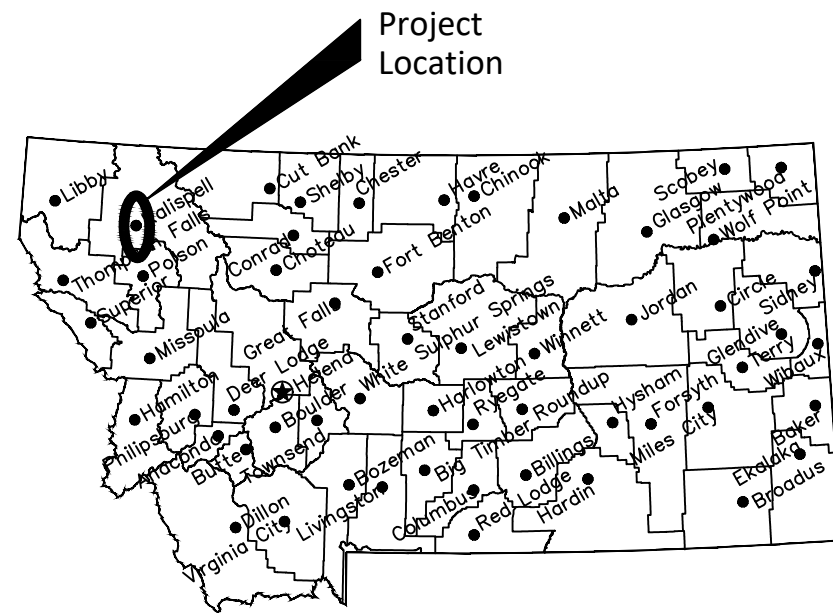


# MONTANA FISH, WILDLIFE & PARKS Lone Pine State Park Water System Improvements Project

Near Kalispell, Montana

FWP # 7176312



**Location Map**

No Scale



North



**Vicinity Map**

No Scale

MONTANA FISH, WILDLIFE AND PARKS A2Z ENGINEERING, PLLC  
DESIGN AND CONSTRUCTION

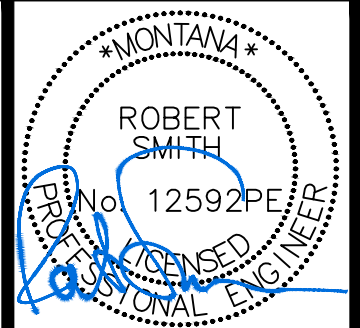
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M Nerdig August 26, 2021  
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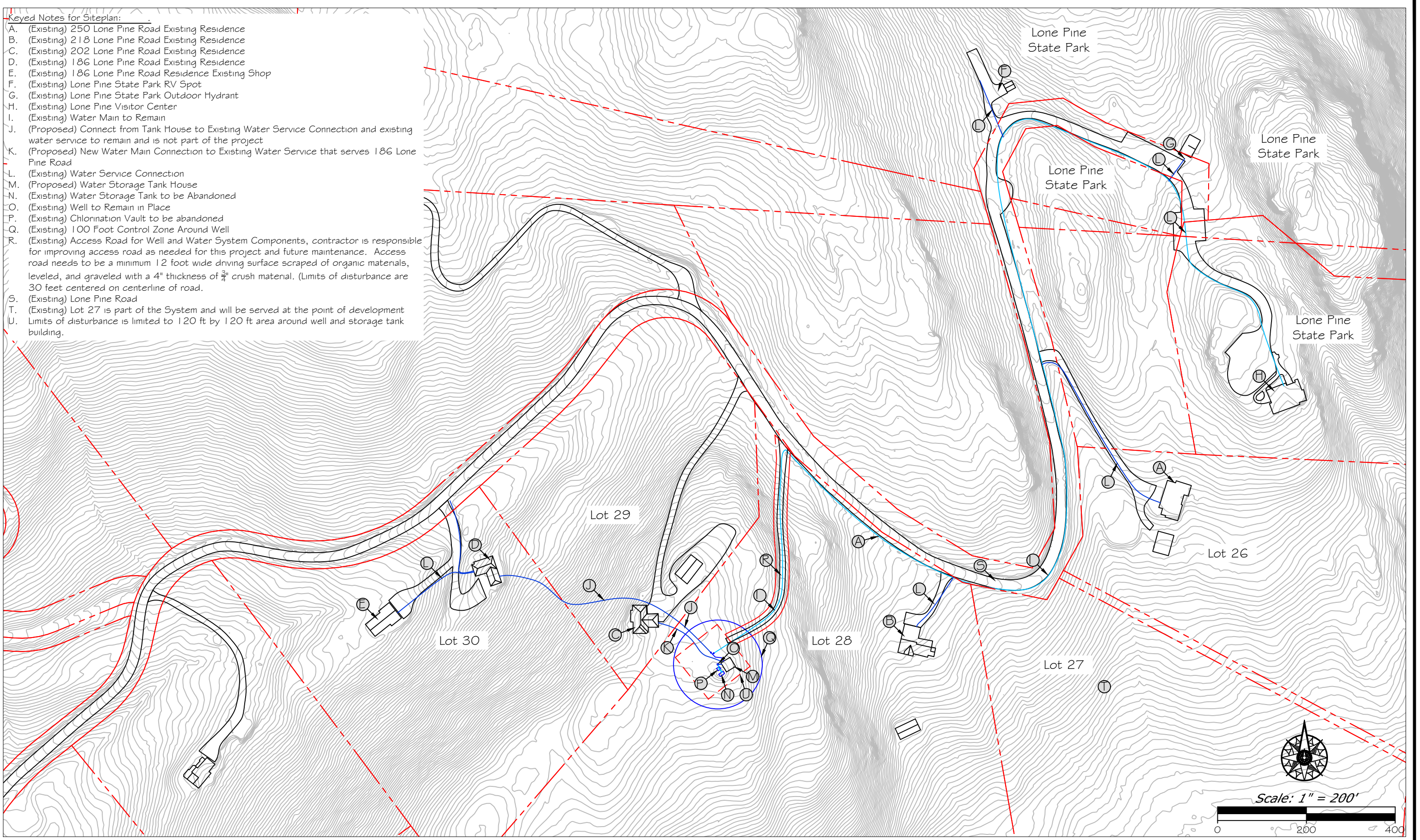
Cover Sheet  
Lone Pine State Park Water System Improvements Project

SHEET: 1 of 20



**Keyed Notes for Siteplan:**

- A. (Existing) 250 Lone Pine Road Existing Residence
- B. (Existing) 218 Lone Pine Road Existing Residence
- C. (Existing) 202 Lone Pine Road Existing Residence
- D. (Existing) 186 Lone Pine Road Existing Residence
- E. (Existing) 186 Lone Pine Road Residence Existing Shop
- F. (Existing) Lone Pine State Park RV Spot
- G. (Existing) Lone Pine State Park Outdoor Hydrant
- H. (Existing) Lone Pine Visitor Center
- I. (Existing) Water Main to Remain
- J. (Proposed) Connect from Tank House to Existing Water Service Connection and existing water service to remain and is not part of the project
- K. (Proposed) New Water Main Connection to Existing Water Service that serves 186 Lone Pine Road
- L. (Existing) Water Service Connection
- M. (Proposed) Water Storage Tank House
- N. (Existing) Water Storage Tank to be Abandoned
- O. (Existing) Well to Remain in Place
- P. (Existing) Chlorination Vault to be abandoned
- Q. (Existing) 100 Foot Control Zone Around Well
- R. (Existing) Access Road for Well and Water System Components, contractor is responsible for improving access road as needed for this project and future maintenance. Access road needs to be a minimum 12 foot wide driving surface scraped of organic materials, leveled, and graveled with a 4" thickness of  $\frac{3}{4}$ " crush material. (Limits of disturbance are 30 feet centered on centerline of road.
- S. (Existing) Lone Pine Road
- T. (Existing) Lot 27 is part of the System and will be served at the point of development
- U. Limits of disturbance is limited to 120 ft by 120 ft area around well and storage tank building.



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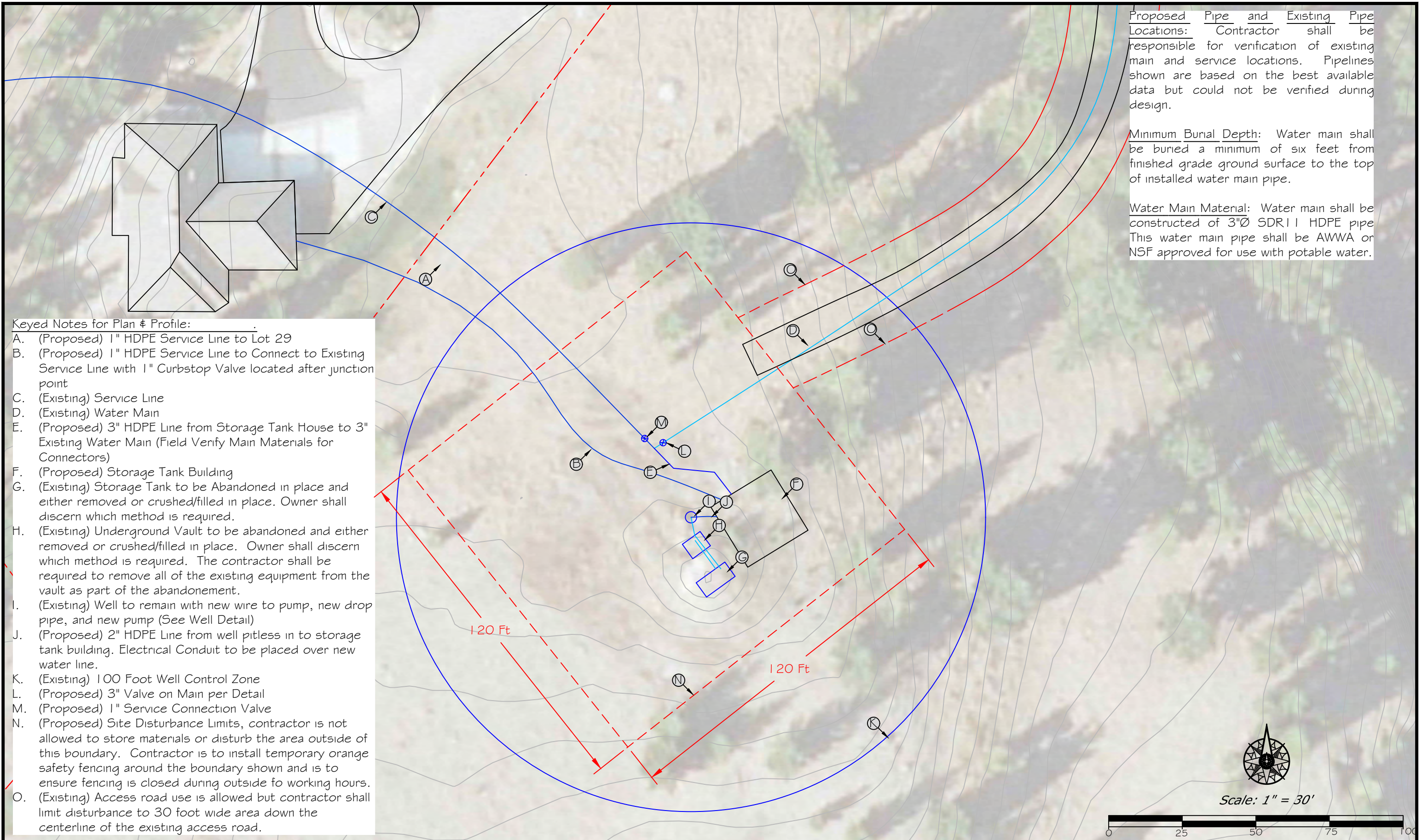


**Montana Fish,  
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**Site Layout**  
Lone Pine State Park Water System Improvements Project

SHEET: 02  
of 20





Proposed Pipe and Existing Pipe Locations: Contractor shall be responsible for verification of existing main and service locations. Pipelines shown are based on the best available data but could not be verified during design.

Minimum Burial Depth: Water main shall be buried a minimum of six feet from finished grade ground surface to the top of installed water main pipe.

Water Main Material: Water main shall be constructed of 3"Ø SDR11 HDPE pipe. This water main pipe shall be AWWA or NSF approved for use with potable water.

- Keyed Notes for Plan & Profile:**
- A. (Proposed) 1" HDPE Service Line to Lot 29
  - B. (Proposed) 1" HDPE Service Line to Connect to Existing Service Line with 1" Curbstop Valve located after junction point
  - C. (Existing) Service Line
  - D. (Existing) Water Main
  - E. (Proposed) 3" HDPE Line from Storage Tank House to 3" Existing Water Main (Field Verify Main Materials for Connectors)
  - F. (Proposed) Storage Tank Building
  - G. (Existing) Storage Tank to be Abandoned in place and either removed or crushed/filled in place. Owner shall discern which method is required.
  - H. (Existing) Underground Vault to be abandoned and either removed or crushed/filled in place. Owner shall discern which method is required. The contractor shall be required to remove all of the existing equipment from the vault as part of the abandonment.
  - I. (Existing) Well to remain with new wire to pump, new drop pipe, and new pump (See Well Detail)
  - J. (Proposed) 2" HDPE Line from well pitless in to storage tank building. Electrical Conduit to be placed over new water line.
  - K. (Existing) 100 Foot Well Control Zone
  - L. (Proposed) 3" Valve on Main per Detail
  - M. (Proposed) 1" Service Connection Valve
  - N. (Proposed) Site Disturbance Limits, contractor is not allowed to store materials or disturb the area outside of this boundary. Contractor is to install temporary orange safety fencing around the boundary shown and is to ensure fencing is closed during outside of working hours.
  - O. (Existing) Access road use is allowed but contractor shall limit disturbance to 30 foot wide area down the centerline of the existing access road.

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# Well Area Layout

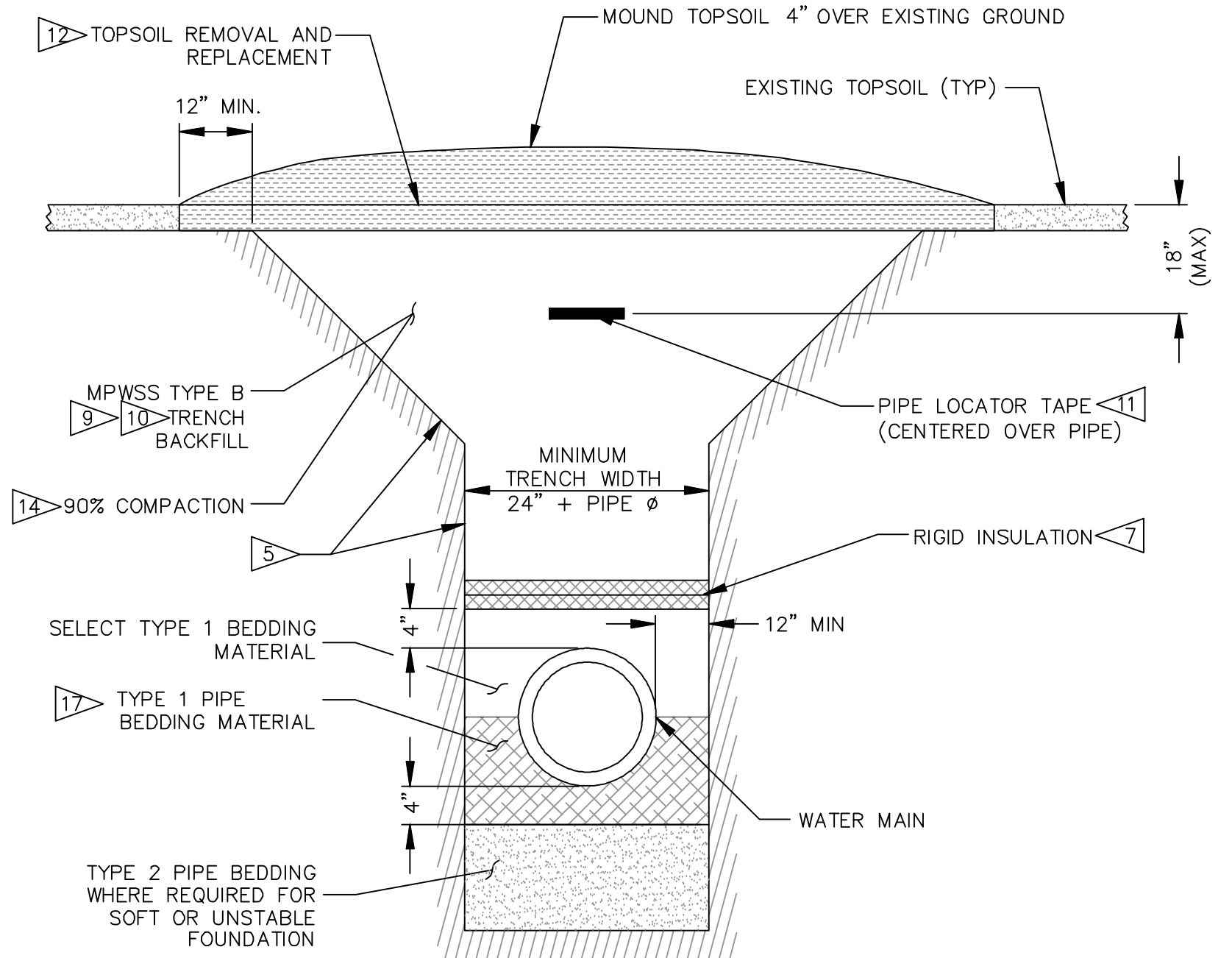
## Lone Pine State Park Water System Improvements Project

SHEET: 03 of 20



**CONSTRUCTION NOTES:**

1. Bedding and backfill definitions are found in the Montana Public Works Standard Specifications (MPWSS). Specific notes and trenching details shown on this page take precedence over those found in the MPWSS.
2. Where trench passes through gravel, the gravel shall be removed and replaced a minimum of 12 inches from the edge of the trench opening.
3. Where the trench passes through existing pavement, the pavement shall be cut along a vertical line a minimum of 12 inches from the edge of the trench opening.
4. n/a
5. Trench shall be constructed to O.S.H.A. specifications for excavation, section 1926, Subpart B. Drawings do not show trench dimensions or backslopes that may be required.
6. All spoils shall be removed and disposed at an approved location.
7. When a minimum pipe cover depth of six feet can not be maintained, the contractor shall consult with the project engineer. Generally, the situation will be resolved as follows:
  - 7.1. Contractor shall install water resistant rigid insulation, being DOW STYROFOAM SM or equal
  - 7.2. Contractor shall install insulation for the full width of the trenching
  - 7.3. Contractor shall provide at least a one inch thickness (R-Value of 5.0) for each foot of soil cover less than six feet
  - 7.4. Burial depth of less than 3.5 feet shall be strongly discouraged
8. All rocks greater than 12 inches in any dimension shall be hauled off site and disposed of property.
9. No rocks or lumps larger than 2 inches in any dimension shall be allowed within 6 inches of the pipe.
10. Use suitable native material for backfill: On-site excavated soil may be used to backfill water mains, water services, and hydrant leads. Saturated or near saturated soils will not be permitted for use as backfill material. Backfill material under traffic areas shall be placed in 8 inch maximum loose lifts and shall be compacted to at least 95% of the material's maximum dry density, as determined by AASHTO T-99 or ASTM D698. No rocks larger than 4 inches in any dimension will be permitted in the first lift of backfill. The contractor shall provide the engineer with a proctor (moisture-density relationship) for the backfill material.
11. Use labeled and color-coded tape appropriate for water main.
12. Seed and fertilize all disturbed areas which are not paved or graveled.
13. n/a
14. Compaction refers to percent of maximum density determined by a standard proctor, AASHTO T-99 or ASTM D698.
15. Finish grade must match the original existing grade where pipe is installed unless otherwise noted.
16. Verify that compaction methods are compatible with pipe manufacturer's recommendations. Any damage to the pipe will be the contractor's responsibility.
17. Select type 1 bedding specifications are found in the MPWSS.
18. Payment for surface restoration is per lineal foot along the centerline of the installed pipe. Contractor shall create the minimum width of disturbance possible. No additional payment will be made for excessive trench width.
19. Payment for bid item "Buried Pipe" shall include the cost of trenching, pipe, bedding, insulation, backfill, compaction, testing, disinfection and any other items incidental to typical water main installation in accordance with MPWSS (excluding surface restoration).
20. Payment shall not be made on a separate basis for import of fill or disposal of waste material. Very little of these are expected and no separate payment will be made.



TRENCHING DETAIL  
Not to Scale

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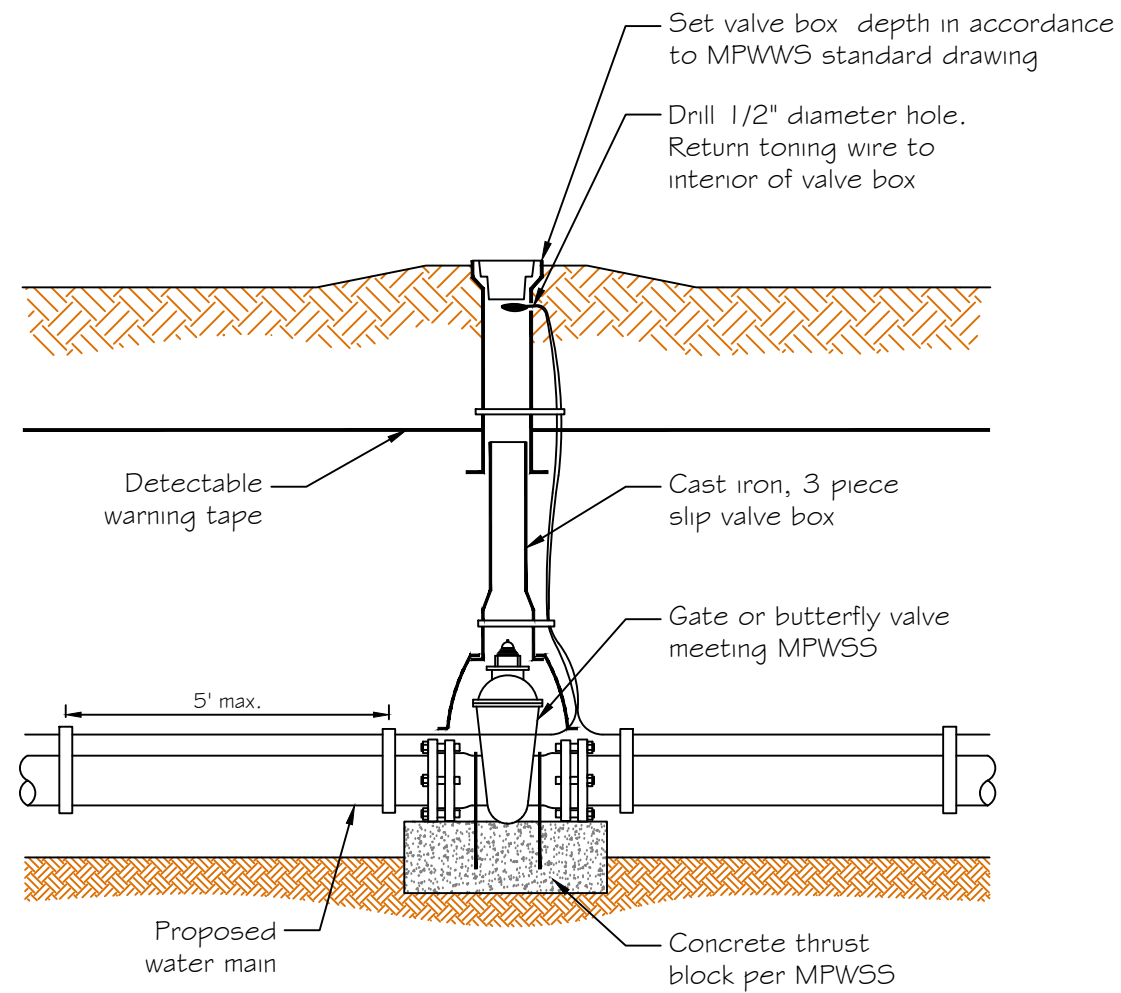
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# Main Detail

Lone Pine State Park Water System Improvements Project

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TYPICAL VALVE SECTION DETAIL  
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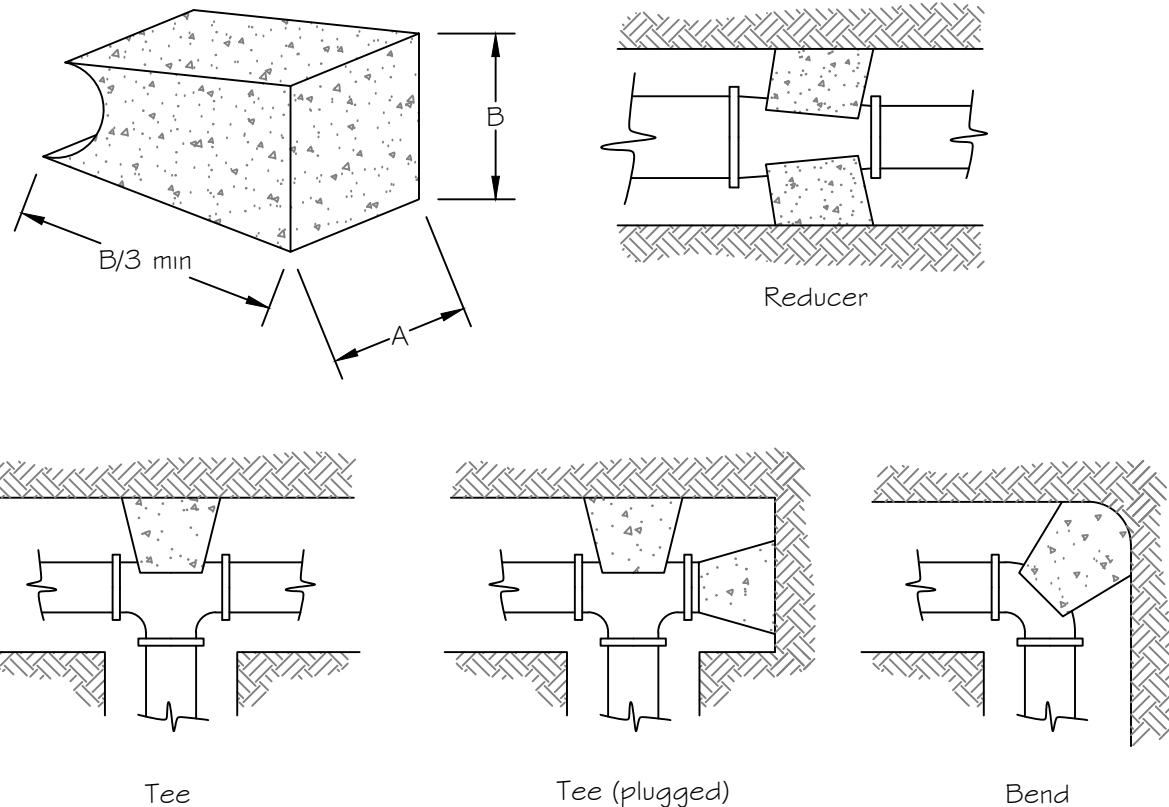
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## Valve Detail

Lone Pine State Park Water System Improvements Project

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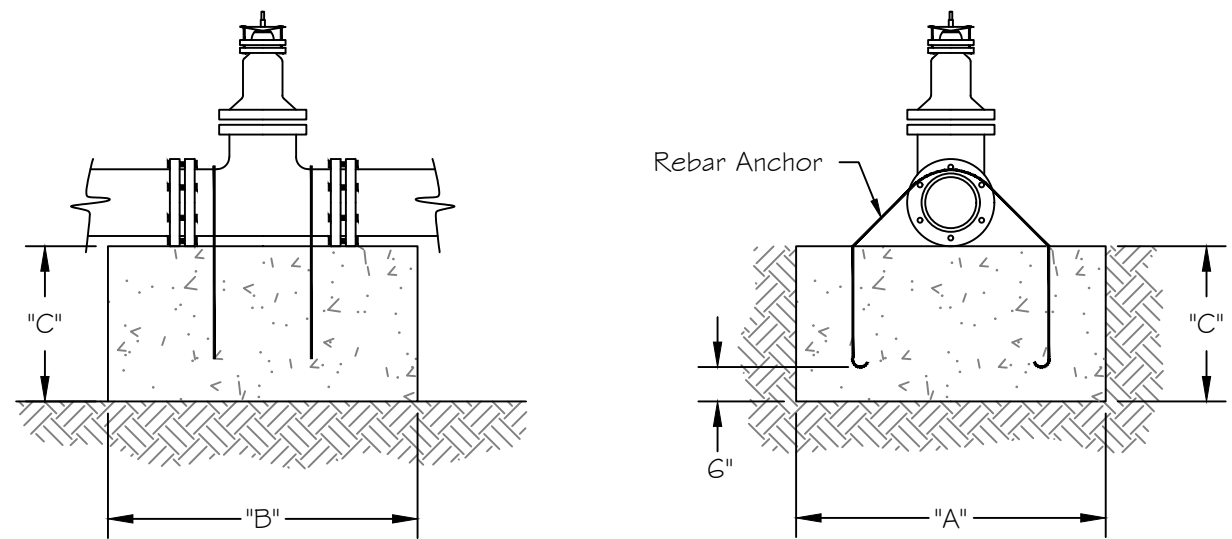
Thrust blocking notes:

1. These tables are based on 150 psi main pressure and 2000 psf soil bearing pressure
2. Wrap all fittings with polyethylene

Standard Dimensions for Thrust Blocking								
Fitting sizes	Tees & Plugs		90° Bend		45° Bend & Wyes		Reducers & 22.5° Bend	
	A	B	A	B	A	B	A	B
4"	1'-7"	1'-2"	1'-9"	1'-6"	1'-8"	0'-10"	1'-7"	0'-6"
6"	2'-0"	1'-11"	2'-5"	2'-2"	1'-10"	1'-7"	1'-9"	0'-10"
8"	2'-8"	2'-6"	3'-2"	3'-0"	2'-5"	2'-11"	1'-9"	1'-6"
10"	3'-4"	3'-3"	4'-0"	3'-10"	3'-0"	2'-9"	2'-2"	1'-11"
12"	4'-0"	3'-10"	4'-8"	4'-8"	3'-8"	3'-3"	2'-7"	2'-3"
14"	5'-5"	3'-10"	6'-6"	4'-11"	4'-9"	3'-5"	3'-5"	2'-5"

THRUST BLOCKING FOR WATER MAIN FITTINGS  
Not to Scale

Detail Note: This detail is drawn from the Montana Public Works Standard Specification, standard drawing #02660-3. The MPWSS document shall control if there are any discrepancies.



Notes:

1. Coat rods with "KOPPERS" bitumastic no. 50 coating or equal.
2. Pressures shown below are maximum working in system.
3. Thrust blocking and anchors are required on valves only when specified on the plans or in the special provisions.

Standard Dimensions for Thrust Blocking										
Anchor Rod Size	Valve Size	100 PSI			150 PSI			200 PSI		
		"A"	"B"	"C"	"A"	"B"	"C"	"A"	"B"	"C"
3/4"	6 & 8"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"
3/4"	10"	2'-0"	2'-0"	2'-0"	2'-6"	2'-6"	2'-0"	2'-9"	2'-6"	2'-6"
3/4"	12"	2'-3"	2'-0"	2'-0"	3'-0"	3'-0"	2'-8"	3'-5"	3'-0"	3'-0"
1"	14"	2'-3"	2'-0"	2'-4"	3'-5"	3'-0"	3'-0"	4'-6"	3'-0"	3'-0"
1 1/8"	16"	3'-0"	3'-0"	2'-11"	4'-4"	3'-0"	3'-0"	4'-1"	4'-0"	4'-0"
1 1/4"	18"	3'-8"	3'-0"	3'-0"	5'-5"	3'-0"	3'-0"	5'-1"	4'-0"	4'-0"
1 3/8"	24"	4'-4"	4'-0"	4'-0"	6'-5"	4'-0"	4'-0"	6'-6"	5'-0"	5'-0"

THRUST BLOCKING FOR WATER MAIN VALVES  
Not to Scale

Detail Note: This detail is drawn from the Montana Public Works Standard Specification, standard drawing #02660-1. The MPWSS document shall control if there are any discrepancies.

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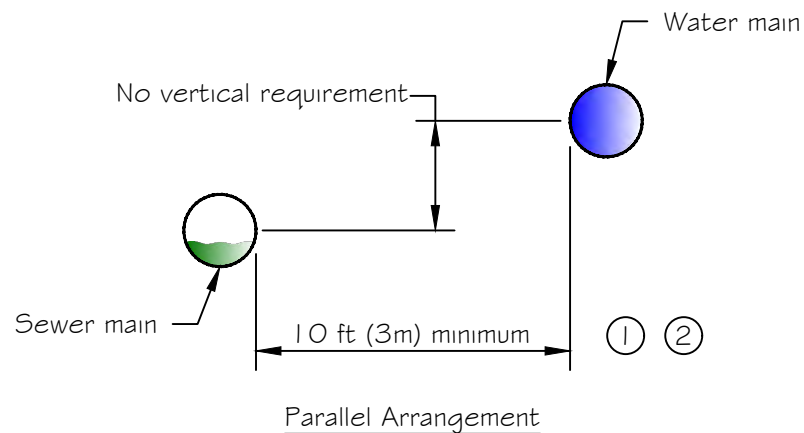
**Thrust Block Detail for Water Mains**  
Lone Pine State Park Water System Improvements Project

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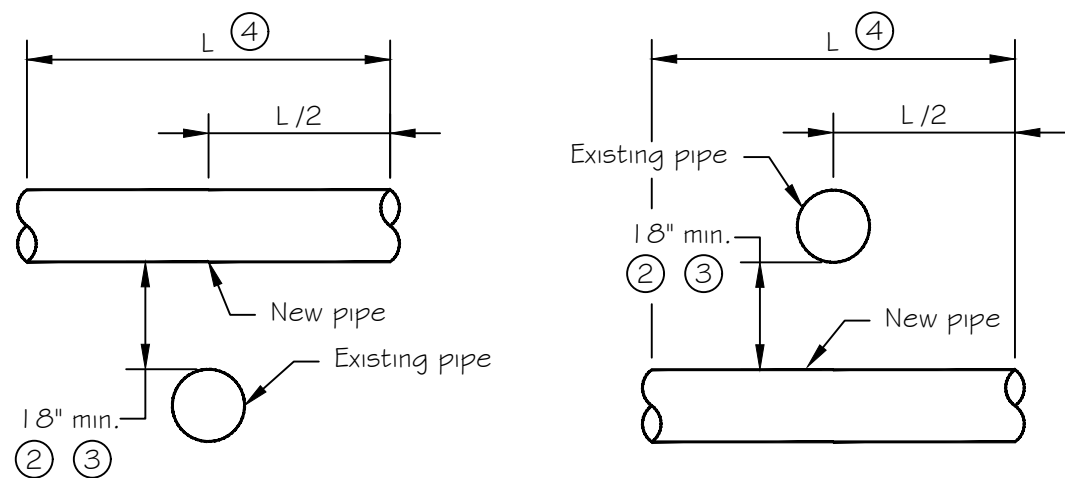


**WATER AND SEWER MAIN SEPARATION DETAIL**

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Parallel Arrangement



Crossings ⑤

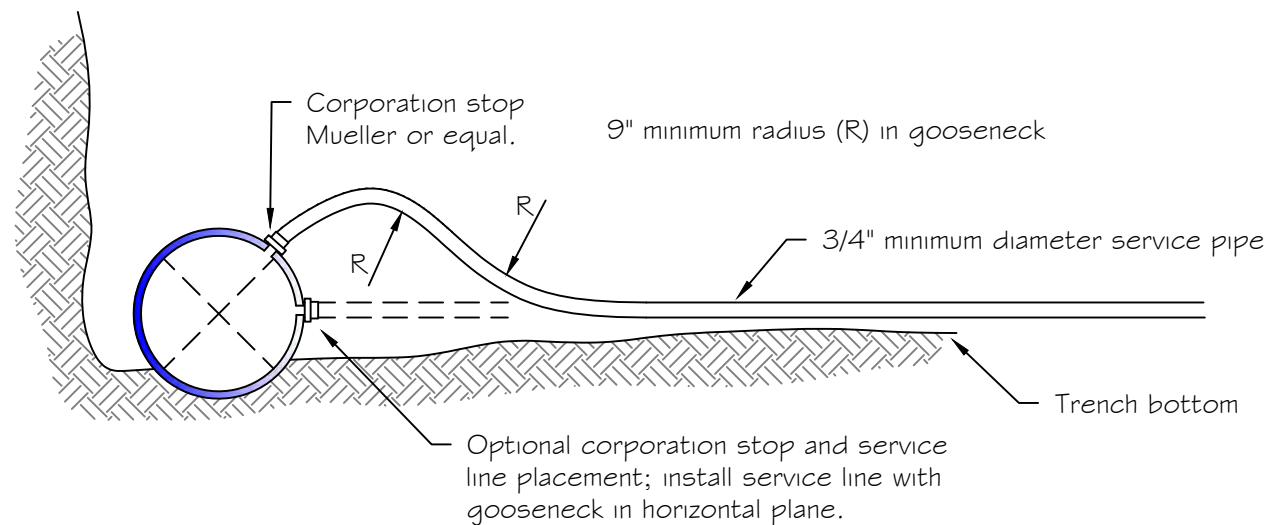
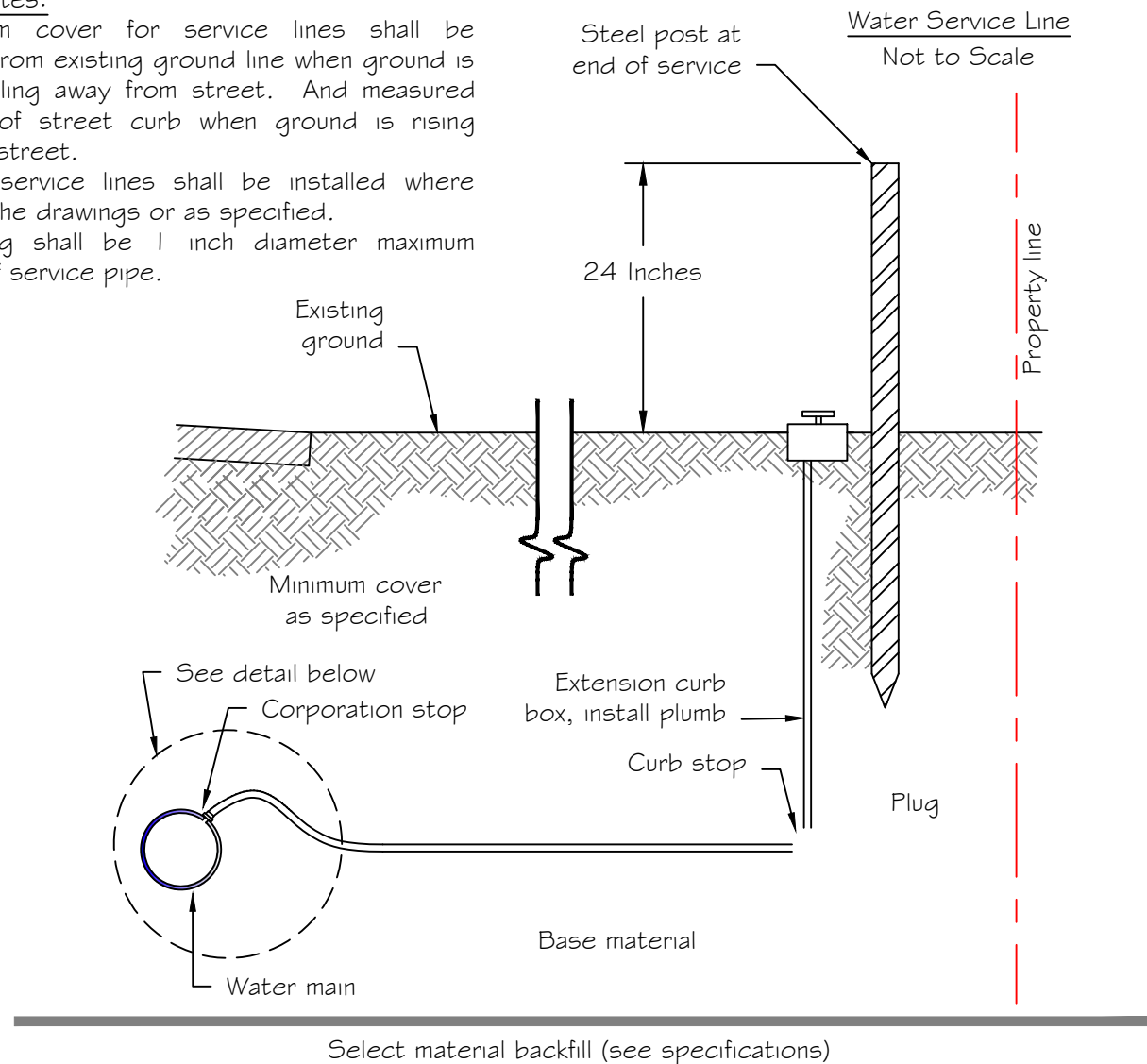
**Notes:**

1. Specific Montana Department of Health and Environmental Sciences approval is required for a distance less than 10 feet (3m) between water and gravity sewer.
2. No exception to the minimum separation requirement is permitted when the sewage carrying pipe is a force main. At crossings, one full length of water main pipe shall be located so that both joints will be as far from the force main as possible.
3. Less than 18 inches (0.5m) of separation is permitted when the gravity sewer at the crossing is made from a single 20 foot (6.1 m) length of A.W.W.A. pressure pipe and the crossing angle is approximately 90 degrees. Specific Montana Department of Health and Environmental Sciences approval is required for a vertical separation of less than 18 inches (0.5m) between water main and sanitary sewer.
4. "L" is a standard length of pipe as supplied by a pipe manufacturer.
5. Adequate structural support for pipes at crossings shall be provided.

Detail Note: This detail is drawn from the Montana Public Works Standard Specification, standard drawing #02660-2. The MPWSS document shall control if there are any discrepancies.

**General Notes:**

1. Minimum cover for service lines shall be measured from existing ground line when ground is level or falling away from street. And measured from top of street curb when ground is rising away from street.
2. Water service lines shall be installed where shown on the drawings or as specified.
3. Bedding shall be 1 inch diameter maximum within 6" of service pipe.



Detail of a properly installed corporation stop, showing gooseneck in service pipe.

Note: Typical 1"Ø HDPE water service line from a Mueller BR2 service saddle, with a Mueller 300 series corp stop ball valve, and a Mueller H-10306 curb box.

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**Montana Fish,  
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**Main and Connection Details**

Lone Pine State Park Water System Improvements Project

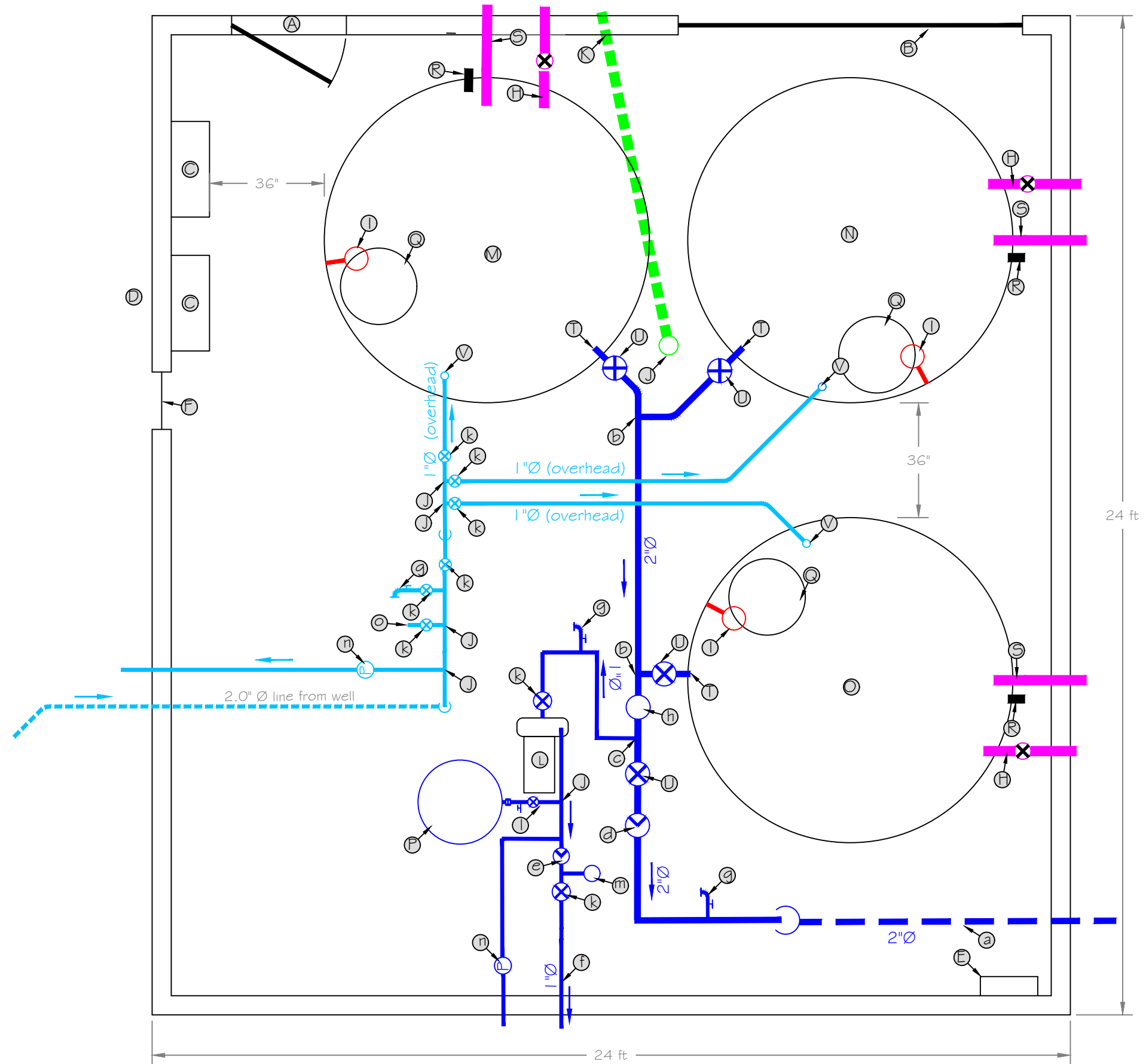
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**KEYED NOTES FOR PUMP HOUSE:**

- A. Exterior steel entry door, 36" minimum width
- B. Garage door, insulated, 9 ft wide by 9 ft high minimum
- C. Electrical supply and pump control panels
- D. Exterior visual alarm posted with operator's contact information, connected to pump controller fault circuits
- E. 4,000 Watt 240 Volt Electric wall unit heater with fan; thermostat controlled
- F. Insulated electric ventilation fan with humidistat, vented to exterior
- G. Pressure switch controlling domestic single service booster pump
- H. Tank drain assembly, see note on page 9
- I. NSF approved float switch assembly to be hooked to well pump controls (See Settings on Page 9)
- J. Cast in place 4"Ø steel floor drain
- K. Buried 4"Ø PVC sch 40 under slab drain sloped to daylight
- L. Domestic booster pump for Foote Residence, Grundfos model CM 3-6 or approved equal capable of 16 GPM @ 140 Ft Head
- M. Tank #1, 3000 gallon water storage tank
- N. Tank #2, 3000 gallon water storage tank
- O. Tank #3, 3000 gallon water storage tank
- P. Hydropneumatic tank, Amtrol model WX-250 or approved equal
- Q. Pre-molded 24"Ø access lid to tank
- R. Install 2"Ø sch 40 PVC vent pipe (downward facing opening @ 24 mesh screen)
- S. Install 2"Ø sch 40 Galvanized Steel overflow pipe, drops along wall to 18" above floor then penetrates building wall (downward facing opening 18" over splash pad @ 24 mesh screen).
- T. Install 2"Ø sch 40 Galvanized Steel pipe tank connection 1" above floor level with gasketed bulkhead fittings (remove or seal manf. bulkhead fittings)
- U. Install 2"Ø sch 40 Galvanized Steel ball valve
- V. Install 1"Ø bulkhead fitting at top of tank for fill line connection
- a. Buried 2"Ø HDPE water main (6 ft minimum bury)
- b. 2"x2"x2" sch 40 Galvanized Steel tee
- c. 2"x2"x1" sch 40 Galvanized Steel tee
- d. 2"Ø sch 40 Galvanized Steel check valve
- e. 1"Ø sch 40 Galvanized Steel check valve
- f. 1" Service Line to nearby Foote Residence
- g. smooth nose sample tap
- h. 2" Flow Meter with Totalizer
- i. 2"Ø HDPE buried water line from well (6 ft minimum bury), 90° bend then rises through floor slab penetration, rises up to just below ceiling, then 90° bend to feed tanks with overhead line.
- j. 1"x1"x1" sch 40 Galvanized Steel tee
- k. 1"Ø sch 40 Galvanized Steel ball valve
- l. tank connection assembly (ball valve, spigot & union)
- m. pressure gauge (0-100 PSI Liquid Filled)
- n. 1" pressure relief valve set to 100 PSI (Emerson Kunkle model 19 meeting NSF 61 or approved equal) Line to outside of building to terminate 18" from the ground surface with 90 Degree turn down at end and 24 Mesh Screen.
- o. Connection point for Chlorination Injection

Garage Building: Contractor shall be responsible for all permitting for this structure including the state required electrical permit. It is not a commercial structure therefore it is assumed no commercial building permit is required with the State of Montana. Flathead County does not have any building permit process. The structure shall meet all state adopted IRC/IBC code requirements.



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**Montana Fish, Wildlife & Parks**

**Public Water Supply Tank House**  
 Lone Pine State Park Water System Improvements Project

SHEET: 08 of 20

1. Water Storage Tank Materials Note: The supplier / contractor providing the proposed water tanks for this project shall provide certification that the tanks are rated to meet current AWWA or NSF potable water standards.
2. Water Storage Tank Drain Assembly: Install a 2" bulk head fitting, 2" ball valve, 2" pipe to exterior of building, terminated over a splash pad and covered with #24 mesh non-corrodible screen. Assembly shall be installed as low as possible on tank.
3. Pressure Tank Assembly: Each pressure tank will have an assembly connecting it to the system. The assembly will have a ball valve, then a spigot, then a union. This allows the line to the tank to be shut off, the tank drained, then disconnected with the union.
4. Piping Material: Plumbing inside of wellhouse shall be either galvanized iron, schedule 80 PVC, or engineer approved equal. All materials contacting water shall be NFS potable water safe and meet current lead limitations.
5. Pipe Supports Note: Contractor shall use manufactured pipe supports with specifications that are adequate for the proposed plumbing pipe and fixture's shown.
6. Building Construction: Building shall be typical framing on a concrete slab with thickened edge foundation. Finished floor shall be at least 6" above grade on all sides and finished grading shall provide positive slope away from structure in all directions. Floor drains shall be provided which are plumbed to exterior gravel drywells.
7. Water Storage Tank Float Switch Assembly and Control Panel Note: Each tank shall be fitted with an NSF approved float switch assembly. All assembly's shall feed a control panel that receives the float switch inputs from all three tanks and allows selection of float switch assembly for system operation. Only one assembly shall be used to run the system, but if a tank is taken off-line then the assembly on another tank can be made active. The assembly shall (1) activate well pump to refill tanks and activate the power to a 110 V outlet and 20 Amp Outlet where a chlorinator can be plugged in. The control panel shall also accept inputs from the alarm circuit and perform the following; (1) set off alarm light as well as cut the power to the booster pump that feeds the Foote residence when the low level alarm is triggered. (2) The alarm light indicator on the exterior of the building shall be the only item activated when the high level float is triggered.
8. Water Storage Tank Fill Line Note: The air gap provided at the outlet from the fill line shall not be less than 6".
9. Booster Pump Pressure Switch Settings: Engineer recommended settings for system startup (operator may adjust as necessary as they gain experience with the system)

Pressure switch controlling single residential service booster pump

- Pump On @ 40 PSI
- Pump Off @ 60 PSI

10. Water Storage Tank Float Switch Depth Settings (Distance Above Floor):

- 0" (0 gallons stored) - Floor level
- 3" (315 gallons stored) - Silt stop level (bottom of bulkhead fitting)
- 12" (1275 gallons stored) - LOW LEVEL ALARM ACTIVATION
- 70" (7425 gallons stored) - WELL PUMP ON LEVEL
- 78" (8280 gallons stored) - WELL PUMP OFF LEVEL
- 84" (8910 gallons stored) - HIGH LEVEL ALARM ACTIVATION
- 87" (9000 + gallons stored) - Cisterns begin to spill through overflow pipe

11. Water Storage Tank Disinfection Procedure: Finished water storage structures must be disinfected in accordance with current AWWA Standard G52. Two or more successive sets of samples, taken at 24-hour intervals, must indicate microbiologically satisfactory water before the facility is placed into operation.

A solution of 200-mg/L available chlorine shall be applied directly to the surfaces of all parts of the storage facility that would be in contact with water when the storage facility is full to the overflow elevation.

Method of application: The chlorine solution may be applied with suitable brushes or spray equipment. The solution shall thoroughly coat all surfaces to be treated, including the inlet and outlet piping, and shall be applied to any sepa-rate drain piping such that it will have available chlorine of not less than 10 mg/L when filled with water. Overflow piping need not be disinfected.

Retention: The disinfected surfaces shall remain in contact with the strong chlorine solution for at least 30 min, after which potable water shall be admitted, the drain piping purged of the 10-mg/L chlorinated water, and the storage facility then filled to its overflow level. Following this procedure, and subject to satisfactory bacteriological testing and acceptable aesthetic quality, such water may be delivered to the distribution system.

Disposal: Disposal of heavily chlorinated water from the tank disinfection process must be in accordance with the requirements of state of Montana and it cannot be discharged to any surface water. The disposal of heavily chlorinated water shall be verified with the engineer and owner prior to disposal.

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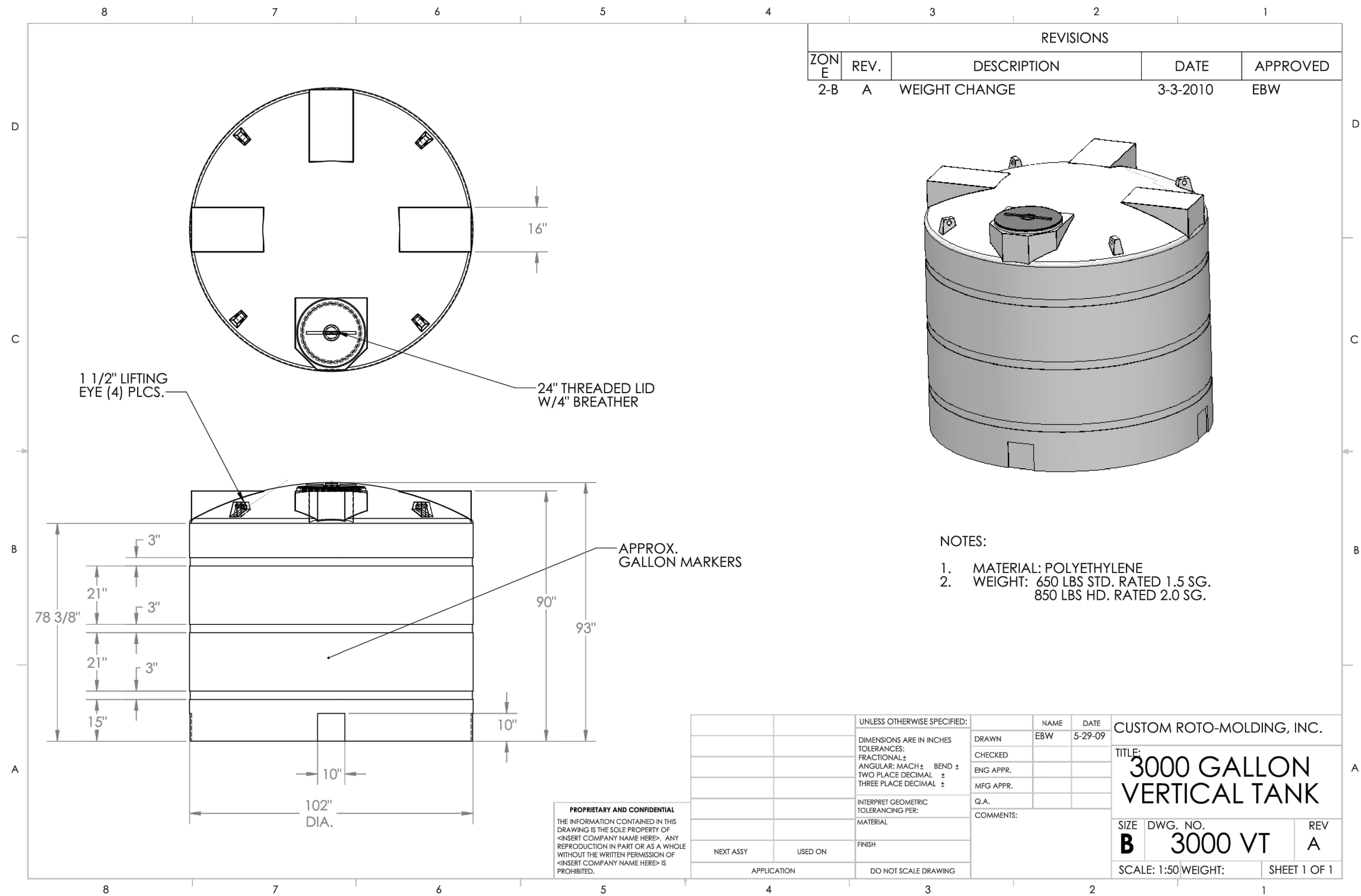
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**Water System General Notes**  
Lone Pine State Park Water System Improvements Project

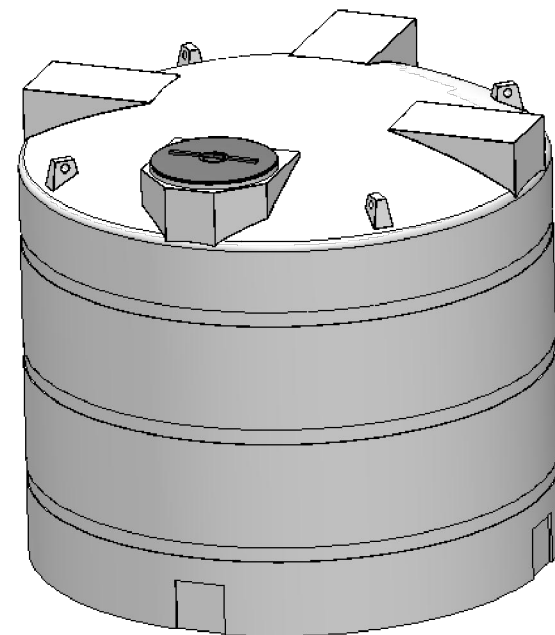
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Note: The supplier / contractor providing the proposed water tanks for this project shall provide certification that the tanks are rated to meet current AWWA or NSF potable water standards.



REVISIONS				
ZON E	REV.	DESCRIPTION	DATE	APPROVED
2-B	A	WEIGHT CHANGE	3-3-2010	EBW



- NOTES:
- MATERIAL: POLYETHYLENE
  - WEIGHT: 650 LBS STD. RATED 1.5 SG.  
850 LBS HD. RATED 2.0 SG.

**PROPRIETARY AND CONFIDENTIAL**  
 THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF <INSERT COMPANY NAME HERE>. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF <INSERT COMPANY NAME HERE> IS PROHIBITED.

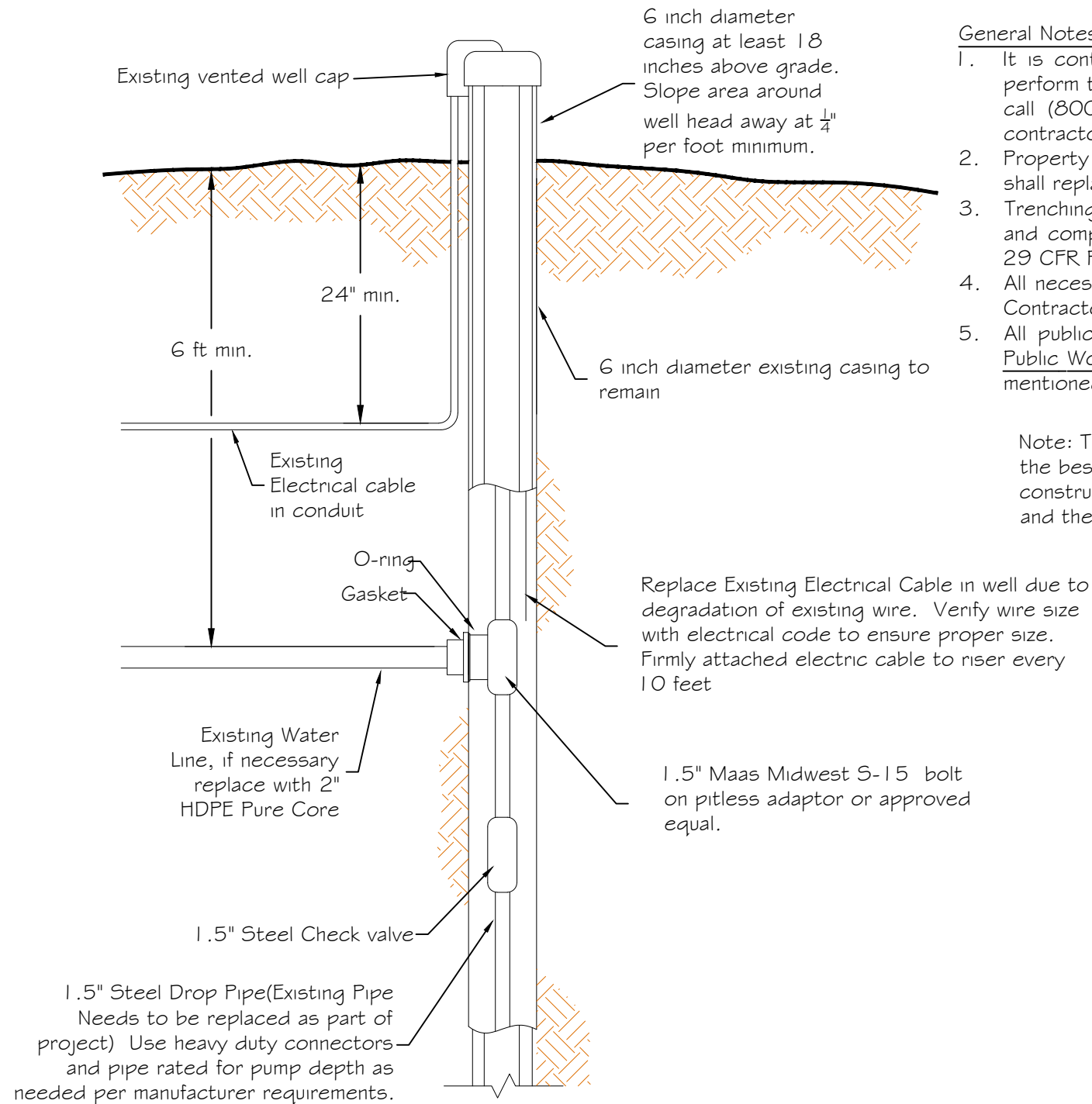
UNLESS OTHERWISE SPECIFIED:		NAME	DATE	CUSTOM ROTO-MOLDING, INC.
DIMENSIONS ARE IN INCHES		EBW	5-29-09	
TOLERANCES:		DRAWN		TITLE: <b>3000 GALLON VERTICAL TANK</b>
FRACTIONAL ±		CHECKED		
ANGULAR: MACH ± BEND ±		ENG APPR.		
TWO PLACE DECIMAL ±		MFG APPR.		
THREE PLACE DECIMAL ±		Q.A.		REV <b>A</b>
INTERPRET GEOMETRIC TOLERANCING PER:		COMMENTS:		
MATERIAL				SIZE DWG. NO.
FINISH				<b>B</b> 3000 VT
NEXT ASSY	USED ON			SCALE: 1:50 WEIGHT:
APPLICATION	DO NOT SCALE DRAWING			SHEET 1 OF 1

Matt Nerdig, PE August 26, 2021 DRAWN BY: DATE:	REVISD BY: DATE:	APPROVED BY: DATE:
Rob Smith, PE August 26, 2021 CHECKED BY: DATE:	APPROVED BY: DATE:	APPROVED BY: DATE:



# Tank Details

## Lone Pine State Park Water System Improvements Project



**General Notes:**

1. It is contractor's responsibility to verify the presence, location and depth of all existing utilities as needed to perform the work. It shall be the contractor's responsibility to protect the utilities from damage. Contractor shall call (800) 551-8344 or (406) 755-UDIG (8344) within Flathead and Lincoln Counties. In all other areas, contractor shall call (800) 424-5555.
2. Property pins found within the construction area shall be preserved. If a monument is disturbed, the contractor shall replace the monument at their expense.
3. Trenching and excavation can be hazardous. Contractor shall take all necessary precautions to protect workers and comply with the Occupational Safety & Health Administration's established standards for such work, found in 29 CFR Part 1926 subpart P.
4. All necessary permits shall be obtained by contractor and filing any required reports with the Board of Water Well Contractors.
5. All public improvements shall be constructed and tested in accordance with the latest edition of the Montana Public Works Standard Specifications. The construction plans are intended to work in conjunction with the above mentioned standards.

Note: The well pump that is existing is a Franklin Tri Seal 10G530 based on the best records available. This shall be verified on site during the construction process. The pump replacement shall be bid as an optional item and the contractor shall match the existing pump with the replacement.

WELLHEAD DETAIL  
Not to scale

Matt Nerdig, PE August 26, 2021  
DRAWN BY: DATE:  
Rob Smith, PE August 26, 2021  
CHECKED BY: DATE:

REVISED BY: DATE:  
APPROVED BY: DATE:

APPROVED BY: DATE:  
APPROVED BY: DATE:



**Montana Fish,  
Wildlife & Parks**

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## Wellhead Details

Lone Pine State Park Water System Improvements Project

SHEET: 11  
of  
20



DESIGN ENGINEER:

Matt Nerdig , PE #17074  
A2Z Engineering, PLLC  
P.O. Box 10248, Kalispell, Montana 59904  
406.755.7888 phone 406.755.7880 fax  
Email address: [mnerdig@a2z-engineering.com](mailto:mnerdig@a2z-engineering.com)  
Visit our website at [www.A2Z-Engineering.com](http://www.A2Z-Engineering.com)

GOVERNING CODE: The design and construction of this project is governed by the "International Building Code (IBC)", 2018 Edition, hereafter referred to as the IBC, as adopted and modified by the State of Montana and/or the local building jurisdiction.

REFERENCE STANDARDS: Refer to Chapter 35 of IBC. Where other Standards are noted in the drawings, use the latest edition of the standards unless a specific date is indicated. Reference to a specific section in a code does not relieve the contractor from compliance with the entire standard.

DEFINITIONS: The following definitions cover the meaning of certain terms in the notes and plans:

"Engineer of Record" (EOR) - The engineer who is licensed to stamp and sign the structural documents for the project. The EOR is responsible for the design of the Primary Structural System.

"Submit for Review" - Submit to the Architect/Engineer for review prior to fabrication or construction.

"Per Plan" - Indicates reference to the structural plans, elevations and structural general notes.

"Specialty Structural Engineer" (SSE) - A professional engineer licensend in the state where the project is located (typically not the EOR) who performs specialty structural engineering services for selected specialty engineered elements identified in the Contract Documents, and who has experience and training in the Specialty. Documents stamped and signed by the SSE shall be completed by or inder the direct supervision of the SSE.

DEFINITIONS (CONT):

"Bidder-designed" - Components of the structure that require the general contractor, subcontractor, or supplier who is responsible for the design, fabrication and installation of specialty-engineered elements identified in the contract documents to retain the services of an SSE. Submittals of "Bidder-designed" elements shall be stamped and signed by the SSE.

"U.N.O." - Unless noted otherwise.

OTHER DRAWINGS: Refer to the architectural, mechanical, electrical, civil and plumbing drawings for additional information including but not limited to: dimensions, elevations, slopes, door and window openings, non-bearing walls, stairs, finishes, drains, waterproofing, ratings, mechanical unit locations, and other non-structural items.

STRUCTURAL DETAILS: The structural drawings are intended to show the general character and extent of the project and are not intended to show all details of the work.

STRUCTURAL RESPONSIBILITIES: The EOR is responsible for the strength and stability of the primary structure in its completed form.

COORDINATION: The Contractor is responsible for coordinating details and accuracy of the work; for confirming and completing all quantities and dimensions; for selecting fabrication processes; for techniques of assembly; and for performing work in a safe and secure manner.

MEANS, METHODS AND SAFETY REQUIREMENTS: The contractor is responsible for the means and methods of construction and all job related safety standards such as OSHA and DOSH.

BRACING/SHORING DESIGN ENGINEER: The contractor shall, at their discretion, contract with the EOR or employ an SSE for the design of any temporary bracing or shoring.

TEMPORARY SHORING AND BRACING: The contractor is responsible for the strength and stability of the structure during construction and shall provide temporary shoring, bracing and other elements required to maintain stability until the structure is complete. It is the contractor's responsibility to be familiar with the work required in the construction documents and the requirements for executing it properly.

CONSTRUCTION LOADS: Loads on the structure during construction shall not exceed the design loads as noted in the structural plan set or the capacity of partially completed construction as determined by the Contractor's bracing and shoring design engineer.

CHANGES IN LOADING: The contractor has the responsibility to notify the EOR of any architectural, mechanical, electrical or plumbing load imposed on the structure that differs from or that is not documented in the original Contract Documents. Provide documentation of location, load size and anchorage of all undocumented loads in excess of 400 pounds. Provide marked-up structural plan indicating locations of any new equipment or loads. Submit plans to the Architect/Engineer for review prior to construction.

NOTE PRIORITIES: Plan and detail notes and specific loading data provided on individual plan and detail drawings supercedes information in the Structural General Notes.

ALTERNATES: Alternate products of similar strength, nature and form for specified items may be submitted with adequate technical documentation to the EOR for review. Alternates that require substantial effort to review will not be reviewed unless authorized by the Owner.

CONTRACTOR RESPONSIBILITIES:

1. It is contractor's responsibility to verify the presence, location and depth of all existing utilities as needed to perform the work. It shall be the contractor's responsibility to protect the utilities from damage. Contractor shall call (800) 551-8344 or (406) 755-UDIG (8344) within Flathead and Lincoln Counties. In all other areas, contractor shall call (800) 424-5555.
2. Property pins found within the construction area shall be preserved. If a monument is disturbed, the contractor shall replace the monument at their expense.
3. Trenching and excavation can be hazardous. Contractor shall take all necessary precautions to protect workers and comply with the Occupational Safety & Health Administration's established standards for such work, found in 29 CFR Part 1926 subpart P.
4. All necessary permits shall be obtained by contractor.
5. All construction shall be in accordance with IBC 2009 or IRC 2009. The contractor is responsible to know and follow the IRC/IBC requirements even if not specifically noted in this plan set.
6. The contractor shall keep thorough records through photographs of foundation and framing elements and provide them at engineer/inspector/owners request. If this step is not performed the contractor may be forced to verify structural elements and construction items at their cost.
7. Contractor shall be responsible to ensure that all construction is plumb, level, and square. All proper means and methods of construction shall be followed as outlined in the IBC 2018.
8. Contractor to verify all dimensions and conditions prior to start of construction.
9. Contractor is responsible to comply with all applicable and local codes and regulations and to obtain all necessary permits prior to start of construction.

Matt Nerdig, PE August 26, 2021  
DRAWN BY: DATE:

REVISED BY: DATE:

APPROVED BY: DATE:

Rob Smith, PE August 26, 2021  
CHECKED BY: DATE:

APPROVED BY: DATE:

APPROVED BY: DATE:



Montana Fish, Wildlife & Parks

# Structural Notes

## Lone Pine State Park Water System Improvements Project

SHEET: 12 of 20

DESIGN CRITERIA AND LOADS:

Ground Snow Loading: 62 PSF  
Snow Load Importance Factor (I): 1.0  
Snow Exposure Factor (Ce): B  
Thermal Factor (Ct): 1.0  
Roof Top Chord Live Load: 55 PSF (Snow)  
Roof Top Chord Dead Load: 10 PSF  
Truss Bottom Chord Dead Load: 10 PSF  
Truss Bottom Chord Live Load: 10 PSF  
Floor Live Design Loading: 50 PSF  
Floor Dead Design Loading: 20 PSF  
Soil Bearing: 2,000 PSF  
Wind Speed and Exposure: 90 MPH and Exposure C  
Seismic Design Category: C I = 1.0

SUBMITTALS

SUBMITTAL FOR REVIEW: Submittals of shop drawings and product data are required for items noted in the individual materials sections and for bidder-designed elements.

SUBMITTAL REVIEW PERIOD: Submittals shall be made in time to provide a minimum of ONE WEEK for review by the EOR prior to the onset of fabrication.

GENERAL CONTRACTOR'S PRIOR REVIEW: Prior to submissions to the EOR, the Contractor shall review the submittal for completeness. Dimensions and quantities are not reviewed by the EOR, and, therefore, must be verified by the Contractor. Contractor shall provide any necessary dimensional details requested by the Detailer and provide Contractor's review stamp and signature before forwarding to the EOR.

SHOP DRAWING REVIEW: Once the Contractor has completed his review, the EOR will review the submittal for general conformance with the design concept and the contract documents of the building and will stamp the submittal accordingly. Markings or comments shall not be construed as relieving the contractor from compliance with the project plans and specifications, nor departure therefrom.

SHOP DRAWING DEVIATIONS: When shop drawings differ from or add to the requirements of the structural drawings, they shall be designed and stamped by the responsible SSE.



DEFERRED SUBMITTALS

BIDDER-DESIGNED ELEMENTS: Submit bidder-designed deferred submittals to EOR prior to fabrication. Design of prefabricated, bidder-designed, manufactured, pre-engineered, or other fabricated products shall comply with the following requirements:

- 1) Design considers tributary dead, live, wind, seismic, snow and drift loads in combinations required by IBC.
- 2) Design within Deflection Limits noted herein and as specified or referenced in IBC.
- 3) Design shall conform to the specifications and standards of the governing code.
- 4) Submittal shall include:
  - a) Calculations prepared, stamped and signed by SSE demonstrating code conformance.
  - b) Engineered component design drawings are prepared, stamped and signed by SSE.
  - c) Product data, technical information and manufacturer's written requirements.

DEFLECTION LIMITS:

Vertical:  
Roof Members Total Load: L/240  
Roof Members Live, Snow, Wind Load: L/360  
Floor Members Total Load: L/360  
Floor Live Load: L/480  
Horizontal:  
Members Supporting Brittle Finishes: L/240  
Members Supporting Flexible Finishes: L/180

COMMON BIDDER-DESIGNED ITEMS: Contractor shall submit all bidder-designed elements to the EOR for review using the means outlined herein. Common bidder-designed elements include but are not limited to:

- Handrails, Guardrails and Balcony Rail Anchorages.
- Temporary Shoring Systems
- Precast Structural Elements
- Roof Trusses
- Floor Trusses or Joists
- Structural Insulated Panels

TESTS AND INSPECTIONS

INSPECTIONS: Special Inspections required by IBC 1704, 1705, 1707 and 1708 shall be performed per the requirement of the IBC. Special inspection shall occur in accordance with the Statement of Special Inspections per 1704 and 1705. Foundations, footings, under slab systems and framing are subject to inspection by the Building Official per IBC 109.3. Contractor shall coordinate all required inspections with the building official.

EOR INSPECTION LIMITATIONS: Inspections performed by the EOR shall not be considered special inspection. EOR accepts no liability for items not observed or overlooked during inspections. Inspections performed by EOR are intended as a means of added quality control, but EOR is not a special inspector or in possession of specific inspection credentials. Where areas of concern exist or where IBC requires special inspection, those services should be sought from a qualified special inspector.

TESTS AND INSPECTIONS (CONT.)

RECOMMENDED INSPECTION ITEMS BY EOR: It is strongly recommended the EOR be contacted by the contractor to inspect the following items:

- Reinforcing steel placement and temporary charring.
- Shape, location and placement of all concrete members formed.
- Use of required concrete design mix.
- Maintenance of specified curing temperature and methods.
- Placement of concrete precast members.
- Sampling of fresh concrete to determine slump, air entrainment and pouring temperature.
- During welding process to verify certified welders performing the work.
- During the welding process to verify valid welding process per AWS D1.1.
- Upon completion of welding process to visually observe all welds performed.
- Upon complete on wood framing and before placement of finishing to verify all wood structural components are present and properly installed.

FOUNDATIONS

REFERENCE STANDARDS: Conform to most recent edition of:

- 1) ACI 301 "Standard Specifications for Structural Concrete"
- 2) IBC Chapter 19 - Concrete
- 3) ACI 318

FIELD REFERENCE: It is highly recommended that the contractor keep a copy of ACI Field Reference Manual, SP-15 "Standards Specifications for Structural Concrete (ACI 301) with Selected ACI and ASTM References."

GENERAL FOUNDATION REQUIREMENTS:

- Do not scale drawings. verify all dimensions and conditions prior to start of construction. notify designer or engineer of any discrepancies or omissions that are found. establish and verify all openings and inserts for mechanical, electrical and plumbing with appropriate trades and drawings prior to the start of work.
- Bottom of all footings shall bear on compacted or undisturbed soil, 4'-0" minimum below frost line for commercial and 3'-0" minimum below frost line for residential.
- All rebar in footings and walls shall be suspended away from earthen material 3" and placed mid depth in the slab.
- Finish grade shall slope at a minimum of 1" per 4'-0" away from building and provide positive drainage.
- Contractor to verify native soil is compactible and free of organic material, refuse, or voids. If any clay or unusual soil is encountered contact the engineer of record.
- Footing drains shall be placed around the foundation walls to keep water out of the crawl space or basement area. These footing drains shall be sloped at a minimum 1/8" per foot and flow to daylight or to an approved method to convey water away from structures. Where areas of particular drainage or groundwater concerns are encountered, contact EOR for the design of project specific drainage plans.
- Concrete footings and walls shall be true to line, level, square, and plumb.

Matt Nerdig, PE August 26, 2021  
DRAWN BY: DATE:

REVISED BY: DATE:

APPROVED BY: DATE:

Rob Smith, PE August 26, 2021  
CHECKED BY: DATE:

APPROVED BY: DATE:

APPROVED BY: DATE:



Montana Fish, Wildlife & Parks

Structural Notes

Lone Pine State Park Water System Improvements Project

SHEET: 13 of 20



**GENERAL FOUNDATION NOTES**

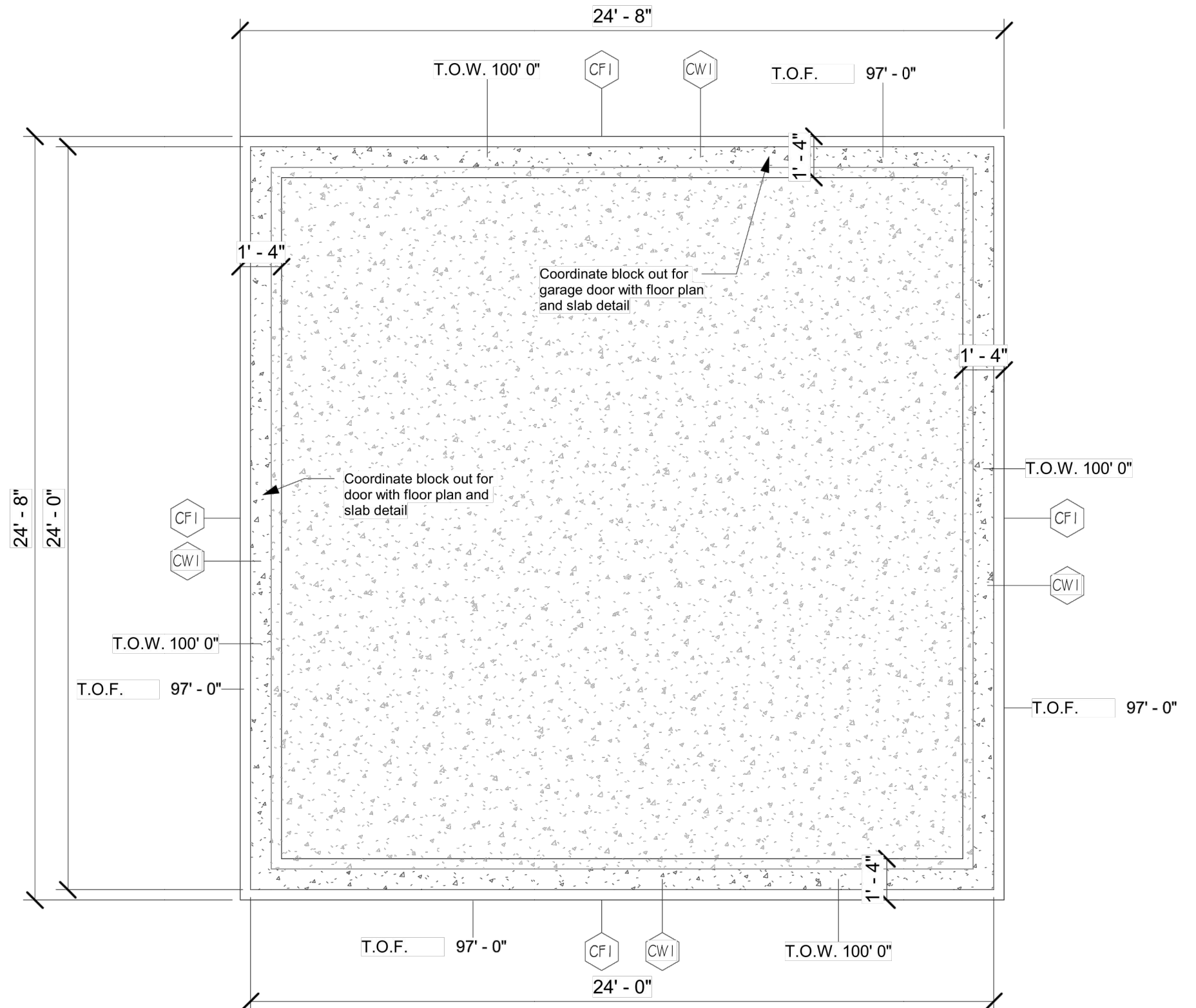
- BOTTOM PLATES SHALL BE BROWN TREATED DOUG FIR. SILL PLATES TO HAVE 5/8" X 12" ANCHOR BOLTS (OR PER DETAIL) 12" MINIMUM FROM ENDS, CORNERS, AND JAMBS AND AT 36" O.C. THEREAFTER. EMBED ANCHOR BOLTS 7" MINIMUM. PROVIDE 3"X3"X1/4" SLOTTED PLATE WASHER AND NUT AT EACH BOLT. COUNTERSINK WHERE REQUIRED.
- CONTRACTOR TO VERIFY NATIVE SOIL IS COMPACTABLE AND FREE OF ORGANIC MAT'L, REFUSE, OR VOIDS. IF ANY CLAY OR UNUSUAL SOIL IS ENCOUNTERED, CONTACT THE ENGINEER OF RECORD.
- CONTRACTOR RESPONSIBLE TO CONSTRUCT ALL FOOTINGS AND STEMWALLS PLUMB, SQUARE, TRUE, AND PER DIMENSIONS SHOWN. CROSS CHECK AGAINST ARCHITECTS PLANS BEFORE PROCEEDING. CEASE WORK AND RECTIFY ANY SITUATIONS WHERE DISCREPANCIES ARE FOUND.
- ESTABLISH AND VERIFY ALL OPENINGS AND INSERTS FOR MECHANICAL, ELECTRICAL, AND PLUMBING W/ APPROPRIATE TRADES AND DRAWINGS PRIOR TO START OF WORK.
- BOTTOM OF ALL FOOTING SHALL BEAR ON COMPACTED OR UNDISTURBED SOIL 4'-0" BELOW GRADE OR PER PLANS.
- FINISH GRADE SHALL SLOPE AT A MINIMUM OF 1" PER 4' AWAY FROM BUILDING AND PROVIDE POSITIVE DRAINAGE.
- STEP DOWN FOOTING PER GRADE REQUIREMENTS, SITE CONDITIONS.
- THE DIMENSIONS SHOWN ON THIS PLAN REFLECT THE ARCHITECT'S DRAWINGS. VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION. IF A DISCREPANCY IS FOUND, CONTACT A2Z ENGINEERING SO THE DIMENSIONS ON THIS PLAN CAN BE CORRECTED.
- FOUNDATION: 3000PSI AT 28 DAYS 4" SLUMP MAX. PLACTICIZER IF NEEDED. REBAR 60 KSI U.N.O.
- INTERIOR SLABS: 4000PSI AT 28 DAYS, 3-5% AIR ENTRAINMENT, 4" SLUMP MAX. PLACTICIZER IF NEEDED. REBAR 60 KSI U.N.O. DO NOT OVERWORK.
- EXTERIOR SLABS: 5000PSI AT 28 DAYS, 5-7% AIR ENTRAINMENT, 4" SLUMP MAX. PLACTICIZER IF NEEDED. REBAR 60 KSI U.N.O. DO NOT OVERWORK.
- ANY DIMENSION MARKED TBD SHALL BE DETERMINED FROM ARCHITECTURAL DRAWINGS.
- ELEVATION MARKS ARE BASED OFF ARCHITECTS PLANS AND A MAIN SUB FLOOR ELEVATION OF 100' 0"

**CONTINUOUS FOOTING SCHEDULE**

Type Mark	Width	Depth	Description
CF1	1' 4"	10"	(2) #4 Bars Continuous along length of footing with proper lap length

**CONTINUOUS WALL SCHEDULE**

Type Mark	Width	Description
CW1	8"	#4 Bars at 16" OC Each Way and ensure that all verticals extend in to footing with 4" return on hook in footing below



FOUNDATION PLAN  
Scale 1/4" = 1' 0"

Matt Nerdig, PE August 26, 2021  
DRAWN BY: DATE:

Rob Smith, PE August 26, 2021  
CHECKED BY: DATE:

REVISED BY: DATE:

APPROVED BY: DATE:

APPROVED BY: DATE:

APPROVED BY: DATE:



**Montana Fish,  
Wildlife & Parks**

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**Structural Foundation Plan**  
Lone Pine State Park Water System Improvements Project

SHEET: 14  
of  
20

**GENERAL FRAMING NOTES:**

- ALL DIMENSIONED LUMBER SHOWN ON THESE PLANS IS STRUCTURAL GRADE #2 DOUGLAS FIR, U.N.O. DO NOT USE #3 GRADE OR LOWER FOR THE LUMBER SHOWN ON THESE PLANS WITHOUT APPROVAL FROM STRUCTURAL ENGINEER OF RECORD. SPRUCE/PINE/FIR #2 MAY BE USED FOR NONSTRUCTURAL PARTITION WALLS LESS THAN 10'-0" TALL.

- THE TERM GL OR "GLU-LAM" REFERS TO A 24F-V4 BEAM FOR SIMPLE SPAN AND 24F-V8 FOR MULTI SPAN & AS MANUFACTURED BY BOISE CASCADE. VLB REFERS TO A 3100Fb VERSALAM BEAM AS MANUFACTURED BY BOISE CASCADE. TIMBERSTRAND REFERS TO 1.5E LSL AS MANUFACTURED BY ILEVEL TRUSS JOIST. EQ MAY BE SUB.

- PROVIDE SOLID BLOCKING IN THE FLOOR BOX WHERE COLUMNS ARE BEARING FROM UPPER FLOORS TO LOWER FLOORS INCLUDING EDGES OF SHEARWALLS. BLOCKING MUST BE PROVIDED FOR THE ENTIRE BEARING AREA OF THE COLUMN.

-THE STRUCTURAL MEMBERS SHOWN ON THESE PLANS MUST BE ERECTED IN A COMPETENT MANNER WITH HIGH QUALITY BUILDING PRACTICES BEING USED DURING CONSTRUCTION. IF ANY QUESTION ARISES REGARDING QUALITY BUILDING PRACTICES, CONTACT ENGINEER. BUILDER ASSUMES ALL LIABILITY IF DEVIATION FROM THIS PLAN IS MADE WITHOUT CONSULTING THE ENGINEER OF RECORD, OR IF INFERIOR CONSTRUCTION WORK IS PRACTICED.

-NOTE THAT A CHARACTERISTIC OF WOOD CONSTRUCTION IS THAT THE WOOD MATERIALS WILL SHRINK, EXPAND, OR DO BOTH DURING DIFFERENT SEASONS. THIS WILL BE MOST PRONOUNCED DURING THE FIRST TWO YEARS AFTER CONSTRUCTION IS COMPLETE. TRUSS UPLIFT DURING THE WINTERTIME WILL ALSO BE PRESENT. SEE COVER PAGES FOR MINIMIZING DRYWALL CRACKING @ PARTITIONS.

-TIMBERS NOTED ON THE PLANS ARE DOUGLAS FIR #2 GRADE UNLESS NOTED OTHERWISE

-SIMPSON CONNECTORS MAY BE SUBSTITUTED WITH EQUIV. USP AS MNFR'D. BY THE MITEK COMPANY.

- JAMB DESIGN, U.N.O.:  
 OPENING < 4'-0" THEN USE (1)-2X6 TRIMMER  
 (1)-2X6 KING STUD  
 OPENING < 4'-0" THEN USE (2)-2X6 TRIMMER  
 (2)-2X6 KING STUD

- CONTINUE ALL COLUMNS TO FOUNDATION SILL PLATE

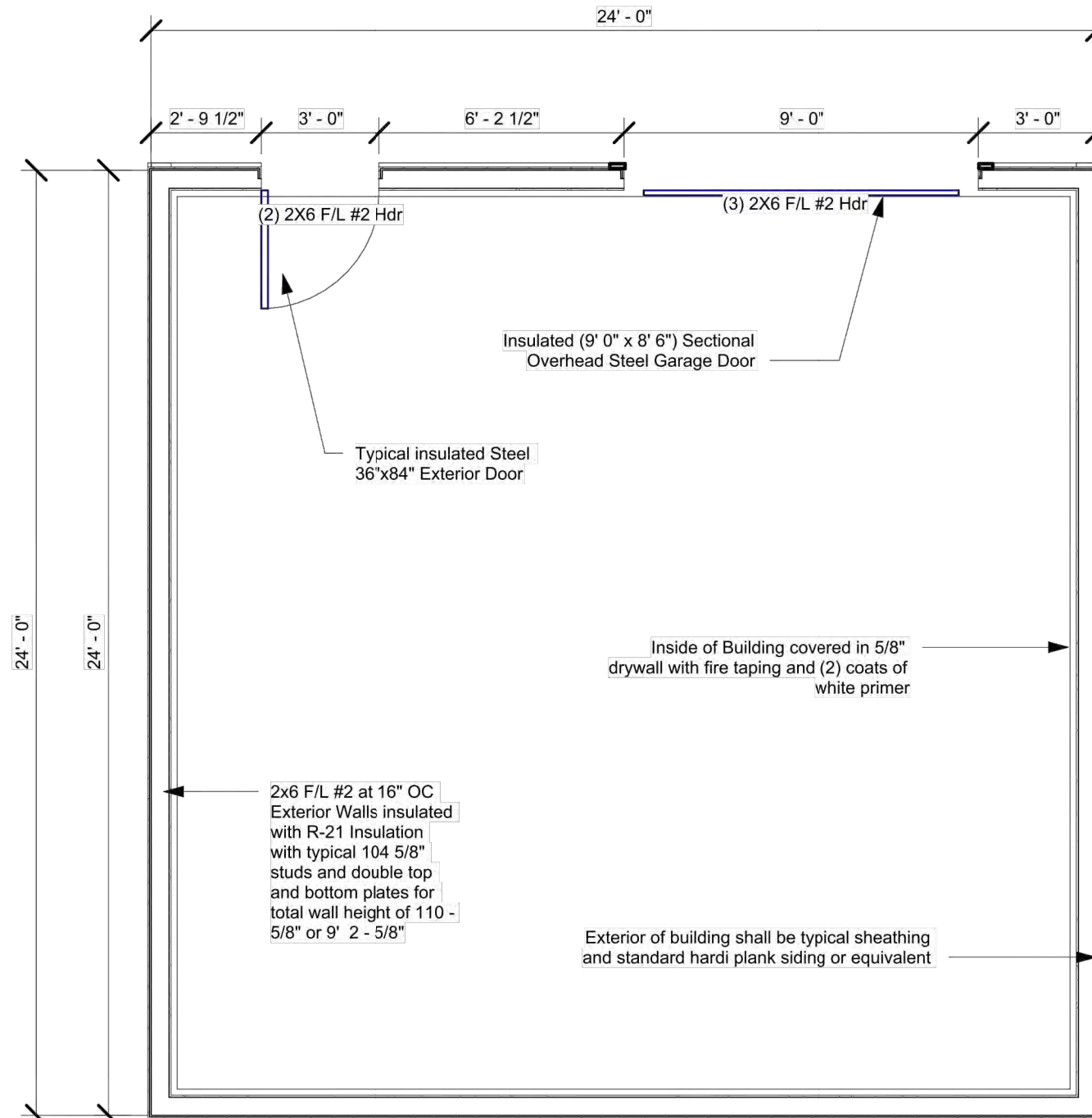
- FLOOR BLOCKING, U.N.O.:  
 - FASTEN FLOOR SHEATHING TO RIMBOARD/BLK'G W/ EDGE NAILING  
 - FASTEN RIMBOARD/BLK'G TO TOP PLATE OR SILL PLATE W/16d TOE-NAILS @ 8" O.C.

- U.N.O., EXTERIOR WALL SHEATHING TO BE 7/16" APA RATED STRUCTURAL GRADE 1 SHEATHING FASTENED TO WALL STUDS W/ 8d NAILS @ 6" O.C. EDGE AND 12" O.C. FIELD. BLOCK ALL PANEL EDGES.

- FLOOR SHEATHING, U.N.O.: 3/4" PLYWOOD W/ 10d NAILS @ 6" O.C. EDGE & 12" O.C. FIELD

- ROOF SHEATHING, U.N.O.: 5/8" PLYWOOD W/ 10d NAILS @ 6" O.C. EDGE & 12" O.C. FIELD

- CONNECTORS TOUCHING TREATED LUMBER AND CONNECTORS W/EXPOSURE TO WEATHER ARE TO BE ZMAX COATED



WALL FRAMING PLAN  
 Scale 1/4" = 1' 0"

Matt Nerdig, PE August 26, 2021  
 DRAWN BY: DATE:

Rob Smith, PE August 26, 2021  
 CHECKED BY: DATE:

REVISED BY: DATE:

APPROVED BY: DATE:

APPROVED BY: DATE:

APPROVED BY: DATE:



Montana Fish, Wildlife & Parks

Structural Wall Framing Plan  
 Lone Pine State Park Water System Improvements Project



**PREFABRICATED WOOD TRUSSES:** Prefabricated Wood Trusses are considered a bidder-designed element and are subject to all associated requirements. Submittal of the truss design packet to the EOR for review shall occur prior to truss fabrication and erection.

- Maximum Roof truss spacing is 24" OC
- Roof truss loading per plan and notes.
- Trusses to be fabricated by a certified member of the Truss Plate Institute (TPI). Design, fabrication and erection shall conform to TPI standards.
- Connectors plates shall be i.c.b.o. approved with a minimum size of 3" x 5".
- Wood Floor Trusses bearing width shall be verified by the truss manufacturer or as shown otherwise.
- Truss layout provided is for general information only and was produced by truss manufacturer.
- All chord members shall have lumber grade stamps: All web members shall have grade stamps or all web members for a given truss, shall be made from the same lumber grade with at least 50% of the web members bearing a grading stamp.
- Truss designs & erection plans shall be by a professional engineer registered in the State of Montana. Erection plans shall show truss spacing, truss mark numbers (corresponding to the design calculations), concentrated loads, permanent bracing/bridging as re-required by the truss design, and erection bracing. Reference BCSI 1-03 for bracing guidelines.
- Shop drawings shall include, for each type of truss, dimensions and configurations, location of each connector at each joint, and amount of camber if required. Design calculations, shop drawings and erection plans shall be submitted for review by the structural engineer of record and contractor prior to fabrications.

**DESIGN CRITERIA AND LOADS:**

Ground Snow Loading:	62 PSF
Snow Load Importance Factor (I):	1.0
Snow Exposure Factor (Ce):	B
Thermal Factor (Ct):	1.1
Roof Top Chord Live Load:	55 PSF (Snow)
Roof Top Chord Dead Load:	10 PSF
Truss Bottom Chord Dead Load:	10 PSF
Truss Bottom Chord Live Load:	10 PSF
Floor Live Design Loading:	40 PSF
Floor Dead Design Loading:	15 PSF
Soil Bearing:	2000 PSF
Wind Speed and Exposure:	90 MPH and Exposure C
Seismic Design Category:	D I = 1.0

**BIDDER-DESIGNED ELEMENTS:** Submit bidder-designed deferred submittals to EOR prior to fabrication. Design of prefabricated, bidder-designed, manufactured, pre-engineered, or other fabricated products shall comply with the following requirements:

- 1) Design considers tributary dead, live, wind, seismic, snow and drift loads in combinations required by IBC.
- 2) Design within Deflection Limits noted herein and as specified or referenced in IBC.
- 3) Design shall conform to the specifications and standards of the governing code.
- 4) Submittal shall include:
  - a) Calculations prepared, stamped and signed by SSE demonstrating code conformance.
  - b) Engineered component design drawings are prepared, stamped and signed by SSE.
  - c) Product data, technical information and manufacturer's written requirements.

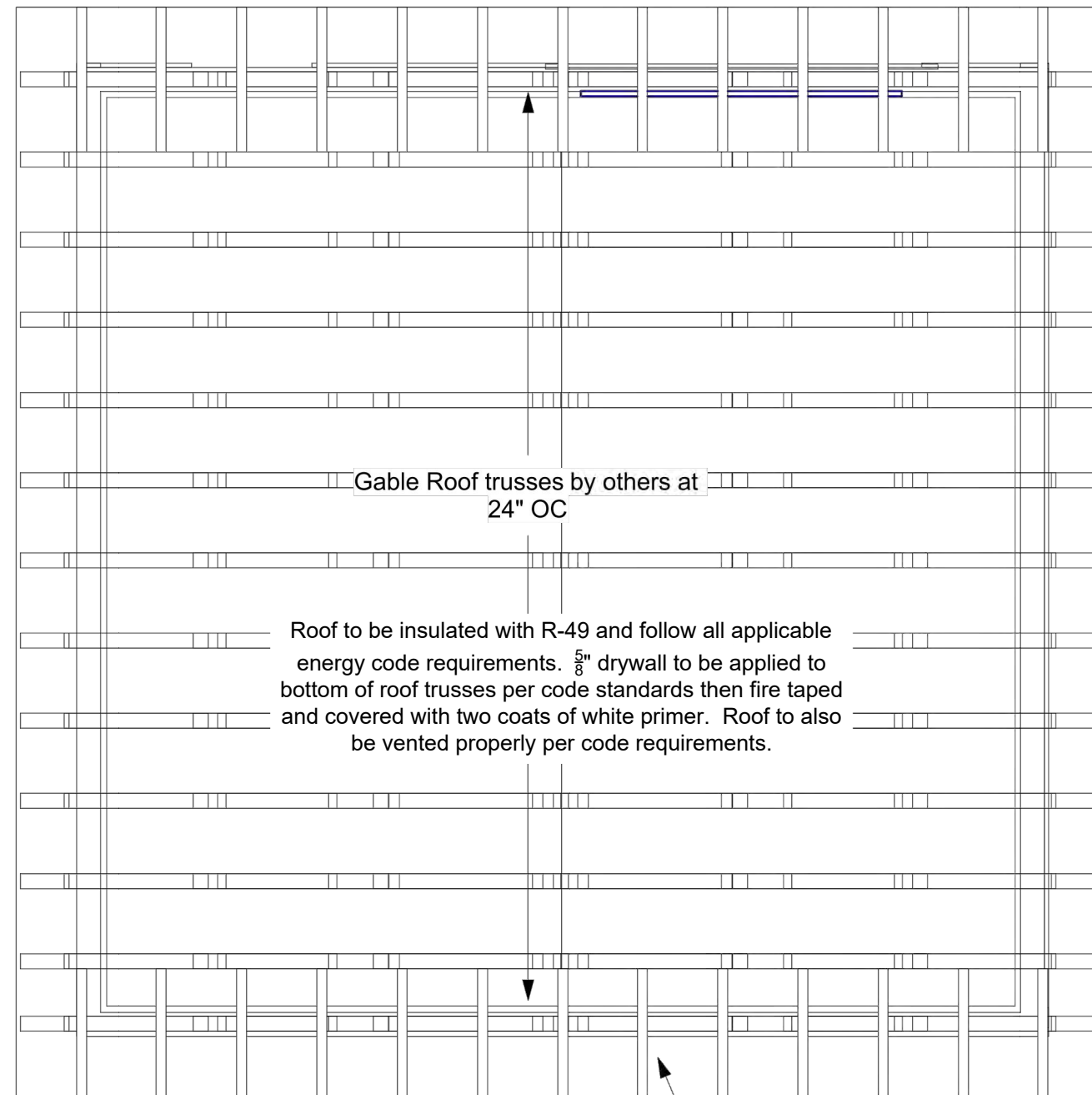
**DEFLECTION LIMITS:**

**Vertical:**

Roof Members Total Load:	L/360
Roof Members Live, Snow, Wind Load:	L/360
Floor Members Total Load:	L/600
Floor Live Load:	L/600

**Horizontal:**

Members Supporting Brittle Finishes:	L/240
Members Supporting Flexible Finishes:	L/180



ROOF FRAMING PLAN  
Scale 1/4" = 1' 0"

Matt Nerdig, PE August 26, 2021  
DRAWN BY: DATE:

REVISED BY: DATE:  
APPROVED BY: DATE:

APPROVED BY: DATE:  
APPROVED BY: DATE:



**Montana Fish, Wildlife & Parks**

**Roof Framing Layout**  
Lone Pine State Park Water System Improvements Project

SHEET: 16 of 20





**Roof Shingles**

Owens Corning Duration Series  
Driftwood  
(Match Nearby Home)



**Siding**

Hardi Plank Lap Siding  
Select CedarMill

Light Mist  
(Verify Color with Nearby Home)

**Soffit**

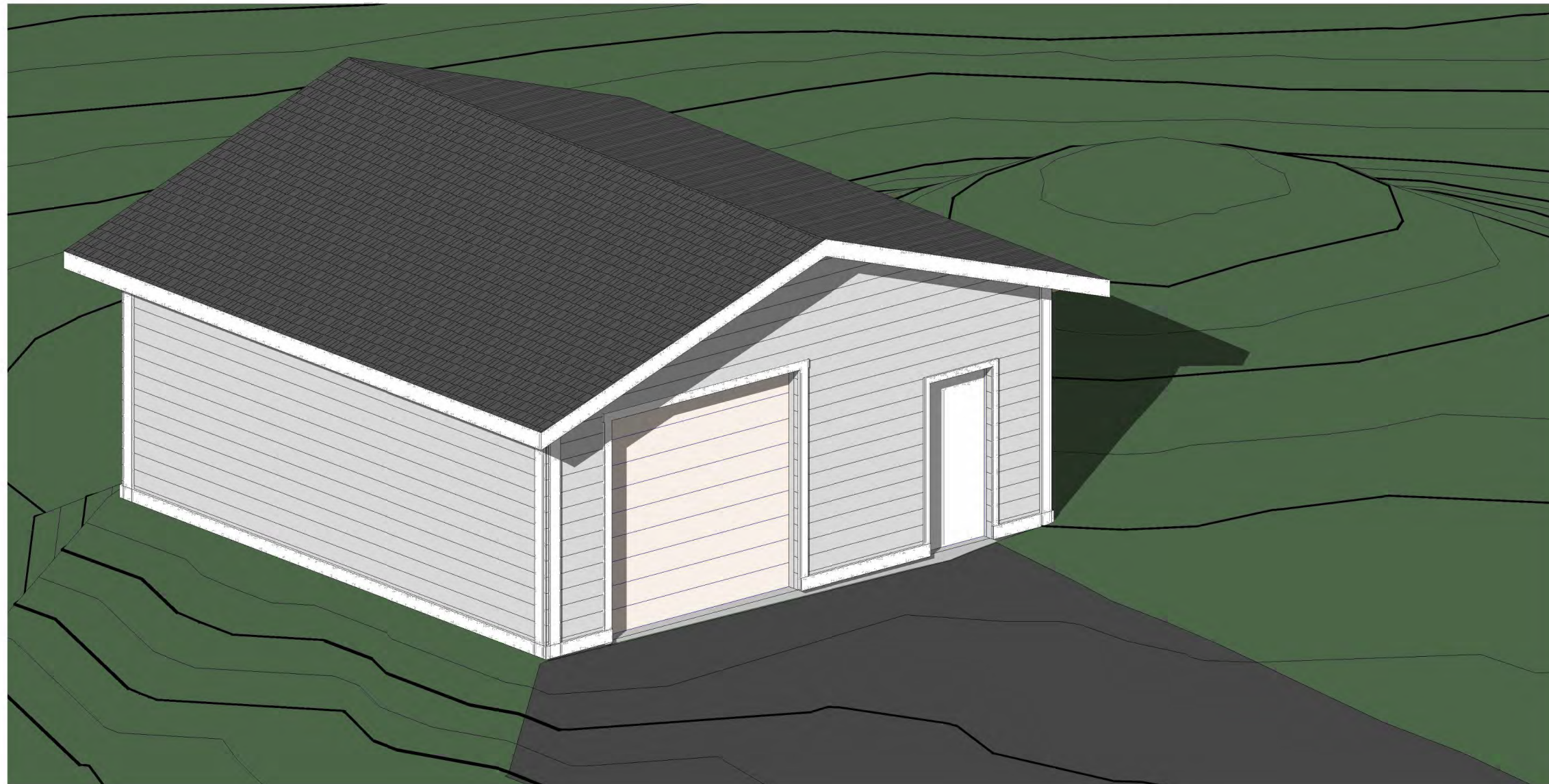
LP Smartside Soffit Panels

White



**Corner (1x4), Door Trim(1x4),  
Fascia (1x6), and Belly Band (1x6)**  
LP Smartside Engineered Wood  
Trim

White  
(Verify Color with Nearby Home)



Matt Nerdig, PE August 26, 2021  
DRAWN BY: DATE:

Rob Smith, PE August 26, 2021  
CHECKED BY: DATE:

REVISED BY: DATE:

APPROVED BY: DATE:

APPROVED BY: DATE:

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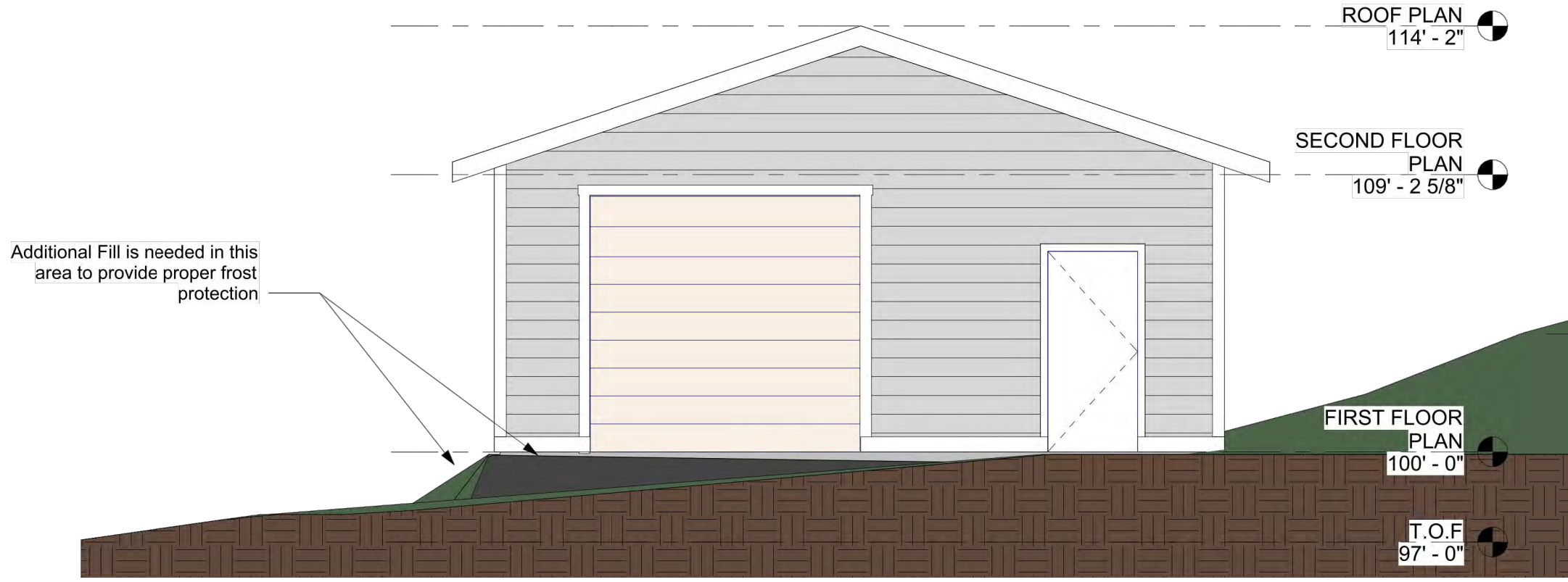
**Montana Fish,  
Wildlife & Parks**

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**Building 3D Views and Materials**  
Lone Pine State Park Water System Improvements Project

SHEET: 17  
of  
20





○ SOUTHEAST ELEVATION



○ NORTHEAST ELEVATION

Matt Nerdig, PE August 26, 2021  
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 Rob Smith, PE August 26, 2021  
 CHECKED BY: DATE:

REVISED BY: DATE:  
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**Montana Fish,  
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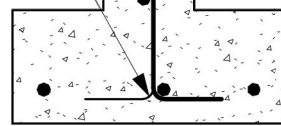
**Building Elevations**  
 Lone Pine State Park Water System Improvements Project

BEND AND LAP  
VERT. WALL REINF.  
24" INTO SLAB

0' - 8"

CONC. FOUNDATION  
- SEE PLAN

STD. 90 DEG  
ALTERNATING  
HOOK



CONC. SLAB -  
SEE PLAN  
SEE TYP. SLAB DETAIL  
FOR NOTES NOT SHOWN

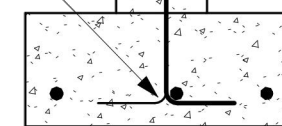
2X @ 16" O.C.  
W/ SHEATHING  
PER PLAN

EDGE NAILING

2X TREATED SILL  
PLATE  
W/AB's PER PLAN

CONC. FOUNDATION  
PER PLAN

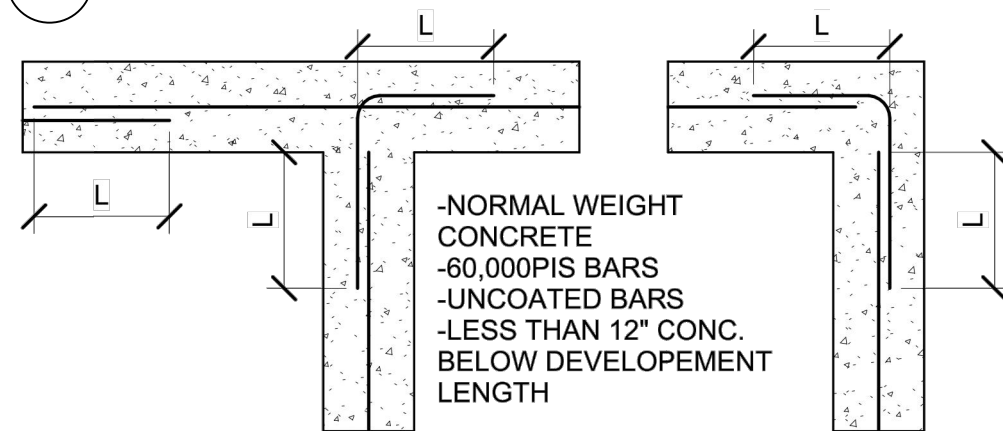
STD. 90 DEG  
ALTERNATING  
HOOK



1/2" EXPANSION JOINT  
CONC. SLAB - SEE PLAN

SEE TYP. SLAB  
DETAIL FOR  
NOTES NOT  
SHOWN

SLAB AT DOOR OPENINGS



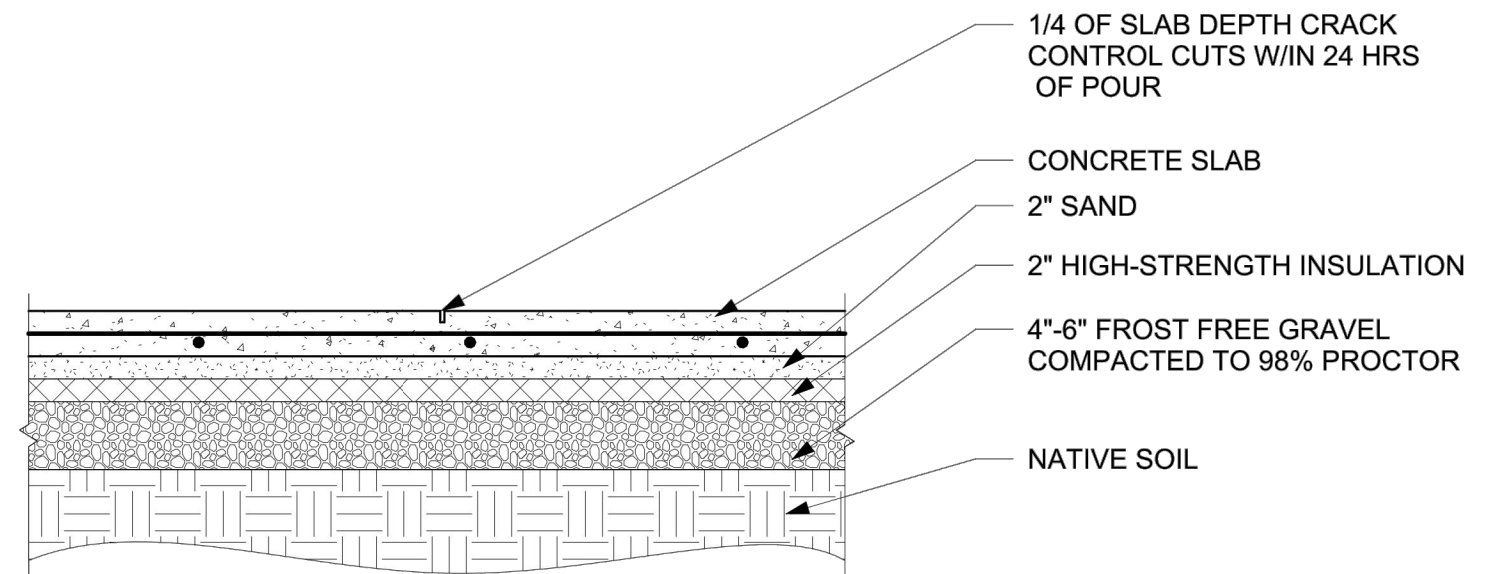
-NORMAL WEIGHT  
CONCRETE  
-60,000PSI BARS  
-UNCOATED BARS  
-LESS THAN 12" CONC.  
BELOW DEVELOPEMENT  
LENGTH

Required Reinforcement Lap Lengths, L, (in)

Bar Size	Concrete Strength	
	f'c=3000psi	f'c=4000psi
#3	22	19
#4	29	25
#5	36	31
#6	43	37

FOUNDATION REINFORCEMENT LAP LENGTHS

SLAB AT FOUNDATION WALL



1/4 OF SLAB DEPTH CRACK  
CONTROL CUTS W/IN 24 HRS  
OF POUR

CONCRETE SLAB

2" SAND

2" HIGH-STRENGTH INSULATION

4"-6" FROST FREE GRAVEL  
COMPACTED TO 98% PROCTOR

NATIVE SOIL

TYPICAL SLAB DETAIL

Matt Nerdig, PE August 26, 2021  
DRAWN BY: DATE:

REVISED BY: DATE:

APPROVED BY: DATE:

Rob Smith, PE August 26, 2021  
CHECKED BY: DATE:

APPROVED BY: DATE:

APPROVED BY: DATE:



Montana Fish,  
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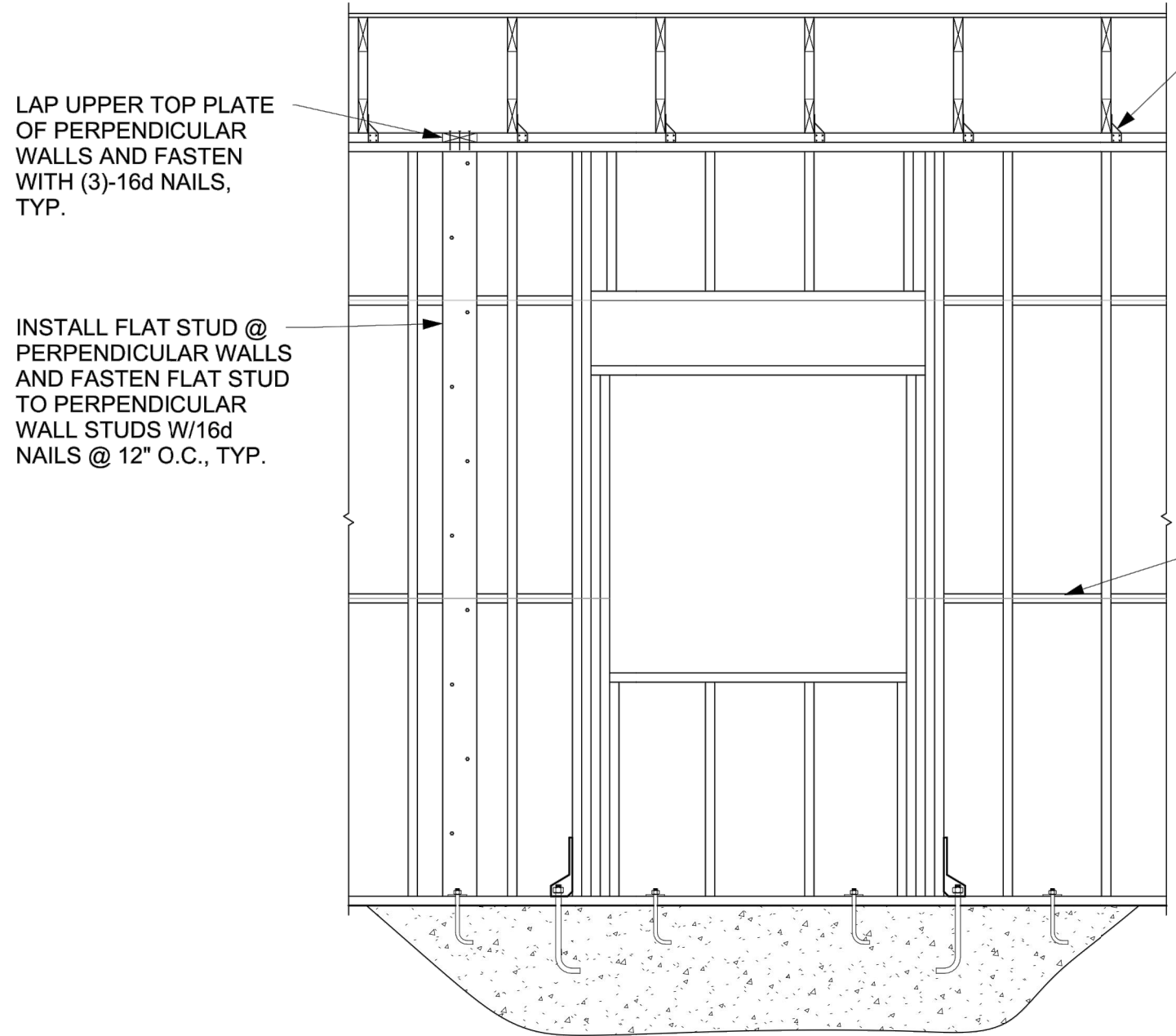
205

## Structural Details

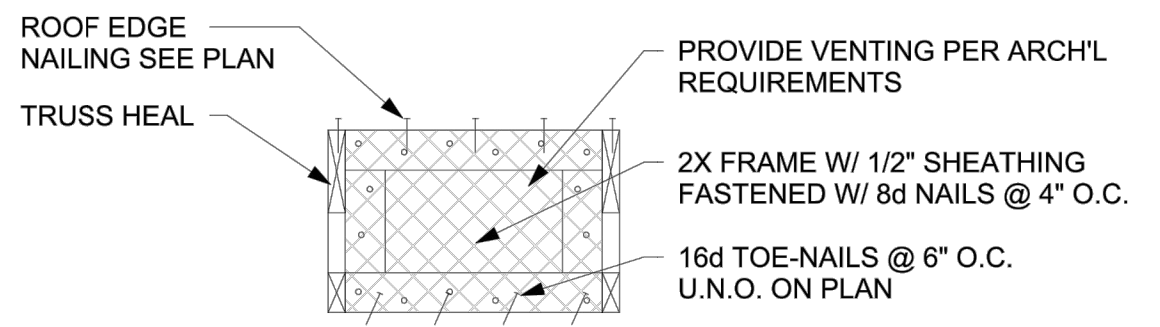
Lone Pine State Park Water System Improvements Project

SHEET: 19  
of  
20

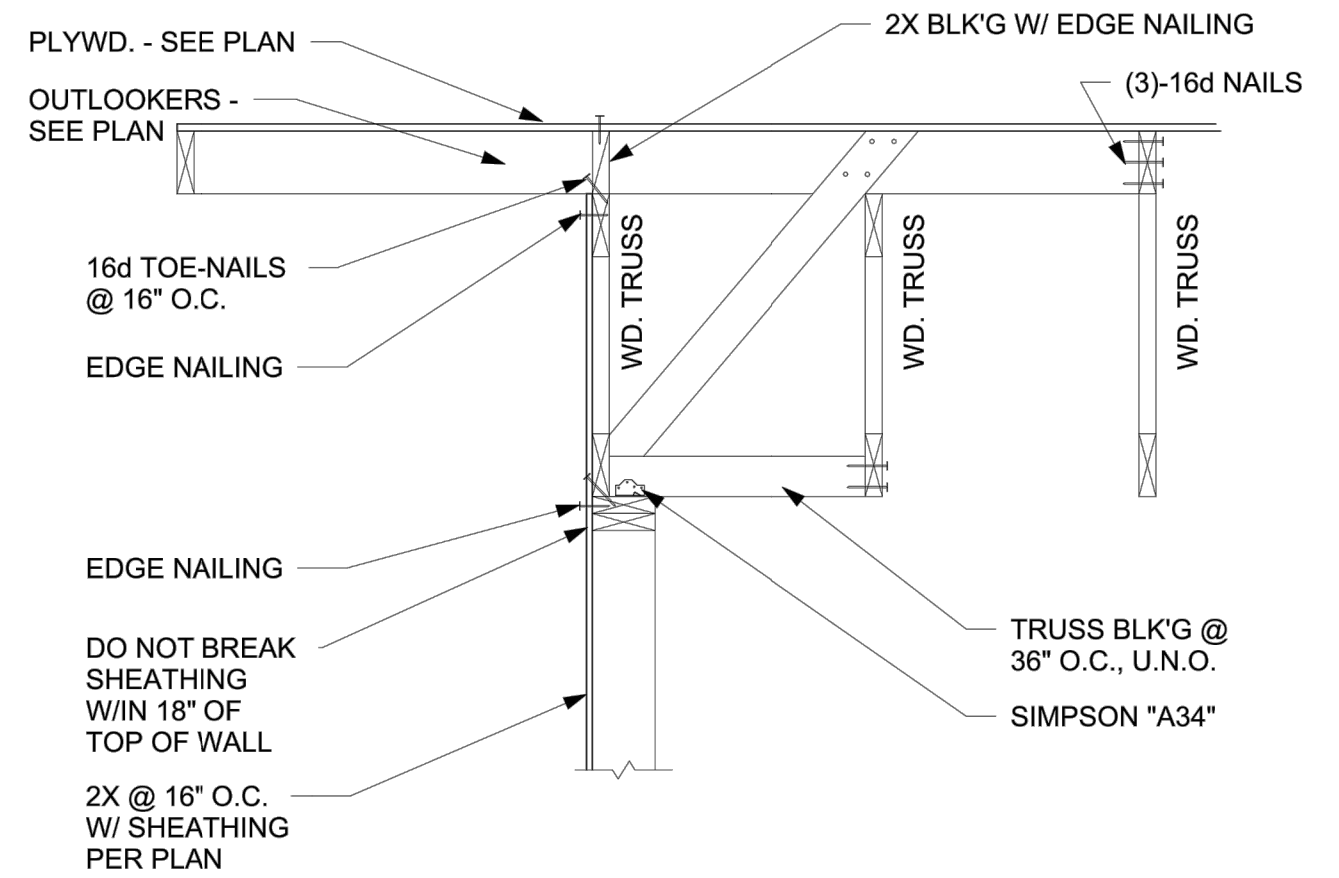




○ TYPICAL WALL DETAIL



○ TYPICAL TRUSS BLOCKING



○ TYPICAL TRUSS DETAIL AT PARALLEL WALL

Matt Nerdig, PE August 26, 2021  
 DRAWN BY: DATE:

Rob Smith, PE August 26, 2021  
 CHECKED BY: DATE:

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**Montana Fish, Wildlife & Parks**

**Structural Details**  
 Lone Pine State Park Water System Improvements Project