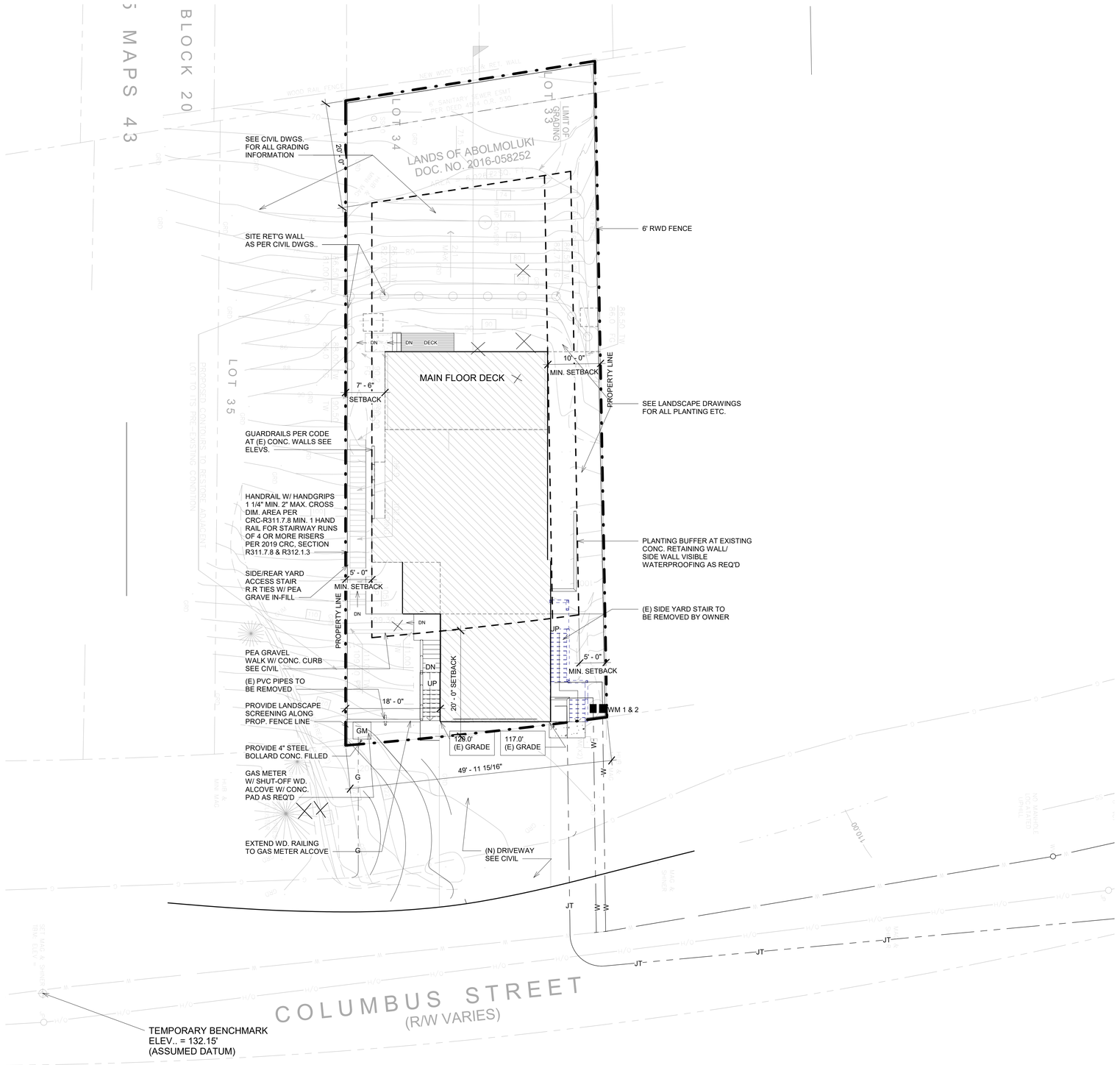
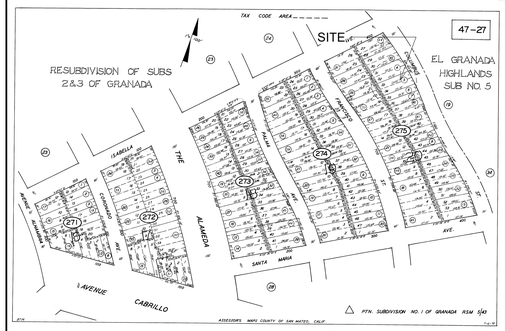


PROPOSED SITE PLAN NORTH

PLANNING DATA

GROSS LOT AREA	=	6026 SF	
ZONING-S-17 COMBING DISTRICT(MID COAST)			
ALLOWABLE FLOOR AREA	=	3193.78 SF	
PROPOSED FLOOR AREAS			
MAIN LEVEL		1081 SF	
LOWER LEVEL	+	1281 SF	
LIVING SUBTOTAL	=	2362 SF	
FRONT PORCH	+	25 SF	
GARAGE	+	437 SF	
TOTAL	=	2824 SF	
FLOOR AREA RATIO	=	46.86%	
SETBACKS			
FRONT	=	20'	
SIDES COMBINED TOTAL OF 15'	=	5' MIN.	
REAR	=	20'	
PARCEL COVERAGE 35% MAX.	=	2109.1 SF	
PROPOSED COVERAGE	=	2074 SF	34.4%
HEIGHT LIMIT	=	28'	

LOCATION MAP



SITE PLAN NOTES

1. SEE CIVIL DRAWINGS FOR ALL SITE GRADING ETC. TYPICAL.

RESIDENTIAL DESIGN SOLUTIONS

406 LA JOLLA AVENUE
SAN MATEO, CA 94403
(650) 218-8161
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WEB CHRISTIANRUFFAT.COM

NEW RESIDENCE

1120 COLUMBUS DR.
EL GRANADA, CA.
APN.047-275-050

-DESIGN REVIEW RESUBMITTAL-V1

REVISIONS		DESCRIPTION	DATE	BY
	1	PLANNING RESUBMITTAL	3-2-2021	CR
	2	PLANNING RESPONSES	6-20-2021	CR
	3	PLANNING RESPONSES	12-23-2021	CR
	4			
	5			

DRAWING STATUS

PRELIMINARY DESIGN

PLANNING

PC1

PC2

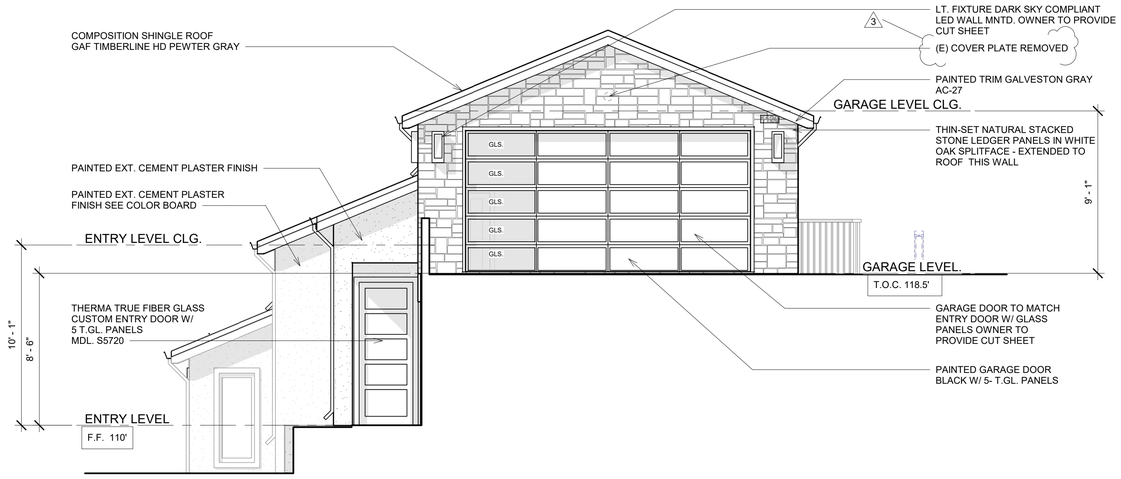
PERMIT

DATE
12/23/2021

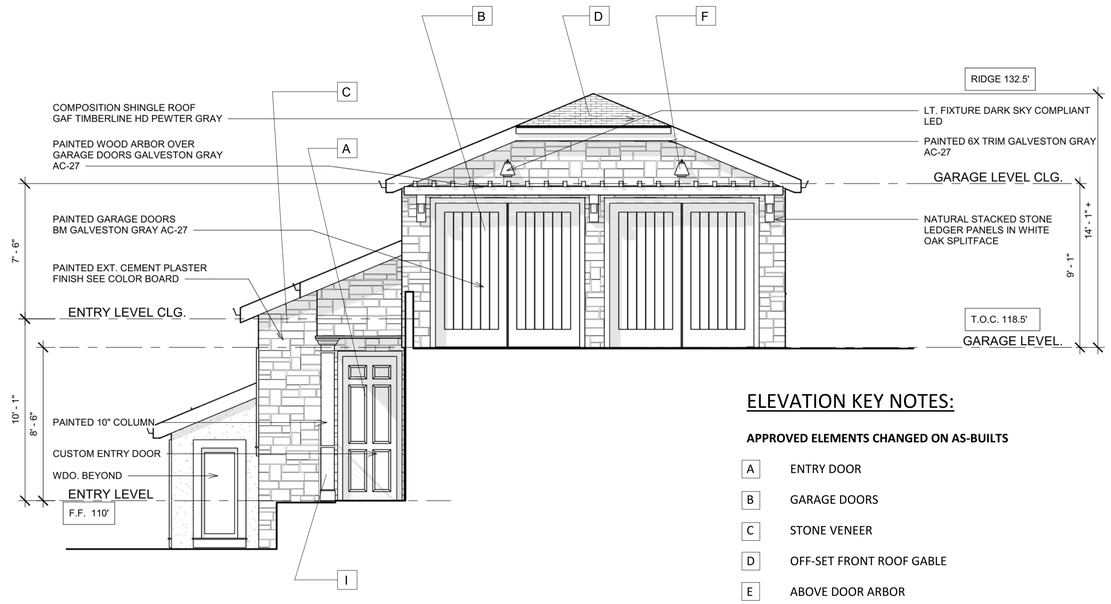
Drawing Number
A1

Scale
1" = 10'-0"

Project Number
AB03



1 FRONT ELEVATION-AS BUILT
SCALE: 1/4" = 1'-0"



2 FRONT ELEVATION-APPROVED
SCALE: 1/4" = 1'-0"

ELEVATION KEY NOTES:

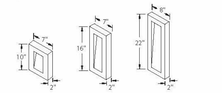
APPROVED ELEMENTS CHANGED ON AS-BUILTS

A	ENTRY DOOR
B	GARAGE DOORS
C	STONE VENEER
D	OFF-SET FRONT ROOF GABLE
E	ABOVE DOOR ARBOR
F	EXTERIOR LIGHT FIXTURES
G	PAINTED BELLY BAND/ACCENT
H	EXTERIOR BALCONY METAL RAILING
I	FRONT ENTRY COLUMN

URBAN – model: WS-W11
LED Outdoor Sconce Luminiare

MODERN FORMS
A WAC LIGHTING COMPANY

Fixture Type: BRONZE
Catalog Number:
Project: ABOLMOLUKI RESIDENCE
Location: EL GRANADA



PRODUCT DESCRIPTION
Like urban renewal, the Urban sconce gives new life to the conventional step baffle. Form follows function in this simplified indirect wall sconce. Clean styling and robust LED performance are combined in this modern dark sky luminaire.

FEATURES
- ETL & cETL listed for wet locations: IP65
- Interior light and down light
- Low profile design
- Replaceable LED module
- 277V option available special order
- 50,000 hour potential life
- **Color Temp: 3000K**
- **CRI: 85**

SPECIFICATIONS
Construction: Aluminum.
Power: No driver or transformer required.
Light Source: High output LED.
Dimming: Dims to 10% with an electronic low voltage (ELV) dimmer.
Mounting: Mounts directly to junction box.
Finish: Black (BK), Bronze (BZ), Graphite (GH), White (WT).
Standards: ETL & cETL listed. ADA compliant. Dark Sky friendly. IP65. Wet location.

ORDER NUMBER

Model	Height	Watt	# of LEDs	LED Lumens	Photometric Lumens	Finish	
WS-W11	10	10"	12W	3	720	370	BK Black
	16	16"	16W	4	960	490	BZ Bronze
	22	22"	20W	5	1200	610	GH Graphite
							WT White

WS-W11 [ ] – [ ]

Example: **WS-W116-GH**
For 277V special order, add an "F" before the finish: **WS-W116F-GH**

REPLACEMENT GLASS

Model	Fixture	Description
RPL-GLA-1110-01	WS-W1110	Top Lens
RPL-GLA-1110-02		Bottom Lens
RPL-GLA-1116-01	WS-W1116	Top Lens
RPL-GLA-1116-02		Bottom Lens
RPL-GLA-1122-01	WS-W1122	Top Lens
RPL-GLA-1122-02		Bottom Lens

Back Plate Dimensions:

Model	Dimension
WS-W1110	10"L x 7"W x 2"H
WS-W1116	18"L x 7"W x 2"H
WS-W1122	22"L x 8"W x 2"H

modernforms.com
Phone (800) 526.2588
Fax (800) 526.2585

Headquarters/Eastern Distribution Center
44 Harbor Park Drive
Port Washington, NY 11050

Central Distribution Center
1600 Distribution Ct
Lithia Springs, GA 30122

Western Distribution Center
1750 Archibald Avenue
Ontario, CA 91760

WAC Lighting retains the right to modify the design of our products at any time as part of the company's continuous improvement program AUG 2015

3 LIGHT FIXTURE CUT SHEET
SCALE: 12" = 1'-0"

Capital Lighting - 9092RI-GD - Outdoor Dark Sky-Energy Saver One Light Wall Lantern in Mediterranean Bronze
SKU#: 9092RI-GD
Availability: In Stock

Capital Lighting - 9092RI-GD - Outdoor Dark Sky-Energy Saver One Light Wall Lantern in Mediterranean Bronze

Retail Price: $145.00
Your Savings: $29.00
Your Price:
$116.00

Quantity 1

Add to Gift Registry Wish List Tell a Friend

DESCRIPTION

Features:

- Wall lantern
- Outdoor collection
- Mediterranean Bronze finish
- Acid washed glass lens shade
- Traditional style
- UL listed for wet locations
- Dark sky
- Energy saver
- Eco friendly

Specifications:

- Accommodates (1) 18W GU24 fluorescent base bulb (included)
- Backplate dimensions: 7.64" H x 5.71" W x 1.1" D
- Overall dimensions: 8.25" H x 10" W x 11" D

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	4			
	5			

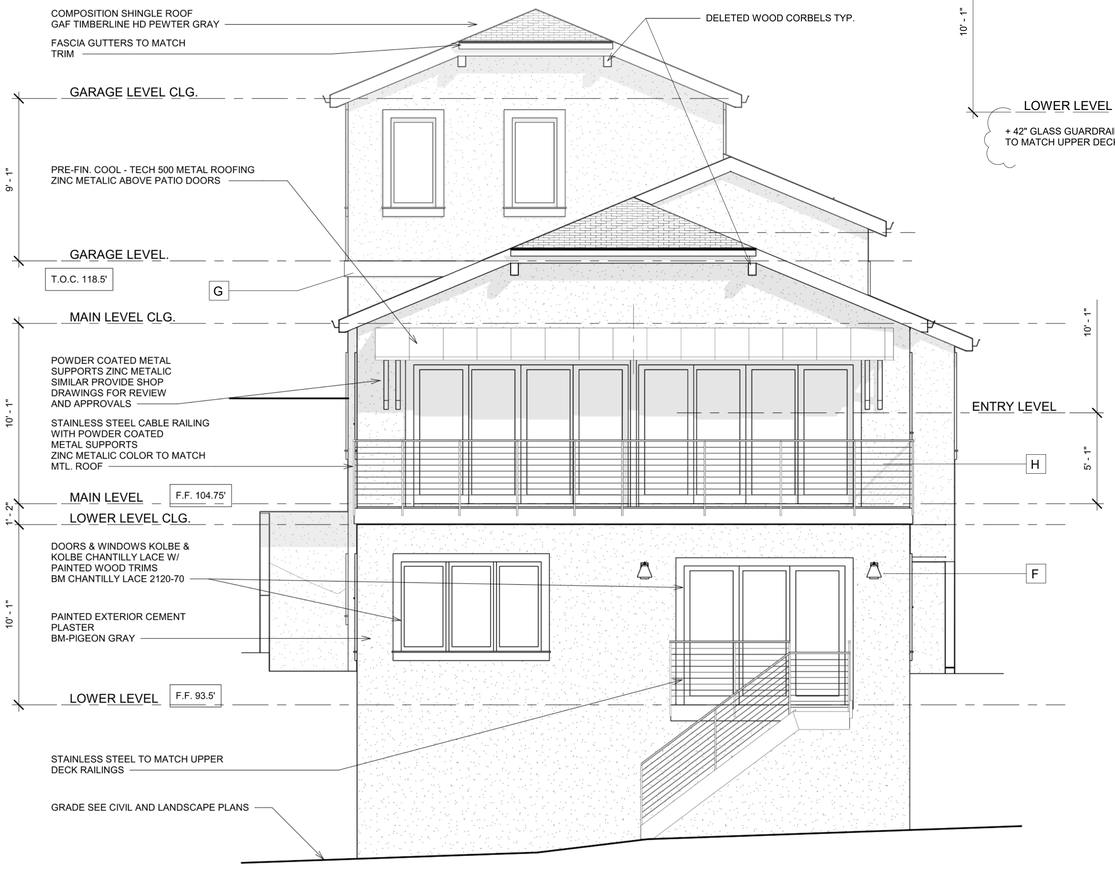
DRAWING STATUS
PRELIMINARY DESIGN
PLANNING
PC1
PC2
PERMIT

DATE
12/23/2021

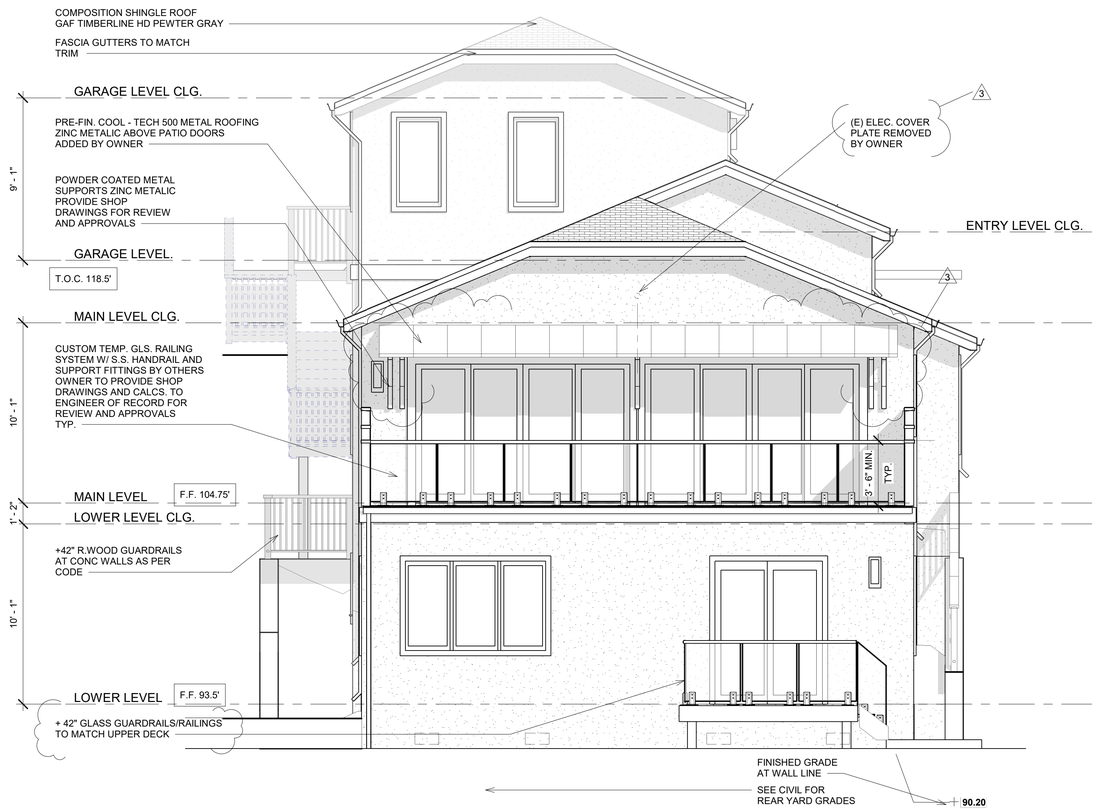
Drawing Number
A5.0

Scale
As indicated

Project Number
AB03



2 REAR ELEVATION-APPROVED
SCALE: 12" = 1'-0"



1 REAR ELEVATION- AS BUILT
SCALE: 1/4" = 1'-0"

ELEVATION KEY NOTES:

APPROVED ELEMENTS CHANGED ON AS-BUILTS

A	ENTRY DOOR
B	GARAGE DOORS
C	STONE VENEER
D	OFF-SET FRONT ROOF GABLE
E	ABOVE DOOR ARBOR
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G	PAINTED BELLY BAND/ACCENT
H	EXTERIOR BALCONY METAL RAILING
I	FRONT ENTRY COLUMN

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-DESIGN REVIEW RESUBMITTAL-V1

REVISIONS	DESCRIPTION	DATE	BY
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3	PLANNING RESPONSES	12-23-2021	CR
4			
5			

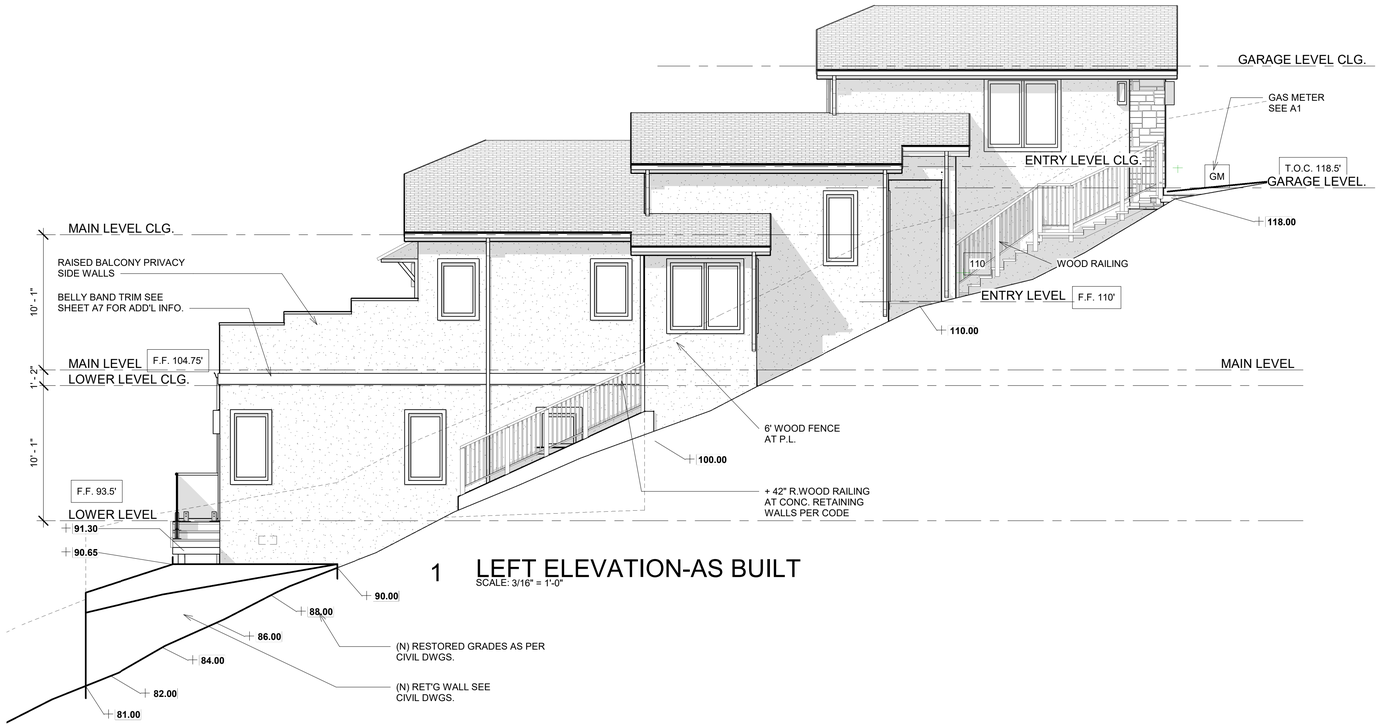
DRAWING STATUS
PRELIMINARY DESIGN
PLANNING
PC1
PC2
PERMIT

DATE
12/23/2021

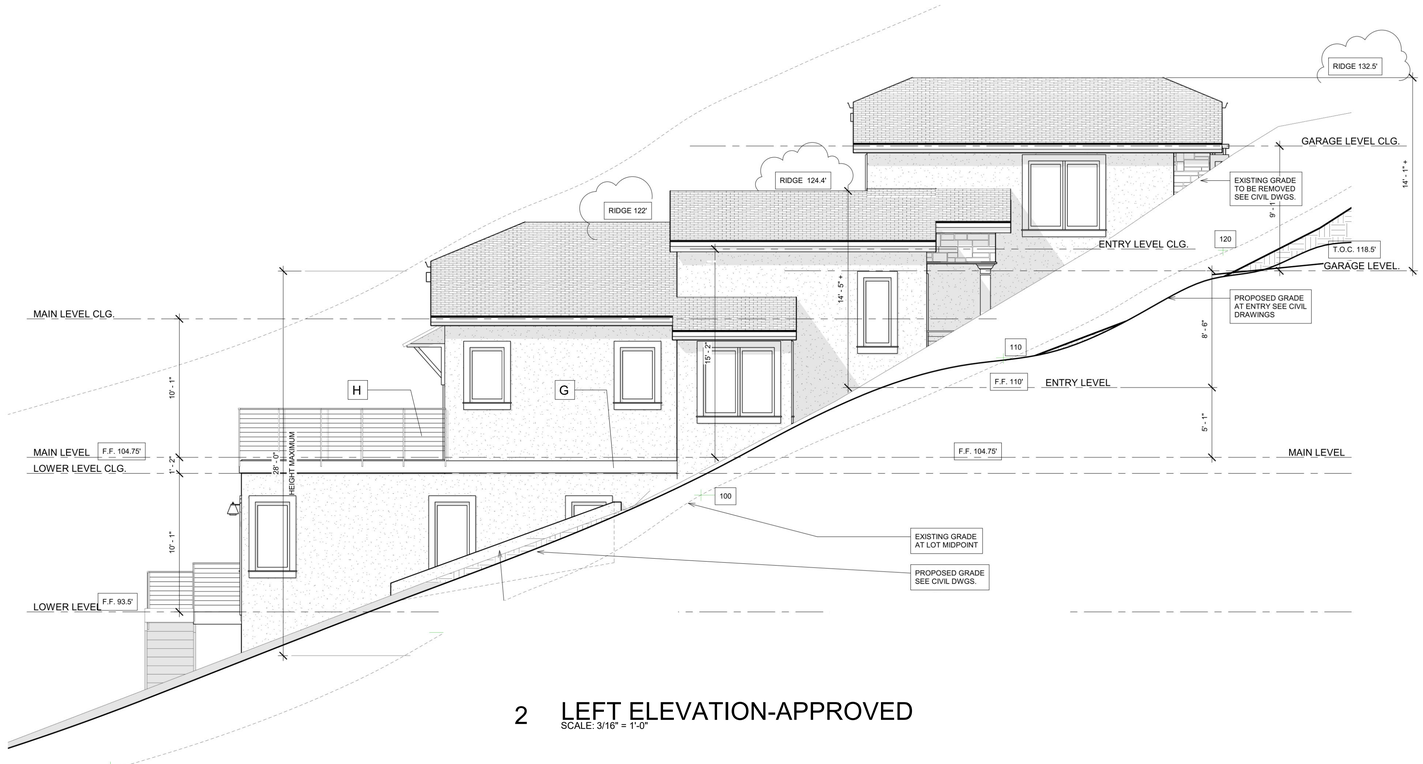
Scale
As indicated

Project Number
AB03

Drawing Number
A5.1



1 LEFT ELEVATION-AS BUILT
SCALE: 3/16" = 1'-0"



2 LEFT ELEVATION-APPROVED
SCALE: 3/16" = 1'-0"

ELEVATION KEY NOTES:

APPROVED ELEMENTS CHANGED ON AS-BUILTS

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4			
5			

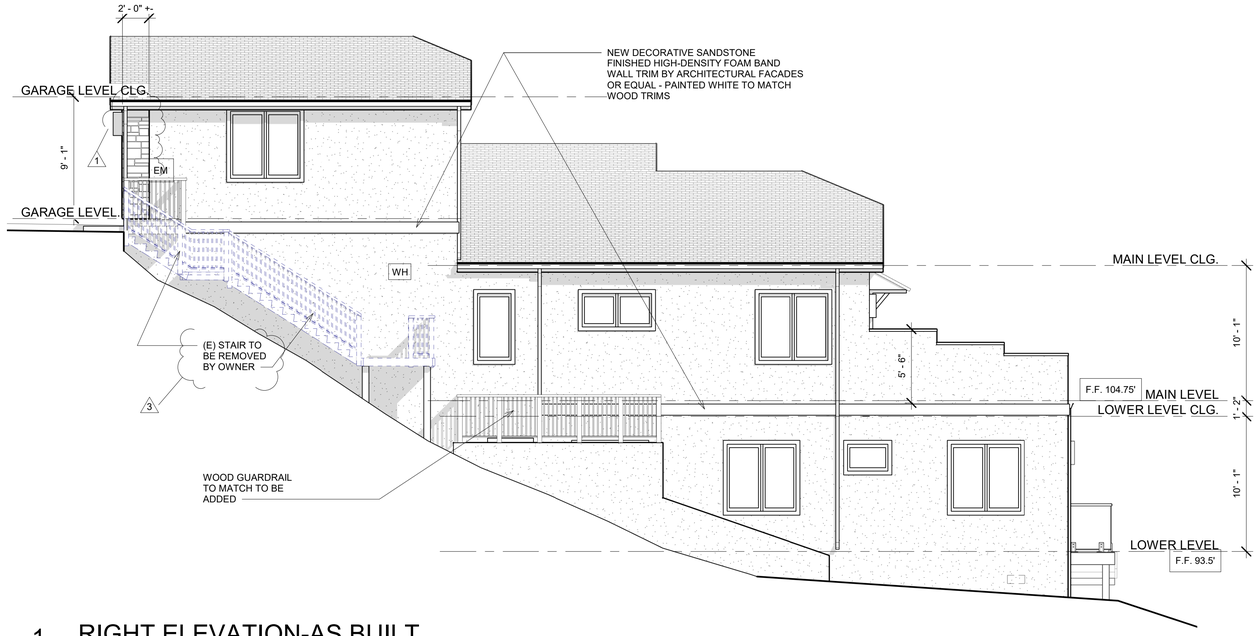
DRAWING STATUS
PRELIMINARY DESIGN
PLANNING
PC1
PC2
PERMIT

DATE
12/23/2021

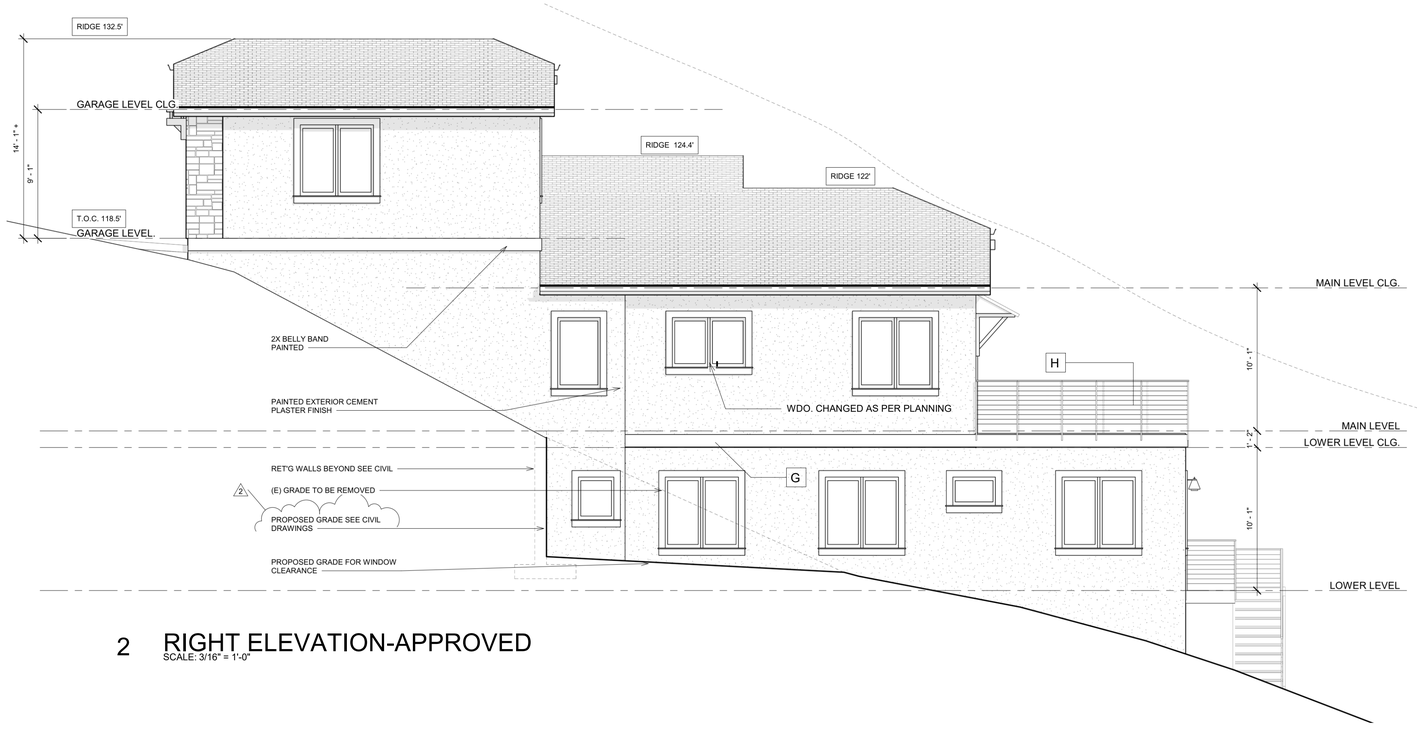
Drawing Number
A6

Scale
3/16" = 1'-0"

Project Number
AB03



1 RIGHT ELEVATION-AS BUILT
SCALE: 3/16" = 1'-0"



2 RIGHT ELEVATION-APPROVED
SCALE: 3/16" = 1'-0"

ELEVATION KEY NOTES:

APPROVED ELEMENTS CHANGED ON AS-BUILTS

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NEW RESIDENCE

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EL GRANADA, CA.
APN.047-275-050

-DESIGN REVIEW RESUBMITTAL-V1

REVISIONS

	DESCRIPTION	DATE	BY
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2	PLANNING RESPONSES	6-20-2021	CR
3	PLANNING RESPONSES	12-23-2021	CR
4			
5			

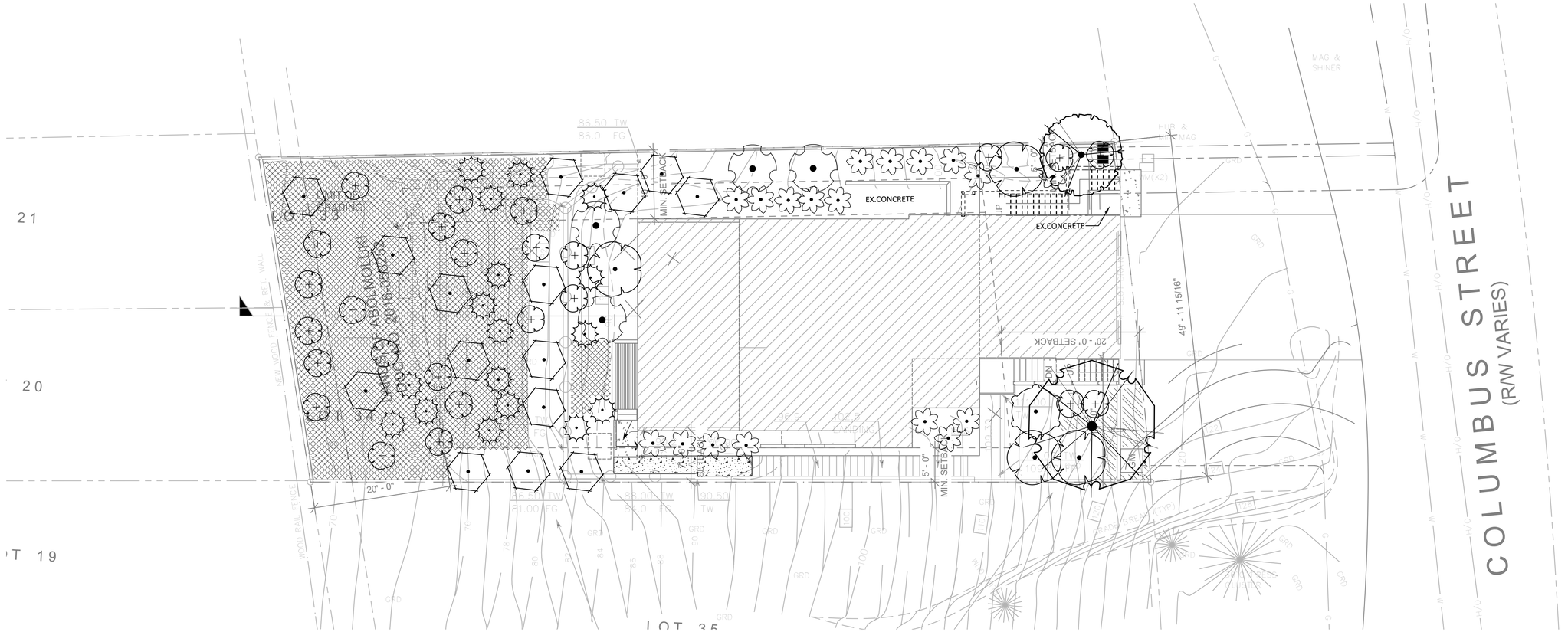
DRAWING STATUS
PRELIMINARY DESIGN
PLANNING
PC1
PC2
PERMIT

DATE
12/23/2021

Drawing Number
A7

Scale
3/16" = 1'-0"

Project Number
AB03



MAINTENANCE DURING THE WARRANTY PERIOD by the plant installer
During the warranty period, provide all maintenance for all plantings to keep the plants in a healthy state and the planting areas clean and neat.
General requirements:

1. All work shall be undertaken by trained planting crews under the supervision of a foreman with a minimum of 5 years experience supervising commercial plant maintenance crews.
2. All chemical and fertilizer applications shall be made by licensed applicators for the type of chemicals to be used. All work and chemical use shall comply with all applicable local, provincial and federal requirements.
3. Assure that hoses and watering equipment and other maintenance equipment does not block paths or be placed in a manner that may create tripping hazards. Use standard safety warning barriers and other procedures to maintain the site in a safe manner for visitors at all times.
4. All workers shall wear required safety equipment and apparel appropriate for the tasks being undertaken.
5. The Contractor shall not store maintenance equipment at the site at times when they are not in use unless authorized in writing by the Owner's Representative.
6. Maintenance vehicles shall not park on the site including walks and lawn areas at any time without the Owner's Representative's written permission.
7. Maintain a detailed log of all maintenance activities including types of tasks, date of task, types and quantities of materials and products used, watering times and amounts, and number of each crew. Periodically review the logs with the Owner's Representative, and submit a copy of the logs at the end of each year of the maintenance agreement.
8. Meet with the Owner's Representative a minimum of three times a year to review the progress and discuss any changes that are needed in the maintenance program. At the end of the warranty period attend a hand over meeting to formally transfer the responsibilities of maintenance to the Owner's Representative. Provide all information on past maintenance activities and provide a list of critical tasks that will be needed over the next 12 months. Provide all maintenance logs and soil test data. Make the Contractor's supervisor available for a minimum of one year after the end of the warranty period to answer questions about past maintenance.
9. Provide the following maintenance tasks:
10. Watering; Provide all water required to keep soil within and around the root balls at optimum moisture content for plant growth.
11. Maintain all watering systems and equipment and keep them operational.
12. Monitor soil moisture to provide sufficient water. Check soil moisture and root ball moisture with a soil moisture meter on a regular basis and record moisture readings. Do not over water.
13. Soil nutrient levels: Take a minimum of 4 soil samples from around the site in the spring and fall and have them tested by an accredited agricultural soil testing lab for chemical composition of plant required nutrients, pH, salt and % organic matter. Test results shall include laboratory recommendations for nutrient applications. Apply fertilizers at rates recommended by the soil test.
14. Make any other soil test and/or plant tissue test that may be indicated by plant conditions that may not be related to soil nutrient levels such as soil contaminated by other chemicals or lack of chemical uptake by the plant.
15. Plant pruning: Remove cross over branching, shorten or remove developing co dominant leaders, dead wood and winter-damaged branches. Unless directed by the Owner's Representative, do not shear plants or make heading cuts.
16. Restore plants: Reset any plants that have settled or are leaning as soon as the condition is noticed.
17. Guying and staking: Maintain plant guys in a taught position. Remove tree guys and staking after the first full growing season unless directed by Owner's Representative.
18. Weed control: Keep all beds free of weeds. Hand-remove all weeds and any plants that do not appear on the planting plan. Chemical weed control is permitted only with the approval of the Owner's Representative. Schedule weeding as needed but not less 12 times per year.
19. Trash removal: Remove all trash and debris from all planting beds and maintain the beds in a neat and tidy appearance. The number of trash and debris removal visits shall be no less than 12 times per year and may coincide with other maintenance visits.
20. Plant pest control: Maintain disease, insects and other pests at manageable levels. Manageable levels shall be defined as damage to plants that may be noticeable to a professional but not to the average person. Use least invasive methods to control plant disease and insect outbreaks.
21. The Owner's Representative must approve in advance the use of all chemical pesticide applications.
22. Plant replacement: Replace all plants that are defective as defined in the warranty provisions, as soon as the plant decline is obvious and in suitable weather and season for planting as outlined in above sections. Plants that become defective during the maintenance period shall be covered and replaced under the warranty provisions.
23. Mulch: Refresh mulch once a year to maintain complete coverage but do not over mulch. At no time shall the overall mulch thickness be greater that 3 inches. Do not apply mulch within 6 inches of the trunks or stems of any plants. Replacement mulch shall meet the requirements of the original approved material. Mulch shall be no more than one inch on top of the root ball surface.
24. Bed edging: Check and maintain edges between mulch and lawn areas in smooth neat lines as originally shown on the drawings.
25. Leaf, fruit and other plant debris removal: Remove fall leaf, spent flowers, fruit and plant part accumulations from beds and paved surfaces. Maintain all surface water drains free of debris. Debris removal shall be undertaken at each visit to weed or pick up trash in beds.
26. Damage from site use: Repair of damage by site visitors and events, beyond normal wear, are not part of this maintenance. The Owner's Representative may request that the Contractor repair damage beds or plantings for an additional cost. All additional work shall be approved in advance by the Owner's Representative.

PLANT SCHEDULE

TREES	CODE	QTY	BOTANICAL / COMMON NAME	CONT	WATER USE
	ARC HUR	1	ARCTOSTAPHYLOS MANZANITA `DR. HURD` / DR. HURD MANZANITA	15 GAL.	LOW
	CER FOR	1	CERCIS CANADENSIS 'FOREST PANSY' / FOREST PANSY EASTERN REDBUD	24" BOX	LOW
SHRUBS	**CODE**	**QTY**	**BOTANICAL / COMMON NAME**	**CONT**	
	BAC TWI	6	BACCHARIS PILULARIS `TWIN PEAKS II` / TWIN PEAKS COYOTE BRUSH	1 GAL	LOW
	CEA VAL	25	CEANOTHUS MARITIMUS `VALLEY VIOLET` / MARITIME CEANOTHUS	5 GAL	LOW
	CEA JUL	1	CEANOTHUS X `JULIA PHELPS` / CALIFORNIA LILAC	5 GAL	LOW
	HET ARB	4	HETEROMELES ARBUTIFOLIA / TOYON	5 GAL	LOW
	MUH RIG	17	MUHLENBERGIA RIGENS / DEER GRASS	1 GAL	LOW
	MYR CAL	15	MYRICA CALIFORNICA / PACIFIC WAX MYRTLE	5 GAL	MEDIUM
	WOO FIM	19	WOODWARDIA FIMBRIATA / GIANT CHAIN FERN	1 GAL	MEDIUM
GROUND COVERS	**CODE**	**QTY**	**BOTANICAL / COMMON NAME**	**CONT**	**SPACING**
	MYO PAR	109	MYOPORUM PARVIFOLIUM / TRAILING MYOPORUM	1 GAL	48" o.c. LOW
	SAL BEE	5	SALVIA X `BEE`S BLISS` / SAGE	1 GAL	48" o.c. LOW

"I HAVE COMPLIED WITH THE LANDSCAPE DESIGN CRITERIA OF THE MODEL WATER EFFICIENT LANDSCAPE ORDINANCE AND APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THIS DESIGN."

DATED: 01/04/2022
BY: *Andrew Bolt*

811 Know what's below. Call before you dig.

General Notes

LICENSED LANDSCAPE CONTRACTOR
ANDREW BOLT LICENSE NUMBER
Andrew Bolt
SIGN HERE
06/2023
RENEWAL DATE
STATE OF CALIFORNIA

PLANTING LAYOUT

No.	Revision/Issue	Date

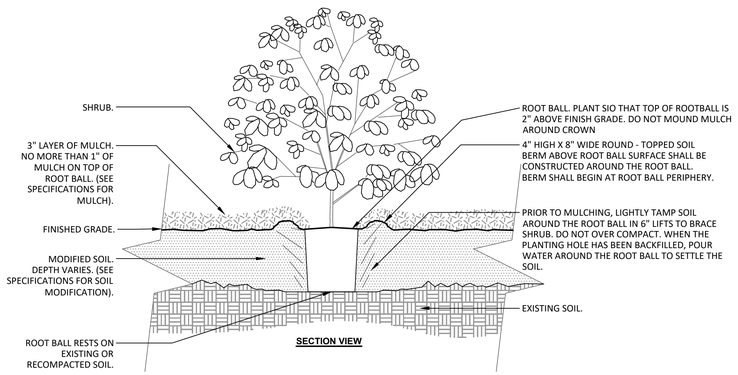
Firm Name and Address

4Binc Select Certified IRRIGATION ASSOCIATION Experienced professionals. Efficient solutions. LIC# 1012730—IA CERTIFICATION # 57436
ASIC PROFESSIONAL MEMBER

Project Name and Address

COLUMBUS ST.
EL GRANADA, CA

Project 236-2019	**Drawn By** 4BInc.
Date 9/10/19	**Checked By** 4BInc.
Scale 1/8"=1'-0"	**Approved By**
NORTH	**Sheet** L-1.0

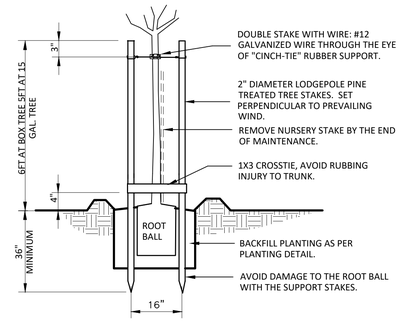


NOTES:
1- SHRUBS SHALL BE OF QUALITY PRESCRIBED IN THE ROOT OBSERVATIONS DETAIL AND SPECIFICATIONS.

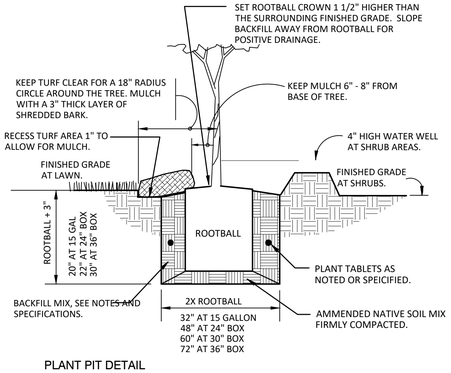
2- SEE SPECIFICATIONS FOR FURTHER REQUIREMENTS RELATED TO THIS DETAIL.

3 SHRUB PLANTING

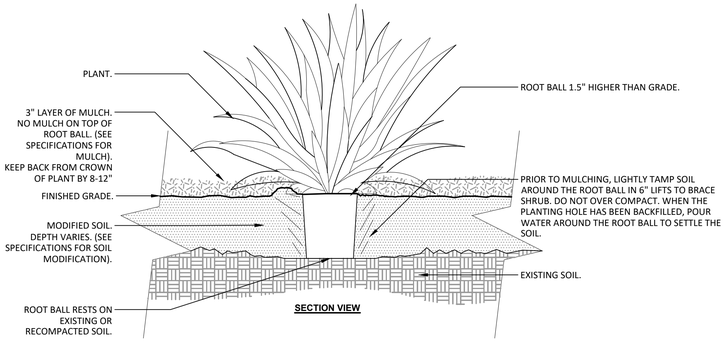
NTS AB-LA-PLA-07



STAKING DETAIL



PLANT PIT DETAIL



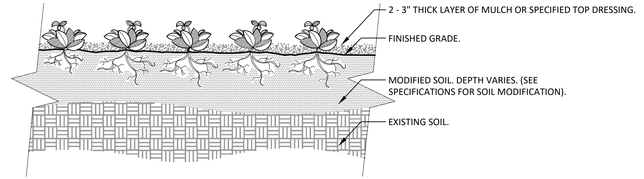
NOTES:
1- SHRUBS SHALL BE OF QUALITY PRESCRIBED IN THE ROOT OBSERVATIONS DETAIL AND SPECIFICATIONS.
2- SEE SPECIFICATIONS FOR FURTHER REQUIREMENTS RELATED TO THIS DETAIL.

4 GRASSES & STRAPPY PLANT PLANTING

NTS AB-LA-PLA-09

2 TREE PLANTING DOUBLE STAKE

NTS AB-LA-PLA-06



NOTES:
1- SEE PLANTING LEGEND FOR GROUNDCOVER SPECIES, SIZE, AND SPACING DIMENSION.
2- SMALL ROOTS (¼" OR LESS) THAT GROW AROUND, UP, OR DOWN THE ROOT BALL PERIPHERY ARE CONSIDERED A NORMAL CONDITION IN CONTAINER PRODUCTION AND ARE ACCEPTABLE HOWEVER THEY SHOULD BE ELIMINATED AT THE TIME OF PLANTING. ROOTS ON THE PERIPERHY CAN BE REMOVED AT THE TIME OF PLANTING. (SEE ROOT BALL SHAVING CONTAINER DETAIL).
3- SETTLE SOIL AROUND ROOT BALL OF EACH GROUNDCOVER PRIOR TO MULCHING.

1 GROUNDCOVER

NTS AB-LA-PLA-01

"I HAVE COMPLIED WITH THE LANDSCAPE DESIGN CRITERIA OF THE MODEL WATER EFFICIENT LANDSCAPE ORDINANCE AND APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THIS DESIGN."

DATED: 01/04/2022
BY: Andrew Bolt

Know what's below. Call before you dig.

General Notes

PLANTING DETAILS

No.	Revision/Issue	Date

Firm Name and Address

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ASIC PROFESSIONAL MEMBER

Project Name and Address

COLUMBUS ST.
EL GRANADA, CA

Project	Drawn By
236-2019	4Binc.
Date	**Checked By**
9/10/19	4Binc.
Scale	**Approved By**
	Sheet
	L-2.0

PLANTING

A. Plant Warranty:

1. The Contractor agrees to replace defective work and defective plants. The Owner's Representative shall make the final determination if plants meet these specifications or that plants are defective.

   Plants warranty shall begin on the date of Substantial Completion Acceptance and continue for the following periods, classed by plant type:

   a. Trees - 1 Year(s).
   b. Shrubs - 1 Year(s).
   c. Ground cover and perennial flower plants - 1 Year(s).
   d. Bulbs, annual flower and seasonal color plants - for the period of expected bloom or primary display.

2. When the work is accepted in parts, the warranty periods shall extend from each of the partial Substantial Completion Acceptances to the terminal date of the last warranty period. Thus, all warranty periods for each class of plant warranty, shall terminate at one time.
3. All plants shall be warrantied to meet all the requirements for plant quality at installation in this specification. Defective plants shall be defined as plants not meeting these requirements. The Owner's representative shall make the final determination that plants are defective.
4. Plants determined to be defective shall be removed immediately upon notification by the Owner's Representative and replaced without cost to the Owner, as soon as weather conditions permit and within the specified planting period.
5. Any work required by this specification or the Owner's Representative during the progress of the work, to correct plant defects including the removal of roots or branches, or planting plants that have been bare rooted during installation to observe for or correct root defects shall not be considered as grounds to void any conditions of the warranty. In the event that the Contractor decides that such remediation work may compromise the future health of the plant, the plant or plants in question shall be rejected and replaced with plants that do not contain defects that require remediation or correction.
6. The Contractor is exempt from replacing plants, after Substantial Completion Acceptance and during the warranty period, that are removed by others, lost or damaged due to occupancy of project, lost or damaged by a third party, vandalism, or any natural disaster.
7. Replacements shall closely match adjacent specimens of the same species. Replacements shall be subject to all requirements stated in this specification. Make all necessary repairs due to plant replacements. Such repairs shall be done at no extra cost to the Owner.
8. The warranty of all replacement plants shall extend for an additional one-year period from the date of their acceptance after replacement. In the event that a replacement plant is not acceptable during or at the end of the said extended warranty period, the Owner's Representative may elect one more replacement items or credit for each item. These tertiary replacement items are not protected under a warranty period.
9. During and by the end of the warranty period, remove all tree wrap, ties, and guying unless agreed to by the Owner's Representative to remain in place. All trees that do not have sufficient caliper to remain upright, or those requiring additional anchorage in windy locations, shall be staked or remain staked, if required by the Owner's Representative.

B. End of Warranty Final Acceptance - Acceptance of plants at the end of the warranty period.

1. At the end of the warranty period, the Owner's Representative shall observe all warranted work, upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date for final observation.
2. End of Warranty Final Acceptance will be given only when all the requirements of the work under this specification and in specification sections Planting Soil and Irrigation have been met.

1.2 SELECTION and observation OF PLANTS

A. The Owner's Representative may review all plants subject to approval of size, health, quality, character, etc. Review or approval of any plant during the process of selection, delivery, installation and establishment period shall not prevent that plant from later rejection in the event that the plant quality changes or previously existing defects become apparent that were not observed.

B. Plant Selection: The Owner's Representative reserves the right to select and observe all plants at the nursery prior to delivery and to reject plants that do not meet specifications as set forth in this specification. If a particular defect or substandard element can be corrected at the nursery, as determined by the Owner's Representative, the agreed upon remedy may be applied by the nursery or the Contractor provided that the correction allows the plant to meet the requirements set forth in this specification. Any work to correct plant defects shall be at the contractor's expense.

1. The Owner's Representative may make invasive observation of the plant's root system in the area of the root collar and the top of the root ball in general in order to determine that the plant meets the quality requirements for depth of the root collar and presence of roots above the root collar. Such observations will not harm the plant.
2. Corrections are to be undertaken at the nursery prior to shipping.

C. The Contractor shall bear all cost related to plant corrections.

D. All plants that are rejected shall be immediately removed from the site and acceptable replacement plants provided at no cost to the Owner.

E. Submit to the Owner's Representative, for approval, plant sources including the names and locations of nurseries proposed as sources of acceptable plants, and a list of the plants they will provide. The plant list shall include the botanical and common name and the size at the time of selection. Observe all nursery materials to determine that the materials meet the requirements of this section.

1.3 PLANT SUBSTITUTIONS FOR PLANTS NOT AVAILABLE

A. Submit all requests for substitutions of plant species, or size to the Owner's Representative, for approval, prior to purchasing the proposed substitution. Request for substitution shall be accompanied with a list of nurseries contacted in the search for the required plant and a record of other attempts to locate the required material. Requests shall also include sources of plants found that may be of a smaller or larger size, or a different shape or habit than specified, or plants of the same genus and species but different cultivar origin, or which may otherwise not meet the requirements of the specifications, but which may be available for substitution.

1.4 SITE CONDITIONS

A. Submit all requests for substitutions of plant species, or size to the Owner's Representative, for approval, prior to purchasing the proposed substitution. Request for substitution shall be accompanied with a list of nurseries contacted in the search for the required plant and a record of other attempts to locate the required material. Requests shall also include sources of plants found that may be of a smaller or larger size, or a different shape or habit than specified, or plants of the same genus and species but different cultivar origin, or which may otherwise not meet the requirements of the specifications, but which may be available for substitution.

B. It is the responsibility of the Contractor to be familiar with the local growing conditions, and if any specified plants will be in conflict with these conditions. Report any potential conflicts, in writing, to the Owner's Representative.

C. This specification requires that all Planting Soil and Irrigation (if applicable) work be completed and accepted prior to the installation of any plants.

1. Planting operations shall not begin until such time that the irrigation system is completely operational for the area(s) to be planted, and the irrigation system for that area has been preliminarily observed and approved by the Owner's Representative.

C. Actual planting shall be performed during those periods when weather and soil conditions are suitable in accordance with locally accepted horticultural practices.

1. Do not install plants into saturated or frozen soils. Do not install plants during inclement weather, such as rain or snow or during extremely hot, cold or windy conditions.

1.5 PLANTING AROUND UTILITIES

Contractor shall carefully examine the civil, record, and survey drawings to become familiar with the

A. existing underground conditions before digging.

B. Determine location of underground utilities and perform work in a manner that will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until parties concerned mutually agree upon removal.

C. Notification of *Local Utility Locator Service, Insert PHONE NUMBER*, is required for all planting areas: The Contractor is responsible for knowing the location and avoiding utilities that are not covered by the *Local Utility Locator Service*.

PART 2 – PRODUCTS

2.1 PLANTS: GENERAL

A. Standards and measurement: Provide plants of quantity, size, genus, species, and variety or cultivars as shown and scheduled in contract documents.

1. All plants including the root ball dimensions or container size to trunk caliper ratio shall conform to ANSI Z60.1 "American Standard for Nursery Stock" latest edition, unless modified by provisions in this specification. When there is a conflict between this specification and ANSI Z60.1, this specification section shall be considered correct.
2. Plants larger than specified may be used if acceptable to the Owner's Representative. Use of such plants shall not increase the contract price. If larger plants are accepted the root ball size shall be in accordance with ANSI Z-60.1. Larger plants may not be acceptable if the resulting root ball cannot be fit into the required planting space.
3. If a range of size is given, no plant shall be less than the minimum size and not less than 50 percent of the plants shall be as large as the maximum size specified. The measurements specified are the minimum and maximum size acceptable and are the measurements after pruning, where pruning is required.

B. Proper Identification: All trees shall be true to name as ordered or shown on planting plans and shall be labeled individually or in groups by genus, species, variety and cultivar.

   Compliance: All trees shall comply with federal and state laws and regulations requiring observation for plant disease, pests, and weeds. Observation certificates required by law shall accompany each shipment of plants. Clearance from the local county agricultural commissioner, if required, shall be obtained before planting trees originating outside the county in which they are to be planted.

C. Plant Quality:

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   1. **General**: Provide healthy stock, grown in a nursery and reasonably free of die-back, disease, insects, eggs, bores, and larvae. At the time of planting all plants shall have a root system, stem, and branch form that will not restrict normal growth, stability and health for the expected life of the plant

      Plant quality above the soil line:

      a. Plants shall be healthy with the color, shape, size and distribution of trunk, stems, branches, buds and leaves normal to the plant type specified. Tree quality above the soil line shall comply with the project Crown Acceptance details (or Florida Grades and Standards, tree grade Florida Fancy or Florida #1) and the following:

         1.) Crown: The form and density of the crown shall be typical for a young specimen of the species or cultivar pruned to a central and dominant leader.

            a.) Crown specifications do not apply to plants that have been specifically trained in the nursery as topiary, espalier, multi-stem, clump, or unique selections such as contorted or weeping cultivars.

         2.) Leaves: The size, color, and appearance of leaves shall be typical for the time of year and stage of growth of the species or cultivar. Trees shall not show signs of prolonged moisture stress or over watering as indicated by wilted, shriveled, or dead leaves.

3.) Branches: Shoot growth (length and diameter) throughout the crown should be appropriate for the age and size of the species or cultivar. Trees shall not have dead, diseased, broken, distorted, or otherwise injured branches.

   a.) Main branches shall be distributed along the central leader not clustered together. They shall form a balanced crown appropriate for the cultivar/species.

b.) Branch diameter shall be no larger than two-thirds (one-half is preferred) the diameter of the central leader measured 1 inch above the branch union.

c.) The attachment of the largest branches (scaffold branches) shall be free of included bark.

4.) Trunk: The tree trunk shall be relatively straight, vertical, and free of wounds that penetrate to the wood (properly made pruning cuts, closed or not, are acceptable and are not considered wounds), sunburned areas, conks (fungal fruiting bodies), wood cracks, sap leakage, signs of boring insects, galls, cankers, girdling ties, or lesions (mechanical injury).

5.) Temporary branches, unless otherwise specified, can be present along the lower trunk below the lowest main (scaffold) branch, particularly for trees less than 1 inch in caliper. These branches should be no greater than 3/8-inch diameter. Clear trunk should be no more than 40% of the total height of the tree.

   b. Trees shall have one central leader. If the leader was headed, a new leader (with a live terminal bud) at least one-half the diameter of the pruning cut shall be present.

      1.) All trees are assumed to have one central leader trees unless a different form is specified in the plant list or drawings.

   c. All graft unions, where applicable, shall be completely closed without visible sign of graft rejection. All grafts shall be visible above the soil line.

   d. Trunk caliper and taper shall be sufficient so that the lower five feet of the trunk remains vertical without a stake. Auxiliary stake may be used to maintain a straight leader in the upper half of the tree.

   1. Plant quality at or below the soil line:

   a. Plant roots shall be normal to the plant type specified. Root observations shall take place without impacting tree health. Root quality at or below the soil line shall comply with the project Root Acceptance details and the following:

      1.) The roots shall be reasonably free of scrapes, broken or split wood.

2.) The root system shall be reasonably free of injury from biotic (e.g., insects and pathogens) and abiotic (e.g., herbicide toxicity and salt injury) agents. Wounds resulting from root pruning used to produce a high quality root system are not considered injuries.

3.) A minimum of three structural roots reasonably distributed around the trunk (not clustered on one side) shall be found in each plant. Root distribution shall be uniform throughout the root ball, and growth shall be appropriate for the species.

   a.) Plants with structural roots on only one side of the trunk (J roots) shall be rejected.

4.) The root collar shall be within the upper 2 inches of the substrate/soil. Two structural roots shall reach the side of the root ball near the surface of the root ball. The grower may request a modification to this requirement for species with roots that rapidly descend, provided that the grower removes all stem girdling roots above the structural roots across the top of the root ball.

5.) The root system shall be reasonably free of stem girdling roots over the root collar or kinked roots from nursery production practices.

   a.) Plant Grower Certification: The final plant grower shall be responsible to have determined that the plants have been root pruned at each step in the plant production process to remove stem girdling roots and kinked roots, or that the previous production system used practices that produce a root system throughout the root ball that meets these specifications. Regardless of the work of previous growers, the plant's root system shall be modified at the final production stage, if needed, to produce the required plant root quality. The final grower shall certify in writing that all plants are reasonably free of stem girdling and kinked roots as defined in this specification, and that the tree has been grown and harvested to produce a plant that meets these specifications.

6.) At time of observation and delivery, the root ball shall be moist throughout. Roots shall not show signs of excess soil moisture conditions as indicated by stunted, discolored, distorted, or dead roots.

A. Submittals: Submit for approval the required plant quality certifications from the grower where plants are to be purchased, for each plant type. The certification must state that each plant meets all the above plant quality requirements.

1. The grower's certification of plant quality does not prohibit the Owner's Representative from observing any plant or rejecting the plant if it is found to not meet the specification requirements.

2.2 ROOT BALL PACKAGE OPTIONS: The following root ball packages are permitted. Specific root ball packages shall be required where indicated on the plant list or in this specification. Any type of root ball packages that is not specifically defined in this specification shall not be permitted.

A. CONTAINER (INCLUDING ABOVE-GROUND FABRIC CONTAINERS AND BOXES) PLANTS

1. Container plants may be permitted only when indicated on the drawing, in this specification, or approved by the Owner's Representative.
2. Provide plants shall be established and well rooted in removable containers.
3. Container class size shall conform to ANSI Z60.1 for container plants for each size and type of plant.

B. BARE ROOT PLANTS

1. Harvest bare root plants while the plant is dormant and a minimum of 4 weeks prior to leaf out (bud break).
2. The root spread dimensions of the harvested plants shall conform to ANSI Z60.1 for nursery grown bare root plants for each size and type of plant. Just prior to shipping to the job site, dip the root system into a slurry of hydrogel (cross linked polyacrylamide) and water mixed at a rate of 15 oz. of hydrogel in 25 gallons of water. Do not shake off the excess hydrogel. Place the root system in a pleated black plastic bag and tie the bag snugly around the trunk. Bundle and tie the upper branches together.
3. Keep the trees in a cool dark space for storage and delivery. If daytime outside temperatures exceeds 70 degrees F, utilize a refrigerated storage area with temperature between 35 and 50 degrees.
4. Where possible, plan time of planting to be before bud break. For trees to be planted after bud break, place the trees before bud break in an irrigated bed of pea gravel.
   a. The pea gravel bed shall be 18 inches deep over a sheet of plastic.
   b. Space trees to allow the unbundled branches to grow without shading each other.
   c. Once stored in pea gravel, allow the trees sufficient time for the new root system to flush and spring growth of leaves to fully develop before planting.
   d. Pea gravel stored trees may be kept for up to one growing season.
   e. Pea gravel stored trees shall be dipped, packaged and shipped similar to the requirements for freshly dug bare root trees above.

C. IN-GROUND FABRIC BAG-GROWN

1. In-ground fabric container plants may be permitted only when indicated on the drawing, in this specification, or approved by the Owner's Representative.
2. Provide plants established and well rooted.

2.3 Annual flowering and seasonal color plants

A. Container or flat-grown plants should be sized as noted in the planting plan. Plants shall be well-rooted and healthy.

2.4 Planting Soil.

A. in this specification means the soil at the planting site, or imported as modified and defined in specification Section Planting Soil. If there is no Planting Soil specification, the term Planting Soil shall mean the soil at the planting site within the planting hole.

2.5 MULCH

A. Mulch shall be 3" layer of "Walk on" grade, coarse, ground, from tree and woody brush sources. The size range shall be a minimum (less than 25% or less of volume) fine particles 3/8 inch or less in size, and a maximum size of individual pieces (largest 20% or less of volume) shall be approximately 1 to 1-1/2 inch in diameter and maximum length approximately 4 to 8". Pieces larger than 8 inch long that are visible on the surface of the mulch after installation shall be removed.

   1. It is understood that mulch quality will vary significantly from supplier to supplier and region to region. The above requirements may be modified to conform to the source material from locally reliable suppliers as approved by the Owner's Representative.

B. Submit supplier's product specification data sheet and a one gallon sample for approval.

2.6 TREE STAKING AND GUYING MATERIAL

A. Tree guying to be flat woven polypropylene material, 3/4 inch wide, and 900 lb. break strength. Color to be Green. Product to be ArborTie manufactured by Deep Root Partners, L.P. or approved equal.

B. Stakes shall be lodge pole stakes free of knots and of diameters and lengths appropriate to the size of plant as required to adequately support the plant.

C. Below ground anchorage systems to be constructed of 2 x 2 dimensional untreated wood securing (using 3 inch long screws) horizontal portions to 4 feet long vertical stakes driven straight into the ground outside the root ball.

D. Submit manufacturer's product data for approval.

2.7 TREE Bark Protector

A. Tree Bark Protectors shall be black extruded resin mesh, 4 inches in diameter, 5 feet long. As manufactured by Industrial Netting, Minneapolis, MN, USA or approved equal.

B. Fasten the split side of the Tree Bark Protector together in three places with black plastic tape.

C. Submit manufacturers' product data for approval.

2.8 CHEMICAL or biological ADDITIVES

PART 3 –EXECUTION

3.1 SITE EXAMINATION

A. Examine the surface grades and soil conditions to confirm that the requirements of the Specification Section - Planting Soil - and the soil and drainage modifications indicated on the Planting Soil Plan and Details (if applicable) have been completed. Notify the Owner's Representative in writing of any unsatisfactory conditions.

3.2 DELIVERY, STORAGE AND HANDLING

A. Protect materials from deterioration during delivery and storage. Adequately protect plants from drying out, exposure of roots to sun, wind or extremes of heat and cold temperatures. If planting is delayed more than 24 hours after delivery, set plants in a location protected from sun and wind. Provide adequate water to the root ball package during the shipping and storage period.

1. All plant materials must be available for observation prior to planting.
2. Using a soil moisture meter, periodically check the soil moisture in the root balls of all plants to assure that the plants are being adequately watered. Volumetric soil moisture shall be maintained above wilting point and below field capacity for the root ball substrate or soil.

B. Do not deliver more plants to the site than there is space with adequate storage conditions. Provide a suitable remote staging area for plants and other supplies.

1. The Owner's Representative or Contractor shall approve the duration, method and location of storage of plants.

C. Provide protective covering over all plants during transporting.

3.4 PLANTING SEASON

A. Planting shall only be performed when weather and soil conditions are suitable for planting the materials specified in accordance with locally accepted practice. Install plants during the planting time as described below unless otherwise approved in writing by the Owner's Representative. In the event that the Contractor request planting outside the dates of the planting season, approval of the request does not change the requirements of the warranty.

3.5 Adverse weather conditions

A. No planting shall take place during extremely hot, dry, windy or freezing weather.

3.6 COORDINATION WITH PROJECT WORK

A. The Contractor shall coordinate with all other work that may impact the completion of the work.

B. Prior to the start of work, prepare a detailed schedule of the work for coordination with other trades.

C. Coordinate the relocation of any irrigation lines, heads or the conduits of other utility lines that are in conflict with tree locations. Root balls shall not be altered to fit around lines. Notify the Owner's Representative of any conflicts encountered.

3.7 LAYOUT AND PLANTING SEQUENCE

A. Relative positions of all plants and trees are subject to approval of the Owner's Representative.

B. Notify the Owner's Representative, one (1) week prior to layout. Layout all individual tree and shrub locations. Place plants above surface at planting location or place a labeled stake at planting location. Layout bed lines with paint for the Owner's Representative's approval. Secure the Owner's Representative's acceptance before digging and start of planting work.

C. When applicable, plant trees before other plants are installed.

D. It is understood that plants are not precise objects and that minor adjustments in the layout will be required as the planting plan is constructed. These adjustments may not be apparent until some or all of the plants are installed. Make adjustments as required by the Owner's Representative including relocating previously installed plants.

3.8 SOIL PROTECTION DURING plant DELIVERY and installation

A. Protect soil from compaction during the delivery of plants to the planting locations, digging of planting holes and installing plants.

1. Where possible deliver and plant trees that require the use of heavy mechanized equipment prior to final soil preparation and tilling. Where possible, restrict the driving lanes to one area instead of driving over and compacting a large area of soil.
2. Till to a depth of 6 inches, all soil that has been driven over during the installation of plants.

3.9 SOIL MOISTURE

A. Volumetric soil moisture level, in both the planting soil and the root balls of all plants, prior to, during and after planting shall be above permanent wilting point and below field capacity for each type of soil texture within the following ranges.

   Soil type Permanent wilting point Field capacity

   Sand, Loamy sand, Sandy loam5-8%12-18%

   Loam, Sandy clay, Sandy clay loam14-25%27-36%

   Clay loam, Silt loam11-22%31-36%

   Silty clay, Silty clay loam22-27%38-41%

1. Volumetric soil moisture shall be measured with a digital moisture meter. The meter shall be the Digital Soil Moisture Meter, DSMM500 by General Specialty Tools and Instruments, or approved equivalent.

   The Contractor shall confirm the soil moisture levels with a moisture meter. If the moisture is too high, suspend planting operations until the soil moisture drains to below field capacity

3.10 INSTALLATION OF plants: General cont.

E. Container and Boxed Root Ball Shaving: The outer surfaces of ALL plants in containers and boxes, including the top, sides and bottom of the root ball shall be shaved to remove all circling, descending, and matted roots. Shaving shall be performed using saws, knives, sharp shovels or other suitable equipment that is capable of making clean cuts on the roots. Shaving shall remove a minimum of one inch of root mat or up to 2 inches as required to remove all root segments that are not growing reasonably radial to the trunk.

F. Exposed Stem Tissue after Modification: The required root ball modifications may result in stem tissue that has not formed trunk bark being exposed above the soil line. If such condition occurs, wrap the exposed portion of the stem in a protective wrapping with a white filter fabric. Secure the fabric with biodegradable masking tape. DO NOT USE string, twine, green nursery ties or any other material that may girdle the trunk if not removed.

G. Excavation of the Planting Space: Using hand tools or tracked mini-excavator, excavate the planting hole into the Planting Soil to the depth of the root ball measured after any root ball modification to correct root problems, and wide enough for working room around the root ball or to the size indicated on the drawing or as noted below.

1. For trees and shrubs planted in soil areas that are NOT tilled or otherwise modified to a depth of at least 12 inches over a distance of more than 10 feet radius from each tree, or 5 feet radius from each shrub, the soil around the root ball shall be loosened as defined below or as indicated on the drawings.
   a. The area of loosening shall be a minimum of 3 times the diameter of the root ball at the surface sloping to 2 times the diameter of the root ball at the depth of the root ball.
   b. Loosening is defined as digging into the soil and turning the soil to reduce the compaction. The soil does not have to be removed from the hole, just dug, lifted and turned. Lifting and turning may be accomplished with a tracked mini excavator, or hand shovels.
2. If an auger is used to dig the initial planting hole, the soil around the auger hole shall be loosened as defined above for trees and shrubs planted in soil areas that are NOT tilled or otherwise modified.
3. The measuring point for root ball depth shall be the average height of the outer edge of the root ball after any required root ball modification.
4. If motorized equipment is used to deliver plants to the planting area over exposed planting beds, or used to loosen the soil or dig the planting holes, all soil that has been driven over shall be tilled to a depth of 6 inches.

B. For trees to be planted in prepared Planting Soil that is deeper than the root ball depth, compact the soil under the root ball using a mechanical tamper to assure a firm bedding for the root ball. If there is more than 12 inches of planting soil under the root ball excavate and tamp the planting soil in lifts not to exceed 12 inches.

C. Set top outer edge of the root ball at the average elevation of the proposed finish. Set the plant plumb and upright in the center of the planting hole. The tree graft, if applicable, shall be visible above the grade. Do not place soil on top of the root ball.

D. The Owner's Representative may request that plants orientation be rotated when planted based on the form of the plant.

E. Backfill the space around the root ball with the same planting soil or existing soil that was excavated for the planting space. See Specification Section Planting Soil, for requirements to modify the soil within the planting bed.

F. Brace root ball by tamping Planting Soil around the lower portion of the root ball. Place additional Planting Soil around base and sides of ball in six-inch (6") lifts. Lightly tamp each lift using foot pressure or hand tools to settle backfill, support the tree and eliminate voids. DO NOT over compact the backfill or use mechanical or pneumatic tamping equipment. Over compaction shall be defined as greater than 85% of maximum dry density, standard proctor or greater than 250 psi as measured by a cone penetrometer when the volumetric soil moisture is lower than field capacity.

1. When the planting hole has been backfilled to three quarters of its depth, water shall be poured around the root ball and allowed to soak into the soil to settle the soil. Do not flood the planting space. If the soil is above field capacity, allow the soil to drain to below field capacity before finishing the planting. Air pockets shall be eliminated and backfill continued until the planting soil is brought to grade level.

J. Where indicated on the drawings, build a 4 inch high, level berm of Planting Soil around the outside of the root ball to retain water. Tamp the berm to reduce leaking and erosion of the saucer.

K. Thoroughly water the Planting Soil and root ball immediately after planting.

L. Remove all nursery plant identification tags and ribbons as per Owner's Representative instructions. The Owner's Representative's seals are to remain on plants until the end of the warranty period.

M. Remove corrugated cardboard trunk protection after planting.

N. Follow additional requirements for the permitted root ball packages.

O. CONTAINER (INCLUDES BOXED AND ABOVE-GROUND FABRIC CONTAINERS) PLANTS

1. This specification assumes that most container plants have significant stem girdling and circling roots, and that the root collar is too low in the root ball.
2. Remove the container.
3. Perform root ball shaving as defined in Installation of Plants: General above.
4. Remove all roots and substrate above the root collar and the main structural roots according to root correction details so root system conforms to root observations detail.
5. Remove all substrate at the bottom of the root ball that does not contain roots.
6. Using a hose, power washer or air excavation device, wash out the substrate from around the trunk and top of the remaining root ball and find and remove all stem girdling roots within the root ball above the top of the structural roots.

P. BARE ROOT PLANTS

1. Dig the planting hole to the diameter of the spread of the roots to a depth in the center that maintains the root collar at the elevation of the surrounding finished grade and slightly deeper along the edges of the hole.
2. Spread all roots out radial to the trunk in the prepared hole making the hole wider where needed to accommodate long roots. Root tips shall be directed away from the trunk. Prune any broken roots removing the least amount of tissue possible.
3. Maintain the trunk plumb while backfilling soil around the roots.
4. Lightly tamp the soil around the roots to eliminate voids and reduce settlement.

A. IN-GROUND FABRIC CONTAINERS

1. Remove the fabric container from the root ball. Cut roots at the edge of the container as needed to extract the fabric from the roots. Make clean cuts with sharp tools; do not tear roots away from the fabric.
2. Observe the root system after the container is removed to confirm that the root system meets the quality standards.

3.11 GROUNDCOVER, PERENNIAL AND ANNUAL PLANTING

A. Assure that soil moisture is within the required levels prior to planting. Irrigation, if required, shall be applied at least 12 hours prior to planting to avoid planting in muddy soils.

B. Assure that soil grades in the beds are smooth and as shown on the plans.

C. Plants shall be planted in even, triangularly spaced rows, at the intervals called out for on the drawings, unless otherwise noted. The first row of Annual flower plants shall be 6 inches from the bed edge unless otherwise directed.

D. Dig planting holes sufficiently large enough to insert the root system without deforming the roots. Set the top of the root system at the grade of the soil.

E. Schedule the planting to occur prior to application of the mulch. If the bed is already mulched, pull the mulch from around the hole and plant into the soil. Do not plant the root system in the mulch. Pull mulch back so it is not on the root ball surface.

F. Press soil to bring the root system in contact with the soil.

G. Spread any excess soil around in the spaces between plants.

H. Apply mulch to the bed being sure not to cover the tops of the plants with or the tops of the root ball with mulch.

I. Water each planting area as soon as the planting is completed. Apply additional water to keep the soil moisture at the required levels. Do not over water.

3.12 Palm Planting

A. Palm trees shall be placed at grade making sure not to plant the tree any deeper in the ground than the palm trees originally stood.

B. The trees shall be placed with their vertical axis in a plumb position.

C. All backfill shall be native soil except in cases where planting in rock. Water-settle the back fill.

D. Do not cover root ball with mulch or topsoil.

E. Provide a watering berm at each palm. Berms shall extend a minimum of 18 inches out from the trunk all around and shall be a minimum of (6) inches high.

F. Remove twine which ties fronds together after placing palm in planting hole and securing it in the upright position.

3.13 STAKING AND GUYING

A. Do not stake or guy trees unless specifically required by the Contract Documents, or in the event that the Contractor feels that staking is the only alternative way to keep particular trees plumb.

1. The Owner's Representative shall have the authority to require that trees are staked or to reject staking as an alternative way to stabilize the tree.
2. Trees that required heavily modified root balls to meet the root quality standards may become unstable. The Owner's Representative may choose to reject these trees rather than utilize staking to temporarily support the tree.

B. Trees that are guyed shall have their guys and stakes removed after one full growing season or at other times as required by the Owner's Representative.

C. Tree guying shall utilize the tree staking and guying materials specified. Guying to be tied in such a manner as to create a minimum 12-inch loop to prevent girdling. Refer to manufacturer's recommendations and the planting detail for installation.

1. Plants shall stand plumb after staking or guying.
2. Stakes shall be driven to sufficient depth to hold the tree rigid.

D. For trees planted in planting mix over waterproofed membrane, use dead men buried 24 inches to the top of the dead man, in the soil. Tie the guy to the dead man with a double wrap of line around the dead man followed by a double half hitch. When guys are removed, leave the dead men in place and cut the guy tape 12 inches above the ground, leaving the tape end covered in mulch.

3.14 Tree bark protection

A. For all street trees in commercial areas where indicted on the drawings, apply a Tree Bark Protector to each tree.

3.15 STRAIGHTENING PLANTS

A. Maintain all plants in a plumb position throughout the warranty period. Straighten all trees that move out of plumb including those not staked. Plants to be straightened shall be excavated and the root ball moved to a plumb position, and then re-backfilled.

Do not straighten plants by pulling the trunk with guys.

3.16 INSTALLATION OF FERTILIZER AND OTHER CHEMICAL ADDITIVES

A. Do not apply any soluble fertilizer to plantings during the first year after transplanting unless soil test determines that fertilizer or other chemical additives is required. Apply chemical additives only upon the approval of the Owner's Representative.

B. Controlled release fertilizers shall be applied according to the manufacturer's instructions and standard horticultural practices.

3.17 PRUNING OF TREES AND SHRUBS

A. Prune plants as directed by the Owner's Representative. Pruning trees shall be limited to addressing structural defects as shown in details; follow recommendations in "Structural Pruning: A Guide For The Green Industry" published by Urban Tree Foundation, Visalia CA.

B. All pruning shall be performed by a person experienced in structural tree pruning.

C. Except for plants specified as multi-stemmed or as otherwise instructed by the Owner's Representative, preserve or create a central leader.

D. Pruning of large trees shall be done using pole pruners or if needed, from a ladder or hydraulic lift to gain access to the top of the tree. Do not climb in newly planted trees. Small trees can be structurally pruned by laying them over before planting. Pruning may also be performed at the nursery prior to shipping.

E. Remove and replace excessively pruned or malformed stock resulting from improper pruning that occurred in the nursery or after.

F. Pruning shall be done with clean, sharp tools.

G. No tree paint or sealants shall be used.

3.18 MULCHING OF PLANTS - See L1 for mulch type

A. Apply 3 inches of mulch before settlement, covering the entire planting bed area. Install no more than 1 inch of mulch over the top of the root balls of all plants. Taper to 2 inches when abutting pavement.

B. For trees planted in lawn areas the mulch shall extend to a 5 foot radius around the tree or to the extent indicated on the plans.

C. Lift all leaves, low hanging stems and other green portions of small plants out of the mulch if covered.

3.19 Planting bed finishing

A. After planting, smooth out all grades between plants before mulching.

B. Separate the edges of planting beds and lawn areas with a smooth, formed edge cut into the turf with the bed mulch level slightly lower, 1 and 2 inches, than the adjacent turf sod or as directed by the Owner's Representative. Bed edge lines shall be a depicted on the drawings.

3.20 WATERING

A. The Contractor shall be fully responsible to ensure that adequate water is provided to all plants from the point of installation until the date of Substantial Completion Acceptance. The Contractor shall adjust the automatic irrigation system, if available, and apply additional or adjust for less water using hoses as required.

B. Hand water root balls of all plants to assure that the root balls have moisture above wilt point and below field capacity. Test the moisture content in each root ball and the soil outside the root ball to determine the water content.

3.21 CLEAN-UP

A. During installation, keep the site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day. Remove trash and debris in containers from the site no less than once a week.

1. Immediately clean up any spilled or tracked soil, fuel, oil, trash or debris deposited by the Contractor from all surfaces within the project or on public right of ways and neighboring property.

B. Once installation is complete, wash all soil from pavements and other structures. Ensure that mulch is confined to planting beds and that all tags and flagging tape are removed from the site. The Owner's Representative's seals are to remain on the trees and removed at the end of the warranty period.

C. Make all repairs to grades, ruts, and damage by the plant installer to the work or other work at the site.

D. Remove and dispose of all excess planting soil, subsoil, mulch, plants, packaging, and other material brought to the site by the Contractor.

3.22 PROTECTION DURING CONSTRUCTION

A. The Contractor shall protect planting and related work and other site work from damage due to planting operations, operations by other Contractors or trespassers. Maintain protection during installation until Substantial Completion Acceptance. Treat, repair or replace damaged work immediately.

B. Damage done by the Contractor, or any of their sub-contractors to existing or installed plants, or any other parts of the work or existing features to remain, including roots, trunk or branches of large existing trees, soil, paving, utilities, lighting, irrigation, other finished work and surfaces including those on adjacent property, shall be cleaned, repaired or replaced by the Contractor at no expense to the Owner. The Owner's Representative shall determine when such cleaning, replacement or repair is satisfactory.

3.23 PLANT MAINTENANCE PRIOR TO SUBSTANTIAL COMPLETION ACCEPTANCE

A. During the project work period and prior to Substantial Completion Acceptance, the Contractor shall maintain all plants.

B. Maintenance during the period prior to Substantial Completion Acceptance shall consist of pruning, watering, cultivating, weeding, mulching, removal of dead material, repairing and replacing of tree stakes, tightening and repairing of guys, repairing and replacing of damaged tree wrap material, resetting plants to proper grades and upright position, and furnishing and applying such sprays as are necessary to keep plantings reasonably free of damaging insects and disease, and in healthy condition. The threshold for applying insecticides and herbicide shall follow established Integrated Pest Management (IPM) procedures. Mulch areas shall be kept reasonably free of weeds, grass.

3.24 Substantial Completion Acceptance

A. Upon written notice from the Contractor, the Owners Representative shall review the work and make a determination if the work is substantially complete.

1. Notification shall be at least 7 days prior to the date the contractor is requesting the review.

B. The date of substantial completion of the planting shall be the date when the Owner's Representative accepts that all work in Planting, Planting Soil, and Irrigation installation sections is complete.

C. The Plant Warranty period begins at date of written notification of substantial completion from the Owner's Representative. The date of substantial completion may be different than the date of substantial completion for the other sections of the project.

3.25 MAINTENANCE DURING THE WARRANTY PERIOD by others

A. After Substantial Completion Acceptance, the Contractor shall make sufficient site visits to observe the Owner's maintenance and become aware of problems with the maintenance in time to request changes, until the date of End of Warranty Final Acceptance.

1. Notify the Owner's Representative in writing if maintenance, including watering, is not sufficient to maintain plants in a healthy condition. Such notification must be made in a timely period so that the Owner's Representative may take corrective action.
   a. Notification must define the maintenance needs and describe any corrective action required.
2. In the event that the Contractor fails to visit the site and or notify, in writing, the Owner's Representative of maintenance needs, lack of maintenance shall not be used as grounds for voiding or modifying the provisions of the warranty.

"I HAVE COMPLIED WITH THE LANDSCAPE DESIGN CRITERIA OF THE MODEL WATER EFFICIENT LANDSCAPE ORDINANCE AND APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THIS DESIGN."

DATED: 01/04/2022
BY: *Andrew Bolt*

811 Know what's below. Call before you dig.

General Notes

PLANTING NOTES

No.	Revision/Issue	Date

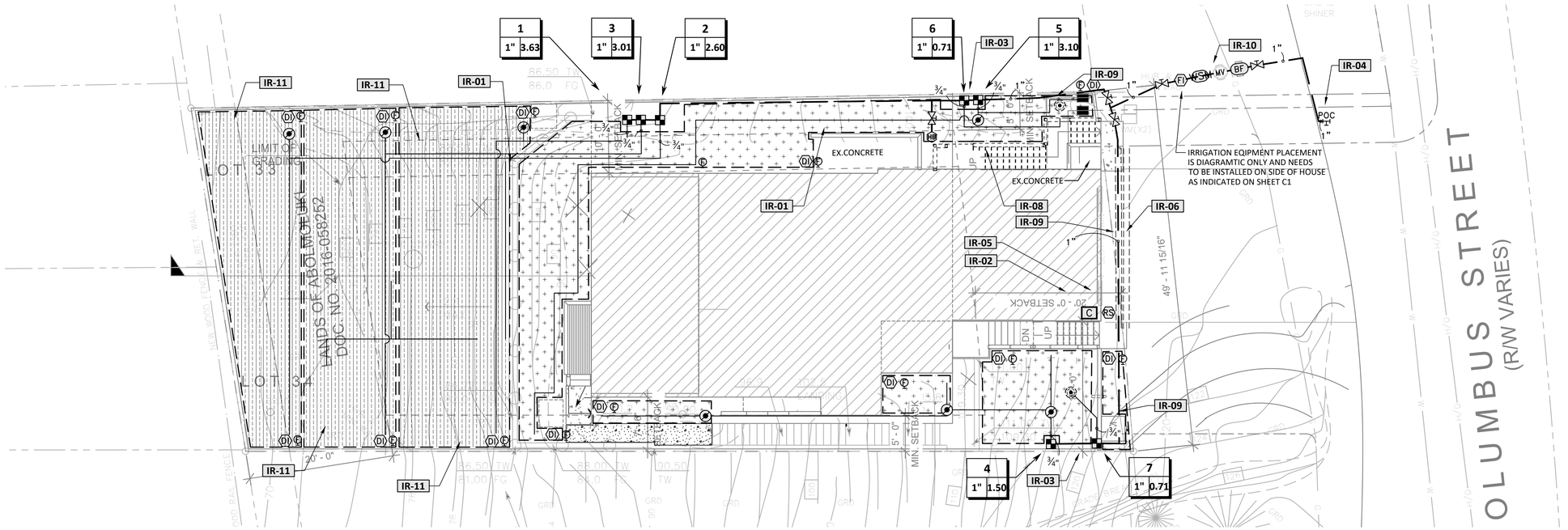
Firm Name and Address

4Binc Select Certified IRRIGATION ASSOCIATION Experienced professionals. Efficient solutions. LIC# 1012730—IA CERTIFICATION # 57436 — ASIC PROFESSIONAL MEMBER

Project Name and Address

COLUMBUS ST.
EL GRANADA, CA

Project 236-2019	**Drawn By** 4Blnc.
Date 9/10/19	**Checked By** 4Blnc.
Scale	**Approved By**
	Sheet L-3.0



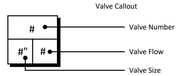
IRRIGATION SCHEDULE

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
	TORO DZK-700-1-MF MEDIUM-FLOW DRIP CONTROL VALVE KIT. WITH 1" IRRITROL 700 ULTRAFLOW INLINE VALVE, TORO Y-FILTER, AND MEDIUM-FLOW PRESSURE REGULATOR AND FITTINGS. 5GPM-20GPM.
	PIPE TRANSITION POINT PVC-PLOY PIPE TRANSITION POINT.
P	NETAFIM TLSOV NETAFIM TLSOV- 1/2" MANUAL FLUSH VALVE, BARBED INSERT. INSTALL IN 10" BOX, WITH ADEQUATE BLANK OR "COBRA" TUBING TO EXTEND VALVE OUT OF VALVE BOX. 17MM FITS TECHLINE HCVXR, HCVXR-RW/RWP, CV, DL, RW AND RWP DRIPLINES, AND PE IRRIGATION HOSE
DI	RAIN BIRD OPERIND DRIP SYSTEM OPERATION INDICATOR, STEM RISES 6" FOR CLEAR VISIBILITY WHEN DRIP SYSTEM IS CHARGED TO A MINIMUM OF 20PSI. INCLUDES 16" OF 1/4" DISTRIBUTION TUBING WITH CONNECTION FITTING PRE-INSTALLED. INSTALL MINIMUM TWO PER DRIP ZONE, PLACE NEXT TO FLUSH VALVE.
	TREE DRIP RING 1.0 GPH TREE DRIP RING TORO RGP-212 / 1.0 GPH.INSTALL PER DETAIL. 3 RINGS = 42.5 GPH 4 RINGS = 69.5 GPH. INSTALL (2) ROOTWELL 318-C EVENLY AROUND THE ROOT BALL OF EVERY PROPOSED TREE
	AREA TO RECEIVE DRIP EMITTERS NETAFIM WPC WITH BUG CAP SINGLE OUTLET PRESSURE COMPENSATING DRIP EMITTER, 5PSI INTERNAL CHECK VALVE, WITH A BARB INLET X NIPPLE OUTLET. BUG CAP INCLUDED. RED= 0.5GPH, BLACK= 1.0GPH, GREEN= 2.0GPH. Emitter Notes: 2.0 GPH emitters (3 assigned to each 1 Gal plant) 2.0 GPH emitters (3 assigned to each 5 Gal plant)
	AREA TO RECEIVE DRIPLINE NETAFIM TLHCVXR-053-18 TECHLINE HCVXR PRESSURE COMPENSATING LANDSCAPE DRIPLINE WITH CHECK VALVE AND ANTI-SIPHON FEATURE. 0.53 GPH EMITTERS AT 18" O.C. DRIPLINE LATERALS SPACED AT 18" APART, WITH EMITTERS OFFSET FOR TRIANGULAR PATTERN. 17MM.

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
HB	BUCKNER-SUPERIOR HB1F 3/4" X 1/2" FEMALE NPT RED BRASS HOSE BIBB. INSTALL BELOW GRADE WITHIN A 1416 VALVE BOX, TYPICAL
	NIBCO T-113 CLASS 125 BRONZE GATE SHUT OFF VALVE WITH WHEEL HANDLE, SAME SIZE AS MAINLINE PIPE DIAMETER AT VALVE LOCATION. SIZE RANGE - 1/4" - 3"

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
MV	BUCKNER-SUPERIOR 3300 1-1/2" NORMALLY OPEN BRASS MASTER VALVE THAT PROVIDES DIRTY WATER PROTECTION AND NO MINIMUM FLOW FEATURE, WHICH ENSURES RELIABLE OPENING AND CLOSING OF THE VALVE IN EXTREME HIGH OR LOW FLOW SCENARIOS. AVAILABLE IN 1-1/2", 2", 2-1/2" AND 3".
BF	FEBCO 825Y 3/4" REDUCED PRESSURE BACKFLOW PREVENTER WITH FREEZE BLANKET PER CITY STANDARDS
C	HUNTER HC-12 12 STATION CONTROLLER WITH WI-FI CONNECTION
RS	HUNTER RFC-NO-SGM RAIN AND FREEZE SENSOR, WITH CONDUIT INSTALLATION, MOUNT AS NOTED. NORMALLY OPEN SWITCH. WITH OPTIONAL GUTTER MOUNT.
VSM	HUNTER HC-075-FLOW 3/4" FLOW METER FOR USE WITH HYDRAWISE ENABLED CONTROLLER TO MONITOR FLOW AND PROVIDE SYSTEM ALERTS. ALSO FUNCTIONS AS STAND ALONE FLOW TOTALIZER/SUB METER ON ANY RESIDENTIAL OR COMMERCIAL IRRIGATION SYSTEM.
FI	EZ-FLO FERTILIZING SYSTEMS EZ001-CX ONE SYSTEM FEEDS ALL ZONES, DRIP OR SPRINKLER. INSTALL DIRECTLY IN THE IRRIGATION SYSTEM MAIN LINE AFTER THE BACK FLOW PREVENTER. TANK CAPACITY: 1.5 G. USE LIQUID ORGANIC FERTILIZER OR CONTACT EZ FLOW FOR RECOMMENDED FERTILIZERS.
POC 1"	POINT OF CONNECTION 1"
	IRRIGATION LATERAL LINE: PVC CLASS 200 SDR 21 INSTALL ALL LATERAL LINES TO A DEPTH OF 12" BELOW FINISH GRADE. PIPE TO SHRUB IRRIGATION ONLY. BACKFILL WITH CLEAN FILL NO ROCKS OVER 1/2" IN SIZE.
	IRRIGATION MAINLINE: PVC SCHEDULE 40 INSTALL ALL MAINLINE TO A DEPTH OF 18" UNLESS OTHERWISE NOTED. BACKFILL WITH CLEAN FILL NO ROCKS OVER 1/2" IN SIZE. NOTE ALL MAINLINE LOCATION ON ASBUILT PLANS.
	PIPE SLEEVE: PVC SCHEDULE 40 INSTALL SLEEVE 12" PAST EDGE OF HARDSCAPE TO A DEPTH OF 24" FOR MAINLINE AND 18" FOR LATERAL LINES. ALL OTHER SLEEVING INSTALL TO A DEPTH OF 12".

Valve Callout



CRITICAL ANALYSIS

Generated:	2019-10-18 14:42
P.O.C. NUMBER: 01	
Water Source Information:	
FLOW AVAILABLE	
Point of Connection Size:	1"
Flow Available:	20.24 gpm
PRESSURE AVAILABLE	
Static Pressure at POC:	50.00 psi
Pressure Available:	50.00 psi
DESIGN ANALYSIS	
Maximum Station Flow:	4.94 gpm
Flow Available at POC:	20.24 gpm
Residual Flow Available:	15.30 gpm
Critical Station:	2
Design Pressure:	30.00 psi
Friction Loss:	0.54 psi
Fittings Loss:	0.05 psi
Elevation Loss:	0.00 psi
Loss through Valve:	3.00 psi
Pressure Req. at Critical Station:	33.59 psi
Loss for Fittings:	0.07 psi
Loss for Main Line:	0.73 psi
Loss for POC to Valve Elevation:	0.00 psi
Loss for Backflow:	11.68 psi
Loss for Master Valve:	0.45 psi
Critical Station Pressure at POC:	46.52 psi
Pressure Available:	50.00 psi
Residual Pressure Available:	3.48 psi

REFERENCE NOTES SCHEDULE

SYMBOL	IRRIGATION DESCRIPTION
IR-01	LATERAL LINES- ALL LATERALS ARE SIZED 3/4" UNLESS OTHERWISE NOTED.
IR-02	CONTROLLER LOCATION- CONTRACTOR TO CONFIRM LOCATION WITH OWNER OR GENERAL CONTRACTOR.
IR-03	SCHEMATIC VALVE BOX LOCATION- INSTALL ALL VALVE BOXES IN PLANTER AREAS AND SET BACK 2 FEET FROM ANY PATHS, ROADS OR OTHER HARDSCAPE AREAS.
IR-04	POINT OF CONNECTION- CONTRACTOR TO CONFIRM POC LOCATION, WELL STATIC PRESSURE AND FLOWS AVAILABLE. IF LOCATION IS DIFFERENT INDICATE ON AS BUILT PLANS. IF STATIC PRESSURE AVAILABLE IS UNDER 45 PSI NOTIFY LANDSCAPE ARCHITECT PRIOR TO PROCEEDING WITH IRRIGATION INSTALLATION.
IR-05	WEATHER BASED SENSOR LOCATION- INSTALL WEATHER SENSOR ON SW SIDE OF BUIDLING WITH NO OVERHANG OBSTRUCTIONS.
IR-06	CONDUIT- FOR CONTROL VALVE WIRE RUN(S) TO CONTROLLER, SIZE PER PLAN
IR-07	INLINE DRIP SUPPLY AND EXHAUST HEADERS- CONTRACTOR MUST INSTALL PVC SUPPLY AND EXHAUST HEADERS ON ALL DRIP SYSTEMS PER DETALS ON THE IRRIGAITON DETAIL SHEET(S). ALL SUBSURFACE DRIP MUST TERMINATE IN A PVC EXHAUST HEADER. PLANS ONLY SHOW SUPPLY TAP-IN LOCAITON.
IR-08	TREE DRIP RING- FOR PROPOSED TREES
IR-09	MAIN LINE- INSTALL MAIN LINE IN PLANTER AREAS WITHIN THE SITES PROPERTY BOUNDARIES AND SET BACK 2 FEET FROM ANY PATHS, ROADS OR OTHER HARDSCAPE AREAS. THE PROPOSED MAIN LINE LOCATION(S) IS DIAGRAMMATIC.
IR-10	MASTER CONTROL VALVE & HUNTER HC FLOW METER- INSTALLING CONTRACTOR IS RESPONSIBLE FOR INSTALLING AND PROGRAMMING MASTER VALVE AND FLOW METER AT THE IRRIGATION CONTROLLER. CONTACT MANUFACTURER FOR ASSISTANCE WITH SET UP.
IR-11	EROSION CONTROL- REFER TO CIVIL ENGINEER PLANS, SHEET C-2 FOR JUTE MESH (OVER GRADED SLOPES) SPECIFICATION AND DETAILS

LANDSCAPE MWELO GENERAL NOTES:

- A CERTIFICATE OF COMPLETION SHALL BE COMPLETED BY EITHER THE OWNER, THE DESIGNER OF THE LANDSCAPE PLANS OR BY THE LICENSED INSTALLING CONTRACTOR.
- AN AS BUILT DIAGRAM OF THE INSTALLED IRRIGATION SHOWING NUMBERED ZONES, VALVE LOCATION, MAINLINE LOCATION, IRRIGATION CONTROLLER AND P.O.C LOCATION SHALL BE KEPT WITH THE CONTROLLER FOR SUBSEQUENT MANAGEMENT PURPOSES.
- CHECK VALVES ARE REQUIRED ON ALL SPRINKLER HEADS WHERE LOW HEAD DRAINAGE COULD OCCUR.
- PRESSURE REGULATING DEVICES ARE REQUIRED IF WATER OPTIMUM PRESSURE OF THE SPECIFIED IRRIGATION DEVICE PRESSURE EXCEEDS THE OPERATING RECOMMENDATIONS.
- NO OVERHEAD IRRIGATION IS PERMITTED IN LANDSCAPE AREAS THAT ARE LESS THAN 10' WIDE. DRIP OR LOW FLOW BUBBLER IRRIGATION MUST BE USED AS AN ALTERNATIVE.
- INSTALLING CONTRACTOR IS RESPONSIBLE FOR INSTALLING AND PROGRAMMING ALL SELF ADJUSTING WEATHER/SOIL MOISTURE SENSING BASED CONTROLLERS. RAIN SENSORS ARE TO BE INSTALLED WITH ANY CONTROLLER WHERE AN OFFSITE WEATHER STATION IS USED.
- ALL SPECIFIED FLOW SENSORS AND MASTER VALVES MUST BE INSTALLED AND PROGRAMMED AS PER MANUFACTURERS REQUIREMENTS.
- AN IRRIGATION AUDIT AND COMMISSIONING IS REQUIRED ON ALL PROJECTS. CONTACT ANDREW BOLT 209-404-1746 TO SET UP.
- THESE PLANS HAVE BEEN PREPARED BY A CERTIFIED PROFESSIONAL AND ARE MEANT AS A GUIDE ONLY. PIPING AND VALVE PLACEMENT ARE DIAGRAMTIC ONLY. ALL PIPING UNDER HARDSCAPES MUST BE SLEEVED WITH SPECIFIED SLEEVING MATERIALS.
- PROTECT ALL EXISTING TREES DURING IRRIGATION TRENCHING AND PIPE INSTALLATION. CONSULT WITH LANDSCAPE ARCHITECT BEFORE CUTTING ANY ROOTS.
- NOTE TO CONTRACTOR: ALL IRRIGATION ZONES HAVE BEEN LAYED OUT AND APPROVED BY THE CITY OR COUNTY BASED ON PLANT WATER USE. SHOULD THE INSTALLING CONTRACTOR CHANGE OR MODIFY THE APPROVED IRRIGATION LAYOUT IN ANYWAY WITHOUT PRIOR AUTHORIZATION THE CONTRACTOR WILL ASSUME ALL LIABILITY AND COST OF ALL CHANGES TO THE IRRIGATION LAYOUT AND ALL ADDITIONAL WATER USAGE OVER AND ABOVE FOR THE LIFE OF THE IRRIGATION SYSTEM(S) AND ALL COSTS THAT ARE ASSOCIATED WITH OVER WATER USAGE.

IRRIGATION NOTES:

POINT OF CONNECTION (P.O.C).

1. CONNECT IRRIGATION MAINLINE TO MAIN WATER SUPPLY (SEE CIVIL OR ARCHITECTURAL DRAWINGS FOR LOCATION). LANDSCAPE CONTRACTOR TO VERIFY LOCATION, SIZE, FLOW AND PRESSURES AVAILABLE AND TO NOTIFY LANDSCAPE ARCHITECT OF ANY NECESSARY CHANGES NEEDED TO BE MADE SO THAT THE IRRIGATION SYSTEM PERFORMS TO AN IRRIGATION EFFICIENCY OF A MINIMUM OF 81 PERCENT.
2. SYSTEM MAXIMUM OPERATING PRESSURES: 80 PSI (AT P.O.C) INSTALL PRESSURE REDUCER IF PRESSURES EXCEED EQUIPMENT MANUFACTURERS SUGGESTED MAXIMUM OPERATING PRESSURES.
3. SYSTEM MINIMUM OPERATING PRESSURES: 47 PSI (AT P.O.C)

MWELO NOTES

CERTIFICATION OF COMPLETION REQUIREMENTS

UPON COMPLETION OF LANDSCAPE AND IRRIGATION INSTALLATION THE LANDSCAPE CONTRACTOR SHALL SUBMIT THE FOLLOWING AS REQUIRED BY CALIFORNIA MODEL WATER EFFICIENT LANDSCAPE ORDINANCE. (MWELO)

1. PROJECT INFORMATION SHEET.
2. CERTIFICATION FROM LANDSCAPE ARCHITECT FOR INSTALLATION ACCORDING TO THE APPROVED LANDSCAPE DOCUMENTATION PACKAGE.
3. SOIL MANAGEMENT REPORT AND RECEIPTS FOR SOIL IMPROVEMENT PRODUCTS.
4. LANDSCAPE MAINTENANCE MANAGEMENT REPORT.
5. IRRIGATION MAINTENANCE MANAGEMENT REPORT.
6. IRRIGATION SCHEDULE FOR NEW AND ESTABLISHED PLANT MATERIALS
7. IRRIGATION AUDIT REPORT INDICATING SITE IRRIGATION EFFICIENCY,
8. IRRIGATION DISTRIBUTION UNIFORMITY, ALL INSTALLED EQUIPMENT COMPLIES WITH APPROVED MWELO GUIDELINES.
9. CERTIFICATE OF COMPLETION (COC) FORM.

CONTACT LOCAL ENFORCING AGENCY FOR APPROVED SUBMITTAL FORMS AND PROCEDURES.

"I HAVE FOLLOWED THE LANDSCAPE DESIGN CRITERIA OF THE MODEL WATER EFFICIENT LANDSCAPE ORDINANCE AND APPLIED THEM TO THIS DESIGN."

ANDREW BOLT 10/18/19

"I HAVE COMPLIED WITH THE LANDSCAPE DESIGN CRITERIA OF THE MODEL WATER EFFICIENT LANDSCAPE ORDINANCE AND APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THIS DESIGN."

DATED: 01/04/2022
BY: Andrew Bolt

811 Know what's below. Call before you dig.

General Notes

LICENSED LANDSCAPE CONTRACTOR — ANDREW BOLT — LICENSED — Andrew Bolt — SIGN HERE — DATE/RENEWAL DATE — STATE OF CALIFORNIA

IRRIGATION LAYOUT

No.	Revision/Issue	Date

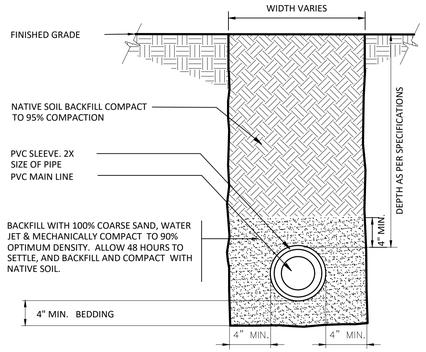
Firm Name and Address

4Binc Select Certified IRRIGATION ASSOCIATION Experienced professionals. Efficient solutions. LIC# 1012730—IA CERTIFICATION # 57436 — ASIC PROFESSIONAL MEMBER

Project Name and Address

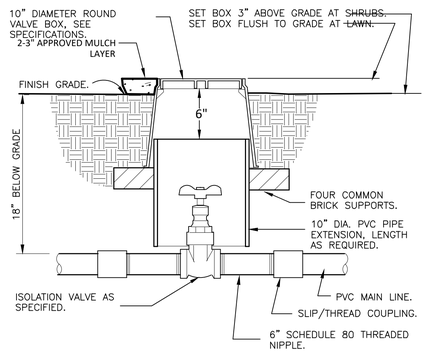
COLUMBUS ST.
EL GRANADA, CA

Project 236-2019	Drawn By 4BInc.
Date 9/10/19	Checked By 4BInc.
Scale 1/8"=1'-0"	Approved By
NORTH	Sheet IR-1.0



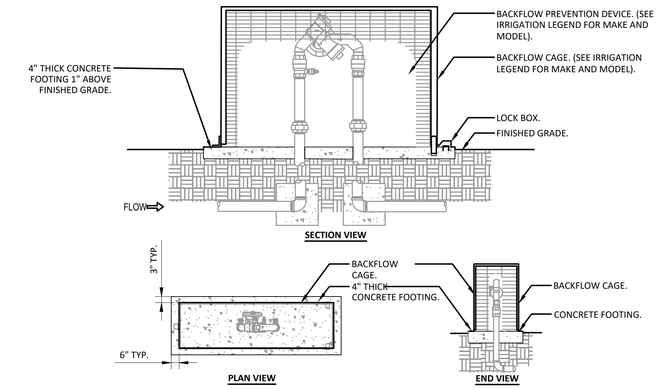
3 MAINLINE & SLEEVING

1 1/2" = 1'-0" AB-IR-MAI-07



2 BRASS "T" ISOLATION VALVE

NTS AB-IR-POC-02



NOTES:
1- INSTALL BACKFLOW CAGE PER MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
2- SEE BACKFLOW PREVENTION DEVICE DETAIL FOR REFERENCE.
3- LOCK BOX SHALL BE LOCATED ABOVE CONCRETE FOOTING
4- CONTRACTOR SHALL PROVIDE A LOCK AS APPROVED BY THE OWNER'S REPRESENTATIVE.

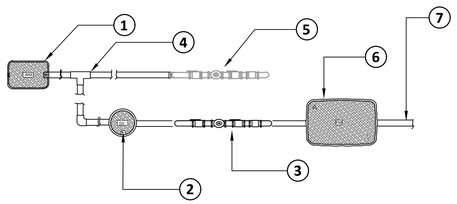
1 FEBCO 825YA (LEAD FREE) BACKFLOW PREVENTER IN CAGE

1/2" = 1'-0" AB-IR-BAC-01

LEGEND

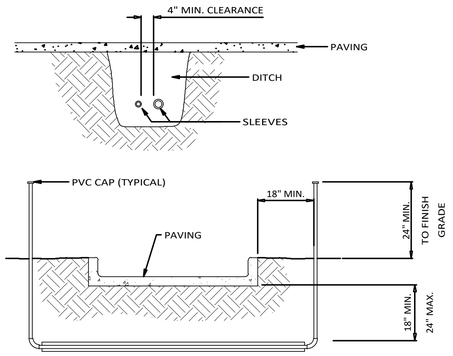
1. WATER METER. REFER TO CIVIL AND/OR IRRIGATION PLANS FOR SIZE & LOCATION
2. GATE VALE
3. IRRIGATION BACKFLOW PREVENTER.
4. TEE FITTING INSTALLED BY OTHERS TO IRRIGATION SUPPLY LINE
5. EXISTING BACKFLOW FOR BUILDING. BY OTHERS
6. HUNTER FLOW METER
7. MAIN LINE TO IRRIGATION VALVES

NOTE: REFER TO IRRIGATION LAYOUT AND EQUIPMENT SCHEDULE FOR ALL EQUIPMENT LOCATION, TYPE AND SIZES.



6 POC & IRRIGATION EQUIPMENT LAYOUT WITH HUNTER HC METER

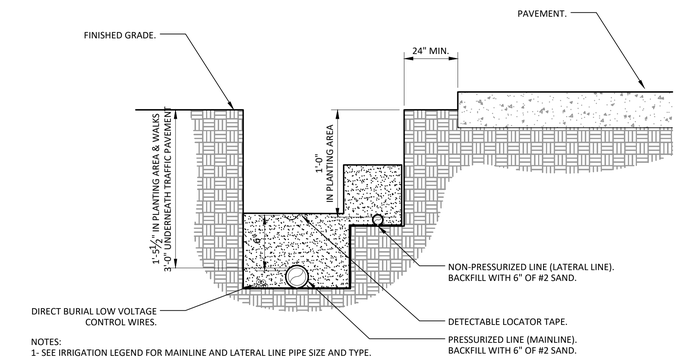
NTS AB-IR-POC-328409-69



1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. DO NOT SCALE DRAWINGS.
3. ALL PVC IRRIGATION SLEEVES TO BE CLASS 200 PIPE.
4. ALL JOINTS TO BE SOLVENT WELDED AND WATERTIGHT.
5. WHERE THERE IS MORE THAN ONE SLEEVE, EXTEND THE SMALLER SLEEVE TO 24" MINIMUM ABOVE FINISH GRADE.
6. MECHANICALLY TAMP TO 95% PROCTOR.

5 SLEEVING DETAIL

NTS AB-IR-MAI-328409-06



NOTES:
1- SEE IRRIGATION LEGEND FOR MAINLINE AND LATERAL LINE PIPE SIZE AND TYPE.

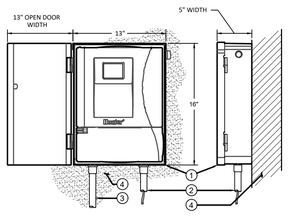
2- DIRECT BURIAL CONTROL WIRES SHALL BE INSTALLED IN SCH. 40 PVC ELECTRICAL CONDUIT IF REQUIRED.

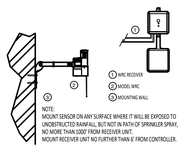
3- 2-WIRE IRRIGATION WIRE SHALL BE INSTALLED IN SCH. 40 PVC ELECTRICAL CONDUIT.

4- DETECTABLE LOCATOR TAPE SHALL BE LOCATED SIX INCHES (6") ABOVE THE ENTIRE MAINLINE RUN.

4 IRRIGATION TRENCHING

NTS AB-IR-MAI-08





DETAIL LEGEND:

1. IRRIGATION CONTROLLER (HCC-800-M) PER PLAN
2. IRRIGATION CONTROL WIRE IN CONDUIT - SIZE AND TYPE PER LOCAL CODES
3. ELECTRICAL SUPPLY CONDUIT - CONNECT TO POWER SOURCE, J-BOX INSIDE CONTROLLER
4. ADJACENT SURFACE TO MOUNT CONTROLLER PER PLAN

NOTES:
1. CONTROLLER ACCEPTS 120 VOLTS A.C. OR 230 VOLTS A.C. (INTERNATIONAL MODEL).
2. MOUNT CONTROLLER LCD SCREEN AT EYE LEVEL, CONTROLLER SHALL BE HARD-WIRED TO GROUNDED 110 VAC POWER SOURCE.
3. REFER TO THE HUNTER HCC INSTALLATION GUIDE FOR FURTHER INSTRUCTIONS.
4. CONNECT TO LOCAL WIFI AND SET UP CONTROLLER

7 HUNTER HCC-PRO 800M_WRS

1" = 1'-0" AB-IR-TIM-HUNT-328409-10

"I HAVE COMPLIED WITH THE LANDSCAPE DESIGN CRITERIA OF THE MODEL WATER EFFICIENT LANDSCAPE ORDINANCE AND APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THIS DESIGN."

DATED: 01/04/2022
BY: Andrew Bolt

811 Know what's below. Call before you dig.

General Notes

No.	Revision/Issue	Date

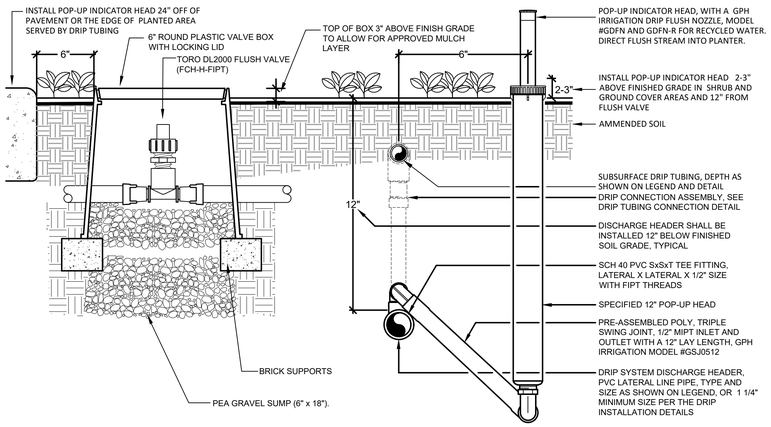
Firm Name and Address

4Binc Select Certified IRRIGATION ASSOCIATION Experienced professionals. Efficient solutions. ASIC PROFESSIONAL MEMBER
LIC# 1012730—IA CERTIFICATION # 57436

Project Name and Address

COLUMBUS ST.
EL GRANADA, CA

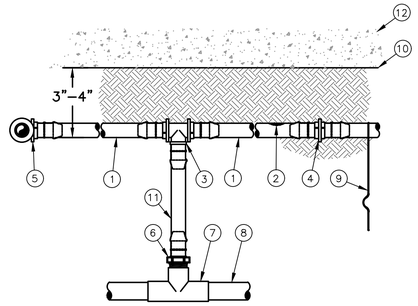
Project	Drawn By
236-2019	4BInc.
Date	Checked By
9/10/19	4BInc.
Scale	Approved By
	Sheet
	IR-2.0



NOTE: INSTALL INDICATOR HEAD 24" FROM THE EDGE OF PAVING OR THE PLANTER EDGE. INSTALL ORANGE COLORED INDICATOR NOZZLE GDFN ON POP-UP HEAD. FOR RECYCLED WATER USE A GDFN-R IRRIGATION NOZZLE PURPLE COLOR CODED FLUSH NOZZLE. NOZZLES BY GPH IRRIGATION PRODUCTS

3 12" DRIP INDICATOR OFF LATERAL LINE

1" = 1" AB-IR-DRI-328413-07

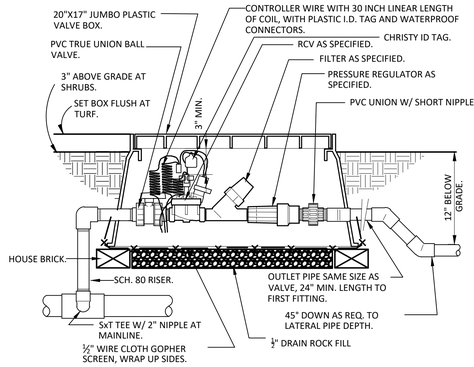


1. ON–SURFACE DRIPLINE:
2. INLINE DRIP EMITTER OUTLET, SEE IRRIGATION LEGEND FOR DRIPLINE OUTLET SPACING.
3. BARB OR TWIST TEE
4. BARB OR TWIST LOCK COUPLING
5. BARB OR TWIST LOCK ELBOW
6. BARB OR TWIST LOCK MALE ADAPTER
7. PVC TEE SxSxT
8. PVC LATERAL SUPPLY HEADER
9. TIE DOWN STAKE:
10. FINISH GRADE
11. BLANK TUBING LENGTH AS REQUIRED
12. 3" LAYER OF MULCH

NOTES:
1. PLACE TIE DOWN STAKES EVERY TWO FEET IN SAND, THREE FEET IN LOAM, AND FOUR FEET IN CLAY.
2. AT FITTINGS WHERE THERE IS A CHANGE OF DIRECTION SUCH AS TEES OR ELBOWS, USE TIE–DOWN STAKES ON EACH LEG OF THE CHANGE OF DIRECTION.

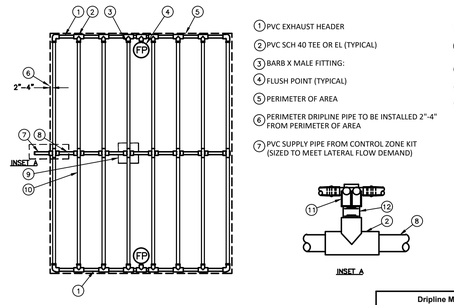
2 PVC SUPPLY LINE TO DRIP LINE TRANSITION DETAIL

NTS AB-IR-DRI-13



1 1" DRIP VALVE/FILTER/REGULATOR

1 1/2" = 1'-0" AB-IR-DRI-VALV-328413-02



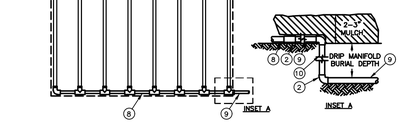
1. PVC EXHAUST HEADER
2. PVC SCH 40 TEE OR EL (TYPICAL)
3. BARB X MALE FITTING:
4. FLUSH POINT (TYPICAL)
5. PERIMETER OF AREA
6. PERIMETER DRIPLINE PIPE TO BE INSTALLED 2"-4" FROM PERIMETER OF AREA
7. PVC SUPPLY PIPE FROM CONTROL ZONE KIT (SIZED TO MEET LATERAL FLOW DEMAND)
8. PVC SUPPLY MANIFOLD
9. CONNECTION FROM SUPPLY MANIFOLD TO DRIPLINE (TYPICAL)- SEE INSET A
10. ON-SURFACE DRIPLINE:
11. BARB X FEMALE FITTING:
12. ¾" PVC NIPPLE, LENGTH AS NECESSARY

Dripline Maximum Lateral Lengths (Feet)						
Inlet Pressure psi	12" Spacing		18" Spacing		24" Spacing	
	Nominal Flow (gph)		Nominal Flow (gph)		Nominal Flow (gph)	
	0.6	0.9	0.6	0.9	0.6	0.9
15	273	155	314	250	424	322
20	318	169	353	294	508	368
30	360	230	413	350	586	414
40	395	255	465	402	652	474
50	417	285	528	420	720	488
60	460	290	596	455	780	514

NOTES:
1. DISTANCE BETWEEN LATERAL ROWS AND EMITTER SPACING TO BE BASED ON SOIL TYPE, PLANT MATERIALS AND CHANGES IN ELEVATION. SEE INSTALLATION SPECIFICATIONS ON RAIN BIRD WEB SITE (WWW.RAINBIRD.COM) FOR SUGGESTED SPACING.
2. LENGTH OF LONGEST DRIPLINE LATERAL SHOULD NOT EXCEED THE MAXIMUM SPACING SHOWN IN THE ACCOMPANYING TABLE.
3. WHEN USING 17MM INSERT FITTINGS WITH DESIGN PRESSURE OVER 50PSI, IT IS RECOMMENDED THAT STAINLESS STEEL CLAMPS BE INSTALLED ON EACH FITTING.

5 CENTER FEED DRIP LINE

NTS AB-IR-DRI-DRIP-18



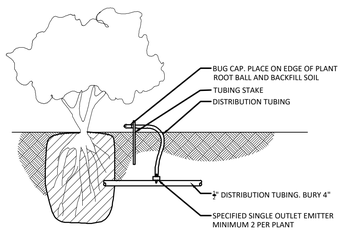
1. PVC EXHAUST HEADER
2. PVC SCH 40 TEE OR EL (TYPICAL)
3. BARB X MALE FITTING:
4. FLUSH POINT (TYPICAL)
5. PERIMETER OF AREA
6. PERIMETER DRIPLINE PIPE TO BE INSTALLED 2"-4" FROM PERIMETER OF AREA
7. ON-SURFACE DRIPLINE:
8. PVC SUPPLY HEADER
9. PVC DRIP MANIFOLD FROM CONTROL ZONE VALVE KIT (SIZED TO MEET LATERAL FLOW DEMAND)
10. PVC SCH 40 RISER PIPE
11. DRIP INDICATOR

NOTES:
1. DISTANCE BETWEEN LATERAL ROWS AND EMITTER SPACING TO BE BASED ON SOIL TYPE, PLANT MATERIALS AND CHANGES IN ELEVATION. SEE INSTALLATION SPECIFICATIONS ON RAIN BIRD WEB SITE (WWW.RAINBIRD.COM) FOR SUGGESTED SPACING.
2. LENGTH OF LONGEST DRIPLINE LATERAL SHOULD NOT EXCEED THE MAXIMUM SPACING SHOWN IN THE ACCOMPANYING TABLE.
3. WHEN USING 17MM INSERT FITTINGS WITH DESIGN PRESSURE OVER 50PSI, IT IS RECOMMENDED THAT STAINLESS STEEL CLAMPS BE INSTALLED ON EACH FITTING.

Dripline Maximum Lateral Lengths (Feet)						
Inlet Pressure psi	12" Spacing		18" Spacing		24" Spacing	
	Nominal Flow (gph)		Nominal Flow (gph)		Nominal Flow (gph)	
	0.6	0.9	0.6	0.9	0.6	0.9
15	273	155	314	250	424	322
20	318	169	353	294	508	368
30	360	230	413	350	586	414
40	395	255	465	402	552	474
50	417	285	528	420	720	488
60	460	290	596	455	780	514

4 END FEED DRIP GRID SYSTEM

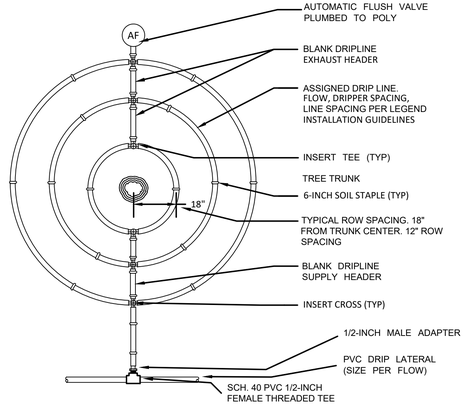
NTS AB-IR-DRI-DRIP-17



NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. DO NOT SCALE DRAWING.
3. ALL INFORMATION CONTAINED HEREIN WAS CURRENT AT THE TIME OF DEVELOPMENT BUT MUST BE REVIEWED AND APPROVED BY THE PRODUCT MANUFACTURER TO BE CONSIDERED ACCURATE.

7 DRIP EMITTER DETAIL

NTS AB-IR-DRI-14



NOTES TO INSTALLER:
1. INSTALL FIRST DRIP LINE LOOP 18-INCHES FROM CENTER OF TREE TRUNK. INSTALL EACH ADDITIONAL LOOP 12" APART.
2. INSTALL DRIP LINE ON SURFACE TO MAXIMUM OF 6-INCHES BELOW GRADE, STAPLE IN PLACE PER MANUFACTURER'S RECOMMENDATIONS. BACKFILL AND SPREAD SURFACE TREATMENT AS DIRECTED BY OTHERS.
3. INSTALL DRIP LINE IN ACCORDANCE WITH MANUFACTURERS INSTALLATION GUIDELINES.
4. DRIP RINGS MUST BE 0.9 GPH 12" O.C EMITTER SPACING
5. TOTAL FLOW OF
   2 DRIP RINGS IS 6 GPH (1.44"/H)
   3 DRIP RINGS IS 18 GPH (1.44"/H)
   4 DRIP RINGS IS 24 GPH (1.44"/H)

6 DRIP LINE TREE RING DETAIL

1" = 1" AB-IR-TRE-04

"I HAVE COMPLIED WITH THE LANDSCAPE DESIGN CRITERIA OF THE MODEL WATER EFFICIENT LANDSCAPE ORDINANCE AND APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THIS DESIGN."

DATED: 01/04/2022
BY: Andrew Bolt

Know what's below. Call before you dig.

General Notes

DRIP DETAILS

No.	Revision/Issue	Date

Firm Name and Address

Project Name and Address

COLUMBUS ST.
EL GRANADA, CA

Project	Drawn By
236-2019	4BInc.
Date	Checked By
10/18/19	4BInc.
Scale	Approved By
	Sheet
	IR-3.0

SECTION 32 8400
IRRIGATION

PART 1 GENERAL

1.1 SUMMARY

A. Irrigation system required for this work includes but is not limited to the furnishing of all labor, tools, materials, appliances, tests, permits, taxes, etc., necessary for the installation of a landscape irrigation system as herein specified and shown on the drawings, and the removal of all debris from the site.

1. Locate, purchase, deliver and install piping, conduit, sleeves, 120 volt and low voltage electrical and water connections, valves, backflow preventer devices, controllers, rain sensors, spray and bubbler heads, drip irrigation lines, and associated accessories for a fully operational automatic irrigation system.
2. Trenching and water settling of backfill material.
3. Testing and startup of the irrigation system.
4. Prepare an as built record set of drawings.
5. Training of the Owner's maintenance personnel in the operational requirements of the Irrigation system.
6. Clean up and disposal of all excess and surplus material.
7. Maintenance of the irrigation system during the prescribed maintenance period.

B. The system shall efficiently and evenly irrigate all areas and be complete in every respect and shall be left ready for operation to the satisfaction of the Owner's Representative.

C. Coordinate with other trades, as needed to complete work, including but not limited to Water Meter, Point of Connection (POC) and Backflow Preventer Device (BFPD) location and electrical hookups.

1.2 CONTRACT DOCUMENTS

A. Shall consist of specifications and its general conditions and the drawings. The intent of these documents is to include all labor, materials, and services necessary for the proper execution of the work. The documents are to be considered as one. Whatever is called for by any part shall be as binding as if called for in all parts.

1.3 RELATED DOCUMENTS AND REFERENCES

A. Related Documents: Refer to Landscape Documents or Landscape Architect provided documentation and specifications

References:

1. American Society of Testing Materials (ASTM): cited section numbers.
2. National Sanitation Foundation (NSF): rating system.
3. Irrigation Association: Turf & Landscape Irrigation Best Management Practices

1.4 VERIFICATION

A. Irrigation piping and related equipment are drawn diagrammatically. Scaled dimensions are approximate only. Before proceeding with work, carefully check and verify dimensions and immediately notify the Owner's Representative of discrepancies between the drawings or specifications and the actual conditions. Although sizes and locations of plants and or irrigation equipment are drawn to scale wherever possible, it is not within the scope of the drawings to show all necessary offsets, obstructions, or site conditions. The Contractor shall be responsible to install the work in such a manner that it will be in conformance to site conditions, complete, and in good working order.

B. Piping and equipment is to be located within the designated planting areas wherever possible unless specifically defined or dimensioned otherwise.

1.5 PERMITS AND REGULATIONS

A. The Contractor shall obtain and pay for all permits related to this section of the work unless previously excluded under provision of the contract or general conditions. The Contractor shall comply with all laws and ordinances bearing on the operation or conduct of the work as drawn and specified. If the Contractor observes that a conflict exists between permit requirements and the work outlined in the contract documents, the Contractor shall promptly notify the Owner's Representative in writing including a description of any necessary changes and changes to the contract price resulting from changes in the work.

B. Wherever references are made to standards or codes in accordance with which work is to be performed or tested, the edition or revision of the standards and codes current on the effective date of this contract shall apply, unless otherwise expressly set forth.

C. In case of conflict among any referenced standards or codes or between any referenced standards and codes and the specifications, the more restrictive standard shall apply or Owner's Representative shall determine which shall govern.

1.6 PROTECTION OF WORK, PROPERTY AND PERSON

A. The Contractor shall adequately protect the work, adjacent property, and the public, and shall be responsible for any damages or injury due to the Contractor's actions.

1.7 CHANGES IN THE WORK

A. The Owner's Representative may order changes in the work, and the contract sum being adjusted accordingly. All such orders and adjustments plus claims by the Contractor for extra compensation must be made and approved in writing before executing the work involved.

B. All changes in the work, notifications and Contractor's request for information (RFI) shall conform to the contract general condition requirements.

1.8 CORRECTION OF WORK

A. The Contractor shall re-execute any work that fails to conform to the requirements of the contract and shall remedy defects due to faulty materials or workmanship upon written notice from the Owner's Representative, at the soonest as possible time that can be coordinated with other work, and seasonal weather demands, but not more than 90 (ninety) days after notification.

1.9 DEFINITIONS

A. Owner's Representative: The person appointed by the Owner to represent their interest in the review and approval of the work and to serve as the contracting authority with the Contractor. The Owner's Representative may appoint other persons to review and approve any aspects of the work.

B. Substantial Completion Acceptance: The date at the end of the Planting, Planting Soil, and Irrigation installation where the Owner's Representative accepts that all work in these sections is complete and the Warranty period has begun. This date may be different that the date of substantial completion for the other sections of the project.

C. Final Acceptance: The date when the Owner's Representative accepts that the plants and work in this section meet all the requirements of specification. It is intended that the materials and workmanship warranty for Planting, Planting Soil, and Irrigation work run concurrently.

1.10 SUBMITTALS

A. See the contract General Conditions for policy and procedures related to submittals.

B. Product data

1. Submit a minimum of (3) complete lists of all irrigation equipment to be used, manufacturer's brochures, maintenance manuals, warrantees and operating instructions, within 15 days after the notice to proceed.
   a. This submission may be done digitally and all documents shall be submitted in one PDF document.
2. The submittals shall be packaged and presented in an organized manner, in the quantity described in Division 1 of the specifications. Provide a table of contents of all submitted items.
3. Clearly identify on each submitted sheet by underlining or highlighting (on each copy) the specific product being submitted for approval. Failure to clearly identify the specific product being submitted will result in a rejection for the entire submittal. No substitutions of material or procedures shall be made concerning these documents without the written consent of an accepted equivalent by the Owner's Representative.
4. Equipment or materials installed or furnished without prior approval of the Owner's Representative, may be rejected by the Owner's Representative and the Contractor shall be required to remove such materials from the site at their own expense.
5. Approval of substitution of material and/or products, other than those specified shall not relieve the Contractor from complying with the requirements of the contract documents and specifications. The Contractor shall be responsible, at their own expense, for all changes that may result from the approved substitutions, which affect the installation or operations other items of their own work and/or the work of other Contractors.

C. Samples: Samples of the equipment may be required at the request of the Owner's Representative if the equipment is other than that specified.

D. Other Submittals: Submit for approval:

1. Documentation of the installer's qualifications.
2. As built record set of drawings.
3. Testing data from all required pressure testing.
4. Backflow prevention device certification: Certification from the manufacturer or their representative that the back flow prevention device has been installed correctly according to the manufactures requirements.
5. Booster pump certification: Certification from the manufacturer or their representative that the booster pump has been installed correctly according to the manufacturer's requirements.
6. Irrigation controller certification: Certification from the manufacturer or an authorized distributor that the Controller has been installed correctly according to the manufactures requirements.

1.11 OBSERVATION OF THE WORK

A. The Owner's Representative may inspect the work at any time. They may remove samples of materials for conformity to specifications. Rejected materials shall be immediately removed from the site and replaced at the Contractor's expense. The cost of testing materials not meeting specifications shall be paid by the Contractor.

B. The Owner's Representative shall be informed of the progress of the work so the work may be observed at the following key times in the construction process. The Owner's Representative shall be afforded sufficient time to schedule visit to the site. Failure of the Owner's Representative to make field observations shall not relieve the Contractor from meeting all the requirements of this specification.

1. Trenching, directional boring, and sleeving review.
2. Hydrostatic pressure testing.
3. Adjustment and coverage test.
4. Pre-maintenance observation.
5. Final acceptance / system malfunction corrections.

1.12 PRE-CONSTRUCTION CONFERENCE

A. Schedule a pre-construction meeting with the Owner's Representative at least seven (7) days before beginning work to review any questions the Contractor may have regarding the work, administrative procedures during construction and project work schedule.

1.13 QUALITY ASSURANCE

A. It is the intention of this specification to accomplish the work of installing an automatic irrigation system, which will operate in an efficient and satisfactory manner. The irrigation system shall be installed and made operational according to the workmanlike standards established for landscape installation and sprinkler irrigation operation as set forth by the most recent Best Management Practices (BMP) of the Irrigation Association.

B. The specification can only indicate the intent of the work to be performed rather than a detailed description of the performance of the work. It shall be the responsibility of the Contractor to install said materials and equipment in such a manner that they shall operate efficiently and evenly and support optimum plant growth and health.

C. The Owner's Representative shall be the sole judge of the true intent of the drawings and specifications and of the quality of all materials furnished in performance of the contract.

D. The Contractor shall keep one copy of all drawings and specifications on the work site, in good order. The Contractor shall make these documents available to the Owner's Representative when requested.

E. In the event of any discrepancies between the drawings and the specification, the final decision as to which shall be followed, shall be made by the Owner's Representative.

F. In the event the installation is contradictory to the direction of the Owner's Representative, the installation shall be rectified by the Contractor at no additional cost to the Owner. The Contractor shall immediately bring any such discrepancies to the attention of the Owner's Representative.

G. It shall be distinctly understood that no oral statement of any person shall be allowed in any manner to modify any of the contract provisions. Changes shall be made only on written authorization of the Owner's Representative.

H. Installer Qualifications: The installer shall be a firm having at least 5 years of successful experience of a scope similar to that required for the work.

a. Installer Field Supervision: The installer shall maintain on site an experienced full-time supervisor who can communicate in English with the Owner's Representative.
b. Submit the installer's qualifications for approval.

1.14 IRRIGATION SYSTEM WARRANTY:

A. The Contractor shall Warrantee all workmanship and materials for a period of 1year (s) following the acceptance of the work.

6. Any parts of the irrigation work that fails or is defective shall be replaced or reconstructed at no expense to the Owner including but not limited to: restoring grades that have settled in trenches and excavations related to the work. Reconstruction shall include any plantings, soil, mulch or other parts of the constructed landscape that may be damaged during the repair or that results from soil settlement.

B. The date of acceptance of the work and start of the Guarantee period shall be determined by the Owner's Representative, upon the finding that the entire irrigation system is installed as designed and specified, and found to be operating correctly, supplying water evenly to all planting and/or lawn areas.

C. The system controller shall be warranted by the equipment manufacturer against equipment malfunction and defects for a period of 5 years, following the acceptance of the work.

D. Neither the final acceptance nor any provision in the contract documents shall relieve the Contractor of responsibility for faulty materials or workmanship. The Contractor shall remedy any defects within a period of 7 days (s) from the date of notification of a defect.

1.15 SITE CONDITIONS

A. It is the responsibility of the Contractor to be aware of all surface and sub-surface conditions, and to notify the Owner's Representative, in writing, of any circumstances that would negatively impact the installation of the work. Do not proceed with work until unsatisfactory conditions have been corrected.

1.16 DELIVERY, STORAGE, AND HANDLING

A. All materials and equipment shall be stored properly and protected as required by the Contractor. The Contractor shall be entirely responsible for damages or loss by weather or other cause to work under the contract. Materials shall be furnished in ample quantities and at such times as to ensure uninterrupted progress of the work.

B. Deliver the products to the job site in their original unopened container with labels intact and legible at time of use.

C. Store in accordance with the manufacturers' recommendations.

1.17 PROTECTION

A. The Contractor shall continuously maintain adequate protection of all their work from damage, destruction, or loss, and shall protect the owner's property from damage arising in connection with this contract. Contractor shall make good any such damage, destruction, loss or injury. Contractor shall adequately protect adjacent property as provided by law and the contract documents.

B. The Contractor shall maintain sufficient safeguards, such as railings, temporary walks, lights, etc., against the occurrence of accidents, injuries or damage to any person or property resulting from their work, and shall alone be responsible for the same if such occurs.

C. All existing paving, structures, equipment or plant material shall be protected at all times, including the irrigation system related to plants, from damage by workers and equipment. The Contractor shall follow all protection requirements including plant protection provision of the general contract documents. All damages shall be repaired or replaced at the Contractor's expense. Repairs and or replacement shall be to the satisfaction of the Owner's Representative, including the selection of a Contractor to undertake the repair or maintenance. Repairs shall be at no cost to the owner.

1. For trees damaged to the point where they will not be expected to survive or which are severely disfigured and that are too large to replace, the cost of damages shall be as determined by the Owner's arborist using accepted tree value evaluation methods.

D. The Contractor shall refrain from trenching within the drip line of any existing tree to remain. The Owner's Representative may require the Contractor to relocate proposed irrigation work, bore lines beneath roots or use air spade technology to dig trenches through and under the root system to avoid damage to existing tree root areas.

1.18 EXCAVATING AROUND UTILITIES

A. Contractor shall carefully examine the civil, record, and survey drawings to become familiar with the existing underground conditions before digging.

1. Do not begin any excavation until all underground utilities have been located and marked.

Determine location of underground utilities and perform work in a manner that will avoid possible damage. Hand excavate, as required. Maintain stakes and or markings set by others until parties concerned mutually agree to their removal.

B. Notification to 811 is required for all excavation around utilities. The Contractor is responsible for knowing the location and avoiding utilities that are not covered by the Local *Utility Locator Service*.

C. Section 4216/4217 of the government code requires a dig-alert identification number be issued before a "permit to excavate" will be valid. For your dig-alert identification number call underground service alert toll free 1-800-422-4133 two working days before beginning construction.

1.19 POINT OF CONNECTION

Point of connection option 1 - Irrigation Contractor provided

A. The point of connection of the irrigation system to its electrical power sources shall be provided by the irrigation installer. All connections shall be made by a licensed electrical Contractor per governing codes at the location shown on the drawings.

B. The point of connection of the irrigation system to its potable and or non-potable water sources, including the main shutoff valve and backflow preventer shall be provided by the irrigation installer. All connections shall be made by a licensed Contractor per governing codes, at the location shown on the drawings.

Point of connection option 2 - General Contractor provided

A. The point of connection of the irrigation system to its electrical power sources shall be provided by the General Contractor's licensed electrical Contractor per governing codes at the location shown on the drawings. The irrigation Contractor will connect the power to provided junction box or grounded plug receptacle.

B. The point of connection of the irrigation system to its potable and or non-potable water sources, including the main shutoff valve and backflow preventer shall be provided by the General Contractor's licensed plumbing Contractor per governing codes at the location shown on the drawings. The minimum size and water pressure of the pressurized line will be as noted on the irrigation drawing.

1.20 TEMPORARY UTILITIES

A. All temporary piping, wiring, meters, panels and other related appurtenances required between source of supply and point of use shall be provided by the Contractor and coordinated with the Owner's Representative. Existing utilities may be used with the written permission of the owner.

1.21 CUTTING, PATCHING, TRENCHING AND DIGGING

A. The Contractor shall do all cutting, fitting, trenching or patching of their work that may be required to make its several parts come together as shown upon, or implied by, the drawings and specifications for the completed project.

B. Digging and trenching operations shall be suspended when the soil moisture is above field capacity.

1.22 USE OF PREMISES

A. The Contractor shall confine their apparatus; the storage of materials, and the operations of their workers to limits indicated by the law, ordinances, or permits and shall not unreasonably encumber the premises with their materials.

B. Contractor parking, and material and equipment storage shall in areas approved by the Owner's Representative.

1.23 AS BUILT RECORD SET OF DRAWINGS

A. Immediately upon the installation of any buried pipe or equipment, the Contractor shall indicate on the progress record drawings the locations of said pipe or equipment. The progress record drawings shall be made available at any time for review by the Owner's Representative.

B. Before final acceptance of work, the Contractor shall provide an as built record set of drawings showing the irrigation system work as built. The drawings shall be transmitted to the Owner's Representative in paper format and as a pdf file of each document on compact disk or flash drive. The drawings shall include all information shown on the original contract document and revised to reflect all changes in the work. The drawings shall include the following additional information

1. All valves shall be numbered by station and corresponding numbers shall be shown on the as built record set of drawings.
2. All main line pipe or irrigation equipment including sleeves, valves, controllers, irrigation wire runs which deviate from the mainline location, backflow preventers, remote control valves, grounding rods, shut-off valves, rain sensors, wire splice locations, and quick coupling valves shall be located by two (2) measured dimensions, to the nearest one-half foot. Dimensions shall be given from permanent objects such as buildings, sidewalks, curbs, walls, structures and driveways. All changes in direction and depth of main line pipe shall be noted exactly as installed. Dimensions for pipes shall be shown at no greater than a 50 ft. maximum interval.
3. As built record set of drawings shall be signed and dated by the Contractor attesting to and certifying the accuracy of the as built record set of drawings. As built record set of drawings shall have "As Built Record Set of Drawings", company name, address, phone number and the name of the person who created the drawing and the contact name (if different).

C. The Owner shall make the original contract drawing files available to the Contractor.

1.24 CONTROLLER CHARTS:

A. Provide one controller chart for each automatic controller installed.

1. On the inside surface of the cover of each automatic controller, prepare and mount a color-coded chart showing the valves, main line, and systems serviced by that particular controller. All valves shall be numbered to match the operation schedule and the drawings. Only those areas controlled by that controller shall be shown. This chart shall be a plot plan, entire or partial, showing building, walks, roads and walls. The plan, reduced as necessary and legible in all details, shall be made to a size that will fit into the controller cover. This print shall be approved by the Owner's Representative and shall be protected in laminated in a plastic cover and be secured to the inside back of the controller cabinet door.
2. The controller chart shall be completed and approved prior to acceptance of the work.

1.25 TESTING

A. Provide all required system testing with written reports as described in part 3.

1.26 OPERATION AND MAINTENANCE MANUALS AND GUARANTEES

A. Prepare and deliver to the Owner's Representative within ten calendar days prior to completion of construction, two 3-ring hard cover binders containing the following information:

1. Index sheet stating Contractor's address and telephone number, list of equipment with name and addresses of local manufacturers' representatives.
2. Catalog and parts sheets on all material and equipment.
3. Guarantee statement. The start of the guarantee period shall be the date the irrigation system is accepted by the Owner.
4. Complete operating and maintenance instruction for all major equipment.
5. Irrigation product manufacturers warrantees.

B. In addition to the above-mentioned maintenance manuals, provide the Owner's maintenance personnel with instructions for maintaining major equipment and show evidence in writing to the Owner's Representative at the conclusion of the project that this has been rendered.

PART 2 PRODUCTS

2.1 MATERIALS GENERAL

A. All materials shall be of standard, approved and first grade quality and shall be new and in perfect condition when installed and accepted.

B. See the parts schedule on the drawings for specific components and manufacturers. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and configuration desired only. Other manufacturer's equipment may be submitted for approval with written approval by the Owner's Representative. Substituted equipment shall not substantially alter the operations of the system.

C. Approval of any items or substitutions indicates only that the product(s) apparently meet the requirements of the drawings and specifications on the basis of the information or samples submitted. The Contractor shall be responsible for the performance of substituted items. If the substitution proves to be unsatisfactory or not compatible with other parts of the system, the Contractor shall replace said items with the originally specified items, including all necessary work and modifications to replace the items, at no cost to the owner.

2.2 RECLAIMED WATER SYSTEM DESIGNATION

A. Where irrigation systems use reclaimed water, all products including valve boxes, lateral and main line pipe, etc. where applicable and/or required by local code shall have the reclaimed water purple color designation.

2.3 PIPING MATERIAL

A. Individual types of pipe and fittings supplied are to be of compatible manufacturer unless otherwise approved. Pipe sizes shown are nominal inside diameter unless otherwise noted.

B. Plastic pipe:

1. All pipe shall be free of blisters, internal striations, cracks, or any other defects or imperfections. The pipe shall be continuously and permanently marked with the following information: manufacturer's name or trade mark, size, class and type of pipe pressure rating, quality control identifications, date of extrusion, and National Sanitation Foundation (NSF) rating.
2. Pressure main line for piping upstream of remote control valves and quick coupling valves:
   a. Pipe smaller than 2 inch diameter shall be plastic pipe for use with solvent weld or threaded fittings. Shall be manufactured rigid virgin polyvinyl chloride (PVC) 1220, Type 1, Grade 2 conforming to ASTM D 1785, designated as Schedule 40.
   b. Pipe 2 - 3 inch diameter shall be manufactured rigid virgin polyvinyl chloride (PVC), Type 1, Grade 2 conforming to ASTM D 1785, designated as bell gasket Class 315.
   c. Pipe larger than 3 inch diameter shall be manufactured rigid virgin polyvinyl chloride (PVC), Type 1, Grade 2 conforming to ASTM D 1785, designated as bell gasket Class 200 PVC.
3. Non_pressure lateral line for piping downstream of remote control valves: plastic pipe for use with solvent weld or threaded fittings. Shall be manufactured rigid virgin polyvinyl chloride PVC 1220 (type 1, grade 2) conforming to ASTM d 1785, designated as Class 200, 3/4 minimum size.

C. Galvanized pipe shall be used for above ground connections to, backflow prevention device assemblies, hose bibs, and booster pumps and as shown on the plans and details.

1. Pipe shall be hot dip galvanized continuous welded, seamless, Schedule 40 conforming to applicable current ASTM standards.

2.4 FITTINGS AND CONNECTIONS:

A. Polyvinyl chloride pipe fittings and connections: Type II, Grade 1, Schedule 40, high impact molded fittings, manufactured from virgin compounds as specified for piping tapered socket or molded thread type, suitable for either solvent weld or screwed connections. Machine threaded fittings and plastic saddle and flange fittings are not acceptable. Furnish fittings permanently marked with following information: nominal pipe size, type and schedule of material, and National Sanitation Foundation (NSF) seal of approval. PVC fittings shall conform to ASTM D2464 and D2466.

B. Brass pipe fittings, unions and connections: standard 125 pound class 85% red brass fittings and connections, IPS threaded.

C. PVC Schedule 80 threaded risers and nipples: Type I, grade 1, Schedule 80, high impact molded, manufactured from virgin compounds as specified for piping and conforming to ASTM D-2464. Threaded ends shall be molded threads only. Machined threads are not acceptable.

D. Galvanized pipe fittings shall be galvanized malleable iron ground joint Schedule 40 conforming to applicable current ASTM standards.

2.5 SOLVENT CEMENTS AND THREAD LUBRICANT

A. Solvent cements shall comply with ASTM D2564. Socket joints shall be made per recommended procedures for joining PVC plastic pipe and fittings with PVC solvent cement and primer by the pipe and fitting manufacturer and procedures outlined in the appendix of ASTM D2564.

B. Thread lubricant shall be Teflon ribbon-type, or approved equal, suitable for threaded installations as per manufacturer's recommendations.

C. Pipe Joint Compound (Pipe dope) shall be used on all galvanized threaded connections. Pipe Joint Compound is a white colored, non-separating thread sealant compound designed to seal threaded connections against leakage due to internal pressure. It shall contain PTFE (Polytetrafluoroethylene) to permit a tighter assembly with lower torque, secure permanent sealing of all threaded connections and allow for easy disassembly without stripping or damaging threads.

2.6 BACKFLOW PREVENTION DEVICES

A. The backflow prevention device shall be certified to NSF/ANSI 372 shall be ASSE Listed 1013, rated to 180 degree F, and supplied with full port ball valves.

B. The main body and access covers shall be low lead bronze (ASTM B 584)

C. The seat ring and all internal polymers shall be NSF Listed Noryl and the seat disc elastomers shall be silicone.

D. Backflow Preventer shall be as indicated on the drawings.

2.7 PRESSURE REGULATOR

A. Pressure regulator shall certified to NSF/ANSI 372, consisting of low lead bronze body bell housing, a separate access cap shall be threaded to the body and shall not require the use of ferrous screws.

B. The main valve body shall be cast bronze (ASTM B 584).

C. The access covers shall be bronze (ASTM B 584 or Brass ASTM B 16)

D. The assembly shall be of the balanced piston design and shall reduce the pressure in both flow and no flow conditions.

E. Pressure regulator shall be as indicated on the drawings.

2.7. WYE STRAINER

A. Strainer shall conform to MIL -S-16293, and be ANSI 3rd party certified to comply with the states lead plumbing law 0.25% maximum weighted average lead content.

B. The main body shall be low lead bronze (ASTM B 584)

C. The access covers shall be yellow brass or cast bronze (ASTM B 16 or ASTM B 584)

D. Strainer screen shall be 300 series stainless steel available in 20, 40, 60, 80, or 100 mesh.

F. Wye strainer shall be as indicated on the plans.

G. 2.8 BACKFLOW PREVENTER CAGE & FROST BLANKET

H. A heavy-duty steel mesh cage with rust proof finish. The caging shall be sized to allow space for the entire piping assembly associated with the Backflow Preventer unit, and all associated equipment.

I. The cage shall include the manufacturers' standard tamper proof locking mechanism.

J. Provide a concrete base as detailed on the drawings.

K. Backflow Preventer Cage type, manufacturer and color shall be as indicated on the plans.

L. A Frost Blanket, manufacturer and color shall be as indicated on the plans.

2.9 BOOSTER PUMP (where applicable)

A. Booster pump shall be housed in a sturdy, locking, weather-resistant case, furnished for maximum exterior protection.

B. Booster pump shall be as indicated on the drawings. .

2.10 BALL VALVES

A. Ball valves for 3/4 inch through 2 - 1/2 inch shall be of PVC, block, tru-union design with EDPDM seals and o-ring.

B. Ball valves for 3 inch and larger shall be gate design and shall be iron body, brass or bronze mounted AWWA gate valves, and shall have a clear waterway equal to the full nominal diameter of the valve, and shall be rubber gasket, flanged or mechanical joint only, and shall be able to withstand a continuous working pressure of 150 PSI. Valve shall be equipped with a square-operating nut.

C. All ball valves located in a valve manifold shall be the same size as the main line (1-1/2 inch size minimum). Provide pipe-reducing adapters down stream of valves, as required. All ball valves in line shall be the same size as the pipe.

D. Ball valves shall be as indicated on the drawings.

2.11 CHECK VALVES

A. Swing check valves 2 inch and smaller shall be 200 lbs., W.O.G., bronze construction with replaceable composition, neoprene or rubber disc and shall meet or exceed federal specification WW-V-5d, class a, type iv.

B. Anti_drain valves shall be of heavy-duty virgin PVC construction with female iron pipe thread inlet and outlet. Internal parts shall be stainless steel and neoprene. Anti-drain valves shall be field adjustable against draw out from 5 to 40 feet of head.

C. Check valves shall be as indicated on the drawings.

2.12 REMOTE CONTROL VALVES

A. Remote control valves shall be electrically operated, single seat, normally closed configuration, equipped with flow control adjustment and capability for manual operation.

B. Valves shall be actuated by a normally closed low wattage solenoid using 24 volts, 50/60 cycle solenoid power requirement. Solenoid shall be epoxy encased. A union shall be installed on the discharge end.

C. Remote control valves shall be wired to controller in same numerical sequence as indicated on drawings.

D. Remote control valves shall be as indicated on the drawings.

2.13 MASTER CONTROL VALVES

E. Master Control Valve shall be compatible with the irrigation controller.

F. Master control valves shall be as indicated on the drawings.

2.14 FLOW SENSOR

A. Flow sensor shall be compatible with the irrigation controller.

B. Flow sensor shall be as indicated on the drawings.

2.15 HYDROMETER

C. Hydrometer shall be compatible with the irrigation controller.

D. Hydrometer shall be as indicated on the drawings.

2.16 QUICK COUPLER VALVES

A. Quick coupler valves shall be a one or two piece, heavy-duty brass construction with a working pressure of 150 PSI with a built in flow control and a self_closing valve.

B. Quick coupler shall be equipped with locking red brass cap covered with durable yellow thermo-plastic rubber cover. Key size shall be compatible with quick coupler and of same manufacturer.

C. Quick coupler valves shall be as indicated on the drawings.

2.17 SPRINKLER HEADS

D. All sprinkler heads shall have check valves installed.

E. All sprinkler heads shall be as indicated on the drawings.

F. Riser nipples for all sprinkler heads shall be the same size as the riser opening in the sprinkler body and fabricated as shown on the drawings.

2.18 AUTOMATIC CONTROLLER

A. Controller shall be housed in a sturdy, locking, weather_resistant case, furnished for maximum exterior protection.

B. Controller shall be equipped with evapo-transpiration (ET) sensor, which adjusts the controller programming based on local climatic conditions. The sensor shall also have a rain sensing shut-off switch, wind sensing shut-off switch, and freeze sensing shut-off of switch.

1. If a moisture sensor is used in lieu of an evapo-transpiration sensor an additional sensor, which has a rain-sensing shut-off switch, wind sensing shut-off switch, and freeze sensing shut-off switch shall be provided.

C. Automatic controller shall be as indicated on the drawings.

2.19 CONTROLLER DECODERS

D. All decoders shall be per the controller manufacturer's specifications.

E. Decoder model number shall be as shown on the drawings.

2.20 ELECTRICAL CONTROL WIRING

A. Low voltage

1. The electrical control wire shall be direct burial type UF, no. 14 AWG, solid, single conductor, copper wire UL approved or larger, if required to operate system as designed.
2. For 2-Wire controllers all irrigation wire for the controller, flow sensor, master valve, hydrometer, remote control valves and moisture sensors shall be per the controller manufacturer's specifications and recommendations.
3. Color code wires to each valve. Common wire shall be white.
4. If multiple controllers are being utilized, and wire paths of different controllers cross each other, both common and control wires from each controller to be of different colors.
5. Control wire splices: Splices are when required shall be placed in splice boxes.
6. Wire connections shall be per the controller manufacturer's specifications and recommendations.

B. High voltage

1. Shall be of type as required by local codes and ordinances.
2. Shall be of proper size to accommodate needs of equipment it is to serve.

2.21 VALVE BOXES AND MATERIALS

A. Valve boxes: valve boxes shall be constructed of ABS (acrylonitrile butadiene styrene) plastic, green in color, with rigid base and sides and shall be supplied with bolt lock cover secured with stainless steel bolts. Cover shall be identified as shown on drawings. Provide box extensions as required.

1. Master valves, flow sensors, remote control irrigation valves, gate valves, and ball valves 3 inch or less in size shall use a 14 inch x 19 inch x 12 inch rectangular box.
2. Quick coupler valves, wire splices, and grounding rods shall use a 10 inch circular box.

2.22 CONCRETE THRUST BLOCKS

A. Concrete thrust blocks shall be sized per the pipe manufactures requirement or as indicated on the drawings.

2.23 VALVE IDENTIFICATION TAGS

A. Valve Identification Tags shall be 2.25 inch x 2.65 inch polyurethane. Color: potable water; yellow / Non-potable water; purple. Tags shall be permanently attached to each remote control valve with tamper proof seals as indicated on the drawings.

2.24 EQUIPMENT TO BE FURNISHED TO OWNER

A. Two (2) sets of keys for each automatic controller.

B. Two (2) 48 inch tee wrenches for operating the gate valves.

C. Three (3) sets of special tools required for removing, disassembling and adjusting each type of sprinkler and valve supplied on this project.

D. Five (5) Extra sprinkler heads, nozzles, shrub adapters, nozzle filter screens, for each type used on the project.

E. Two (2) quick coupler keys to match manufacturer type of quick coupler.

2.25 INCIDENTAL MATERIALS AND EQUIPMENT

A. Furnish all materials and equipment not specified above, but which are necessary for completion of the work as intended.

2.26 MAIN LINE LOCATOR TAPE

A. 3 - inch wide plastic detectable locator tape.

2.27 MAIN LINE AND LATERAL LINE BEDDING SAND

A. Sand shall consist of natural or manufactured granular material, free of organic material, mica, loam, clay or other substances not suitable for the intended purpose.

B. Sand shall be masonry sand ASTM C 144 or coarse concrete sand, ASTM C 33.

General Notes

IRRIGATION NOTES

No.	Revision/Issue	Date

Firm Name and Address

4Binc
Select Certified
IRRIGATION ASSOCIATION
Experienced professionals. Efficient solutions.
LIC# 1012730—IA CERTIFICATION # 57436
ASIC
PROFESSIONAL MEMBER

Project Name and Address

COLUMBUS ST.
EL GRANADA, CA

Project 236-2019	**Drawn By** 4Binc.
Date 9/10/19	**Checked By** 4Binc.
Scale	**Approved By**
	Sheet IR-4.0

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. Code requirements shall be those of state and municipal codes and regulations locally governing this work, providing that any requirements of the drawings and specifications, not conflicting therewith, but exceeding the code requirements, shall govern unless written permission to the contrary is granted by the Owner's Representative.

B. Extreme care shall be exercised at all times by the Contractor in excavating and working in the project area due to existing utilities and irrigation systems to remain. Contractor shall be fully responsible for expenses incurred in the repair of damages caused by their operation.

1. The Contractor is responsible for identifying and maintaining existing irrigation main lines that supply water to areas on the site as noted on the drawings and outside of the proposed limit of work. The Contractor shall relocate or replace existing irrigation main line piping as required to provide a continuous supply of water to all areas of existing irrigation on site.
   a. Providing continuous water supply shall include hand watering and or the use of watering trucks to provide adequate water.

C. Plan locations of backflow preventers, valves, controllers, irrigation lines, sleeves, spray heads and other equipment are diagrammatic and indicate the spacing and relative locations of all installations. Final site conditions and existing and proposed plantings shall determine final locations and adjusted as necessary and as directed to meet existing and proposed conditions and obtain complete water coverage. Minor changes in locations of the above from locations shown shall be made as necessary to avoid existing and proposed trees, piping, utilities, structures, etc. at the Contractor's expense or when directed by the Owner's Representative.

1. The Contractor shall be held responsible for relocation of any items without first obtaining the Owner's Representative's approval. The Contractor shall remove and relocate such items at their expense if so directed by the Owner's Representative.

D. Prior to any work the Contractor shall stake out locations of all pipe, valves, equipment and irrigation heads and emitters using an approved staking method and maintain the staking of the approved layout in accordance with the drawings and any required modifications. Verify all horizontal and vertical site dimensions prior to staking of heads. Do not exceed spacing shown on drawings for any given area. If such modified spacing demand additional or less material than shown on the drawings, notify the Owner's Representative before beginning any work in the adjacent area.

E. Stub out main line at all end runs and as shown on drawings. Stub out wires for future connection where indicated on plan and as directed.

F. Point of connection shall be approximately as shown on drawings. Connect new underground piping and valves and provide all flanges, adapters or other necessary fittings for connection.

G. Permission to shut off any existing in-use water line must be obtained 48 hours in advance, in writing from the Owner. The Contractor shall receive instructions from the Owner's Representative as to the exact length of time of each shut-off.

H. No fittings shall be installed on pipe underneath pavement or walls.

I. Prior to starting any work, Contractor shall obtain a reading of existing static water pressure (no flow condition) at the designated point of connection and immediately submit written verification of pressure with date and time of recording to Owner's Representative.

3.2 TRENCHING, DIRECTIONAL BORING AND SLEEVING

A. Perform all trenching, directional boring, sleeving and excavations as required for the installation of the work included under this section, including shoring of earth banks to prevent cave_ins.

B. The Contractor may directional bore lines where it is practical or where required on the plans.

1. Extend the bore 1' past the edge of pavement unless noted differently on the plans
2. Cap ends of each bore and locate ends at finished grade using metal stakes.
3. All boring and sleeving shall have detectable locator tape placed at the ends of the pipe.

C. Make trenches for mains, laterals and control wiring straight and true to grade and free of protruding stones, roots or other material that would prevent proper bedding of pipe or wire.

D. Excavate trenches wide enough to allow a minimum of 4 - inch between parallel pipelines and 8 inch from lines of other trades. Maintain 3 - inch vertical clearance between irrigation lines. Minimum transverse angle is 45 degrees. All pipes shall be able to be serviced or replaced without disturbing the other pipes.

E. Trenches for pipelines shall be made of sufficient depth to provide the minimum cover from finished grade as follows:

4. Pressure main line: 18 inches below finish grade and 24-30 inches below paved areas in Schedule 40 PVC sleeves.
5. Reclaimed water constant pressure main lines shall cross at least twelve (12) inches below potable water lines.
   a. If a constant pressure reclaimed water main line must be installed above a potable water line or less than twelve (12) inches below a potable water line, then reclaimed water line shall be installed within an approved protective sleeve. The sleeve shall extend ten (10) feet from each side of the center of the potable line, for a total of twenty (20) feet. The sleeve shall be color-coded (purple) for use with reclaimed water.
3. Lateral lines: 12 inches below finish grade and 18 inches below paved areas in Schedule 40 PVC sleeves.
4. Control wiring: to the side of pressure main line and 24 inches below paved areas in Schedule 40 PVC sleeves.

F. On new on-site systems (post-meter), the required horizontal separation between potable water lines, reclaimed water constant pressure main lines and sewer lines shall be a minimum of four (4) feet apart as directed by the project engineer and/ or regulatory agency. Measurements shall be between facing surfaces, not pipe centerlines.

G. When trenching through areas of imported or modified soil, deposit imported or modified soils on one side of trench and subsoil on opposite side.

H. Backfill the trench per the requirements in paragraphs "Backfilling and Compacting" below.

3.3 PIPE INSTALLATION

A. General Pipe Installation

1. Exercise caution in handling, loading and storing, of plastic pipe and fittings to avoid damage.
   a. The pipe and fittings shall be stored under cover until using, and shall be transported in a vehicle with a bed long enough to allow the length of pipe to lay flat so as not to be subjected to undue bending or concentrated external load at any point.
   b. All pipe that has been dented or damaged shall be discarded unless such dent or damaged section is cut out and pipe rejoined with a coupling.
2. Trench depth shall be as specified above from the finish grade to the top of the pipe.
3. Install a detectable pipe locator tape 6 to 8 inches above all main line pipes.

B. Polyvinyl Chloride Pipe (PVC) Installation

1. Under no circumstance is pipe to rest on concrete, rock, wood blocks, construction debris or similar items.
2. No water shall be permitted in the pipe until a period of at least 24 hours has elapsed for solvent weld setting and curing.
3. Install assemblies and pipe to conform to respective details and where shown diagrammatically on drawings, using first class workmanship and best standard practices as approved. All fittings that are necessary for proper connections such as swing joints, offsets, and reducing bushings that are not shown on details shall be installed as necessary and directed as part of the work.
4. Dielectric bushings shall be used in any connections of dissimilar metals.
5. Gasketed plastic pipe: pipe-to-pipe joints or pipe to fittings shall be made in accordance with manufacturer's specifications.
6. Solvent weld or threaded plastic pipe:
   a. Installation of all pipe and fittings shall be in strict accordance with manufacturer's specifications.
   b. Pipe shall be cut using approved PVC pipe cutters only. Sawed joints are disallowed. All field cuts shall be beveled to remove burrs and excess before gluing.
   c. Welded joints shall be given a minimum of 15 minutes to set before moving or handling. Excess solvent on the exterior of the joint shall be wiped clean immediately after assembly.
   d. Plastic to metal connections shall be made with plastic adapters and if necessary, short (not close) brass threaded_nipples. Connection shall be made with two (2) wraps of Teflon tape and hand tightened plus one turn with a strap wrench.
   e. Snake pipe horizontally in trench to allow one (1) foot of expansion and contraction per 100 feet of straight run.
   f. Threaded pipe joints shall be made using Teflon tape. Solvent shall not be used with threaded joints. Pipe shall be protected from tool damage during assembly. All damaged pipe shall be removed and replaced. Take up threaded joints with light wrench pressure.
   g. No close nipples or risers are allowed. Cross connections in piping is disallowed.
   h. Center load pipe at 10 feet on center intervals with small amount of backfill to prevent arching and slipping under pressure. Other than this preliminary backfill all pipe joints, fittings and connections are to remain uncovered until successful completion of hydrostatic testing and written approval of the testing report.
   i. Concrete thrust blocks shall be constructed behind all pipe fittings 1-1/2 inch diameter and larger at all changes of direction of 45 degrees or more.

C. Galvanized Pipe Installation

1. All joints shall be threaded with pipe joint compound used on all threads.
2. Dielectric bushings shall be used in any connections of dissimilar metals.

3.4 TRENCHING, DIRECTIONAL BORING, AND SLEEVING REVIEW:

A. Upon completion and installation of all trenching, directional boring, and sleeving, all installed irrigation control wiring, lines and fittings shall be visually observed by the Owner's Representative unless otherwise authorized. Do not cover any wires, lines or fittings until they have been tested and observed by the Owner's Representative.

3.5 FLUSHING

A. Openings in piping system during installation are to be capped or plugged to prevent dirt and debris from entering pipe and equipment. Remove plugs when necessary to flush or complete system.

B. After completion and prior to the installation of any terminal fittings, the entire pipeline system shall be thoroughly flushed to remove dirt, debris or other material.

3.6 HYDROSTATIC PRESSURE TESTING

A. After flushing, and the installation of valves the following tests shall be conducted in the sequence listed below. The Contractor shall furnish all equipment; materials and labor necessary to perform the tests and all tests shall be conducted in the presence of the Owner's Representative.

B. Water pressure tests shall be performed on all pressure main lines before any couplings, fittings, valves and the like are concealed.

C. Immediately prior to testing, all irrigation lines shall be purged of all entrapped air or debris by adjusting control valves and installing temporary caps forcing water and debris to be discharged from a single outlet.

D. Test all pressure main line at 150 PSI. For a minimum of four (4) hours with an allowable loss of 5 PSI. Pressure and gauges shall be read in PSI, and calibrated such that accurate determination of potential pressure loss can be ascertained.

E. Re_test as required until the system meets the requirements. Any leaks, which occur during test period, will be repaired immediately following the test. All pipe shall be re_tested until final written acceptance.

F. The Contractor is responsible for proving documentation stating the weather conditions, date, the start time and initial water pressure readings, the finish time and final water pressure readings and the type of equipment used to perform the test. The documentation must be signed by a witness acceptable to the Owner, verifying all of the above-mentioned conditions.

G. Submit a written report of the pressure testing results with the other above required information to the Owner's Representative for approval.

3.7 BACKFLOW PREVENTER TESTING

A. The backflow preventer shall be tested according to procedures and results per the requirements of the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California or American Water Works Association whichever is more stringent.

B. Testing shall be performed by a Backflow Prevention Assembly Tester with a current certification from the American Backflow Preventer Association.

3.8 CONTROLLER AND BOOSTER PUMP TESTING AND CERTIFICATION

A. Controller and booster Pump shall be certified by a factory approved certified professional. Contact xxxxxxxx at xxx.xxx.xxxx.

3.9 BACKFILLING AND COMPACTING

A. Irrigation trenches shall be carefully backfilled with material approved for backfilling and free of rocks and debris one (1) inch in diameter and larger. When back filling trenches in areas of imported or modified planting soil, replace any excavated subsoil at the bottom and the imported soil or modified planting soil at the top of the trench.

B. Backfill shall be compacted with approved equipment to the following densities

1. Backfill under pavement and within 2 feet of the edge of pavement: Compact to 95% or greater of maximum dry density standard proctor.
2. Backfill of subsoil under imported planting mixes or modified existing planting soil: Between 85 and 90% of maximum dry density standard proctor.
3. Backfill of imported planting mixes or modified existing planting soil: Compact to the requirements of the adjacent planting mix or planting soil as specified in section "Planting Soil".

C. Finish grade of all trenches shall conform to adjacent grades without dips or other irregularities. Dispose of excess soil or debris off site at Contractor's expense.

D. Any settling of backfill material during the maintenance or warranty period shall be repaired at the Contractor's expense, including any replacement or repair of soil, lawn, and plant material or paving surface.

3.10 RESURFACING PAVING OVER TRENCHES

A. Restore all surfaces and repair existing underground installations damaged or cut as a result of the excavation to their original condition, satisfactory to the Owner's Representative.

B. Trenches through paved areas shall be resurfaced with same materials quality and thickness as existing material. Paving restoration shall be performed by the project paving Sub-contractor or an approved Contractor skilled in paving work.

C. The cost of all paving restoration work shall be the responsibility of the irrigation Contractor unless the trenching thru the paving was, by previous agreement, part of the general project related construction.

3.11 INSTALLATION OF EQUIPMENT

A. General:

1. All equipment shall be installed to meet all installation requirements of the product manufacturer. In the event that the manufactures requirements cannot be implemented due to particular condition at the site or with other parts of the design, obtain the Owner's Representative's written authorization and approval for any modifications.
2. Install all equipment at the approximately at the location(s) and as designated and detailed on the drawings. Verify all locations with the Owner's Representative.
3. Install all valves within a valve box of sufficient size to accommodate the installation and servicing of the equipment. Group valves together where practical and locate in shrub planting areas.
4. All sprinkler irrigation systems that are using water from potable water systems shall require backflow prevention. All backflow prevention devices shall meet and be installed in accordance with requirements set forth by local codes and the health department.

B. Pressure regulator:

1. Set regulator for required PSI per manufacturer's specifications.

C. Check Valve:

1. Install check valves approximately at the locations necessary to prevent low head run off.

D. Remote control valves:

1. Install one remote control valve per valve box.
2. Remote control valve manifolds and quick coupler valves shall be separate allowing use of a quick coupler with all remote control valves shut off.
3. Install boxes no farther than 12 inches from edge of paving and perpendicular to edge of paving and parallel to each other. Allow 12 inches clearance between adjacent valve boxes.

E. Quick coupler valve:

1. Install each quick coupler valve in its own valve box.
2. Install thrust blocks on quick couplers.
3. Place no closer than 12 inches to adjacent paving.
4. Install 18 inches off set from main line.

F. Sprinkler heads:

1. All main lines and lateral lines, including risers, shall be flushed and pressure tested before installing sprinkler heads.
2. Install specified sprinkler heads as shown in details at locations shown on the drawings. Adjust layout for full coverage, spacing of heads shall not exceed the maximum spacing recommended by the manufacturer.
3. All sprinkler heads shall be set perpendicular to finish grade unless otherwise designated on the drawings or details.

G. Irrigation controllers:

1. Remote control valves shall be connected to controller in numerical sequence as shown on the drawings.
2. Controller shall be tested with complete electrical connections. The Contractor shall be responsible for temporary power to the controller for operation and testing purposes.
3. Connections to control wiring shall be made within the pedestal of the controller. All wire shall follow the pressure main insofar as possible.
4. Electrical wiring shall be in a rigid gray PVC plastic conduit from controller to electrical outlet. The electrical Contractor shall be responsible for installing all wiring to the controller, in order to complete this installation. A disconnect switch shall be included.

H. Wiring:

1. Low Voltage
   a. Control wiring between controller and electrical valves shall be installed in the same trench as the main line where practical. The wire shall be bundled and secured to the lower quadrant of the trench at 10 foot intervals with plastic electrical tape.
   b. When the control wiring cannot be installed in the same main line trench it shall be installed a minimum of 18 inches below finish grade and a bright colored plastic ribbon with suitable markings shall be installed in the trench 6 inches below grade directly over the wire.
   c. An expansion loop shall be provided every 500 feet in a box and inside each valve box. Expansion loop shall be formed by wrapping wire at least eight (8) times around a ¾ inch pipe and withdrawing pipe.
   d. Provide one control wire to service each valve in system.
   e. Provide 03 common wire(s) per controller, or as needed.
   f. Run two (2) spare #14 - 1 wires from controller along entire main line to last electric remote control valve on each and every leg of main line. Label spare wires at controller and wire stub to be located in a box.
   g. All control wire splices not occurring at control valve shall be installed in a separate splice valve box.
   h. Wire markers (sealed, 1 inch to 3 inch square) are to identify control wires at valves and at terminal strips of controller. At the terminal strip mark each wire clearly indicting valve circuit number.
2. High Voltage
   a. All electrical work shall conform to local codes, ordinances and any authorities having jurisdiction. All high voltage electrical work to be performed by licensed electrician.
   b. The Contractor shall provide 120-volt power connection to the automatic controller unless noted otherwise on drawings.

I. Valve boxes:

1. Install one valve box for each type of valve installed as per the details.
2. Gravel sump shall be installed after compaction of all trenches. Final portion of gravel shall be placed inside valve box after valve is backfilled and compacted.
3. Permanently label valve number and or controller letter on top of valve box lid using a method approved by the Owners Representative.

J. Tracer wire:

1. Tracer wire shall be installed with non_metallic plastic irrigation main lines where controller wires are not buried in the same trench as the main line.
2. The tracer wire shall be placed on the bottom of the trench under the vertical projection of the pipe with spliced joints soldered and covered with insulation type tape.
3. Tracer wire shall be of a color not used for valve wiring. Terminate wire in a valve box. Provide enough length of wire to make a loop and attach wire marker with the designation "tracer wire".

K. Drip Installation:

1. Clamp fittings with Oetiker clamps or approved equal when operating pressure exceeds specific drip tubing fitting requirements.
2. When installing drip tubing, install soil staples as listed below:
   a. Sandy Soil - One staple every three (3') feet and two (2) staples on each change of direction (tee, elbow, or cross).
   b. Loam Soil - One staple every four (4') feet and two (2) staples on each change of direction (tee, elbow, or cross).
   c. Clay Soil - One staple every five (5') feet and two (2) staples on each change of direction (tee, elbow, or cross).
3. Cap or plug all openings as soon as lines have been installed to prevent the intrusion of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.
4. Thoroughly flush all water lines before installing valves and other hydrants.

3.12 ADJUSTMENT AND COVERAGE TEST

A. Adjustment:

1. The Contractor shall flush and adjust all sprinkler heads, valves and all other equipment to ascertain that they function according to the manufacturer's data.
2. Adjust all sprinkler heads not to overspray onto walks, roadways and buildings when under maximum operating pressure and during times of normal prevailing winds.

B. Coverage test:

1. The Contractor shall perform the coverage test in the presence of the Owner's Representative after all sprinkler heads have been installed, flushed and adjusted. Each section is tested to demonstrate uniform and adequate coverage of the planting areas serviced.
2. Any systems that require adjustments for full and even coverage shall be done by the Contractor prior to final acceptance at the direction of the Owner's Representative at no additional cost. Adjustments may also include realignment of pipes, addition of extra heads, and changes in nozzle type or size.
3. The Contractor at no additional cost shall immediately correct all unauthorized changes or improper installation practices.
4. The entire irrigation system shall be operating properly with written approval of the installation by the Owner's representative prior to beginning any planting operations.

3.13 REPAIR OF PLANTING SOIL

A. Any areas of planting soil including imported or existing soils or modified planting soil which become compacted or disturbed or degraded as a result of the installation of the irrigation system shall be restored to the specified quality and compaction prior to beginning planting operations at no additional expense to the Owner. Restoration methods and depth of compaction remediation shall be approved by the Owner's Representative.

3.14 CLEAN-UP

A. During installation, keep the site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day. Remove trash and debris in containers from the site no less than once a week.
   a. Immediately clean up any spilled or tracked soil, fuel, oil, trash or debris deposited by the Contractor from all surfaces within the project or on public right of ways and neighboring property.

B. Once installation is complete, wash all soil from pavements and other structures.

1. Make all repairs to grades ruts, and damage to the work or other work at the site.
2. Remove and dispose of all excess soil, packaging, and other material brought to the site by the Contractor.

3.15 PROTECTION

A. The Contractor shall protect installed irrigation work from damage due to operations by other Contractors or trespassers.

1. Maintain protection during installation until Acceptance. Treat, repair or replace damaged work immediately. The Owner's Representative shall determine when such treatment, replacement or repair is satisfactory.

3.16 PRE-MAINTENANCE OBSERVATION:

A. Once the entire system shall be completely installed and operational and all planting is installed, the Owner's Representative shall observe the system and prepare a written punch list indicating all items to be corrected and the beginning date of the maintenance period.

B. The irrigation/landscape contractor is responsible for scheduling an irrigation audit prior to general maintenance taking effect. The irrigation auditor must be CLIA certified, in good standing and must comply with all Irrigation Associations methods and code of ethics.

C. This is not final acceptance and does not relieve the Contractor from any of the responsibilities in the contract documents.

3.17 GENERAL MAINTENANCE AND THE MAINTENANCE PERIOD

A. General maintenance shall begin immediately after installation of irrigation system. The general maintenance and the maintenance period shall include the following:

1. On a weekly basis the Contractor shall keep the irrigation system in good running order and make observations on the entire system for proper operation and coverage. Repair and cleaning shall be done to keep the system in full operation.
2. Records of all timing changes to control valves from initial installation to time of final acceptance shall be kept and turned over to the Owner's Representative at the time of final acceptance.
3. During the last week of the maintenance period, provide equipment familiarization and instruction on the total operations of the system to the personnel who will assume responsibility for running the irrigation system.
4. At the end of the maintenance period, turn over all operations logs, manuals, instructions, schedules, keys and any other equipment necessary for operation of the irrigation system to the Owner's Representative who will assume responsibility for the operations and maintenance of the irrigation system.

B. The maintenance period for the irrigation system shall coincide with the maintenance period for the Planting. (See specification section "Planting"

3.18 SUBSTANTIAL COMPLETION ACCEPTANCE

A. Upon written notice from the Contractor, the Owners Representative shall review the work and make a determination if the work is substantially complete.

B. The date of substantial completion of the irrigation shall be the date when the Owner's Representative accepts that all work in Planting, Planting Soil, and Irrigation installation sections is complete.

3.19 FINAL ACCEPTANCE / SYSTEM MALFUNCTION CORRECTIONS

A. At the end of the Plant Warrantee and Maintenance period, (See specification section "Planting") the Owner's Representative shall inspect the irrigation work and establish that all provisions of the irrigation system are complete and the system is working correctly.

1. Restore any soil settlement over trenches and other parts of the irrigation system.
2. Replace, repair or reset any malfunctioning parts of the irrigation system.

B. The Contractor shall show all corrections made from punch list. Any items deemed not acceptable shall be reworked and the maintenance period will be extended.

C. The Contractor shall show evidence that the Owner's Representative has received all charts, records, drawings, and extra equipment as required before final acceptance.

D. Failure to pass review: If the work fails to pass final review, any subsequent observations must be rescheduled as per above. The cost to the Owner for additional observations will be charged to the Contractor at the prevailing hourly rate of the reviewer.

END OF SECTION 32 8400

IRRIGATION NOTES

General Notes

No.	Revision/Issue	Date

Firm Name and Address

4Binc Select Certified IRRIGATION ASSOCIATION — Experienced professionals. Efficient solutions.
ASIC PROFESSIONAL MEMBER
LIC# 1012730—IA CERTIFICATION # 57436

Project Name and Address

COLUMBUS ST.
EL GRANADA, CA

Project 236-2019	**Drawn By** 4BInc.
Date 9/10/19	**Checked By** 4BInc.
Scale	**Approved By**
	Sheet IR-4.1

- Irrigation/Watering Responsibility
  - It is the responsibility of the Maintenance Contractor to operate the irrigation system in an efficient manner and to minimize water waste. It is the Maintenance Contractor's responsibility to adjust the system to apply water in accordance with plant requirements based on weather, soil, and site conditions. The irrigation program shall be scheduled to minimize water waste through runoff, excessive irrigation run times, utilize CYCLE SOAK scheduling when applicable. It is the responsibility of the Maintenance Contractor to operate the irrigation system based on local municipal guidelines.
- Irrigation Activation
  - Activate irrigation system in spring (or when weather permits). Charge mainline in February or March to check for leaks and/or malfunctioning valves.
  - Turn on backflow preventers, open gate valves and activate booster pumps if installed.
  - Set the irrigation controller to RUN MODE and verify that all programs are activated and set up to be run in Self Adjusted mode.
  - Site verification and adjustments. This includes turning on each zone, monitoring for leaks or malfunctioning parts, cutting grass away from sprinkler heads and adjusting sprinklers for proper arc and maximum efficiency.
  - Verify that drip irrigation is functional and that distribution tubing has not been cut or broken during non operational period.
  - Service, clean and adjust and weather sensor system. This is critical for ALL self adjusting controllers.
  - If applicable service irrigation booster pump, this need to be completed by the manufacturers certified technician.
- Irrigation Monitoring/Landscape Watering
  - Check the ET/Weather Based self adjusting system programming, Flow Sensor and Master Valve operation and programming; adjust as required to ensure proper operation.
  - ALL Backflow Prevention Devices are to be maintained as per Local city or county codes.
  - All turf areas shall be monitored to determine the need for supplemental irrigation. Frequency and duration of each watering will be dependent on local weather conditions. To determine the need for watering, Landscape Maintenance Contractor shall use a soil probe to examine the first 6-12" of the soil profile. If the soil is cool, damp and holds its shape, watering is not necessary. Plant material roots should be encourage to root as deep as possible, this is accomplished by deep root watering, longer irrigation run times and utilizing CYLCE SOAK method. Frequent shallow irrigation scheduling is ineffective and will only promote shallow rooting and require excessive water waste.
  - Groundcover and shrub beds shall be watered using an automatic irrigation system. The entire groundcover/shrub bed shall be soaked to a depth to maximize healthy plant root growth. Irrigation run time to be based on irrigation device precipitation rate (not flow rate) and plant material irrigation demand. (Use WUCOLS reference for plant watering needs). In the event of establishing plants, or compromised soil profile, watering frequencies may be adjusted.
  - Establish time settings and intervals of irrigation water application for each valve of all irrigation zones. Make adjustments when necessary to correspond to variable watering requirements. Check for coverage and plugged emission/nozzle devices. Clean devices and adjust devices while maintaining the system in proper working order.
  - ALL automatic controllers will be programmed to apply water during hours as permitted by local town, city or county ordinances.
- Irrigation System Repair
  - Cleaning and adjusting the sprinklers heads are the Maintenance Contractor's responsibility. Repair and/or replacement of any vandalized or malfunctioning component beyond Maintenance Contractor's control is the responsibility of the Owner/Agent. Any damage caused by Maintenance Contractor will be repaired by Maintenance Contractor at no cost to the Owner/Agent.
  - All irrigation repaired or replaced MUST be in accordance with the original irrigation design, local city or county guidelines and must provide the maximum efficiency as possible so as NOT to waste water.
  - ALL Drip systems are to be manually flushed a minimum one time per year and filters to be cleaned on a regular basis.
  - All damaged and repaired pipe MUST be flushed of all debris. Maintenance Contractor to guarantee full operational and efficient performance of repaired systems.
  - Repairs to Backflow Prevention Devices must be conducted by a trained certified backflow technician.
  - It is recommended that ALL irrigation maintenance and repair be performed by California Licensed and/or Certified contractor. Not maintaining irrigation systems in an efficient manner will result in plant and landscape degradation and additional maintenance costs.
- Irrigation System Winterization
  - Where applicable, shut off and drain irrigation system(s) at the end of the irrigation season. Turn off all main supply valves, open all manual drain valves, and bleed valves on backflow prevention devices. Perform winterization prior to November 1st.
- Irrigation Start up
  - Flush all drip lines at flush points.
  - Remove and clean all filters and replace any damaged filters.
  - Check that all weathers sensors are functioning and replace batteries as needed.

IRRIGATION MAINTENANCE

EMITTER COUNT FOR 1" VALVE

GPM	GPH	GPH	GPM	DEVICES / 1" VALVE	FLOW GPM
0.25	15	0.5	0.01	1700	14.2
0.5	30	1	0.02	850	14.2
1	60	5	0.08	180	15.0
2	120	7	0.12	100	11.7
4	240	10	0.17	90	15.0
6	360	12	0.2	75	15.0
8	480	18	0.3	50	15.0
10	600	24	0.4	37	14.8
		30	0.5	30	15.0
		60	1	15	15.0
					1" VALVE BASED ON 15 GPM MAX

DRIP LINE CHART

GPH	GPM	SPACING	SQUARE FOOTAGE	FLOW GPM	PRECIP RATE
0.27	0.0045	12x12	100	0.44	0.42
0.27	0.0045	12x18	100	0.29	0.28
0.27	0.0045	12x24	100	0.22	0.21
0.27	0.0045	18x18	100	0.19	0.19
0.27	0.0045	18x24	100	0.13	0.14
0.27	0.0045	24x24	100	0.11	0.1
0.4	0.066	12x12	100	0.65	0.64
0.4	0.066	12x18	100	0.43	0.43
0.4	0.066	12x24	100	0.33	0.32
0.4	0.066	18x18	100	0.29	0.29
0.4	0.066	18x24	100	0.20	0.21
0.4	0.066	24x24	100	0.16	0.16
0.6	0.01	12X12	100	0.99	0.96
0.6	0.01	12X18	100	0.66	0.64
0.6	0.01	12X24	100	0.50	0.48
0.6	0.01	18X18	100	0.44	0.43
0.6	0.01	18X24	100	0.33	0.32
0.6	0.01	24x24	100	0.25	0.24
0.9	0.015	12X12	100	1.48	1.44
0.9	0.015	12X18	100	0.99	0.96
0.9	0.015	12X24	100	0.75	0.72
0.9	0.015	18X18	100	0.66	0.64
0.9	0.015	18X24	100	0.50	0.48
0.9	0.015	24X24	100	0.38	0.36

INLINE FORMULA
PR= 231.1 x Emitter Flow /Emitter Spacing x Row Spacing

PRECIPITATION RATES & SOIL INTAKE RATES

DRIP PRECIPITATION RATES

GPH	GPM	Wr	Cr	# Devices	WA	Precip Rate
1	0.017	1	1	1	3.1	0.51
2	0.033	1.5	1	1	7.1	0.45
5	0.083	2	1	1	12.6	0.64
7	0.117	2.5	1	1	19.6	0.57
10	0.167	3	1	1	28.3	0.57
12	0.2	3.5	1	1	38.5	0.50
18	0.3	4	1	1	50.2	0.58
24	0.4	4.5	1	1	63.6	0.61
30	0.5	5	1	1	78.5	0.61
60	1	7	1	1	153.9	0.63

WETTED AREA OF SOIL TYPES

SOIL TYPE	Cr (FT)	SOIL TYPE	Cr (FT)
CLAY	1.0	LOAM	0.7
CLAY LOAM	1.0	LOAMY SAND	0.4
COURSE SAND	0.2	SANDY LOAM	0.6
FINE SAND	0.3	SILT LOAM	0.9

LEGEND

Cr	Soil Coefficient
TWr	Total Wetted Area
WA	Wetted Area

BASIC INTAKE RATE

SOIL TYPE	BASIC INFILTRATION RATE
SANDY	Less than 1.5"/hr
SANDY LOAM	.75 - 1.25"/hr
LOAM	.75"/hr
CLAY LOAM	.40"/hr
CLAY	.20"/hr

TREE RINGS 12" O.C EMITTER SPACING. MIN 3 RINGS PER TREE

RADIUS	CIRCUMF	TOTAL LF	FLOW RATE	TOTAL FLOW	PRECIP RATE	TOTAL FLOW/RING COUNT
18"	3.14*DIA	9.42	0.6 GPH	5 GPH	0.96"/HR	3 RINGS@ .6 GPH = 29 GPH
30"	3.14*DIA	15.7	0.6 GPH	9 GPH	0.96"/HR	4 RINGS@ .6 GPH = 47 GPH
48"	3.14*DIA	25.12	0.6 GPH	15 GPH	0.96"/HR	
60"	3.14*DIA	31.4	0.6 GPH	18 GPH	0.96"/HR	
18"	3.14*DIA	9.42	0.9 GPH	7.5 GPH	1.44"/HR	3 RINGS@ .9 GPH = 42.5 GPH
30"	3.14*DIA	15.7	0.9 GPH	13 GPH	1.44"/HR	4 RINGS@ .9 GPH = 69.5 GPH
48"	3.14*DIA	25.12	0.9 GPH	22 GPH	1.44"/HR	
60"	3.14*DIA	31.4	0.9 GPH	27 GPH	1.44"/HR	

Formula A	**96.25 x GPH / 60 /Wetted Area*Cr**
Formula B	**1.605 x GPH / Wetted Area *Cr**

Job Name: Columbus St. Res

Date: 10/18/2019

California Water Efficient Landscape Worksheet

	Reference Evapotranspiration (ET_o)	33.7	Project Type	Residential	0.55				
	Rain Fall (Inches)		Usable Rain Fall (Inches)	0					
	Hydrozone # / Planting Description[a]	Plant Factor (PF)	Irrigation Method[b]	Irrigation Efficiency (IE)[c]	ETAF (PF/IE)	Landscape Area (Sq. Ft.)	ETAF x Area	Estimated Total Water Use (ETWU)[d]	Gallons Per Minute GPM	% Landscape Area
Zone #	**Regular Landscape Areas**									
1	GRD. CVR - LOW	0.2	Drip	0.81	0.25	1,222	306	6383	4.78	33.60%
2	GRD. CVR - LOW	0.2	Drip	0.81	0.25	1,262	316	6592	4.94	34.70%
3	SHRUBS - LOW	0.2	Drip	0.81	0.25	449	111	2316	1.70	12.35%
4	SHRUBS - LOW	0.2	Drip	0.81	0.25	209	52	1078	1.00	5.75%
5	SHRUBS - MED	0.5	Drip	0.81	0.62	145	90	1870	0.90	3.99%
6	TREES - LOW	0.2	Drip	0.81	0.25	150	37	774	2.12	4.12%
7	TREES - LOW	0.5	Drip	0.81	0.62	200	123	2580	2.83	5.50%
					Totals	**3637**	**1033**	**21593**	**18.27**	**100.00%**
	Special Landscape Areas									
	[redacted]									
					Totals	0	0	0		
							ETWU Total	21593		
							Maximum Allowed Water Allowance (MAWA)[e]	41795		

ETAF Calculations

Regular Landscape Areas	
Total ETAF x Area	1033
Total Area	3637
Average ETAF	0.29

All Landscape Areas	
Total ETAF x Area	1033
Total Area	3637
Average ETAF	0.29

Average ETAF for Regular Landscape Areas must be 0.55 or below for residential areas, and 0.45 or below for non-residential areas.

ETWU ACRE FEET	**0.066267**
MAWA ACRE FEET	**0.128265**
% ETWU OF MAWA	**0.52**
PASS:	**YES**

MWELO CALCULATIONS

ESTABLISHED PLANT IRRIGATION SCHEDULE

CLIENT:	**Columbus St. Residence**	**July Eto:**	**4.30**	**Site Annual Eto:**	**33.7**
				Avg Plant Factor Et:	**0.2**

Controller	**Hunter A2C**							**ET SOURCE**	**WiFi + Rain/Freeze Sensor**				**Soil Type**	**SANDY LOAM**	**1**	**% Site Irrigation Effic:**			**0.81**
Zone #	**Program**	**Plant Type**	**Plant Factor**	**ET Plant Factor**	**Plant Factor x Eto**	**Root Depth "**	**Shade Factor**	**Density Factor**	**Irrigation Type**	**Inches Precip Rate**	**% Dist Unif**	**Irri Water Requirement Inches**	**Total Period Run Time**	**Valve Cycle Time**	**Cycles**	**Totals Days Per July**	**Zone GPM**	**Total GPM**	**Total Run Days/Yr**	**Total Gallons/Yr**
1	A	Groundcover	Low	0.2	0.9	6	1	1	Inline Drip	0.37	0.9	0.22	19	19	1	8	4.78	93	51	4,703.35
2	A	Groundcover	Low	0.2	0.9	6	1	1	Inline Drip	0.37	0.9	0.22	19	19	1	8	4.94	96	51	4,860.78
3	B	Shrub	Low	0.2	0.9	12	1	1	Drip Device	0.23	0.9	0.22	31	31	1	8	1.7	53	51	2,690.93
4	B	Shrub	Low	0.2	0.9	12	1	1	Drip Device	0.23	0.9	0.22	31	31	1	8	1	31	51	1,582.90
5	B	Shrub	Medium	0.5	2.2	12	1	1	Drip Device	0.23	0.9	0.56	78	78	1	8	0.9	70	51	3,561.52
6	C	Tree	Low	0.2	0.9	18	1	1	Drip Device	1.6	0.9	0.22	4	4	1	8	2.12	9	51	482.39
7	C	Tree	Low	0.2	0.9	18	1	1	Drip Device	1.6	0.9	0.22	4	4	1	8	2.83	13	51	643.94
									Average Site % DU		0.90		188	Total Run Time					

Estimated Total Water Use: Gallons	**18,584.16**

IRRIGATION SCHEDULE

General Notes

IRRIGATION CALCULATIONS

No.	Revision/Issue	Date

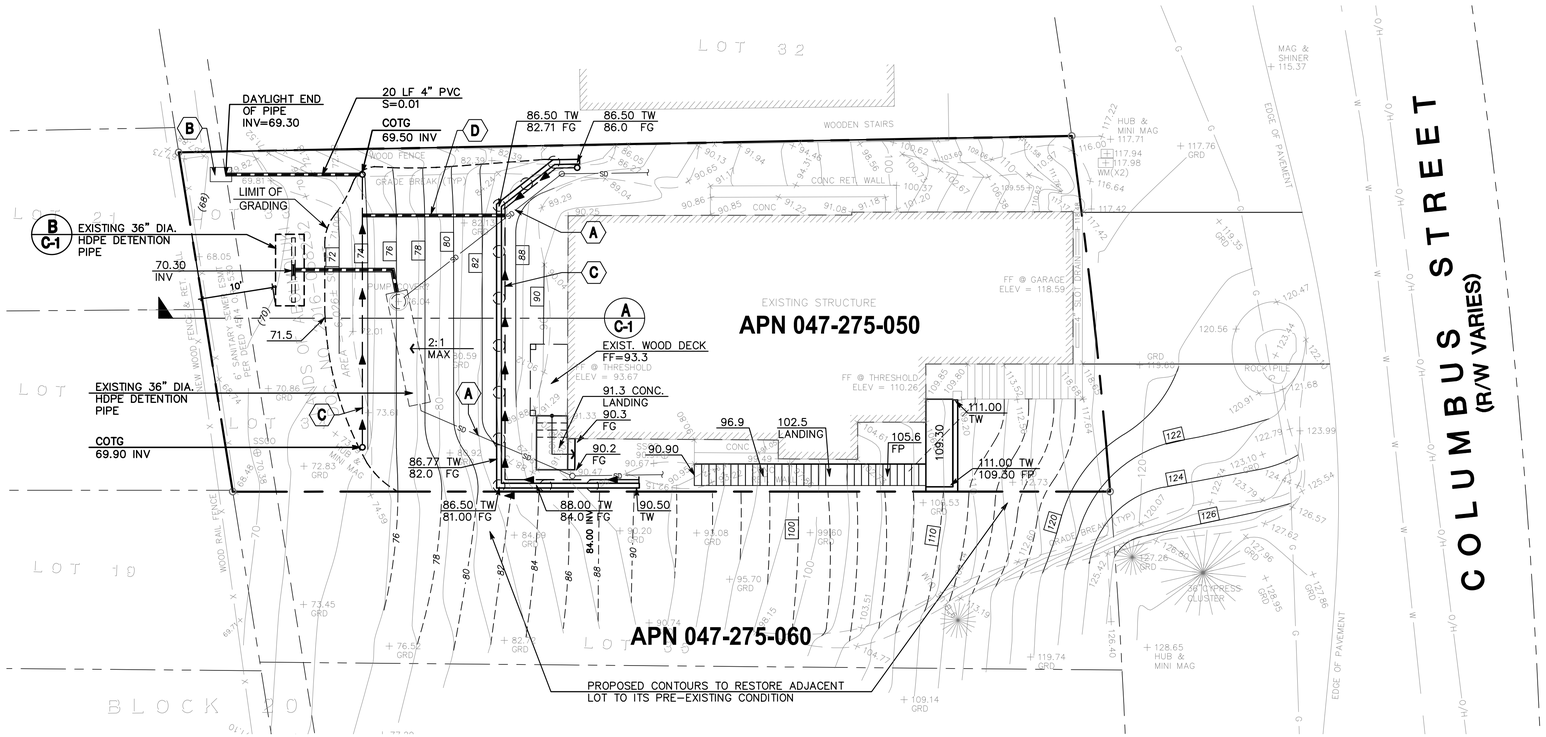
Firm Name and Address

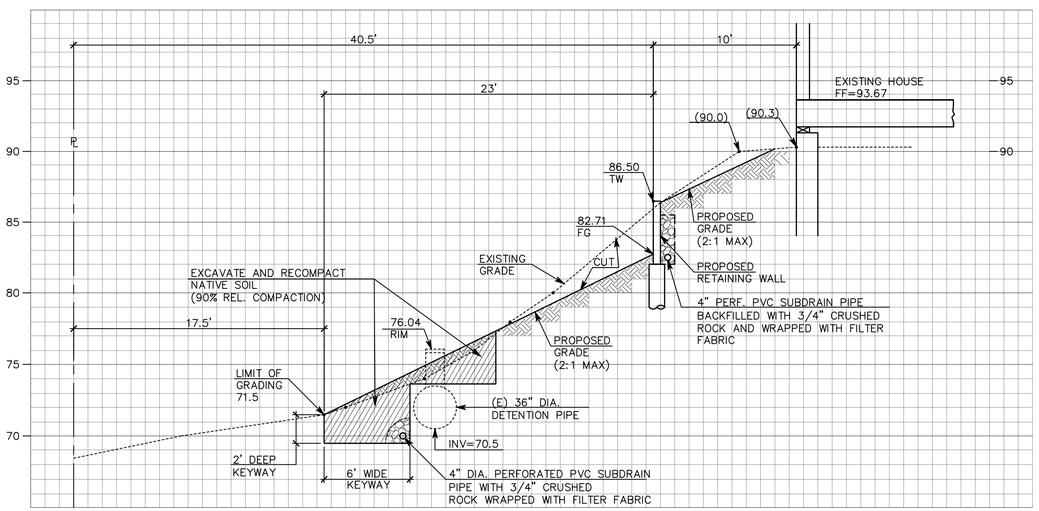
4Binc
Select Certified IRRIGATION ASSOCIATION
Experienced professionals. Efficient solutions.
LIC# 1012730—IA CERTIFICATION # 57436
ASIC PROFESSIONAL MEMBER

Project Name and Address

COLUMBUS ST.
EL GRANADA, CA

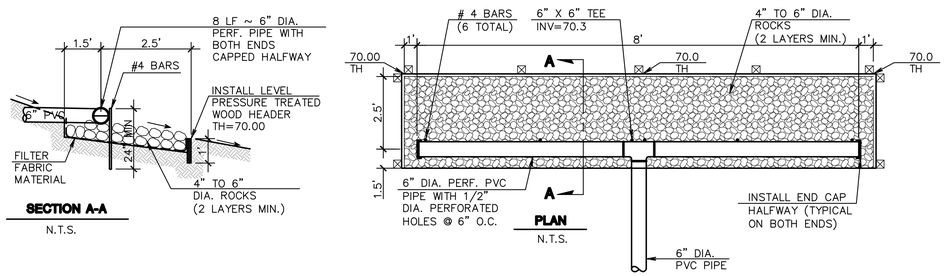
Project 236-2019	**Drawn By** 4Binc.
Date 9/10/19	**Checked By** 4Binc.
Scale	**Approved By**
	Sheet IR-5.0





A **SECTION**

SCALE: 1"=5' (V AND H)



B **ENERGY DISSIPATER**

SCALE: (NOT TO SCALE)

GENERAL NOTES:

1. ALL MATERIALS SHALL BE FURNISHED BY AND INSTALLED BY THE CONTRACTOR UNLESS OTHERWISE NOTED.
2. WHEN APPLICABLE, ALL CONSTRUCTION MATERIALS AND METHODS SHALL COMPLY WITH THE ORDINANCES, SPECIFICATIONS AND STANDARDS OF THE COUNTY OF SAN MATEO, UNLESS OTHERWISE NOTED.
3. CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT (U.S.A.) PRIOR TO START OF CONSTRUCTION. PHONE (800) 642-2444.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DISTRIBUTING ANY EXCESS MATERIAL OR SUPPLYING MATERIAL FOR DEFICIENCIES TO BRING DRIVEWAY AND BUILDING PADS TO REQUIRED GRADE.
5. THE CONTRACTOR IS RESPONSIBLE FOR MATCHING EXISTING SURROUNDING LANDSCAPE AND OTHER IMPROVEMENTS WITH A SMOOTH TRANSITION IN PAVING, GRADING, ETC., AND TO AVOID ABRUPT OR APPARENT CHANGES OR CROSS SLOPES, LOW SPOTS OR HAZARDOUS CONDITIONS.
6. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR ALL WORK SHOWN ON THIS PLAN.
7. ALL STORM DRAIN PIPES SHALL BE PVC SDR 35 WITH BELL AND SPIGOT RUBBER GASKET JOINTS PER ASTM D3034 OR BETTER.

UTILITY NOTE:

THE UTILITIES EXISTING ON THE SURFACE AND SHOWN ON THIS DRAWING HAVE BEEN LOCATED BY FIELD SURVEY. ALL UNDERGROUND UTILITIES SHOWN ON THIS DRAWING ARE FROM RECORDS OF THE VARIOUS UTILITY COMPANIES AND THE SURVEYOR/ENGINEER DOES NOT ASSUME RESPONSIBILITY FOR THEIR COMPLETENESS, INDICATED LOCATION, OR SIZE. RECORD UTILITY LOCATION SHOULD BE CONFIRMED BY EXPOSING THE UTILITY.

SURVEY NOTE:

THE EXISTING TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN WAS TAKEN FROM A BOUNDARY & TOPOGRAPHIC SURVEY PLAN PREPARED BY B&H LAND SURVEYING, INC., DATED SEPTEMBER 2016, JOB. NO. 6997-16.

GEOTECHNICAL ENGINEER'S NOTE:

THE GEOTECHNICAL SITE INVESTIGATION REPORT PREPARED BY J. YANG AND ENGINEERS, PROJECT NO, J16-1625, DATED JANUARY 25, 2017, SHALL BE MADE A PART OF THIS PLAN.

CONSTRUCTION NOTES:

- (A) PROVIDE SLEEVE THRU WALL FOR EXISTING 6" PVC PIPE
- (B) DAYLIGHT END OF 4" DIA. PERFORATED PVC PIPE AND INSTALL 2' X 3' ROCK RIPRAP DISSIPATER.
- (C) INSTALL 4" DIA. PERF. PVC SUBDRAIN PIPE AT 1% MIN. SLOPE.
- (D) CONNECT RETAINING WALL SUBDRAIN WITH 4" PVC AT 1% MIN.

GRADING QUANTITIES:

A.P.N. 047-275-050

	CUT	FILL
REAR YARD	30	10
FRONT YARD	0	20
STREET FRONTAGE	0	35
TOTAL	30	65

IMPORT = 35 C.Y.

GRADING QUANTITIES:

A.P.N. 047-275-060

	CUT	FILL
MAIN LOT	20	70
STREET FRONTAGE	0	25
TOTAL	20	95

IMPORT = 75 C.Y.

REV.	DESCRIPTION	BY:	DATE:
---	PER COUNTY COMMENTS	VPG	03/09/22

REGISTERED PROFESSIONAL ENGINEER DANIEL G. MacLEOD No. 35048 CIVIL STATE OF CALIFORNIA

MacLEOD AND ASSOCIATES
CIVIL ENGINEERING • LAND SURVEYING
965 CENTER STREET • SAN CARLOS • CA 94070 • (650) 593-8580

PREPARED FOR: BAHRAM ABOLMOLUKI

GRADING AND DRAINAGE PLAN

1120 COLUMBUS STREET
A.P.N. 047-275-050
UNINCORPORATED SAN MATEO COUNTY CALIFORNIA

DRAWN BY:	DJK/AAP
DESIGNED BY:	VPG
CHECKED BY:	DGM
SCALE:	1"=10'
DATE:	12/13/21
DRAWING NO.	4452-GRAD
SHEET	1 OF 4

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