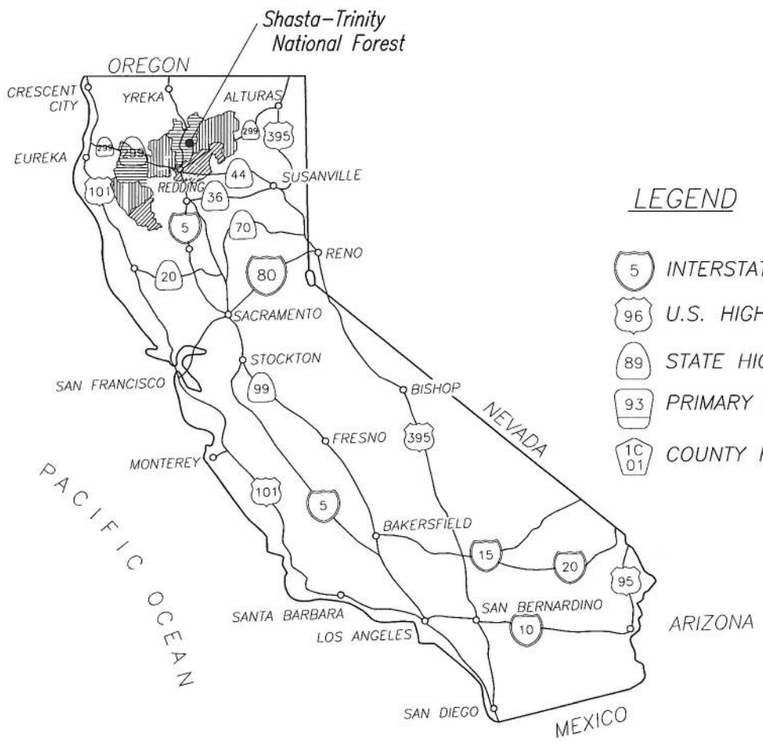
UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
PACIFIC SOUTHWEST REGION 5

SHASTA–TRINITY NATIONAL FOREST

Ash Creek Helispot - Phase 1



STATE OF CALIFORNIA

INDEX MAP

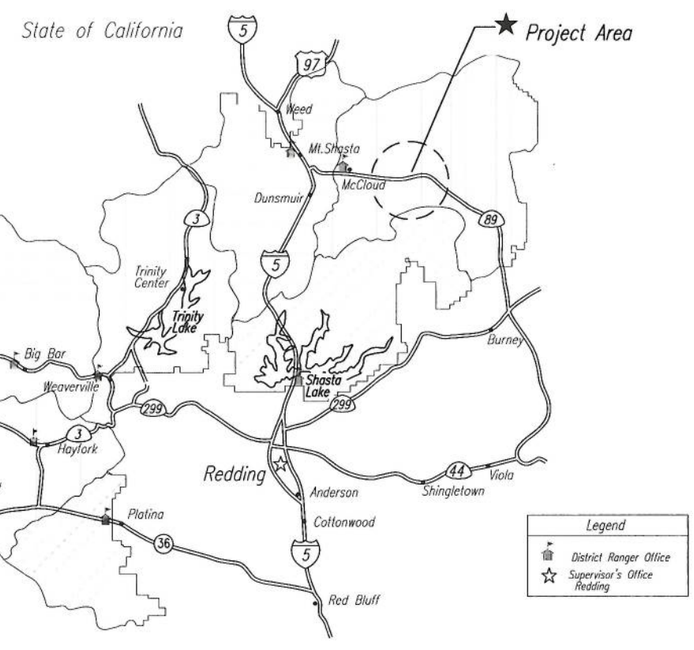
Scale: None

LEGEND

- 5 INTERSTATE HIGHWAY
- 96 U.S. HIGHWAY
- 89 STATE HIGHWAY
- 93 PRIMARY FOREST ROUTE
- 1C 01 COUNTY ROAD

N

W E



SHASTA–TRINITY NATIONAL FOREST

PROJECT LOCATION MAP

Scale: None

INDEX TO SHEETS

Sht #	Dwg ID	Sheet Name
1	T–1	Title Sheet
2	G–1	General Notes, Legend & Abbrevs
3	C–1	Survey Control Plan
4	C–2	Grading and Plaving Plan
5	C–3	Site Sections
6	C–4	Utility Plan
7	C–5	Miscellaneous Details
8	C–6	Typical Sections and Details
9	E–1	PP&L Underground Requirements & Details

FOREST SERVICE U S DEPARTMENT OF AGRICULTURE

Fred Perrin Project Engineer	7/8/26 DATE
Steph Gale Forest Engineer	07/08/26 DATE
J. [illegible] District Ranger	7-08-26 DATE
Lois Shoemaker Forest Supervisor	7-08-26 DATE

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
SHASTA–TRINITY NATIONAL FOREST
REDDING, CALIFORNIA

Ash Creek Helispot
Phase 1

Title Sheet

DESIGNED:	K. Nolan	DATE:	09/2024
DRAWN:	K. Nolan	DATE:	09/2024
CHECKED:	S. Frahm	DATE:	09/2024

DATE	REVISION	BY
xx/xx/xx	XXXX	XX

DRAWING ID
T–1

Sheet 1 of 9

GENERAL NOTES

1. The contractor shall prosecute the work in accordance with these Project Plans, the Project Statement of Work, the Federal Highway Administration (FHWA) "STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-14)" and as modified by the Forest Service Supplemental Specifications (FSSS) prepared and included as an attachment to the Contract associated with these Project Plans. FP-14 specifications may be downloaded at: https://highways.dot.gov/federal-lands/specs/fp-14.
2. Estimated quantities, where referenced in the Contract, including clearing and grubbing, soil overexcavation and compaction of surfacing and base materials, are based on compacted in-place volumes.
3. Contractor shall be responsible for locating and protecting utilities in place. Utility locations shown on drawings are approximate. Contractor shall contact CALIFORNIA ONE CALL (811) to arrange markouts and utility markout ticket prior to any excavation activities
4. Public safety, traffic control, and dust control are the responsibility of the contractor and shall be provided in accordance with State and County requirements, unless specified elsewhere in these Plans or the Project Specifications. The project area may require intermittent closures on federal owned lands (within the campgrounds and forest service roads) and temporarily closed to vehicle traffic during construction, but the Contractor must allow for pedestrian access to National Forest Lands at all times. Contractor shall not impede traffic on Hwy 89 during any construction activities.
5. The Contractor shall immediately notify the COR of any discrepancies encountered in the field or errors identified in the contract.
6. The Contractor shall keep daily records and record changes on project drawings in red-lined markups showing changes or variations made during construction on these plans. These records (redlined as-builts) shall be provided to the COR upon project completion for government records.
7. The Contractor is responsible for the protection of existing property monuments and other survey markers. Any markers destroyed during construction will require replacement at Contractor's expense.
8. Staging areas for equipment storage or material stockpiles will be allowed only in areas approved by the COR.
9. Borrow site for materials used for surfacing and fill placement are as designated at the locations shown on the Project Plans. Borow materials shall be stripped and screened prior to use as fill placement of surfacing materials.
10. In general, the Contractor is responsible for supplying electricity, water and sanitary facilities. In some cases water and sanitary facilities may be available on site.
11. All imported material to be weed free and come from a source location approved by the COR.
12. All equipment shall arrive on site washed and free of all visible soil, debris, and organic matter. All equipment may be inspected and subject to approval of the COR. COR may direct contractor to remove equipment off government property if equipment is not properly cleaned before entering project areas.
13. Grading activities shall be scheduled and conducted to avoid disturbance of prepared subgrades or other previously graded areas, and to ensure specified surfacing or placement of base materials occurs promptly following grading and/or subgrade preparation activities.
14. Asphalt concrete (AC) shall be sawcut when matching new or existing asphalt, or when removing portions of existing asphalt paths or roadways.
15. A pre-paving inspection will be conducted by the COR a minimum of two days prior to placing pavement. Compaction, grades, and elevations will be checked for positive drainage. It is the Contractor's responsibility to achieve required compaction and ensure positive drainage as described in these plans and the Project Specifications.

OVER-EXCAVATION, SOILS PREPARATION AND GRADING NOTES

The following notes are based on the recommendations included in the "Geotechnical Exploration Report for Ash Creek Helispot" prepared by KC Engineering Company, September 15, 2023, hereinafter referred to as Project Soils Report. The Project Soils Report is incorporated into the Contract for this project. Contradictions, if any, between the Project Soils Report, these Project Plans or the Statement of Work shall be referred to the Contracting Officer for resolution.

1. The preparation of surfaces of improved areas including natural soils, imported aggregate base, concrete and/or asphalt paving areas to be supported by on-site soils, and where otherwise directed on the Project Plans, shall be over-excavated and screened to remove existing vegetation, other deleterious materials and objectionable soil materials. As such, the upper 24 inches of existing soil materials, as measured from the existing original ground surface, shall be over-excavated and screened to remove organic materials, followed by scarification and compacting the underlying 12 inches. Soil materials that are laced with organics such as bark, bits and pieces of branches, root balls, tree limbs, and the like, may not be used as engineered fill. Excavated soil materials without organics may be used as engineered fill with the approval of the Contracting Officers Representative (COR), provided they do not contain debris, or over-sized rocks or boulders. Any existing undesirable items encountered on-site that do not meet the requirements of engineered fill (fence posts/wood, tree roots, concrete rubble and buried pipes) shall be excavated, removed and disposed away from Government land.
2. After over-excavation, the exposed bottom of any over-excavated area to receive fill should be scarified a minimum of 12 inches, uniformly moisture conditioned and compacted to a minimum relative compaction of 90% at or above optimum moisture content. Fill may then be placed in lifts of 6 to 8 inches in loose (un-compacted) thickness, moisture conditioned to optimum moisture content or above, and compacted to a minimum of 92% relative compaction for building pads and 95% relative compaction for paved areas. Relative compaction is to be based on Modified Proctor ASTM D1557. Engineered fill shall be placed in this manner until finish grade is achieved.
3. Over-excavation, soil conditioning, fill placement and compaction as described herein shall extend a minimum of 5' beyond the paving and improvement limits shown on the Project Plans.
4. Refer to the Project Soils Report for test pits locations on the property with the approximate locations shown on Figure 2 therein. It is noted that test pits were loosely backfilled with excavated trench spoils. All test pits located within five (5) feet laterally of the proposed structures or pavement should be excavated and replaced as engineered fill.
5. Borrow excavation for consideration as engineered fill is available within the project clearing area. The location, size and depth of the borrow excavation is included as an attachment to the Contract. The borrow excavation soil material shall be screened to remove existing vegetation, deleterious materials and any other objectionable soil materials. Excavated soil materials without organics may be used as engineered fill with the approval of the Contracting Officers Representative (COR), provided they do not contain debris, or over-sized rocks or boulders.
6. Should import material be used as engineered fill to establish the proper elevations for the proposed project, the import material should be approved by the Soil Engineer before it is brought to the site. Caltrans Class 2 aggregate base may be used as select engineered fill. If import soil is used, it should meet the following requirements:
   a. Have a Plasticity Index no higher than 10;
   b. No more than 15% passing the No. 200 sieve;
   c. No rocks larger than 3 inches in maximum size.
6. Prior to compaction, each layer should be spread evenly and shall be thoroughly blade mixed during the spreading to obtain uniformity of material in each layer. The fill shall be brought to a water content that will permit proper compaction by either (a) aerating the material if it is too wet, or (b) spraying the material with water if it is too dry. Compaction shall be performed by footed rollers or other types of approved compaction equipment and methods. Compaction equipment shall be of such design that they will be able to compact the fill to the specified density. Rolling of each layer shall be continuous over its entire area and the equipment shall make sufficient trips to ensure that the required density has been obtained. No ponding or jetting is permitted to achieve compaction.
5. The standard test used to define maximum densities and optimum moisture content of all compaction work shall be the Laboratory Test procedure ASTM D1557 and field tests shall be expressed as a relative compaction in terms of the maximum dry density and optimum moisture content obtained in the laboratory by the foregoing standard procedure. Field density and moisture tests shall be made in each compacted layer by a qualified soils engineering technician in accordance with Laboratory Test Procedures ASTM D1557 and ASTM D6938, respectively. When footed rollers are used for compaction, the density and moisture tests shall be taken in the compacted material below the surface disturbed by the roller. When these tests indicate that the compaction requirements on any layer of fill, or portion thereof, have not been met, the particular layer, or portion thereof, shall be reworked until the compaction requirements have been met.

PAVING NOTES

The following notes are based on the recommendations included in the "Geotechnical Exploration Report for Ash Creek Helispot" prepared by KC Engineering Company, September 15, 2023, hereinafter referred to as Project Soils Report. The Project Soils Report is incorporated into the contract for this project. Contradictions, if any, between the Project Soils Report and these Project Plans or the Project Technical Specifications shall be referred to the Contracting Officer for resolution.

1. Preparation of subgrade shall be as setforth in the Grading Notes hereon. Prior to placement of aggregate base rock, the subgrade shall be proof rolled and observed for deflection by the COR. Should deflection and/or pumping conditions be encountered, stabilization recommendations from the COR will be provided based on field observations.
2. Areas to receive asphalt pavement shall be cement treated. The upper 18 inches of the treated areas shall comprise the on-site materials modified with Portland cement. The cement treatment should consist of a 4% mixture by dry weight. Based on a unit weight of 95 pcf, a spread rate of 5.7 psf should be applied for the 18-inch mixing depth. The cement treated soils shall be compacted to at least 95% relative compaction.
3. ASPHALT CONCRETE: Asphalt concrete shall be hot mix ½" Type B, PG64-10 conforming with Section 39 of Caltrans Standard Specifications .
6. PORTLAND CEMENT CONCRETE: shall be Type II and mix design shall be 1-1/2" Course Aggregate Gradation with 4000 psi compressive strength at 28 days per Table 501-1. See Sections 501 and 601 of FP-14. Where PCC pavement areas are proposed, the concrete shall be placed on 6" compacted ¾" Class 2 aggregate base rock. Concrete pavement for helipads shall be a minimum of 6 inches thick with No. 4 rebar spaced at 16 inches on center, each way. See Details sheet.
7. REINFORCEMENT: Rebar shall be deformed Grade 60 reinforcing bars and conform to Section 709 of the FP-14 Specifications. Splicing of rebar shall have 24 inch minimum lapping.
8. AGGREGATE BASE SURFACING and subbase shall be minimum 6" compacted in place as shown on the Site Sections and Typical Sections.
9. All aggregate base shall conform to Caltrans Specifications for ¾" Class 2 Aggregate Base (AB).

ABBREVIATIONS

AC	ASPHALT CONCRETE
AB	AGGREGATE BASE (Class 2)
Approx	APPROXIMATELY OR APPROXIMATE
APWA	AMERICAN PUBLIC WORKS ASSOCIATION
BC	BEGINNING OF CURVE
BLDG	BUILDING
CB	CATCH BASIN
CCJ	CRACK CONTROL JOINT
CF	CURB FACE
CIP	CAST IRON PIPE
CL or ℄	CENTERLINE, CLASS
CLF	CHAIN LINK FENCE
CLR	CLEAR or CLEARANCE
CONC	CONCRETE
DBL	DOUBLE
DC	DOUBLE CHECK
DIA	DIAMETER
D/S	DOWNSTREAM
DW	DOMESTIC WATER
E	EAST
EC	END OF CURVE
ELEV	ELEVATION
EP	EDGE OF PAVING
EXIST	EXISTING
FE	FLANGED END
FF	FINISHED FLOOR
FG	FINISHED GRADE
FL	FLOWLINE
FLG	FLANGE
FS	FINISHED SURFACE
FTG	FITTING
F&I	FURNISH AND INSTALL
GB	GRADE BREAK
GLV	GALVANIZED
GSP	GALVANIZED STEEL PIPE
HORZ	HORIZONTAL
HP	HIGH POINT
ID	INSIDE DIAMETER
INT	INTERSECTION
INV	INVERT
L	LEFT or LONG
MIN	MINIMUM
MOC	MIDDLE OF CURVE
N	NORTH
NG	NATIVE GROUND
NPW	NON-POTABLE WATER
NTS	NOT TO SCALE
OC	ON CENTER
OG	ORIGINAL GROUND
OHE	OVERHEAD ELECTRICAL
OVER"X"	OVEREXCAVATION
PC	POINT OF CURVE
PCC	PORTLAND CEMENT CONCRETE
PCF	POUNDS PER CUBIC FOOT
PE	PLAIN END (Pipe)
PLCS	PLACES
PP&L	PACIFIC POWER (Pacific Power & Lighting)
PSI	POUNDS PER SQUARE INCH
PSF	POUNDS PER SQUARE FOOT
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
R	RIGHT
RAD	RADIUS
RC	RELATIVE COMPACTION
REINF	REINFORCEMENT
RET	RETAINING
RP	RADIUS POINT
RW	RESILIENT WEDGE (Gate Valve)
R/W	RIGHT OF WAY
S	SOUTH OR SEWER
S =	SLOPE EQUALS
SCH	SCHEDULE
SD	STORM DRAIN
SS	SANITARY SEWER
STD	STANDARD
STL	STEEL
ST	STREET
TBD	TO BE DETERMINED
TC	TOP OF CURB
TG	TOP OF GRATE
THD	THREAD or THREADED
TW	TOP OF WALL
TYP	TYPICAL
VERT	VERTICAL
W	WEST
W/	WITH

LEGEND

S	EXIST SEWER LINE
W	EXIST WATER LINE
E	EXIST ELECTRICAL LINE
T	EXIST TELCO LINE
OHE	EXIST OVERHEAD ELECTRICAL LINES
GAS	EXIST GAS LINE
	EXIST WATER HYDRANT
	FIRE HYDRANT
	WATER VALVE
W	PROPOSED OFFSITE WATER LINE
OHE	PP&L RELOCATED OVERHEAD ELECTRICAL LINES
E	PROPOSED ELECTRICAL DUCT
T	PROPOSED TELCO DUCT
	CENTERLINE Or CONTROL LINE
	STATE HWY RIGHT OF WAY
3675	EXISTING SURFACE CONTOUR ELEVATION
3676	PROPOSED SURFACE CONTOUR ELEVATION
(3675.1) NG	EXISTING SURFACE SPOT ELEVATION
3675.88 FS	PROPOSED SURFACE SPOT ELEVATION
	APPROXIMATE GRADING DAYLIGHT LIMITS
	¾" CLASS 2 AGGREGATE PAVED AREAS
	4000' PSI REINFORCED CONCRETE PAVEMENT (HELIPAD)
	AGGREGATE PAVING AND SUBGRADE PREPARATION FOR CONCRETE: MINIMUM 6" COMPACTED CLASS 2 AGGREGATE BASE.
	SCREENING, OVEREXCAVATION AND COMPACTION OF SUBGRADE
	Compacted or Undistrubed Earth

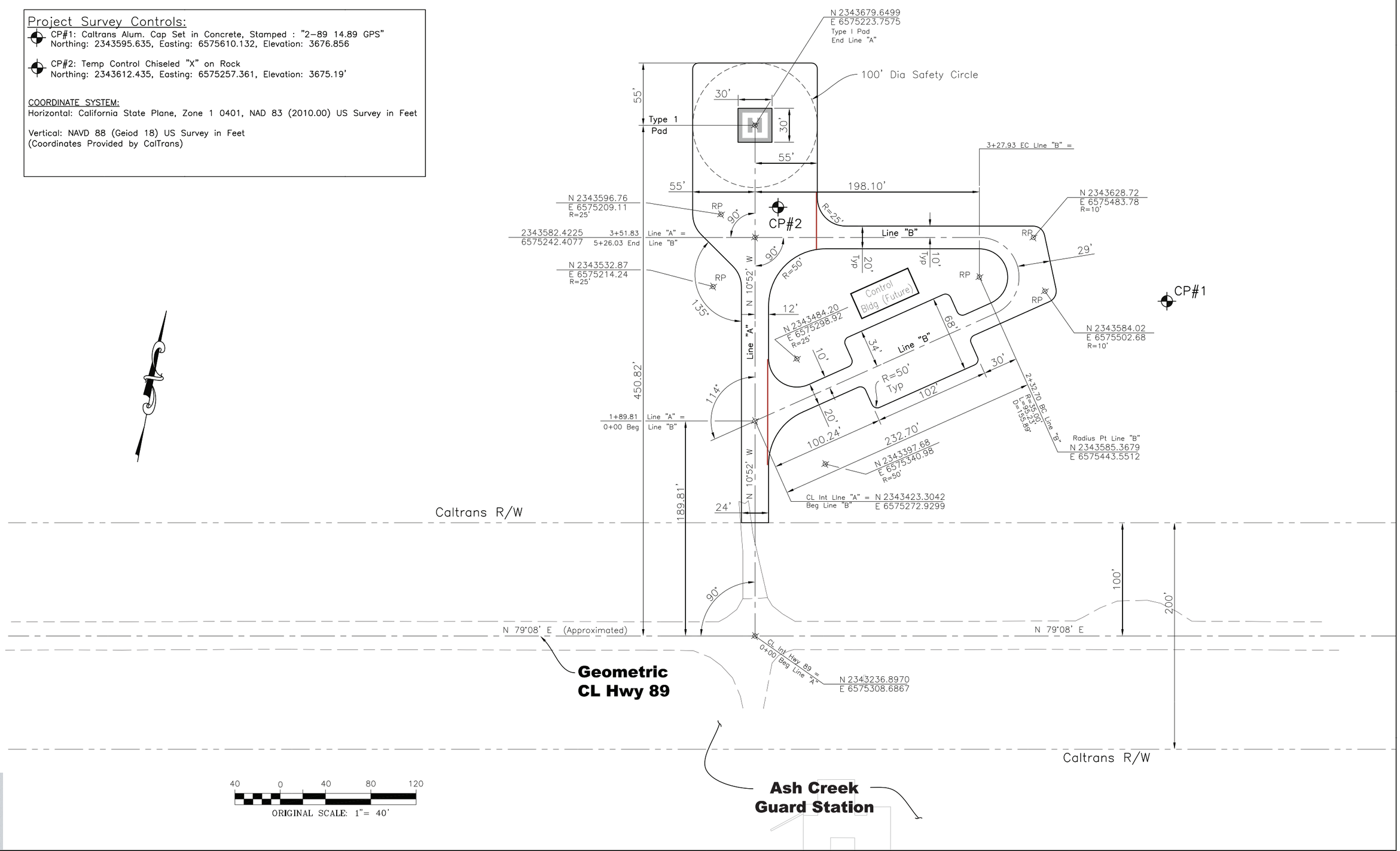
Project Survey Controls:

CP#1: Caltrans Alum. Cap Set in Concrete, Stamped : "2–89 14.89 GPS"
Northing: 2343595.635, Easting: 6575610.132, Elevation: 3676.856

CP#2: Temp Control Chiseled "X" on Rock
Northing: 2343612.435, Easting: 6575257.361, Elevation: 3675.19'

COORDINATE SYSTEM:
Horizontal: California State Plane, Zone 1 0401, NAD 83 (2010.00) US Survey in Feet

Vertical: NAVD 88 (Geiod 18) US Survey in Feet
(Coordinates Provided by CalTrans)



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
SHASTA–TRINITY NATIONAL FOREST
REDDING, CALIFORNIA

Ash Creek Helispot
Phase 1

Survey Control Plan

DESIGNED: K. Nolan	DATE: 08/2024		
DRAWN: K. Nolan	DATE: 08/2024		
CHECKED:	DATE:		

DATE	REVISION	BY
XX/XX/XX	1 XXXXXXXX	XX

DRAWING ID
C–1

Sheet 3 of 9

LEGEND

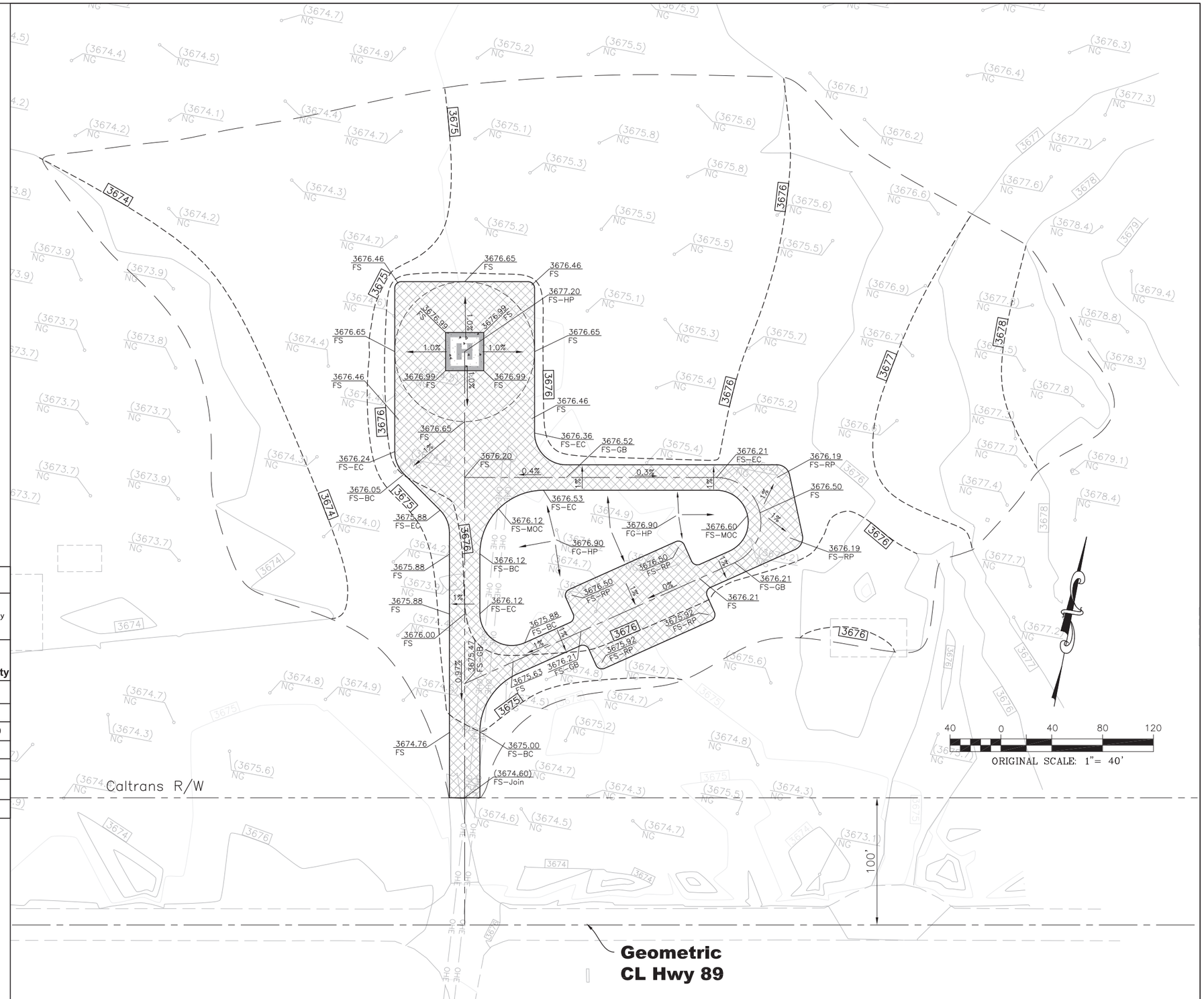
- CENTERLINE Or CONTROL LINE
- STATE HWY RIGHT OF WAY
- 3675 — EXISTING SURFACE CONTOUR ELEVATION
- 3676 — PROPOSED SURFACE CONTOUR ELEVATION
- (3675.1) NG — EXISTING SURFACE SPOT ELEVATION
- 3675.88 FS — PROPOSED SURFACE SPOT ELEVATION
- APPROXIMATE GRADING DAYLIGHT LIMITS
- AGGREGATE PAVED AREAS: MINIMUM 6" COMPACTED CLASS 2 AGGREGATE BASE. SEE SITE SECTIONS.
- 6" REINFORCED CONCRETE PAVEMENT (HELIPAD) OVER MINIMUM 6" COMPACTED CLASS 2 AGGREGATE BASE. SEE SITE SECTIONS. SEE SHEET 8 OF 9 FOR DETAILS.

NOTE:
SEE SHEET 2 OF 9 FOR GRADING AND PAVING NOTES.

SUMMARY OF QUANTITIES OF MAJOR ITEMS OF EARTHWORK & PAVING

Note: The items below are not necessarli the contract pay items, but represent an estimate only and are provided as a convenience to the contractor. Not all work element quantities are listed below but rather, in the opinion of the engineer, represent the major items of work. The contractor is encouraged to thoroughly familiarize themselves with the Contract, Project Plans and Specifications, and site conditions to best understand the entire scope of work.

Statement of Work Section	Description	Units	Quantity
A	Mobilization, Temp Traffic Control, Survey Staking and Demobilization	L.S.	1
B	Clearing & Grubbing	AC	7
C	Overexcavation, Screening & Recompaction	C.Y.	6700
C	Borrow Excavation, Engineered Fill Placement & Grading	C.Y.	3200
D	Furnish & Place Class 2 Aggregate Base & Finish Grade	C.Y.	800
E	Construct Reinforced Concrete Helipad	C.Y.	19
F	Paint Helipad Designation Markings	L.S.	1



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
SHASTA–TRINITY NATIONAL FOREST
REDDING, CALIFORNIA

Ash Creek Helispot
Phase 1

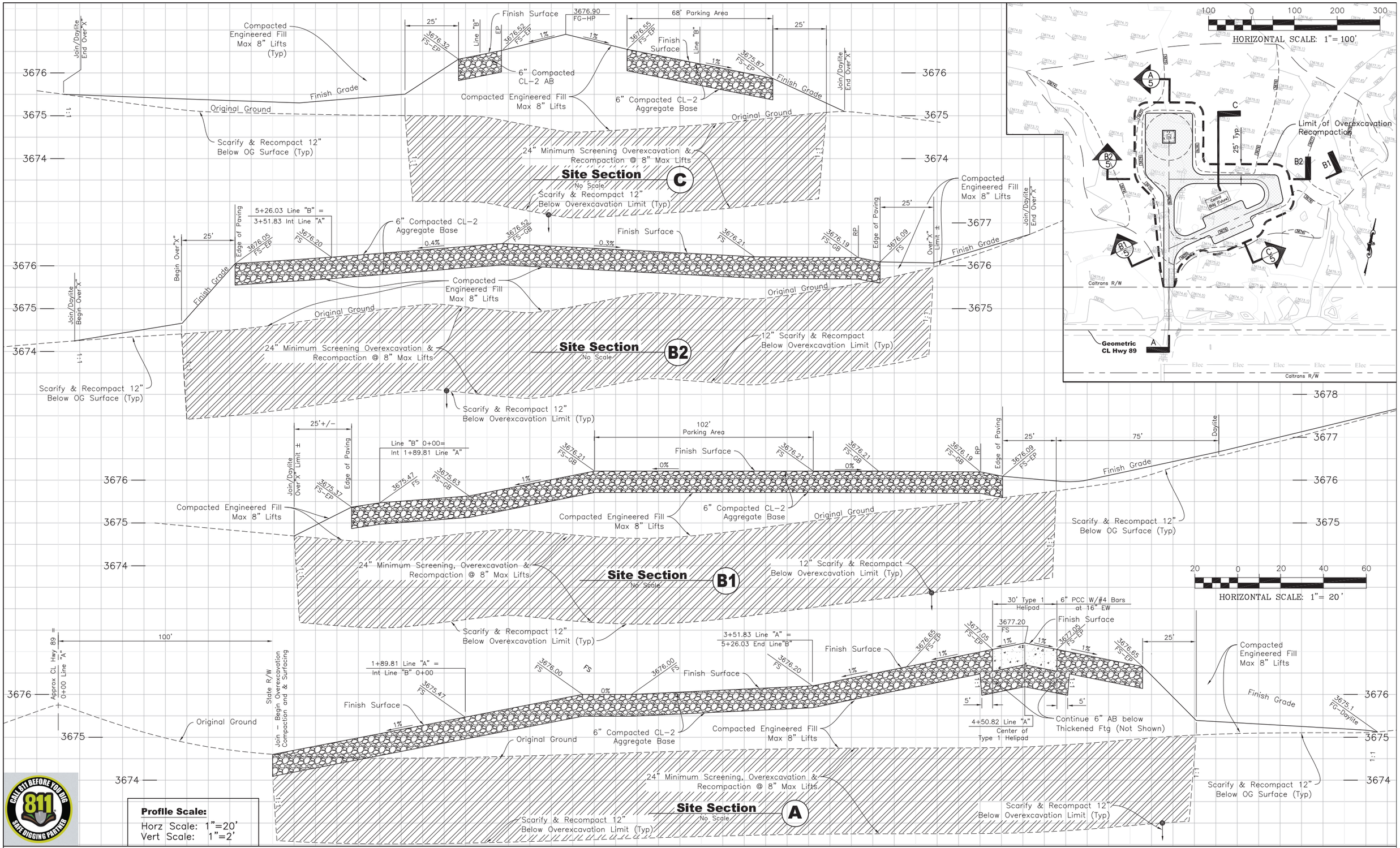
Grading & Paving Plan

DESIGNED:	K. Nolan	DATE:	08/2024
DRAWN:	K. Nolan	DATE:	08/2024
CHECKED:	T. Moxness	DATE:	09/2024

DATE	REVISION	BY
XX/XX/XX	1 XXXXXXXX	XX

DRAWING ID
C–2

Sheet 4 of 9



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
SHASTA–TRINITY NATIONAL FOREST
REDDING, CALIFORNIA

Ash Creek Helispot
Phase 1

Site Sections

DESIGNED: K. Nolan	DATE: 08/2024		
DRAWN: K. Nolan	DATE: 08/2024		
CHECKED:	DATE:		

DATE	REVISION	BY
XX/XX/XX		XX

DRAWING ID
C–3

Sheet 5 of 9

WATER LINE CONSTRUCTION NOTES

1. Furnish and Install 3" Sch 80 PVC Pipe & Fittings, Including but not Limited to Trenching & Backfill, Joint Sealants, Couplings, GSP Fittings, Thrust Blocks, Polyethylene Wrap, and Tracer Wire. See Plan Hereon, Typical Sections, Details Sheets and Supplemental Notes for Trench Conditions, Pipe Bedding & Backfill, Surfacing & Related Requirements.
2. Join Existing 3" PVC Water Line per Connection Detail 1, Sheet 7 of 8, Including but not necessarily limited to, Trenching & Backfill, Existing Pipe Preparation, Furnishing and Installing Sch 80 PVC Pipe, Pipe Bedding, Transition Coupling, 3" Swing Check Valve, Valve Boxes, Pipe Supports, GSP Fittings, Unions, Couplings, Joint Sealants, Polyethylene Wrap, Thrust Blocks, and Tracer Wire, Complete.
3. Cut, Remove and Dispose Interfering Portions of Existing 3" PVC Water Line and Appurtenances Through Limits Indicated on Plan and/or Details. Abandon Remaining Water Line in-place.
4. Join Existing 4" CIP Water Line per Connection Detail 2, Sheet 7 of 8, Including but not Necessarily Limited to, Trenching and Backfill, Exist Pipe Preparation, Pipe Bedding, Furnishing and Installing 3" Sch 80 PVC Pipe, 4" & 3" Transition Couplings & GSP Nipples, PVC Couplings & Unions, Joint Sealants, Polyethylene Wrap, Tracer Wire, Backfill, and as Otherwise Shown on Details Sheets Complete.
5. Remove Existing 3" Gate Valve, Valve Box and Interfering Appurtenances, and Join Exist 4" CIP to Exist 3" PVC Pipe per Detail 3, Sheet 7 of 8, Including but not Necessarily Limited to, Trenching & Backfill, Pipe Removal, Pipe Preparation, Pipe Bedding, 3" and 4" GSP Nipples, 4" CIPx4" GSP Transition Coupling, 4"x3" GSP Reducer, 3"x3" Trans Coupling, Joint Sealants, Polyethylene Wrap, Tracer Wire, and as Otherwise Shown on Detail Sheets Complete.
6. Furnish and Install Mueller Dry Barrel Fire Hydrant No. FH 15, 2-1/8" Std with Two 2-1/2" Nozzles with Threaded Shoe, 3" Gate Valve and Swing Check Valve Assemblies, 3" Gate Valve Stub and Valve Box, per Detail 4, Sheet 7 of 8, Including but not Necessarily Limited to, Pipe Preparation, Pipe Bedding and Valve Boxes, Pipe Supports, 2" & 3" GSP Fittings & Couplings, Flanged Joint Gaskets, Pipe Joint Sealants, Sch 80 PVC Pipe & Fittings, Polyethylene Wrap on GSP Materials, Backfill and as Otherwise Shown on Detail Sheets Complete.
7. Furnish and Install Mueller Dry Barrel Fire Hydrant No. FH 15, 2-1/8" Std with Two 2-1/2" Nozzles with Threaded Shoe, 3" Gate Valve and Swing Check Valve Assemblies, per Detail 5, Sheet 7 of 8, Including but not Necessarily Limited to, Pipe Preparation, Pipe Bedding and Valve Boxes, Pipe Supports, 2" & 3" GSP Fittings & Couplings, Flanged Joint Gaskets, Pipe Joint Sealants, Sch 80 PVC Pipe & Fittings, Polyethylene Wrap on GSP Materials, Backfill and as Otherwise Shown on Detail Sheets Complete.
8. Furnish and Install Watts 3" Double Check Valve Assembly (Model 757NRS) per Detail 6, Sheet 7 of 8, Including but not Necessarily Limited to, Trenching & Backfill, Removing Interfering Portions of Existing 3" PVC Pipe, Pipe Preparation, Pipe Bedding, Furnishing and Installing 3" GSP Nipples, 3" CIP Flanged Fittings & Spools, 3" GSP Threaded Adaptors, Transition Couplings, Polyethylene Wrap, Reinf Concrete Slab, "Safe-T-Cover" Enclosure, Tracer Wire, and as Otherwise Shown on Detail Sheets Complete.
9. Furnish and Install 3" Gate Valve on Existing 3" PVC Line with New Valve Box per Detail 6, Sheet 7 of 8, Including but not Necessarily Limited to, Trenching & Backfill, Remove Interfering Portions of Exist 3" PVC Pipe, Pipe Preparation, Furnishing and Installing GSP Nipples, Transition Couplings, RW Gate Valve, Valve Box, Polyethylene Wrap, Tracer Wire, and as Otherwise Shown on Detail Sheets Complete.
10. Furnish and Place Concrete Thrust Block at Joints, Fittings, & Pipe Angle Point. Thrust Block to be 80-Pound Sack of Quikcrete or Sakcrete Placed Snug Against Fitting and Undisturbed Trench Wall. Thrust Block to be Placed After Fitting Adhesive has Cured.
11. Furnish and Install 17"x30" Valve Box, a "Duralite" Product Model 1730 (heavy duty) Available from OldCastle Infrastructure. Valve Box Depth Shall Be a Minimum of 30 Inches. Valve Box Cover Shall Be Polymer Concrete with Embossed "Water".
12. Furnish and Install 24"x36" Valve Box, a "Duralite" Product Model 2436 (heavy duty), Available from OldCastle Infrastructure. Valve Box Depth Shall Be a Minimum of 30 Inches. Valve Box Cover Shall Be Polymer Concrete with Embossed "Water".

Electrical & Communications Duct Construction Notes

60. Furnish and Install One (1) Electrical Grade 3" Sch 80 PVC Conduit, Sweeps and Fittings. Materials and Installation, Including but not Necessarily Limited to, Conduit Materials, Pipe Bedding, Backfill, Pull Line, End Plugs, and Conduit Proofing, per Pacific Power Requirements.
61. Furnish and Install One (1) Communications Grade 2" Sch 80 PVC Conduit, Sweeps and Fittings in Joint Trench with Electrical Conduit. Maintain specs as per Elec Conduits Requirements for PP&L.
62. Furnish and Install 24"x36" Conduit Pull Box, a "Duralite" Product 2436 (heavy duty) Available from OldCastle Infrastructure. Pull Box Depth Shall Be a Minimum of 24" Depth. Pull Box Cover Shall Be Polymer Concrete with Embossed "Electric".
63. Existing Overhead Electrical Lines and Poles to Be Removed and Relocated by Pacific Power.
64. Locate and Remove Interfering Legacy Phone Cable and Pedestal to Outside the Grading Area.

Electrical & Communications Duct General Notes

1. See sheet 9 of 9 for PP&L general underground service requirements to be installed by contractor. Sheet 9 provided to the contractor for their convenience but should not be construed as entirely complete.
2. Contractor shall comply with all requirements of electrical underground service (duct bank) in accordance with PP&L requirements. The contractor is directed to PP&L's 2022 Electrical Service Requirements Manual as well as PP&L Policy No. 343 (September 2021) for the complete electrical underground requirements.
3. When crossing other utilities (e.g., water line), set water line low enough below electrical lines in order to maintain 12" of vertical clearance between utilities as well as a minimum of cover of 24" above electrical conduits. Document installation with photos demonstrating clearance with photos and measurements if PP&L is not present during installation.
4. Termination of conduits in pull boxes shall be with required minimum radius sweep and removable conduit end plugs.

SUPPLEMENTAL WATER INSTALLATION NOTES:

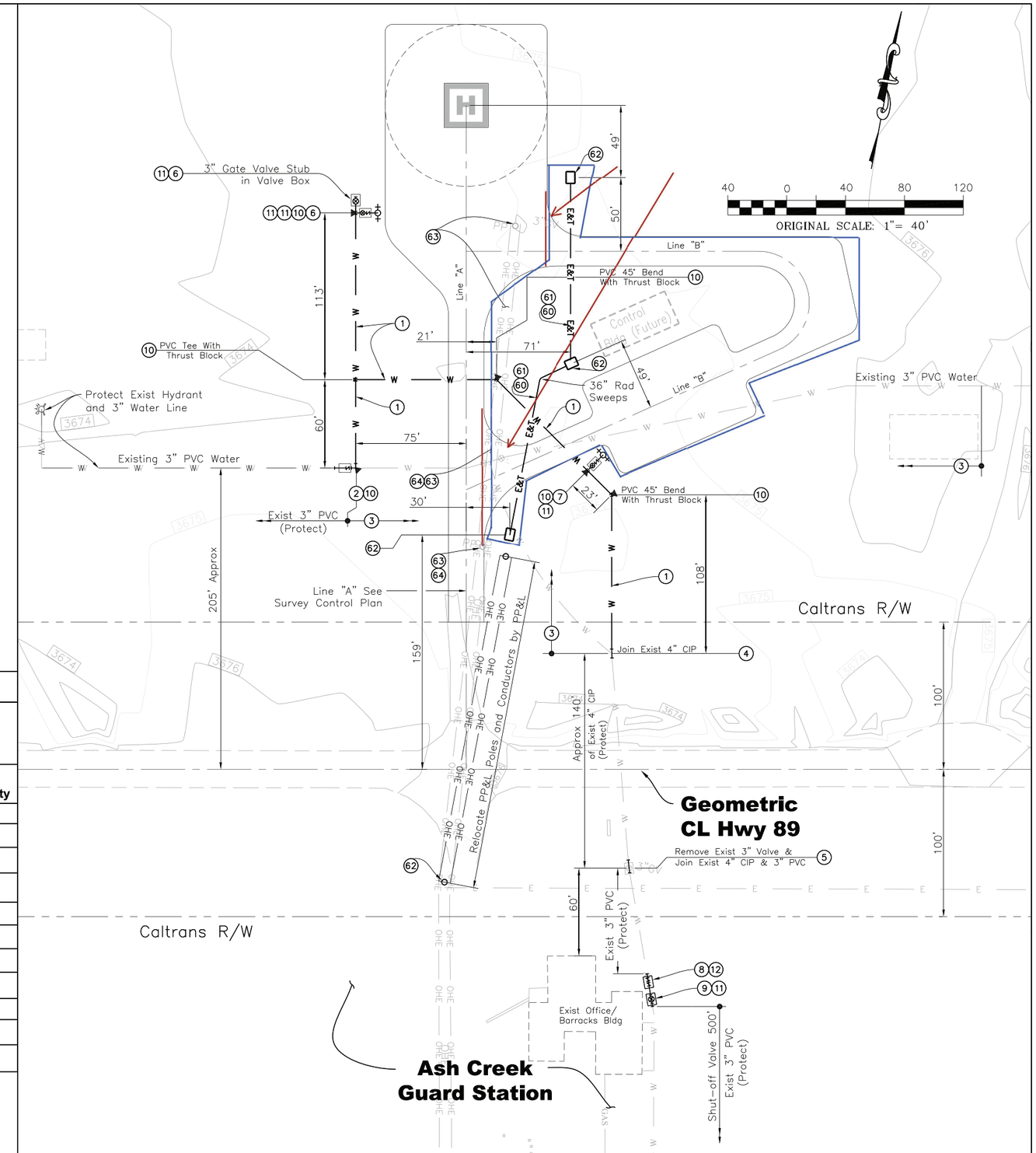
ALL WORK ASSOCIATED WITH THE FOLLOWING NOTES AND INDICATED ON THESE PLANS ARE THE CONTRACTOR'S RESPONSIBILITY, UNLESS NOTED OTHERWISE.

1. All water lines shown on these plans are U.S. Government property. Installation is subject to inspection and approval by the Contracting Officer's Representative (COR).
2. Minimum Depth of Cover Shall be Per Typical Sections, Sheet 8.
3. The proposed potable water system improvements shall conform to the Project Plans, the project Technical Specifications, applicable sections of the APWA "Greenbook", American Water Works Association specifications, and the California Plumbing Code (CPC), latest editions, including construction materials, methods and separation requirements.
4. Contractor to field verify existing pipe line sizes and materials, and connection points to existing water systems, prior to initiating modifications and installations of new components.
5. Excess excavation spoils and unsuitable material shall be disposed of away from Federal Lands. Final grade shall be groomed flush with adjacent grade and cleared of any debris or cobble. See Grading & Paving Plan.
6. Pipe trenches for water lines shall be a minimum of 12" wide with trench walls a minimum of 4" but no more than 6" clear from sides of pipe.
7. The trench Pipe Zone is as follows: pipe bedding shall be minimum 4" clean sand below the pipe and extending to 6" above the crown of the pipe. Place #10 insulated tracer wire and secure to Pipe with Tape. Lay "Water Line" locator warning tape per Typical Sections. Backfill above the pipe zone shall be clean fill with rocks no greater than 3" diameter as shown in the Typical Sections or as otherwise required by the COR.
8. All buried galvanized, cast iron, ductile iron and other metallic pipe and fittings shall be polyethylene wrapped and taped in accordance with AWWA C105 Standard prior to backfill. Cast Iron and ductile iron, pipe, spools and fittings shall be interior lined and coated per ANSI/AWWA C104/A21.4 and exteriors shall be factory epoxy coated.
9. Hardware for all flanged fittings shall be 316 Stainless Steel.
10. All flanged fittings shall include manufacturer recommended gaskets. All sealants for plain and threaded pipe shall be as recommended by pipe manufacturer and meet NSF requirements for potable water systems.
11. Tracer wire shall be insulated (coated) copper stranded tracer wire, #10 gauge. Tracer wire shall be laid above and taped to PVC water pipe, as shown on Typical Sections. Provide minimum 30" spooled slack of tracer wire in valve boxes. Tracer wire shall not be wrapped around pipe or pipe fittings.
12. Items indicated to be removed shall become the property of the contractor and disposed outside government land and in a manner consistent with state and local regulations, unless noted otherwise.
13. Contractor to coordinate with COR for water system operation (shut down, draining or pressurizing) and provide minimum 48 hours notice of changes required in water system operation.
14. Contractor to disinfect water main in accordance with the California State Division of Drinking Water, sample and test for bacteria contamination by a State certified laboratory. Sampling and testing shall be repeated until laboratory results indicate absence of Total Coliform and E. Coli bacteria.
15. Any bend 45° or greater (horizontally or vertically) shall have thrust blocks installed. Thrust blocks shall be a minimum of 0.6 cubic feet per (one 80 lb Sakcrete) and set firm between pipe fitting and undisturbed trench wall (or 90% relative compacted backfill).
16. When crossing electrical lines, set water line low enough below electrical lines in order to maintain 12" of vertical clearance between utilities as well as a minimum of cover of 24" above electrical conduits. Document installation with photos demonstrating clearance with photos and measurements if PP&L is not present during installation.
17. Contact underground utility services via Dial 811 and follow markout, notification and related procedures before any excavation work.

SUMMARY OF QUANTITIES OF MAJOR ITEMS OF UTILITY WORK

NOTE: The items below are not necessarily the contract quantities nor pay items, but represent an estimate only and are provided as a convenience to the contractor. Not all work element quantities are listed below but rather, in the opinion of the engineer, represent the major items of work. The contractor is encouraged to thoroughly familiarize themselves with the Contract, Project Plans and Specifications, and site conditions to best understand the entire scope of work.

Statement of Work Section	Description	Units	Quantity
G	Furnish & Install 3" Schedule 80 PVC Pipe	L.F.	492
H	Join Existing 3" Water Line per Detail 1, Sht 7	L.S.	1
I	Furnish & Install FH Lateral with Gate Valve, Check Valve & Valve Boxes per Details 4 & 5, Sht 7	EA	2
J	Furnish & Install 3" Gate Valve/Stub in Valve Box per Detail 4, Sht 7	L.S.	1
K	Construct Connection to 4" CIP per Detail 2, Sht 7	L.S.	1
L	Remove Existing 3" Gate Valve per Detail 3, Sht 7	L.S.	1
M	Furnish & Install 3" Gate Valve & 3" Dbl Check Valve with Valve Boxes, DC Valve Enclosure per Detail 6, Sht 7	L.S.	1
N	Furnish & Install Water Line Marker per Detail 7, Sht 7 Locations T.B.D.	EA	2
O	Pressure Test/Leak Test Water Line	L.S.	1
P	Disinfect, Sample & Test Potable Water System	L.S.	1
Q	Furnish & Install Electrical and Communications Duct Bank	L.F.	260



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
SHASTA-TRINITY NATIONAL FOREST
REDDING, CALIFORNIA

Ash Creek Helispot
Phase 1

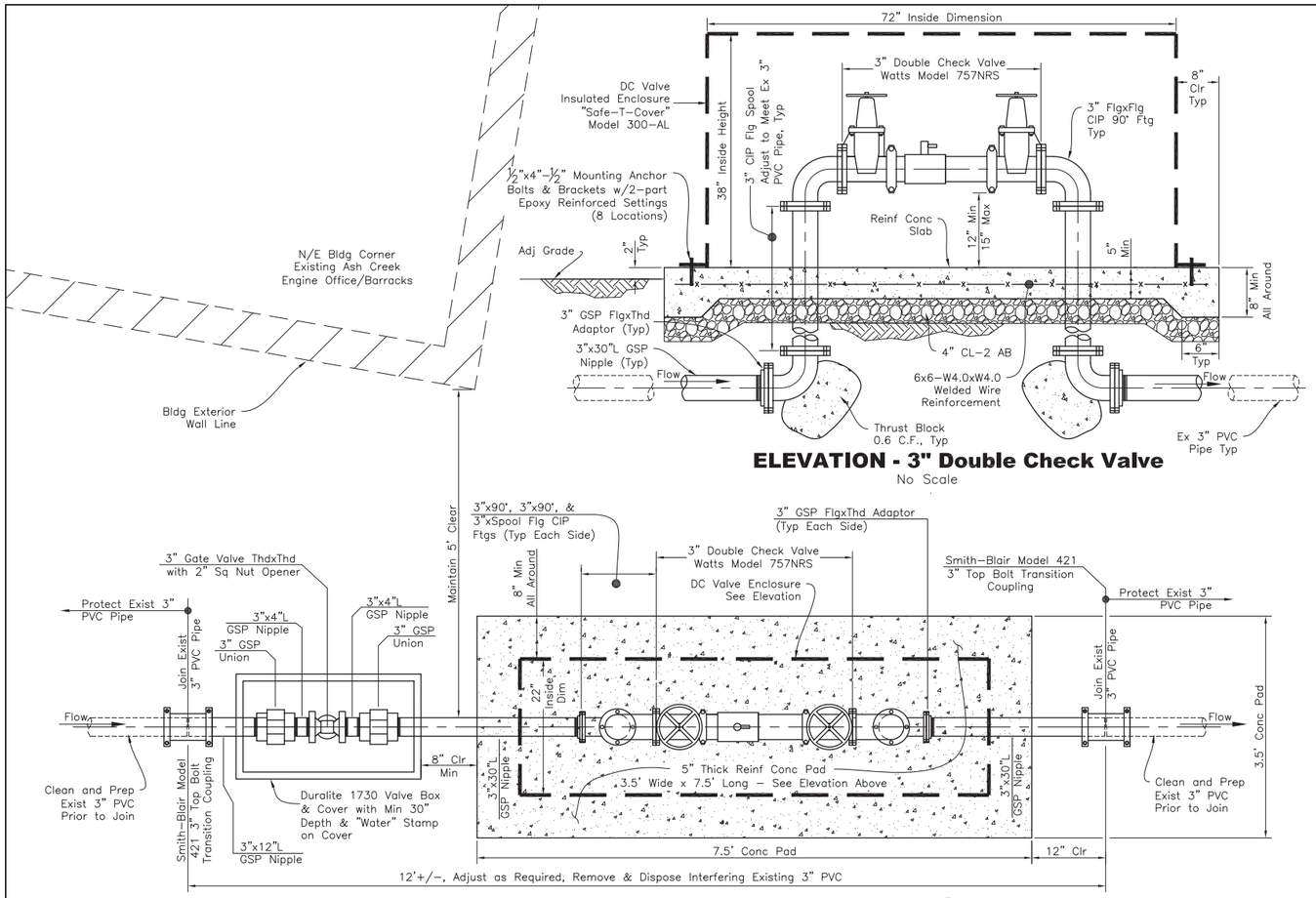
Utility Plan

DESIGNED:	K. Nolan	DATE:	08/2024
DRAWN:	K. Nolan	DATE:	08/2024
CHECKED:		DATE:	

DATE	REVISION	BY
XX/XX/XX	1 XXXXXXXX	XX

DRAWING ID
C-4

Sheet 6 of 9



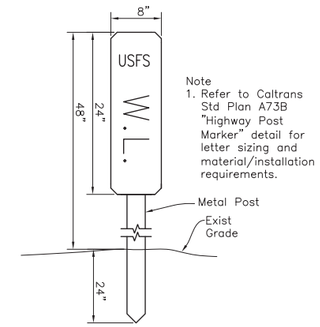
ELEVATION - 3" Double Check Valve

No Scale

3" Gate Valve & 3" Double Check Valve Detail

No Scale

6

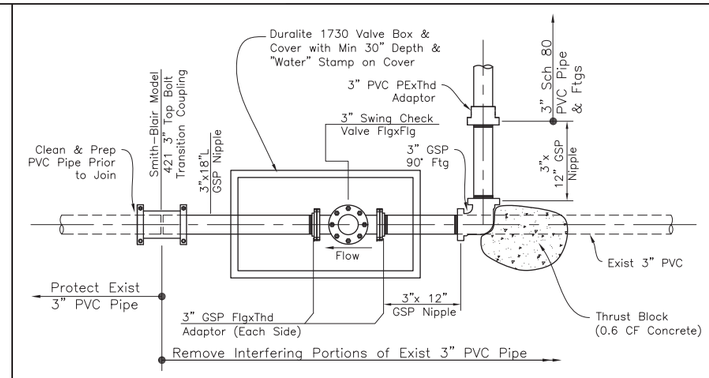


Note
1. Refer to Caltrans Std Plan A73B "Highway Post Marker" detail for letter sizing and material/installation requirements.

"Waterline" Marker

No Scale

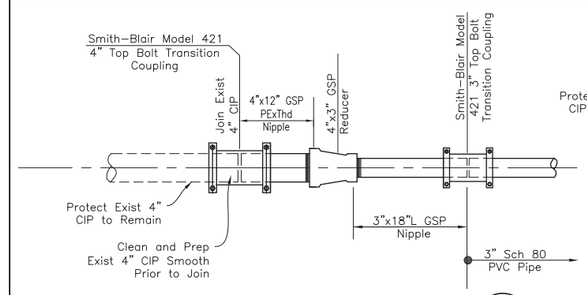
7



Join Exist 3" PVC Detail

No Scale

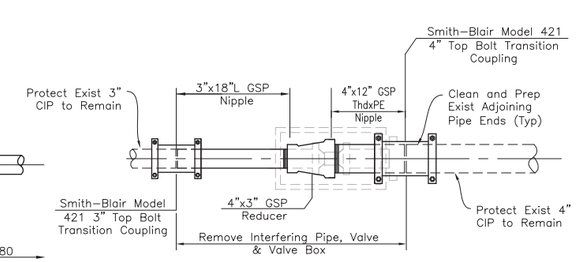
1



Join Exist 4" GSP Detail

No Scale

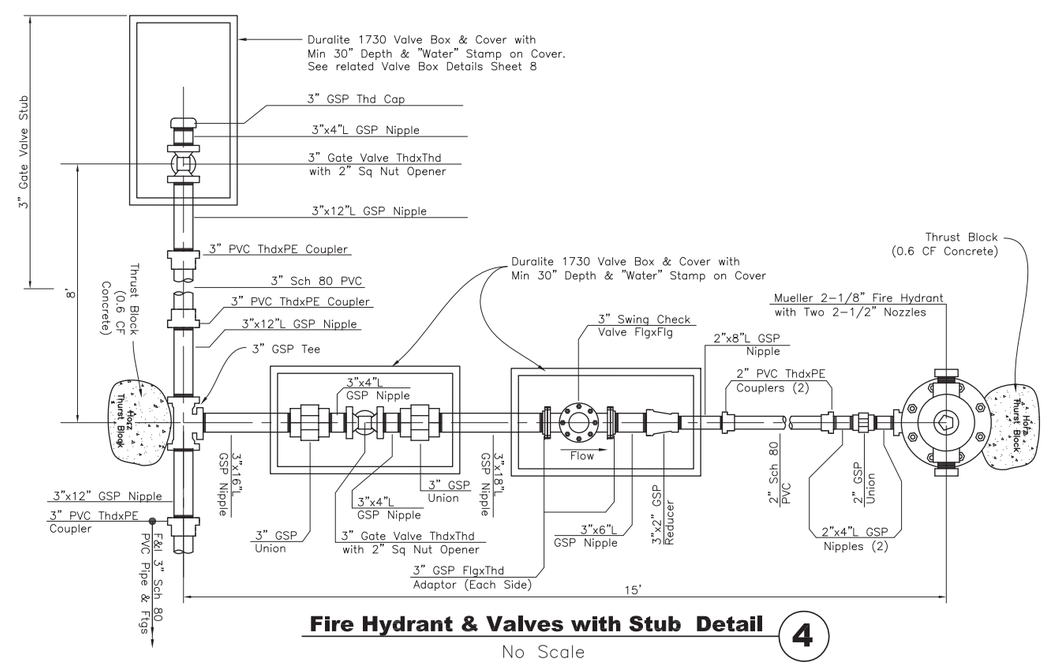
2



Remove Exist 3" Gate Valve

No Scale

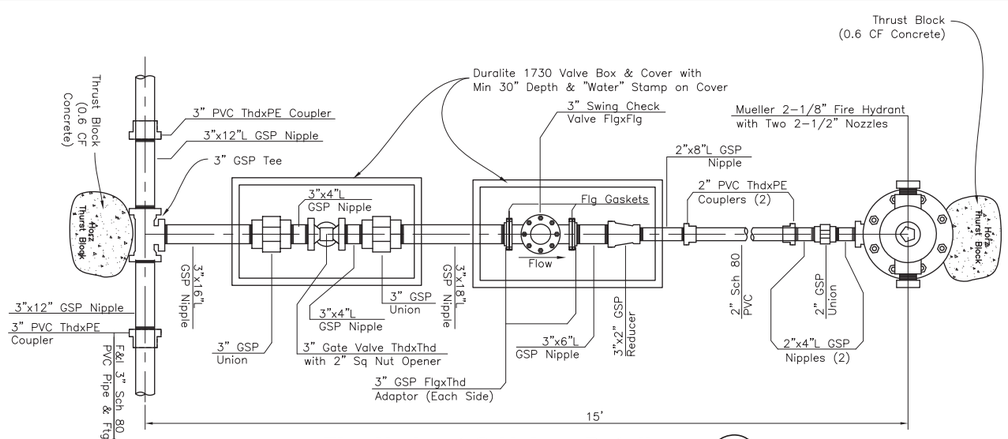
3



Fire Hydrant & Valves with Stub Detail

No Scale

4



Fire Hydrant & Valves Detail

No Scale

5

General Notes

1. See Utility Pan, Sheet 6 for full list of water system general notes.
2. See Sheet 8 for related Valve/Pull Box installation details.
3. All buried galvanized, cast iron, ductile iron and other metallic pipe and fittings shall be polyethylene wrapped and taped in accordance with AWWA C105 Standard prior to backfill. Cast Iron and ductile iron pipe, spools and fittings shall be interior lined and coated per ANSI/AWWA C104/A21.4 and exteriors shall be factory epoxy coated.
4. All flanged fittings shall include manufacturer recommended gaskets. All sealants for plain and threaded pipe shall be as recommended by pipe manufacturer and meet NSF requirements for potable water systems.

CALL 811 BEFORE YOU DIG 811 SAFE DIGGING PARTNER

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
SHASTA-TRINITY NATIONAL FOREST
REDDING, CALIFORNIA

Ash Creek Helispot
Phase 1

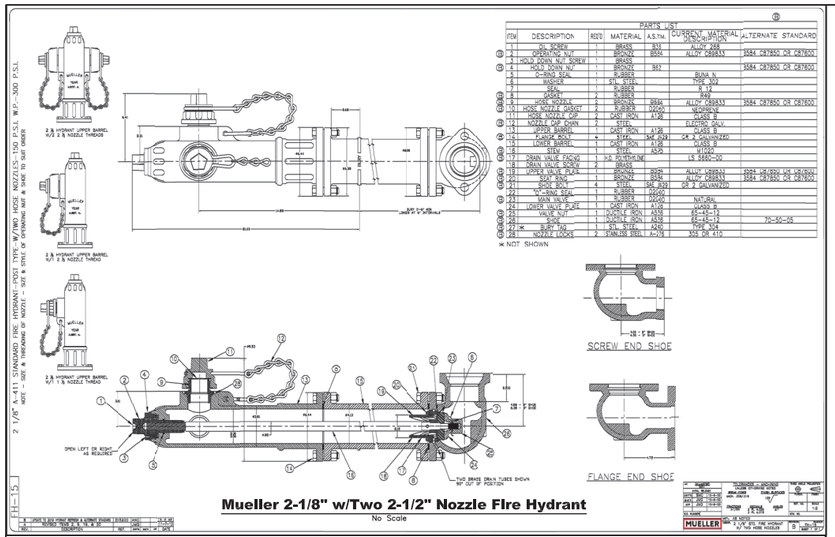
Miscellaneous Details

DESIGNED: K. Nolan	DATE: 08/2024		
DRAWN: K. Nolan	DATE: 08/2024		
CHECKED:	DATE:		

DATE	REVISION	BY
XX/XX/XX	1 XXXXXXXX	XX

DRAWING ID
C-5

Sheet 7 of 9

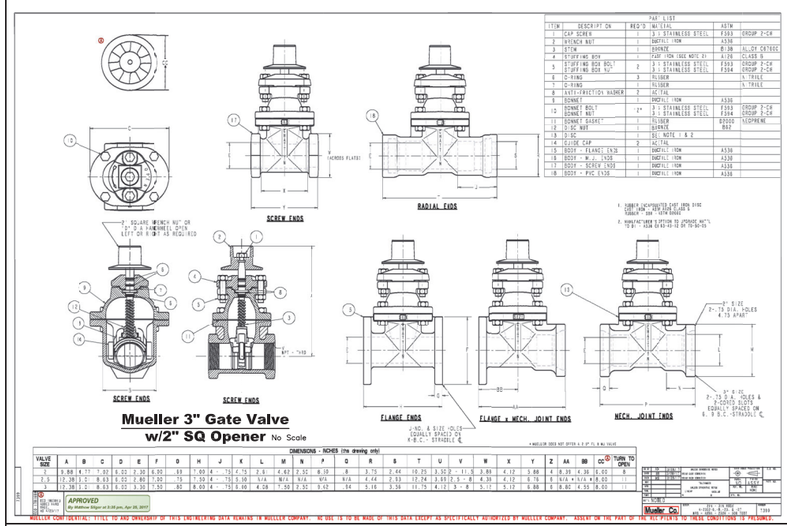


ITEM	DESCRIPTION	REQ'D	MATERIAL	ASTM	CURRENT MATERIAL DESIGNATION	ALTERNATE STANDARD
1	OIL SCREW	1	BRASS	B16	ALLOY 268	
2	OPERATING NUT	1	BRONZE	B584	ALLOY C86500	B584 C87850 OR C87600
3	HOLD DOWN NUT SCREW	1	BRASS			
4	HOLD DOWN NUT	1	BRONZE	B62		B584 C87850 OR C87600
5	O-RING SEAL	1	RUBBER		BUNA N	
6	WASHER	1	STL STEEL		TYPE 302	
7	SEAL	1	RUBBER		B 14	
8	GASKET	2	RUBBER		B49	
9	HOSE NOZZLE	2	BRONZE	B584	ALLOY C86500	B584 C87850 OR C87600
10	HOSE NOZZLE GASKET	2	RUBBER	D2000	NEOPRENE	
11	HOSE NOZZLE CAP	2	CAST IRON	A126	CLASS B	
12	NOZZLE CAP CHAIN	2	STEEL		ELECTRO GALV.	
13	UPPER BARREL	1	CAST IRON	A126	CLASS B	
14	FLANGE BOLT	*	STEEL	B6, B18	OR 2 GALVANIZED	
15	LOWER BARREL	1	CAST IRON	A126	CLASS B	
16	STEM	1	STEEL	A576	M1020	
17	DRAIN VALVE FACING	1	NOT PLATED/TIN		LS 5460-00	
18	DRAIN VALVE SHOE	2	BRASS			
19	DRAIN VALVE PLATE	1	BRONZE	B584	ALLOY C86500	B584 C87850 OR C87600
20	STOP RING	1	BRONZE	B584	ALLOY C86500	B584 C87850 OR C87600
21	SHOE BOLT	1	STEEL	B6, B18	OR 2" GALVANIZED	
22	"O"-RING SEAL	1	RUBBER	D6630		
23	MAIN VALVE	1	RUBBER	D4020	NATURAL	
24	LOWER VALVE PLATE	1	CAST IRON	A126	CLASS B	
25	VALVE NUT	1	BRONZE	B584	ALLOY C86500	
26	VALVE	1	CAST IRON	A126	CLASS B	70-50-05
27	BUSHING	1	BRONZE	B584	ALLOY C86500	
28	SLIP TYP	1	STEEL	A240	TYPE 304	
29	NOZZLE LOCKS	2	STAINLESS STEEL	A-276	305 OR 410	

* NOT SHOWN

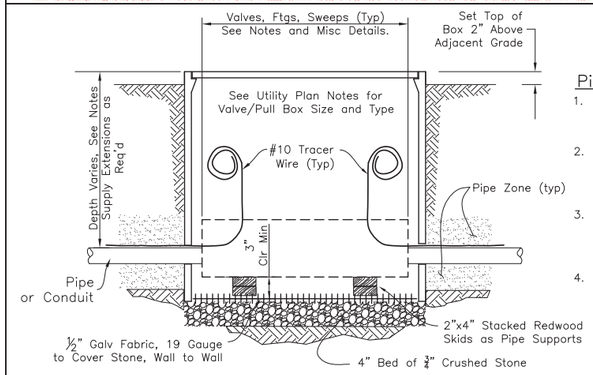
Mueller 2-1/8" w/Two 2-1/2" Nozzle Fire Hydrant

No Scale



Mueller 3" Gate Valve w/2" SQ Opener

No Scale



Typical Valve/Pull Box Detail

No Scale

Pipe Support Notes

1. Pipe Supports to be 2"x4" redwood or treated lumber skids. Minimum of two pipe support locations per valve box.
2. Set on galvanized fabric and stack a minimum of two, or more if necessary, for a snug fit up against the underside of the pipe nipple or suitable fitting.
3. Space pipe supports for balanced support within the box. Do not set pipe supports at Unions which might encumber joint from ready disassembly.
4. Pipe supports not required for Electrical/Communication Pull Boxes.

4.2 MUELLER® 2"-12" SWING TYPE GRAVITY OPERATED CHECK VALVES - FL. X FL.

Rev. 9-14 Shaded area indicates change

- Catalog number—
  A-2600-06BB flanged ends, with bronze disc facing
  A-2602-06B1 flanged ends, with rubber disc facing
- Sizes – 2", 2-1/2", 3", 4", 6", 8", 10", 12"
- Meets all applicable parts of ANSI/AWWA C508 Standard
- Epoxy coated interior & exterior for corrosion resistance
- Certified to ANSI/NSF 61
- Flanged end dimensions and drilling comply with ANSI B16.1
- Iron body, bronze mounted (IBBM)
- Choice of bronze or rubber disc facing
- For horizontal installation only
- O-ring sealed stuffing box
- Swing type, gravity operated
- 200 psig (1400 kPa/14 barg) maximum working pressure, 400 psig (2800 kPa/28 barg) test pressure

A-2600-06BB

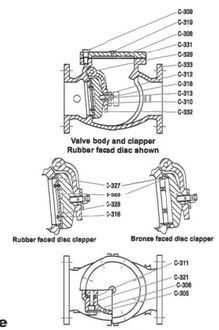
Options

- PN 10/PN 16 Flange Drilling 4"-12"
- Stainless Steel Nuts & Bolts
- Tappec Bosses

Check Valve Parts (2011-present)

Catalog Part No.	Description	Material	Material Standard
C-305	Hinge Plug	Brass	ANSI B21
C-308	Gasket	Rubber	ASTM D2000, BK 807
C-309	Cover Bolt	Zinc Coated Steel	ASTM A307 Grade B
C-310	Washer	Brass	ANSI B21
C-311	Spacer	Brass	ANSI B21
C-312	Disc Nut	Brass	ANSI B21
C-313	Disc Stud	Brass	ANSI B21
C-318	Pin	Stainless Steel	ASTM A276 Type 304
C-319	Test Plug	Malleable Iron	ASTM A47
C-321	Hinge Pin	Stainless Steel	ASTM A276 Type 304
C-327	Body Seat Ring	Bronze	ANSI B62
C-329	Arm	Ductile Iron	ASTM A536 ▼
C-331	Cover	Cast Iron	ASTM A126 Cl. B
C-332	Disc	Cast Iron	ASTM A126 Cl. B
C-333	Body	Cast Iron	ASTM A126 Cl. B
Rubber Faced Disc Parts			
C-316	Disc Seat Bolt	Stainless Steel	ASTM A276 Type 304
C-326	Disc Seat Ring	Rubber	ASTM D2000, BK 807
C-328	Seat Holder	Cast Iron*	ASTM A126 Cl. B
Bronze Faced Disc Parts			
C-326	Disc Seat Ring	Bronze	ANSI B62

*2"- 6" sizes are cast iron, ASTM A126 Cl. B, 8"- 12" sizes are ductile iron ASTM A536
▼ Material strength ASTM A536 65-45 minimum



Mueller 3" Swing Check Valve

No Scale

Available Models

Suffix:

- NRS – non-rising stem resilient seated gate valves
- OSY – UL/FM outside stem and yoke, resilient seated gate valves
- BFG – UL/FM grooved gear operated butterfly valves with tamper switch
- QT – 2½", 3" and 4" quarter-turn ball valves
- **OSY FxG – Flanged inlet gate connection and grooved outlet gate connection
- **OSY GxF – Grooved inlet gate connection and flanged outlet gate connection
- **OSY GxG – Grooved inlet gate connection and grooved outlet gate connection

Available with grooved NRS gate valves - consult factory**
Post indicator plate and operating nut available - consult factory**
**Consult factory for dimensions

Dimensions — Weight

Materials

Housing & Sleeve: 304 (Schedule 40) Stainless Steel
Elastomers: EPDM, Silicone and Buna-N
Tri-link Checks: Noryl®, Stainless Steel
Check Discs: Reversible Silicone or EPDM
Test Cocks: Lead Free* Bronze Body
Pins & Fasteners: 300 Series Stainless Steel
Springs: Stainless Steel

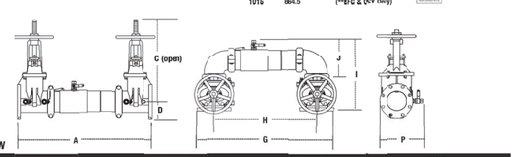
Pressure — Temperature

Temperature Range: 33°F – 140°F (0.5°C – 60°C)
Maximum Working Pressure: 175psi (12.1 bar)

Approvals

- Approved by the Foundation for Cross-Connection Control and Hycraulic Research at The University of Southern California (FCCCHR-USC)
- AWWA C510-97

1016 · B64.5 · (**BFG & QT Only) · NSF

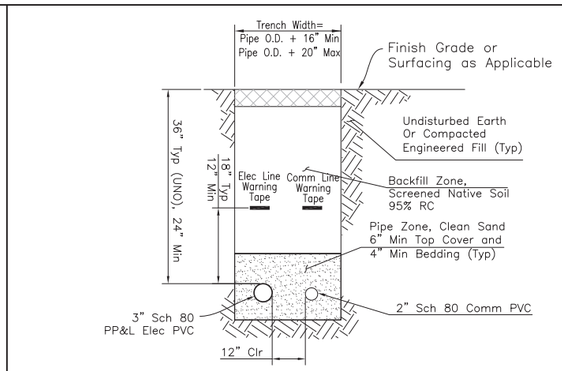


757, 757N

SIZE	A		C (OSY)		C (NRS)		D		G		H		I		J		P		757NRS		757OSY		757N NRS		757N OSY	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kgs.	lbs.	kgs.	lbs.	kgs.	lbs.	kgs.
2½	30¼	781	16⅝	416	9⅝	238	3⅛	89	29¼	738	21⅛	546	15⅛	393	8⅝	223	9⅛	234	115	52	125	57	123	56	133	60
3	31⅛	806	18⅞	479	10⅛	260	3⅛	94	30¼	768	22⅛	565	17⅛	435	9⅛	233	10½	267	131	59	145	66	144	65	158	72
4	33⅛	857	22⅛	578	12⅝	310	4	102	33	838	23⅛	597	18⅛	470	9⅞	252	11⅛	284	161	73	161	73	184	83	184	83
6	43⅛	1105	30¼	765	16	408	5⅛	146	44¼	1137	33⅛	851	23⅞	589	13⅛	332	13	381	273	124	295	134	314	142	336	152
8	49⅛	1264	37⅞	959	19⅝	506	6⅞	175	54⅛	1375	40¼	1018	27⅞	697	15⅞	399	17⅞	437	438	199	480	218	513	233	555	252
10	57⅛	1467	45¼	1162	23⅝	605	8⅞	208	66	1676	49½	1257	32⅛	826	17⅞	440	20	508	721	327	781	354	891	404	951	431

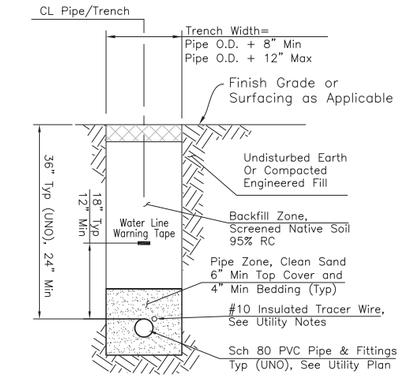
Watts 3" Double Check Valve - Model 757NRS

No Scale



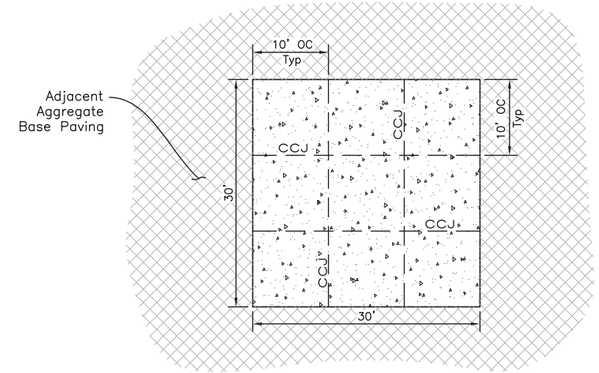
Typical Joint Trench Detail Electrical/Communications Duct

No Scale



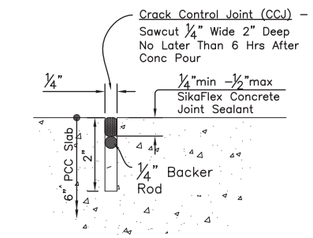
Typical Trench Section - Water Lines

No Scale



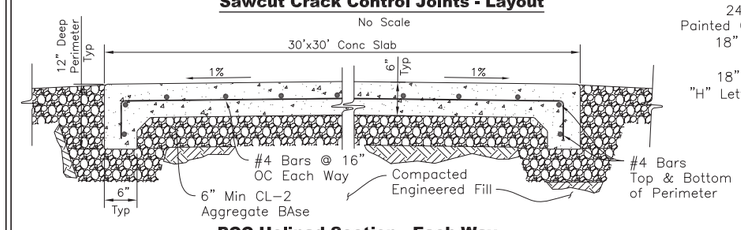
Sawcut Crack Control Joints - Layout

No Scale



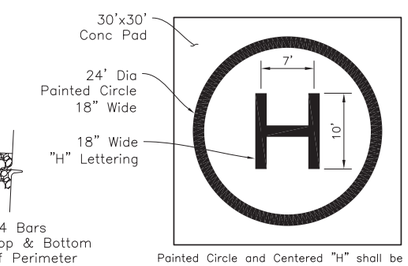
Sawcut Crack Control Joints - Section

No Scale



PCC Helipad Section - Each Way

No Scale



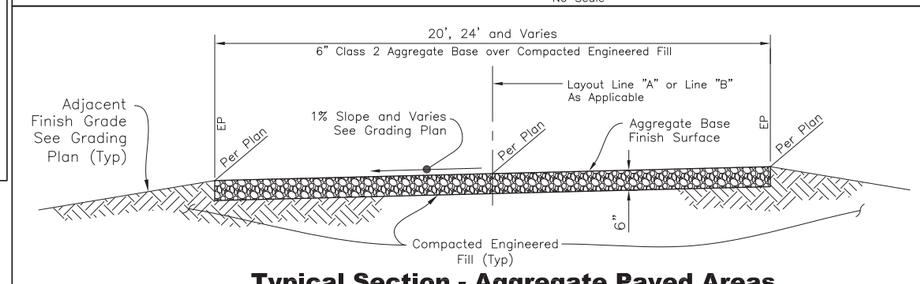
Painted Circle and Centered "H" shall be elastomeric paint coating "Maximum Stretch" as manufactured by Ames Waterproof Coatings.

Helipad Painted Designator

No Scale

Type 1 Helipad Details

No Scale



Typical Section - Aggregate Paved Areas

No Scale

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
SHASTA–TRINITY NATIONAL FOREST
REDDING, CALIFORNIA

Ash Creek Helispot
Phase 1

Typical Sections and Details

DESIGNED: K. Nolan	DATE: 08/2024		
DRAWN: K. Nolan	DATE: 08/2024		
CHECKED:	DATE:		

DATE	REVISION	BY
XX/XX/XX	1 XXXXXXXX	XX

DRAWING ID
C–6

Sheet 8 of 9

5. Underground Requirements

5.1 General

The customer is responsible for providing all trenches, backfill, compaction, conduit, and equipment foundations. The customer is responsible for boring if that method is used. The customer shall meet the requirements described in this section to complete construction for underground installation of services. Consult the Power Company for conduit layout, and for equipment foundation requirements for secondary and primary extensions.

All equipment bases, whether Power Company- or customer-owned, will be level with no more than 2 degrees slope. The customer is solely responsible that the installation remains structurally sound throughout the term of service; to this end, the customer should consider local ground and frost conditions. The Power Company may refuse to install facilities if a base is not structurally sound.

The customer is responsible for ensuring that all conduit system installations comply with Power Company requirements and are located consistent with drawings, when provided, as part of the agreement between Power Company and customer. Any conduit installed before receiving a job sketch from the Power Company may be subject to rejection or revision.

5.2 Conduit Requirements

All underground service conductors shall be installed in conduit.

The Power Company will install the underground cable from the Power Company's source to the service point.

The customer is responsible for ensuring that all conduit complies with Power Company requirements.

Requirements:

For all conduit installations, the customer shall:

1. Ensure that Power Company conduit is located away from (and never underneath) buildings, building foundations, or other structures (including retaining walls); for Rocky Mountain Power see Policy 242, section 4.3 (available here: https://www.rockymountainpower.net/working-with-us/builders-contractors/electric-service-requirements.html), for Pacific Power see Policy 343, section 4.3 (available here: https://www.pacificpower.net/working-with-us/builders-contractors/electric-service-requirements.html). See Section 10 for possible variance approvals.
2. Be responsible for recognizing potential surface and subgrade water flows and consulting the Power Company to minimize potential runoff problems.
3. Seal all raceways and conduit to prevent the infiltration of water into the electrical equipment.
4. Provide and install listed electrical grade conduit, fittings, and long radius sweeps (elbows). See Table 13. Above-ground conduit shall be Schedule 40 PVC or better. HDPE conduit cannot be exposed above grade. Some jurisdictions may require conduit grades better than Schedule 40; consult the local governing code.

Table 11—Below-Grade Conduit and Sweep Applications

Application	Type of Conduit[1]	Sweep Material[1]
Three-phase primary	PVC, Fiberglass, HDPE[3]	Fiberglass
Single-phase primary	PVC, Fiberglass, HDPE[3]	Fiberglass or PVC[2]
Secondary	PVC, Fiberglass, HDPE[3]	Fiberglass or PVC[2]

Notes:
1. Steel conduit, casings, and sweeps may be required for special applications
2. Fiberglass can tolerate higher sidewall pressures than PVC and resist burn-through from pulling ropes. Longer conduit runs or conduit with multiple sweeps may require fiberglass.
3. **HDPE is only allowed when directional boring or cable plowing installation methods are used.**

Table 12—Above-Grade Conduit and Sweep Applications

Application	Type of Conduit[1]	Sweep Material[1]
Three-phase primary	Fiberglass or PVC	Fiberglass
Single-phase primary	Fiberglass or PVC	Fiberglass or PVC[2]
Secondary	Fiberglass or PVC	Fiberglass or PVC[2]

Notes:
1. Steel conduit, casings, and sweeps may be required for special applications
2. Fiberglass can tolerate higher sidewall pressures than PVC and resist burn-through from pulling ropes.

Table 13—Sweep Specifications

Conduit Diameter	Long Radius Sweep
3″	36″
4″	36″
6″	48″

Additional Requirements for Conduit Elbows and Sweeps:

a. Fiberglass elbows require special couplings; see company Material Specification ZG 033, *Fiberglass Conduit*, for details. ZG 033 is posted at https://www.pacificpower.net/working-with-us/builders-contractors/electric-service-requirements.html and https://www.rockymountainpower.net/working-with-us/builders-contractors/electric-service-requirements.html.

b. HDPE is discussed in company specification ZG031. ZG 031 is posted at https://www.pacificpower.net/working-with-us/builders-contractors/electric-service-requirements.html and https://www.rockymountainpower.net/working-with-us/builders-contractors/electric-service-requirements.html.

c. Elbows and sweeps must be certified by a Nationally Recognized Testing Laboratory (NRTL). Manufactured sweeps shall not be altered. Field form sweeps are not permitted.

5. All joints shall be compressed to the depth of the coupling system, and glued. Where straight ends and bell ends are joined, the straight end shall be beveled so as not to become an obstacle to mandrels or pulled cable.

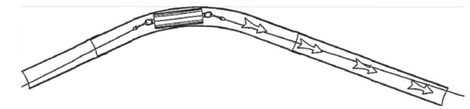
6. The customer shall supply smooth-walled conduit reducers (swedges) when required.
7. When conduit terminates at Power Company equipment, the customer shall consult the Power Company for the exact conduit location. **The customer shall not install conduit within 2 feet of Power Company facilities,** unless requested by the Power Company. Coordinate final conduit or sweep installation with the Power Company.
8. An expansion coupling shall be provided in the riser below the metering enclosure in areas where frost heaves and settling are likely to pull the surface-mounted meter socket from the wall.
9. When conduit extends vertically through a paved or concrete surface, a sleeve shall be placed around the conduit to prevent direct contact with the pavement or concrete to help prevent damage to conductors and service equipment caused by soil settling.
10. The customer shall keep the conduit free of dirt and debris during installation.
11. The customer shall provide backfill, compaction, and surface restoration that conforms to city, county, and state requirements.
12. The customer is responsible for repairing crushed conduit, including any costs for Power Company crews to return to the job site.
13. The customer shall not install or place any materials, including without limitation customer-owned conductors in the same conduit/vault system with Power Company conductors.
14. The customer shall provide a flat pull line (preferred) or poly rope (alternative) capable of withstanding 1,000 lbs. of tension, installed with 72 inches of extra line capable of extending from each end of the conduit. The pull line shall be secured inside the ends of the conduit and both conduit ends shall be capped.
15. All underground raceways should be proofed with a mandrel to remove obstructions, and to confirm at least 80% of the nominal conduit diameter. When requested by the Power Company, the customer shall perform a "witnessed proofing" of conduit systems. See Table 14 and Figure 14.

Table 14—Required Mandrel Sizes for Conduit Proofing

Conduit Nominal Diameter	Mandrel Diameter	Minimum Mandrel Length	Maximum Mandrel Length	Proof
3″	2.5″	3.25″	8″	83%
4″	3.5″	4.25″	8″	87%
6″	5.5″	6.25″	10″	92%

Note: The reduced inner diameter of HDPE conduit requires a smaller mandrel diameter than listed. Use a mandrel that confirms at least 80% of the nominal inner diameter.

Figure 14—Mandrel Proofing



5.2.1 Service Conduit Requirements

The customer shall meet the following requirements when preparing a service conduit system:

1. A stronger conduit material, larger conduit size, or larger sweep radius may be required for long runs or where more than three bends are needed. The customer shall obtain prior written approval from the Power Company for exceptions.
2. The customer must meet minimum conduit size requirements. See Table 15 and Table 16.
3. An aerial extension (primary or secondary) to connect a new underground service should be avoided, unless one or more of the following conditions exist, and the customer obtains the Power Company's prior approval:
   a. Physical obstacles such as large culverts or sewer lines prohibit boring or trenching
   b. Boring is prohibited by an authority having jurisdiction (AHJ)
   c. Geological barriers such as deep canyons, water ways, solid rock, steep slopes, or unstable soil conditions prohibit trenching or boring

Table 15—Single-Phase Service Conduit Size, Run Lengths, and Bend Limits

Panel Ampacity	Maximum Conduit Length	Max Degree of Bends	Single Family Residential		Multi-Family and Non-Residential	
			Number of Conduit Runs	Conduit Trade Size	Number of Conduit Runs	Conduit Trade Size
125 or less	150	270	1	2″	1	2″
200	150	270	1	3″	1	3″
400	150	270	1	3″	2	3″
600	100	270	2	3″	2	3″
800	100	270	3	3″	3	3″

Table 16—Three-Phase Service Conduit Size, Run Lengths, and Bend Limits

Panel Ampacity	Maximum Conduit Length	Max Degree of Bends	120/208		277/480	
			Number of Conduit Runs	Conduit Trade Size	Number of Conduit Runs	Conduit Trade Size
200 or less	150	270	1	3″	1	3″
400	150	270	2	4″	2	3″
600	100	270	2	4″	2	4″
800	100	270	3	4″	3	4″
1,000	50	180	4	4″	4	4″
1,200	50	180	5	4″	5	4″
1,600	50	180	6	4″	6	4″
2,000	50	180	7	4″	6	6″
2,400	50	180	6	6″	6	6″
2,800	50	180	8	6″	8	6″
3,000	50	180	10	6″	10	6″
3,200	50	180	10	6″	10	6″
3,600	50	180	12	6″	12	6″
4,000	50	180	12	6″	12	6″

5.3 Trench and Backfill Requirements

The customer shall provide all trenching. All trenching work shall comply with all OSHA requirements, including shoring required when the combined height of the trench and the spoil exceeds 5 feet.

To the extent possible, trench bottoms shall be level and made of well-tamped earth or selected backfill without sharp rises and drops in elevation. Rock spurs or ridges shall not project into the trench. The customer is responsible for ensuring a clean trench prior to conduit installation.

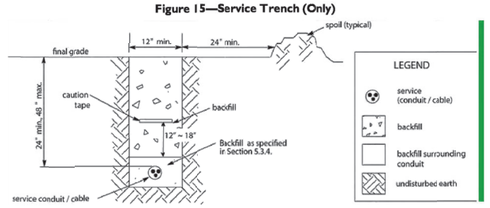
5.3.1 Call Before You Dig

State laws require the customer or excavator call for underground utility locations. Excavation may not be started until locations have been marked or the utilities have informed the excavator that there are no facilities in the area. Notify the local underground locating services (8-1-1) before you dig.

5.3.2 Service Trench

When installing only underground service conduit in the trench, follow the dimensions in Figure 15.

Figure 15—Service Trench (Only)



5.3.3 Joint Use Service Trench

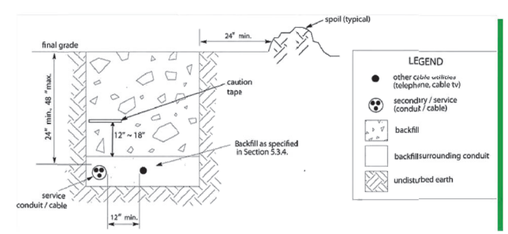
Joint use trenching requirements may vary by area; consult the Power Company for requirements before installation. The customer may be allowed to place communication, signal, and other electrical supply conductors in the same trench as Power Company conductors, provided that the installation meets Power Company requirements, and all concerned parties agree on the placement.

The Power Company will not install electrical conductors in a common trench with water lines, sewer lines, or other drainage lines. In general, a minimum distance of 12 inches shall exist between the underground service conduit and other utility lines, unless superseded by the requirements of other utilities involved (and/or unless local requirements differ).

For a joint use trench with gas lines, consult the Power Company for requirements. The minimum distance between the underground service conduit and gas lines may be greater than 12 inches if required by the gas utility.

When installing an underground service conduit in a joint use trench, follow the dimensions in Figure 16.

Figure 16—Joint Use Service Trench



5.3.4 Backfill Requirements

The following list of requirements applies to all installations requiring backfill:

1. The customer shall provide trench backfill and site restoration.
2. All backfill shall be free of materials that may damage the conduit system. Backfill within 4 inches of the conduit shall be select (capable of passing through a 3/4-inch sieve).
3. Extra caution should be taken when refilling trenches.
4. The Power Company may not energize conductors until the customer completes the backfill to Power Company satisfaction.

The cost to repair a conduit is the responsibility of the customer.

5.4 Underground Utility Equipment Signs and Markers

Above-grade signage, buried radio frequency (RF) markers, and buried caution tapes assist utility location services. Their presence may also provide a supplemental level of protection against service interruptions from dig-ins. General requirements are provided below:

Requirements:

1. Caution tape shall be installed 12 to 18 inches above all electrical conduits and duct banks, if trenching or other open excavation methods are used.
   a. Caution tape shall be red in color with black text "CAUTION BURIED ELECTRIC LINE BELOW," tape shall be a minimum of 6 inches wide by 0.004 inches thick. (3M Scotch #368 or equivalent).
2. Red-dyed concrete shall be used if concrete encasement is used to encase electrical conduits or duct banks.
3. Radio frequency (RF) markers shall be installed above 4- to 8-inch electrical conduits at stub-outs and transition points between bored and trench installations. (3M #1256 Passive Mid-Range Marker Power Encoded or equivalent). If these markers are required, they will be provided by the Power Company with locations specified on the job sketch.
4. Above-grade signage, if required, will be provided by the Power Company with locations specified on the job sketch.
5. Additional signs or markers may be required for unique installations.

CALL 811 BEFORE YOU DIG — 811 — SAFE DIGGING PAYS OFF

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
SHASTA–TRINITY NATIONAL FOREST
REDDING, CALIFORNIA

Ash Creek Helispot
Phase 1

PP&L Underground Requirements & Details

DESIGNED:	K. Nolan	DATE:	08/2024
DRAWN:	K. Nolan	DATE:	08/2024
CHECKED:		DATE:	

DATE	REVISION	BY
XX/XX/XX	1 XXXXXXXX	XX

DRAWING ID
E–1

Sheet 9 of 9