 / 1 / 2025



SHEET TITLE:

PROPOSED
ELECTRICAL PLAN

SHEET NO:

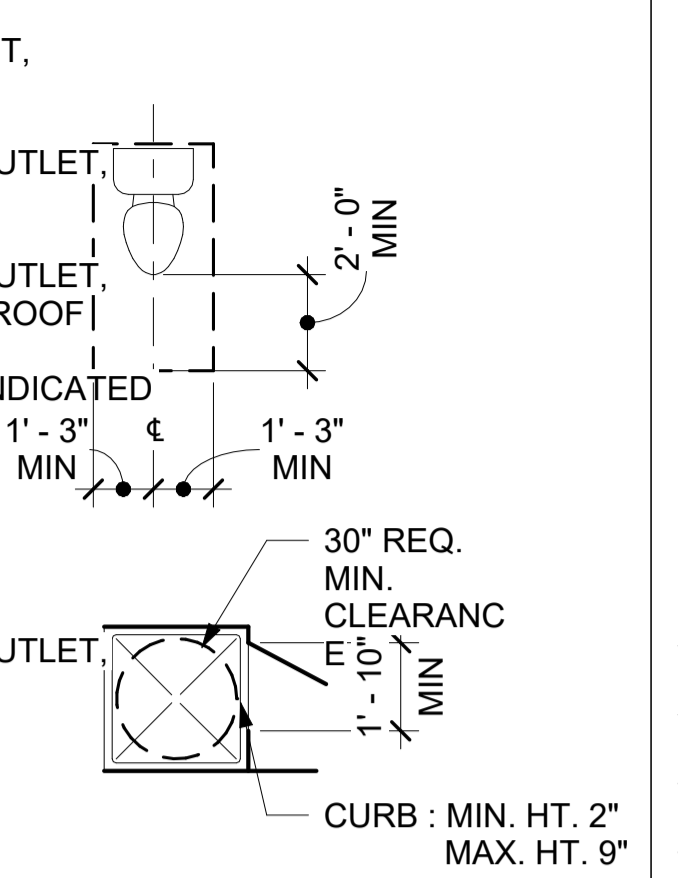
A.3.1

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ELECTRICAL LEGEND

- ARC FAULT CIRCUIT INTERRUPTER OUTLET, TAMPER PROOF
- GROUND FAULT CIRCUIT INTERRUPTER OUTLET, TAMPER PROOF
- GROUND FAULT CIRCUIT INTERRUPTER OUTLET, EXTERIOR USE WITH COVER, TAMPER PROOF
- REFRIGERATOR OUTLET WITH HEIGHT INDICATED TO BE ON DEDICATED CIRCUIT
- RANGE OUTLET 250V, 40-50 AMPS
- ELECTRICAL SUB PANEL 250 AMPS
- GROUND FAULT CIRCUIT INTERRUPTER OUTLET FOR COUNTERS, TAMPER PROOF
- DUCTLESS MINI-SPLIT HEAT PUMP
- HOSE BIB
- HOT WATER TAP
- COLD WATER TAP

PLUMBING FIXTURE CLEARANCE

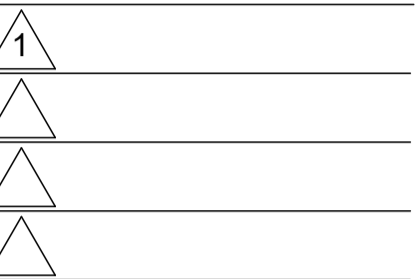


2 LOWER LEVEL RCP
1/4" = 1'-0"

1 FIRST FLOOR RCP
1/4" = 1'-0"



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REVISIONS DATE

OWNER:
EDUARDO LANDEROS
2204 PINE AVE
SAN PABLO, CA 94806
PH: 415-531-6111

PLANNING SET

NEW RESIDENCE
1518 BARTH AVE, SAN PABLO, CA 94806
APN 419192015

DRAWN BY: BM

DATE: 4 / 1 / 2025



SHEET TITLE:

PROPOSED
REFLECTED
CEILING PLAN

SHEET NO:

A.3.2

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CEILING PLAN LEGEND

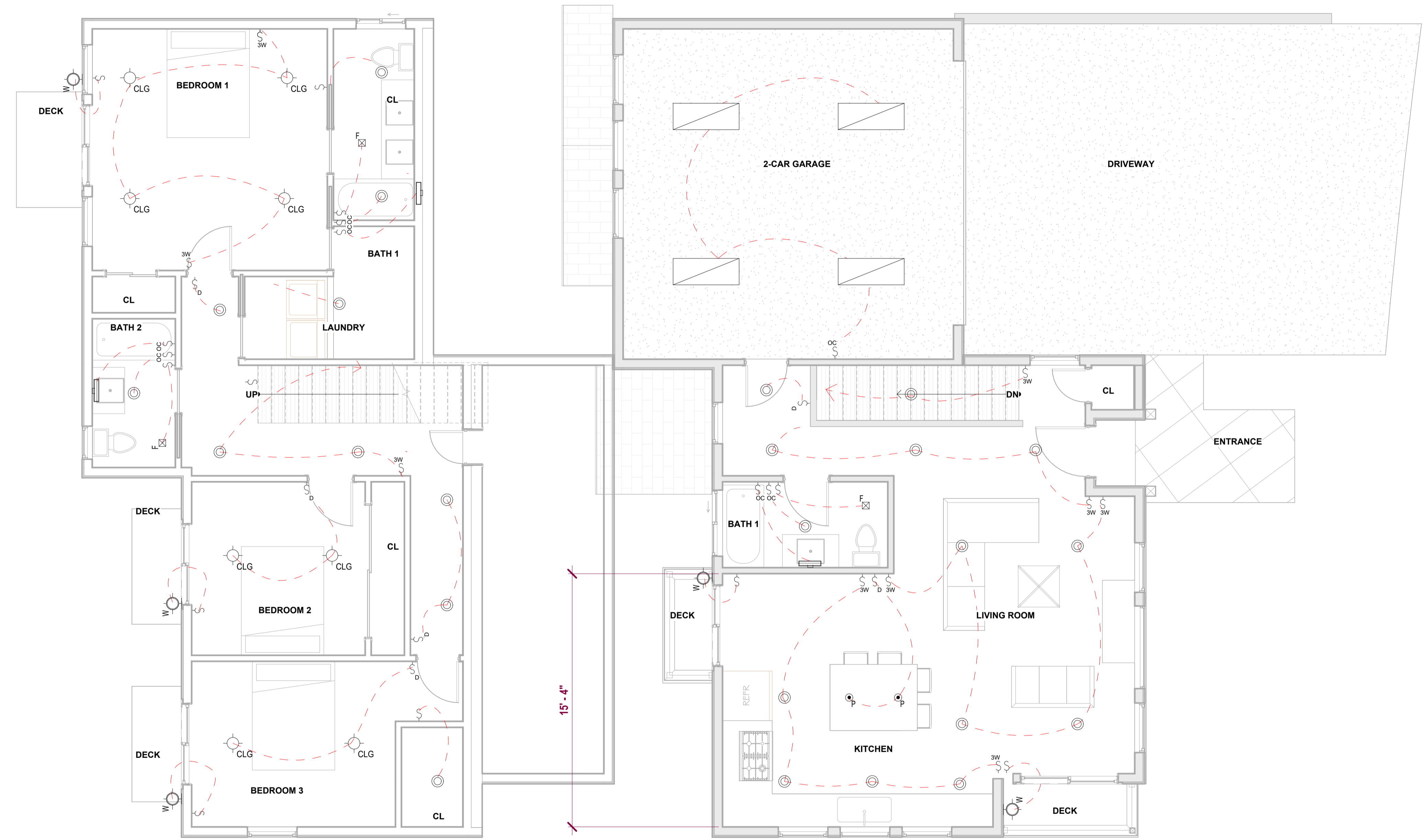
- CARBON MONOXIDE DETECTOR
SEE ELEC. NOTE #22 ON MEP 1.0
- BATHROOM LIGHT/FAN COMBO, SEE MEP NOTES
- INDOOR AIR QUALITY EXHAUST FANS, FAN TO BE LEFT ON AT ALL TIMES-PANASONIC WHISPER - SEE VENTILATION CALCULATIONS FOR SIZE
- SMOKE DETECTOR HARD WIRED SMOKE ALARM W/ BATTERY BACK-UP-SEE ELEC. NOTE #21.21 ON MEP 1.0
- PHOTOELECTRIC SMOKE DETECTOR HARD WIRED SMOKE ALARM W/ BATTERY BACK-UP-SEE ELEC. NOTE #21.21 ON MEP 1.0
- RECESSED LIGHT SUITABLE FOR WET AREAS
- CEILING FIXTURE, SURFACE MOUNTED
- RECESSED CAN FIXTURE, 4" DIA.
- PENDANT LIGHT -LED
- RANGE HOOD, SEE MEP NOTES
- VANITY WALL LIGHT FIXTURE
- WALL MOUNTED FIXTURE-FOR EXTERIOR / WET LOCATIONS
- 4 FT. LONG SURFACE MOUNTED LED WRAPAROUND LIGHT
- PHOTOCELL MOTION SENSOR WALL MOUNTED FIXTURE
- SINGLE SWITCH - DIMMER
- SINGLE SWITCH - TIMER
- DOUBLE SWITCH WITH OCCUPANCY SENSOR
- SINGLE SWITCH
- 3 WAY SWITCH
- SINGLE SWITCH - OCCUPANCY SENSOR
- CEILING HEIGHTS
- MINI SPLIT WALL UNIT

NOTES:
SEE EMP 1.0 FOR GENERAL REQUIREMENTS FOR LIGHTING, AND ALL OTHER FIXTURES

ATTIC ACCESS DOOR TO BE SELF-CLOSING AND SELF-LATCHING

SOUND RATING OF VENTILATION FANS:
THEY SHALL BE RATED AT LESS THAN 1 SONE FOR CONTINUOUS FANS OR A MAXIMUM OF 3 SONE FOR INTERMITTENT FANS; UNLESS THEIR MAX RATED AIRFLOW EXCEEDS 400 CFM

RANGE HOOD:
W/ 100 CFM EXHAUST FAN AND LIGHT
HERS RATER MUST VERIFY THAT INSTALLED RANGE HOOD IS LISTED IN THE HVI CERTIFIED HOME VENTILATING PRODUCTS DIRECTORY



2 LOWER LEVEL ELECTRICAL PLAN
1/4" = 1'-0"

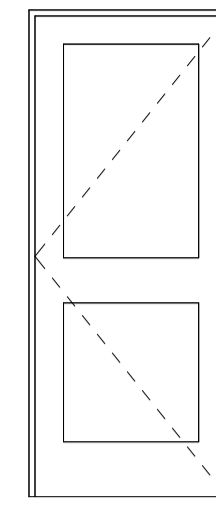
1 FIRST FLOOR ELECTRICAL PLAN
1/4" = 1'-0"

| DOOR SCHEDULE - OPT 4 | | | | | | |
|-----------------------|-------------|----------|-------------|---------------------------|-------------------------------|----------|
| DOOR NO. | ROOM | WIDTH | HEIGHT | OPERATION | DESCRIPTION | EXTERIOR |
| 47 | | | | | | |
| D-72 | | 8' - 0" | 6' - 8" | | | |
| 56 | | | | | | |
| D-80 | | 2' - 8" | 8' - 0" | POCKET | | |
| D-82 | | 2' - 8" | 8' - 0" | POCKET | | |
| A | | | | | | |
| D-33 | BATHROOM 1 | 2' - 8" | 6' - 8" | INTERIOR INSWING | WOOD PANEL DOOR | No |
| D-77 | | 2' - 8" | 6' - 8" | INTERIOR INSWING | | |
| D-85 | | 2' - 8" | 6' - 8" | INTERIOR INSWING | | |
| D | | | | | | |
| D-7 | GARAGE | 16' - 0" | 8' - 0" | GARAGE - EMBOSSED - PANEL | WOOD PANEL DOOR | Yes |
| E | | | | | | |
| D-2 | CL | 2' - 0" | 6' - 8" | INTERIOR INSWING | WOOD PANEL DOOR | No |
| D-87 | | 2' - 0" | 6' - 8" | INTERIOR INSWING | | |
| F | | | | | | |
| D-50 | | 2' - 6" | 6' - 8" | INTERIOR INSWING | | |
| D-69 | | 2' - 6" | 6' - 8" | INTERIOR INSWING | | |
| J | | | | | | |
| D-1 | ENTRY | 3' - 0" | 6' - 8" | | WOOD PANEL DOOR | Yes |
| N | | | | | | |
| D-84 | | 3' - 0" | 6' - 9 1/2" | | | |
| P | | | | | | |
| D-55 | | 4' - 11" | 6' - 10" | | | |
| D-75 | | 4' - 11" | 6' - 10" | | | |
| D-76 | | 4' - 11" | 6' - 10" | | | |
| D-86 | | 4' - 11" | 6' - 10" | | | |
| Q | | | | | | |
| D-3 | LIVING ROOM | 5' - 11" | 6' - 10" | | WOOD FRAME, DOUBLE GLASS DOOR | Yes |
| R | | | | | | |
| D-88 | | 2' - 6" | 8' - 0" | POCKET | | |
| D-91 | | 2' - 6" | 8' - 0" | POCKET | | |

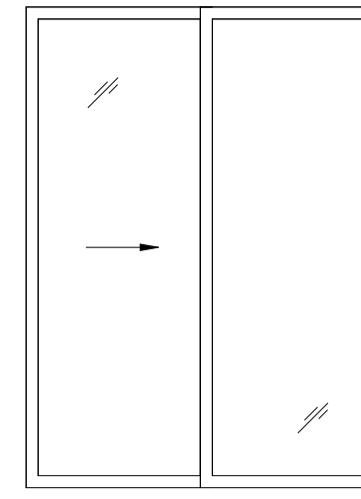
Grand total: 20

| WINDOW SCHEDULE - ADU | | | | | | | | |
|-----------------------|-------------|------|---------|---------|--------------|-------------|----------|-------------|
| WINDOW NO. | WINDOW TYPE | ROOM | WIDTH | HEIGHT | SILL HEIGHT | OPERATION | TEMPERED | DESCRIPTION |
| W-62 | 54 | | 3' - 0" | 1' - 0" | 5' - 8" | | | |
| 54: 1 | | | | | | | | |
| W-4 | 58 | | 3' - 0" | 4' - 0" | 2' - 9 1/2" | | | |
| W-12 | 58 | | 3' - 0" | 4' - 0" | 2' - 9 1/2" | | | |
| W-52 | 58 | | 3' - 0" | 4' - 0" | 2' - 8" | | | |
| 58: 3 | | | | | | | | |
| W-20 | 59 | | 2' - 6" | 4' - 0" | 3' - 0" | | | |
| 59: 1 | | | | | | | | |
| W-54 | 60 | | 2' - 0" | 3' - 0" | 3' - 8" | | | |
| 60: 1 | | | | | | | | |
| W-49 | 61 | | 3' - 0" | 3' - 0" | 3' - 8" | | | |
| W-61 | 61 | | 3' - 0" | 3' - 0" | 3' - 8" | | | |
| 61: 2 | | | | | | | | |
| W-25 | 63 | | 5' - 0" | 4' - 0" | 2' - 10 1/2" | | | |
| 63: 1 | | | | | | | | |
| W-3 | A | | 3' - 0" | 3' - 0" | 3' - 8" | DOUBLE HUNG | | |
| W-1 | A | | 3' - 0" | 3' - 0" | 3' - 8" | DOUBLE HUNG | | |
| W-45 | A | | 3' - 0" | 3' - 0" | 3' - 8" | DOUBLE HUNG | | |
| W-48 | A | | 3' - 0" | 3' - 0" | 3' - 8" | DOUBLE HUNG | | |
| W-55 | A | | 3' - 0" | 3' - 0" | 3' - 8" | DOUBLE HUNG | | |
| W-59 | A | | 3' - 0" | 3' - 0" | 3' - 8" | DOUBLE HUNG | | |
| W-60 | A | | 3' - 0" | 3' - 0" | 3' - 8" | DOUBLE HUNG | | |
| A: 7 | | | | | | | | |
| W-2 | B | | 4' - 0" | 1' - 0" | 5' - 9 1/2" | SLIDER | | |
| B: 1 | | | | | | | | |

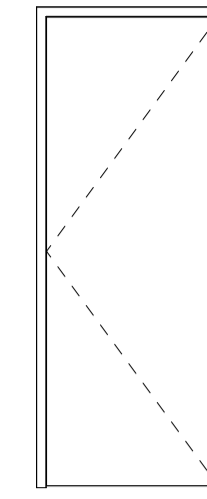
Grand total: 17



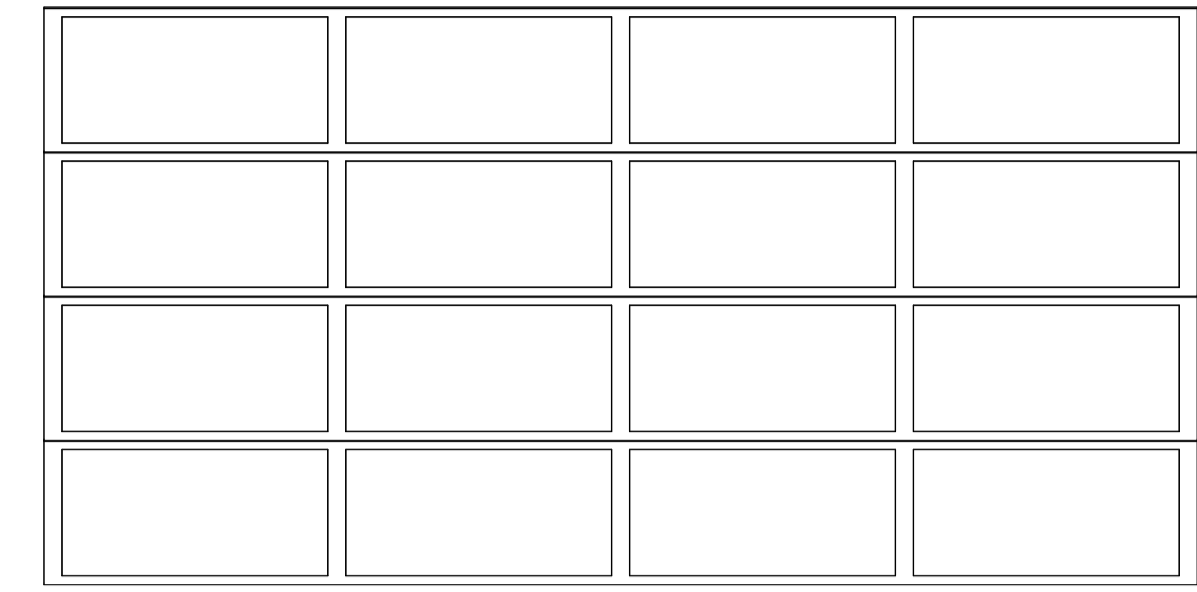
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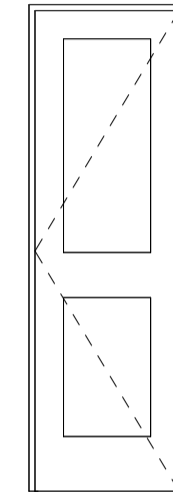
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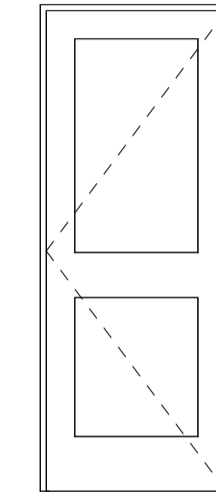
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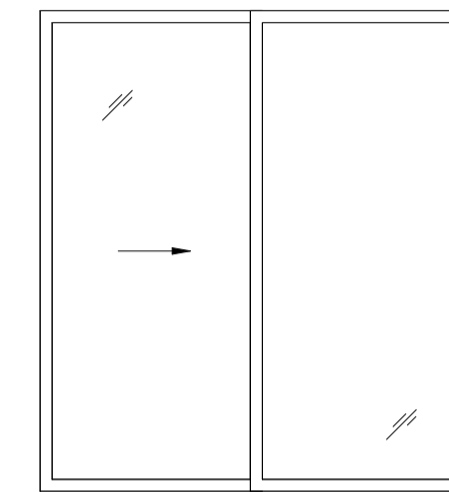
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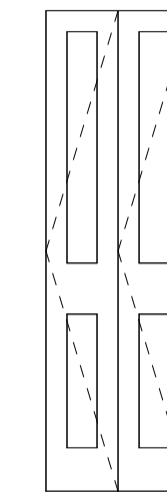
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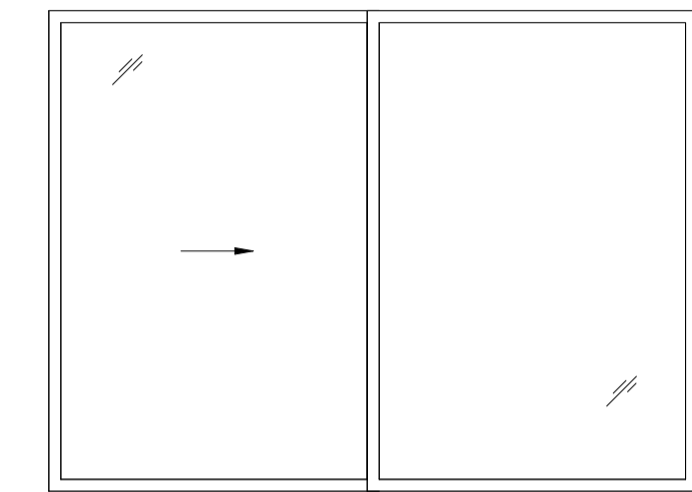
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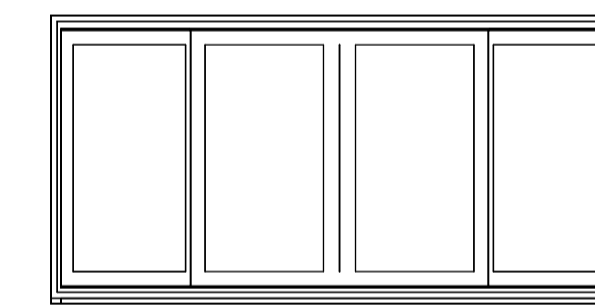
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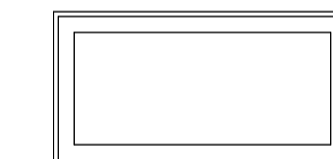
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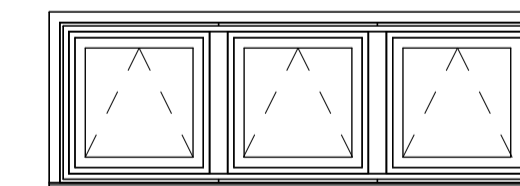
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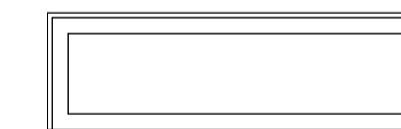
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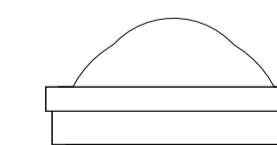
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B



E



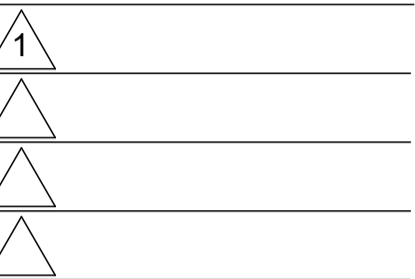
C



F



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Portland, OR 97213
bacilia@bmacarch.net
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P: 510.929-0727



REVISIONS DATE

OWNER:
EDUARDO LANDEROS
2204 PINE AVE
SAN PABLO, CA 94806
PH: 415-531-6111

PLANNING SET

NEW RESIDENCE
1518 BARTH AVE, SAN PABLO, CA 94806
APN 419192015

DRAWN BY: BM

DATE: 4 / 1 / 2025



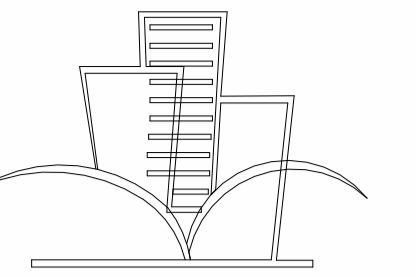
SHEET TITLE:

DOOR WINDOW SCHEDULE

SHEET NO:

A.3.3

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BACILIA MACIAS
ARCHITECTURE

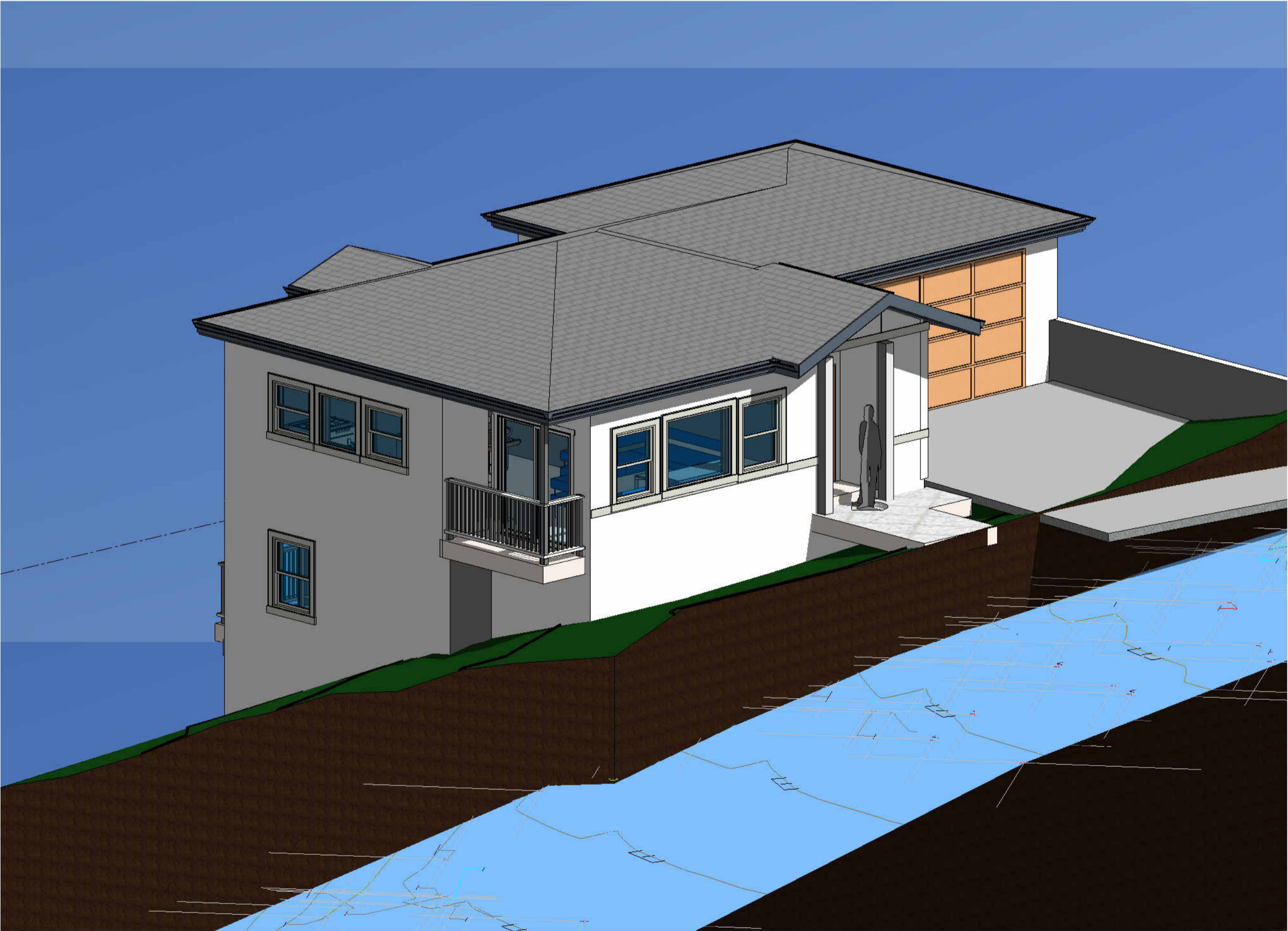
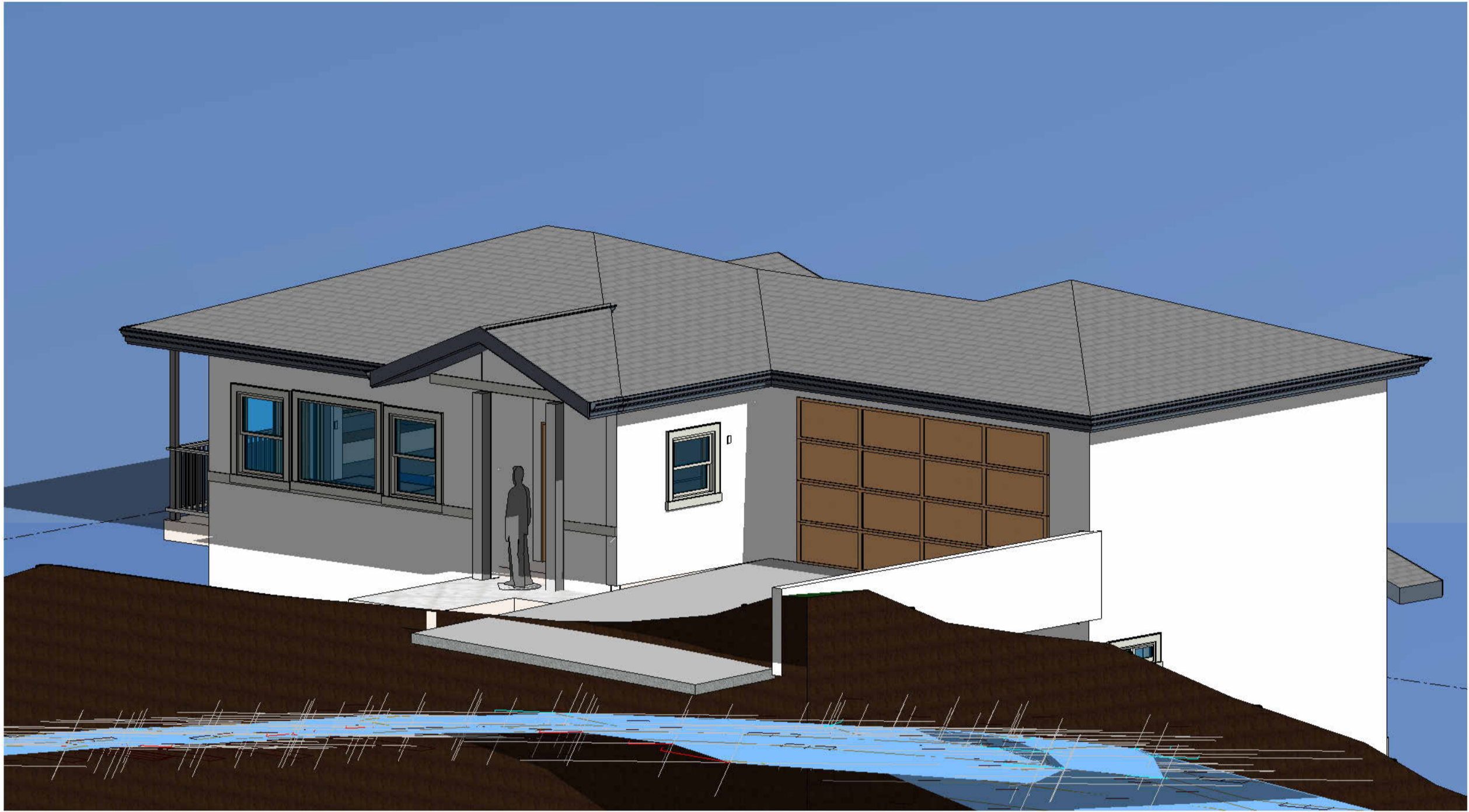
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REVISIONS DATE

OWNER:
EDUARDO LANDEROS
2204 PINE AVE
SAN PABLO, CA 94806
PH: 415-531-6111

PLANNING SET



NEW RESIDENCE
1518 BARTH AVE, SAN PABLO, CA 94806
APN 419192015

DRAWN BY: BM

DATE: 4 / 1 / 2025



SHEET TITLE:

3D VIEWS

SHEET NO:

A.5.1

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April 28, 2026

Dianna Lecca, Project Planner
Contra Costa County
Department of Conservation & Development
Community Development Division
30 Muir Road
Martinez, California 94553

Subject: **Geologic Peer Review / CDVR24--01044 / 2nd Letter**
1518 Barth Avenue / APN 419-192-015
Bacilia Macias Architect (appli.) / E. Landeros. (owner)
San Pablo Area, Contra Costa County
DMA Project 3011.26

Dear Dianna,

On January 20, 2025 we issued a comment letter on the captioned project. Since that letter was issued the project geotechnical engineer has, in effect, resigned or been fired by their client, and no replacement has been named. Furthermore, John Campbell + Associates did not review or comment on grading as well as neglecting to comment on the proposed drainage. Preliminary recommendations were provided for the project but it is not stated that the project geotechnical engineer performed a site reconnaissance, and the scope of the Campbell + Associates investigation did not include subsurface exploration or laboratory testing of samples or slope stability analyses. Furthermore, Campbell + Associates neglected to reference a previous geotechnical report for the same site. That report was prepared by Cal Engineering & Geology (CEG).¹ That firm no longer exists. They were bought out by Haley Aldrich (HA), a civil engineering firm. In effect the acquisition of CEG allowed the scope of HA's staff to include geotechnical engineers, engineering geologist and field staff to implement their geo-recommendations. To my knowledge, HA tends to focus on major public works projects; not construction of a single-family residence. We reference the CEG report only to indicate that it presents the results of a broader scoped investigation that did include subsurface exploration, laboratory testing of samples and engineering analysis of the data gathered. Referencing the subsurface data could have strengthened the Campbell + Associates evaluation of the site or perhaps would have resulted in more conservative *Preliminary Recommendations*.

One further comment. County and neighborhood concerns are focused on slope stability, which implies knowledge of the bedrock geology and engineering properties of the over-lying Quaternary deposits. In our opinion it is critical that the applicant retain a geotechnical engineer that is experienced in hillside development, and ideally the geotechnical engineer having experience in the West County area would be an asset. There is something that we have not mentioned, which pertains to the geotechnical standard of care. Geotechnical engineers are expected to consider the effect of development on adjacent parcels. The proposed project should not reduce the stability of the adjacent developed lots and ideally the project should strive to improve the outlook for long-term stability. Similarly, runoff from a project site should not be allowed to worsen or create drainage problems for neighboring lots that are down-gradient.

¹ Cal Engineering & Geology, 2008, *Geotechnical Investigation, Proposed New Residence, 1518 Barth Avenue, Richmond, CA*. CEG Job #070780, (report dated May 13, 2008).

DMA Findings

We were provided the opportunity to provide final comments on the Geologic/ Geotechnical Conditions of Approval. Those comments are presented below.

GEO-1 There shall be no a) clearing of the site, b) grading, c) tree removal, or d) instillation of utilities prior to the issuance of construction permits.

GEO-2 All grading, excavation and filling shall be conducted during the dry season (April 15 through October 15) only, and all areas of exposed soils shall be revegetated to minimize erosion and subsequent sedimentation. After October 15, only erosion control work shall be allowed. Any modification to the above schedule shall be subject to review by the BID Grading Inspector, and the review / approval of the Zoning Administrator.

GEO-3 At least 45 days prior to issuance of Construction Permits, the project proponent shall submit a design level geotechnical recommendations that are based on adequate subsurface and laboratory test data. The expectations of the County for the scope of the investigation include the following:

- A. The project geotechnical engineer shall provide design-level recommendations intended to guide preparation of grading, drainage and foundation plans. Construction drawings shall be subject to final review to ensure that geotechnical recommendations have been successfully incorporated into construction drawings. The geotechnical engineer shall excavate and log borings or test pits at/near the four corners of the area proposed for grading to establish the depth to bedrock and characterize the engineering properties of the bedrock and Quaternary deposits. The report shall include geologic cross-sections showing the geotechnical engineer's interpretation of subsurface sites conditions; the logs shall not be diagrammatic or generalized; they shall show the details of the earth materials penetrated. Representative samples shall be retrieved for laboratory testing. The logs should show the weathering profile, and comment on the effect of weathering on engineering properties of the units penetrated.
- B. Samples collected during the subsurface exploration plan shall be subject to laboratory testing (we suggest that consideration be given to the following tests: moisture/density, compressive strength, shear strength, expansion potential, gradation testing of Quaternary deposits, and corrosion potential testing.),
- C. Provide an original geologic map of the site that represents the geotechnical engineer's and/or engineering geologist's interpretation of site conditions (i.e., bedrock lithology, presence of any significant features (shear zones, bedding, deeply weathered zones, as well as native soils / artificial fill / Quaternary deposits).
- D. The geotechnical update report shall provide mitigation measures for any significant impacts that are confirmed to be present of the site. That analysis shall give consideration to the effect of grading on the stability of adjacent parcels, and the effect of site runoff on the adjacent down-gradient parcels (e.g., recommended gradient of proposed engineered slopes shall give consideration to their effect on the adjacent parcels and improvement on those adjacent lands. This may warrant use of retaining walls instead of steeping natural slopes).
- E. Provide detailed recommendations for geotechnical monitoring and testing during the construction period, which shall commence during clearing and stripping and extend through the grading period, and implementation of foundation recommendations, retaining wall construction and installation of drainage recommendations.
- F. Roof gutter waters and waters falling on other impervious surfaces shall be conveyed to adequate discharge points and/or outfall into existing storm drainage facilities. This may warrant use of a

private on-site stormwater detention facility, that would become the maintenance responsibility of the owner.

GEO-4 The geotechnical report shall be subject to review by the County's peer review geologist, and review/approval of the Zoning Administrator. Improvement, grading and building plans shall carry out the recommendations of the approved report.

GEO-5 The geotechnical report required by GEO-3 routinely includes recommended geotechnical observation and testing services during construction. These services are essential to the success of the project. They allow the geotechnical engineer to (i) ensure geotechnical recommendations for the project are properly interpreted and implemented by contractors, (ii) allow the geotechnical engineer to view exposed conditions during construction to ensure that field conditions match those that were the basis of the design recommendations in the approved report, and (iii) provide the opportunity for field modifications of geotechnical recommendations (with BID approval), based on exposed conditions. The monitoring shall commence during clearing, and extend through grading, installation of recommended drainage facilities, and foundation related work, including retaining wall construction. A *hard hold* shall be placed on the "final" building inspection, pending submittal of a final report from the project geotechnical engineer that documents their observation and testing services, including the testing of any required backfill (e.g., backfilling of utility trenches). The monitoring report shall also include the geotechnical engineer's opinion on the compliance of the as graded, as-built project with all recommendations in the design level report.

GEO-6 The project proponent shall record a deed disclosure that is intended to (i) identify the project geotechnical engineers and reference all reports and letters issued by the geotechnical engineers (i.e., provide full bibliographic citation to these documents), (ii) provide information that explains on how an interested party could access these documents, (iii) state that no changes to site grading or drainage can be allowed without prior review and approval of the Department of Conservation and Development. Note that DCD's review/ approval may require justification from the property owner's geotechnical engineer, and (iv) explain that the property owner assumes monitoring and maintenance responsibility for all drainage improvements on the parcel. A draft of the proposed Deed Disclosure language must be reviewed and approved by the Community Development Division (CDD) prior to recordation; after the Deed Disclosure is recorded, the project proponent must provide CDD with a copy of the recorded document to serve as evidence that the requirements of GEO-6 were satisfied.

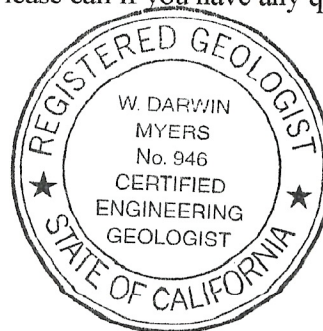
Purpose and Limitations

The purpose of our review was to provide a professional opinion on the adequacy of the geotechnical reconnaissance report submitted with the application to construction of a single-family residence on the captioned property. Specifically, we provide technical advice to assist the Community Development Division with discretionary permit decisions. Our services for this project have been limited to review of the reports cited in our two peer review letters. Our opinions and conclusions are made in accordance with generally accepted principles and practices of the engineering geology profession. We trust this letter provides the evaluation and comments that you requested. Please call if you have any questions.

Sincerely,
DARWIN MYERS ASSOCIATES



Darwin Myers, CEG 946
Principal





January 20, 2025

Nai Saephan, Project Planner
Contra Costa County
Department of Conservation & Development
Community Development Division
30 Muir Road
Martinez, California 94553

Subject: **Geologic Peer Review / CDVR24--01044**
1518 Barth Avenue / APN 419-192-015
Bacilia Macias Architect (appli.) / E. Landeros. (owner)
San Pablo Area, Contra Costa County
DMA Project 3037.24

Dear Nai,

As the County Peer Review Geologist, we are responding to the *Agency Comment Request* received on December 9, 2024. The captioned project is located approximately ¼ miles northeast of the Alquist-Priolo *Earthquake Fault Zone* (EFZ) that encompasses recently active and potential active traces of the Hayward Fault, and it within the vicinity where substantial landslide deposits and tightly folded bedrock are delineated on published geologic maps. The purpose of our peer review letter is to provide the professional opinion of an engineering geologist on the adequacy of the published geologic, seismic and geotechnical data, in combination with the report issued by John Campbell + Associates (JCA)¹ for the limited purposes of deeming the application complete from a *Geology and Soils* perspective. Our comments are organized to a) provide our understanding of the project, followed by b) a discussion of the geologic and seismic setting of the site, and c) a brief overview of Health - Safety Element Policies that are pertinent to the project. With that background, we then provide peer review comments on the investigation of JCA, followed by our evaluation and recommendations.

Understanding of Project

The application is a request for a variance to allow the following variances from the standards of the prevailing R-6 Zoning District to allow the construction of a new 2-story, single-family residence on a legally established, vacant lot. The application includes a request for approval of multiple variances: front yard setback, side yard setback, a permit for removal of one code protected tree and work within the dripline of another tree that is to be retained. Additionally, a small lot design review is required for the construction of the proposed 2,238 sq. ft. residence. The architect has prepared a Site Plan, floor plans, proposed exterior elevations and aerial images of the proposed new residence.² Topographically the project site is a steep, northwest-facing slope, with 28 ft. of relief and a gradient of approximately 45 percent.

¹ John Campbell + Associates, 2024, *Geotechnical Investigation of Proposed Residence, 1518 Barth Ave., San Pablo, CA*, JCA Job # 2024.9.2035 (17 pgs., report dated October 30, 2024; date stamped September 18, 2024).

² Bacilia Macias Architecture, 2024, *New Residence, 1518 Barth Ave., San Pablo, CA 94806, APN 419-192-015* (7 Sheets, dated September 18, 2024).

Geologic and Seismic Setting

1. Introduction

We reviewed geologic reports and maps issued by the California Geological Survey (CGS) and the United States Geological Survey (USGS), along with the Soil Survey of Contra Costa County. With this background we a) analyzed a stereo pair of historic vertical-angle aerial photographs,³ b) reviewed Safety Element maps and policies and c) reviewed previous engineering geology reports that provide data on site conditions in the neighborhood, d) evaluated the data gathered, and e) prepared the peer review letter presented herein which presents our evaluation and recommendations.

2. Surface Fault Rupture

The northwest-trending Hayward fault bisects the neighborhood. It is considered active by both the CGS and USGS. The official Alquist-Priolo Earthquake Fault Zone (EFZ) Map indicates the EFZ zone, in the vicinity of the site, is approximately ¼-mile wide and trends about N30°W. Figure 1 is a Vicinity Map that shows the local road network, as well as the EFZ (shaded orange), permanent open space (green) and creeks and water bodies (shaded blue). The project site is represented by a red dot located within a bullseye). In summary, the CGS has delineated a broad EFZ because information on the precise location of the active trace(s) is sketchy. The project site is approximately 1,000 ft. northeast of the A-P Zone. Recently active and potentially active fault traces may be present anywhere in the EFZ.

It should be recognized that the neighborhood that includes the site was developed when the CGS originally delineated the A-P Zone in the 1970s. Landslides, along with the activities of man (which included grading, drainage improvements and loss of native vegetation) can obscure or obliterate geomorphic features that are characteristic of active faulting. Perhaps the most significant geologic investigation of the neighborhood was performed for the San Pablo Redevelopment Agency by Woodward Clyde Consultants (WCC) during the late 1970's.⁴ That investigation included a) a detailed field reconnaissance of the WCC study area b) geologic interpretation of aerial photographs, and c) logging on exploratory trenches and borings. The primary objectives of that study were to characterize geologic hazards within a redevelopment area and to serve as the primary source of information for the "Geologic and Soils" chapter of the CEQA document that was to be prepared by the Lead Agency (i.e., City of San Pablo). The WCC investigation failed to accurately establish the location of any active fault traces within their study area.

The A-P Act, California Public Resources Code, Division 2, Chapter 7-5, commencing with Section 2621, requires a geologic investigation directed to the hazard of surface fault rupture for "projects" located within the official EFZ. All proposed subdivisions of land (including minor subdivisions) are subject to the provisions of the A-P Act. The Act also allows local jurisdictions to have more stringent standards. The Contra Costs 2045 Health and Safety Element presents policies aimed at the protection of human life and reducing the potential for serious injuries from earthquakes, including ground shaking and surface fault rupture. General Plan policies pertaining to geologic and seismic hazards are presented in Table 1. Those policies indicate that fault hazard investigations are warranted in areas of suspected active faulting. In the case of the proposed construction of single-family, one-to-two story dwelling on a legally established parcel, it has been the practice of the County to only trigger fault hazard investigations where there is evidence of an active fault trace within approximately 200 ft. When required, the intent of the investigation is to determine if there is evidence of an active trace within the subject parcel. There has also been flexibility

³ Pacific Aerial Surveys, 1973, Photographs #CC3526-1-55 thru 1-57, scale 1 in. = 1,000 ft. (flown on May 7, 1973).

⁴ Woodward-Clyde and Associates, 1978, *Phase II Geologic Assessment, San Pablo Redevelopment Agency Hillside Neighborhood, San Pablo, California* (report on file with the CGS; file #AP-727).

in the amount of the required structural setback. The County’s objective is to allow development of the site provided that structures for human occupancy are setback from the active trace. The amount of structure setback is provided by fault investigation report, prepared by the applicant’s consultant, based on appropriately detailed information. In one case in the East Richmond Heights area, a residential lot was developed with a detached garage constructed within the structure setback zone, and a variance to the rear yard setback standard of the prevailing zoning district was granted to facilitate development of the residence.

Table 1
Health & Safety Element Geologic Hazard Policies

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| <p>HS-P11.1 For projects in Alquist -Priolo Earthquake Fault Zones or Seismic Hazard Zones (areas considered at-risk of earthquake triggered liquefaction or landslide displacement) delineated by the California Geological Survey, as well as any other areas of steep slopes or areas of suspected ground failure known to the County, require submittal of appropriately detailed engineering geologic or geotechnical investigations. The reports must be compliant with State Guidelines and include:</p> <ul style="list-style-type: none"> a) A map showing the outline of any geologic or potentially hazardous soil conditions and areas subject to inundation. b) Recommended means of mitigation of any adverse condition representing a hazard to improvements. c) Recommendations to assure proper implementation of mitigation measures during construction. <p>HS-P11.2 Prohibit construction of buildings intended for human occupancy in areas where seismic and other geologic hazards (e.g. landslides, liquefaction and fault lines) cannot be adequately mitigated.</p> <p>HS-P11.3 Discourage construction of critical facilities and buildings intended for human occupancy in Alquist-Priolo Fault Zones and encourage earthquake retrofitting where such development already exists. If there is no feasible alternative to siting critical facilities and buildings intended for human occupancy in the Fault Zones, buildings must be sited, designed and constructed to withstand the anticipated seismic stresses.</p> <p>HS-P11.4 Refer geotechnical and engineering geologic reports to the County Peer Review Geologist for evaluation of their adequacy, as required by State Law for projects in State-designated hazard zones. Reports deemed inadequate will require further engineering analysis and revision until the findings/ opinions of the Peer Review Geologist have been addressed to the County’s satisfaction.</p> <p>HS-P11.5 Discourage development on slopes exceeding 15 percent and prohibit development on slopes of 26 percent or greater to avoid slope instability, unnecessary grading and extensive land disturbance, and facilitate long-term control of erosion and sedimentation. Exceptions may be considered for infrastructure projects and development on existing legal lots where no other feasible building sites exist.</p> <p>HS-P11.6 Require projects to form a Geologic Hazard Abatement District (GHAD) or join an existing GHAD whenever necessary to adequately mitigate anticipated or residual geologic hazards.</p> <p>HS-P11.7 Do not accept public road dedications or allow construction of private roads on unstable hillsides or in landslide hazard areas unless potential hazards have been mitigated to the County’s satisfaction. All private roads constructed in such areas must be fully compliant with private road standards adopted by the County and fire protection district with jurisdiction.</p> <p style="text-align: right;"><i>Source: Contra Costa County 2045 General Plan – Health and Safety Element, pages 9-52 & -53</i></p> |
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In summary, the location of surface rupture generally can be assumed to be along an active major fault trace. Although mapping of the CGS and USGS have not confirmed the presence of any active or inactive faults on the project site. Furthermore, maps issued by those agencies indicate that the project site is not within the EFZ. Consequently, the risk of surface rupture on the project site is regarded as less-than-significant. Because of the proximity of the Hayward fault, we have provided the following discussion:

- A. Guidelines for Investigations. It should also be recognized that the State has adopted Guidelines for evaluation of the Hazard of Surface Fault Rupture (DMG Note #49), and the State Mining and Geology Board adopted *Policies and Criteria* that are intended to guide implementation of the State Law. The provisions of the State Law are presented in Appendix A, and the Board's Policies and Criteria are presented in Appendix B. Additionally, the CGS has issued Guidelines for Reviewing Geologic Reports (CGS Note #41). Fault hazard reports prepared in compliance with the A-P Act must be peer reviewed by a registered geologist acting in behalf of the local jurisdiction, and copies of the fault hazard report along with a copy of the peer review must be provided to the CGS. Peer review is a critical part of the evaluation process. It is the duty of the peer reviewer to assure that the geologic investigation and resulting report adequately addresses the geologic conditions that exist on the site. CGS Note #41 requires that a) the reviewer must have the courage of his/ her convictions and not approve a report that is inadequate, b) the reviewer must bear in mind that some competent investigators are not accomplished writers, and that an important task of the reviewer is distinguish between the important and the insignificant. The guidelines also note that the best reviews generally are performed by experienced reviewers. (Use of multiple, part-time reviewers by a lead agency tends to prevent development consistently high-quality reviews.) This is, at least in part, attributable to different reviewers having differing standards, which can result in inconsistent treatment of development projects.
- B. Historic Perspective. The Hayward fault zone comprises a northwest-trending zone of faults along the western front of the hills bordering the east side of San Francisco Bay. The fault zone can be traced nearly continuously northwesterly from the Warm Springs District in Southern Alameda County to San Pablo Bay at Point Pinole in Contra Costa County. It cannot be traced south of the Warm Springs District of Fremont with any degree of certainty. Southeast of the San Francisco Bay Area, the Hayward fault is inferred to merge with the Calaveras fault in the vicinity of the Calaveras Reservoir. Fault traces within this zone have experienced surface fault rupture during historic earthquakes, including the 1868 earthquake. That seismic event resulted in surface fault rupture on the segment of the Hayward fault between Mills College, Oakland and the Warm Springs District of Fremont. Faulting was reported as far north as the campus of the University of California, Berkeley. No large historic earthquakes are known to have occurred on the northern segment of the Hayward fault in historic time (i.e., segment that bisects Contra Costa County). In 2001 a paleoseismicity study of Late Holocene deposits was conducted within the Mira Vista Country Club in El Cerrito (located approximately 2½ miles SE of the project site). The purpose of the study was to obtain scientific data on the occurrence of large earthquakes on the northern segment of the Hayward fault during the Late Holocene. Evidence of several seismic "events" that triggered fault rupture were confirmed in an exploratory trench that crossed the Hayward fault. Radiocarbon dating indicated that these seismic events (and associated surface fault rupture) occurred during the past 2,130 years. Detailed study of trench exposures yielded a recurrence interval ranging from 270 years to approximately 710 years for large earthquakes.⁵
- C. Seismicity. Existing seismic records provide compelling evidence that the Hayward fault remains seismically active. For example, the earthquakes recorded in the San Francisco Bay Region show a good correlation between earthquake epicenters and known active traces, including the Hayward fault. These epicenters are evidence of adjustments taking place at-depth along active Bay faults. In a typical year, 20 or more felt seismic events are recorded in the immediate vicinity of the Hayward fault.

⁵ Lettis, W.R., 2001, *Late Holocene Behavior and Seismogenic Potential of the Hayward- Rogers Creek Fault System in the San Francisco Bay Area, California*, in Engineering Geology Practice in Northern California, C.G.S. Bulletin 201 and Assoc. of Engineering Geologists Spec. Pub. 12 (pages 167-177).

- D. Fault Creep. Fault creep has been observed at various places along the length of the Hayward fault from Point Pinole to Fremont. Fault creep has cracked and offset curbs, streets, fences, railroad tracks, pipelines and buildings. All creep movement appears to be right-lateral. Near Point Pinole, a series of benchmarks were placed perpendicular to the fault by the USGS. During the period 1968 to 1980, 65 mm. of aseismic displacement was recorded (5.3 mm/year; Harsh and Buford, 1982). The long-term slip rate on the Hayward fault is believed to be on the order of 8 mm/year. No fault creep has been confirmed by the USGS on the segment of the Hayward fault that passes through the vicinity of the project site. Assuming an 8 mm/year average rate of displacement, 8 mm/yr. displacement would translate into 31.5 inches of slippage on the fault per century. At Point Pinole, approximately two-thirds of the displacement may be occurring through fault creep. In the San Pablo Hills neighborhood of the amount and rate of fault creep has not been established.
- E. Recently Active Traces of Hayward Fault. According to the CGS, recently active and potentially active traces of the Hayward fault may exist anywhere in the A-P Zone. Because the EFZ is centered on the discontinuous but aligned geomorphic features considered to be possible evidence surface fault rupture, the center of the EFZ may represent a higher risk area within the EFZ. In summary, evidence of the active trace(s) of the Hayward fault is not well defined in the San Pablo Hills, and there is potential for branching or en echelon traces / step-overs.

In the 1990s the USGS attempted to map the *recently active trace*⁶ of the Hayward fault using three lines of evidence:⁷ (a) geomorphic expression (i.e. terrain features that are aligned and are typically associated with fault displacement at the surface), (b) fault creep (i.e. aseismic fault slip), and (c) fault exposures in exploratory trenches excavated by consultants who were performing EFZ investigation for land development projects that were located in the EFZ. The major scientific goal of the USGS was to learn how the distribution of fault creep features and creep rate varied both along the fault and transverse to the fault. The text accompanying the report cautions engineers and land use planners that the clarity of the features along the fault is variable, and that subsidiary traces (i.e., branching or en echelon) may not be recognized because many sections of the fault were urbanized prior to enactment of the Alquist-Priolo Earthquake Fault Zone Act by the State of California. Furthermore, geomorphic features indicative of active faulting may have been obliterated by human activity (e.g., grading, drainage improvements, construction, urban vegetation). Additionally, both active and dormant landslides may have obliterated tectonic creep features. For these reasons, the main method of recognizing and precise location active fault strands for segments of the fault that lack reliable creep data will continue to be the subsurface data gathered by fault hazard investigations.

Figure 2 presents an enlargement of the latest revision of Lienkaemper map for the segment of the fault that passes through the project vicinity. This map identifies two subparallel traces in the vicinity of the project site. The western trace is shown passing approximately 1,600 ft. southwest of the site; the eastern trace is shown to passing approximately 1,100 ft. southwest of the site. Both traces are represented by dashed-and-queried symbols, indicating considerable uncertainty regarding the precise location of these fault traces. Approximately 1,500 ft. west-northwest of the CDVR24-01044 project site, the eastern trace of the Hayward fault is represented by a solid red line, indicating that the location shown is considered well defined. This line terminates where this trace crosses Bayo Vista Ave. Although the recently active trace of the Hayward fault is weakly

⁶ The term "recently active fault trace", as used in this USGS report, is defined as a fault trace that has evidence of movement during Holocene time (approximately the last 11,700 years).

⁷ Lienkaemper, J.J., 1992, *Map of Recently Active Traces of the Hayward Fault, Alameda and Contra Costa Counties, California*, USGS Miscellaneous Field Studies Map MF-2196 (1992; date of most recent revision 2008)

defined in the San Pablo hills, the evidence gathered to date indicate that the Hayward fault passes more than ¼ mi. southwest of the site.

3. Bedrock Geology

In 1994 the USGS issued a digitized geologic map of Contra Costa County that emphasized bedrock formations.⁸ Figure 3, presents a clean Topographic Map, showing topography in the San Pablo hills and vicinity, but without the interpretation of bedrock geology, and without the local road network in the hills and without parcels. This resulting topographic map indicates the project site is located on the backbone of a prominent ridge, whose axis trends northwesterly, along with the bedrock faults mapped by the USGS in the vicinity of the project site. This map does not classify faults by their activity status. However, the sub-parallel faults that pass southwest of the project site correspond to the twin traces of the Hayward fault; faults shown northeast of the project site are not considered active. No faults are shown crossing the project site.

Figure 4 shows the same area as was presented in Figure 3 but with roads, parcels and bedrock formations added to the topographic base map. The project site is indicated to be in the outcrop belt of the Orinda Formation (Tor). Note that this USGS map does not attempt to show the distribution of landslide deposits. The Orinda Formation consists of chiefly of sandstone, much of it clean, much clayey, along with some conglomerate and mudstone, and locally minor tuff and tuff breccia have been mapped in Tor. This formation is generally characterized as weakly consolidated, and weathered to depths of up to 30 ft. Most bedrock is unexpansive; some expansive (mudstone). Most soil mantle is severely expansive. The intergranular permeability of clean sandstones is high where the rock is clay free or nearly clay free; moderate where sand grains are clay coated; conglomerate is mostly high. Where clayey matrix material is abundant in fine-grained sandstone and siltstone, permeability ranges from low to very low; in tuffaceous material the permeability is low.

4. Landslides

Publications that provide mapping of landslides in the site vicinity include mapping of the CGS⁹ and USGS.¹⁰ These maps are presented in Figures 5 and 6. The scope of those investigations and their findings can be summarized as follows:

- A. California Geological Survey. In 1973 the CGS (formerly the California Department of Mines & Geology) was retained by Contra Costa County and the Cities of El Cerrito, Richmond and San Pablo to perform a broad-scoped reconnaissance of the hills overlooking the Bay Plain in the three cities, along with the adjoining unincorporated area. The scope of work included (a) field mapping, (b) geologic interpretation of historic aerial photographs, (c) geophysical surveys, and (d) geologic evaluation of the data gathered and (e) publishing a report that provided the evaluation and recommendations of the CGS. The purposes of the investigation were to provide information on potential geologic and seismic hazards that could be incorporated into Safety Elements of the local jurisdictions; and provide data to planners, engineers, property owners and developers on potential geologic and seismic hazards. The CGS report was not intended to serve as a substitute for site-specific geologic / geotechnical investigations of individual parcels of land.

⁸ Graymer, R., D.L. Jones & E.E. Brabb, 1994. *Preliminary Geologic Map Emphasizing Bedrock Formations in Contra Costa County, California*. U.S. Geological Survey Open File Report 94-622.

⁹ Bishop, C.C., Knox, R.D., et. al., 1973, *Geological and Geophysical Investigation for Tri-Cities Seismic Safety and Environmental Resources Study*, California Division of Mines & Geology, Preliminary Report # 19

¹⁰ Dibblee, T.W., 1980, *Preliminary Geologic Map of the Richmond Quadrangle, Alameda and Contra Costa Counties*: U.S.G.S. Open-File Map 80-1100 (scale 1:24,000).

Figure 5 presents a portion of the Bishop Landslide Map. According to this map the site is located approximately 500 ft. east of a 25 ac.± area classified “dg” (i.e., disturbed ground). The “dg” designation indicates that the CGS geologists concluded the area has experienced recently active ground movement, based on geomorphic features, which included scarps, other inferred landslide-related terrain features, and evidence of slope creep. Additionally, the Bishop Map shows several large landslides (outlined in red). The red arrow within the slide indicates the general direction of downslope displacement. The nearest of these landslides is approximately 400 ft. south of the site.

- B. U.S. Geological Survey. In 1980 USGS geologist Tom Dibblee prepared a bedrock geology map of the Richmond Quadrangle that was based on field mapping. In areas where the bedrock was obscured by landslide deposits, the approximate boundary of landslides was plotted. Figure 6 shows key features mapped by Dibblee in the vicinity of the project site. The base map shows topographic contours, the local road network and parcel boundaries, and the site boundary is outlined in green. Geologic features that are shown include a) landslides (which are shaded pink, with a black arrow indicating the general direction of down slope movement), b) the axis of a synclinal fold (represented by black dashes (shaded yellow) which trend N40°W. A syncline is a *canoe-shaped* fold; as shown the axis of the fold passes approximately 125 ft northeast of the project site. The orientation of bedding on the site can be inferred to dip to the northeast (toward the synclinal axis). Additionally, Dibblee maps the location of two sub-parallel faults which generally match the inferred location of the Hayward fault traces mapped by Lienkaemper and the traces shown of the EFZ map issued by the CGS. These subparallel, northwest-trending faults pass approximately 1,500 and 1,800 ft. southwest of the project site. They represent the inferred location of Hayward fault traces. In summary, the landslides mapped by Dibblee do not pose a hazard to the project site. The location of landslides in mapped by Dibblee closely match the interpretation of landslides presented in Figure 5.

5. Soils

According to the Soil Survey of Contra Costa County,¹¹ the soil series mapped on the site is the Los Osos clay loam (LhF; 30 to 50% slopes). This soil series consists of well-drained soils underlain by soft fine-grained sandstone and shale. The soil profile is typically 32 inches thick, consisting of an A-horizon that extends from to surface to a depth of 10 inches. The B-horizon extends from the base of the A-horizon to the weathered bedrock. The A-horizon is described as *a very dark gray clay loam that is weak, fine, and with a sub-angular blocky structure*; the B-horizon is *similar to the A-horizon but with a higher clay content, and with a weak, coarse blocky prismatic structure*. LhF is a non-prime agricultural soil (Class IV). This soil is well drained, runoff is medium to rapid, and the hazard of erosion is “moderate” to “high” where the soil is bare.

The Soil Survey map of Contra Costa County considers the native soils on the project site to be *Highly Expansive* and *Highly Corrosive*. Expansive soils are soils that expand when water is added and shrink when they dry out. This continuous change in soils volume causes homes and other structures to move unevenly and crack. It should also be recognized that corrosive soils tend to damage concrete and/or uncoated steel that is in contact with the ground. Following grading and site preparation work for the proposed improvements, laboratory testing is warranted to confirm foundation conditions. Ideally, corrosivity testing is performed after clearing and any rough grading so that the laboratory testing addresses the properties of the foundation soils. The risks of damage associated with corrosive soils can be avoided / minimized by proper site preparation work, in combination with foundation and drainage design that is sensitive to the prevailing soils conditions.

¹¹ Welch, L.E. et. al., 1977, Soil Survey of Contra Costa County, California, USDA Soil Conservation Service

Seismic Hazard Zone Mapping Act

1. State Law

The provisions of the Seismic Hazard Mapping Act can be found in the California Public Resources Code, Chapter 7.8, Sections 2690-2699.6. This law is similar in many respects to the Alquist-Priolo Earthquake Fault Zone Mapping Act, which has been implemented by the County for 50 years. However, the official Seismic Hazard Zone (SHZ) maps issued by the California Geological Survey (CGS) identify areas that are at-risk of earthquake induced landslide displacement and earthquake induced liquefaction. The procedure for issuance of official SHZ maps is to distribute preliminary review copies of the SHZ maps and invite local jurisdictions, public agencies, and property owner/ general public to provide comments, particularly submittal of technical data. The CGS professional staff reviews the comments/ technical data provided. Based on input provided on the preliminary map(s), the CGS may modify the Preliminary Map. Finally, a public hearing is held before the State Mining and Geology Board with a recommendation from the CGS that the map(s) be approved. When SHZ maps are accepted as adequate by the Mining and Geology Board, they are distributed to local jurisdictions and public agencies. Nearly all land development projects that are located within areas at-risk of earthquake-triggered landslide displacement or liquefaction (or both) and which will eventually lead to construction of structures for human occupancy (including all major and minor subdivisions), require comprehensive geological/ geotechnical investigation. The SHZ Mapping Act has relatively few exemptions. However, construction of a single-family residence up to 2½ stories is exempt from the provisions of the State Law requiring a comprehensive landslide or liquefaction hazard investigation, provided the parcel was legally established prior to the issuance of the SHZ map. The project site is located within the Richmond Quadrangle. The official SHZ map was issued in 2024.¹² Figure 7 presents a portion of this SHZ map showing the San Pablo Hills and vicinity. The boundary of the project site is indicated with a green line. The area subject to potential hazard from earthquake induced landslide displacement is identified in a muted red color and the area subject to liquefaction is indicated in a yellow ochre color. According to Figure 7, the project site is not located in a SHZ.

2. Standards and Criteria

Accompanying each official SHZ map is a Seismic Hazard Zone Report.¹³ The SHZ report describes the approach used by the CGS staff in their analysis and it presents technical data pertaining to the a) geology, b) groundwater, c) the probabilistic seismic hazard analysis model and its application to landslide hazard assessment d) results of materials testing, d) ground motion assessment, e) lists key references and f) explains the associated zoning techniques. Note that for a project site to be designated within an area of potential earthquake induced landslide displacement does not necessarily imply the presence of landslide debris on the property. The hazard designation implies that based on review of topographic, geologic, geotechnical and subsurface water conditions by the CGS geologists, there is a potential for permanent ground displacements such that mitigation as defined in California Public Resources Code Section 2693 (c) would be required.

3. Regarding the Relationship of SHZ Map to CEQA

The relationship of SHZ's to the CEQA process, the State of California CEQA Guidelines indicate the

¹² California Geological Survey, 2024, *Official Map of Earthquake Zones of Required Investigation, Richmond Quadrangle Released: February 22, 2024.*

¹³ California Geological Survey, 2024, *Seismic Hazard Zone Report 134 for the Richmond, Mare Island and San Quentin 7.5-Minute Quadrangles, Contra Costa County California, (37 pgs. and 7 Plates).*

following:

Nothing in these guidelines is intended to negate, supersede or duplicate any requirement of the SHZ. At the discretion of the lead agency, some or all of the investigations required by the Seismic Hazard Mapping Act may occur either before, concurrent with or after the CEQA process.

The State CEQA Guidelines go on to indicate that if the SHZ investigation does not precede CEQA, it may be desirable for the CEQA document to describe the full range of mitigation measures that may be required to stabilize the land development project. However, if all or part of the investigation is performed prior to completion of the CEQA process, it may be possible to narrow the discussion of mitigation alternatives to only those that would provide reasonable protection of the public safety given site-specific knowledge of the field conditions.

Investigation of John Campbell + Associates

1. Background

In 2024 John Campbell + Associates (hereafter referred to as JCA) were retained to provide an overview of the geologic setting of the site, characterize foundation conditions, and provide conceptual recommendations for site grading, drainage and foundation design. The scope of the investigation was limited to a review of readily available geologic and geotechnical reports and maps and a field reconnaissance performed by a California licensed Civil Engineer. The consultant's scope of work did not include the following:

- (a) Reference/ review civil engineering drawings prepared for the project (grading & drainage plans)
- (b) Reference/ present data from a relevant investigation performed for nearby land development project in the immediate site vicinity
- (c) Include analysis of stereo pairs of historic aerial photographs, which can provide the opportunity to view the site during buildout of the neighborhood; and opportunity to view of the site in different seasons of the year and in different years
- (d) Subsurface exploration was no included in the scope of the investigation and no laboratory data on the engineering properties of the native soils or bedrock
- (e) Did not present an original geologic map of JCA's study are their interpretation of site conditions.

2. JCA Findings

The consultant's findings were presented on pg. 6 of JCA report. They provide brief, rather generalized discussion of the following:

- a) The site description indicates the parcel is a vacant lot and is a relatively steep downhill lot.
- b) The geologic setting is overly simplified but identifies the bedrock as sandstone. No information is provided on its age, engineering properties or geologic structure of the sandstone.
- c) At the surface, JCA indicates the presence of silty sand at the ground surface, underlain by bedrock. JCA references geotechnical borings on an adjacent parcel but fails to identify the property, the geotechnical firm or provide details of the soil and rock that was penetrated. JCA concludes that soil conditions on the project site are consistent with those encountered on the adjacent parcel.
- d) JCA states that groundwater levels are not anticipated to pose an issue for development of the project site.

3. JCA Conclusions

- a) Faulting The subject property is not located in the Earthquake Fault Zone delineated by the CGS, and no evidence of faulting was found during the site reconnaissance. JCA concludes the risk of surface fault rupture is less-than-significant (i.e., further evaluation of the risks associated with the potential for surface fault rupture is deemed to be necessary by the consultant).
- b) Regional Seismicity. JCA provides a brief review of the seven (7) historic earthquakes that have impacted the San Francisco Bay Region. Additionally, the forecasts of the USGS for major earthquakes in the Bay Area are presented, including a 32% probability of a 6.7 or greater magnitude earthquake in the Hayward Fault by the year 2030.
- c) Ground Shaking. Based on the seismicity of the Bay Area, JCA indicates there is potential for very strong to violent ground shaking on the project site. JCA recommends the improvements on the project be designed and constructed in compliance with the provisions of the California Building Code.
- d) Liquefaction. After presenting a brief overview of the liquefaction hazard, JCA states the following:

Due to the density of the sandy clays and the clays are cohesive, soils on the site are not susceptible to liquefaction.

However, JCA's **Findings** state that the sandstone bedrock on the site is overlain by silty sand. That discussion makes no mention of silty clay / cohesive clay overlying the bedrock. Unfortunately, gradation testing was not performed on the soils that overlies sandstone on the project site. Note that no information is provided by JCA on the thickness of the soils that overlie the bedrock. JCA concludes that the liquefaction potential is very low on the project site. We do not disagree with JCA's conclusion, but the report lacks data to support the conclusion.

- e) Lateral Spreading, Densification and Landslides. JCA provides their conclusions regarding these potential hazards. The impacts are regarded as less-than-significant for each. We have one comment on the assessment of landslide hazards. JCA indicates that based on their review of landslide maps of the area, there is no landslide risk. We would note that the maps reviewed were not listed in Appendix A of their report, Furthermore, those published maps can only indicate that no landslides have been identified on or in the immediate vicinity to the site. On a relatively steep site, with an average slope of 45%, the risks of slope failure cannot be dismissed. Moreover, JCA has not gathered sufficient information to prove that the sandstone bedrock is present throughout the property. The lack of an original geologic map on the site which identifies sandstone outcrop areas within their study area, the lack of information on orientation of bedding, the absence of data on the weathering profile weakens JCA's assessment of slope stability.
- f) Sandstone at Proposed Foundation Levels. JCA indicates that there will be competent sandstone at the proposed foundation levels. We do have some reservations, even though the consultant had the opportunity to review data from an adjacent parcel. That is because the JCA report a) did not include an Original Geologic of the project site, b) the average slope gradient on the site is 45% and total relief on the site is nearly 30 ft., c) nearby properties in the San Pablo Hills (located within the outcrop belt of the same formation that occurs on the site) have been mapped as landslide deposits (i.e., mapping of Bishop et. al., 1973), Dibblee, 1980 and Nilsen, 1975.¹⁴ Additionally, d) no information is presented by JCA on the strike and dip of bedding, e) the thickness of the sandstone bed that occurs on the project site is unknown, f) the depth of weathering in the sandstone and its effect on the strength of the sandstone is unknown, and g) the distribution, thickness and engineering properties of the residual soil is unknown. A USGS report characterizes the

¹⁴ Nilsen, T.H., 1975. *Preliminary Photointerpretation Map of Landslide and Other Surficial Deposits of the Richmond 7.5-Minute Quadrangle, Contra Costa & Alameda Counties*, U.S. Geological Survey, Open File Map 75-277-47.

stratigraphy of Orinda formation (identified by Ellen and Wentworth as Unit #131) in the San Pablo Hills as follows: ¹⁵

.... interbedded conglomerate, sandstone, siltstone and mudstone. Much of the soil mantle and at least some of the bedrock is highly expansive. Within this formation the sandstone in places contains pebble trains and consists poorly sorted sand with matrix material that contains silt and clay to saturation. Clayey fine-grained sandstone and siltstone grade into one another and into mudstone. Much of this formation has irregular or lenticular bedding, some sandstone as laminated bedding and cross-bedded sandstone is also present. With regard to hardness, conglomerate and medium- to coarse-grained sandstone are mostly soft where weathered and fresh, but some of these materials are anomalously quite firm, especially where partially cemented by calcite....

In summary, the bedrock is not isotropic and homogeneous. In our experience where simplifying assumptions must be made due to the limited scope of work, it is important that geotechnical recommendations be conservative on the side of safety, and geotechnical monitoring during construction becomes especially important. Due to the steepness and height of the slope on the subject parcel, measures are required to control the long-term risk of active erosion and sedimentation. To date there are no grading, drainage or foundation plans have been provided for our review and none are referenced in Appendix A of the JCA report.

One final comment: On some occasions project sites that appear to have no serious geotechnical constraints can pose significant issues during or following the construction period.

- g) Earthquake Hazards. JCA acknowledges that the project site is located within the highly seismic San Francisco Bay Area and indicates the foundation recommendations in the report are expected to provide a significant improvement in performance during earthquake ground shaking *over the existing foundation system* (?). The discussion of Earthquake Hazards on pg. 7 makes reference to the California Building Code (CBC) as it pertains to seismic design provisions. Note that on pg. 8 JCA provides 2022 seismic design criteria for the proposed project. Based on JCA's review of the geologic setting of the project site, the seismic design criteria include classifying the building site as Type D, and spectral accelerations are provided for use by the project structural engineer.)
- h) Post Construction Settlement. JCA cautions that settlement of foundation improvements is to be expected. Assuming the project foundations are designed and constructed in compliance with JCA's recommendations, the total post construction settlement is anticipated to be less than 2 inches, implying that the structural design of the proposed improvements should be designed to mitigate the adverse effects of the anticipated settlement.

4. JCA Recommendations

Commencing on pg. 10 of the report, recommendations are provided for site grading, drainage and foundation design, commencing with plan review to assess compliance of the construction drawings with the geotechnical recommendations of JCA. Those recommendations, which extend onto pg. 16, appear to be generally compliant with the prevailing regulations governing the construction of a two-story, wood-frame single family residence. Note that project building plans are subject to review by the professional staff of the Building Inspection Division of DCD. It would not be surprising if BID required supplemental calculations, general notes, plan revisions or other clarifications.

¹⁵ Ellen, S.D. and C.M. Wentworth, 1995. *Hillside Materials and Slopes in the San Francisco Bay Region, California*. U.S. Geological Survey Professional Paper 1357.

DMA Evaluation

The purpose of our review was to provide a professional opinion on the adequacy of the geotechnical report to serve a suitable basis to allow for the full processing of the application, which is a request for approval of construction permits for a new single-family residence on the project site located on a steep slope and any justification it might provide for granting approval of the variances being requested. The primary geologic, geotechnical and seismic hazards to this project include the following: a) earthquake ground shaking, b) slope failure, c) erosion and sedimentation, d) and the native soils on the project site are classified as highly expansive and highly corrosive by the Soil Survey of Contra Costa County.

1. Slope Stability and Drainage

The density of landslides and the San Pablo hills neighborhood is evidence that existing slopes this portion of the outcrop belt of the Orinda Formation bedrock is marginally stable; and existing natural slopes are likely to be sensitive to grading. However, the project site is not within a mapped landslide area, and it is not located within the Seismic Hazard Zone (SHZ) delineated by the California Geological Survey (see attached Figures 5, 6 and 7). Because of the steepness of the slope gradient and total relief on the project site (45% gradient & 28 ft. of relief), there is potential for the project grading and drainage to create slope stability, sedimentation and/or erosion problems that could impact developed residential lots that are adjacent to the project site. Given the potential for the project to impact downslope lots, it is important that a) grading be minimized, b) use of sliver fills avoided and c) engineered/permanent retaining walls constructed with building permits in lieu of graded slopes.

Control of runoff is another factor that is critical to the success of the project. In our opinion adequate protection of downslope lots following buildout of the project should be designed with the intent to not increase either peak flows or total volume of runoff (i.e. design the project with the intent to collect runoff from graded and developed areas and convey it in a closed conduit to adequate existing drainage facilities.

2. Seismicity

Although the project site is not within the official Earthquake Fault Zone (EFZ) delineated by the CGC, the project site is within approximately $\frac{1}{4}$ mile of the active trace of the Hayward fault. Although the risk of surface fault rupture is less-than-significant on the project site, the property is within an area where violent ground shaking is a potential hazard, particularly in the event a major earthquake on the Hayward fault. The JCA report provides seismic parameters that are used by the project structural engineer to design improvements that mitigate the ground shaking hazard. The intent of the CBC is to mitigate ground shaking damage as described below:

The site is within the seismically active San Francisco Bay Region area, where a moderate to high magnitude earthquake is a foreseeable event. The risk of damage from ground shaking is controlled by using sound engineering judgement and compliance with the latest provisions of the California Building Code (CBC), as a minimum. The seismic design provisions of the CBC prescribe minimum lateral forces applied statistically to the structure(s), combined with the gravity forces and dead-and-live loads. The code-prescribed lateral forces are generally considered to be substantially smaller than the comparable forces that would be associated with a major earthquake. The intent of the code is to enable structures to *(i)* resist minor earthquakes without damage, *(ii)* resist moderate earthquakes without structural damage but with some non-structural damage, and *(iii)* resist major earthquakes without collapse but with some structural as well as non-structural damage.

3. Soils

The Soil Survey of Contra Costa County classifies the soils that occur in the San Pablo hills as highly expansive and highly corrosive. The geotechnical report for the project did not include any subsurface exploration of the site and no laboratory testing. In our opinion there is a need for a geotechnical report update prior to issuance of any construction permits requiring evaluation of these adverse soil properties and the report shall provide mitigation measures for any adverse soil conditions that are confirmed to be present on the site.

DMA Recommendations

Based on review of our review of the materials provides by the project proponent, including the JCA report, along with review of the pertinent published geologic and seismic hazard maps and the General Plan Policies presented in Table 1, it is our opinion that the Community Development Divisions of DCD should require submittal of an update geotechnical report prior to issuance of an Update Geotechnical Report as a Condition of Approval. The intent of the report is to present subsurface and laboratory test data that is adequate to confirm/ modify the preliminary conclusions and recommendation of the project geotechnical engineer. The following are recommended Conditions of Approval.

GEO-1 At least 30 days prior to issuance of Construction Permits, the project proponent shall submit an updated geotechnical report that provides adequate subsurface and laboratory test data. The expectations of the County for the scope of the investigation include the following:

- A. The project geotechnical engineer shall review design-level grading, drainage and foundation plans, referencing the date of the plans reviewed.
- B. The geotechnical engineer shall excavate and log borings or test pits at/near the four corners of the area proposed for grading to establish the depth to bedrock, characterize. The report shall include logs showing the details of the earth materials penetrated. The logs shall not be diagrammatic or generalized. Representative samples shall be retrieved for laboratory testing. The logs should show the weathering profile, and comment on the the effect of weathering on engineering properties of the units penetrated.
- C. Samples of the samples collected shall be subject to laboratory testing (moisture/density, compressive strength, shear strength, expansion potential, gradation testing of native soils, and corrosion potential testing of soil and bedrock. and gradation),
- D. Provide an original geologic map of the site that represents the geotechnical engineer's and/or engineering geologist's interpretation of site conditions (i.e., bedrock stratigraphy, presence of any significant features (shear zones, bedding, deeply weathered zones, properties of native soils).
- E. The geotechnical update report shall provide mitigation measures for any significant impacts that are confirmed to be present of the site,
- F. Restate recommendations for geotechnical monitoring and testing during the construction period.

GEO-2 The geotechnical report shall be subject to review by the County's peer review geologist, and review/approval of the Zoning Administrator. Improvement, grading and building plans shall carry out the recommendations of the approved report.

GEO-3 The geotechnical report required by GEO-1 routinely includes recommended geotechnical observation and testing services during construction. These services are essential to the success of the project. They allow the geotechnical engineer to (i) ensure geotechnical recommendations for the project are properly interpreted and implemented by contractors, (ii) allow the geotechnical engineer to view

exposed conditions during construction to ensure that field conditions match those that were the basis of the design recommendations in the approved report, and (iii) provide the opportunity for field modifications of geotechnical recommendations (with BID approval), based on exposed conditions. The monitoring shall commence during clearing, and extend through grading, installation of recommended drainage facilities, and foundation related work, including retaining wall construction. A *hard hold* shall be placed on the "final" building inspection, pending submittal of a report(s) from the project geotechnical engineer that documents their observation and testing services, including the testing of any required backfill (e.g., backfilling of utility trenches). The monitoring report shall also include the geotechnical engineer's opinion on the compliance of the as graded, as-built project with all recommendations in the design level report.

GEO-4 All grading, excavation and filling shall be conducted during the dry season (April 15 through October 15) only, and all areas of exposed soils shall be revegetated to minimize erosion and subsequent sedimentation. After October 15, only erosion control work shall be allowed. Any modification to the above schedule shall be subject to review by the BID Grading Inspector, and the review / approval of the Zoning Administrator.

GEO-5 The project proponent shall record a deed disclosure that is intended to (i) identify the project geotechnical engineers and reference all reports and letters issued by the geotechnical engineers (i.e., provide full bibliographic citation to these documents), (ii) provide information that explains on how an interested party could access these documents, (iii) state that no changes to site grading or drainage can be allowed without prior review and approval of the Department of Conservation and Development. Note that DCD's review/ approval may require justification from the property owners geotechnical engineer, and (iv) explain that the property owner assumes monitoring and maintenance responsibility for all drainage improvements on the parcel. A draft of the proposed Deed Disclosure language must be reviewed and approved by the Community Development Division (CDD) prior to recordation; after the Deed Disclosure is recorded, the project proponent must provide CDD with a copy of the recorded document to serve as evidence that the requirements of GEO-5 were satisfied.

Purpose and Limitations

The purpose of our review was to provide a professional opinion on the adequacy of the geotechnical reconnaissance report submitted with the application to construction of a single-family residence on the captioned property. Specifically, we provide technical advice to assist the Community Development Division with discretionary permit decisions. Our services have been limited to interpretation of 1973 aerial photographs and review of the referenced reports and maps. Our opinions and conclusions are made in accordance with generally accepted principles and practices of the engineering geology profession.

We trust this letter provides the evaluation and comments that you requested. Please call if you have any questions.

Sincerely,
DARWIN MYERS ASSOCIATES



Darwin Myers, CEG 946
Principal



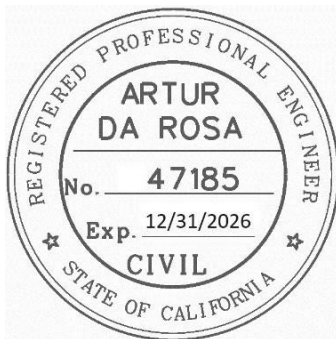
GEOTECHNICAL INVESTIGATION

Proposed Residence

1518 Barth Ave.
San Pablo, CA

Prepared by

John Campbell + Associates



A handwritten signature in black ink, appearing to read "Artur Da Rosa".

10/30/2024

- October 30, 2025
- Project No.
2024.9.2035

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Table of Contents

| | |
|--|---|
| INTRODUCTION..... | 4 |
| Project Description | 4 |
| Purpose and Scope of Work | 4 |
| Review of Geotechnical Data..... | 4 |
| FINDINGS | 4 |
| Site Description | 4 |
| Geologic Setting | 5 |
| Bedrock and Structure | 5 |
| Earth Materials | 5 |
| Soils and Bedrock | 5 |
| Groundwater | 5 |
| CONCLUSIONS..... | 5 |
| Geologic Hazards | 5 |
| Faulting | 5 |
| Regional Seismicity | 5 |
| Ground Shaking..... | 6 |
| Liquefaction | 6 |
| Lateral Spreading | 6 |
| Densification | 6 |
| Landsliding Risk | 6 |
| General Geotechnical Considerations for Proposed Foundation Improvements | 6 |
| Sandstone at Proposed Foundation Levels..... | 7 |
| Earthquake Hazards..... | 8 |
| RECOMMENDATIONS | 9 |
| General..... | 9 |
| Seismic Design..... | 9 |
| Wet Weather Construction..... | 9 |

| | |
|---|----|
| Clearing and Grading | 10 |
| Structural Fills | 10 |
| Cut slopes..... | 10 |
| Foundations..... | 10 |
| Spread Footing Foundations | 11 |
| Retaining Walls..... | 11 |
| Retaining Wall Drainage | 12 |
| Retaining Wall Backfill | 12 |
| Floor Structure..... | 12 |
| Concrete Slabs-on-Grade..... | 13 |
| Slab Design | 13 |
| Slab Construction and Cracking Control..... | 13 |
| Vapor Barrier | 14 |
| Geotechnical Drainage | 14 |
| Maintenance | 14 |
| Construction Observation | 15 |
| Supplemental Services..... | 15 |
| LIMITATIONS | 16 |
| APPENDIX A - REFERENCES | 17 |

Approval

The following Geotechnical Investigation was conducted under the supervision of

INTRODUCTION

Project Description

A geotechnical study has been completed for a new residence at 1518 Barth Avenue in San Pablo, California. The project involves new foundations for the new residence.

Purpose and Scope of Work

The purpose of this study is to gather information on the nature, distribution, and characteristics of the earth materials and the groundwater conditions at the site to prepare this report, which includes conclusions and recommendations for the design and construction of the new foundations for the residence. The design criteria are intended for use by your structural engineer. In addition, we have evaluated the site's exposure to primary geologic hazards, including faulting and ground shaking; and to secondary geologic hazards, including landsliding, liquefaction, subsidence, and ground spreading during future earthquakes.

Our investigation included an engineering reconnaissance of the site and surrounding areas; a review of published geologic data pertinent to the project area; engineering analyses; and this report's preparation.

This report contains the results of our investigation, including our findings regarding site, soil, geologic, and groundwater conditions; conclusions pertaining to geologic hazards and geotechnical considerations; and recommendations for foundation and drainage construction.

Pertinent exhibits appear in Appendix A.

Review of Geotechnical Data

Several published and unpublished sources of data were reviewed to evaluate geotechnical information regarding the subject parcel. This information included geotechnical literature, topographic and geologic maps, and preliminary photo interpretive landslide maps prepared by the United States Geological Survey, also including geologic, landslide, and fault maps prepared by the California Geological Survey (formerly the California Division of Mines and Geology - CDMG).

A list of the published sources used is presented at the end of this report.

FINDINGS

Site Description

The subject property is currently vacant and is on a relatively steep downhill lot.

Geologic Setting

Bedrock and Structure

Wagner, (1991), has mapped the underlying deposits as Sandstone derived from the underlying bedrock.

Earth Materials

Soils and Bedrock

Silty sands were encountered at the surface underlain by sandstone bedrock. relatively shallow foundations are anticipated. previous borings were performed on an adjacent site, and the soil conditions are consistent with the subject site.

Groundwater

Groundwater levels are not anticipated to be an issue for the proposed construction.

CONCLUSIONS

Geologic Hazards

Faulting

The property is not within a current *Alquist-Priolo Special Studies Zone*, and we did not observe any evidence of active faulting during our reconnaissance of the property. In addition, no evidence of faulting or fault-related features were noted on the property. We believe that there is little risk of ground rupture along a fault trace at the site.

Regional Seismicity

The site is within the Coast Range Province which is considered seismically active. Historical earthquake records indicate a potential for strong earthquake shaking throughout the entire East Bay area. Large magnitude earthquakes have historically impacted the Bay area in 1836, 1938, 1852, 1861, 1868, 1906, and most recently, 1989 (the Loma Prieta earthquake).

Studies by the United States Geological Surveys Working Group on California Earthquake Probabilities (United States Geological Survey, 1999) have estimated a 70 percent probability of at least one magnitude 6.7 or greater earthquake occurring in the San Francisco Bay Region before the year 2030. As part of their prediction, they estimated the probability to be 32 percent for a magnitude 6.7 or greater earthquake to occur on the Hayward fault by the year 2030.

Ground Shaking

The greatest short-term risk to the property is from ground shaking from forecast activity along the Hayward Fault, Calaveras, and the San Andreas Faults along the Peninsula. Future strong earthquake shaking should be anticipated at the site from these faults are active and trend in a northwest direction through the Bay Area and are capable of producing very strong to violent earthquakes. It will be necessary to design and construct the project improvements in strict adherence to current standards for earthquake-resistant construction.

Liquefaction

Liquefaction is a sudden loss of shear strength experienced in saturated granular soils below the groundwater level during strong earthquake ground shaking. According to Seed (1983), the likelihood of this phenomenon is dependent on many factors, including the intensity of duration of ground shaking, soil density and particle size distribution, and position of the groundwater table. Due to the density of the sandy clays and the clays are cohesive the soils at the site are not susceptible to liquefaction. We anticipate that the groundwater table and/or phreatic (saturation) level beneath the residence may possibly rise during winter storm periods. Even under these conditions, however, it is estimated that the risk of liquefaction beneath the property is very low.

Lateral Spreading

Lateral spreading or lurching is generally caused by seismically induced liquefaction of marginally stable soils underlying gentle slopes and is usually accompanied by fissures. Because the soils underlying the site are not subject to liquefaction during a future earthquake, and the site is on a relatively gentle slope there is a very low risk associated with seismically-induced lateral spreading affecting the structure.

Densification

Earthquake-induced densification and settlement of soils above the groundwater table are considered unlikely due to the density of the clays.

Landsliding Risk

Although the area is relatively steep, we checked landslide maps of the area, there is no risk of landsliding.

General Geotechnical Considerations for Proposed Foundation Improvements

Based on our investigation, it is our opinion the site is suitable for the proposed foundation improvements from a geotechnical standpoint. All the conclusions and recommendations presented in this report should be incorporated into the design and construction of the project to reduce potential geotechnical risks.

- The presence of relatively dense Sandstone at proposed foundation levels;
- and Earthquake hazards.

These considerations are discussed as follows.

Sandstone at Proposed Foundation Levels

Sandstone will be found at the surface and well below foundation levels. These materials are relatively easy to excavate and are suitable for relatively high bearing pressures as required by foundations and retaining walls. The foundation depths for the structure will be extended approximately 18 inches below grade to provide lateral resistance to movement during seismic activity. New foundations, foundation improvements, and retaining walls can be supported on conventional spread footing foundations. Provided that the foundations are extended to the recommended depths conventional spread footings will provide adequate support for the structures.

Earthquake Hazards

The subject site is located in the highly seismic San Francisco Bay Area and there is a strong probability that a moderate to severe earthquake will occur during the life of the structure. The foundations recommended in this report would be expected to generally provide a significant improvement in performance over the existing foundation system. The 2024 California Building Code has adopted provisions for the incorporation of ground shaking into the design of all structures. Recommendations for geotechnical parameters to be used in the structural seismic design of the new foundations are presented in the Recommendations Section.

Post Construction Settlement

Minor cracking during the settlement of foundation improvements is to be expected following construction.

Provided that the foundation supports are designed and constructed in accordance with our recommendations, we estimate that short-term maximum total post-construction settlements will be less than about 2 inches.

RECOMMENDATIONS

General

It is the responsibility of the owner or his representative to confirm that the recommendations presented in this report are called to the attention of the contractor, subcontractors, and any governmental body that may have jurisdiction and that these recommendations are carried out in the field.

It will be necessary to design and construct the project improvements in strict adherence to current standards for earthquake-resistant construction. It is our understanding that the project is to be designed in accordance with the 2024 California Building Code.

In order to determine the soil profile in the upper 100 feet, we reviewed the hardness data from typical bedrock materials in the area. We are recommending an SC soil/rock profile for the seismic design of the improvements to the site and structure.

Seismic Design

The closest major active faults in the area, San Andreas and Hayward, are capable of producing an earthquake with a magnitude equal to or greater than 7.5.

Based on our review of the site location, geology, and the newly adopted 2022 California Building Code (CBC), we recommend the following parameters be used for the seismic design of the foundations for the residence.

- Site Class D Mapped Spectral Acceleration for Short Period ($S_s=2.610g$)
- Site Class D $S_1= 1.02g$
- Site Class D $S_{ms}= 2.74g$
- Site Class D $S_{m1} = 1.82$
- Site Class D ($S_{ds}=2.15g$)
- Site Class D $S_{d1}= 1.44g$.

Wet Weather Construction

Construction is most economically performed during the summer months when the on-site soils are driest. Delays should be anticipated in site construction performed during the rainy season due to excessive moisture. Special and comparatively expensive construction procedures should be anticipated if construction must be completed during the winter.

If utility trenches or excavations are open during winter rains, then caving of the trenches or foundation walls may occur. Also, if the foundation trenches fill with water during construction,

or if saturated materials are encountered at the anticipated bottom of the foundations, they may need to be extended to greater depths to reach adequate support capacity than would be necessary if dry weather construction took place. We should also note that it has been our experience that increased clean-up costs will occur, and greater safety hazards will exist if the work proceeds during the wet winter months. Furthermore, engineering costs to observe construction are increased because of project delays, modifications, and rework.

Clearing and Grading

Those areas where new foundations will be constructed should be stripped of any topsoil or loose materials and removed from the site. After the selected areas of the site have been stripped, excavations required can be made.

Structural Fills

No fills are anticipated at the project. If fills are needed, only select, non-expansive soils, should be used as fill below slabs, (if necessary), and behind retaining walls. Fill material should have a Plasticity Index of less than 15. The surficial sands and clays on site would appear to meet these criteria. Non-expansive import may be used.

New utility trenches beneath the foundations should be compacted to avoid settlement and sealed to keep external water sources from entering the trenches below the structure.

Backfill materials should be approved by the soil engineer prior to use. All backfill should be placed in lifts not exceeding 8 inches in loose thickness. Each lift should be brought to at least the optimum moisture content and compacted to at least 90 percent relative compaction, in accordance with ASTM Designation D 1557.

Cut slopes

No finished cuts are anticipated for the project. In general, finished permanent cut slopes should be no steeper than 2:1 (2 horizontal to 1 vertical). Fills should be no steeper than 2:1. Where steeper banks are required, retaining walls should be used.

Foundations

Foundations for the new residence, including retaining walls, should consist of continuous spreadtype footings stepped into the hillside. There may also be isolated interior column loads supporting floor joists and beams. These loads should be supported upon conventional isolated spread footing pads as well. As noted, an alternative to spread footings for the foundation system can consist of a matt slab. Recommendations for the matt slab should be prepared by your structural engineer.

Spread Footing Foundations

The design of the foundation system should be performed by the structural engineer. Groundlevel floors can consist of raised wood floors or slab floors.

Any basement and additional foundations for the residence should consist of spread footings supported on stiff clays at design foundation depths indicated on the plans. Perimeter foundations at ground level, as well as interior foundations supporting walls and isolated interior column supports should be on spread footings designed in accordance with the criteria given below.

Isolated column footings should be at least 24 inches wide.

There may be isolated interior column loads from posts supporting floor beams. These loads should be supported upon conventional isolated spread footings excavated into the bedrock as outlined above. An allowable passive pressure of 400 psf should be used against the vertical projection of the footings for earthquake loads.

Foundations so established should be designed for the following maximum allowable bearing pressures.

Table 1

| <u>Dead Load</u> | <u>Dead + Live Load</u> | <u>Total Load</u> |
|------------------|-------------------------|-------------------|
| 2,500 psf | 3000 psf | 3,500 psf |

Dead-plus live loads are defined as "real" loads, including permanently applied live loads, and total loads are defined as "real" loads plus the effects of seismic or wind forces. The weight of foundation concrete extending below grade may be disregarded in sizing computations.

The plans should indicate that the soil engineer should provide observation of the excavations for spread footing foundations prior to the placement of foundation steel and concrete.

Retaining Walls

Retaining walls should be founded on spread footings in accordance with the criteria given previously. For walls supporting level backfill, walls should be designed to resist active earth pressures equivalent to those exerted by a fluid weighing 45 pounds per cubic foot. For backslopes steeper than 3:1, to a maximum of 2:1, the walls should be designed for lateral pressures equivalent to a fluid weighing 55 pounds per cubic foot. These pressures are based upon Rankine coefficients for an active state of stress.

Retaining walls restrained from movement at the top should be designed for "at rest" lateral earth pressures equivalent to a fluid weighing 60 pounds per cubic foot for level backfill conditions, and 75 pounds per cubic foot backslopes steeper than 3:1, to a maximum of 2:1. The walls must be designed to resist lateral earth pressures plus additional lateral pressures that may be caused by surcharge loads applied at the ground surface behind the walls.

Where an imaginary plane inclined at 1½:1 extends downward from the nearest edge of any foundation through a retaining wall, the portion of the affected wall below the intersection should be designed for an additional horizontal surcharge load, such as for adjacent neighboring foundations. A lateral frictional coefficient of 0.35 for sliding should be used.

Retaining Wall Drainage

Retaining walls should be fully back drained. The back drains should consist of a 4-inch diameter, rigid perforated pipe embedded in drain rock. The pipe should be PVC Schedule 80 or ABS (SDR 35 or better), and the pipe should be sloped to drain to appropriate outlets by gravity. Drain rock should consist of clean, free-draining crushed rock or gravel. The rock should be wrapped in filter fabric such as Mirafi 140N® or equivalent. Alternatively, the drainage blanket may consist of Class 2 "Permeable Material", per Section 68-1.025 of the Caltrans Standard Specifications (1991). Miradrain® geotechnical drainage product can be used on excavations where excavating for a gravel drain behind the wall is prohibitive.

The top of the collector pipe should be at least 8 inches below the lowest adjacent grade and at least 8 inches below the base of the floor slabs where retaining walls abut floor slabs. The crushed rock or gravel should extend to within 1 foot of the surface. The upper 1 foot should be backfilled with compacted soil to exclude surface water. The ground surface behind retaining walls should be sloped to drain.

Retaining Wall Backfill

Only select, non-expansive soils should be used as wall backfill. Wall backfill should be placed in the wedge-shaped zone described by the rear of the wall or wall drainage blanket, a plane extending upward at an inclination not exceeding 1:1 from the heel of the wall, and a finished grade behind the wall. Drainage rock consisting of clean ¾" rock can be used for backfill without compaction. All backfill should be placed in lifts not exceeding 8 inches in loose thickness. Each lift should be brought to at least the optimum moisture content and compacted to at least 90 percent relative compaction, in accordance with ASTM Designation D 1557. We should observe the foundation excavations prior to the placement of reinforcing steel for concrete. Also, if soil conditions other than those observed at the site are encountered during foundation excavations we should be notified in order to evaluate the possible modifications to our recommendations. The retaining walls should be backfilled with clean ¾" drain rock. A back drain should be incorporated into the design of the wall to reduce the risk of seepage through the retaining walls.

Floor Structure

Floors in the new residence can consist of standard wood floors or concrete slabs on grade.

Concrete Slabs-on-Grade

If floors in the structure are to be concrete slab on grade the following recommendations apply. Interior slabs-on-grade will be supported on the stiff undisturbed soils, bedrock, or on a minimum of 12 inches of compacted, nonexpansive soil. Minor structural fills may be required to bring the slab subgrades to the proper elevation for the construction of the slabs. In general, fill and backfill materials for slabs and retaining walls should be approved by the soil engineer prior to use. Prior to the construction of the slabs, any disturbed subgrade surface should be compacted to provide a smooth, firm surface for slab support.

Only select, non-expansive soils should be used as fill below slabs. Fill material should have a Plasticity Index of less than 15 and be crushed to a size smaller than 2.5 inches. Clean 3/4-inch drain rock can be used as slab backfill. All fill and backfill should be placed in lifts not exceeding 8 inches in loose thickness. Each lift should be brought to at least the optimum moisture content and compacted to at least 90 percent relative compaction, in accordance with ASTM Designation D 1557-78.

Slab Design

The slabs should be appropriately reinforced according to structural requirements; concentrated loads may require additional reinforcing. Minor movement of the concrete slab with resulting cracking should be expected. Steps to the house from the slab area should be created with an expansion joint between the steps and the house foundations. The recommendations presented above, if properly implemented, should help minimize the magnitude of this cracking. It has been our experience that the installation of wire mesh for slab reinforcement has often not been performed properly during the construction of the slab. As a result, we recommend that steel bar reinforcement be used to reinforce any proposed slabs. Any new exterior slabs should be placed on non-expansive materials which are properly compacted.

Slab Construction and Cracking Control

Slabs, including any new slab, should be at least 5 inches thick and should be reinforced to reduce cracking. Slabs should be provided with construction joints spaced no farther apart than 10 feet on centers (both ways) to control cracking. The subgrade soils should be rolled to produce a dense, uniform, and essentially unyielding surface. The subgrade should not be allowed to dry out prior to the placement of concrete. Concrete is a rigid construction material, and even though reinforced to reduce cracking minor cracks will occur in slabs from temperature expansion and minor settlements of the slab. Slab reinforcement should be designed by the structural engineer.

TABLE 2

| <u>Percent Passing by Weight</u> | <u>Sieve Size</u> |
|----------------------------------|-------------------|
| 1 inch 100 No. 4 | 0 |

Vapor Barrier

A moisture vapor barrier membrane should be included below the slabs. The membrane should be placed between the drain rock and the slab and should be covered with 2 inches of damp, clean sand to protect it during construction.

Capillary Break - Slabs should be underlain by a capillary moisture break consisting of at least 4 inches of clean, free-draining crushed rock or gravel graded as follows when tested in accordance with ASTM Designation D 422-73.

Geotechnical Drainage

In general, surface water should be diverted away from slopes and foundations. Roofs should be provided with gutters, and the downspouts should be connected to closed conduits discharging well away from foundations and slopes. Roof downspouts and surface drains must be maintained entirely separate from any foundation drains that may exist. Drainage from retaining walls should be channeled into an appropriate drainage collection facility in accordance with the requirements of the County.

Where any perforated sub-drain pipe connects with the solid discharge drainpipe, the drainrock backfill should be discontinued. A clay plug should be constructed out of relatively impervious soils to direct collected water into the perforated pipe and minimize the potential for water collecting around the solid drainpipe and saturating the adjacent soils. We recommend waterproofing be applied to any proposed retaining walls where applicable. The specification of the type of waterproofing and the observation of its installation should be performed by the architect and/or structural engineer. In addition to the drainage details noted above, the high end and all 90-degree bends of the sub-drain pipe should be connected to a riser that extends to the surface and acts as a cleanout. The number of cleanouts can be reduced by installing "sweep" 90degree bends or pairs of 45-degree bends in succession instead of using "tight" 90-degree bends.

Maintenance

Some nominal maintenance of the drainage facilities should be expected after the initial construction has been completed. Surface and subsurface drainage facilities should be checked frequently, and cleaned and maintained as necessary. Downspout sub-drain pipes should be checked by flushing with a hose once every two years. If blockages develop, the lines should be cleared by a contractor who specializes in such work.

Should ownership of this property change hands, the new owner should be informed of the existence of this report, not adversely change the grading or drainage facilities, and understand the importance of maintaining proper surface drainage.

Construction Observation

On-site geotechnical observation during construction is recommended in order to ensure that the subsurface conditions encountered during construction are consistent with those encountered during the investigation to assure that your contractor follows the recommendations in the report and on the approved plans, and to submit a final summary letter to the Contra Costa Building Department as required. If variations in field conditions become apparent, it may be necessary to re-evaluate the recommendations of this report., If we are not retained to provide the recommended review, we can assume no responsibility for misinterpretation of our recommendations.

Supplemental Services

The following are supplemental services we recommend during project development. We recommend that we be retained to review the geotechnical aspects of the project plans and specifications to determine if they are consistent with our recommendations. In addition, we should be retained to observe the geotechnical aspects of the construction, and foundation excavations and to perform appropriate field and laboratory testing. Special geotechnical inspection may be required by the County Building Department.

If, during construction, subsurface conditions different from those encountered in the explorations are observed, or appear to be present beneath excavations, we should be advised at once so that these conditions may be reviewed and our recommendations reconsidered. The recommendations made in this report are contingent upon such notification and review of the changed conditions.

If more than 18 months have elapsed between the submission of this report and the start of work at the site, or if conditions have changed because of natural causes or construction operations at, or adjacent to, the site, the recommendations made in this report may no longer be valid or appropriate. In such a case, we recommend that we review this report to determine the applicability of the conclusions and recommendations, considering the elapsed time or changed conditions. T h e recommendations made in this report are contingent upon such a review.

These supplemental services are performed on an as-requested basis and are in addition to this geotechnical investigation. Subsequent additional work anticipated, but not included in this proposal, would consist of a plan review of the structural plans for mitigation, and geotechnical construction observation services during the actual construction. We cannot render an opinion for conditions, situations, or stages of construction that we are not retained to observe.

LIMITATIONS

This report has been prepared for the exclusive use of the owner, and their consultants for development of the proposed project described in this report.

Our services have consisted of professional opinions and conclusions developed in accordance with generally accepted geotechnical engineering principles and practices. We provide no other warranty, either express or implied. Our conclusions and recommendations are based on the information provided to us regarding the proposed construction, the results of our field observation, geologic mapping, and professional judgment. Site conditions and cultural features described in the text of this report are those existing at the time of our field observations and reconnaissance and may not necessarily be the same or comparable at other times.

The scope of our services did not include an environmental assessment or investigation for the presence of absence of wetlands, corrosive soils or groundwater, hazardous or toxic materials in the soil, surface water, groundwater or air, on or below, or around the site. Any statements contained in this report, regarding odors noted or unusual or suspicious items or conditions observed are strictly for the information of our client.

APPENDIX A - REFERENCES

Caltrans, 1991, *Standard Specifications*, State of California Department of Transportation.

H. Seed, H. B., and Idriss, E., 1982, *Ground Motion and Soil Liquefaction*

During Earthquakes, Earthquake Engineering Research Institute Monograph

U.S. Geological Survey, 1999, "Earthquake Probabilities in the San Francisco Bay Region: 2000 to 2030 – A Summary of Findings," Open File Report 99-517.

U.S.G.S. Earthquake Hazards Program - Seismic Design Values for Buildings Internet Site.

Wagner, D. L., Bortugno, E. J., and McJunkin, R. D., 1990, Geologic Map of the Santa Rosa Quadrangle, California Division of Mines and Geology, scale 1:250,000.

Working Group on California Earthquake Probabilities, (1999), *Earthquake Probabilities in the San Francisco Bay Region: 2000 to 2030 –*

A Summary of Findings, U.S. Geological Survey, Open File Report 99-517, Online Version 1.0



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**GEOTECHNICAL INVESTIGATION
PROPOSED NEW RESIDENCE
1518 BARTH AVENUE
RICHMOND, CALIFORNIA**

CE&G Project No. 070780
13 May 2008

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COMMUNITY DEVELOPMENT DEPT.

Prepared for:

Rene Lucchini
801 Yuba Street
Richmond, California 94805

Prepared by:

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13 May 2008

Rene Lucchini
801 Yuba Street
Richmond, California 94805

RE: Subsurface Exploration
Proposed New Residence
1518 Barth Avenue
Richmond, California

Dear Ms. Lucchini:

In accordance with our contract, we have completed our subsurface exploration and report for the proposed new residence to be constructed on your property located at 1518 Barth Avenue in Richmond, California (Figure 1). The purposes of this project were to develop information regarding the surface and subsurface soil conditions near the proposed improvements and to provide geotechnical engineering recommendations for the proposed project.

1.0 SCOPE OF WORK

The scope of work for this project has included but was not limited to the following tasks:

- review of published soil and geologic maps of the area;
- review of engineering reports by others provided by the client;
- drilling and sampling of four exploratory borings;
- evaluation of the materials encountered in the borings;
- laboratory testing of selected samples recovered from the borings;
- engineering analyses;
- development of geotechnical design parameters for the project; and
- preparation of this summary report of findings and recommendations.

This report presents the results of the field exploration, laboratory testing program, data analysis, and conclusions and recommendations pertaining to the geotechnical engineering aspects of the design and construction of the proposed project. Evaluation or identification of the potential presence of hazardous materials at the site was not requested and is beyond the authorized scope of this project.

**SUBSURFACE EXPLORATION FOR PROPOSED NEW RESIDENCE
1518 BARTH AVENUE
RICHMOND, CALIFORNIA**

TABLE OF CONTENTS

| | | |
|-----|--|----|
| 1.0 | <u>SCOPE OF WORK</u> | 1 |
| 2.0 | <u>SITE DESCRIPTION AND HISTORY</u> | 2 |
| 2.1 | Site Description | 2 |
| 2.2 | Project Description | 2 |
| 2.3 | Site History | 2 |
| 3.0 | <u>SOIL AND GEOLOGIC CONDITIONS</u> | 3 |
| 3.1 | Surficial Soils | 3 |
| 3.2 | Bedrock Geology | 3 |
| 3.3 | Landslides | 4 |
| 3.4 | Liquefaction | 4 |
| 3.5 | Seismicity | 4 |
| 4.0 | <u>SUBSURFACE EXPLORATION</u> | 5 |
| 5.0 | <u>LABORATORY TESTING</u> | 6 |
| 6.0 | <u>CONCLUSIONS</u> | 6 |
| 6.1 | General | 6 |
| 6.2 | Geotechnical Considerations | 6 |
| 6.3 | Seismic Hazards | 7 |
| 7.0 | <u>RECOMMENDATIONS</u> | 8 |
| 7.1 | General | 8 |
| 7.2 | Option 1: Remedial Grading/Landslide Removal | 8 |
| 7.3 | Option 2: Landslide Stabilization Foundation | 8 |
| 7.4 | Appurtenant Slabs | 13 |
| 7.5 | Site Grading | 13 |
| 7.6 | Surface Drainage | 14 |
| 7.7 | Seismic Design Parameters | 15 |
| 7.8 | Excavations and Trenches | 15 |
| 8.0 | <u>LIMITATIONS</u> | 16 |
| 9.0 | <u>REFERENCES</u> | 18 |

FIGURES

APPENDIX A - BORING LOGS

APPENDIX B - PRELIMINARY TIE-BACK CALCULATIONS

2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Description

For the purposes of this report, the reader should assume that the property is located on the north side of Barth Avenue between Harbor View Avenue and Capitol Hill Avenue (Figure 1). Barth Avenue generally trends east-west in front of the property. The property consists of a 4,685 square foot, pentagon-shaped, undeveloped lot that slopes down to the north-northwest at an estimated average inclination of approximately 2.2H:1V.

Past grading on the property appears to have consisted of conventional cut-and-fill grading associated with the construction of Barth Avenue and the parcels along the downslope side of the roadway. Such grading is evidenced by the uniform nature of the slope and the presence of a mid-slope bench. In addition, a landslide repair was completed on the property in 1984 (see below).

2.2 Project Description

We understand that consideration is being given to developing the site for a single family residence. It is anticipated that the residence will be of modular home construction and supported on a pier-and-grade beam type foundation.

2.3 Site History

We reviewed the following geotechnical reports prepared for the subject property by other consultants:

2.3.1 "Geotechnical Engineering Services, Barth Avenue Slide, Richmond, California," prepared by Harding Lawson Associates (HLA), dated 4 April 1984.

According to this report, a landslide developed on the property in March 1983. The landslide was characterized as a wedge-type failure that formed in residual soil and overlying fill. As part of their investigation, HLA drilled and sampled two exploratory borings. HLA did not determine the location of a discrete slide plane from the boring data. The original repair for the landslide designed by HLA consisted of a buttress fill across the lower half of the slide mass. The upper portion of the slide was to remain intact and stabilized in-place by the buttress fill. The HLA report indicates that the actual repair was modified to include a smaller buttress fill at the toe, with benched levels of compacted fill up to the headscarp of the slide below Barth Avenue. Two subdrains were also placed beneath the fill. The repair was completed by the end of August 1983.

2.3.2 "Slope Stability Investigation Report for Barth Avenue, City of Richmond, California," prepared by Questa Engineering Corporation (QEC), dated 7 November 2001

The QEC report documented cracking distress in the pavement of Barth Avenue directly above the subject property following the heavy El Nino rains in 1997 to 1999. The distress was attributed to slope movement which occurred after the 1983 HLA repairs to the hillside. QEC drilled and sampled four borings in the Barth Avenue pavement during their investigation. They concluded that

the “observed deformation is most likely due to settlement and rotational slumping of low density and poorly compacted fill underlying Barth Avenue and movement due to saturation of the fill soil during prolonged heavy winters.” QEC further concluded that the movement may also be “partially due to settlement of the fill soil placed during the previous landslide repair and the underlying residual soil left in place in the upper portion of the repair.” QEC recommended that the soil underlying the affected portion of the Barth Avenue be removed and replaced as an engineered fill, with a subdrain placed along the contact between the new fill and underlying fill and/or residual soil. The recommended repairs to Barth Avenue had not been implemented at the time of this report.

2.3.3 “Report - Geotechnical Investigation, Planned Residence on Barth Avenue, San Pablo, California,” prepared by Earth Mechanics Consulting Engineers, dated 25 May 2005.

This report provided geotechnical recommendations for drilled pier and spread footing foundation systems, slabs-on-grade, retaining walls, and drainage. Earth Mechanics Consulting Engineers drilled and sampled one boring as part of their investigation. The report noted evidence of slope movement at the site, and concluded the following:

It is our opinion that further studies of the potential limits of landsliding within the site and the potential rate of movement should be conducted prior to developing the subject site. We recommend that the work be performed by a certified engineering geologist and should include a field reconnaissance and review of historical aerial photographs. Depending on the engineering geologist's findings, it may be necessary to install slope inclinometers and monitor them over a period of years to determine the rate of landslide movement. The certified engineering geologist may determine based on the collected data that the subject lot may or may not be suitable for support of residential construction in its current condition.

3.0 SOIL AND GEOLOGIC CONDITIONS

3.1 Surficial Soils

The surficial soil in the vicinity of the property has been mapped by the USDA Soil Conservation Service as clay loam belonging to the Los Osos Series on 30 to 50 percent slopes (SCS, 1977). Soils of this series form on soft, fine-grained sandstone and shale bedrock materials and are found on upland areas. The Los Osos Series classifies as a low plasticity clay (CL) which a high shrink-swell potential. Runoff is medium to rapid, and the hazard of erosion is moderate to high where the soil is bare.

3.2 Bedrock Geology

According to published geologic maps of this area (Dibblee, 2005 and Crane, 1995), the area encompassing the subject property is underlain by Pliocene age bedrock materials (Figure 2). The bedrock is described as consisting of interbedded pebble conglomerate, sandstone, and claystone of the Orinda Formation. The Crane mapping shows that the bedrock locally dips 85 degrees to the northeast. This mapping is consistent with the materials encountered in our exploratory borings.

3.3 Landslides

The U.S. Geological Survey has developed regional landslides features maps for a significant portion of the greater San Francisco Bay Area. The landslide features map for this area does not show any landslide features on the property (Nilsen, 1975). According to a geological and geophysical seismic safety report of this area (CDMG, 1973), the area encompassing the subject property is classified as "Urban Area C: Areas underlain by incompetent formations, but having no well-defined landslide features." A landslide features map contained in the report also does not show any mapped slides on or adjacent to the property.

3.4 Liquefaction

According to the seismic safety report referenced above (CDMG, 1973), the area encompassing the subject property is classified as a "Zone III; Liquefaction Potential Probably Absent."

3.5 Seismicity

The project site is located within the greater San Francisco Bay Area which is recognized as one of the more seismically active regions of California. The seismic activity of the greater Bay Area results from the complex movements along the transform boundary between the Pacific Plate and the North American Plate. Studies have shown that the Pacific Plate is slowly moving to the northwest relative to the more stable North American Plate at an average rate of about 49 mm/yr (Page, 1992). The differential movements between the two crustal plates have caused the formation of a series of active fault systems within the transform boundary. The transform boundary between the two plates extends across a broad zone of the North American Plate within which right lateral strike slip faulting predominates. In this broad zone, the San Andreas fault accommodates less than half of the average total relative plate motion. Much of the remainder in the greater San Francisco Bay Area is distributed across the Calaveras, Hayward, Concord- Greenvalley, Greenville, West Napa, and Rodgers Creek Fault systems.

The site is not located within an Earthquake Fault Zone for active¹ faults as designated by the State Geologist (CGS, 1992). However, the active Hayward fault system has been mapped approximately 1000 feet (0.3 km) west of the subject property (CDMG, 1998). Other nearby active faults systems which could induce strong ground shaking at the site include the Calaveras, Greenville, Concord-Green Valley, West Napa, Rodgers Creek, and San Andreas faults. These active faults and their distances from the project site are presented in Table A (CDMG, 1998).

¹Earthquake Fault Zones (EFZ) have been delineated by the California Geological Survey (formerly the California Division of Mines and Geology) around all known active faults throughout the State. A fault is defined as being active if it exhibits evidence of surface rupture due to faulting within the last 11,000 years (Holocene time). The land within an EFZ is believed to have an elevated potential for experiencing surface rupture due to faulting.

A large magnitude earthquake on any of these fault systems has the potential to cause significant ground shaking at the site. The intensity of ground shaking that is likely to occur at the property will generally be dependent upon the magnitude of the earthquake and the distance to the epicenter. In general, the greater the distance to the epicenter, the lesser the intensity of the ground shaking that is anticipated to occur at the site.

| TABLE A - DISTANCES TO KNOWN ACTIVE FAULTS | | |
|---|-------------------|--------------------------|
| Fault | Fault Type | Distance To Fault |
| Hayward | Type A | 0.3 km southwest |
| Calaveras | Type B | 25 km southeast |
| Greenville | Type B | 30 km east |
| Concord-Green Valley | Type B | 21 km east |
| West Napa | Type B | 22 km northeast |
| Rodgers Creek | Type A | 12 km northeast |
| San Andreas | Type A | 27 km west |

4.0 SUBSURFACE EXPLORATION

The subsurface conditions in the vicinity of the proposed new residence were explored by drilling and sampling four exploratory borings. The exploratory drilling was performed on 12 July 2007, using a "Minuteman" portable-type drilling rig equipped with 4-inch diameter solid stem, continuous flight augers. The borings were drilled to depths between 14.5 and 26.5 feet below the existing grade. Drive samples of the site materials were obtained using California Modified (CM) and Standard Penetration (SPT) samplers. The samplers were advanced using a 140-pound hammer with a free fall drop of 30 inches. The number of blows required to drive each of the samplers 6 inches was recorded and the uncorrected blow counts are shown on the boring logs in Appendix A. Samples obtained from the borings were retained for possible laboratory testing and analyses. The approximate locations of the borings are shown on Figures 3 and 4.

The materials encountered in the borings were continuously logged in the field by a geologist from our office. The soils were visually classified in the field, office, and laboratory according to the Unified Soil Classification System (USCS) (Figure 5) and the Bedrock Characteristics Chart (Figure 6). The logs of the borings are included in Appendix A.

We encountered between 4.5 feet and 14 feet of artificial fill in the borings. The artificial fill consisted of a variable mixture of silts, clays, and gravels. The artificial fill is underlain by clayey silt, sandy silt, and silty clay native/residual soil and landslide debris. These soil materials are underlain by siltstone and sandstone bedrock to the depths explored. Free groundwater was not encountered in the borings.

5.0 LABORATORY TESTING

Laboratory testing was performed to obtain information concerning the physical properties of the samples recovered from the exploratory borings. Tests were performed in general conformance with applicable ASTM standards. Tests performed included determination of moisture content, dry unit weight, and Atterberg Limits. The results of the laboratory tests are summarized on the boring logs in Appendix A.

6.0 CONCLUSIONS

6.1 General

Based on the results of our work, it is our opinion that there has been ongoing subsurface movement at the site since the 1983 slope repair. This movement can be mitigated by either utilizing an earthwork-type repair or installing a deep pier foundation system for the new residence that effectively pins the upper portion of the slide mass.

6.2 Geotechnical Considerations

6.2.1 Soil Conditions

The results of our limited subsurface exploration indicate that the surficial soils in the vicinity of the proposed improvements consist of gravel, silt, and clay soils. Our laboratory soil testing indicates that the clayey soils have a high expansion potential. The expansion potential of these soils must be taken into consideration when designing the foundations systems for the proposed improvements and shallow founded appurtenant structures.

6.2.2 Landsliding

The landslide that occurred on the property in 1983 was partially stabilized in 1984 utilizing a buttress fill at the toe, with benched levels of compacted fill up to the headscarp below Barth Avenue, and two subdrains. This repair did not remove and replace the entire slide mass on the subject property as an under drained engineered fill. Most of the fill at the property is underlain at depth by landslide debris. Between 1997 and 1999 additional movement was documented by Questa Engineering Corporation in the street above the project site. It appears that this more recent movement is likely the result of a combination of continued movement of the slide mass and settlement of the fill soils placed during the 1984 partial stabilization. Our interpretation of the subsurface geometry is presented in Figure 4. In order to develop the property with a single family dwelling, the identified subsurface movement will need to be abated. Recommendations for slope stabilization measures are presented in Section 7.0.

6.2.3 Groundwater

Groundwater was not encountered in the four exploratory borings. However, groundwater levels can fluctuate seasonally and/or over a period of years. Note that the exploratory boring sampled by

Earth Mechanics Consulting Engineers in 2005 encountered a perched water table at a depth of 3.5 feet.

Therefore, it is possible the adverse groundwater conditions could be encountered during construction. The contractor should be prepared for this possibility.

6.3 Seismic Hazards

6.3.1 Fault Rupture

The site is not located within an Earthquake Fault Zone for active faults as defined by the State Geologist. The nearest mapped active fault (Hayward Fault) is located approximately 0.3 kilometer west of the site. Therefore, it is our opinion that the potential for surface rupture due to primary faulting at the site is low.

6.3.2 Seismically-Induced Ground Shaking

Due to the proximity of the site to numerous active fault systems which traverse the greater San Francisco Bay Area, it is likely that the property will be subjected to the effects of a major earthquake during the design life of the proposed improvements. The effects are likely to consist of significant ground accelerations. These ground movements may cause damage to the proposed improvements. This potential hazard should be taken into consideration when designing the structural systems of the proposed structures and associated appurtenances.

6.3.3 Liquefaction

Due to the shallow depth of the soils, the high clay and silt content, and the absence of elevated groundwater conditions underlying the site, it is our opinion that there is no potential for liquefaction.

6.3.4 Lateral Spreading

Lateral spreading is a type of ground instability that results in ground displacements that occur when liquefaction of a soil layer causes insufficient strength for lateral stability. This phenomenon occurs when either the ground surface or the soil layer subject to liquefaction is sloped, or when there is an open slope face or stream channel adjacent to a potentially liquefiable soil layer. These conditions are not known to be present at the site. It is our opinion that there is no potential for lateral spreading to occur at the site.

6.3.5 Seismically-Induced Subsidence

Seismically-induced ground shaking can cause vertical subsidence of specific types of soils. Seismically related settlement generally results from the densification of loose sands and sandy silts due to vibrations or liquefaction. Due to the nature of the soils encountered during our exploratory borings, it is our opinion that the potential for seismically induced subsidence is very low.

6.3.6 Ground Lurching

Ground lurching is a phenomenon whereby strong seismic shaking causes cracking and deformation of the ground surface in areas underlain by soft weak soils. The cracking and deformation are the result of the disruption of the passing earthquake waves. Based on the known site soil conditions and our analysis, it is our opinion that the potential for ground lurching to occur at the site is moderate unless the recommended stabilization measures are constructed.

7.0 RECOMMENDATIONS

7.1 General

We recommend that the foundation system for the new residence consist of pier supported grade beam system, tie beams, and retaining walls. The foundation system should be specifically designed and constructed to resist future movement of the landslide debris which underlies the site. This can be accomplished by either 1) removing the landslide and replacing it with a drained engineered fill, or 2) constructing a foundation system for the new residence which serves the dual purpose of stabilizing the underlying landslide debris and supporting the house. The specific system utilized at the site should be selected by considering cost, the potential for affecting adjacent parcels, and potential future maintenance costs. These landslide mitigation options are discussed in more detail below.

7.2 Option 1: Remedial Grading/Landslide Removal

The most straightforward way to abate the landslide debris underlying the site would be to remove it entirely and regrade the hillside with a well-drained engineered fill. It is anticipated that the existing fill and underlying landslide debris could be reused as engineered fill. It would also be necessary to install temporary shoring piers to provide lateral support to Barth Avenue prior to the start of the grading. In our opinion, it is unlikely that this option would prove feasible considering the proximity of the adjacent properties and Barth Avenue, and lack of area to temporarily stockpile materials on site. As a result, we have not developed specific recommendations for this option.

7.3 Option 2: Landslide Stabilization Foundation

The second option for abating the landslide debris which underlies the site is to design and construct a foundation system for the new house to stabilizing it in place. This would be accomplished by designing the new foundation system to extend at least 15 feet below the interpolated depth of active movement identified in this report and using grade beams with tiebacks to resist the lateral forces exerted by the landslide debris. Although the design and construction of this option would require relatively minimal grading, the loads required to retain the landslide debris in-place would be significant and, therefore, expensive.

load equal to an equivalent fluid pressure of 85 psf/ft acting from the original ground surface (or as regraded) to a depth of 23 feet below the original ground surface. To resist the lateral loading, a passive equivalent fluid pressure of 500 psf/ft acting over two pier diameters can be assumed for the soil and bedrock below a depth of 23 feet. The passive resistance of the upper 23 feet soil should be neglected in the structural calculations. Alternatively, the piers and tiebacks can be designed by determining loading requirements based on the results of slope stability analyses as shown in the preliminary stabilization design analyses included in Appendix B.

All other piers and grade beams:

All other piers and grade beams should be designed to resist a lateral load equal to an equivalent fluid pressure of 50 psf/ft acting from the final ground surface to a depth of 10 feet. To resist the lateral loading, a passive equivalent fluid pressure of 500 psf/ft acting over two pier diameters can be assumed for the soil and bedrock below a depth of 8 feet. The passive resistance of the upper 8 feet soil should be neglected in the structural calculations.

Tieback design parameters: Additional lateral resistance forces can be provided by the use of permanent double corrosion protected tiebacks which are structurally connected to the piers/grade beams. Preliminary tieback design analyses included in Appendix B indicate that for tiebacks spaced at 8 feet on center at a depth of 6 feet below grade and inclined at 20 degrees, a design load of 155 kips per tieback will be required.

Tiebacks should be designed by the contractor assuming an allowable adhesion of 1500 psf. Actual forces developed by the tiebacks should be determined by proof testing of the tiebacks. Tiebacks should be designed in conformance with current Caltrans methodology or equivalent.

Final design pier depths and spacing and tieback requirements should be based on structural design considerations. All perimeter piers and interior piers should be structurally connected with grade beams and tie beams. Care should be taken to ensure that the interior grade beams do not adversely impact the cross flow ventilation of the underfloor areas. The grade beams and tie beams should be designed by the project Structural Engineer. Grade beam and tie beam dimensions and steel reinforcing requirements should be determined based on the design structural loads. We recommend that all tiebacks be required to be contractor-designed and that the design calculations and plans be provided to our office for review.

7.3.2 Piers

The bottoms of the all pier holes should be dry and free of loose cuttings and debris prior to installation of the reinforcing steel and concrete. This shall be done to the satisfaction of the engineer or geologist from Cal Engineering & Geology, Inc. observing the drilling operations. The concrete should be placed carefully in the pier holes so that over pouring of the piers (mushrooming at the top) does not occur and the concrete does not have a free fall drop in excess of 4 feet.

Free groundwater was not encountered during the exploratory drilling at the site. However, a perched groundwater condition was reported in the borings drilled in the street by QEC. As groundwater levels can fluctuate seasonally and over a period of years. It is therefore possible that adverse groundwater conditions will be encountered during the drilling of the foundation piers. The contractor must be prepared to drill and place the steel and concrete for the foundation piers on the same day, should adverse groundwater conditions be encountered during construction. Under no circumstances shall water be allowed to remain in a drilled pier hole overnight. Should this occur, it will be necessary for the contractor to enlarge the hole to a wider diameter and a greater depth to the satisfaction of the engineer or geologist from our office who is observing the drilling operation.

7.3.3 Tiebacks

All tiebacks should be constructed and tested in accordance with current Caltrans guidelines or equivalent methods if approved by our office.

7.3.4 Foundation Retaining Walls

It is our understanding foundation retaining walls may be required as part of the foundation system for the new residence. It is recommended that all foundation retaining walls be designed for at-rest conditions (restrained walls). Based on the information obtained from the field work, it is our opinion that these retaining walls should be supported drilled piers. The retaining wall foundations can be designed using the parameters provided in the Design Criteria section of this report.

All foundation retaining walls should be waterproofed to prevent moisture migration through the concrete walls. The waterproofing system should be designed by the project Architect and/or Structural Engineer and reviewed by our office.

For level conditions above the walls, a restrained at rest equivalent fluid pressure of 70 pcf should be assumed to be acting over the full height of the wall. For back slopes up to 2:1V (horizontal to vertical) above the wall, an active equivalent fluid pressure of 90 pcf should be used. For back slopes between level and 2H:1V, the active equivalent fluid pressure should be interpolated between 70 and 90 pcf.

The above active pressures assume fully drained conditions behind the retaining walls. Therefore, the retaining walls should be provided with a full height back wall drainage consisting of a 12 inch wide layer of Caltrans Class 2 permeable drain material or a 12 inch wide layer of ¾ inch crushed rock with a 6 ounce per square yard non-woven filter fabric. A perforated ABS SDR 35 plastic pipe

should be placed at the heel of the wall. The pipe should be placed with the perforations down and should be installed with a cross gradient of not less than 2%.

All retaining wall backfill materials should be compacted to minimum relative compaction of 90% as determined by the ASTM D-1557 test procedure at a moisture content of approximately of 3% above optimum. Soils which do not meet the required relative compaction should be scarified, moisture conditioned, and reworked until the required relative density is attained.

The recommendations for fill placement provided above are based on the assumption that adequate surface and subsurface drainage will be incorporated into the project and that water will not be allowed to build-up within or behind the fills. Therefore, all fills in excess of 5 feet thick should be well-drained. Subsurface drains for the fills should be at least 12 inches wide and extend a minimum of 3 feet up the back cut of the excavation. The subdrain should consist of a perforated ABS SDR-35 pipe (with perforations down), surrounded with Class 2 permeable material. All excavations, trenches, and pipes should have a minimum fall of 2%.

7.3.5 Garage Slab

It is anticipated that the garage floor will be constructed on grade as a concrete slab-on-grade floor. The slab-on-grade floor should be structurally independent from the perimeter foundation elements. We recommend that the concrete slab floor be a minimum of 5 inches thick and reinforced with a minimum of #3 bars at 12-inches on center in both directions or #4 bars in both directions at 18-inch centers. The steel reinforcement shall be placed in the middle of the slab and should be held in place by dobie blocks or other suitable means. Actual dimensions and reinforcement should be determined by the project Structural Engineer. Even with the steel reinforcement, it should be recognized that some cracking of the slab will likely occur.

It is recommended that the floor slab for the garage be supported by on a minimum of 6 inches of non-expansive, granular fill (Caltrans Class 2 aggregate base rock or equivalent), compacted to a minimum relative compaction of 95% as determined by the ASTM D-1557 test procedure. We recommend that the upper 6 inches of the soil below the base course material be removed and re-compacted as engineered fill. The soils should be compacted to a minimum relative density of 90% at a moisture content of at least 3% over optimum as determined by the ASTM D-1557 test procedure.

If it is desirable to reduce the potential for moisture migration through the garage floor slab, then consideration should be given to the installation of a moisture vapor barrier. The vapor barrier should consist of a double layer of 10 mil polyethylene membrane. The vapor barrier should be underlain by a 3 inch layer of pea gravel placed after proof rolling of the base course. The membrane should be covered with a 2 inch thick, uniform layer of sand to protect the membrane during construction.

7.4 Appurtenant Slabs

To reduce the potential for cracking of the appurtenant concrete slabs (such as walkways and patios), we recommend that slabs be a minimum of 5 inches thick. The slabs should include minimum reinforcement of #3 bars in both directions at 12-inch centers or #4 bars in both directions at 18-inch centers. The steel should be placed in the middle of the slab and should be held in place by dobie blocks or other suitable means. Actual dimensions and reinforcement should be determined by the project Structural Engineer. The concrete slabs should be underlain by at least 4 inches of Class 2 aggregate base rock compacted to a minimum relative compaction of 95%. Even with the steel reinforcement and base rock, it should be recognized that some cracking and heaving of the slabs will likely occur. All exterior slabs should be isolated from the building foundations.

All exterior concrete slabs-on-grade located within 10 feet of a downslope will be subject to the effects of long-term and on-going downslope creep of the near surface soils. Downslope soil creep of the near surface soils has the potential to cause sloping and cracking of the concrete slabs. If it desirable to minimize the potential impacts of soil creep on these structures, then the slabs should be supported on drilled piers. The piers can be designed using the parameters provided above.

7.5 Site Grading

It is anticipated that conventional cut and fill grading will be required to establish the desired grades.

It is recommended that all fill placed at the site be engineered and compacted to the following specifications.

7.5.1 Fill Placement

Prior to commencement of the grading operation, the site should be cleared and grubbed of existing vegetation. All existing structures and debris should be removed from the site, including but not limited to: foundation systems, leach fields, septic tank, basements, groundwater well, buried pipes etc. Prior to placement of engineered fill, all loose soil and vegetation should be removed from the areas to receive fill. All fills should be keyed at least 2 feet into competent soil and/or bedrock materials.

All fill shall be placed as engineered fill. All fills should be compacted to a minimum relative compaction of 90 percent as determined by the ASTM D-1557 (latest revision) test procedure at a moisture content of approximately 3 percent above optimum. Fill materials shall be spread evenly and compacted in uniform lifts not exceeding 8 inches in uncompacted thickness. Fill materials which do not meet the specified relative compaction shall be ripped, moisture conditioned, and re-compacted until the required relative compaction and moisture content are obtained.

7.5.2 Imported Fill Materials

All imported fill must be reviewed and approved by the geotechnical engineer prior to importation to the site. A minimum of three to four days will be required to evaluate and test the suitability of

all proposed imported materials. All imported materials should meet the following criteria.

The imported materials shall be non-expansive and have a Plasticity Index less than 15 percent and a Liquid Limit of 30 percent or less. The imported material shall be free of organic debris or contaminated materials.

7.5.3 Fill Slopes

Permanent cut and fill slopes less than 10 feet tall can be made at a maximum gradient of 2.1 H:1V or flatter.

7.5.4 Fill Drainage

The fills in excess of 5 vertical feet in thickness shall be bench keyed and under drained. Subsurface drains should be at least 12 inches wide and extend a minimum of 3 feet up the back cut. The subdrain should consist of perforated ABS SDR-35 pipe (with perforations down), surrounded with Caltrans Class 2 permeable material. All excavations, trenches, and pipes should have a minimum fall of 2 percent. The subdrains should discharge into an appropriate erosion resistant drainage facility.

7.6 Surface Drainage

The areas adjacent to the proposed residence should be positively sloped away from the building to provide for rapid removal of surface water runoff. Ponding of water in the underfloor area or seepage toward foundation systems at any time during or after construction should be prevented. To reduce the potential for ponding of water adjacent to the foundation system, we recommend the following be included in the project plans.

- At a minimum, we recommend that at least 8 inches of soil be placed and compacted on the outside of the grade beams and sloped away from the foundations at a gradient of 5 percent for a distance of at least 5 feet to provide for rapid removal of surface water runoff.
- Finished grades within 5 feet of the structure should slope away from the house and garage at a minimum gradient of 5% to allow surface water to drain positively away from the structures.
- All storm water from roof downspouts should be collected in a solid pipe and outlet into an appropriate discharge facility.
- Planted areas should be avoided immediately adjacent to the buildings. If planting adjacent to the building is desired, the use of plants that require very little moisture is recommended. Irrigation of landscape areas should be limited strictly to that necessary for plant growth. Sprinkler systems should not be installed where they may cause ponding or saturation of foundation soils within 5 feet from walls or under the structures.

If it is desirable to reduce the potential for near surface water entering into the underfloor area, then a subdrain should be installed around the exterior of the residence. The subdrain should consist of 4 inch diameter perforated ABS SDR 35 pipe encapsulated in 3/4 inch clean crushed rock wrapped in a non-woven geotextile. The subdrain trench should extend at least 12 inches below the bottom of the perimeter grade beams. The drain pipe should be connected to a solid wall pipe which discharges to an erosion resistant discharge point located away from the building.

7.7 Seismic Design Parameters

Due to the proximity of the site to numerous active fault systems, it is likely that the property will be subjected to the effects of a major earthquake during the design life of the proposed improvements. The effects are likely to consist of significant ground accelerations. These ground type movements may cause damage to the proposed improvements. We therefore recommend that, at a minimum, the structural systems for the new residence be designed in accordance with the requirements of Chapter 16 of the 2007 California Building Code for Site Class B and a Seismic Source Type B at a distance of 0.3 kilometer from the source. The California Building Code seismic design parameters for Site Class B are included in Table B below. These parameters were determined by using the computer program titled Java Earthquake Ground Motion Parameter Calculator, version 5.0.8, which was downloaded from the U.S. Geological Survey Website (<http://earthquake.usgs.gov/research/hazmaps/design/>).

| TABLE B - California Building Code Seismic Design Parameters - Site Class B | | |
|--|---------------------|---|
| Item | Design Value | Source |
| Site Class Definition | B | Table 1613.5.2 |
| 0.2 Second Spectral Response Acceleration, S_s | 2.033 | Figure 1613.5(3) |
| 1.0 Second Spectral Response Acceleration, S_1 | 0.795 | Figure 1613.5(4) |
| Values of Site Coefficient, F_a | 1.0 | Table 1613.5.3(1) |
| Value of Site Coefficient, F_v | 1.0 | Table 1613.5.3(2) |
| Designed Spectral Response Acceleration for Short Periods, S_{DS} | 1.356 | Equation 16-39 ($S_{DS}=2/3(F_a S_s)$) |
| Designed Spectral Response Acceleration for 1-Sec Periods, S_{D1} | 0.530 | Equation 16-40 ($S_{DS}=2/3(F_v S_1)$) |

* Hayward Fault is located 0.3 kilometer west of the project site.

7.8 Excavations and Trenches

All excavations made during development of the site should be backfilled with engineered fill. This includes excavations created during the installation of the utility lines, the sewer lines, etc. The

engineered fill should be compacted to a minimum relative compaction of 90 percent as determined by the ASTM D-1557 test procedure. It is anticipated that the on-site soil and bedrock materials will be suitable for use as trench backfill. Furthermore, no loose or uncontrolled backfilling of depressions resulting from stripping or tree removal should be permitted.

It is recommended that an impervious seal be created wherever a trench passes beneath the perimeter foundation of a house. The impermeable seal should be designed to prevent near surface water from reaching the exterior areas of the property from flowing beneath the house along the utility trench. The impermeable seal should extend for a distance of at least 3 feet on both sides of the perimeter foundation.

8.0 LIMITATIONS

The conclusions and recommendations of this report are based upon information provided to us regarding the proposed improvements, subsurface conditions encountered at the boring locations, our geologic reconnaissance, the results of the laboratory testing program, and professional judgement. We have employed accepted geotechnical engineering and engineering geologic procedures, and our professional opinions and conclusions are made in accordance with generally accepted geotechnical engineering and engineering geologic principles and practices. This standard is in lieu of all warranties, either expressed or implied.

It is the owner's responsibility ensure that the recommendations contained in this report are brought to the attention of the architect, engineers, and contractors working on the project. Furthermore, it is the owner's responsibility to make sure that these recommendations are carried out during the design and construction phases of the project.

The locations of the borings were determined by taping from established site features and other points of reference and are considered to be approximate only. Site conditions described in the text are those existing at the time of our last field exploration and reconnaissance in July 2007 and are not necessarily representative of the site conditions at other times or locations.

Unanticipated soil conditions are frequently encountered during construction and cannot be fully determined by drilling and sampling a limited number of exploratory borings. Additional expenditures may be required during the construction phases of the project as conditions vary. It is recommended that a contingency fund be established to cover potential adverse soil and groundwater conditions which may be encountered during site development. If it is found during construction that subsurface conditions differ from those described on the borings logs, then the conclusions and recommendations in this report shall be considered invalid, unless the changes are reviewed and the conclusions and recommendations modified and approved in writing by Cal Engineering & Geology, Inc.

The findings of this report should be considered valid for period of three years unless the conditions of the site change. After a period of three years, we should be contacted to review the site conditions and prepare a letter regarding the applicability of this report.

Cal Engineering & Geology, Inc. should be accorded the opportunity to review the final plans and specifications to determine if the recommendations of this report have been implemented in those documents.

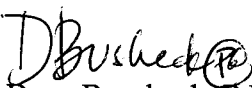
Field observation and testing services are essential parts of the proposed project. It is important that Cal Engineering & Geology, Inc. be retained to observe the earthwork, foundation drilling and excavation, and other relevant construction operations. The recommendations of this report are contingent upon this stipulation.

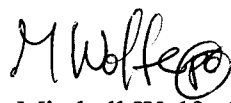
The evaluation or identification of the potential presence of hazardous materials at the site was not requested and is beyond the scope of this project.

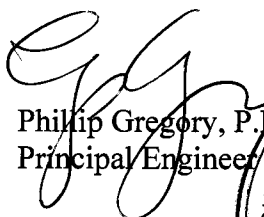
If you have questions regarding this report, or if we may be of further service, please contact us.

Yours truly,

CAL ENGINEERING & GEOLOGY, INC.


Dave Buscheck, P.E.
Senior Engineer

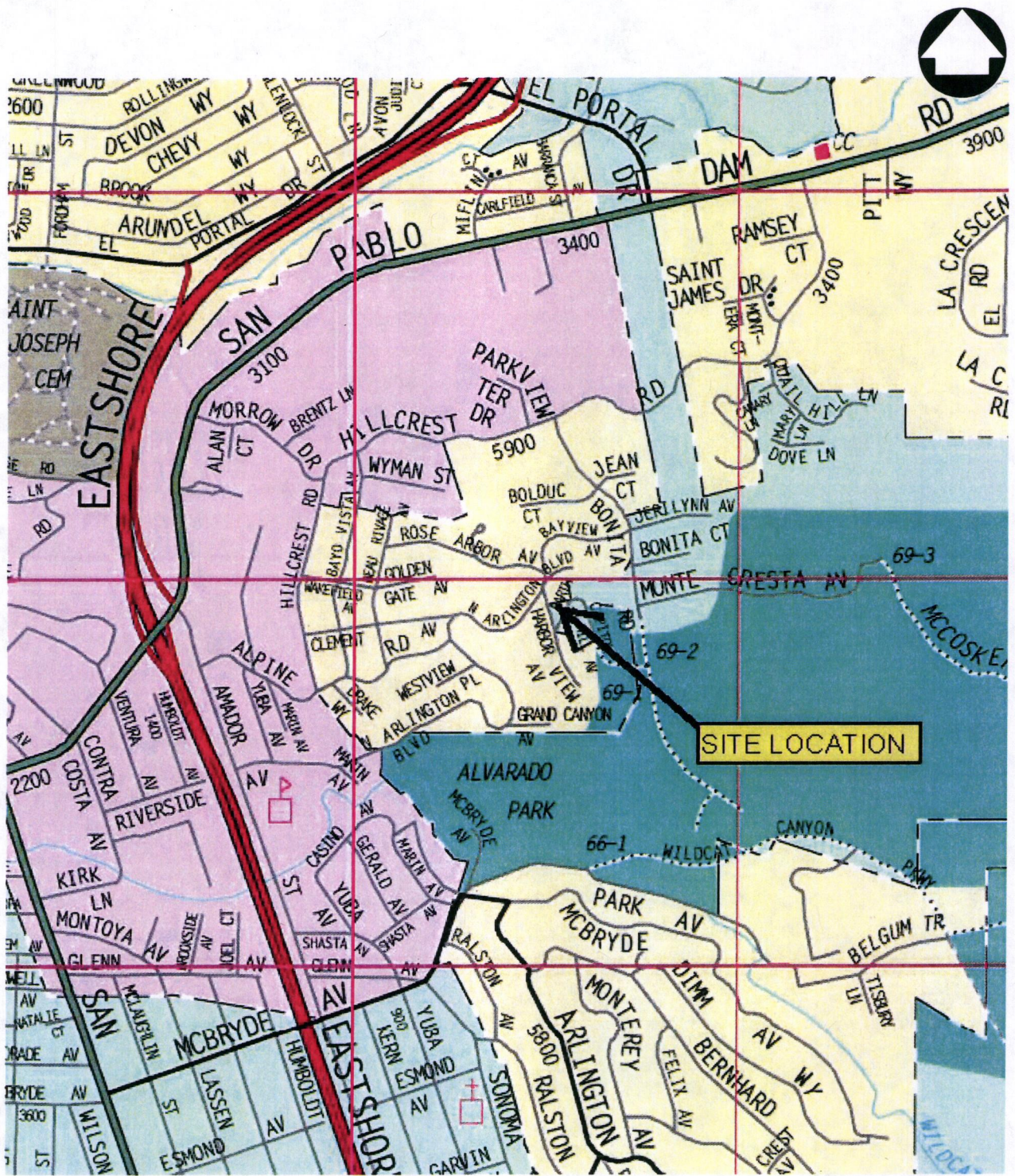

Mitchell Wolfe, P.G., E.G.
Principal Geologist


Phillip Gregory, P.E., C.E.
Principal Engineer



9.0 REFERENCES

- California Building Code, 2007, California Code of Regulations, Title 24, Part 2, Volume 2, California Building Standards Commission, effective date January 1, 2008.
- California Department of Conservation Division of Mines and Geology, 1998, Maps of Known Active Faults Near-Source Zones in California and Adjacent Portions of Nevada, International Conference of Building Officials, Map Scale 1.2 inches = 5 km.
- California Division of Mines and Geology, 1982, Special Studies Zones map, Richmond Quadrangle, California: map scale 1:24,000.
- California Division of Mines and Geology, 1973, "Geological and Geophysical Investigations for Tri-Cities Seismic Safety and Environmental Resources Study," Preliminary Report 19, prepared in cooperation with the cities of El Cerrito, Richmond, and San Pablo.
- Crane, R. C., 1995, Preliminary geologic map of the Richmond Quadrangle, Alameda and Contra Costa Counties, California, unpublished geologic map, map scale 1:24:000.
- Dibblee, Thomas W. Jr., 1980, "Preliminary Geologic Map of the Richmond 7.5' Quadrangle, Alameda and Contra Costa Counties, California," United States Geological Survey Open File Report 80-1100.
- Nilsen, Tor H., 1975, "Preliminary Photointerpretation Map of Landslide and Other Surficial Deposits of the Richmond 7.5" Quadrangle, Alameda and Contra Costa Counties, California," United States Geological Survey Open File Map 75-277-47.
- Page, B.M., 1992, Tectonic setting of the San Francisco Bay Region, Borchardt, Glenn, and others, eds., Proceedings of the Second Conference on Earthquake Hazards in the Eastern San Francisco Bay Area: California Department of Conservation, Division of Mines and Geology, Special Publication 113, p. 1-7.
- Soil Conservation Service, 1977, "Soil Survey of Contra Costa County, California," United States Department of Agriculture.



FROM THOMAS BROTHERS MAPS, 1997



SITE LOCATION MAP

1518 BARTH AVENUE, RICHMOND, CA

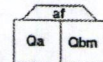
JN: 070780

FIGURE 1



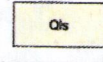
RICHMOND MAP (DF-147)

LEGEND

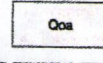


SURFICIAL DEPOSITS

af Manmade artificial fill for dam
Qa Alluvial gravel, sand and clay of valley areas
Qbm Bay mud



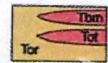
LANDSLIDE RUBBLE



OLDER SURFICIAL SEDIMENTS

Qoa Dissected older alluvial gravel and sand, undeformed; age late Pleistocene

— UNCONFORMITY —



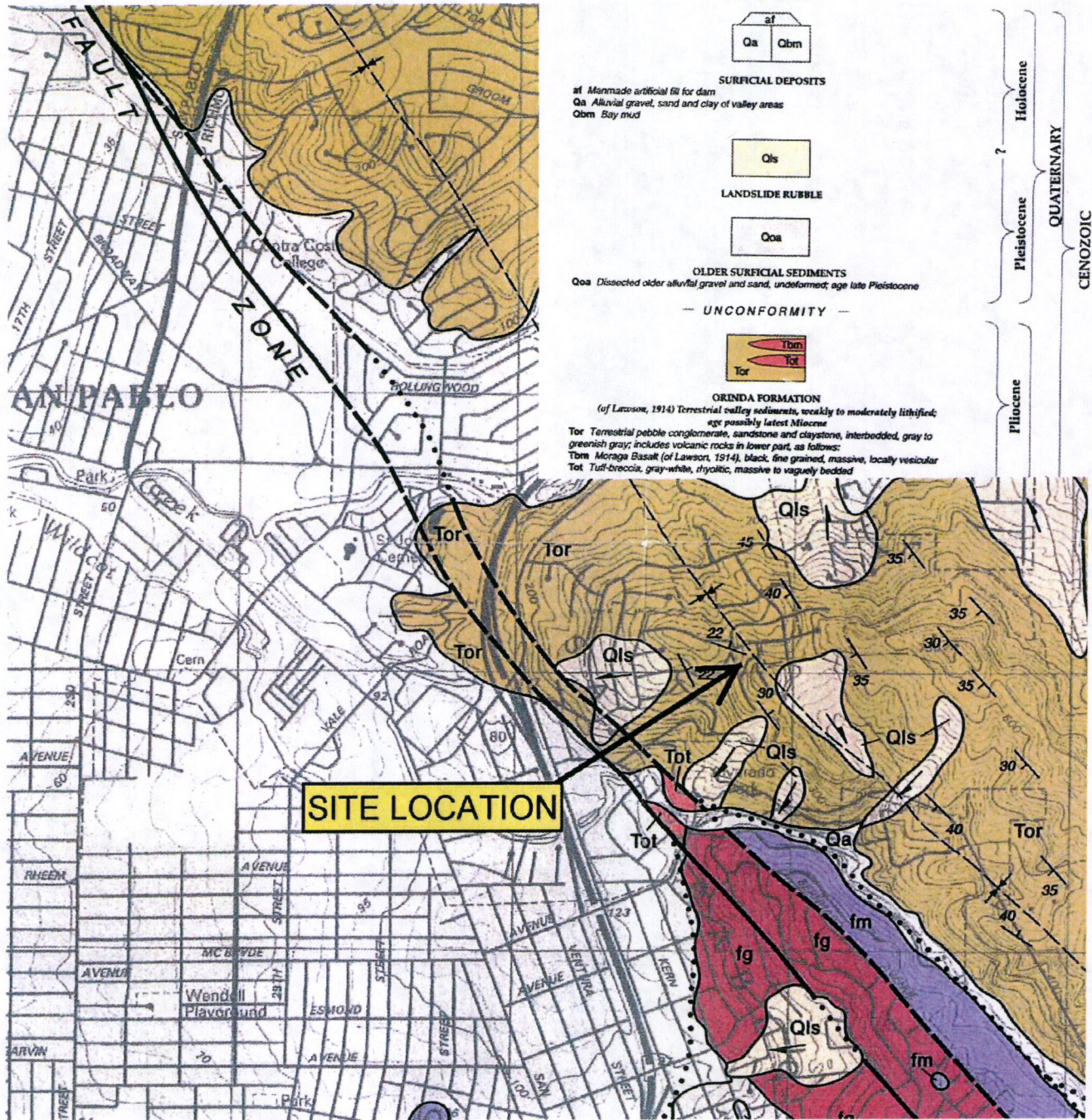
ORINDA FORMATION

(of Lawson, 1914) Terrestrial valley sediments, weakly to moderately lithified; age possibly latest Miocene

Tor Terrestrial pebble conglomerate, sandstone and claystone, interbedded, gray to greenish gray; includes volcanic rocks in lower part, as follows:
Tbn Moraga Basalt (of Lawson, 1914), black, fine grained, massive, locally vesicular
Tot Tuff-breccia, gray-white, rhyolitic, massive to vaguely bedded

Holocene
? QUATERNARY
Pleistocene
CENOZOIC

Miocene



NO SCALE

AFTER DIBBLEE, (2005)

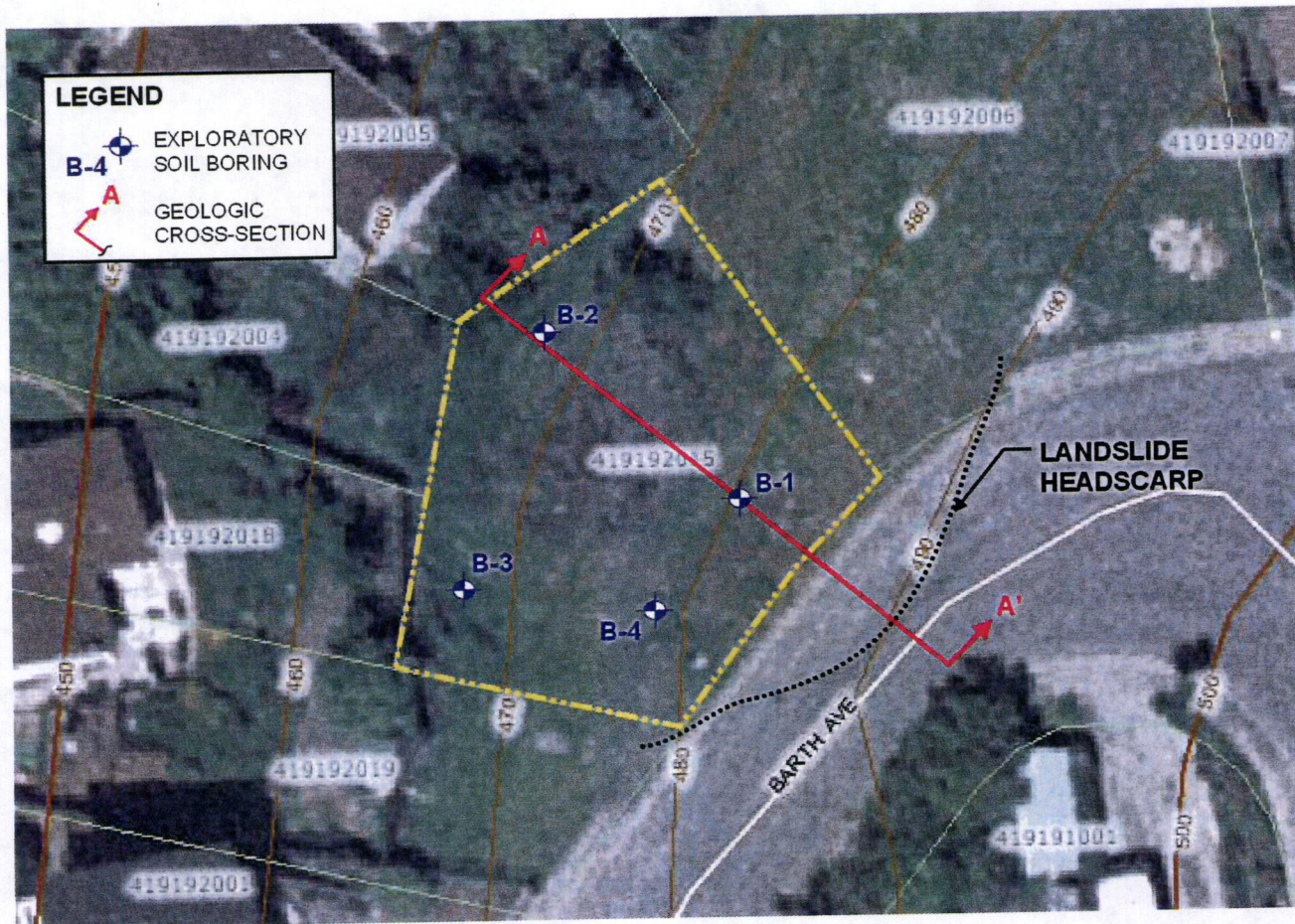


REGIONAL GEOLOGY MAP

1518 BARTH AVENUE, RICHMOND, CA

JN: 070780

FIGURE 2



NOT TO SCALE

SOURCE: CONTRA COSTA COUNTY GIS

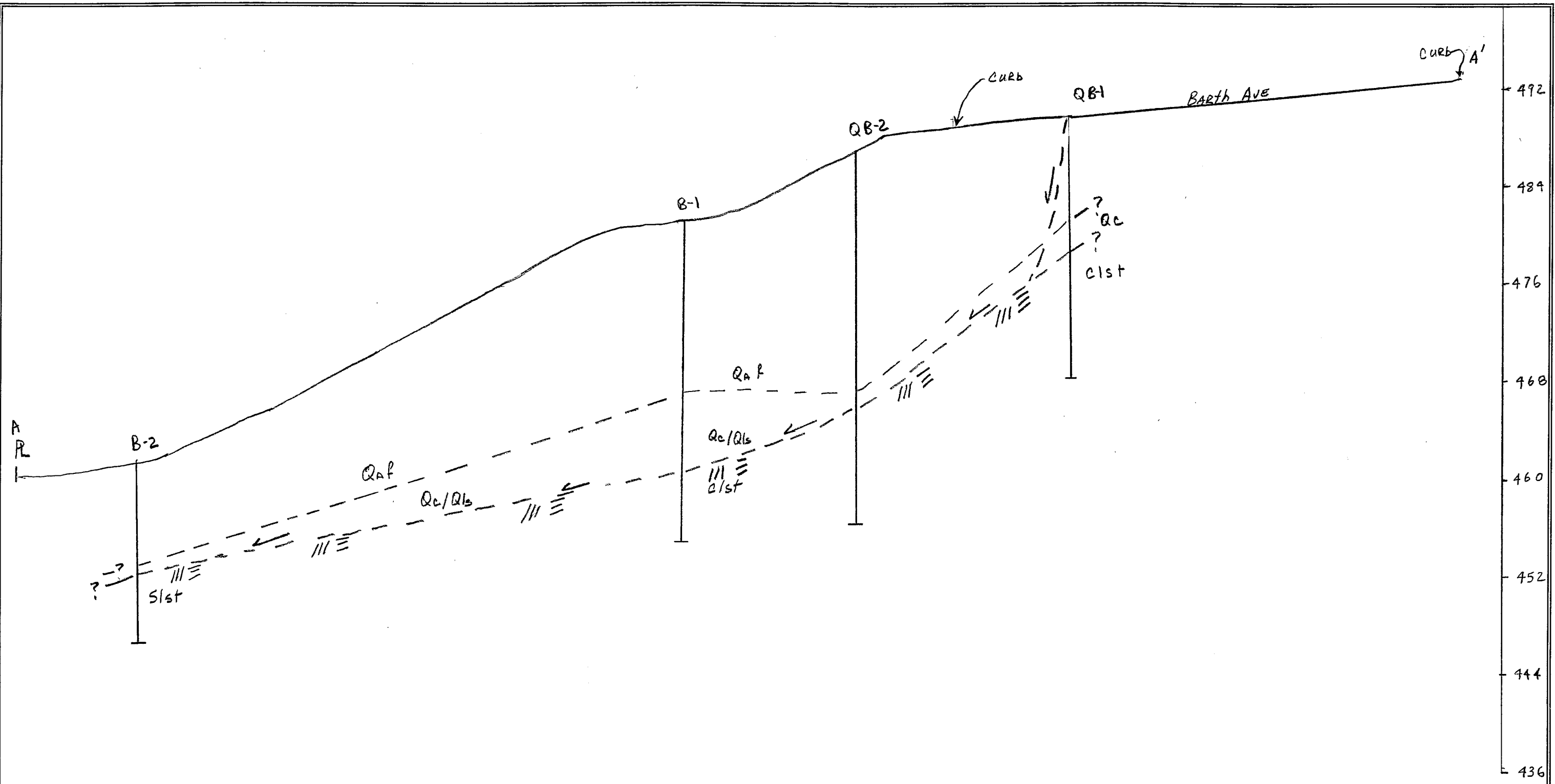


BORING LOCATION MAP

1518 BARTH AVENUE, RICHMOND, CA

JN: 070780

FIGURE 3



Scale as shown.



| | |
|---|----------|
| GEOLOGIC CROSS SECTION | |
| 1518 Barth Avenue, Richmond, California | |
| JN: 070780.001 | Figure 4 |

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D-2487)

| Field Identification | | Group Symbol | Typical Names | Laboratory Classification Criteria | | |
|---|---|---|---|--|---|---|
| Coarse-Grained Soils More than 50% of material is retained on the No. 200 sieve. | Gravels More than 50% coarse fraction retained on the No. 4 sieve | Clean Gravels | GW | Well-graded gravels, gravel-sand mixtures, little or no fines | CLASSIFICATION OF GRAVELS & SANDS WITH 5% TO 12% FINES REQUIRES DUAL SYMBOLS Gravel/Silty Gravel Gravel/Clayey Gravel Sand/Silty Sand Sand/Clayey Sand | |
| | | < 5% Fines | GP | Poorly graded gravels, gravel-sand mixtures, little or no fines | | |
| | | Gravels with Fines | GM | Silty gravels, poorly graded gravel-sand-silt mixtures | | |
| | | | >12% Fines | GC | | Clayey gravels, poorly graded gravel-sand-clay mixtures |
| | Sands More than 50% coarse fraction passes the No. 4 sieve | Clean Sands | SW | Well-graded sands, gravelly sands, little or no fines | | |
| | | < 5% Fines | SP | Poorly graded sands, gravelly sands, little or no fines | | |
| | | Sands with Fines | SM | Silty sands, poorly graded sand-silt mixtures | | |
| | | | >12% Fines | SC | | Clayey sands, poorly graded sand-clay mixtures |
| | | $C_U = D_{60} \div D_{10} \geq 4$ and $C_C = (D_{30})^2 \div (D_{10} \times D_{60}) \geq 1 \ \& \ \leq 3$ | | $C_U = D_{60} \div D_{10} < 4$ and/or $C_C = (D_{30})^2 \div (D_{10} \times D_{60}) < 1 \ \& \ > 3$ | | |
| | | Fines classify as ML or MH | | If fines classify as CL-ML , use dual symbol GC/GM | | |
| Fines classify as CL or CH | | If fines classify as CL-ML , use dual symbol GC/GM | | | | |
| $C_U = D_{60} \div D_{10} \geq 6$ and $C_C = (D_{30})^2 \div (D_{10} \times D_{60}) \geq 1 \ \& \ \leq 3$ | | $C_U = D_{60} \div D_{10} < 6$ and/or $C_C = (D_{30})^2 \div (D_{10} \times D_{60}) < 1 \ \& \ > 3$ | | | | |
| Fines classify as ML or MH | | If fines classify as CL-ML , use dual symbol SC/SM | | | | |
| Fines classify as CL or CH | | If fines classify as CL-ML , use dual symbol SC/SM | | | | |
| Fine-Grained Soils More than 50% of material passes the No. 200 sieve. | Identification Procedures on Percentage Passing the No. 40 Sieve | | | PLASTICITY CHART For Classification of Fine-Grained Soils and Fine-Grained Fraction of Coarse-Grained Soils Equation of "A"-Line: $PI = 4 @ LL = 4$ to 25.5 , then $PI = 0.73 \times (LL - 20)$ Equation of "U"-Line: $LL = 16 @ PI = 0$ to 7 , then $PI = 0.9 \times (LL - 8)$ | | |
| | Silts & Clays Liquid Limit less than 50% | ML | Inorganic silts, very fine sands, rock flour, silty or clayey fine sands with slight plasticity | | | |
| | | CL | Inorganic clays of low to medium plasticity, gravelly, sandy, and/or silty clays, lean clays | | | |
| | | OL | Organic silts, organic silty clays of low plasticity | | | |
| | Silts & Clays Liquid Limit greater than 50% | MH | Inorganic silts, micaceous or diatomaceous fine sandy/silty soil, elastic silts | | | |
| | | CH | Inorganic clays of high plasticity, fat clays | | | |
| | | OH | Organic clays of medium to high plasticity | | | |
| | | HIGHLY ORGANIC SOILS | | | | PT |

KEY TO SAMPLER TYPES AND OTHER LOG SYMBOLS

| | |
|--|---|
| <p>CS California Standard Sampler</p> <p>CM California Modified Sampler</p> <p>SPT Standard Penetration Test Sampler</p> <p>SHL Shelby Tube Sampler</p> <p>BU Bulk Sample</p> <p>LL Liquid Limit of Sample (ASTM D-4318)</p> <p>PI Plasticity Index of Sample (ASTM D-4318)</p> <p>Q_u Unconfined Compression Test (ASTM D-2166)</p> | <p> Depth at which Groundwater was Encountered During Drilling</p> <p> Depth at which Groundwater was Measured After Drilling</p> <p>PP Pocket Penetrometer Test</p> <p>PTV Pocket Torvane Test</p> <p>-#200 % of Material Passing the No. 200 Sieve Test (ASTM D-1140)</p> <p>PSA Particle-Size Analysis (ASTM D-422 & D-1140)</p> <p>C Consolidation Test (ASTM D-2435)</p> <p>TXUU Unconsolidated Undrained Compression Test (ASTM D-2850)</p> |
|--|---|

KEY TO SAMPLE INTERVALS

| | |
|---|--|
| <p> Length of Sampler Interval with a CS Sampler</p> <p> Length of Sampler Interval with a CM Sampler</p> <p> Length of Sampler Interval with a SPT Sampler</p> <p> Length of Sampler Interval with a SHL Sampler</p> | <p> Bulk Sample Recovered for Interval Shown (i.e., cuttings)</p> <p> Length of Coring Run with Core Barrel Type Sampler</p> <p>NR No Sample Recovered for Interval Shown</p> |
|---|--|

Rock Hardness Descriptions

| | |
|------------------------|---|
| Very Hard | Cannot be scratched with knife or sharp pick. Breaking of hand specimen requires several hard blows of geologist's pick. |
| Hard | Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach hand specimen. |
| Moderately Hard | Can be scratched with knife or pick. Gouges or grooves to 1/4-inch deep can be excavated by hard blow of geologist's pick. Hand specimens can be detached by moderate blow. |
| Medium | Can be grooved or gouged 1/16-inch deep by firm pressure of knife or pick point. Can be excavated in small chips to pieces about 1-inch maximum size by hard blows of the point of a geologist's pick. |
| Soft | Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows of a pick point. Small tin pieces can be broken by finger pressure. |
| Very Soft | Can be carved with knife. Can be excavated readily with point of pick. Pieces 1-inch or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail. |

Bedding Thickness & Joint/Fracture Spacing Descriptions

| Centimeters | Inches | Bedding | Joints/Fractures |
|-------------|--------|------------|------------------|
| < 2 | < 3/4 | Laminated | Extremely Close |
| 2-5 | 3/4-2 | Very Thin | Very Close |
| 5-30 | 2-12 | Thin | Close |
| 30-90 | 12-36 | Medium | Moderate |
| 90-300 | 36-120 | Thick | Wide |
| > 300 | > 120 | Very Thick | Very Wide |

Rock Weathering Descriptions

| | |
|--------------------------|--|
| Fresh | Rock fresh, crystals bright, few joints may show slight staining. Rock rings under hammer if crystalline. |
| Very Slight | Rock generally fresh, joints may show thin clay coatings, crystals in broken face show bright. Rock rings under hammer if crystalline. |
| Slight | Rock generally fresh, joints stained, and discoloration extends into rock up to 1 inch. Joints may contain clay. In granitoid rocks some occasional feldspar crystals are dulled and discolored. Crystalline rocks ring under hammer. |
| Moderate | Significant portions of rock show discoloration and weathering effects. In granitoid rocks, most feldspars are dull and discolored; some show clayey. Rock has dull sound under hammer and shows significant loss of strength as compared with fresh rock. |
| Moderately Severe | All rock except quartz discolored or stained. In granitoid rocks, all feldspars dull and discolored and majority show kaolinization. Rock shows severe loss of strength and can be excavated with geologist's pick. Rock goes "clunk" when struck. |
| Severe | All rock except quartz discolored or stained. Rock "fabric" clear and evident, but reduced in strength to strong soil. In granitoid rocks, all feldspars kaolinized to some extent. Some fragments of strong rock usually left. |
| Very Severe | All rock except quartz discolored or stained. Rock "fabric" discernible. But mass effectively reduced to "soil" with only fragments of strong rock remaining. |
| Complete | Rock reduced to "soil." Rock "fabric" not discernible or discernible only in small scattered locations. Quartz may be present as dikes or stringers. |

The above Bedrock Characteristics are based on the ASCE Manual No. 56, "Subsurface Investigation For Design And Construction Of Foundations Of Buildings," 1976.



CAL ENGINEERING & GEOLOGY

Bedrock Characteristics Chart

FIGURE 6