# Fields Stockwater Projects

## SHEET INDEX



## ABBREVIATIONS

| | |
|---|---|
| Ex | Existing |
| Galv | Galvanized |
| Ga | Gauge |
| Grnd | Ground |
| Max | Maximum |
| Min | Minimum |
| Sch | Schedule |

## GENERAL NOTES

1. All construction shall be in accordance with these drawings and the following NRCS Practice Requirements and/or Specifications: Concrete (901), Pipeline (516), Watering Facility (614), Pumping Plant (533), Spring Development (574) and Geotextile Fabric (905),
2. Landowner shall be responsible for obtaining any needed permits, easements, and/or right-of-ways, and meeting all legal requirements.
3. Landowner shall be responsible for locating and protecting all utilities. Special safety precautions shall be taken when working in the vicinity of gas, oil, and electrical lines.
4. Cal-OSHA safety requirements shall be in effect during all construction.
5. All lines and grades shown on these drawings are approximate. The proposed structure locations, excavation limits, and fill requirements will be staked in the field by NRCS engineer.
6. Contact the Natural Resources Conservation Service (NRCS) at least 7 days prior to construction at (805) 434-0396, ext 117.

## DESIGN NOTES

1. *Maximum static pressure is 86 psi.*
2. *Project is a Class IV.*

## CULTURAL RESOURCES

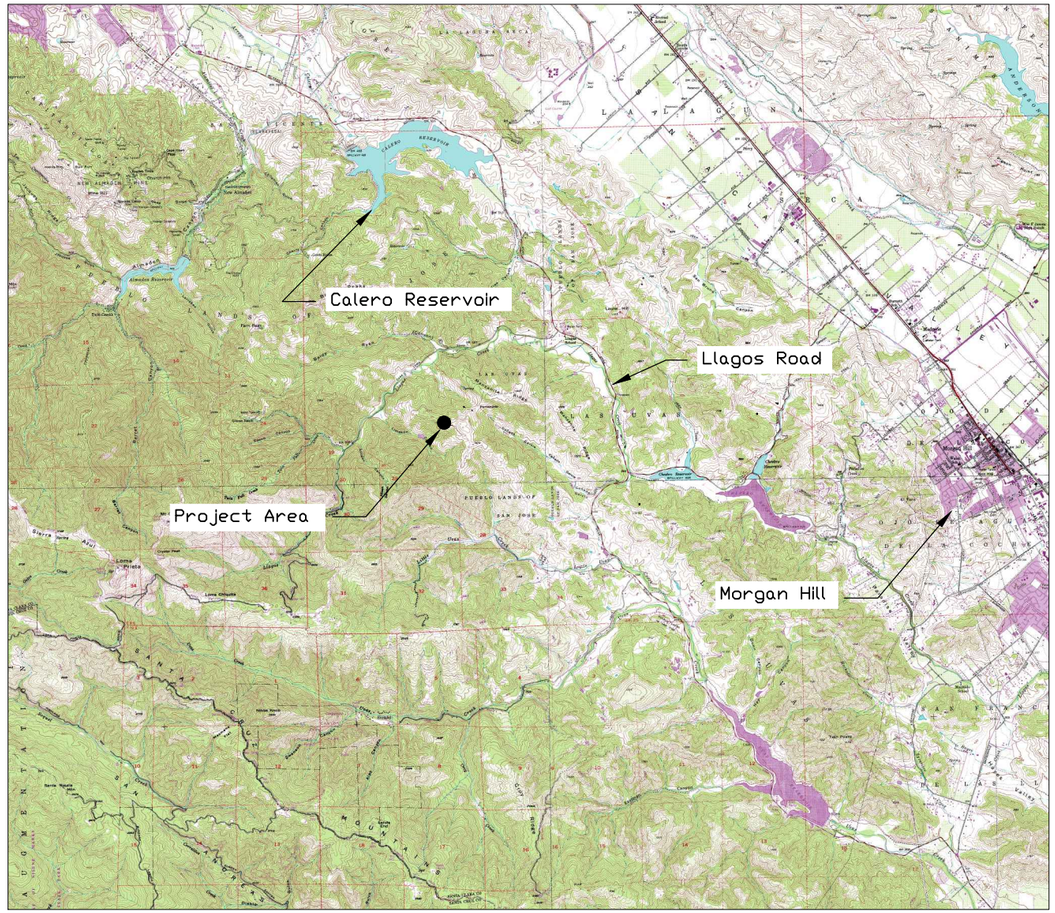
1. *If any commonly recognized cultural resources, sich as human formed artifacts older than 50 years, including projectile points, grinding stones, bowls, baskets, historic bottles, cans or trash deposits, are encountered during construction, then work is to stop immediately. Call NRCS to assess the significance of the find and to ensure that the resources are avoided.*
2. *If human remains are encountered, work is to stop and the Coroner/Sheriff is to be notified immediately. Notify NRCS of the determination of the County Coroner.*

## ENDANGERED SPECIES

*If California red-legged frog, California tiger salamander, western pond turtle or burrowing owl are encountered, no work shall occur until the frog, salamander. turtle or owl has left the area on its own accord or until a qualified wildlife biologist is consulted and appropriate arrangements are made with U.S. Fish & Wildlife Service and the California Department of Fish & Wildlife. Ground disturbing activities cannot occur within 50 feet if burrows are present where tiger salamander or burrowing owls are sighted.*

## SITE MAP

N.T.S.




Date
Designed Mark Barnett May 2013
Drawn Mark Barnett May 2013
Checked
Approved

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Fields Stockwater Projects
Title Page

San Benito Resource Conservation District

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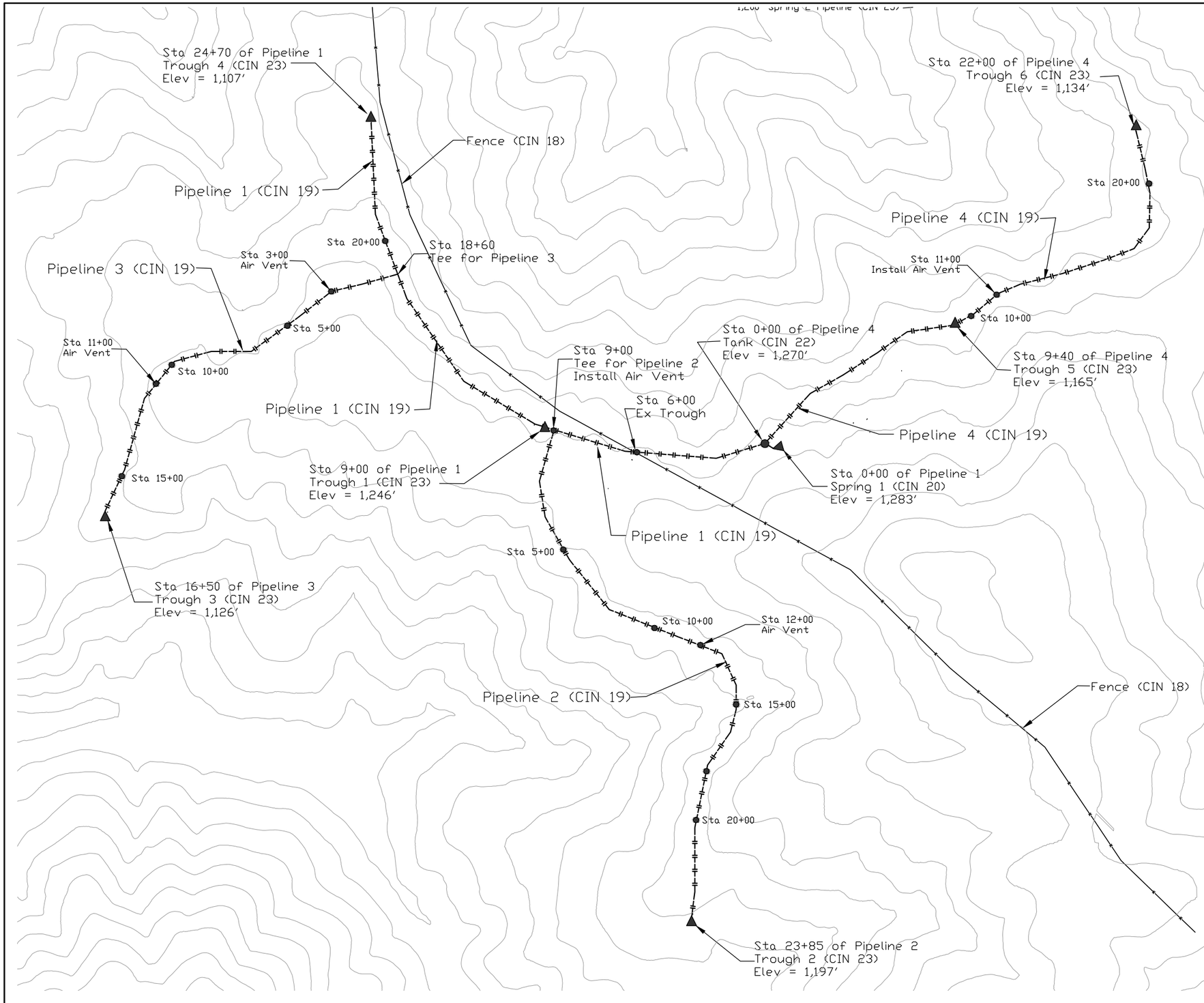
File No.

Drawing No.
2013-08

Sheet 1 of 9




## Project 1 Plan View

*CONSTRUCTION NOTES*

1. *All trough pipe and fittings above ground shall be galvanized steel pipe (GSP) or Schedule 80 PVC. Schedule 40 pipe above ground must be wrapped or painted for UV protection.*

2. *For Project 1, pipe shall be installed below ground and shall be 1.25" Sch 40 PVC pipe.*
   *Minimum cover of pipe shall be 18".*

   *Pipe and fittings shall be installed according to manufacturer's recommendation. Compaction of backfill shall be equivalent to adjacent undisturbed soil.*

3. *Air vents shall be placed at all high points and as designated on drawing. Air vents shall be a combination air vent/air release/vacuum relief valve with a minimum pressure rating of 160 psi. An example is the 2" dual acting air/vacuum relief valve from Agricultural Products, Inc. (API). Obtain NRCS engineer approval prior to purchase of vents.*

4. *Air vents shall be protected by plastic or concrete valve boxes placed in the ground or brought up next to wood fence post.*

| | Date |
|---|---|
| Designed Mark Barnett | May 2013 |
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Fields Stockwater Projects
Project 1 Layout
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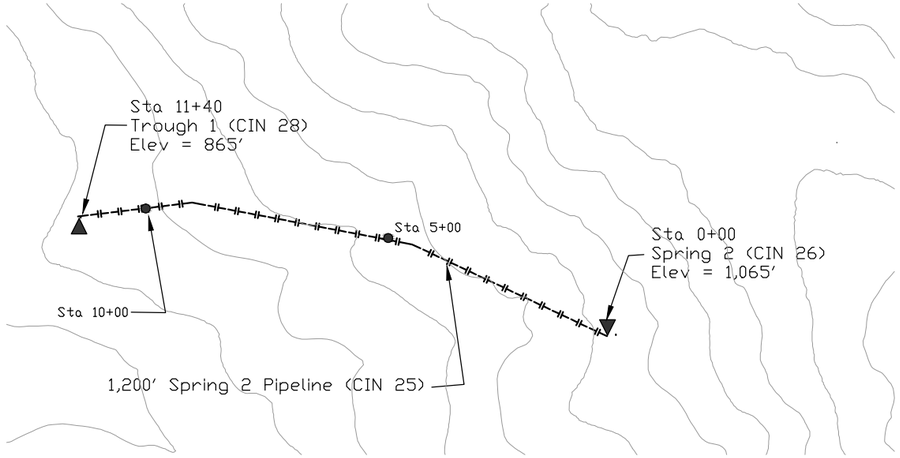
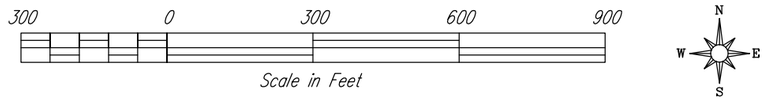
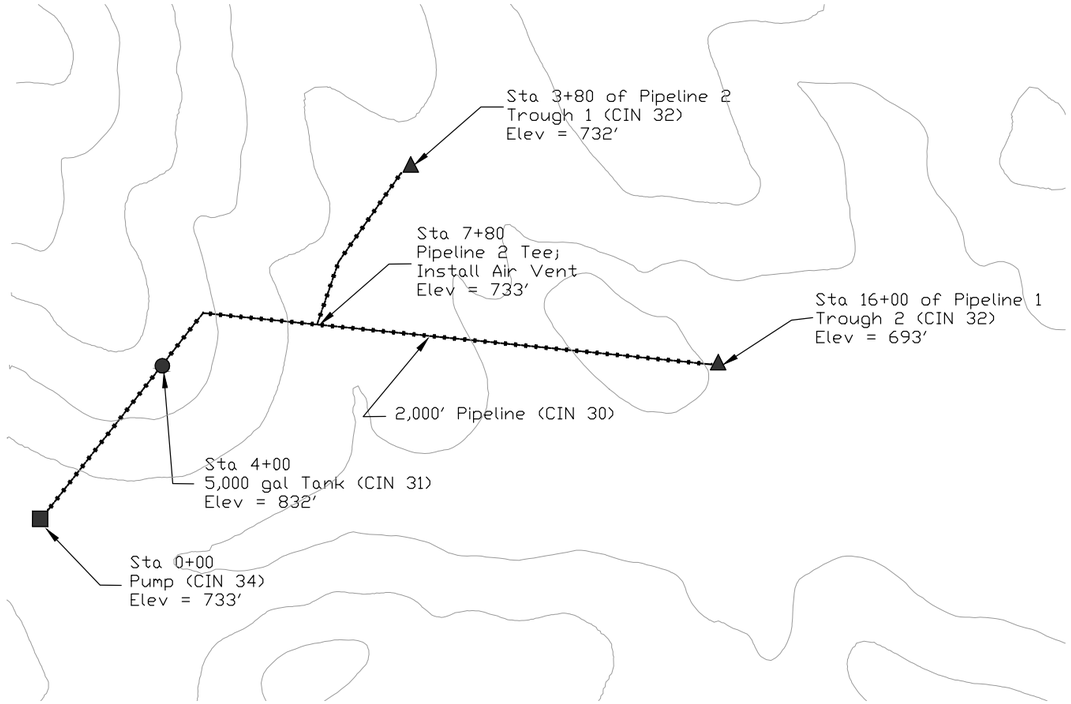



Project 2 Plan View




Project 3 Plan View

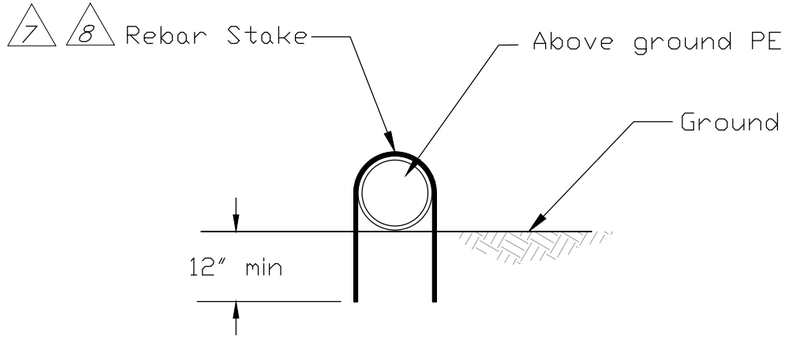
CONSTRUCTION NOTES

1. All trough pipe and fittings above ground shall be galvanized steel pipe (GSP) or Schedule 80 PVC.
2. For Projects 2 & 3, all pipe shall be above ground ground 1.25" PE4710 DR 9 (252 psi).
3. All PE pipe and fittings shall be fusion welded.
4. Allow for 4 feet of expansion/contraction or slop of pipe for every 1,000 ft due to expansion and contraction forces.
5. All air vents shall be placed as designated on drawing and staked in field by NRCS engineer. Air vents shall be a combination air vent/air release/vacuum relief valve and shall have a minimum pressure rating of 160 psi.

   An example vent is the "Barak" D-040 2" dual acting air/vacuum relief valve from Agricultural Research, Inc. (ARI). Obtain NRCS engineer approval prior to purchase of vents. See Table 2 Schedule, Sheet 4.
6. Air vents shall be protected by plastic or concrete valve boxes placed in the ground or brought up next to wood fence post. See Details Sheet 9.

7. Pipe installed at the ground surface shall be staked at 50 ft maximum intervals in areas used heavily by cattle and where cattle may damage the pipeline. In other areas, the pipe shall be staked upstream and downstream of all changes in pipe direction and at 200 ft maximum intervals.

8. For above ground pipe, the pipe stakes may be fashioned from rebar. Other methods of staking pipe shall be approved by NRCS engineer in advance. Stakes shall be installed in such a manner that does not pose an impalement hazard.




Rebar Stake Detail
nts

Date
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Projects 2 & 3 Layout
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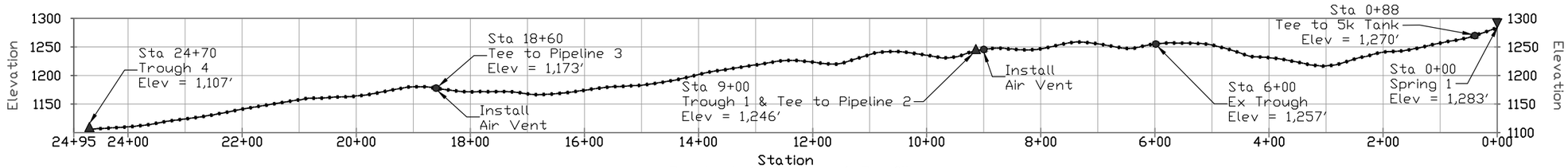
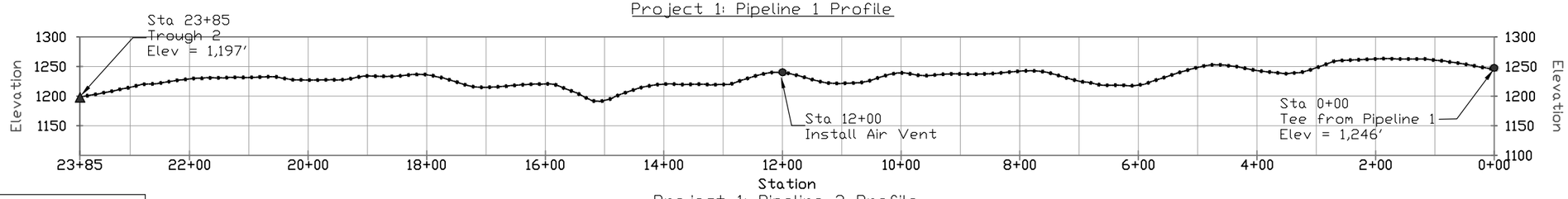
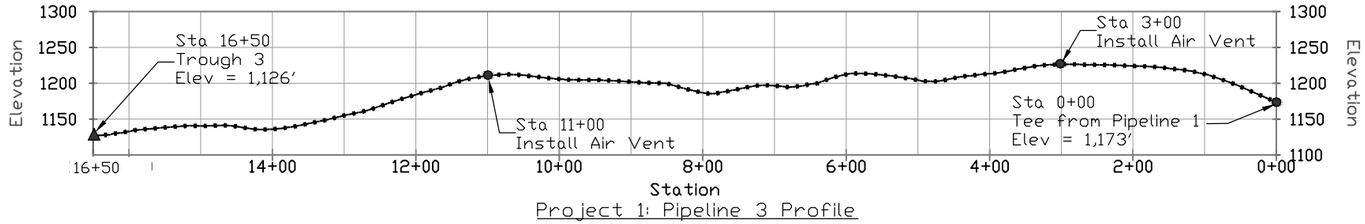


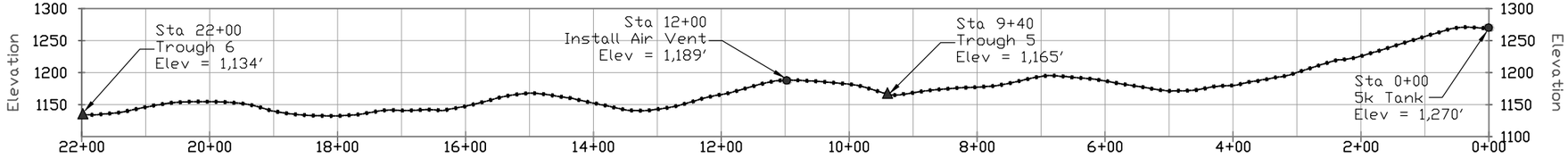

Project 1: Pipeline 1 Profile




Project 1: Pipeline 2 Profile




Project 1: Pipeline 3 Profile



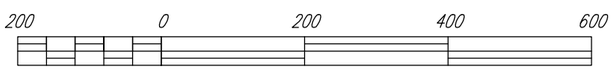

Project 1: Pipeline 4 Profile

Table 2: Air Vent Schedule

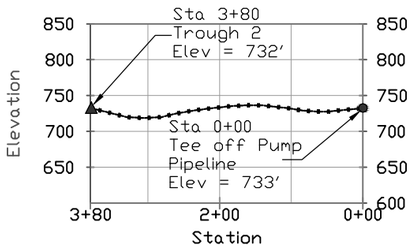
| Project | Pipeline | Station | Acceptable Vent | |
|---|---|---|---|---|
| | | | Name | Rating (PSI) |
| 1 | 1 | 9+00 | ARI "Barak" D-040 | 230 |
| | 1 | 18+60 | ARI "Barak" D-040 | 230 |
| | 2 | 12+00 | ARI "Barak" D-040 | 230 |
| | 3 | 3+00 | ARI "Barak" D-040 | 230 |
| | 3 | 11+00 | ARI "Barak" D-040 | 230 |
| | 4 | 11+00 | ARI "Barak" D-040 | 230 |
| 3 | 1 | 7+80 | ARI "Barak" D-040 | 230 |

Table 1: Trough Schedule

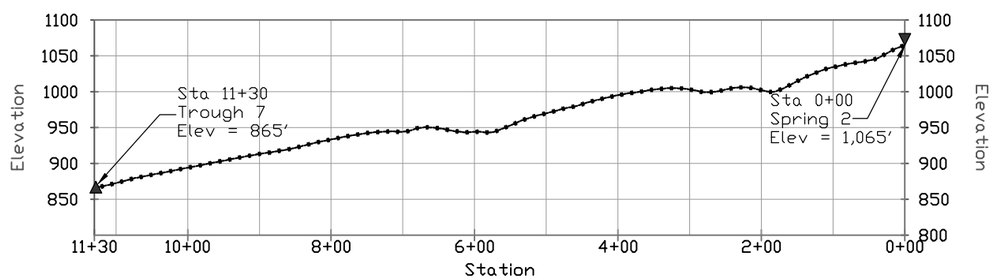
| Project | Pipe Line | Trough No. | Static Pressure (psi) | Max Flow Rate (gpm) | Float Type | | |
|---|---|---|---|---|---|---|---|
| | | | | | 3/8" R400 BOB | 1/2" T&N | Pressure Rating (psi) |
| 1 | 1 | 1 | 13 | 6 | + | | 125 |
| | 2 | 2 | 34 | 7 | + | | 125 |
| | 3 | 3 | 65 | 10 | + | | 125 |
| | 1 | 4 | 73 | 11 | + | | 125 |
| | 4 | 5 | 48 | 8 | + | | 125 |
| | 4 | 6 | 61 | 10 | + | | 125 |
| | 1 | Ex | 8 | 5 | + | | 125 |
| 2 | 1 | 1 | 87 | 19 | | + | 300 |
| 3 | 1 | 1 | 62 | 11 | + | | 125 |
| | 2 | 2 | 45 | 9 | + | | 125 |



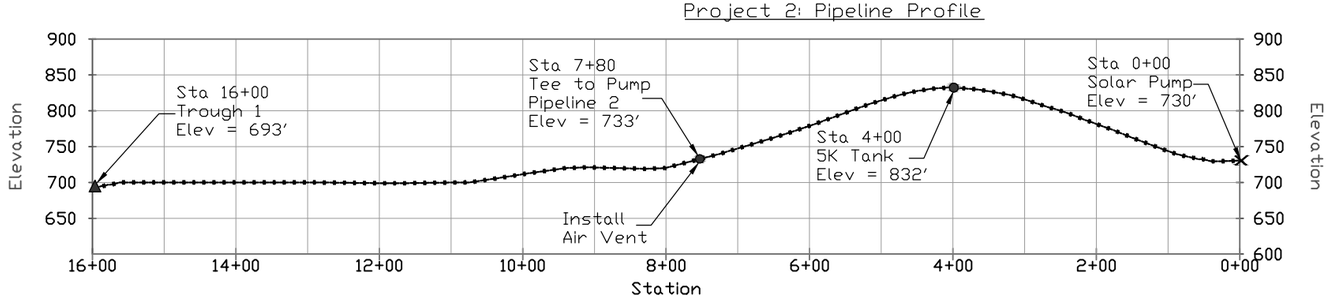

Vertical = Horizontal Scale in Feet




Project 3: Pipeline 1 Profile




Project 2: Pipeline Profile




Project 3: Pump Pipeline Profile

Date May 2013
Designed Mark Barnett
Drawn Mark Barnett
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Fields Stockwater Projects
Project Profiles

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Drawing No.
2013-08

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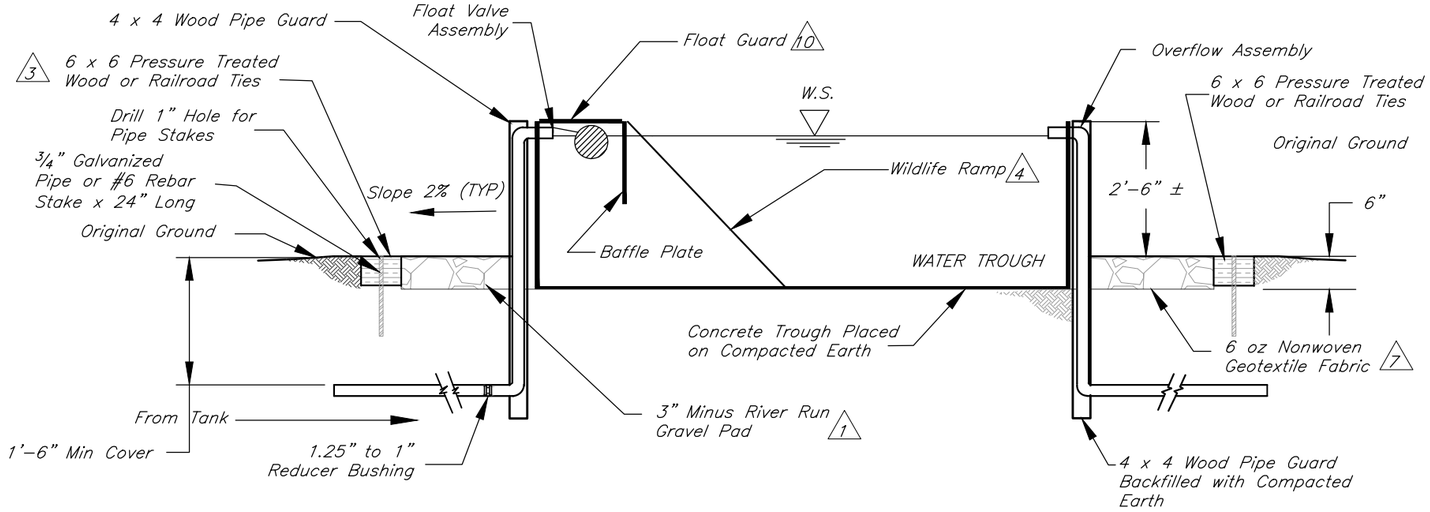
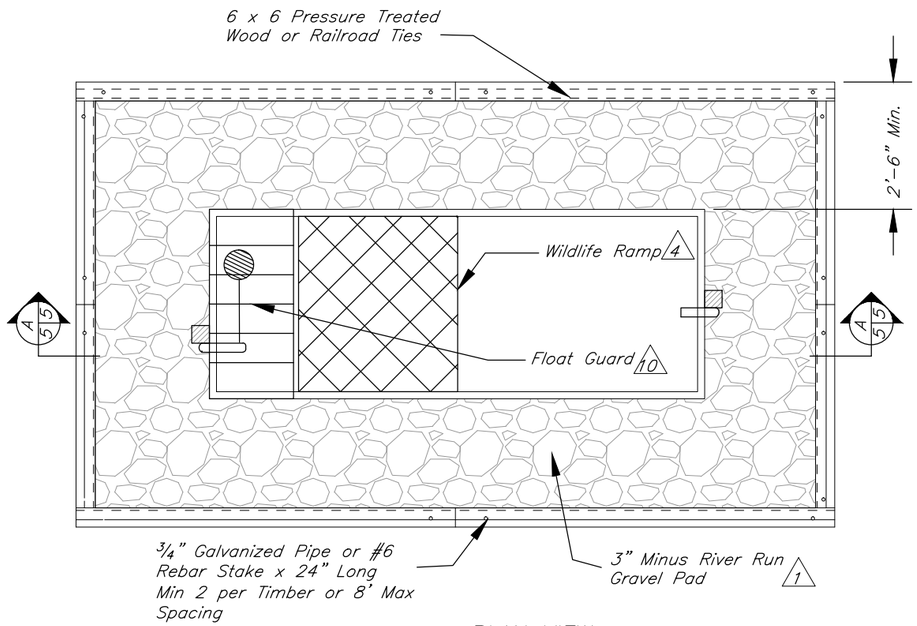



SECTION A – A

(NOT TO SCALE)




PLAN VIEW

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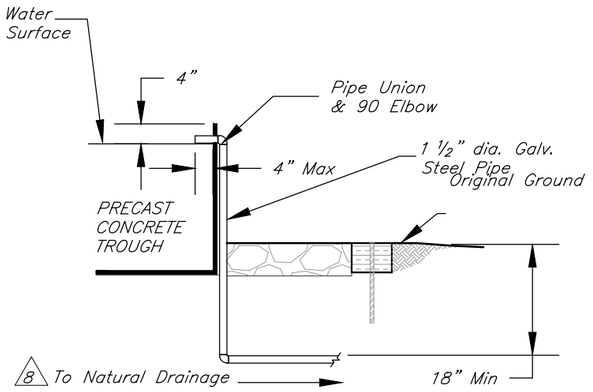


DETAIL – OVERFLOW

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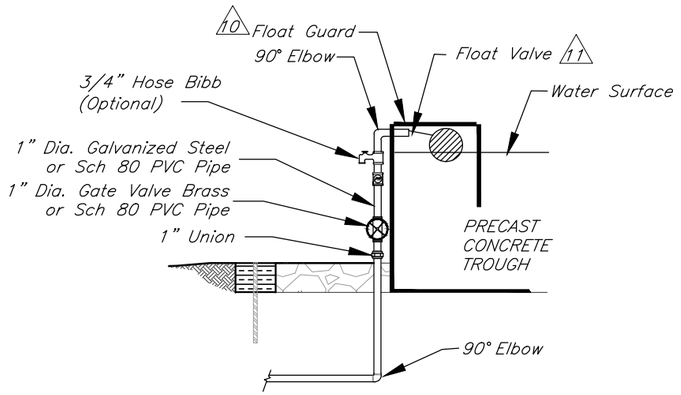


DETAIL – RISER ASSEMBLY

(NOT TO SCALE)

## CONSTRUCTION NOTES

1. Gravel shall extend beyond trough at least 2 ½ feet in all directions. Use pit run gravel, 3 inches maximum size rock. Gravel depth shall be 6 inches. As per NRCS Specification Geotextile (905), 6 oz Nonwoven geotextile (filter fabric) shall be placed beneath gravel.
2. All above-ground pipe and fittings shall be galvanized steel pipe (GSP), or Schedule 80 PVC.
3. Pressure Treated 6"x6" or Railroad Ties held with #6 rebar or 1" Pipe with 1 foot embedment into ground may be used to retain gravel. Top of Retainer shall be flush with existing grade.
4. All troughs shall have a wildlife escape ramp. Ramps shall be constructed from expanded steel welded to a rigid frame and extend to the bottom of the trough. Ramp shall be securely fastened to the edge of trough or float cover. The ramp shall either extend from one edge of trough to the opposite, as shown on drawing, or shall be flush against one side of the trough with the opposite side of the ramp having the edge of the ramp extend down into the water.
5. All below-ground pipe shall be SCH40 PVC (or GSP, DR-11 or thicker walled PE3408, PE3608, or PE4710). Refer to NRCS Construction Specification 516.
6. Pipe shall be buried a minimum depth of 18", and at least 36" beneath heavy use areas and water courses. Refer to NRCS Construction Specification 516.
7. Geotextile fabric shall be placed with a minimum 4" overrun on the sides and all seams shall lap a minimum of 1 foot. Refer to NRCS Construction Specification 905.
8. Overflow shall extend a minimum of 20 feet and drain away from trough to a stable outlet.
9. Troughs shall be constructed from reinforced concrete. Refer to NRCS Construction Specification 614.
10. Float guard shall be constructed of painted wood or metal and secured to trough to resist livestock impacts.
11. Floats shall be as specified in Table 1, Sheet 4.

| | Date |
|---|---|
| Designed | May 2013 |
| Drawn | May 2013 |
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Fields Stockwater Projects

Typical Trough

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Drawing No.
2013-08

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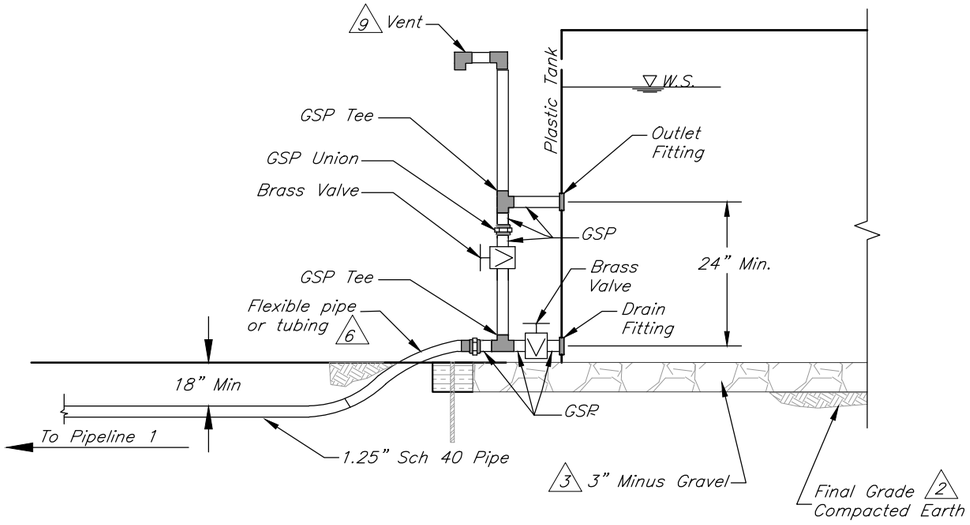
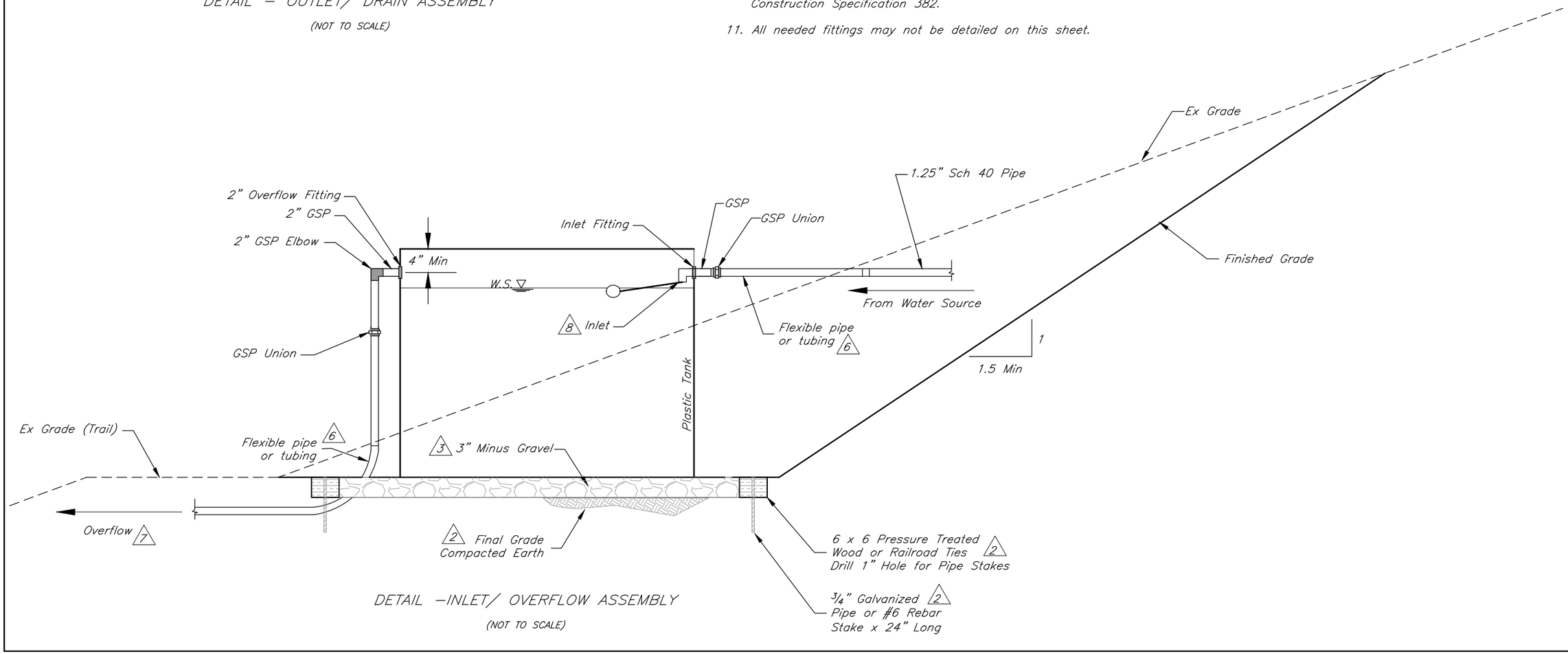



DETAIL – OUTLET/ DRAIN ASSEMBLY

(NOT TO SCALE)

Construction Notes4

1. This detail sheet shall only be used with plastic tanks. Refer to NRCS Construction Specification 614. Pad requirements differ for other tank types.
2. Tank sites shall be graded, leveled and compacted to allow for a retainer filled with gravel. The retainer shall be constructed of Pressure Treated lumber or Railroad Ties held with #6 rebar or 1" Pipe with 1 foot embedment into ground (or similar method approved by NRCS).
3. The retainer shall be filled with pit run gravel, with a 3" minus size. Gravel depth shall be at least 6". As per NRCS Specification Geotextile Fabric (905), 6 oz nonwoven geotextile (filter fabric) shall be placed beneath gravel.
4. Unless specified otherwise on this sheet, all above–ground pipe and fittings shall be galvanized steel pipe (GSP), Schedule 80 PVC, or polyethylene (PE) and valves shall be brass or Sch. 80 PVC. Refer to NRCS Construction Specification 516.
5. Unless specified otherwise on this sheet, all pipe and fittings shall be of equal or greater nominal diameter than the specified buried pipe diameter.
6. Provide a flexible hose, pipe or tubing in this vicinity to allow for settling. The flexible pipe shall have a pressure rating equivalent to the pressure rating of the water source pipe.
7. Overflow shall extend a minimum of 20 feet and drain away from tank to a stable outlet.
8. For both projects 1 & 3, the Float shall be the ⅜" R400 BOB float or NRCS approved equivalent.
9. Air vent shall provide air and vacuum relief. Use double 90° elbows or a standard air vent. Continuous acting air relief is not required. The Netafim Guardian (any size) or approved equivalent may be used. The vent shall be installed at an elevation higher than the normal water surface elevation when the tank is full.
10. Tank and all exposed plumbing shall be protected from livestock by wood or barb wire exclusion fence. Refer to NRCS Construction Specification 382.
11. All needed fittings may not be detailed on this sheet.




DETAIL –INLET/ OVERFLOW ASSEMBLY

(NOT TO SCALE)

Date
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Fields Stockwater Projects
Typical Tank

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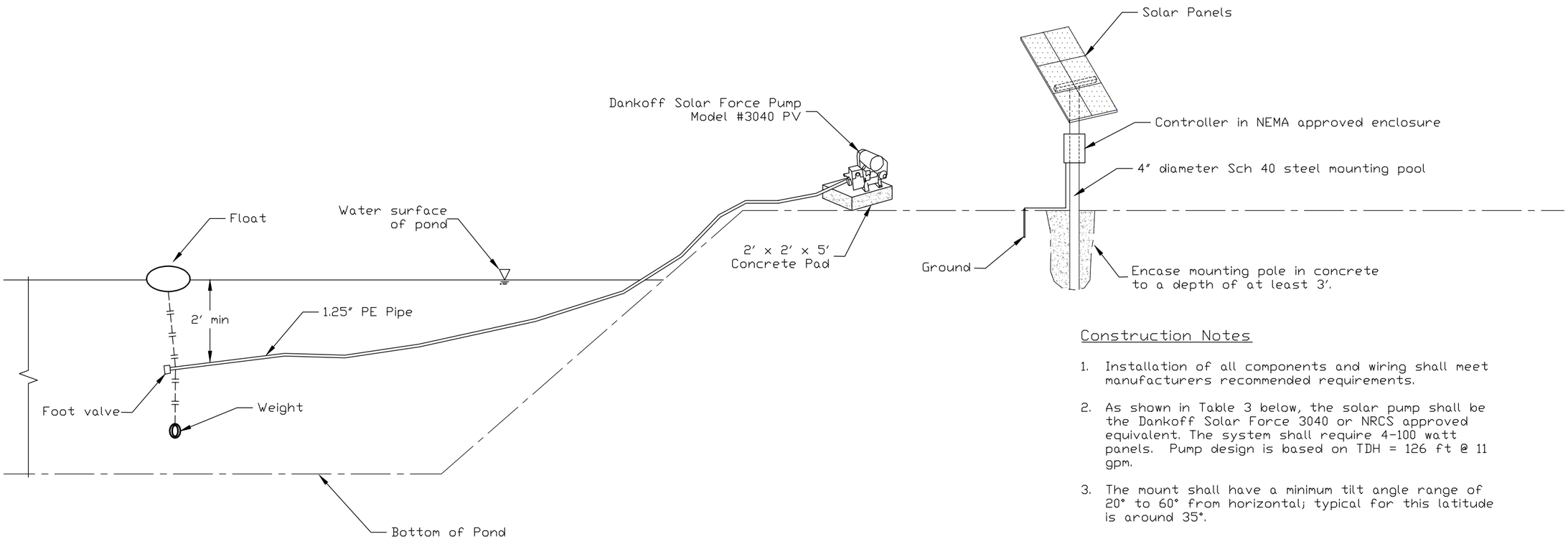


Table 3: Solar pump specifications

| Dankoff Solar Pump | Design Flow | | 100 Watt Panels | | Wiring of Panels |
|---|---|---|---|---|---|
| | (gpm) | (gpd) | (Number) | (Watts) | |
| Solar Force 3040 | 9.4 | 3,960 | 5 Panels | 500 | |

## Construction Notes

1. Installation of all components and wiring shall meet manufacturers recommended requirements.
2. As shown in Table 3 below, the solar pump shall be the Dankoff Solar Force 3040 or NRCS approved equivalent. The system shall require 4-100 watt panels. Pump design is based on TDH = 126 ft @ 11 gpm.
3. The mount shall have a minimum tilt angle range of 20° to 60° from horizontal; typical for this latitude is around 35°.
4. The mounting pole shall be secured in ground with concrete.
5. All electronic components shall be housed in a weather resistant enclosure (National Electrical Manufactures Association (NEMA) 3R or equivalent).
6. Electronic components shall be installed in accordance with NEC requirements and manufacturer's recommendations. The negative PV conductor, the array mounting structure, and all other metal components of the system shall be grounded directly to earth as required by NEC Articles 250 and 690.
7. Panels, control and all other components shall be fenced to protect from cattle
8. The pump shall be fastened to a concrete pad. The pad shall be installed according to NRCS Specification Concrete (901). Use #4 bar @ 12" spacing. Steel shall have 2" clearance against formed sides and 3" clearance when formed against bare earth.

Date
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Fields Stockwater Projects
Solar Pump Layout
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## Construction Notes

1. All construction shall be in accordance with the following NRCS Specifications: Spring Box Development (574), Geotextile Filter Fabric (905), Pipeline (516), and Critical Area Planting (342A).

2. All lines and grades are approximate.

3. Spring box shall be constructed of corrugated metal, polyethylene pipe, concrete tile, redwood, reinforced concrete, masonry, or other durable material. The box shall be perforated. The minimum diameter shall be 24 inches.

4. As per NRCS Specification 905, Geotextile filter fabric shall be non-woven and 4 onces per square yard and installed according to specification.

5. Washed drain rock shall be contained by non-woven geotextile fabric. Excavate hole through water bearing layer so that it extends a few inches into the impermeable layer, but not through it. Line hole with filter fabric. Position spring box on a 4"-6" thick bed of drain rock placed on top of the filter fabric. Backfill washed drain rock, contained by filter fabric, not less than 1 foot thick around upstream sides of spring box and for the depth of the water bearing layer. Drain rock shall be large enough to bridge any perforations in the spring box (1 ½" minus). If filter fabric is not used, substitute sand-gravel filter, conforming to Cal Trans Class 2 permeable drain rock. Cover top of sand-gravel filter with 20 mil plastic sheet. Drain rock or sand-gravel filter shall be composed of clean, hard particles.

6. A "Shoebox" type spring box cover shall be constructed from welded steel plate, ⅛" minimum thickness, or redwood lumber, and fit securely.

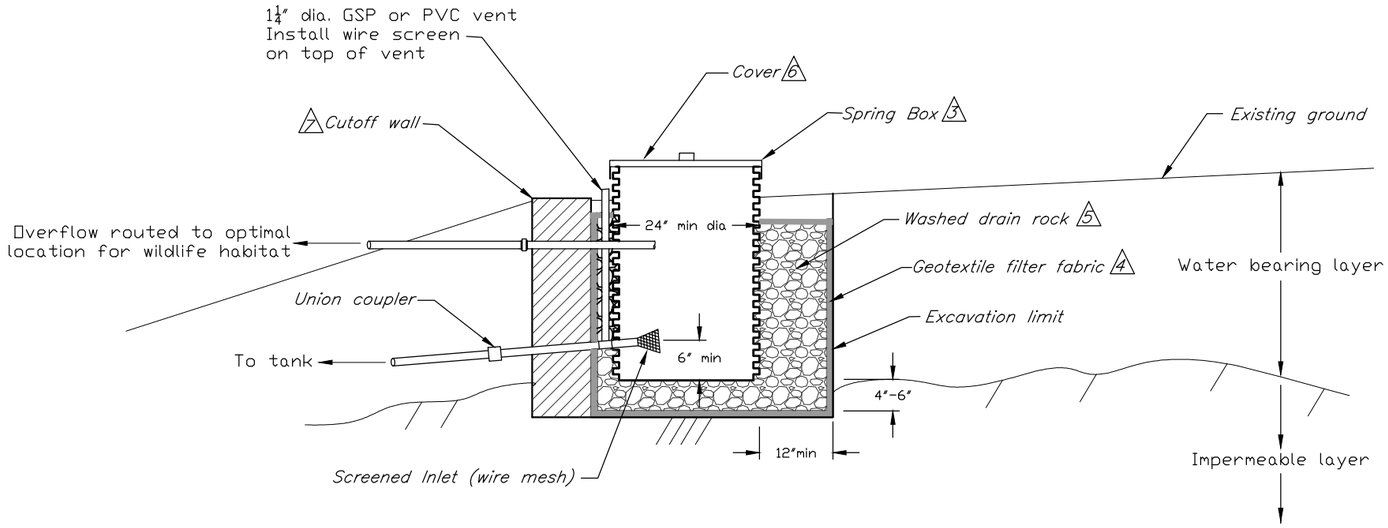
7. A cutoff wall of tamped clay, redwood lumber, concrete, masonry, or other water tight material shall be constructed on the downstream side of the spring box to capture spring flow. The cutoff wall shall be keyed into the impermeable layer on the bottom and two sides to minimize water loss. Attach 20 mil sheet to upstream face as needed.

8. Outlet pipe shall be 1 ¼" minimum diameter, galvanized steel (GSP) or PVC Schedule 40 or 80.

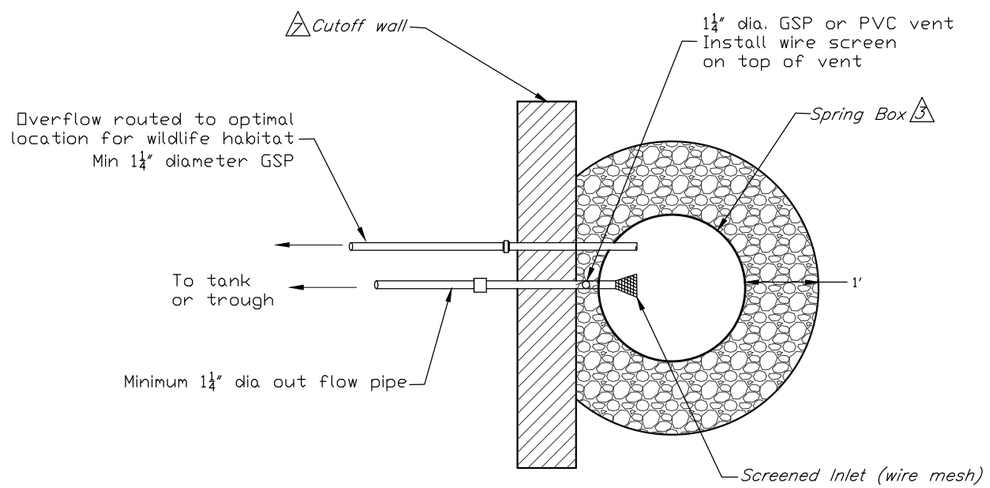
9. The over flow pipe shall be 1¼"diameter, galvanized steel (GSP) or PVC Schedule 40 or 80. The height of the overflow above the outlet pipe shall be a field fit decision. Route the overflow water to o location that optimally enhances wildlife habitat.

10. All areas disturbed by construction shall be revegetated as per NRCS Specification Critical Area Planting (342A).

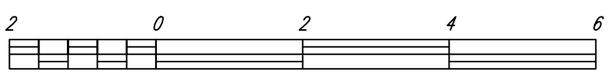
11. The spring development shall be fenced to prevent damage and contamination by live stock.




Profile View




Plan View




Date May 2013
Designed Mark Barnett
Drawn Mark Barnett
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# Fields Stockwater Projects
## Typical Box Spring

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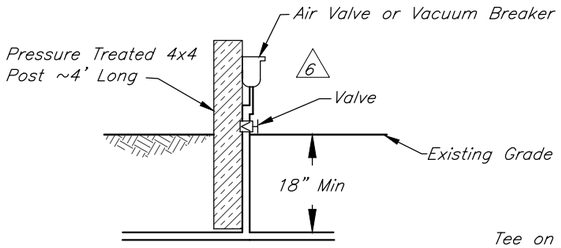


DETAIL – AIR RELEASE ASSEMBLY

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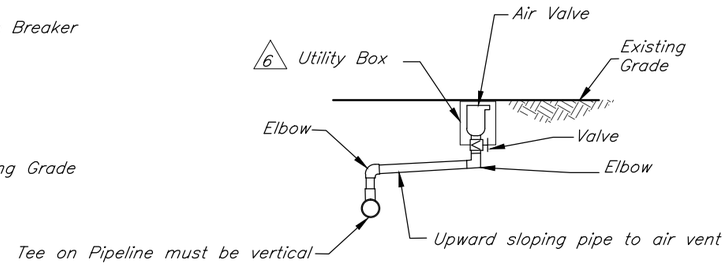
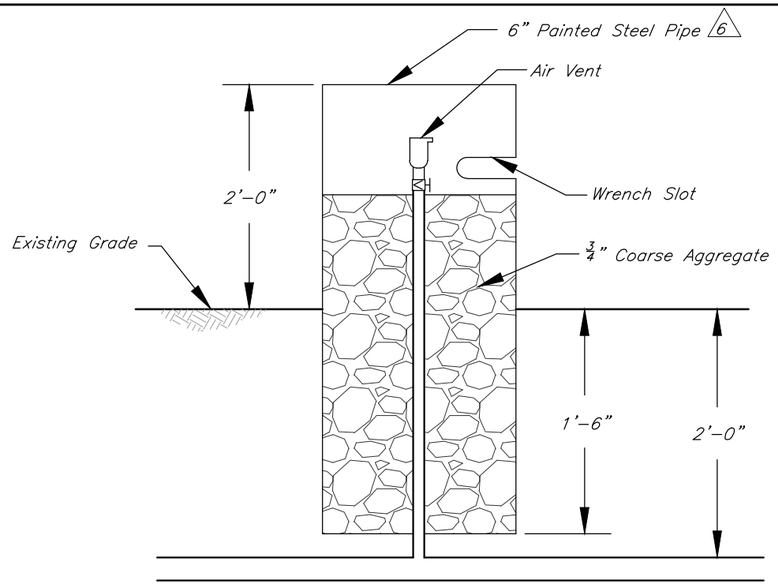


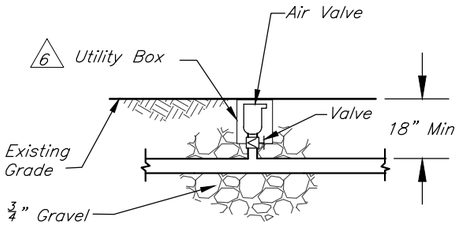

DETAIL – OFFSET AIR RELEASE ASSEMBLY

(NOT TO SCALE)



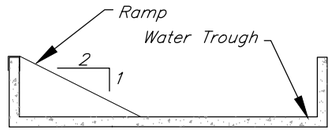

DETAIL – AIR RELEASE VALVE

(NOT TO SCALE)




DETAIL – AIR RELEASE ASSEMBLY

(NOT TO SCALE)




TROUGH SECTION

1. All pipe trenches and earthfill shall be free of debris and foreign material. Moisture shall be maintained to achieve compaction. Refer to NRCS Construction Specification 903.

2. All above-ground pipe and fittings shall be galvanized steel pipe (GSP), or Schedule 80 PVC. All exposed Schedule 40 PVC shall be wrapped or painted for UV protection. Refer to NRCS Construction Specification 516.

3. All below ground pipe shall be Schedule 40 PVC or Schedule 80 PVC. Refer to NRCS Construction Specification 516.

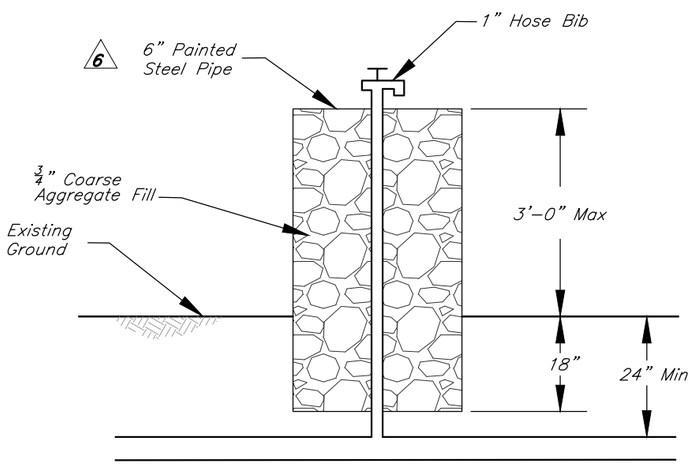
4. Pipe shall be buried a minimum depth of 18" and at least 36" beneath heavy use areas and water courses. Refer to NRCS Construction Specification 516.

5. All air vents shall be placed as designated on drawing and staked in field by NRCS engineer. Air vents shall be a combination air vent/air release/vacuum relief valve and, with the exception of the air vent on Pipeline 3 which shall be rated to at least 300 psi, shall have a minimum pressure rating of 160 psi. Air Vents shall be cast iron. An example is the "Barak" D-040C 2" dual acting air/vacuum relief valve from Agricultural Research, Inc. (ARI). Obtain NRCS engineer approval prior to purchase of vents. See Table 2, Sheet 4.

   For ease of maintenance, install a valve just upstream of all air vents.

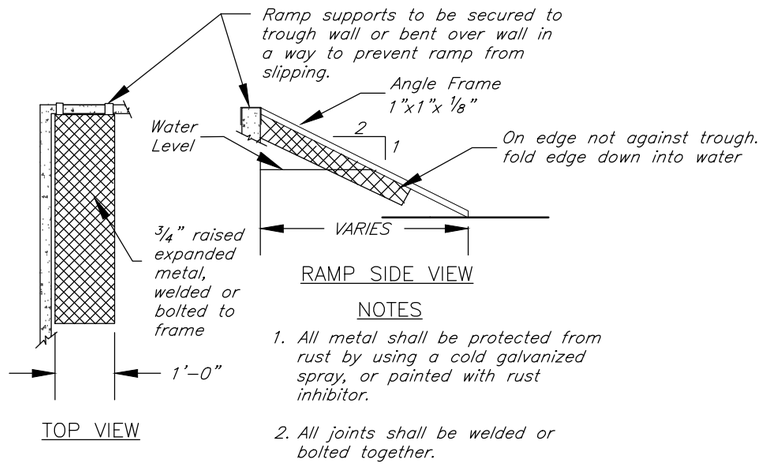
6. All above ground plumbing shall be protected from wildlife and livestock. Use wood posts, steel posts or underground vault boxes are acceptable.

7. All troughs shall have a wildlife escape ramp. Ramps shall be constructed from expanded steel welded to a rigid frame and extend to the bottom of the trough. Ramp shall be securely fastened to the edge of trough or float cover.




HOSE BIB ASSEMBLY

(NOT TO SCALE)




RAMP SIDE VIEW

TOP VIEW

NOTES

1. All metal shall be protected from rust by using a cold galvanized spray, or painted with rust inhibitor.

2. All joints shall be welded or bolted together.

WILDLIFE ESCAPE RAMP 7

(NOT TO SCALE)

Date May 2013
Designed Mark Barnett
Drawn Mark Barnett
Checked
Approved

Fields Stockwater Projects
Detail Sheet

San Benito Resource Conservation District
California

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

File No.

Drawing No.
2013-08

Sheet 9 of 9