Contract Name: Cassie Schweighofer **County:** Wayne

Conservation Practice Design for: Water System

PROJECT NOTES:

REGULATIONS: All Federal, State, and Local Laws. Rules and Regulations governing the construction of this facility shall be strictly followed. The owner or operator is responsible for obtaining all construction permits.

NRCS DESIGN: Failure to construct this facility in accordance with design or authorized modifications will result in withdrawal of NRCS technical assistance. Withdrawal of financial assistance will also be recommended to the appropriate agencies.

PA ACT 187: The contractor must comply with PA ACT 187 and notify PA One Call at 1-800-242-1776 prior to the start of any excavation. The PA One Call design serial number is 20230812475 dated 03/22/23.

CONTRACTOR NAME:	CONTACT INFORMATION:	ENGINEERING JOB CLASS:

NRCS PRACTICE CERTIFICATION

The practices listed below have been installed as per the attached drawings and specifications and meet all applicable NRCS standards and specifications and that the as-built documents are a true and correct record. Certification signatures listed below must have appropriate EJAA for the listed conservation engineering practice.

CIN	CPS #	Conservation Practice	Contracted Amount	Designed Amount	As-built Amount	Certification Signature	Date

As-Builts Completed By: Date:

Designed By:	Pamela Smith	Date:	6/1/23
Title:	Ag. Engineer		
Checked By:	RGD	Date:	7/3/23
Title:			
Approved By:	Robert G. Dunn III	Date:	7/3/23
Title:	ORCA Engineer		

USDA

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Computation Sheet

NRCS–ENG-523A Rev. 6-2002

U.S. Department of Agriculture
Natural Resources Conservation Service

RB

State	Project			
PA · WAYNE	SCHWEIGHOFER, CASSIE			
By	Date	Checked by	Date	Job No.
PAS	12/1/22			
Subject	WATERING SYSTEM CALCS		Sheet ____ of ____	

Water Needs

70 beef (20 gal) = 1400 gal/d

Tankers will be used as water reservoirs and filled by wells.
↳ one tanker is 7,000 gal
the other is 4,000 gal

continuously grazed pastures:
25 % of 1400 gal/d = 350 gal. trough
Trough refill rate: 350 gal / 60 min = 5.83 gpm

Smith, Pamela - FPAC-NRCS, PA

From: Vinton, Edward - FPAC-NRCS, Mayfield, PA
Sent: Thursday, December 29, 2022 10:34 AM
To: Smith, Pamela.A - FPAC-NRCS, Bloomsburg, PA
Subject: RE: Schweighofer Watering System
Attachments: Top Hill Well Pump Details.pdf

Hello Pam,

I received some answers back from Cassie on the watering system. First, we are not doing a design for the area around the existing barn. She is just planning to tie into the existing system.

As to the well at the top of the hill and the large tanker, I've attached the well information she has provided. The pump they use to fill the tanker is 20 gallon/ per minute.

Now for the last well, Cassie doesn't have any other information on that other than the depth and that it never went dry when being used. I think a safe assumption, based on other wells in the area, is that it likely has a minimum of 15 gallons/ minute recharge but I know how assumptions go.

Hopefully this helps some.

Ed

From: Smith, Pamela.A - FPAC-NRCS, Bloomsburg, PA <pamela.a.smith@usda.gov>
Sent: Friday, December 2, 2022 9:35 AM
To: Vinton, Edward - FPAC-NRCS, Mayfield, PA <edward.vinton@usda.gov>
Subject: Schweighofer Watering System

Hi Ed,

I'm finally working on the watering system design for Cassie and I have some questions.

Are the tankers currently set up to be filled by the wells? I know the smaller tanker wasn't in place yet, but do you know if they planned to set them up to be filled? Is that something I need to design (a well pump, power to the well, fittings, etc)?

I know you sent me a message saying the old well was 220' deep, but they didn't know the water depth. Are they able to determine the well yield? I will also need the well yields for the other 2 wells.

Does the farmstead system need to be designed? Cassie made it sound like an existing system that they were just going to tie into. If I will be designing this portion, does the well have a pressure tank? If so, what are the pressure tank settings?

Sorry for all of the questions, this seems to be more complicated than a normal watering system design after talking with Andy (he's helping me through it). Thank you

Pam

Smith, Pamela - FPAC-NRCS, PA

From: Vinton, Edward - FPAC-NRCS, Mayfield, PA
Sent: Friday, December 2, 2022 2:24 PM
To: Smith, Pamela.A - FPAC-NRCS, Bloomsburg, PA
Subject: RE: Schweighofer Watering System

Follow Up Flag: Follow up
Flag Status: Completed

Hi Pam,

The large tanker at the top of the hill is currently connected to the existing well up there. You shouldn't have to do anything with the well or pump for that since it's to be gravity fed from the tanker, and we aren't contracting a new pump or well there. The infrastructure is already in place to fill the tanker.

I believe the smaller tanker is to be similarly installed at the lower location, except with this one, we have contracted a solar pump for the existing well. I will see if Cassie can obtain the yield information for them.

As for the homestead well, let me get back to you. I don't remember what the plan was there, but I do know that adequate water is available since it used to supply irrigation for a tree nursery.

You don't have to apologize to me, nothing up here is normal. We seem to provide you with challenging scenarios all too often.

I'll be back in touch next week, hopefully with better information.

Ed

From: Smith, Pamela.A - FPAC-NRCS, Bloomsburg, PA <pamela.a.smith@usda.gov>
Sent: Friday, December 2, 2022 9:35 AM
To: Vinton, Edward - FPAC-NRCS, Mayfield, PA <edward.vinton@usda.gov>
Subject: Schweighofer Watering System

Hi Ed,

I'm finally working on the watering system design for Cassie and I have some questions.

Are the tankers currently set up to be filled by the wells? I know the smaller tanker wasn't in place yet, but do you know if they planned to set them up to be filled? Is that something I need to design (a well pump, power to the well, fittings, etc)?

I know you sent me a message saying the old well was 220' deep, but they didn't know the water depth. Are they able to determine the well yield? I will also need the well yields for the other 2 wells.

Does the farmstead system need to be designed? Cassie made it sound like an existing system that they were just going to tie into. If I will be designing this portion, does the well have a pressure tank? If so, what are the pressure tank fittings?

Main 1

0	1420	
1	1420	T flow
4	1420	globe valve
5	1420	90°
6	1415	90°
708	1347	T hydrant (off)
932	1327.5	T hydrant (off)
1284	1314.8	T hydrant (off)
2227	1274.1	Tee - lateral
2800	1223.3	Tee - lateral
4099	1290	90°
4100	1292	T hydrant

H_2O Elev = 1424' (high)
1421' (low)

AGPipe
Detailed Pipeline Hydraulic Report

Job: **Schweighofer** Job Class: **3/22/2023**

Location: **Wayne** By: **PAS**

Landuser: **Main Line 1** ID:

Main Pipeline #1

Gravity system, known flow

Water Surface Elevation = **1424** feet,

Required Outlet Pressure = **10** psi Outlet Elevation = **1292** feet, Actual Outlet Pressure = **16.51** psi

Required Outlet Watersurface Elevation = **1315.07**

Entrance Notes:

NODE DATA

Station	Ground Elev. (ft)	Pipe Depth (in)	Pipe Invert Elev. (ft)	Hydraulic Gradeline Elev. (ft)	Energy Gradeline Elev. (ft)	Operating Pressure (psi)	Static Pressure (psi)	Minor Losses (ft)	Cumulative Total Fric. Losses (ft)	Air Vent (in)	Surge Pressure (psi)
0+00	1420.	NA	1420.0	1423.92	1424.00	1.70	1.73	0.000	0.000	2	26.80
	Minor Losses: None										

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 0.023 feet, Hazen Williams, C = 145

0+01	1420.	NA	1419.9	1423.84	1423.92	1.71	1.78	0.062	0.085	None	26.80
	Minor Losses: Tee, line flow, id= 1.049										

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 0.068 feet, Hazen Williams, C = 145

NODE DATA

Station	Ground Elev. (ft)	Pipe Depth (in)	Pipe Invert Elev. (ft)	Hydraulic Gradeline Elev. (ft)	Energy Gradeline Elev. (ft)	Operating Pressure (psi)	Static Pressure (psi)	Minor Losses (ft)	Cumulative Total Fric. Losses (ft)	Air Vent (in)	Surge Pressure (psi)
0+04	1420.	NA	1419.9	1423.17	1423.25	1.42	1.78	0.601	0.754	None	26.80
	Minor Losses: Valve, Globe type, (open), id= 1.049										

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 0.023 feet, Hazen Williams, C = 145

0+05	1420.	NA	1419.9	1423.12	1423.20	1.39	1.78	0.029	0.806	2	26.80
	Minor Losses: Bend, 90 deg. Std. steel or plastic, id= 1.049										

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 0.023 feet, Hazen Williams, C = 145

0+06	1415.	36.0	1411.9	1423.07	1423.14	4.84	5.24	0.029	0.858	None	26.80
	Minor Losses: Bend, 90 deg. Std. steel or plastic, id= 1.049										

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 15.882 feet, Hazen Williams, C = 145

7+08	1347.	36.0	1343.9	1407.14	1407.21	27.41	34.72	0.046	16.786	None	26.80
	Minor Losses: Tee, Hydrant (off), id= 1.049										

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 5.068 feet, Hazen Williams, C = 145

NODE DATA

tation	Ground Elev. (ft)	Pipe Depth (in)	Pipe Invert Elev. (ft)	Hydraulic Gradeline Elev. (ft)	Energy Gradeline Elev. (ft)	Operating Pressure (psi)	Static Pressure (psi)	Minor Losses (ft)	Cumulative Total Fric. Losses (ft)	Air Vent (in)	Surge Pressure (psi)
9+32	1327.	36.0	1324.4	1402.02	1402.10	33.65	43.17	0.046	21.900	None	26.80

Minor Losses: Tee, Hydrant (off), id= 1.049

#2

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 7.964 feet, Hazen Williams, C = 145

12+84	1314.	36.0	1311.7	1394.01	1394.09	35.68	48.68	0.046	29.910	None	26.80

Minor Losses: Tee, Hydrant (off), id= 1.049

#3

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 21.335 feet, Hazen Williams, C = 145

22+27	1274.	36.0	1271.0	1372.62	1372.69	44.04	66.32	0.062	51.307	None	26.80

Minor Losses: Tee, line flow, id= 1.049

→ lateral to Hydrant #4

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 12.964 feet, Hazen Williams, C = 145

28+00	1223.	36.0	1220.2	1359.59	1359.67	60.42	88.34	0.062	64.333	None	26.80

Minor Losses: Tee, line flow, id= 1.049

→ lateral to Hydrant #5

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 29.389 feet, Hazen Williams, C = 145

NODE DATA

Station	Ground Elev. (ft)	Pipe Depth (in)	Pipe Invert Elev. (ft)	Hydraulic Gradeline Elev. (ft)	Energy Gradeline Elev. (ft)	Operating Pressure (psi)	Static Pressure (psi)	Minor Losses (ft)	Cumulative Total Fric. Losses (ft)	Air Vent (in)	Surge Pressure (psi)
40+99	1290.	36.0	1286.9	1330.17	1330.25	18.76	59.42	0.029	93.751	None	26.80
	Minor Losses: Bend, 90 deg. Std. steel or plastic, id= 1.049										

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 0.023 feet, Hazen Williams, C = 145

41+00	1292.	NA	1291.9	1330.09	1330.17	16.55	57.26	0.062	93.836	2	NA
	Minor Losses: Tee, line flow, id= 1.049										

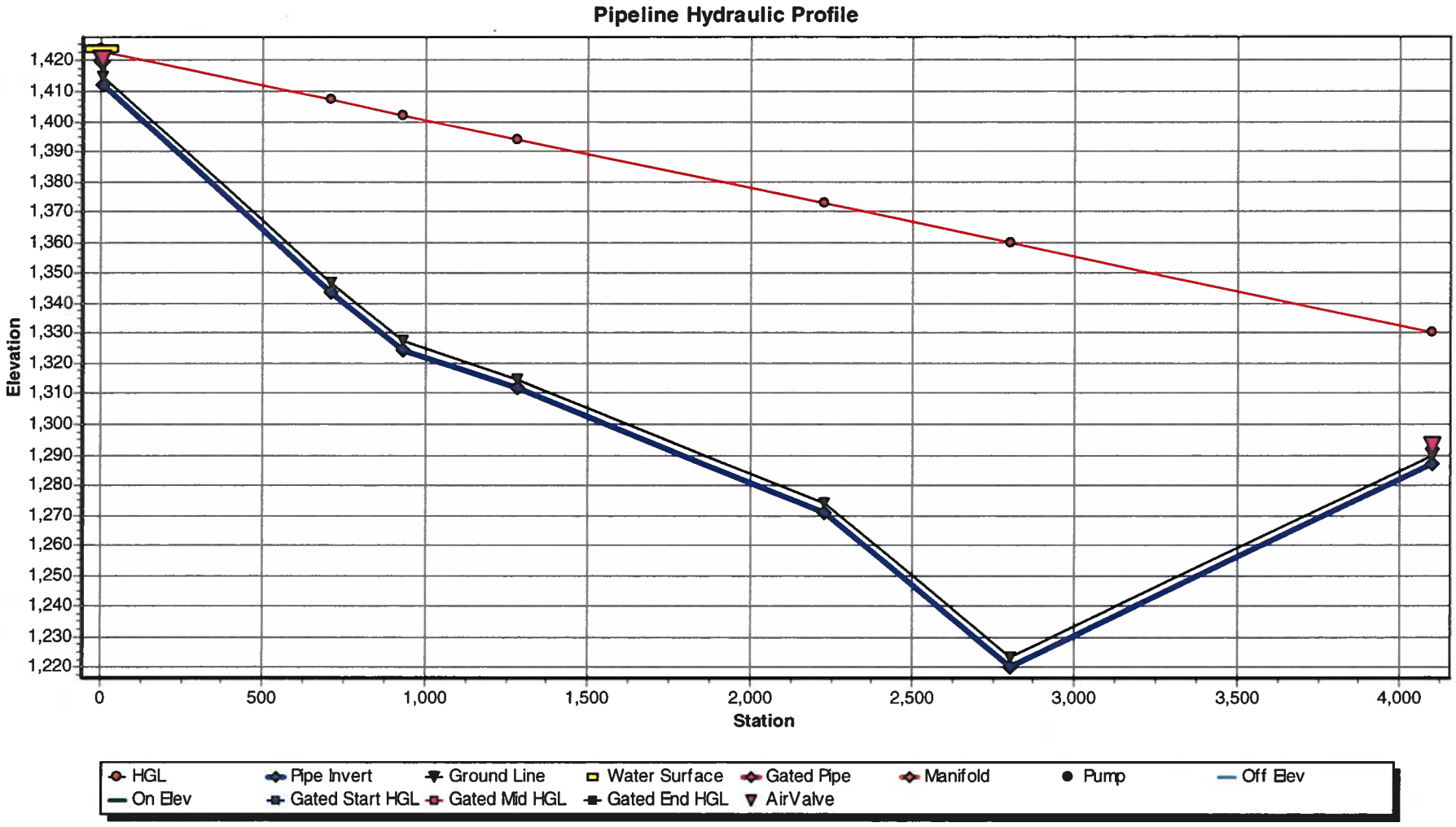
AGPipe

Pipeline Graphic Profile

Job: **Schweighofer** Job Class: **3/22/2023**

Location: **Wayne** By: **PAS**

Landuser: **Main Line 1** ID:



Computation Sheet

NRCS–ENG-523A Rev. 6-2002

U.S. Department of Agriculture
Natural Resources Conservation Service

State	Project			
PA - WAYNE	SCHWEIGHOFER, CASSIE			
By: PAS	Date: 3/22/23	Checked by:	Date:	Job No.:
Subject: FLOAT SETTINGS - MAIN 1				Sheet ____ of ____

Hydrant 1

34.72 psi (static pressure) gravity pipe / 0.72 = 48 psi rated float (Hydrant 1)

Hydrant 2

43.17 psi / 0.72 = 60 psi rated float (Hydrant 2)

Hydrant 3

48.68 psi / 0.72 = 68 psi rated float (Hydrant 3)

Hydrant 4

Grav. Pipe gives static pressure at lateral :.

1420' - (1226' + 3') = 191' (psi / 2.31') = 82.7 psi / 0.72 = 115 psi rated flow (Hydrant 4)

Hydrant 5

- lateral

1420' - (1219' + 3') = 198' = 85.7 psi / 0.72 = 119 psi rated flow (Hydrant 5)

Hydrant 6

57.3 psi / 0.72 = 80 psi rated flow (Hydrant 6)

Step #1 Pipe Flow Design

This step allows you to check transfer pipe flow rates

$$Q = A * (2 * g * h / (1 + K_m + K_p * L))^{(0.5)}$$

Q =	Flow Rate	ft^3/s	
A =	Cross-Sectional pipe area	ft^2	$K_p=5087(n)^2 / (d)^{(4/3)}$
g =	Gravity Constant	ft/s	n = mannings coefficient
h =	Head	ft	d = pipe diameter (in)
L =	Length	ft	
K_p =	Head Loss Coefficient for Circular Pipe Flowing Full		*(Eq. 3-9 EFH)*
K_m =	Head Loss Coefficient for Entrances and Bends		*(Exhibit, Pg. 3.85 EFH)*

Note: Data entry is required for the blue shaded areas. In calculating head and pipe slope, the initial drop is normally from high water elevation to bottom of elbow, ie. top of curb to bottom of elbow. Additional drop is from bottom of elbow to outlet pipe elevation.

Description of Check #1 — Hydrant #1

Pipe Diameter		1.049	in
Cross-sectional pipe area		0.0060	ft^2
Gravity Constant		32.2	ft/s
Total Head		77.00	ft
Head	Initial Drop	4	ft
	Additional Drop	73.00	ft
Length		708	ft
Avg. Pipe Slope		10.31	%

K_p		0.577	unit less
	$K_{entrances}$	0.5	unit less
	K_{bends}	3.6	unit less
K_m	K_{total}	4.1	unit less

Kp for pipe w/ n value of 0.011
VALUE ARE FOR POLYETHYLENE PIPE ONLY (ASTM D2239)
1" = 0.577 1 1/4" = 0.401 1 1/2" = 0.326
2" = 0.234 2.5" = 0.184

Km Values: Sharp Corner Entrance = 0.50
Elbow = 0.9 Tee = 1.80

Flow Rate	**0.0208** ft^3/sec	**9.3** gpm
Velocity	**3.46** ft/sec	

*Velocity to be less than 5 ft/sec

Explanation of Results

Step #1 Pipe Flow Design

This step allows you to check transfer pipe flow rates

$$Q = A * (2 * g * h / (1 + K_m + K_p * L))^{(0.5)}$$

Q =	Flow Rate	ft^3/s
A =	Cross-Sectional pipe area	ft^2
g =	Gravity Constant	ft/s
h =	Head	ft
L =	Length	ft
K_p =	Head Loss Coefficient for Circular Pipe Flowing Full	*(Eq. 3-9 EFH)*
K_m =	Head Loss Coefficient for Entrances and Bends	*(Exhibit, Pg. 3.85 EFH)*

$K_p = 5087(n)^2 / (d)^{(4/3)}$
n = mannings coefficient
d = pipe diameter (in)

Note: Data entry is required for the blue shaded areas. In calculating head and pipe slope, the initial drop is normally from high water elevation to bottom of elbow, ie. top of curb to bottom of elbow. Additional drop is from bottom of elbow to outlet pipe elevation.

Description of Check #1 Hydrant #2

Pipe Diameter		1.049	in
Cross-sectional pipe area		0.0060	ft^2
Gravity Constant		32.2	ft/s
Total Head		89.00	ft
Head	Initial Drop	4	ft
	Additional Drop	85.00	ft
Length		932	ft
Avg. Pipe Slope		9.12	%

K_p		0.577	unit less
	$K_{entrances}$	0.5	unit less
	K_{bends}	5.4	unit less
K_m	K_{total}	5.9	unit less

Kp for pipe w/ n value of 0.011
VALUE ARE FOR POLYETHYLENE PIPE ONLY (ASTM D2239)
1" = 0.577 1 1/4" = 0.401 1 1/2" = 0.326
2" = 0.234 2.5" = 0.184

Km Values: Sharp Corner Entrance = 0.50
Elbow = 0.9 Tee = 1.80

Flow Rate	0.0195 ft^3/sec	8.7 gpm
Velocity	3.24 ft/sec	

*Velocity to be less than 5 ft/sec

Explanation of Results

Step #1 Pipe Flow Design

This step allows you to check transfer pipe flow rates

$$Q = A * (2 * g * h / (1 + K_m + K_p * L))^{(0.5)}$$

Q =	Flow Rate	ft^3/s	
A =	Cross-Sectional pipe area	ft^2	$K_p=5087(n)^2 / (d)^{(4/3)}$
g =	Gravity Constant	ft/s	n = mannings coefficient
h =	Head	ft	d = pipe diameter (in)
L =	Length	ft	
K_p =	Head Loss Coefficient for Circular Pipe Flowing Full		*(Eq. 3-9 EFH)*
K_m =	Head Loss Coefficient for Entrances and Bends		*(Exhibit, Pg. 3.85 EFH)*

Note: Data entry is required for the blue shaded areas. In calculating head and pipe slope, the initial drop is normally from high water elevation to bottom of elbow, ie. top of curb to bottom of elbow. Additional drop is from bottom of elbow to outlet pipe elevation.

Description of Check #1 — Hydrant #3

Pipe Diameter	1.049	in	
Cross-sectional pipe area	0.0060	ft^2	
Gravity Constant	32.2	ft/s	
Total Head	110.00	ft	
Head Initial Drop	4	ft	
Additional Drop	106.00	ft	
Length	1284	ft	
Avg. Pipe Slope	8.26	%	

K_p		0.577	unit less
	$K_{entrances}$	0.5	unit less
	K_{bends}	7.2	unit less
K_m	K_{total}	7.7	unit less

Kp for pipe w/ n value of 0.011
VALUE ARE FOR POLYETHYLENE PIPE ONLY (ASTM D2239)
1" = 0.577 1 1/4" = 0.401 1 1/2" = 0.326
2" = 0.234 2.5" = 0.184

Km Values: Sharp Corner Entrance = 0.50
Elbow = 0.9 Tee = 1.80

Flow Rate	**0.0185** ft^3/sec	**8.3** gpm
Velocity	**3.07** ft/sec	

*Velocity to be less than 5 ft/sec

Explanation of Results

Step #1 Pipe Flow Design

This step allows you to check transfer pipe flow rates

$$Q = A * (2 * g * h / (1 + K_m + K_p * L))^{(0.5)}$$

Q =	Flow Rate	ft^3/s	
A =	Cross-Sectional pipe area	ft^2	$K_p=5087(n)^2 / (d)^{(4/3)}$
g =	Gravity Constant	ft/s	n = mannings coefficient
h =	Head	ft	d = pipe diameter (in)
L =	Length	ft	
K_p =	Head Loss Coefficient for Circular Pipe Flowing Full		*(Eq. 3-9 EFH)*
K_m =	Head Loss Coefficient for Entrances and Bends		*(Exhibit, Pg. 3.85 EFH)*

Note: Data entry is required for the blue shaded areas. In calculating head and pipe slope, the initial drop is normally from high water elevation to bottom of elbow, ie. top of curb to bottom of elbow. Additional drop is from bottom of elbow to outlet pipe elevation.

Description of Check #1 — Hydrant #4

Pipe Diameter	1.049	in	
Cross-sectional pipe area	0.0060	ft^2	
Gravity Constant	32.2	ft/s	
Total Head	150.00	ft	
Head Initial Drop	4	ft	
Additional Drop	146.00	ft	
Length	2227	ft	
Avg. Pipe Slope	6.56	%	

K_p		0.577	unit less
	$K_{entrances}$	0.5	unit less
	K_{bends}	9.9	unit less
K_m	K_{total}	10.4	unit less

Kp for pipe w/ n value of 0.011
VALUE ARE FOR POLYETHYLENE PIPE ONLY (ASTM D2239)
1" = 0.577 1 1/4" = 0.401 1 1/2" = 0.326
2" = 0.234 2.5" = 0.184

Km Values: Sharp Corner Entrance = 0.50
Elbow = 0.9 Tee = 1.80

Flow Rate	**0.0164** ft^3/sec	**7.4** gpm
Velocity	**2.73** ft/sec	

*Velocity to be less than 5 ft/sec

Explanation of Results

Step #1 Pipe Flow Design

This step allows you to check transfer pipe flow rates

$$Q = A * (2 * g * h / (1 + K_m + K_p * L))^{(0.5)}$$

Q =	Flow Rate	ft^3/s	
A =	Cross-Sectional pipe area	ft^2	$K_p=5087(n)^2 / (d)^{(4/3)}$
g =	Gravity Constant	ft/s	n = mannings coefficient
h =	Head	ft	d = pipe diameter (in)
L =	Length	ft	
K_p =	Head Loss Coefficient for Circular Pipe Flowing Full		*(Eq. 3-9 EFH)*
K_m =	Head Loss Coefficient for Entrances and Bends		*(Exhibit, Pg. 3.85 EFH)*

Note: Data entry is required for the blue shaded areas. In calculating head and pipe slope, the initial drop is normally from high water elevation to bottom of elbow, ie. top of curb to bottom of elbow. Additional drop is from bottom of elbow to outlet pipe elevation.

Description of Check #1 | Hydrant #5

Pipe Diameter		1.049	in
Cross-sectional pipe area		0.0060	ft^2
Gravity Constant		32.2	ft/s
Total Head		197.00	ft
Head	Initial Drop	4	ft
	Additional Drop	193.00	ft
Length		2820	ft
Avg. Pipe Slope		6.84	%

K_p		0.577	unit less
	$K_{entrances}$	0.5	unit less
	K_{bends}	11.7	unit less
K_m	K_{total}	12.2	unit less

Kp for pipe w/ n value of 0.011
VALUE ARE FOR POLYETHYLENE PIPE ONLY (ASTM D2239)
1" = 0.577 1 1/4" = 0.401 1 1/2" = 0.326
2" = 0.234 2.5" = 0.184

Km Values: Sharp Corner Entrance = 0.50
Elbow = 0.9 Tee = 1.80

Flow Rate	**0.0167** ft^3/sec	**7.5** gpm
Velocity	**2.78** ft/sec	

*Velocity to be less than 5 ft/sec

Explanation of Results

Step #1 Pipe Flow Design

This step allows you to check transfer pipe flow rates

$$Q = A * (2 * g * h / (1 + K_m + K_p * L))^{(0.5)}$$

Q =	Flow Rate	ft^3/s	
A =	Cross-Sectional pipe area	ft^2	$K_p=5087(n)^2 / (d)^{(4/3)}$
g =	Gravity Constant	ft/s	n = mannings coefficient
h =	Head	ft	d = pipe diameter (in)
L =	Length	ft	
K_p =	Head Loss Coefficient for Circular Pipe Flowing Full		*(Eq. 3-9 EFH)*
K_m =	Head Loss Coefficient for Entrances and Bends		*(Exhibit, Pg. 3.85 EFH)*

Note: Data entry is required for the blue shaded areas. In calculating head and pipe slope, the initial drop is normally from high water elevation to bottom of elbow, ie. top of curb to bottom of elbow. Additional drop is from bottom of elbow to outlet pipe elevation.

Description of Check #1 | Hydrant #6

Pipe Diameter		1.049	in
Cross-sectional pipe area		0.0060	ft^2
Gravity Constant		32.2	ft/s
Total Head		132.00	ft
Head	Initial Drop	4	ft
	Additional Drop	128.00	ft
Length		4100	ft
Avg. Pipe Slope		3.12	%

K_p		0.577	unit less
	$K_{entrances}$	0.5	unit less
	K_{bends}	13.5	unit less
K_m	K_{total}	14	unit less

Kp for pipe w/ n value of 0.011
VALUE ARE FOR POLYETHYLENE PIPE ONLY (ASTM D2239)
1" = 0.577 1 1/4" = 0.401 1 1/2" = 0.326
2" = 0.234 2.5" = 0.184

Km Values: Sharp Corner Entrance = 0.50
Elbow = 0.9 Tee = 1.80

Flow Rate	**0.0113** ft^3/sec	**5.1** gpm
Velocity	**1.89** ft/sec	

*Velocity to be less than 5 ft/sec

Explanation of Results

Main 2

0	1415	
1	1415	T flow
4	1415	globe valve
5	1415	90°
6	1410	90°
526	1349	T hyarant (off)
1491	1286	T hyarant (off)
2512	1210	90°
2513	1212	T hyarant

H_2O Elev : 1419 (high)
1416 (low)

AGPipe
Detailed Pipeline Hydraulic Report

Job: **Schweighofer Main 2** Job Class: **12/12/2022**

Location: **Wayne** By: **PAS**

Landuser: ID:

Main Pipeline #2

Gravity system, known flow

Water Surface Elevation = **1419** feet,

Required Outlet Pressure = **10** psi Outlet Elevation = **1212** feet, Actual Outlet Pressure = **64.63** psi

Required Outlet Watersurface Elevation = **1235.07**

Entrance Notes:

NODE DATA

Station	Ground Elev. (ft)	Pipe Depth (in)	Pipe Invert Elev. (ft)	Hydraulic Gradeline Elev. (ft)	Energy Gradeline Elev. (ft)	Operating Pressure (psi)	Static Pressure (psi)	Minor Losses (ft)	Cumulative Total Fric. Losses (ft)	Air Vent (in)	Surge Pressure (psi)
0+00	1415.	NA	1415.0	1418.86	1418.94	1.67	1.73	0.060	0.060	2	26.80
	Minor Losses: Entrance, Sharp projecting, id= 1.049										

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 0.023 feet, Hazen Williams, C = 145

0+01	1415.	NA	1414.9	1418.78	1418.86	1.68	1.78	0.062	0.145	None	26.80
	Minor Losses: Tee, line flow, id= 1.049										

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 0.068 feet, Hazen Williams, C = 145

NODE DATA

Station	Ground Elev. (ft)	Pipe Depth (in)	Pipe Invert Elev. (ft)	Hydraulic Gradeline Elev. (ft)	Energy Gradeline Elev. (ft)	Operating Pressure (psi)	Static Pressure (psi)	Minor Losses (ft)	Cumulative Total Fric. Losses (ft)	Air Vent (in)	Surge Pressure (psi)
0+04	1415.	NA	1414.9	1418.11	1418.19	1.39	1.78	0.601	0.814	None	26.80
	Minor Losses: Valve, Globe type, (open), id= 1.049										

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 0.023 feet, Hazen Williams, C = 145

0+05	1415.	NA	1414.9	1418.06	1418.13	1.37	1.78	0.029	0.866	2	26.80
	Minor Losses: Bend, 90 deg. Std. steel or plastic, id= 1.049										

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 0.023 feet, Hazen Williams, C = 145

0+06	1410.	36.0	1406.9	1418.01	1418.08	4.81	5.24	0.029	0.918	None	26.80
	Minor Losses: Bend, 90 deg. Std. steel or plastic, id= 1.049										

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 11.765 feet, Hazen Williams, C = 145

5+26	1349.	36.0	1345.9	1406.20	1406.27	26.13	31.68	0.046	12.729	None	26.80
	Minor Losses: Tee, Hydrant (off), id= 1.049										

#7

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 21.833 feet, Hazen Williams, C = 145

NODE DATA

Station	Ground Elev. (ft)	Pipe Depth (in)	Pipe Invert Elev. (ft)	Hydraulic Gradeline Elev. (ft)	Energy Gradeline Elev. (ft)	Operating Pressure (psi)	Static Pressure (psi)	Minor Losses (ft)	Cumulative Total Fric. Losses (ft)	Air Vent (in)	Surge Pressure (psi)
14+91	1286.	36.0	1282.9	1384.32	1384.39	43.96	58.99	0.046	34.608	None	26.80
	Minor Losses: Tee, Hydrant (off), id= 1.049										
	# 8										

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 23.100 feet, Hazen Williams, C = 145

25+12	1210.	36.0	1206.9	1361.19	1361.26	66.87	91.93	0.029	57.737	None	26.80
	Minor Losses: Bend, 90 deg. Std. steel or plastic, id= 1.049										

REACH DATA

> Pipe: 1" PE3048, D2239 ID, SIDR 9
> Pipe inside diameter = 1.049 inches, Pressure rating = 160 psi
> Flow rate = 6 gpm, Velocity = 2.230 ft/sec
> Pipe friction loss = 0.023 feet, Hazen Williams, C = 145

25+13	1212.	NA	1211.9	1361.10	1361.18	64.67	89.77	0.062	57.822	2	NA
	Minor Losses: Tee, line flow, id= 1.049										
	# 9										

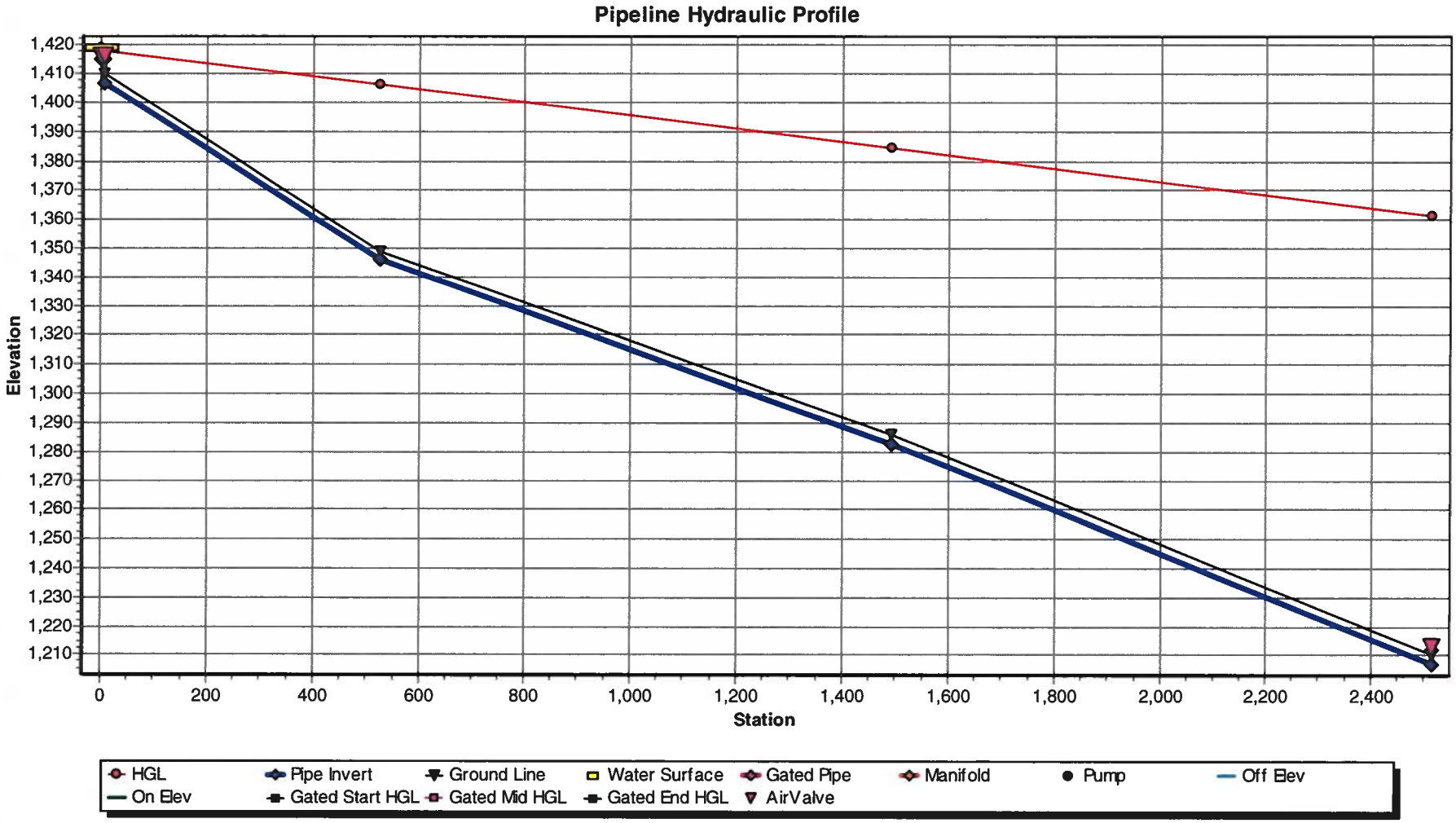
AGPipe

Pipeline Graphic Profile

Job: **Schweighofer Main 2**
Job Class:
12/12/2022

Location: **Wayne**
By: **PAS**

Landuser:
ID:



Computation Sheet

NRCS–ENG-523A Rev. 6-2002

U.S. Department of Agriculture
Natural Resources Conservation Service

State	Project			
PA - WAYNE	SCHWEIGHOFER, CASSIE			
By: PAS	Date: 3/22/23	Checked by:	Date:	Job No.:
Subject: FLOAT SETTINGS - MAIN 2				Sheet ____ of ____

Hydrant 7 : Elev : 1349' + 3' : 1352'

1415' - 1352' : 63' (psi / 2.31') : 27.3 psi / 0.72 : 34 psi

compare to grav. pipe : 31.7 psi (static pressure) / 0.72 : 44 psi rated float (Hydrant 7)

* use Grav. Pipe Values

Hydrant 8

59 psi / 0.72 : 82 psi rated float (Hydrant 8)

Hydrant 9

89.77 psi / 0.72 : 125 psi rated float (Hydrant 9)

Step #1 Pipe Flow Design

This step allows you to check transfer pipe flow rates

$$Q = A * (2 * g * h / (1 + K_m + K_p * L))^{(0.5)}$$

Q =	Flow Rate	ft^3/s
A =	Cross-Sectional pipe area	ft^2
g =	Gravity Constant	ft/s
h =	Head	ft
L =	Length	ft
K_p =	Head Loss Coefficient for Circular Pipe Flowing Full	*(Eq. 3-9 EFH)*
K_m =	Head Loss Coefficient for Entrances and Bends	*(Exhibit, Pg. 3.85 EFH)*

$K_p = 5087(n)^2 / (d)^{(4/3)}$
n = mannings coefficient
d = pipe diameter (in)

Note: Data entry is required for the blue shaded areas. In calculating head and pipe slope, the initial drop is normally from high water elevation to bottom of elbow, ie. top of curb to bottom of elbow. Additional drop is from bottom of elbow to outlet pipe elevation.

Description of Check #1 Hydrant #7

Pipe Diameter		1.049	in
Cross-sectional pipe area		0.0060	ft^2
Gravity Constant		32.2	ft/s
Total Head		67.00	ft
Head	Initial Drop	4	ft
	Additional Drop	63.00	ft
Length		526	ft
Avg. Pipe Slope		11.98	%

K_p		0.577	unit less
	$K_{entrances}$	0.5	unit less
	K_{bends}	3.6	unit less
K_m	K_{total}	4.1	unit less

Kp for pipe w/ n value of 0.011
VALUE ARE FOR POLYETHYLENE PIPE ONLY (ASTM D2239)
1" = 0.577 1 1/4" = 0.401 1 1/2" = 0.326
2" = 0.234 2.5" = 0.184

Km Values: Sharp Corner Entrance = 0.50
Elbow = 0.9 Tee = 1.80

Flow Rate	**0.0224** ft^3/sec	**10.1** gpm
Velocity	**3.74** ft/sec	

*Velocity to be less than 5 ft/sec

Explanation of Results

Step #1 Pipe Flow Design

This step allows you to check transfer pipe flow rates

$$Q = A * (2 * g * h / (1 + K_m + K_p * L))^{(0.5)}$$

Q =	Flow Rate	ft^3/s	
A =	Cross-Sectional pipe area	ft^2	$K_p=5087(n)^2 / (d)^{(4/3)}$
g =	Gravity Constant	ft/s	n = mannings coefficient
h =	Head	ft	d = pipe diameter (in)
L =	Length	ft	
K_p =	Head Loss Coefficient for Circular Pipe Flowing Full		*(Eq. 3-9 EFH)*
K_m =	Head Loss Coefficient for Entrances and Bends		*(Exhibit, Pg. 3.85 EFH)*

Note: Data entry is required for the blue shaded areas. In calculating head and pipe slope, the initial drop is normally from high water elevation to bottom of elbow, ie. top of curb to bottom of elbow. Additional drop is from bottom of elbow to outlet pipe elevation.

Description of Check #1 — Hydrant #8

Pipe Diameter	1.049	in	
Cross-sectional pipe area	0.0060	ft^2	
Gravity Constant	32.2	ft/s	
Total Head	126.00	ft	
Head Initial Drop	4	ft	
Additional Drop	126.00	ft	
Length	1491	ft	
Avg. Pipe Slope	8.45	%	

K_p		0.577	unit less
	$K_{entrances}$	0.5	unit less
	K_{bends}	5.4	unit less
K_m	K_{total}	5.9	unit less

Kp for pipe w/ n value of 0.011
VALUE ARE FOR POLYETHYLENE PIPE ONLY (ASTM D2239)
1" = 0.577 1 1/4" = 0.401 1 1/2" = 0.326
2" = 0.234 2.5" = 0.184

Km Values: Sharp Corner Entrance = 0.50
Elbow = 0.9 Tee = 1.80

Flow Rate	**0.0184** ft^3/sec	**8.2** gpm
Velocity	**3.06** ft/sec	

*Velocity to be less than 5 ft/sec

Explanation of Results

Step #1 Pipe Flow Design

This step allows you to check transfer pipe flow rates

$$Q = A * (2 * g * h / (1 + K_m + K_p * L))^{(0.5)}$$

Q =	Flow Rate	ft^3/s	
A =	Cross-Sectional pipe area	ft^2	$K_p=5087(n)^2 / (d)^{(4/3)}$
g =	Gravity Constant	ft/s	n = mannings coefficient
h =	Head	ft	d = pipe diameter (in)
L =	Length	ft	
K_p =	Head Loss Coefficient for Circular Pipe Flowing Full		*(Eq. 3-9 EFH)*
K_m =	Head Loss Coefficient for Entrances and Bends		*(Exhibit, Pg. 3.85 EFH)*

Note: Data entry is required for the blue shaded areas. In calculating head and pipe slope, the initial drop is normally from high water elevation to bottom of elbow, ie. top of curb to bottom of elbow. Additional drop is from bottom of elbow to outlet pipe elevation.

Description of Check #1 — Hydrant #9

Pipe Diameter		1.049	in
Cross-sectional pipe area		0.0060	ft^2
Gravity Constant		32.2	ft/s
Total Head		126.00	ft
Head	Initial Drop	4	ft
	Additional Drop	200.00	ft
Length		2513	ft
Avg. Pipe Slope		7.96	%

K_p		0.577	unit less
	$K_{entrances}$	0.5	unit less
	K_{bends}	6.3	unit less
K_m	K_{total}	6.8	unit less

Kp for pipe w/ n value of 0.011
VALUE ARE FOR POLYETHYLENE PIPE ONLY (ASTM D2239)
1" = 0.577 1 1/4" = 0.401 1 1/2" = 0.326
2" = 0.234 2.5" = 0.184

Km Values: Sharp Corner Entrance = 0.50
Elbow = 0.9 Tee = 1.80

Flow Rate	**0.0142** ft^3/sec	**6.4** gpm
Velocity	**2.36** ft/sec	

*Velocity to be less than 5 ft/sec

Explanation of Results

Hook Well Drilling

From: Cassilyn Schweighofer <cms346@cornell.edu>
Sent: Saturday, January 08, 2022 11:55 AM
To: hwdi1964@ptd.net
Subject: Re: Schweighofer Well Details Circa 1998-2001

Flag Status: Flagged

Also, do you have any info on the current well pump that is in there?
It's not hardly been used, but it is 20 years old. I'm wondering if it's likely to last and if I should just buy a generator to run it up there!

Thanks again,
Cassie

On Sat, Jan 8, 2022 at 10:59 AM Cassilyn Schweighofer <cms346@cornell.edu> wrote:

Hi guys,
I'm trying to rig up a solar pump for that well up on the top of the mountain to gravity feed the livestock during summer months. I've called requesting details before, but I've only got a record of 380 feet and +50 gpm.

Do you have any other details, specifically: Drilled 10/26/01

Well Depth: 380'

Static Water Level: 190'

Recharge Rate: ?

Diameter of Well Casing: 40' of 6" Casing

Any recommendations for solar pumping companies? Is this something you all do?
No Recommendation on where to purchase. But have installed some
Much appreciated! Hope all is well on the other side of the valley!

Pump Install
11/26/0

--
Cassie Schweighofer
Twin Brook Farms and Livestock
Facebook: https://www.facebook.com/TwinBrookFarms
Website: www.twinbrookfarmsandlivestock.com
Phone: 570-224-4381

20gpm 2hp
Gemotor 3wire Pump
set in well 370' on
1" Black Plastic Pipe 200
ON 8/3 wire
Meaning pump is in 180'
of water

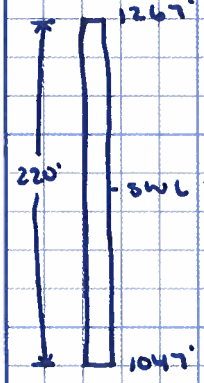
ANY Questions
give me a call
Cell 729-1870

Computation Sheet

NRCS–ENG-523A Rev. 6-2002

U.S. Department of Agriculture
Natural Resources Conservation Service

State	Project			
PA. WAYNE	SCHEIGHOFER, CASSIE			
By: PAS	Date: 3/23/23	Checked by	Date	Job No.
Subject: Solar pump system				Sheet ____ of ____



Well Elev: 1267'
Static water level: 1167' (assumed)

Place Pressure Tank beside well
- bury 2' and approx 6' deep ∴
bottom of P. Tank: 1259'

Highest Hydrant: 1291' (1288' ground elevation)

1291' - 1259' = 32' elevation difference

Friction Loss

Distance between P. Tank + highest hydrant: 2064'
2064' (1.15) = 2374' (15% for fittings)
2374 (1.06/100') = 25 psi (2.31'/psi) = 58'

outlet: 5 psi min (2.31'/psi) = 12'

TDH: 32' + 58' + 12' = 102' TDH

Pressure Tank setting: 102' TDH (psi/2.31') = 44.2 psi

Pressure Tank needs 50/70

Site Pump

High setting from P. Tank: 70 psi (2.31'/psi) = 162'
SWL to P. Tank: 1259' - 1167' = 92'
Friction loss in Pipe to ground elev: 1267' - 1047' = 220' (1.15) = 230' ($\frac{1.06}{100}$) = 2.4 psi (2.31'/psi) = 6'

162' + 92' + 6' = 260' TDH

Use 260' TDH and 6 gpm

Irrigation Association Friction Loss Chart 2008

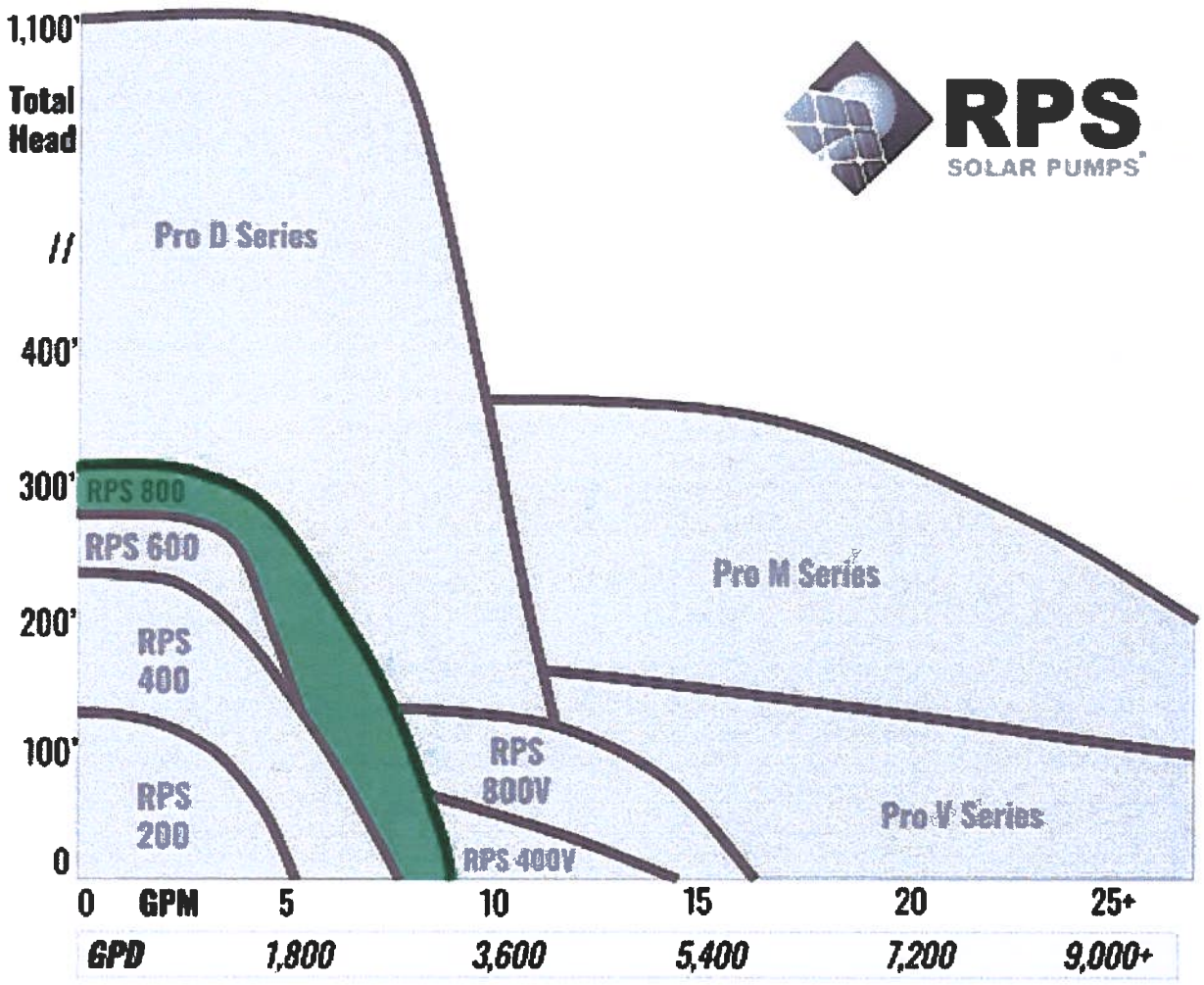
Polyethylene Plastic Pipe (ID controlled)

PE 3408 ASTM D2239 C=140

psi loss per 100 feet of pipe

Nominal size / Avg. ID	1/2" 0.622		3/4" 0.824		1" 1.049		1-1/4" 1.380		1-1/2" 1.610		2" 2.067		2-1/2" 2.469		3" 3.068		4" 4.026	
Flow (gpm)	Velocity (ft/s)	psi loss	Velocity (ft/s)	psi loss	Velocity (ft/s)	psi loss	Velocity (ft/s)	psi loss	Velocity (ft/s)	psi loss	Velocity (ft/s)	psi loss	Velocity (ft/s)	psi loss	Velocity (ft/s)	psi loss	Velocity (ft/s)	psi loss
1	1.05	0.49	0.60	0.12	0.37	0.04	0.21	0.01	0.16	0.00								
2	2.11	1.76	1.20	0.45	0.74	0.14	0.43	0.04	0.31	0.02	0.19	0.01						
3	3.16	3.73	1.80	0.95	1.11	0.29	0.64	0.08	0.47	0.04	0.29	0.01						
4	4.22	6.35	2.40	1.62	1.48	0.50	0.86	0.13	0.63	0.06	0.38	0.02	0.27	0.01				
5	5.27	9.60	3.00	2.44	1.85	0.76	1.07	0.20	0.79	0.09	0.48	0.03	0.33	0.01				
6	6.33	13.46	3.61	3.43	2.22	1.06	1.29	0.28	0.94	0.13	0.57	0.04	0.40	0.02	0.26	0.01		
7	7.38	17.91	4.21	4.56	2.60	1.41	1.50	0.37	1.10	0.18	0.67	0.05	0.47	0.02	0.30	0.01		
8	8.44	22.93	4.81	5.84	2.97	1.80	1.71	0.47	1.26	0.22	0.76	0.07	0.54	0.03	0.35	0.01		
9	9.49	28.52	5.41	7.26	3.34	2.24	1.93	0.59	1.42	0.28	0.86	0.08	0.60	0.03	0.39	0.01		
10	10.55	34.67	6.01	8.82	3.71	2.73	2.14	0.72	1.57	0.34	0.95	0.10	0.67	0.04	0.43	0.01		
12			7.21	12.37	4.45	3.82	2.57	1.01	1.89	0.48	1.15	0.14	0.80	0.06	0.52	0.02		
14			8.41	16.45	5.19	5.08	3.00	1.34	2.20	0.63	1.34	0.19	0.94	0.08	0.61	0.03		
16			9.61	21.07	5.93	6.51	3.43	1.71	2.52	0.81	1.53	0.24	1.07	0.10	0.69	0.04	0.40	0.01
18			10.82	26.21	6.67	8.10	3.86	2.13	2.83	1.01	1.72	0.30	1.20	0.13	0.78	0.04	0.45	0.01
20			12.02	31.85	7.42	9.84	4.28	2.59	3.15	1.22	1.91	0.36	1.34	0.15	0.87	0.05	0.50	0.01
22					8.16	11.74	4.71	3.09	3.46	1.46	2.10	0.43	1.47	0.18	0.95	0.06	0.55	0.02
24					8.90	13.79	5.14	3.63	3.78	1.72	2.29	0.51	1.61	0.21	1.04	0.07	0.60	0.02
26					9.64	16.00	5.57	4.21	4.09	1.99	2.48	0.59	1.74	0.25	1.13	0.09	0.65	0.02
28					10.38	18.35	6.00	4.83	4.41	2.28	2.67	0.68	1.87	0.28	1.21	0.10	0.70	0.03
30					11.12	20.85	6.43	5.49	4.72	2.59	2.86	0.77	2.01	0.32	1.30	0.11	0.76	0.03
32					11.86	23.50	6.86	6.19	5.04	2.92	3.06	0.87	2.14	0.36	1.39	0.13	0.81	0.03
34					12.61	26.29	7.28	6.92	5.35	3.27	3.25	0.97	2.28	0.41	1.47	0.14	0.86	0.04
36							7.71	7.69	5.67	3.63	3.44	1.08	2.41	0.45	1.56	0.16	0.91	0.04
38							8.14	8.50	5.98	4.02	3.63	1.19	2.54	0.50	1.65	0.17	0.96	0.05
40							8.57	9.35	6.30	4.42	3.82	1.31	2.68	0.55	1.73	0.19	1.01	0.05
42							9.00	10.24	6.61	4.83	4.01	1.43	2.81	0.60	1.82	0.21	1.06	0.06
44							9.43	11.16	6.93	5.27	4.20	1.56	2.94	0.66	1.91	0.23	1.11	0.06
46							9.86	12.12	7.24	5.72	4.39	1.70	3.08	0.71	1.99	0.25	1.16	0.07
48							10.28	13.11	7.56	6.19	4.58	1.84	3.21	0.77	2.08	0.27	1.21	0.07
50							10.71	14.14	7.87	6.68	4.77	1.98	3.35	0.83	2.17	0.29	1.26	0.08
55							11.78	16.87	8.66	7.97	5.25	2.36	3.68	0.99	2.38	0.35	1.38	0.09
60							12.85	19.82	9.44	9.36	5.73	2.77	4.02	1.17	2.60	0.41	1.51	0.11
65									10.23	10.86	6.21	3.22	4.35	1.36	2.82	0.47	1.64	0.13
70									11.02	12.45	6.68	3.69	4.69	1.55	3.03	0.54	1.76	0.14
75									11.81	14.15	7.16	4.19	5.02	1.77	3.25	0.61	1.89	0.16
80									12.59	15.95	7.64	4.73	5.35	1.99	3.47	0.69	2.01	0.18
85									13.38	17.84	8.12	5.29	5.69	2.23	3.68	0.77	2.14	0.21
90											8.59	5.88	6.02	2.48	3.90	0.86	2.27	0.23
95											9.07	6.50	6.36	2.74	4.12	0.95	2.39	0.25
100											9.55	7.15	6.69	3.01	4.33	1.05	2.52	0.28
110											10.50	8.53	7.36	3.59	4.77	1.25	2.77	0.33
120											11.46	10.02	8.03	4.22	5.20	1.47	3.02	0.39
130											12.41	11.62	8.70	4.89	5.63	1.70	3.27	0.45
140											13.37	13.33	9.37	5.61	6.07	1.95	3.52	0.52
150													10.04	6.38	6.50	2.22	3.78	0.59
160													10.71	7.19	6.94	2.50	4.03	0.67
170													11.38	8.04	7.37	2.79	4.28	0.74
180													12.05	8.94	7.80	3.11	4.53	0.83
190													12.72	9.88	8.24	3.43	4.78	0.92
200													13.39	10.87	8.67	3.78	5.03	1.01
220															9.54	4.50	5.54	1.20
240															10.40	5.29	6.04	1.41
260															11.27	6.14	6.54	1.64
280															12.14	7.04	7.05	1.88
300															13.00	8.00	7.55	2.13
320															13.87	9.02	8.05	2.40
340																	8.56	2.69
360																	9.06	2.99
380																	9.57	3.30
400																	10.07	3.63
420																	10.57	3.98
440																	11.08	4.33
460																	11.58	4.71
480																	12.08	5.09
500																	12.59	5.49

Shaded area represents velocities over 5 ft/s.
Use with caution.


1,100'
Total Head
//
400'
300'
200'
100'
0
RPS SOLAR PUMPS
Pro D Series
Pro M Series
Pro V Series
RPS 800
RPS 600
RPS 400
RPS 200
RPS 800V
RPS 400V
0 GPM 5 10 15 20 25+
GPD 1,800 3,600 5,400 7,200 9,000+

Computation Sheet

NRCS–ENG-523A Rev. 6-2002

U.S. Department of Agriculture
Natural Resources Conservation Service

State	Project			
PA - WAYNE	SCHWEIGHOFER, CASSIE			
By: PAS	Date: 3/24/23	Checked by:	Date:	Job No.:
Subject: Solar Pump System - Pressure Tank Sizing				Sheet ____ of ____

Pressure Tank has 50/70 setting

1 minute run time → 6 gpm (1 min) : 6 gal

use pressure tank factor (Goulds Tank Selection Table)
: 0.24

WX-203 Pressure tank : 32 gal (0.24) : 7.7 gallons

WX-203

Ref. # 4

Goulds Tank Selection

TECHNICAL DATA

Aqua-Air Tanks

TABLE 1 — TANK SPECIFICATIONS

AQUA-AIR Model No.	Dimensions (inches)		Column A	Column B			Column C			
	Diameter	Height	Total Volume (Gals.)	Drawdown in Gallons at System Operating Pressure Range of 20/40 PSIG	30/50 PSIG	40/60 PSIG	Max. Drawdown Vol. (Gals.)	System Connection	Pre-Chgd. at (lbs.)	Shipping Weight (lbs.)
V-6P	8	11 15/16	2.0	0.7	0.6	0.5	1.2	3/4" NPTM	V6P-18	7.5
V-15P	11	13 15/16	4.5	1.7	1.4	1.2	2.7	3/4" NPTM	V15P-18	11.9
V-25P	11	23 1/16	8.2	3.1	2.6	2.2	4.5	3/4" NPTM	V25P-28	21.1
V-45P	15 3/8	21 1/16	13.9	5.1	4.3	3.7	8.4	1" NPTM	V45P-28	23.8
V-45B	15 3/8	21 1/16	13.9	5.1	4.3	3.7	8.4	1" NPTM	V45B-28	22.6
V-45	15 3/8	24 15/16	13.9	5.1	4.3	3.7	8.4	1" NPTF	V45-28	23.4
ACK1	15 3/8	25 11/16	13.9	5.1	4.3	3.7	8.4	3/4" NPTF	ACK1-18	27.8
V-60	15 3/8	32 3/8	19.9	7.3	6.1	5.3	12.1	1" NPTF	V60-28	33.7
V-60B	15 3/8	28 1/2	19.9	7.3	6.1	5.3	12.1	1" NPTM	V60B-28	32.9
ACL1	15 3/8	33 1/3	19.9	7.3	6.1	5.3	12.1	3/4" NPTF	ACL1-18	40.0
V-80	15 3/8	39 3/16	25.9	8.9	7.7	6.7	13.9	1" NPTF	V80-28	43.0
V-100	15 3/8	47 1/4	31.8	11.8	9.9	8.6	13.8	1" NPTF	V100-28	51.7
V-140	22	36 3/16	45.2	16.5	13.9	12.1	27.3	1 1/4" NPTF	V140-38	64.1
V-140B	22	32 3/16	45.2	16.5	13.9	12.1	27.3	1 1/4" NPTM	V140B-38	62.3
V-200	22	48 3/8	65.1	23.9	20.0	17.4	39.3	1 1/4" NPTF	V200-38	88.9
V-200B	22	44 1/4	65.1	23.9	20.0	17.4	39.3	1 1/4" NPTM	V200B-38	86.9
V-250	26	46	83.5	30.9	25.9	22.5	50.8	1 1/4" NPTF	V250-38	116.0
V-260	22	60 11/16	84.9	31.2	26.2	22.8	44.7	1 1/4" NPTF	V260-38	113.0
V-350	26	61 5/16	115.9	42.9	35.9	31.3	70.5	1 1/4" NPTF	V350-38	161.0

P = Pipe Mounted B = Buried MP = Mounted Pump

TABLE 2 — PRESSURE FACTORS

PUMP CUT-OUT PRESSURE — PSIG	PUMP CUT-IN PRESSURE – PSIG														
	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
30	.22														
35	.30	.20													
40	.37	.27	.13												
45	.42	.34	.25	.17											
50	.46	.39	.31	.23	.15										
55	.50	.43	.36	.29	.22	.14									
60	.54	.47	.40	.33	.27	.20	.13								
65		.50	.44	.38	.31	.25	.19	.13							
70		.53	.47	.41	.35	.30	.24	.18	.12						
75			.50	.45	.39	.33	.28	.22	.17	.11					
80			.53	.48	.42	.37	.32	.26	.21	.16	.11				
85				.50	.45	.40	.35	.30	.25	.20	.15	.10			
90				.53	.48	.43	.38	.33	.29	.24	.19	.14	.10		
95					.50	.46	.41	.36	.32	.27	.23	.18	.14	.09	
100					.52	.43	.44	.39	.35	.31	.26	.22	.17	.13	.09

To determine tank drawdown of operating pressure ranges other than those listed in table 1, use following procedure:

Multiply total tank volume (table 1, column A) by pressure factor (table 2).

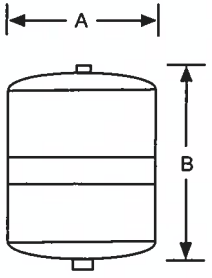
Example: Operating range: 35/55
Tank being used: V-200

65.1 = Total volume of tank (table 1)
x .29 Pressure factor (table 2)
18.9 = Drawdown in gallons at 35/55 PSI operating range.

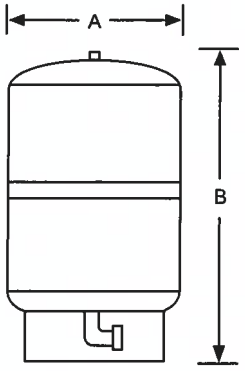
AMTROL

WELLXTROL

Next Generation Well Tanks Featuring Antimicrobial Protection



WX-101 through WX-200



WX-201 through WX-350

Specifications

Model Number	Tank Volume (Gallons)	Max. Acceptance Factor	Dimensions		System Conn. (Inches)	Drawdown (Gallons)			Shipping Weight (lbs.)
			A Diameter (Inches)	B Height (Inches)		30/50	40/60	50/70	
WX-101	2.0	0.45	8	13	¾ NPTM	0.6	0.6	0.5	5
WX-102	4.4	0.55	11	15	¾ NPTM	1.4	1.2	1.0	9
WX-103	7.6	0.43	11	22	¾ NPTM	2.4	2.0	1.8	15
WX-104	10.3	1.00	15	18	1 NPTM	3.2	2.8	2.4	20
WX-200	14.0	0.81	15	22	1 NPTM	4.3	3.8	3.3	22
WX-201	14.0	0.81	15	25	1 NPTF	4.3	3.8	3.3	25
WX-202	20.0	0.57	15	32	1 NPTF	6.2	5.4	4.7	33
WX-202XL	26.0	0.44	15	39	1 NPTF	8.0	7.0	6.1	36
WX-203	32.0	0.35	15	47	1 NPTF	9.9	8.6	7.6	43
WX-205	34.0	1.00	22	30	1 ¼ NPTF	10.5	9.1	8.0	61
WX-250	44.0	0.77	22	36	1 ¼ NPTF	13.6	11.8	10.4	69
WX-251	62.0	0.55	22	47	1 ¼ NPTF	19.2	16.6	14.6	92
WX-255	81.0	0.41	22	57	1 ¼ NPTF	25.0	21.7	19.1	103
WX-252	86.0	0.39	22	62	1 ¼ NPTF	26.6	23.0	20.3	114
WX-302	86.0	0.54	26	47	1 ¼ NPTF	26.6	23.0	20.3	123
WX-350	119.0	0.39	26	62	1 ¼ NPTF	36.8	31.9	28.1	166

Stainless Steel System Connection.
Maximum Working Pressure: All models except WX-252: 150 psig. WX-252: 100 psig. Factory Precharge: 38 psig.
Drawdown can be affected by various ambient and system conditions, including temperature and pressure.

Quick Sizing Chart

Pump Discharge Rate (Approx. GPM)	OPERATING PRESSURE					
	30/50 PSIG		40/60 PSIG		50/70 PSIG	
	ESP I	ESP II	ESP I	ESP II	ESP I	ESP II
5	WX-202	WX-205	WX-202	WX-205	WX-202	WX-250
7	WX-202XL	WX-250	WX-203	WX-251	WX-203	WX-251
10	WX-205	WX-251	WX-205	WX-255	WX-250	WX-302
12	WX-250	WX-255	WX-250	WX-255	WX-251	WX-350
15	WX-250	WX-302	WX-251	WX-350	WX-251	WX-350
20	WX-251	WX-350	WX-255	WX-255 (2)	WX-302	WX-302 (2)
25	WX-255	WX-255 (2)	WX-302	WX-302 (2)	WX-350	WX-350 (2)
30	WX-302	WX-302 (2)	WX-350	WX-350 (2)	WX-350	WX-302 (3)
35	WX-350	WX-350 (2)	WX-350	WX-350 (2)	WX-255 (2)	WX-350 (3)
40	WX-350	WX-350 (2)	WX-255 (2)	WX-302 (3)	WX-302 (2)	WX-350 (3)

ESP I - Effective Sizing Protection I: The tank selection is based on approximately one minute running time. This is recommended for pumps up to 3/4 hp.
ESP II - Effective Sizing Protection II: The tank selection is based on approximately two minutes running time. This is recommended for pumps 3/4 hp or larger.

ANTIMICROBIAL PROTECTION™ NSF NSF/ANSI 61 ISO 9001:2008 REGISTERED AMERICAN GROUND WATER TRUST GROUND WATER EDUCATION LOW-LEAD IAPMO R&T MADE IN USA WATER SYSTEMS COUNCIL national ground water association

AMTROL
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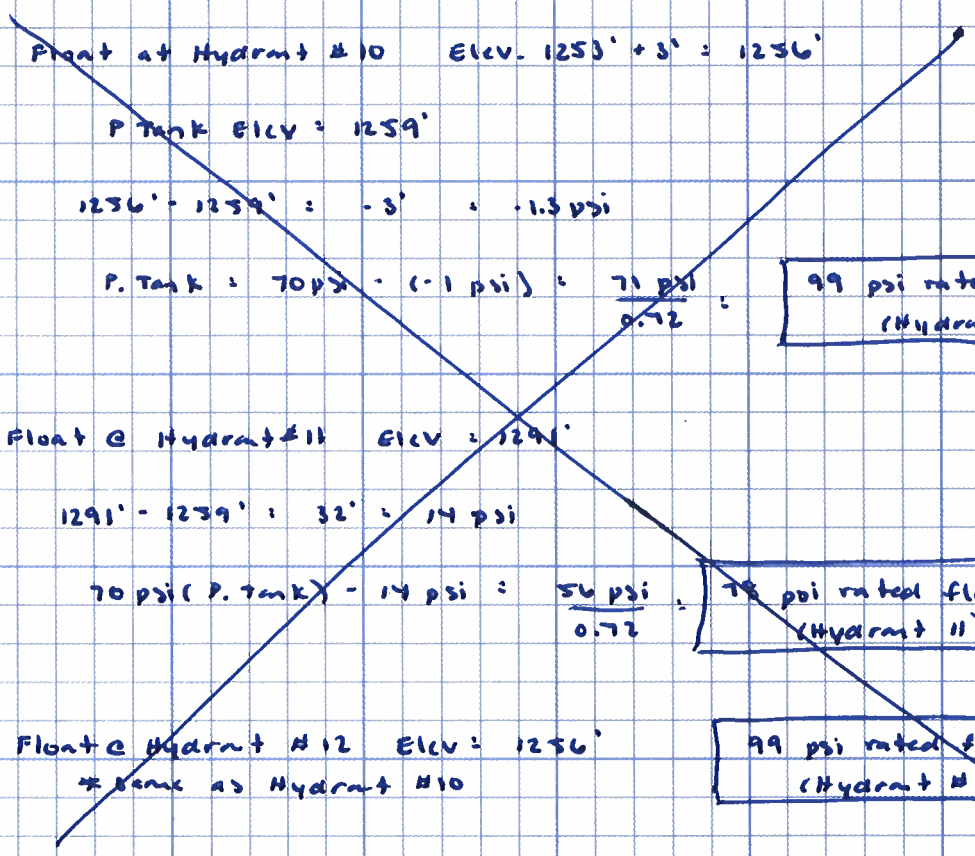
Computation Sheet

NRCS–ENG-523A Rev. 6-2002

U.S. Department of Agriculture
Natural Resources Conservation Service

State	Project			
PA - WAYNE	SCHWEIGHOFER, CASSIE			
By: PAS	Date: 3/23/23	Checked by:	Date:	Job No.:
Subject: FLOAT SETTINGS				Sheet ____ of ____



Float at Hydrant #10 Elev. 1253' + 3' = 1256'

P Tank Elev = 1259'

1256' - 1259' = -3' = -1.3 psi

P. Tank = 70 psi - (-1 psi) = 71 psi / 0.72 = 99 psi rated float (Hydrant 10)

Float @ Hydrant #11 Elev = 1291'

1291' - 1259' = 32' = 14 psi

70 psi (P. Tank) - 14 psi = 56 psi / 0.72 = 78 psi rated float (Hydrant 11)

Float @ Hydrant #12 Elev = 1256'
* same as Hydrant #10

99 psi rated float (Hydrant #12)

Float @ Hydrant #10
35.2' drop = 15.2 psi
15.2 gain psi - 6.1 loss psi = 9.1 psi / 0.72 = 13 psi rated float (Hydrant #10)

Float @ Hydrant #11

5 psi @ #11 + 9.1 psi from #10 = 14.1 psi / 0.72 = 20 psi rated float (Hydrant #11)

Float @ Hydrant #12
* same as Hydrant #10

13 psi rated float (Hydrant #12)

MEGAFLOW TROUGH VALVE
PRODUCT INFO

Jobe valves

MEGAFLOW™
TROUGH VALVE

200 L / MIN

Description

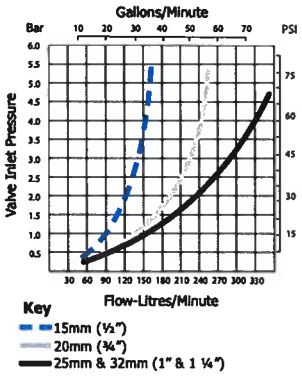
Megaflow trough valves are float operated valves for use in automatic filling of water troughs. The valve is configured for **underwater mounting only**. The float is connected to the valve with a nylon cord, this operates a pilot valve, when the water level drops, the pilot valve is opened and the main diaphragm valve is activated. Megaflow is a good choice where its **high flow**, compact, robust, non corrosive construction is beneficial.

Applications

Maintaining water levels in:

- Animal drinking troughs
- Water storage tanks

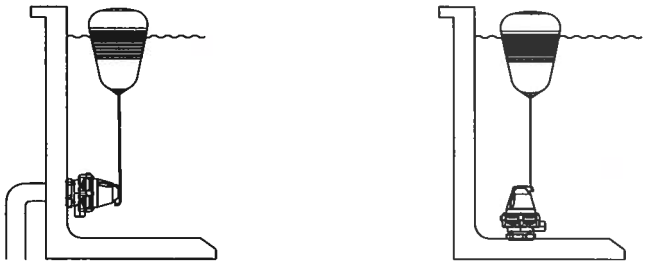
Flow Graph



Features

- High flow
- Compact robust construction
- 20-60mm (¾" - 2½") water level differential (increases as water pressure increases)
- Positive on/off operation
- Lock off with cord lock
- 0.3 - 10 bar (5 - 150 P.S.I.) pressure rating
- Inlet filter
- Constructed from corrosion resistant materials
- Under water installation helps avoid freezing
- Valve is less prone to stock damage

Mounting Positions

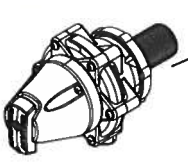


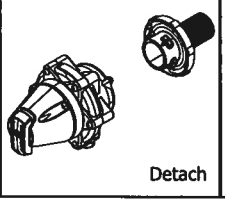
Options

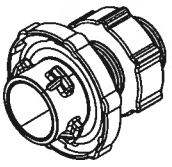
	BSP				NPT			
Inlet Size	½"	¾"	1"	1 ¼"	½"	¾"	1"	1 ¼"
Short Tail		✓	✓	✓		✓	✓	✓
Long Tail	✓	✓	✓	✓	✓	✓	✓	✓

Long Tail:

Supplied with backnut and seal washer
½" Long Tail: 100mm long
¾" Long Tail: 38mm long







MEGAFLOW TROUGH VALVE SPECIFICATION

PRODUCT	CODE	INLET SIZE	CODE	OPTIONS	CODE
Megaflow Trough Valve	MFV	½" bsp/npt	15	Detach Base	D
		¾" bsp/npt	20	Long Tail Thread	LT
		1" bsp	25		
		1" npt	1		
		1 ¼" bsp	32		
		1 ¼" npt	114		

(e.g) A Megaflow Trough Valve with: ¾" bsp inlet thread, detach base, long tail thread has the following spec number: MFV 20 D LT NOTE: If no options are specified the standard ones will be supplied

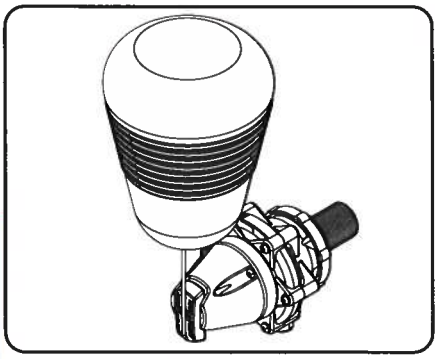
Note: Before using check that under water mounting is allowed by local regulations.
Note: Product may differ slightly from these specs due to ongoing product development.

MEGAFLOW TROUGH VALVE
DIMENSIONS & MATERIALS

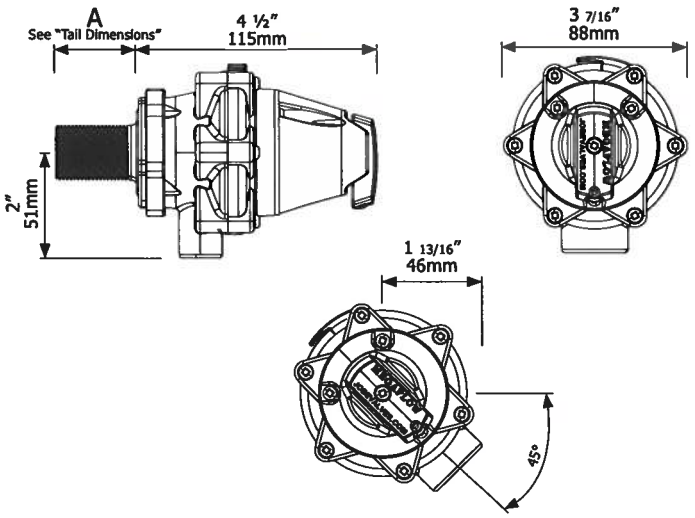
Jobe valves

MEGAFLOW™
TROUGH VALVE

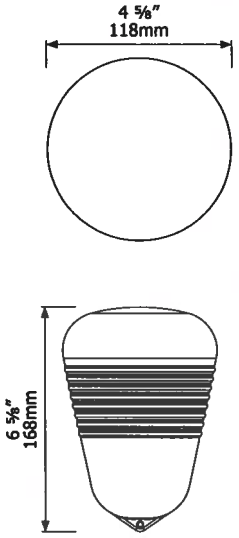
200 L / MIN



Megaflow Dimensions



Float Dimensions



Tail Dimensions

Dimension A	mm	inches
20mm (3/4") Short Tail	22	7/8
25mm (1") bsp/npt short tail	22	7/8
32mm (1 1/4") bsp/npt short tail	25	1
15mm (1/2") Long Tail	100	4
20mm (3/4") long tail	38	1 1/2
25mm (1")bsp/npt long tail	54	2 1/8
32mm (1 1/4") bsp/npt long tail	60	2 3/8

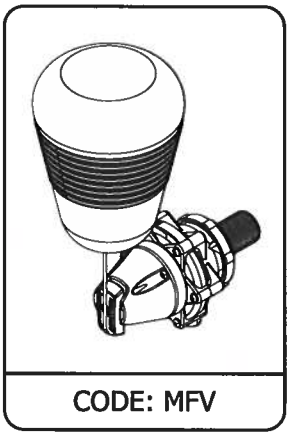
Part	Material	Part	Material
Body	*Glass Filled Nylon*	***Actuator Cap***	*ABS*
White Internal Parts	*Acetal*	***Detach Locking Ring***	*Acetal*
Filter	*PP/Nylon*	***O'Rings***	*Nitrile*
Diaphragm	*EPDM*	***Float***	*HDPE*
Seal	*TPU*	***Seal Washer***	*LDPE*
Springs, Bolts, Nuts, Pin, Screws	*304 Stainless Steel*	***Float Cord***	*Polyester*

Maximum Operating Temperature	60°C, 140°F

MEGAFLOW TROUGH VALVE
PARTS IDENTIFICATION SHEET

Jobe valves

MEGAFLOW™
TROUGH VALVE



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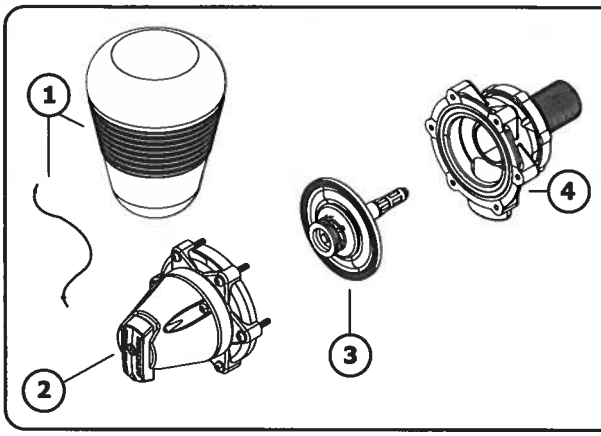
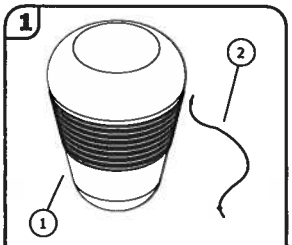


	CODE	DESCRIPTION
1	MFP1	Float Assembly
2	MFP2	Cap & Actuator Assembly
3	MFP3	Diaphragm Assembly
4		Detach Base Assembly

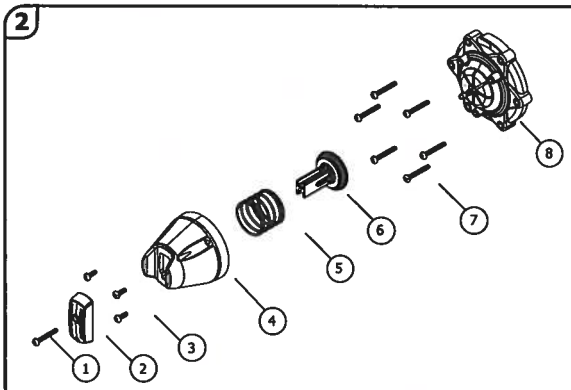
200 L / MIN

1



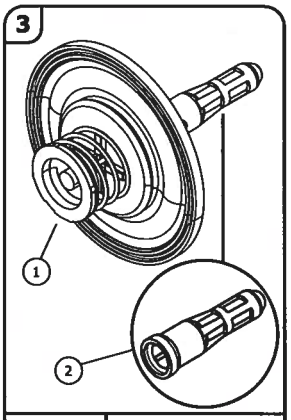
	CODE	DESCRIPTION
1	MFP1010	Float
2	MFP1020	Float Cord

2



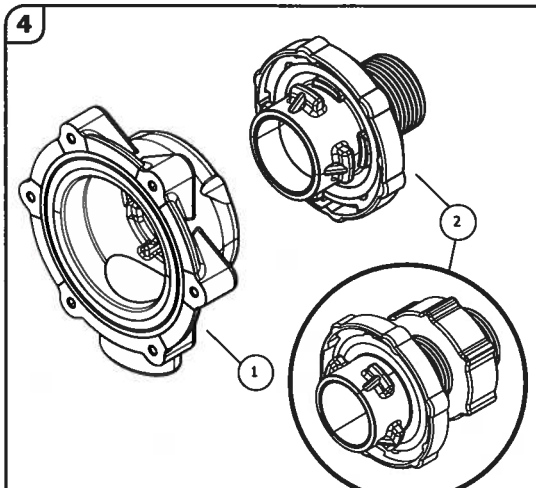
	CODE	DESCRIPTION
1	MFP2050	6g x 25 S/S Screw
2	MFP2041	Two Part Acuator Top
3	MFP2010	6g x 10 S/S Screw
4	MFP2020	Actuator Cap
5	MFP2030	Actuator Spring
6	MFP2042	Two Part Actuator Stem
7	MFP2050	6g x 25 S/S Screw
8	MFP2060	Valve Cap Assembly

3



	CODE	DESCRIPTION
1	MFP3	Diaphragm Assembly
2	TPP3010	Pilot Flow Filter (Fine)
	TPP3011	Pilot Flow Filter (Coarse)

4



NB: All Long Tail Assemblies are supplied with a Seal Washer and Backnut included

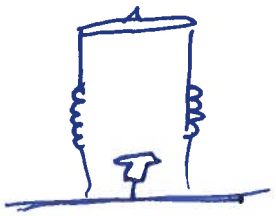
	CODE	DESCRIPTION
1	DTP1	Detach Base
2		***BSP Tails***
		Short Tail Assembly (BSP)
	DTP020	Detach Tail 20mm(3/4") Short
	DTP025	Detach Tail 25mm(1") Short
	DTP032	Detach Tail 32mm(1 1/4") Short
		Long Tail Assembly (BSP)
	DTP015L	Detach Tail 15mm (1/2") Long
	DTP020L	Detach Tail 20mm (3/4") Long
	DTP025L	Detach Tail 25mm (1" bsp) Long
	DTP032L	Detach Tail 32mm (1 1/4" bsp) Long
		NPT Tails
		Short Tail Assembly (NPT)
	DTP0075	Detach Tail 3/4" npt
	DTP0100	Detach Tail 1" npt
	DTP0125	Detach Tail 1 1/4" npt
		Long Tail Assembly (NPT)
	DTP0050L	Detach Tail 1/2" npt Long
	DTP0075L	Detach Tail 3/4" npt Long
	DTP0100L	Detach Tail 1" npt Long
	DTP0125L	Detach Tail 1 1/4" npt Long

VALVE Products

Water and Wastewater Valves

- **Air Release / Vacuum Valves**
  - Air Release Valve (Sewage)
  - Air Release Valves (Clean Water)
- Automatic Control Valves
- Backflow Preventers
- Break Off Plugs
- Butterfly Valves
- Check Valves
- Constant Pressure Pump Control Valves
- Flow Regulators
- Foot Valves
- Gate Valves
- Plug Valves

MODEL: Air Release Simple Level Type - MINIAIR® AIS
3D and AR View Available



Air Release Simple Level Type - MINIAIR® AIS

SIZE RANGE: 3/8 - 1 inch (10 mm - 25 mm)

MAX TEMP: 150°F (65°C) Inlet

MAX PRESSURE: 150 PSI

MINIAIR® AIS- Ductile iron fusion bonded epoxy coated body with two bolt access cover and stainless steel trim. Threaded female x female connections. Stainless seat with Viton o-ring. Small orifice. Vents under line pressure.

Inlet Pressure MIN: 20 PSI*
Inlet Pressure MAX: 150 PSI*

Consult factory for full line of sizes available.

Warranty: 1 Year

Discount Code B
FOB Factory

SUBMIT RFQ

Specifications Manuals

3500	3/8"	7	3/8"	$350.00
3501	1/2"	7	3/8"	$354.00
3502	3/4"	7	3/8"	$396.00
3503	1"	7	1/2"	$443.00

* For alternate lower or higher pressure applications consult factory.

FLOMATIC CORPORATION
15 Pruyn's Island Drive
Glens Falls, NY 12801 USA

PHONE: 1-800-833-2040
INTERNATIONAL CALLERS: 518-761-9797
FAX: 1-800-314-3155

Introduction:

Flomatic® Air Release valves have been designed to be reliable and low maintenance, due to the use of stainless steel internals components and fasteners. Following the information in this manual will insure that the Flomatic Miniair® valve will operate correctly throughout its lifespan.

Air Release valves are typically mounted at the high points of a piping system to relieve pockets of air as they collect in the system. These valves can also be used to release air in tanks and pump casings.

CAUTION:
These valves are designed for use on clean water systems. They are not intended for fuel service or for fluids containing suspended solids. For waste water or solids refer to Sewair Valves.

Flomatic Miniair® valves are float-operated, resilient-seated valves designed to operate in clean water systems. The model number, serial number, and size are listed on the name plate of each individual valve for reference.
Note: Softer Rubber Seats are available upon request for low pressure applications

Upon receipt inspect valves for damage that may have occurred during shipment. Valves should remain boxed and in a clean and dry environment until installed to prevent rust and damage. For storage longer than six months, valve must be stored indoors, boxed, out of direct sunlight.

Operation:

Flomatic Miniair® valves are designed to release air from the system while it is under pressure and in operation. The valve is normal open and will expel air through the orifice. As fluid fills the system and air is dissipated, the float rises and the valve plunger slow closes the orifice off. As air accumulate in the valve displacing the water, the float drops and the lever opens the valve plunger. The lever arm connected to the float and allows the valve to open under high pipeline pressures. An additional port on the cover is provided for draining, flushing and testing purposes.

CAUTION
Install valve with "Inlet" port down or leakage will occur

Installation:

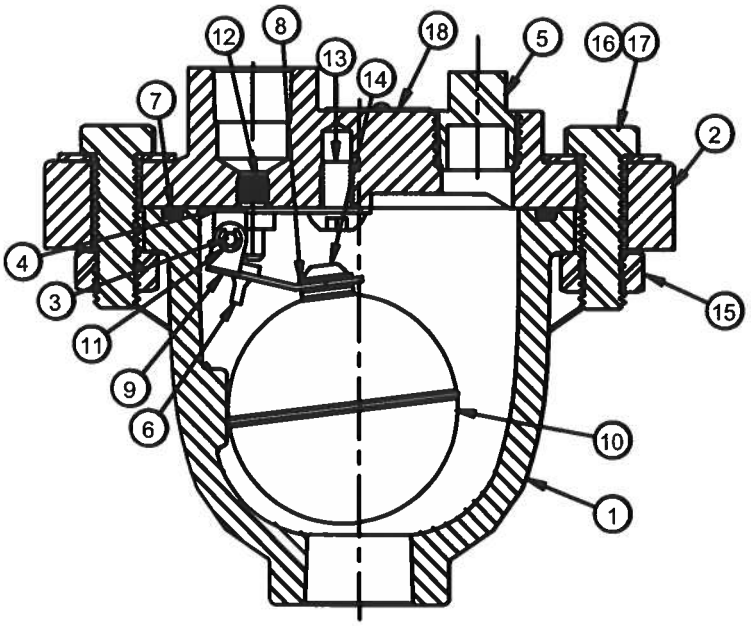
Installation must be performed by qualified, licensed personnel only.
Remove all plastic protection plugs that are covering inlet and outlet threads.
The Flomatic Miniair® should only be installed in a vertical position *ONLY* with inlet down at the high points in the system making sure that the inlet piping is at an angle that will not allow debris to obstruct the inlet. A shut-off valve should be installed below of the Miniair® so the valve can be isolated from system pressure if servicing is required.

Make sure there is sufficient room around the valve so maintenance using the optional backflush attachments is possible. Valve must be supported properly, must have freeze protection, and adequate drainage as there is fluid discharge when the valve is closing.

Valve Construction:

Flomatic Miniair® valves have a Ductile Iron cover and body, all internal components are stainless steel, with the exception of the rubber orifice button (#6) and O-ring (#7).

1	Body
2	Cover
3	Hinge Pin
4	Lever Frame
5	Pipe Plug
6	Orifice Button
7	O-Ring
8	Tooth Lock Washer
9	Float Arm
10	Float
11	Retaining Ring
12	Orifice
13	Screw
14	Screw
15	Nut
16	Bolt
17	Washer
18	Tag



Maintenance:

The Flomatic Miniair® requires no schedule maintain, but should be inspected & tested periodically. A drain valve should be installed where the lower plug is located for ease of flushing, testing and draining.

Testing:

1. Make sure the valve is isolated from the system, by closing the shut-off valve.
2. Install a drain valve where the bottom drain plug is located.
3. Open the shut-off valve.
4. Slow open the drain valve until flow can be heard. If water is released the valve is working properly, if air is released the valve should be tested further (follow steps below).
5. Close the shut-off valve.
6. Open the drain valve to allow fluid to drain (if it is hard to get the valve to drain see trouble shooting guide) & then close the drain valve.
7. Slowly open the shut-off valve to fill the valve.
8. Note the actions of the valve as it closes, if leakage take place see the trouble shooting guide.

Disassembly / Reassembly:

The Flomatic Miniair® can be disassembled without removing it from the line. No special tools are required.

1. Close shut-off valve on the inlet, or shut system down. Be sure the system pressure is relieved.
2. Remove the cover bolts (#16), washers (#17) & nuts (#15)
3. Remove the cover (#2), (float assembly is attached to the cover and may be removed for ease of inspection).
4. Clean and inspect all parts.
5. Replace any parts that exhibited wear or damage.
6. Re-attach float assembly (if removed) to cover.
7. Re-attach the cover (#2) to valve (#1) – do not over torque the bolts.
8. Place valve back in service.

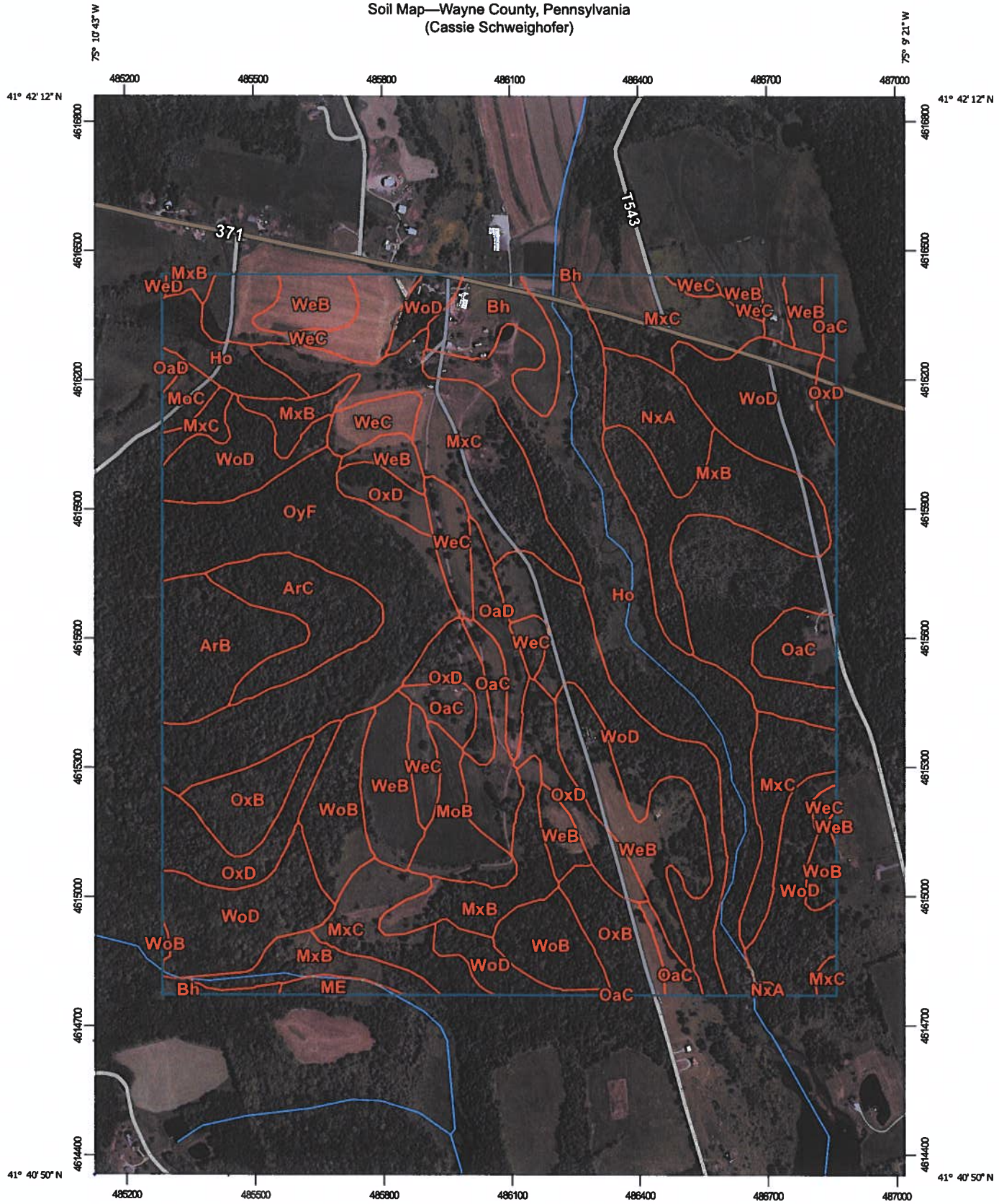
Trouble Shooting Guide	
Problem:	Possible Solutions:
Valve drains hard while testing / doesn't drain properly	Orifice may be plugged – disassemble valve and flush debris from orifice.
Leaking at inlet connection	Tighten valve connection. If valve still leaks remove valve from system and re-attach with new Teflon® tape or liquid Teflon®.
Leaking around the cover	Tighten bolts – max. 20 ft/lbs Do Not Over Torque
Leaks when closed	Flush valve to remove debris. If valves still leaks disassemble valve, inspect and replace used or wore parts. Rubber should be replaced if wore or every 5 years.
Orifice not venting air	Make sure the operating pressure is not exceeded. If not disassemble valve, inspect and replace used or wore parts.

Information needed to order repair parts:

Valve Model Number
Valve Size
Valve working Pressure

Limited One Year Warranty: Flomatic valves are guaranteed against defects of material or workmanship when used for the services recommended. If, in any recommended service a defect develops due to material or workmanship, and the device is returned, freight prepaid, to Flomatic Corporation within 12 months from date of purchase, it will be repaired or replaced free of charge. Flomatic Corporations' liability shall be limited to our agreement to repair or replacement of valve only.

Soil Map—Wayne County, Pennsylvania
(Cassie Schweighofer)



Map Scale: 1:12,200 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Wayne County, Pennsylvania
Survey Area Data: Version 18, Sep 6, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 21, 2022—Jun 5, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ArB	Arnot channery loam, 3 to 8 percent slopes, very rocky	18.2	2.8%
ArC	Arnot channery loam, 8 to 15 percent slopes, very rocky	16.3	2.5%
Bh	Basher silt loam	13.6	2.1%
Ho	Holly silt loam	74.1	11.3%
ME	Medihemists and Medifibrists	2.3	0.4%
MoB	Morris channery loam, 3 to 8 percent slopes	9.9	1.5%
MoC	Morris channery loam, 8 to 15 percent slopes	3.1	0.5%
MxB	Morris channery loam, 0 to 8 percent slopes, rubbly	50.1	7.7%
MxC	Morris channery loam, 8 to 15 percent slopes, rubbly	73.3	11.2%
NxA	Norwich and Chippewa channery silt loams, 0 to 3 percent slopes, rubbly	12.8	2.0%
OaC	Oquaga channery loam, 8 to 15 percent slopes	24.0	3.7%
OaD	Oquaga channery loam, 15 to 25 percent slopes	7.2	1.1%
OxB	Oquaga channery loam, 3 to 8 percent slopes, rubbly	19.9	3.0%
OxD	Oquaga channery loam, 8 to 25 percent slopes, rubbly	34.0	5.2%
OyF	Oquaga and Lordstown extremely stony loams, 25 to 70 percent slopes	56.0	8.6%
WeB	Wellsboro channery loam, 3 to 8 percent slopes	49.9	7.6%
WeC	Wellsboro channery loam, 8 to 15 percent slopes	34.1	5.2%
WeD	Wellsboro channery loam, 15 to 25 percent slopes	0.1	0.0%
WoB	Wellsboro channery loam, 3 to 8 percent slopes, rubbly	24.1	3.7%
WoD	Wellsboro channery loam, 8 to 25 percent slopes, rubbly	131.2	20.1%
Totals for Area of Interest		**654.2**	**100.0%**

Wayne County, Pennsylvania

MxB—Morris channery loam, 0 to 8 percent slopes, rubbly

Map Unit Setting

National map unit symbol: 2vxdq
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Morris, rubbly, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Morris, Rubbly

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 5 inches: channery loam
Bw - 5 to 12 inches: channery loam
Eg - 12 to 16 inches: channery loam
Bx - 16 to 60 inches: channery loam
C - 60 to 72 inches: channery loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 20.0 percent
Depth to restrictive feature: 10 to 22 inches to fragipan
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F140XY024NY - Moist Dense Till
Hydric soil rating: No

Minor Components

Norwich, rubbly

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Wellsboro, rubbly

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, head slope, side slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Wayne County, Pennsylvania
Survey Area Data: Version 18, Sep 6, 2022

Wayne County, Pennsylvania

OaC—Oquaga channery loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2wznj
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Oquaga and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oquaga

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Mountainflank, nose slope, crest
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Reddish loamy till derived from sandstone, siltstone, and shale

Typical profile

Ap - 0 to 7 inches: channery loam
Bw1 - 7 to 15 inches: very channery loam
Bw2 - 15 to 24 inches: very channery loam
C - 24 to 30 inches: extremely channery loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F140XY027NY - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Arnot, very stony

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Mountainflank, mountaintop, interfluve, crest
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Wellsboro

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Cadosia, very stony

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Wayne County, Pennsylvania
Survey Area Data: Version 18, Sep 6, 2022

Wayne County, Pennsylvania

OaD—Oquaga channery loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2wznl
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Oquaga and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oquaga

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Reddish loamy till derived from sandstone, siltstone, and shale

Typical profile

Ap - 0 to 7 inches: channery loam
Bw1 - 7 to 15 inches: very channery loam
Bw2 - 15 to 24 inches: very channery loam
C - 24 to 30 inches: extremely channery loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F140XY027NY - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Cadosia, very stony

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Wellsboro

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Arnot, very stony

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, mountaintop, nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Wayne County, Pennsylvania
Survey Area Data: Version 18, Sep 6, 2022

Wayne County, Pennsylvania

OxD—Oquaga channery loam, 8 to 25 percent slopes, rubbly

Map Unit Setting

National map unit symbol: 2wznw
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Oquaga, rubbly, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oquaga, Rubbly

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Mountainflank, nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Reddish loamy till derived from sandstone and shale

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 5 inches: channery highly organic loam
Bw1 - 5 to 15 inches: very channery loam
Bw2 - 15 to 24 inches: very channery loam
C - 24 to 30 inches: extremely channery loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 8 to 25 percent
Surface area covered with cobbles, stones or boulders: 20.0 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F140XY027NY - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Wellsboro, extremely stony

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Cadosia, extremely stony

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Arnot, extremely stony

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Mountainflank, mountaintop, nose slope, crest
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Rock outcrop

Percent of map unit: 0 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Wayne County, Pennsylvania
Survey Area Data: Version 18, Sep 6, 2022

Wayne County, Pennsylvania

WeB—Wellsboro channery loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2vcl2
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Wellsboro and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wellsboro

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

Ap - 0 to 8 inches: channery loam
Bw - 8 to 22 inches: channery loam
Bx - 22 to 55 inches: channery loam
C - 55 to 72 inches: very channery loam

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 14 to 30 inches to fragipan
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: D
Ecological site: F140XY024NY - Moist Dense Till

Hydric soil rating: No

Minor Components

Lackawanna

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Morris

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Oquaga

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Mountainflank, nose slope, crest
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Wayne County, Pennsylvania
Survey Area Data: Version 18, Sep 6, 2022

Wayne County, Pennsylvania

WeC—Wellsboro channery loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2vcl3
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Wellsboro and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wellsboro

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy till from reddish sandstone, siltstone, and shale

Typical profile

Ap - 0 to 8 inches: channery loam
Bw - 8 to 22 inches: channery loam
Bx - 22 to 55 inches: channery loam
C - 55 to 72 inches: very channery loam

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 14 to 30 inches to fragipan
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: F140XY024NY - Moist Dense Till

Hydric soil rating: No

Minor Components

Lackawanna

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Morris

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Wayne County, Pennsylvania
Survey Area Data: Version 18, Sep 6, 2022

E&S Requirements

1. It is the responsibility of the contractor to comply with the provisions of PA Code Title 25, Chapter 102 before performing any construction. All construction permits are the responsibility of the landowner and their contractor.

2. Install straw bale barrier, silt fence, or silt sock on the contour at base of slope below the construction area, prior to construction.

3. Divert surface water from upslope of the construction site by installing a temporary diversion and minimize the disturbed area.

4. Upon completion of construction, all disturbed areas must be seeded and mulched according to NRCS construction specification PA-342 available at the local NRCS Field Office or online at https://efotg.sc.egov.usda.gov/ . Or the PSU agronomy guide seeding recommendations shall be followed.

5. Regrade and establish permanent seeding on all disturbed areas as soon as practical after completion of the job.

USDA

United States Department of Agriculture

QUALITY ASSURANCE PLAN

Landowner/Operator: _____ Location: _____

Job Description: Water System Engineering Job Class: _____

Primary QA Inspector: _____ Designer: _____

The items listed below are the critical items for inspection as determined by the designer of the project to assure quality workmanship is performed and the intent of the design is met. This is not a complete list, but shows the minimum required to assure that the work meets FOTG standards and specifications. Items listed below can be checked intermittently during construction, no pipelines can be backfilled without being checked by the inspector.

- Excavation – follow all safety regulations as per OSHA, Minimum pipeline bury depth is 3ft
- Confirm contractor has completed PA One Call
- Check pipeline size and conformance to ASTM number listed on design prior to backfilling trench
- Confirm pressure switch settings match design
- Confirm pressure tank has a minimum draw down to allow for pump to run for at least 1 minute, aquire model data
- Acquire pump curve and data, pump supplier shall size pump accordingly
- Check pipeline fittings to ensure double clamps are used and all connections are brass for PE pipe
- Check to ensure that no high spots are located along the pipeline unless a hydrant or air vent is installed
- Confirm pipelines are pressure tested prior to backfilling
- Check backfill material and conformance to compaction requirements
- Check hydrant depth and installation for conformance to construction drawings
- Check gravel HUA around permanent troughs, stone depth and gradation shall meet requirements of design
- Other items: _____

Daily construction activity shall be documented on the SCS-CPA-6 sheets. As-builts must be completed prior to certification of the job, these shall be in red pen and shall include the inspector's initials and date. No changes or modifications are allowed to this design without approval from the designer.

The undersigned agree to commit time to act as the quality assurance inspector on this job. It is the primary inspector's responsibility to provide continued inspection of this job, if unavailable they shall be responsible for assigning a backup inspector.

Primary Inspector: _____ Date: _____

Inspector's Supervisor: _____ Date: _____

OPERATION AND MAINTENANCE
LIVESTOCK PIPELINE
CODE 516

Landowner/Operator_____

County_____ Farm/Tract No._____

Field Office Phone Number: _____

Prepared By:_____ Date:_____

Inspections and maintenance are required to achieve the intended function, benefits, and life of the practice. The landowner/operator is responsible to establish and implement an inspection and maintenance program. Items to inspect and maintain during the 10-year design life of the practice include, but are not limited to, the following:

1. Inspect after significant storm events and at least annually to identify repair and maintenance needs.
2. Inspect the entire length of the pipeline system for signs of erosion and pipe settlement. This is particularly important for the first two or three years after installation.
3. Open/close valves in a manner that prevents excessive water hammer.
4. Fill at the specified rate requirements to remove entrapped air and prevent water hammer surges. Appurtenances, such as a flow meter or other means (e.g., number of turns of a gate valve) should be used to determine the rate of flow into the pipeline. If filling at a slow flow rate is not possible, the system shall be open to the atmosphere (outlets open) prior to pressurizing.
5. Inspect and test pipeline, valves, pressure regulators, pumps, switches and other appurtenances.
6. Check and assure proper operation of any backflow protection devices.
7. Check for debris, minerals, algae and other materials which may restrict system flow.
8. Drain and/or provide for cold weather operation of the system.
9. Promptly repair or replace damaged or inoperable components.
10. Perform routine maintenance of all mechanical components in accordance with the manufacturer's recommendations.
11. Prior to retrofitting any electrically powered equipment, electrical service must be disconnected and the absence of stray electrical current verified.
12. Protect the components from damage by farm equipment and livestock.
13. Maintain erosion protection at outlets.
14. Repair any settlement or erosion that occurs around the pipe with soil and reseed as needed. If this problem persists, evaluate the pipe for leakage and erosion of the fill material into or along the pipe.

OPERATION AND MAINTENANCE
PUMPING PLANT
CODE 533

Landowner/Operator_____

County_____ Farm/Tract No._____

Field Office Phone Number:

_____

_____

Prepared By_____ Date

This Operation and Maintenance, O&M Plan cites normal, repetitive activities that apply to the conservation practice and the plan lists inspection, repair and upkeep items which are required to achieve the intended function, benefits, and life of the conservation practice. The landowner/operator is responsible for establishing and implementing this plan. Items to inspect and maintain during the 15-year design life of the practice include, but are not limited to the following.

1. Inspect the pump, power units, switches, controls, and pressure tank after significant storm events and at least annually to identify repair and maintenance needs.
2. Proper start-up procedures for the operation of the pumping plant shall be in accordance with the manufacturer's recommendations.
3. When applicable, the power unit, fuel storage facilities and fuel lines should be frequently checked for fuel or lubricant leaks and repaired as needed.
4. Periodic checks and removal of debris as necessary from trash racks and structures to assure adequate capacity reaches the pumping plant.
5. Periodic removal of sediment in suction bays to maintain design capacity and efficiency. Inspect and maintain anti-siphon devices, if applicable.
6. Routinely test and inspect all automation components of the pumping plant to assure they are functioning as designed.
7. Inspect and maintain secondary containment facilities, if applicable.
8. Periodic inspection of all safety features to ensure they are in place and functional.
9. Prior to retrofitting any electrically powered equipment, electrical service must be disconnected and the absence of stray electrical current verified.

Special Considerations: _____

_____

OPERATION AND MAINTENANCE
WATERING FACILITY
CODE 614

Landowner/Operator

_____

County_____Farm/Tract No. _____

Field Office Phone Number: _____

Prepared By_____ Date_____

This Operation and Maintenance, O&M Plan cites normal, repetitive activities that apply to the conservation practice and the plan lists inspection, repair and upkeep items which are required to achieve the intended function, benefits, and life of the conservation practice. The landowner/operator is responsible for establishing and implementing this plan. Items to inspect and maintain during the 20-year design life of the practice include, but are not limited to the following.

1. Inspect the watering facility seasonally to identify repair and maintenance needs.
2. Check for debris, algae, sludge, or other materials in the troughs or bowls which may restrict the inflow or outflow system.
3. Check for leaks and repair immediately if any leaks are found.
4. Check the automatic water level device to insure proper operations.
5. Check to ensure that adjacent areas are well protected against erosion.
6. Check to ensure the outlet pipe is freely operating and not causing erosion problems.
7. Maintain the manufacturers recommended stocking rate for fountains, troughs, and waterers operated in freezing weather. Add supplemental heaters, or break up ice in stock tanks operated in freezing weather. Drain all watering facilities and supply pipelines not being used during freezing weather.

Special Considerations: _____

_____

USDA
United States Department of Agriculture

Fact Sheet #9

January 2016

Agriculture Construction Safety

Compliance with safety regulations on agricultural projects is required by OSHA and by all construction insurance/ liability companies. The contractor is to maintain a safe working environment for themselves, their employees, subcontractors, and others who must have access to the site. Detailed knowledge and implementation of safety regulations is their responsibility. Those with more than ten employees must have written safety procedures and document implementation.

Imminent danger situations (hazards that could cause death or serious physical harm) require immediate action, including work stoppage. When NRCS and/or partner personnel observe or become aware of an imminent danger on the work site they will alert the contractor and landowner. They will also advise the landowner that funding and/or technical assistance will be withdrawn if the situation is not corrected. Work may continue after the imminent danger is resolved.

Effective January 1, 2015, all employers must report work-related fatalities, hospitalizations, amputations, and losses of an eye. They can contact the 24-hour OSHA hotline at 1-800-321-OSHA (6742) or their regional OSHA office. See OSHA standards 29 CFR 1904.39 for more information.

Soil Cave-In Protection

- Applies to all excavation over five feet in depth.
- OSHA has regulations set forth in Standards 29 CFR 1926 -Subpart P.
- Options include: sloping, shoring, or working from a safe distance.
- See "Fact Sheet" – SOIL CAVE IN – A FATAL SLIP for general information.

Fall Protection

- This applies to all areas where an individual could fall six feet or more.
- OSHA regulations in 29 CFR Parts 1910 for General Industry and 1926 for the Construction Industry apply to agricultural construction.
- OSHA 29 CFR 1926 subpart L deals with scaffolds and 29 CFR 1926 Subpart M deals with overall fall protection, including but not limited to cast-in-place concrete work, leading edge work, pre-cast concrete erection, tying reinforcement steel, truss installation, and roof construction.
- Options include: warning line system, safety monitors, mechanical equipment, controlled access area, covers, safety nets, scaffolding, guardrail system, and personal fall arrest.
- Selected method(s) shall be implemented at the start of construction.

Underground and Overhead Utility Protection

- Contractor is required to do their own utility check via PA-ONE Call system (811).
- Landowner and/or contractor shall contact any overhead utilities and prepare a procedure to avoid contact and/or schedule work with utility oversight.
- Landowner is to mark and locate any known private buried utilities within the work area.

NOTE: Critical safety measures may be highlighted in the Project Drawings and Specifications.

Fact Sheet

SOIL CAVE IN-A FATAL SLIP

United States Department of Agriculture

Natural Resources Conservation Service

Cause of Cave Ins

Cave ins in pits and ditches cause the death of construction workers every year. Most deaths have occurred in trenches dug for utility lines. However, soil slippage can occur anywhere soil is excavated. Landslides in clay soils kill more people each year than those in sandy soils.

Most workers are careful around sand because they know it moves easily. However, many believe a thick, tough clay soil will not slip. Yet, most clay soils shrink and crack open when dry and swell when wet. This shrinkage and swelling cause slick areas to develop beneath the surface.

Some clay soils contain water-tight layers called fragipans. Water accumulating on the impervious layer lubricates the soil, increasing the probability of slippage. When a ditch or pit is dug in a soil with a fragipan or in a soil with a high shrink-swell potential, the soil will often slip, resulting in a dangerous cave in. This becomes even more likely WHEN THE SOIL IS WET.

Prevention

Occupational Safety and Health Administration (OSHA) regulations require protective action on all worker-occupied excavations unless the cut is made in stable rock, or the cut is less than five feet deep and there is no potential for a cave in to occur. Protection can be accomplished with sloping and benching, support systems, or shield systems which conform to OSHA regulations.

Sloping the sides of the excavation is the simplest protection against a cave in. If soil properties in the excavation are unknown, the excavation slopes should be no steeper than 1-1/2 horizontal to 1 vertical. If the soil can be classified as a Type A or Type B material according to the OSHA classification system (see back side), you can use a steeper slope, as shown in Figures 1 through 5.

Consult OSHA regulations when more than one soil type is exposed in an excavated slope, or when benched slopes are used. The regulations also provide details on support and shield requirements. Complete requirements are found in OSHA's safety and health standards (29 CFR 1926, Subpart P).

Soils Information

Soil survey publications are available for most counties. This information is useful to engineers, builders, contractors and others interested in construction hazards. The publication identifies soils with fragipans and high shrink-swell potential. Other potential construction problems, such as water table, bedrock and corrosiveness, are also contained in the reports as well as information on engineering properties of soils.

Copies of soil survey reports and other soils information are available from the local office of the USDA, Natural Resources Conservation Service, or write Soils, USDA, Natural Resources Conservation Service, Suite 340, One Credit Union Place, Harrisburg, PA 17110-2993.

OSHA Soils Classification for Excavated Slopes

Type A means cohesive soils with an unconfined compressive strength of 1.5 ton per square foot (tsf) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as hardpan are also considered Type A. However, no soil is Type A if:

(i) The soil is fissured; or
(ii) The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or
(iii) The soil has been previously disturbed; or
(iv) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of 4H:1V or greater; or
(v) The material is subject to other factors that would require it to be classified as a less stable material.

Type B means:

(i) Cohesive soil with an unconfined compressive strength greater than 0.5 tsf but less than 1.5 tsf; or
(ii) Granular, cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam; or
(iii) Previously disturbed soils except those which would otherwise be classed as Type C soil; or
(iv) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or
(v) Dry rock that is not stable; or
(vi) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than 4H:1V, but only if the material would otherwise be classified as Type B.

Type C means:

(i) Cohesive soil with an unconfined compressive strength of 0.5 tsf or less; or
(ii) Granular soils including gravel, sand, and loamy sand; or
(iii) Submerged soil or soil from which water is freely seeping; or
(iv) Submerged rock that is not stable; or
(v) Material in a sloped, layered system where the layers dip into the excavation ona slope of four 4H:1V or steeper.

MAXIMUM ALLOWABLE SLOPES

Figure 1. Type A Soil
Simple Slope, General

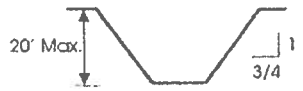


Figure 2. Type A Soil
Simple Slope, Short Term

Figure 3. Type A Soil
Unsupported, Vertically Sided Lower Portion, Maximum 8 Feet in Depth

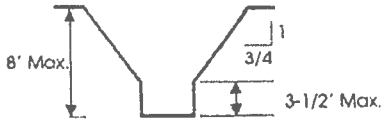
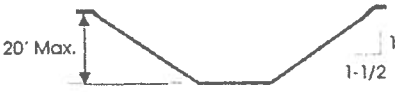


Figure 4. Type A Soil
Unsupported, Vertically Sided Lower Portion, Maximum 12 Feet

Figure 5. Type B Soil
Simple Slope

Figure 6. Type C Soil
Simple Slope



Natural Resources Conservation Service
Practice Specification
Livestock Pipeline (Code 516)

1. SCOPE

The work shall consist of furnishing materials and installing all components of a pipeline, as outlined in this specification and the drawings.

2. MATERIALS

All materials used shall conform to the quality and grade noted on the plans, set forth in Section 5, or as otherwise listed below:

PIPE

If the plastic pipe is stored on site, it should be protected from sunlight.

Pipe and fittings shall meet the requirements of one of the following types and standards, or as described in NRCS NEH Part 636 Chapter 52, or as otherwise set forth in Section 5 or on the drawings.

1. Steel Pipe. AWWA standard C200; ASTM standards A53, A134, A135 and A139, A858, and A865.
2. Ductile Iron. AWWA standard C600; and ASTM standard A746.
3. Aluminum (Tubing). ASTM standards B210, B241, and B313; ANSI standards H35.1 and H35.2.
4. Corrugated Metal. ASTM standards A760 and B745; AASHTO standards M36, M196, and M245. Pipe bands or couplers shall meet the requirements of the applicable pipe specification, except that channel bands (for use with flanged pipe), smooth or flat bands, nor dimple bands shall be allowed.
5. Polyvinyl chloride (PVC). ASTM standards D1784, D1785, D2241, D2466, F794, D2774; AASHTO standard M304; AWWA standards C900 or C905; and ASABE/ANSI standard S376.
6. Acrylonitrile-butadiene-styrene (ABS). ASTM standards D1527, D2282, and D3965.
7. Polyethylene (PE; commonly referred to as PE or HDPE, the primary difference being product density). ASTM standards D3350, F714, D2104, D2239, D2447, D2513, D2737, D3035, F405, F667, F771, F894, and D2774; AASHTO standard M294; AWWA standards C901 and C906; and ASABE/ANSI standard S376.

Pipe shall be marked as directed by the applicable reference standard(s) but shall have at a minimum: nominal pipe size, pipe material, dimensioning system (IPS, NPS, Sch, etc.), thickness (pressure rating or substitute designation from which the pressure rating can be obtained), and manufacture's name or trademark.

Unless otherwise set forth in Section 5, pipe and fittings shall have a protective coating applied and shall conform to one of the following specifications, as applicable:

AWWA C104, AWWA C116, AWWA C203, AWWA C203, AWWA C209, AWWA C210, AWWA C213, AWWA C214, AWWA C218, ASTM A53, ASTM A123/A 123M, or ASTM A153/A

All joints and connections shall be constructed to withstand the design working pressure for the pipeline without leakage and shall leave the inside of the pipeline free of any obstruction which could reduce the pipe capacity below design requirements.

All fittings, such as couplers, reducers, bends, tees and endives shall be made of material that is recommended for use with the type of pipe specified and shall be installed in accordance with the recommendations of the pipe manufacturer.

Joints and connections for steel pipe shall meet the following requirements:

- Field joints shall be installed according to the manufacturer's recommendations. On buried pipelines, high-resistance joints between pipe lengths shall be electrically bridged with a welded, brazed, or soldered copper wire. If coated pipe is field welded, care shall be taken to avoid burning the protective coating. After joints are welded, they shall be covered with a coating equal in quality to that specified for the pipe and hardware.

Plastic pressure pipe fittings shall conform to the following ASTM specifications, as applicable: D 2464, D 2466, D 2467, D 2468, D 2609, D 2672, D 2683, D 3139, or D 3261

Solvents for solvent-welded plastic pipe joints shall conform to the following ASTM specifications, as applicable: D 2235, D 2564, or D 2855

Rubber gaskets for pipe joints shall conform to the requirements of ASTM F477.

VALVES AND OTHER APPURTENANCES

The pipeline valves and appurtenances shall be of the size, type, material and pressure rating as shown on the drawings. If not specified in the design, pressure ratings shall equal or exceed that of the pipe.

Pressure relief valves shall be stamped with the pressure at which the valve starts to open. Adjustable valves shall be sealed or otherwise altered to ensure that the setting marked on the valve is not changed.

All other appurtenances, such as valve housings, shall be made of non-corrosive material and shall be according to manufacturer's recommendations, Section 5 and/or the drawings.

CONCRETE

Concrete used for thrust blocks shall have a minimum compressive strength, at 28 days, of 3000 psi. If the supplier cannot show evidence that a mix will meet strength requirements, a mix with a maximum net water content of seven gallons per bag (94 lbs.) of cement, and a minimum cement content of five and a half (5.5) bags per cubic yard of concrete, may be used

3. PIPE INSTALLATION

Pipelines shall be placed so that they are protected against hazards imposed by traffic, livestock, farm operations, freezing temperatures, or soil cracking. Other means of protection must be provided if the depth required for protection is impracticable because of shallow soils over rock or for other reasons. Abrupt changes in grade must be avoided to prevent rupture of the pipe. All special pipe installation requirements of the pipe manufacturer shall be followed.

Upon pipeline completion, pipeline shall be flushed to ensure that air vents properly operate, and airlocks do not occur.

ABOVE GROUND INSTALLATIONS

For suspension installations the pipe supports (saddle, rack, stand, hanger, etc.) shall meet design specifications and manufacturer or industry recommendations. Unless otherwise specified on the drawings, pipe shall (1) be supported a minimum of one foot above the ground, (2) have two layers of felt strips placed between the pipe and the support, and (3) have graphite lubricant placed between the pipe and the felt strip. Treated wood shall be used for timber supports.

Unless otherwise specified on the drawings, above ground pipelines with restrained joints (e.g., welded steel or banded CMP) shall have: (1) expansion couplers installed at a spacing not to exceed 400 feet, (2) a maximum distance between a coupler and a fixed or anchored location of 200 feet, and (3) couplers that provide for a minimum of 4 inches of travel distance.

For installations designed for laying the pipe across naturally occurring terrain, the pipe shall be firmly and uniformly bedded throughout its entire length. For corrugated metal pipe the bedding shall facilitate pipe installation so that at least the bottom 25% of the pipe circumference shall be in contact with the pipe.

Unless otherwise specified on the design, bedding material shall be imported if the ground surface will result in point loads or unacceptable abrasion on the pipe (e.g., bedrock or rock outcrops). Blocking or mounding shall not be used to bring the pipe up to final grade. Unless otherwise specified on the drawings, supports/saddles specifications as described above shall be followed.

The pipe shall not be handled in a manner to cause damage to the pipe and its coating. The pipe shall not be rolled or dragged on the ground. The pipe shall be placed onto above ground supports by the use of canvas slings or padded cables. Individual joints of pipe shall be inspected, and any damaged pipe shall be removed and replaced.

UNDERGROUND INSTALLATIONS

a. Trench Construction

Trench depth and depth of cover shall be as specified on the drawings.

Trench width at any point below the top of the pipe should be only wide enough to permit the pipe to be easily placed and joined and to allow the initial backfill to be safely and properly placed and compacted. The minimum trench width is dependent on backfill

placing and compacting equipment, but for typical manual installation clearance on either side of the pipe shall be 9 inches unless the trench is precision excavated with a semicircular bottom that closely fits the pipe. In that case, the minimum clearance on either side of the pipe shall be 6 inches. The maximum trench width shall be no greater than the minimum required by backfill placing and compacting equipment, but for typical manual installation shall be 30 inches greater than the outside diameter of the pipe (i.e., maximum clearance between the pipe and trench wall shall be 15 inches).

Trenches more than 5 feet deep shall be shored, sloped, or benched to provide safe and stable trench walls. Unless otherwise specified on the drawings, trenches shall be constructed according to Figures 1 through 5; or as provided in OSHA Construction Safety Regulations, Subpart P, Excavations, Appendix B – Sloping and Benching.

Where rock, hardpan, cobbles or other hard material which might prevent the pipe from being uniformly supported is encountered in the bottom of the trench, the trench shall be undercut a minimum of four inches below final grade. The trench shall then be brought back to grade with appropriate backfill material placed and compacted to provide proper bedding.

More than one pipe may be placed in a common trench. In such cases with typical manual installation the minimum and maximum clearances shall apply, and the minimum distance between pipes shall be 12 inches to facilitate safe and proper backfill installation.

b. Bedding

The pipe shall be firmly and uniformly bedded throughout its entire length. Bedding material, if necessary, shall be placed and spread in uniform layers and in such a manner as to fill the trench so there are no unfilled spaces (air pockets) below the pipe. For pipe with bell joints, holes shall be dug in the bedding at the bells to permit the body of the pipe to be in contact with the bedding along its entire length. Blocking or mounding shall not be used to bring the pipe up to final grade.

The pipe shall not be dropped into the trench or handled in a manner to cause damage. PVC pipe shall not be handled when the temperature is less than 20°F or greater than 100°F. PE pipe shall not be handled when the temperature is less than 10°F or greater than 110°F. The pipe shall be allowed to come within a few degrees of the temperature it will have after it is completely backfilled before placing fill other than that needed for shading or before connecting the pipe to other facilities. Individual joints of pipe shall be inspected, and any damaged pipe shall be removed and replaced.

Thrust blocks shall be formed against a solid trench wall. They shall be of the minimum size and materials as specified on the drawings.

The thrust block cavity shall be in undisturbed soil or previously placed compacted backfill that yields an acceptable allowable bearing pressure. The cavity shall be formed with soil or wood to hold the freshly placed concrete without displacement until an initial set has occurred.

When excavation beyond the designated trench widths and depths, as shown on the drawings or specified in Section 5 of this specification, occurs at locations where installation of concrete thrust blocks is required, the contractor shall install an alternative thrust block provision.

The concrete thrust block shall have a thickness, length, and depth as shown on the drawings or specified in Section 5. Backfill shall be placed on all sides of the thrust block and to the sides of the excavation.

c. Backfill

Initial Backfill. Unless otherwise specified in the design solid wall pipe 18 inches nominal diameter or less the initial backfill material may be fine grained soil. This may be the on-site trench excavated materials as long as any unsuitable materials are removed; it must be free of rocks, gravels, frozen materials larger than 1 inch or earth clods greater than 2 inch in diameter. Unless otherwise specified in the design, for solid wall pipe greater than 18 inches nominal diameter and corrugated, ribbed, or profile wall pipe, the initial backfill material shall be angular 1 to ¼ inch size crush stone with a maximum of 10 percent cohesive fines or sand and gravels (Soil types GW, GP, SW, and SP) with a maximum particle size of 1 inch containing a maximum of 12 percent of non-cohesive fines. Sands shall have a maximum of 45 percent passing the # 40 sieve.

Unless otherwise specified in the design, initial backfill shall be placed in lifts no greater than 8 inches deep before being compacted. For typical manual installation, each lift shall be worked to eliminate any unfilled spaces and compacted with appropriate tamping equipment and significant effort. When backfilling is done by mechanical means the initial fill shall first be worked to eliminate any voids.

The initial backfill materials shall be placed in a manner so as not to displace, deform or damage the pipe.

When water packing is used, the pipe shall be filled with water. The initial backfill, before wetting, shall be of sufficient depth to ensure complete coverage of the pipe with backfill after consolidation has taken place. Water packing shall be accomplished by adding water to diked reaches of the trench in such quantity as to thoroughly saturate the initial backfill. After the backfill is saturated, the fill shall be consolidated by rodding or with a vibrator. The wetted fill shall be allowed to dry until firm before completing the final backfill. The pipeline shall remain full of water until after the final backfill is placed.

Final Backfill. The final backfill material shall be free of rocks, frozen clods or other debris larger than 1inch in diameter within 6 inches of the pipe and 6 inches in particle size for the remaining portion of the final backfill unless otherwise specified in the design. The material shall be placed and spread in approximately uniform layers so there are no unfilled spaces in the backfill. Rolling equipment shall not be used until a minimum of 18 inches of compacted backfill material has been placed over the top of the pipe

Final backfill shall result in a finished trench surface that is smooth, slightly rounded so that the trench surface is higher than the surrounding ground, free of rocks greater in

size than the surrounding surface and has a clean and finished appearance.

Plastic pipelines may be placed by plow-in equipment if soils are suitable and rocks and boulders will not damage the pipe.

All disturbed areas shall be revegetated according to the recommendations for permanent seeding as stated in Conservation Practice Standard PA342, Critical Area Planting and/or the Pennsylvania Agronomy Guide.

4. BASIS OF ACCEPTANCE

The acceptability of the pipeline shall be determined by inspections to check compliance with all the provisions of this standard and specifications including the design of the line, the pipe, and pipe marking, the appurtenances, and the minimum installation requirements.

The pipeline shall be pressure tested for leaks. Before pressure testing, the joints of the assembled pipeline shall be allowed to set as recommended by the manufacturer and all concrete thrust blocks shall be in place and allowed to cure for a minimum of 3 days.

Pipeline shall be pressure tested by one of the following methods:

1. Before backfilling, fill the pipe with water and test at the design working head or at a minimum head of 10 ft., whichever is greater. All leaks must be repaired, and the test must be repeated before backfilling.
2. Pressure test at the working pressure for 2 hours. The allowable leakage shall not be greater than one gallon per diameter inch per mile. If the test exceeds this rate, the defect must be repaired until retests show that the leakage is within the allowable limits, but all visible leaks must be repaired.

If water is not available to complete a test, the installer shall provide a guarantee stating they will return and fix leaks that are found when the pipe is initially filled with water.

All materials shall conform to these minimum requirements and to the tests prescribed in the applicable ASTM Specification. If requested by the engineer, a qualified testing laboratory must certify with supporting test results that the pipe meets the requirements specified in this specification. The seal of approval of a recognized laboratory on pipe bearing the ASTM or AWWA designations may be accepted for this certification.

The installing contractor shall certify that the materials and installation comply with the requirements of these specifications. He shall furnish a written guarantee against defective workmanship and materials to cover a period of not less than one year. The installing contractor shall furnish a copy of the certification and guarantee, which will be made a part of the supporting records of the pipeline.

5. ADDITIONAL CONDITIONS WHICH APPLY TO THIS PROJECT ARE:

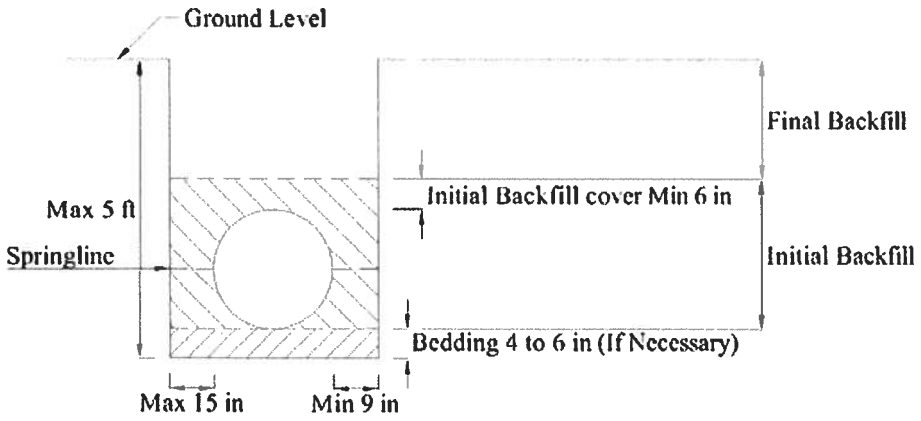


Figure 1. *Typical Trench with flat bottom, Manual Installation of Backfill*

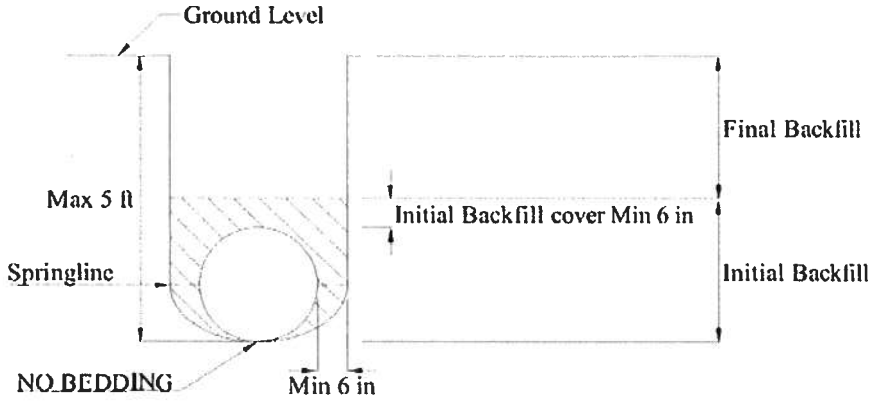


Figure 2. *Typical Trench with semi-circular bottom, Manual Installation of Backfill*

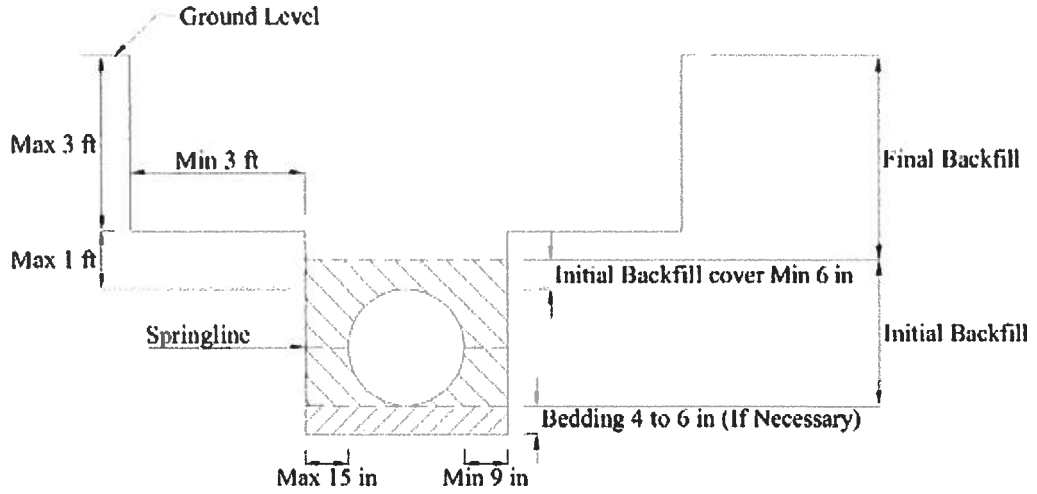


Figure 3. *Trench Depth 5 to 10 feet: Benching System.*

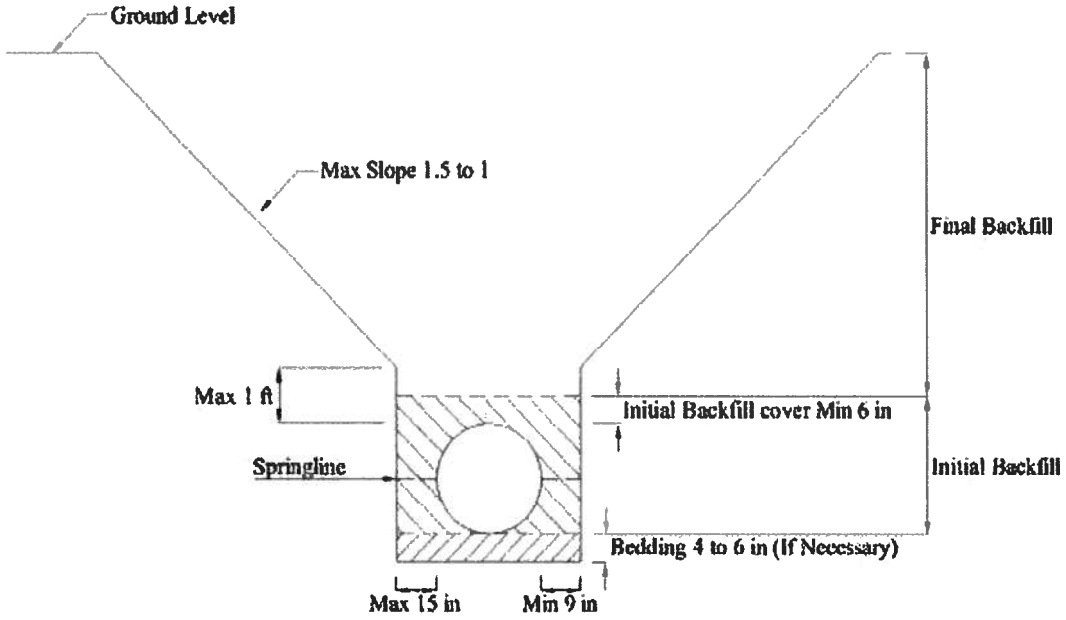


Figure 4. *Trench Depth 5 to 10 feet: Vertically-sided lower portion with sloped upper portion*

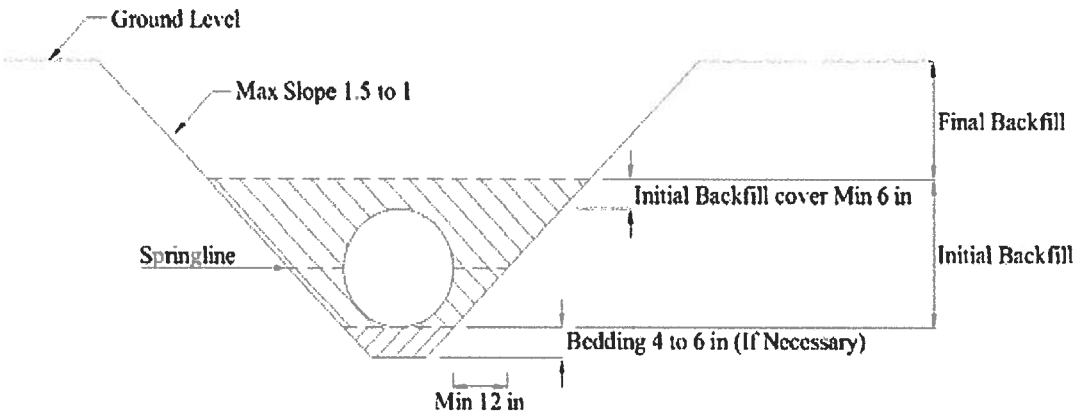


Figure 5. Trench Depth 5 to 12 feet: Sloped walls

USDA United States Department of Agriculture

Natural Resources Conservation Service
Practice Specification
Pumping Plant (Code 533)

1. SCOPE

The work shall consist of furnishing materials and installing all components of the pumping facility, as outlined in this specification and the drawings.

2. MATERIALS

All materials used shall conform to the size, type, etc. noted on the plans, set forth in Section 6, or as otherwise listed below:

1. PUMP:

   The pump shall meet the required capacity, pressure, and head requirements, as specified in Section 6 or on the drawings. Pumps shall be compatible and resistant to the type of water or manure being conveyed.

   The contractor shall be responsible for assessing the consistency, nature, quality and quantity of the substance to be pumped, and provide the appropriate equipment. The contractor shall provide in writing, or by performance tables provided by the manufacturer, the pumps performance characteristics (discharge, head, and pressure) and the relationship to or requirements of the following:
   a. Operating power requirements
   b. Estimated service life
   c. Maintenance requirements
   d. Efficiency

2. PIPE:

   Suction and Discharge pipe shall be chosen so that the type and class of pipe exceeds the systems pressure requirement. The operating pressure shall be specified in Section 6 or on the drawings, or as determined by the pump manufacturer. If the pipe is an integral part of another related planned practice or distribution system, the pipe type and class shall meet or exceed the requirements of the pipe installed in that planned system.

   Fittings shall be rated equal to the pipe being specified.

   The pipe and fittings, where applicable, shall be marked by the manufacturer as described in the applicable ASTM specification.

   Used pipe or seconds shall not be used. Pipe shall be approved by the engineer prior to installation.

3. CONTROLS:

   All check valves and directional control valves, gauges, quick disconnects, and automatic controls shall be durable and constructed with a rust resistant, non-corrosive, material able to withstand the type of water, or manure being pumped.

4. SUCTION AND DISCHARGE BAYS:

Suction and discharge bays shall be designed to conform to the hydraulic characteristics of the pump. They shall be to the dimension and capacity as specified in Section 6 or on the drawings.

Precast concrete units shall be in conformance with PennDOT specifications for such units and/or comply with ACI-525 and 533. All concrete units shall have a 28-day compressive strength of 4000psi., or greater, and all reinforcement bars shall be of grade 60 steel or higher, unless otherwise specified in Section 6 or on the drawings.

Portland cement shall be Type I, IA, II, or IIA and conform to ASTM-C150, unless otherwise set forth in Section 6. If Type I or II is used, an air-entrainment agent shall be used.

Concrete Aggregate shall meet the requirements and gradation specified in ASTM-C33. Coarse aggregate shall meet the gradation for size numbers 57 or 67.

Reinforcement bars shall conform to ASTM-A615, A616, or A617. Welded wire fabric reinforcement shall conform to ASTM-A185 or A497. Reinforcement shall be free from loose rust, oil, grease, curing compound, paint or other deleterious coatings.

All rock structures shall be of rock that is durable and resistant to weathering. The rock shall be of the type specified in Section 6 and shall be obtained from a source listed in the most current edition of PennDOT Bulletin #14. The gradation of the rock shall comply with the requirements set forth by the National Crushed Stone Association.

5. HOUSING AND ACCESSORIES:

Trash racks, housings, and other devices shall be installed as shown on the drawings provided to and concurred in by NRCS. All materials furnished and installed shall conform to the quality and grade noted on the drawings. A site-specific set of construction drawings shall be at the site during construction.

Wood shall be graded and stamped by an agency accredited by the American Lumber Standards Committee as meeting the required species, grade, and moisture content. All exposed or buried lumber shall be pressure treated. Pressure treated wood products shall be Douglas Fir, Southern Yellow Pine, or as otherwise specified in Section 6 or on the drawings. They shall be treated with preservatives in accordance with the American Wood Preservers Association (AWPA) Standard C16 for "wood used on Farms, Pressure Treatment". Non-CCA preservative pressure treated lumber shall be used where aquatic life is a concern.

Roofing material shall be corrugated 29 gage galvanized steel. Equivalent or better material maybe approved by the Engineer.

Sheet piling shall be of steel or vinyl type. The piling must be of the thickness and grade specified in Section 6, and as recommended by the manufacturer for the intended use. Suitable methods of installing and anchoring the piling shall be as listed in Section 6, and as recommended by the manufacturer.

3. SITE PREPARATION

All trees, brush, fences, and other debris shall be cleared so as not to interfere with construction or proper functioning of the Pumping Plant system. All material removed by the clearing and grubbing operation shall be disposed of as directed by the Owner or his/her Representative.

4. SAFETY

All positive responses from the Pennsylvania One Call System should be shown on the drawings and the Pennsylvania One Call serial number and date noted on the plans. It is the Contractor's or Landowner's responsibility to contact the affected utility for marking at the time of construction.

The Contractor must comply with OSHA requirements Part 1926, subpart P, for protection of workers entering trenches.

5. INSTALLATION

Pipelines shall be placed so that they are protected against hazards imposed by traffic, farm operation, freezing temperatures, or soil cracking. Other means of protection must be provided if the depth required for protection is impractical because of shallow soils over rock or for other reasons.

Trenches for pipeline shall be free of rocks and other sharp-edged materials. The pipe shall be carefully placed to prevent damage.

Before backfilling, the pipeline shall be pressure tested. To pressure test the pipe, fill the pipe with water and test at the design working head and pressure. All leaks must be repaired, and the test must be repeated before backfilling.

All backfilling shall be completed before the line is placed in service. The initial backfill shall be of selected material that is free of rocks or sharp-edged materials that can damage the pipe.

Deformation or displacement of the pipe must not occur during backfilling.

All seeding shall be in accordance with the Critical Area Planting Standard and Specifications (PA342).

6. ADDITIONAL CONDITIONS WHICH APPLY TO THIS PROJECT ARE:

Natural Resources Conservation Service
Practice Specification
Watering Facility (Code 614)

1. SCOPE

The work shall consist of furnishing materials and installing all components of the watering facility, as outlined in this specification and the drawings.

2. MATERIALS

All materials used shall conform to the size, quality and grade noted on the plans, set forth in Section 6, or as otherwise noted below.

a. Concrete and masonry

Precast concrete and masonry structures are acceptable when their design and construction have been reviewed and approved.

Precast units shall comply with ACI-318, Chapter 16 and ACI-533.

Masonry components shall meet the requirements of ASTM-C90 & C270, and placed in accordance with ACI-530.

Concrete shall have a minimum compressive strength, at 28 days, of 4,000 psi. If the supplier cannot show evidence that a mix will meet strength requirements, a mix with a maximum net water content of seven gallons per bag (94#) of cement and a minimum cement content of six bags per cubic yard of concrete, may be used. Coarse Aggregates shall be #57 or #67 for ready-mix and hand- mixed concrete. Hand-mixed concrete shall be mixed at a ratio of 1-part cement, 2-parts sand, and 3-parts coarse aggregate. Pre-bagged concrete mix will be mixed according to the manufacturer's recommendation.

Mixing water will be clean and free of substances that would affect the strength or durability of the concrete.

Concrete shall be mixed to a consistency that will allow proper consolidation; i.e., slump between 3" and 6"

b. Metal

Steel tanks shall have a minimum thickness of 20 gauge. The steel shall be galvanized for protection from deterioration.

c. Wood

Wood products used for anchoring or protection measures shall be graded and stamped by an agency accredited by the American Lumber Standards Committee as meeting the required species, grade, and moisture content. Pressure treated wood products shall be Douglas Fir, Southern Yellow Pine, or as otherwise specified in Section 6 or on the drawings. They shall be treated with preservatives in accordance with the American Wood Preservers Association (AWPA) Standard UI as it relates to farm applications. In the absence of a stamp of quality, the contractor or material supplier shall provide written certification that the wood meets the designated quality criteria.

d. Rubber

Rubber tires, used for troughs, shall be free of holes or deep abrasions. The tire sidewall shall be cut at an inward angle so to not expose any metal chords in the tire.

Tires that were filled with antifreeze or other toxic liquids cannot be used for watering facilities, unless they are thoroughly cleaned before use. As a minimum, this shall include scrubbing the inside of the tire with a detergent and rinsing with a high-pressure washer. This process should be repeated at least four

(4) times.

The tire shall be placed such that approximately 1/3 to 1/2 of the tire is below grade. As a minimum, 3" to 4" layer of compacted clay shall be placed as a foundation or seal before installing the tire. A 4" to 6" thick slab of concrete shall be placed to seal the hole in the bottom of the tire trough.

e. Plastic and fiberglass

Plastic and fiberglass structures shall be made of ultraviolet resistant materials or shall have a durable coating for protection from sunlight.

Cast-iron, plastic, or fiberglass bathtubs are not acceptable for use, as a trough or tank.

f. Aggregate and geotextile

Aggregates used for stabilization around the watering facilities shall meet the requirements of Penn DOT, Publication 408, Section 703, for coarse aggregate.

The size and gradation shall be as specified in Section 6 or on the drawings. The aggregate shall be hard, durable, and resistant to weathering.

GEOTEXTILE shall meet the requirements as outlined in NRCS Design Note 24 and NRCS Material Specification 592.

g. Pipe

Unless otherwise shown on the plans or in Section 6, pipe, fittings, and components (e.g., valves), and their installation, shall comply with the requirements of construction specification PA516.

3. FOUNDATION PREPARATION

The foundation area, for the watering facility and related stabilization areas shall be cleared of organic matter and all other unsuitable material. When backfill is required to establish planned grade lines, within 2' of a structure, the backfill shall be compacted by hand-operated compaction equipment.

The foundation area and the immediately surrounding area shall be smoothed and graded to permit free drainage of surface water.

All construction shall be performed in a workmanlike manner and the job site shall have a neat appearance when finished.

4. EROSION AND POLLUTION CONTROL

Construction operations will be carried out in such a manner so erosion and air and water pollution will be minimized. Where required, this shall be in accordance with the E&S Control Plan

5. SEEDING

All disturbed areas shall be protected from erosion as soon, after installation of the structure, as practical. Vegetation, if required, shall be established at the locations shown on the drawings and/or staked in the field, and as set forth herein, in Section 6, and/or as shown on the drawings.

6. ADDITIONAL CONDITIONS WHICH APPLY TO THIS PROJECT ARE:

Smith, Pamela - FPAC-NRCS, PA

From: POCS Ticket Confirmation <Delivery@pa1call.net>
Sent: Wednesday, March 22, 2023 12:24 PM
To: Smith, Pamela - FPAC-NRCS, PA
Subject: [External Email]Ticket Confirm POCS 03/22/23 12:24:22 20230812475-000 New Excavation Final Design

[External Email]
If this message comes from an unexpected sender or references a vague/unexpected topic; Use caution before clicking links or opening attachments.
Please send any concerns or suspicious messages to: Spam.Abuse@usda.gov

TKTCFM 00000 POCS 03/22/23 12:24:22 20230812475-000 NEW XCAV DSGN

==========PENNSYLVANIA UNDERGROUND UTILITY LINE PROTECTION REQUEST========== Serial Number--[20230812475]-[000] Channel#--[1205A999][1111][2019-08]
Message Type--[NEW][EXCAVATION][FINAL DESIGN]

County--[WAYNE] Municipality--[DAMASCUS TWP]
Work Site--[678 COCHECTON TURNPIKE]
Nearest Intersection--[OWL WOOD RD]
Second Intersection--[RUTLEDGEDALE RD]
At Intersection--[N] Between Intersections--[N]
Subdivision--[]
Location Information--
[TYLERHILLS. WORKING ON BOTH SIDES OF OWL WOOD RD. WORK STARTS AT THE INTER OF OWL WOOD RD AND EXTENDS COCHECTON TURNPIKE 1.5 MILE S ON PRIVATE PROP ON BOTH SIDE OF OWL WOOD RD. FROM THE INTER OF COCHECTON TURNPIKE AND OWL WOOD RD. WORKING ON THE E AND WEST SIDE OF OWL WOOD RD. WORK WILL EXTEND 1.5 MILES ON THE W SIDE OF THE RD FOLLOWING THE DIRT FARM RD. THEN WORK WILL BE ON THE E SIDE OF THE RD FOLLOWING ALONG OWL WOOD RD.]
Caller Lat/Lon--[41.696388/-75.166388] Mapped Type--[P] Mapped Lat/Lon--[41.700084/-75.171496,41.678551/-75.167994,41.677744/-75.157077, 41.698892/-75.164029]
Attachments--
[https://gcc02.safelinks.protection.outlook.com/?url=http%3A%2F%2Fwww.pa811.org%2Fattachments%2F20230812475&data=05%7C01%7C%7Cc54e9fa888fd4cad6aba08db2af1e8df%7Ced5b36e701ee4ebc867ee03cfa0d4697%7C0%7C0%7C638150990701079813%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=1bddHT8Ko0qtRvU3d%2BX1VTcxvLonax%2FTnuNENwVB4Ys%3D&reserved=0]
Type of Work--[INSTL PIPELINE] Depth--[4FT]
Extent of Excavation--[10500FT X 1FT] Method of Excavation--[POWER EQUIP]
Equip Type--[BH OR DITCH WITCH]
Street--[ ] Sidewalk--[ ] Pub Prop--[ ] Pvt Prop--[X] Other--[] Private Front--[ ] Rear--[X] Left--[ ] Right--[ ]

Project Dates--[ ] thru [ ] Response Due Date--[05-Apr-23]
Scheduled Excavation Date--[DESIGN]

Caller--[PAM SMITH]

Caller Phone--[570-784-4401]
Excavator--[USDA NRCS]
Address--[702 SAWMILL RD]
City--[BLOOMSBURG] State--[PA] Zip--[17815]
FAX--[] Caller Type--[B]
Email--[pamela.A.smith@usda.gov]
Work For--[CASSIE SCHWEIGHOFER]
Project Contact--[PAM SMITH]
Project Contact Phone--[570-317-9488]
Best Time to Call--[ANYTIME]
Project Contact Email--[pamela.A.smith@usda.gov]

Prepared--[22-Mar-23] at [1223] by [JAMAAL RICE]
Remarks--
[]

BK10 BK1=PENCOR SVCS HLY CVI0 CVI=CHARTER COMM DAM0 DAM=DAMASCUS TWP
LV 0 LV =PENELEC PTD0 PTD=PPL ELEC DESIGN TI 0 TI =VERIZON NORTH

Serial Number--[20230812475]-[000]

Capture First Energy Layers Legend Clone

Smith, Pamela - FPAC-NRCS, PA

From: POCS KARL Responses <Delivery@pa1call.net>
Sent: Thursday, April 6, 2023 2:06 AM
To: Smith, Pamela - FPAC-NRCS, PA
Subject: [External Email]POCS 04/06/23 02:05:45 20230812475-000 KARL Automated Response Service

Follow Up Flag: Follow up
Flag Status: Flagged

PENNSYLVANIA ONE CALL SYSTEM, INC.
KARL AUTOMATED RESPONSE SERVICE

Excavator: USDA NRCS
Telephone #: 570-784-4401
Caller: PAM SMITH
Fax #:
E-Mail: pamela.A.smith@usda.gov

Serial Number 20230812475 at the following location:

County: WAYNE
Municipality: DAMASCUS TWP
Address: 678 COCHECTON TURNPIKE
Nearest Intersection: OWL WOOD RD
Second Intersection: RUTLEDGEDALE RD
Location Information: TYLERHILLS. WORKING ON BOTH SIDES OF OWL WOOD RD. WORK STARTS AT THE INTER OF OWL WOOD RD AND EXTENDS COCHECTON TURNPIKE 1.5 MILE S ON PRIVATE PROP ON BOTH SIDE OF OWL WOOD RD. FROM THE INTER OF COCHECTON TURNPIKE AND OWL WOOD RD. WORKING ON THE E AND WEST SIDE OF OWL WOOD RD. WORK WILL EXTEND 1.5 MILES ON THE W SIDE OF THE RD FOLLOWING THE DIRT FARM RD. THEN WORK WILL BE ON THE E SIDE OF THE RD FOLLOWING ALONG OWL WOOD RD.

has been responded to through Pennsylvania One Call System by these facility owners in the following manner:

UTILITY
RESPONSE
Facility Owner Note:
==========
CHARTER COMMUNICATIONS (CVI)
001- CLEAR. NO FACILITIES OR FACILITIES NOT INVOLVED BASED ON

TICKET INFORMATION.

DAMASCUS TOWNSHIP (DAM)

001- CLEAR. NO FACILITIES OR FACILITIES NOT INVOLVED BASED ON TICKET INFORMATION.

PENCOR SERVICES/BLUE RIDGE COMMUNICATION (BK1)

001- CLEAR. NO FACILITIES OR FACILITIES NOT INVOLVED BASED ON TICKET INFORMATION.

PENNSYLVANIA ELEC CO (LV)

083- ENGINEERING COMPLETED. A PDF FILE OR MARKED UP PLANS WERE SENT TO THE REQUESTOR.

PPL ELECTRIC UTILITIES CORPORATION (PTD)

083- ENGINEERING COMPLETED. A PDF FILE OR MARKED UP PLANS WERE SENT TO THE REQUESTOR.

VERIZON NORTH (TI)

003- FIELD MARKED.

Please take this document to the work site and compare the utility responses for 003-FIELD MARKED to temporary facility marks on the ground. Missing or incorrect marks at the site and/or utilities who DID NOT RESPOND THROUGH PA ONE CALL on this document may warrant further investigation to determine underground utility location(s).

Smith, Pamela - FPAC-NRCS, PA

From: agt_comm@irth.com
Sent: Tuesday, April 4, 2023 1:53 PM
To: Smith, Pamela - FPAC-NRCS, PA
Subject: [External Email]Ticket 20230812475 - Response to Dig Request

[External Email]
If this message comes from an unexpected sender or references a vague/unexpected topic; Use caution before clicking links or opening attachments.
Please send any concerns or suspicious messages to: Spam.Abuse@usda.gov

==========

To: USDA NRCS Attn: PAM SMITH
Voice: 5707844401 Fax:
Re: Response to Dig Request

This is an important message from Verizon replying to your request to locate our underground facilities in an area described on the one call center ticket.

==========

Ticket: 20230812475
County: WAYNE Place: DAMASCUS
Address: 678 COCHECTON TPKE

TI:
Verizon has marked our facilities per the dig site information provided by the one call center ticket.

==========

If you have any questions please contact Verizon.

==========

This message was generated by an automated system. Please do not reply to this email.

AGRICULTURAL WASTE MANAGEMENT SYSTEM

NATURAL RESOURCES CONSERVATION SERVICE
U. S. DEPARTMENT OF AGRICULTURE

CASSILYN SCHWEIGHOFER

WAYNE COUNTY, PENNSYLVANIA

FARM ADDRESS: 678 COCHECTON TURNPIKE
TYLER HILL, PA 18469

NRCS TAKES SAFETY VERY SERIOUSLY, HOWEVER, THE SAFETY COMMITMENT AND THE JOB SITE PRACTICES OF THE CONTRACTOR ARE BEYOND CONTROL OF NRCS. IT IS STRONGLY RECOMMENDED THAT SAFE WORKING CONDITIONS AND ACCIDENT PREVENTION PRACTICES BE THE TOP PRIORITY OF ANY JOB SITE. LOCAL, STATE, AND FEDERAL SAFETY AND HEALTH STANDARDS SHOULD ALWAYS BE FOLLOWED TO HELP INSURE WORKER SAFETY. MAKE CERTAIN ALL EMPLOYEES KNOW THE SAFEST AND MOST PRODUCTIVE WAY OF CONSTRUCTING THE DESIGNED PRACTICES. EMERGENCY PROCEDURES SHOULD BE KNOWN BY ALL EMPLOYEES. DAILY MEETINGS HIGHLIGHTING SAFETY PROCEDURES ARE ALSO RECOMMENDED. IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE A SAFE WORK ENVIRONMENT FOR THEIR EMPLOYEES.

GENERAL NOTES

1. *FAILURE TO CONSTRUCT THIS FACILITY IN ACCORDANCE WITH THE NRCS DESIGN OR AUTHORIZED MODIFICATIONS WILL RESULT IN WITHDRAWAL OF NRCS TECHNICAL AND FINANCIAL ASSISTANCE.*
2. *ALL FEDERAL, STATE, AND LOCAL LAWS, RULES, AND REGULATIONS GOVERNING THE CONSTRUCTION OF THIS FACILITY SHALL BE STRICTLY FOLLOWED. THE OWNER OR OPERATOR IS RESPONSIBLE FOR OBTAINING ALL CONSTRUCTION PERMITS.*
3. *IT IS THE RESPONSIBILITY OF THE EXCAVATING CONTRACTOR TO COMPLY WITH PA ACT 187 (1996) AND ALL ITS REVISIONS BEFORE PERFORMING ANY EXCAVATION. THE PA ONE-CALL PHONE NUMBER IS 1-(800)-242-1776. THE SERIAL NUMBER FOR DESIGN IS 20230812475 DATED 03/22/23.*
4. *A MEETING BETWEEN THE LANDOWNER, CONTRACTOR, AND NRCS REPRESENTATIVE SHALL BE REQUIRED PRIOR TO ANY EXCAVATION OR CONSTRUCTION WORK.*
5. *A COPY OF THE NRCS SPECIFICATIONS AND DRAWINGS SHALL BE ONSITE DURING ALL PHASES OF CONSTRUCTION. A COPY OF THE DRAWINGS SHALL BE PROVIDED TO THE TRUSS MANUFACTURE.*
6. *OSHA REGULATIONS SHALL BE FOLLOWED AT ALL TIMES.*
7. *CERTIFICATION OF CONFORMANCE SHALL CERTIFY THAT ALL WORK WAS PERFORMED TO THE NRCS SPECIFICATIONS.*

* *CONFIRM STATIC WATER LEVEL IN EXISTING WELL BEFORE ORDERING SOLAR PUMP AND PRESSURE TANK.*

PROJECT LOCATION:

AS-BUILT/ DESIGN INFORMATION							
QUALITY ASSURANCE STATEMENT					ENGINEER STATEMENT		
To the best of my knowledge, I certify that the practices have been installed as per the attached drawings and specifications, based on the information provided to me and/or observations I have made.					*In my professional opinion, I certify that the practices have been installed as per the attached drawings and specifications, based on the information provided to me and/or observations I have made.*		
Practice Code	*CIN*	*Description*	*Planned Amount*	*Inspector (Initials)*	*As-Built Amount (by Inspector)*	*Certification (Engineer/JAA Signature)*	*Date Certified*

INDEX OF DRAWINGS

DESIGNED PAS 12/22
DRAWN PAS 12/22
CHECKED RBD 2/15/23

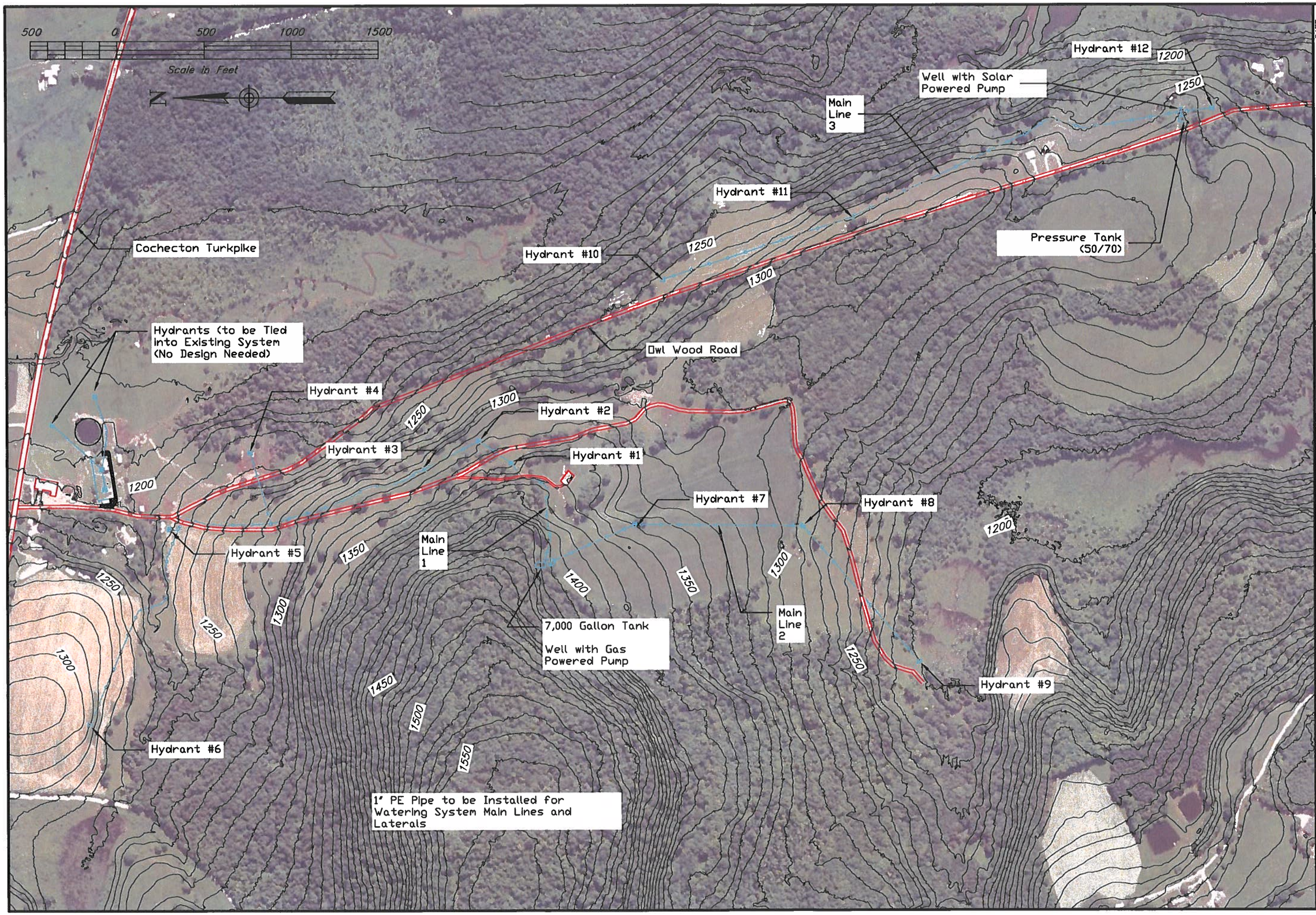
CASSILYN SCHWEIGHOFER
WATERING SYSTEM
COVER SHEET

United States Department of Agriculture
Natural Resources Conservation Service

FILE NO. SCHWEIGHOFER WATER FACILITY DESIGN.DWG

DRAWING NO.

SHEET 1 OF 11



DESIGNED PAS 12/22
DRAWN PAS 12/22
CHECKED
APPROVED

CASSILYN SCHWEIGHOFER

PLANVIEW - 500 SCALE
(WITH 10' CONTOURS)

DAMASCUS TOWNSHIP WAYNE COUNTY, PA

United States Department of Agriculture
Natural Resources Conservation Service

FILE NO. SCHWEIGHOFER WATERING FACILITY DESIGN.DWG

DRAWING NO.

SHEET 2 OF 11

Hydrant#:	Elevation:
1	1350′
2	1330′
3	1318′
4	1229′
5	1222′
6	1292′
7	1352′
8	1289′
9	1215′
10	1256′
11	1291′
12	1256′

Cochecton Turkpike

Hydrants (to be Tied into Existing System (No Design Needed)

Hydrant #4

Hydrant #2

Hydrant #3

Hydrant #1

Hydrant #5

Main Line 1

Hydrant #7

Hydrant #8

7,000 Gallon Tank

Well with Gas Powered Pump (Existing)

Main Line 2

Hydrant #9

Hydrant #6

Hydrant #10

Owl Wood Road

Hydrant #11

Main Line 3

Well with Solar Powered Pump

Hydrant #12

Pressure Tank (50/70)

1′ PE Pipe to be Installed for Watering System Main Lines and Laterals

N

500 0 500 1000 1500

Scale in Feet

DATE 12/22 12/22

DESIGNED PAS

DRAWN PAS

CHECKED

CASSILYN SCHWEIGHOFER

PLANVIEW - 500 SCALE

United States Department of Agriculture

Natural Resources

FILE NO. SCHWEIGHOFER WATER FACILITY DESIGN.DW

DRAWING NO.

SHEET 5 OF 11

CONSTRUCTION OF THE PROPOSED WATERING SYSTEM INCLUDES EXCAVATION, FURNISHING OF MATERIALS, AND INSTALLATION OF THE WATER PIPELINE, PRESSURE TANK AND PUMP, HYDRANTS, AND/OR TROUGHS WHERE SHOWN ON THE PLANVIEW MAP. IN ADDITION TO THE REQUIREMENTS SET FORTH IN CONSTRUCTION SPECIFICATIONS PA-516, PA-533, AND PA-614, THE FOLLOWING REQUIREMENTS SHALL BE MET BELOW:

1. THE PIPE LINES SHALL BE OF POLYETHYLENE (PE) PLASTIC PIPE, MEETING THE REQUIREMENTS OF ASTM D-2339. THE PRESSURE RATING OF THE (PE) PIPE IS A MINIMUM OF 160 PSI. PIPE SHALL BE BOUGHT IN ROLLS, NOT SECTIONS; A MINIMUM OF 300 FOOT ROLL LENGTHS IS REQUIRED.
2. NO HIGH POINTS IN THE PIPELINE SHALL BE ALLOWED, ONLY HIGH POINTS AT HYDRANT LOCATIONS ARE ALLOWED. HIGH POINTS IN THE PIPELINE WILL POTENTIALLY CREATE AIRLOCKS AND CAN SLOW FLOW RATES DOWN. INSTALL AN ADDITIONAL HYDRANT OR A 1 INCH CONTINUOUSLY ACTING AIR VENT AT ANY HIGH POINT LOCATIONS. PROTECT VENTS FROM FREEZING AND ANIMAL/MACHINERY DAMAGE BY INSTALLING BELOW GRADE IN A VALVE BOX. RISES IN PIPE ARE NOT ALLOWED (EVEN AT HYDRANTS) FOR MAIN LINES 1 AND 2.
3. ALL PIPELINES AND APPURTENCES SHALL BE BURIED A MINIMUM OF 3 FEET. ALL PIPELINES WHICH CROSS UNDER ROADS SHALL BE BURIED 4 FEET AND HAVE 1' OF CRUSHED STONE (AASHTO #1 OR #57 STONE) ALONG THE SIDES AND OVERTOP OF THE PIPE PRIOR TO BACKFILLING WITH NATIVE MATERIAL.
4. ALL PIPE CONNECTIONS SHALL BE WATER TIGHT AND CONFORM TO THE REQUIRED PRESSURE CHECKS.
5. ALL PIPE FITTINGS SHALL BE DOUBLE CLAMPED AND MEET THE ASTM NUMBER IN THE SPECIFICATIONS. BRASS FITTINGS SHALL BE USED ON ALL PE PIPE.
6. ALL VALVES & OTHER FITTINGS SHALL BE OF THE SAME DIAMETER AS THE PIPELINE IN WHICH THEY ARE BEING INSTALLED ON. ANY BALL VALVES REQUIRED IN THE PIPELINE SHALL BE HOUSED TO ALLOW FOR EASY ACCESS AND USE. THERE SHALL ALSO BE A CHECK VALVE INSTALLED ON THE WELL.
7. FROST-FREE HYDRANTS SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER AND SHALL HAVE A MINIMUM DEPTH OF 3 FT. CLEAN GRAVEL SHALL BE PLACED AROUND THE BLEED HOLE TO ALLOW FOR DRAINAGE. HYDRANTS SHALL BE PROTECTED FROM ANIMALS BY INSTALLING A PRESSURE TREATED POST OR EQUAL. HYDRANTS CAN BE SUBSTITUTED WITH 2-BALL STYLE WATER TROUGHS DEPENDENT ON LANDOWNER'S PREFERENCES AND NUMBER OF LIVESTOCK NEEDING TO DRINK AT ANY GIVEN TIME. INSTALLATION OF 2-BALL TROUGHS SHALL BE AS PER MANUFACTURER.
8. THE PUMP SHALL BE SIZED FOR 6 GPM CAPABLE OF MEETING A TOTAL DYNAMIC HEAD OF 260 FT FROM THE PROPOSED WATER SYSTEM IN ADDITION TO THE HEAD REQUIREMENTS FROM THE PUMP LOCATION TO THE PRESSURE TANK. THE PUMP SIZING DATA, INCLUDING THE PUMP CURVE, SHALL BE SUPPLIED TO THE NRCS INSPECTOR PRIOR TO ORDERING.
9. THE WELL PUMP TYPE SHALL BE DETERMINED BY A PUMP SUPPLIER, CHOSEN BY THE LANDOWNER.
10. A LOW-FLOW SHUT OFF SWITCH SHALL BE WIRED TO THE PUMP, TO SHUT THE PUMP OFF WHEN THE COLUMN OF WATER IN THE WELL HAS BEEN DEPLETED.
11. THE PUMP MANUFACTURER SHALL RECOMMEND THE SIZE OF ELECTRIC WIRE REQUIRED TO POWER THE PUMP. ALL WIRE SHALL BE RATED FOR EXTERIOR USE AND HAVE A MINIMUM OF 2 FEET OF COVER.
12. SOLAR ARRAY AND ALL ACCESSORIES, CONTROLLERS, ETC. SHALL BE SIZED BY THE PUMP MANUFACTURER.
13. THE PRESSURE TANK SHALL HAVE A PRESSURE SWITCH WITH A 50-70 PSI SWITCH SETTING. HIGHER SWITCH SETTINGS SHALL BE PRE-APPROVED BY THE ENGINEER.
14. THE PRESSURE TANK SHALL BE "HOUSED" FOR PROTECTION AGAINST THE ELEMENTS & FREEZING. THE HOUSING TYPE IS THE LANDOWNER'S DECISION. A BURIED MANHOLE WITH LID OR A BURIED CONCRETE TANK (TRAFFIC RATED) WITH MANHOLE RISER SECTION AND LID ARE OPTIONS. HOWEVER; THE EASIEST OPTION IS TO HOUSE THE PRESSURE TANK INSIDE OF AN INSULATED ROOM IN A BUILDING. IF WATER OR SEEPS ARE ENCOUNTERED WHEN EXCAVATING FOR THE "HOUSING", A TILE DRAIN WITH PIPE AND OUTLET SHALL BE INSTALLED.
15. THE PRESSURE TANK SHALL BE SIZED BY THE SUPPLIER. IT IS RECOMMENDED THAT THE WELL PUMP "RUN" FOR A MINIMUM OF 1 MINUTE EACH TIME IT CYCLES OR "KICKS" ON. THE PRESSURE TANK SHALL BE SIZED WITH AN ADEQUATE DRAW-DOWN TO ALLOW FOR AN APPROPRIATE WELL PUMP RUN TIME.
16. THE FLOAT VALVES USED AT EACH OF THE TROUGHS SHALL BE MEGAFLOW FLOATS, OR EQUIVALENT, AS APPROVED BY THE DESIGNER. THE FLOATS MUST HAVE A MAXIMUM WORKING PRESSURE OF 150 PSI AND BE FULL FLOW. THE FLOATS SHOULD ALSO HAVE A MINIMUM WORKING PRESSURE OF 5 PSI. FLOATS SHALL BE INSTALLED AS PER MANUFACTURER.
17. IT IS RECOMMENDED THAT PORTABLE TROUGHS BE ANCHORED IN-PLACE TO PROTECT THEM FROM BEING TIPPED OVER BY THE CATTLE. THIS CAN BE ACCOMPLISHED USING FENCE POSTS AND PRESSURE TREATED BOARDS ALONG THE SIDES.
18. 350 GALLON, MINIMUM, TROUGH SIZE IS RECOMMENDED. IF TROUGHS ARE TO BE PERMANENT, PLACE SURROUNDING GRAVEL.
19. SEEDING SHALL BE DONE ON ALL DISTURBED AREAS AS A RESULT OF THE INSTALLATION OF THE COMPONENTS OF THE WATERING SYSTEM. SEED, LIME, FERTILIZER, AND MULCH SHALL BE APPLIED AT THE FOLLOWING RATES:

    A. NURSE CROP-- SELECT ONE OF THE FOLLOWING RATES: OATS @ 64 LBS/ACRE PLS* OR WHEAT @ 90 LBS/ACRE PLS OR ANNUAL RYE @ 40 LBS/ACRE PLS.
    B. STABILIZATION: PERENNIAL RYE 40 LBS/ACRE PLS PLUS TALL FESCUE 80 LBS/ACRE PLS.
    C. LIME: APPLICATION RATE BASED ON SOIL TEST RECOMMENDATIONS OR USE AN APPLICATION RATE OF 4 TON/ACRE.
    D. FERTILIZER: APPLICATION RATE BASED ON SOIL TEST RECOMMENDATIONS OR USE AN APPLICATION RATE OF 1000 LBS OF 10-20-20/ACRE.
    E. MULCH: CEREAL STRAW OR EQUIVALENT 3 TONS/ACRE.
    F. BAND SEEDING WILL NOT BE PERMITTED.

    LIME AND ONE-HALF (1/2) THE AMOUNT OF THE FERTILIZER SHALL BE INCORPORATED 4 TO 6 INCHES INTO THE SOIL.

    *PLS MEANS PURE, LIVE SEED. PLS IS THE PRODUCT OF THE PERCENTAGE OF PURE SEED TIMES PERCENTAGE GERMINATION DIVIDED BY 100.
    FOR EXAMPLE, TO SECURE THE ACTUAL PLANTING RATE FOR SWITCHGRASS, DIVIDE 12 POUNDS PLS BY THE PLS PERCENTAGE SHOWN ON THE SEED TAG.
    THUS, IF THE PLS CONTENT OF A GIVEN SEED LOT IS 35%, DIVIDE BY 0.35 TO OBTAIN 34.3 POUNDS OF SEED, THE AMOUNT OF SEED REQUIRED TO PLANT 1 ACRE.

DESIGNED PAS DATE 12/22
DRAWN PAS 12/22
CHECKED

CASSILYN SCHWEIGHOFER
CONSTRUCTION NOTES

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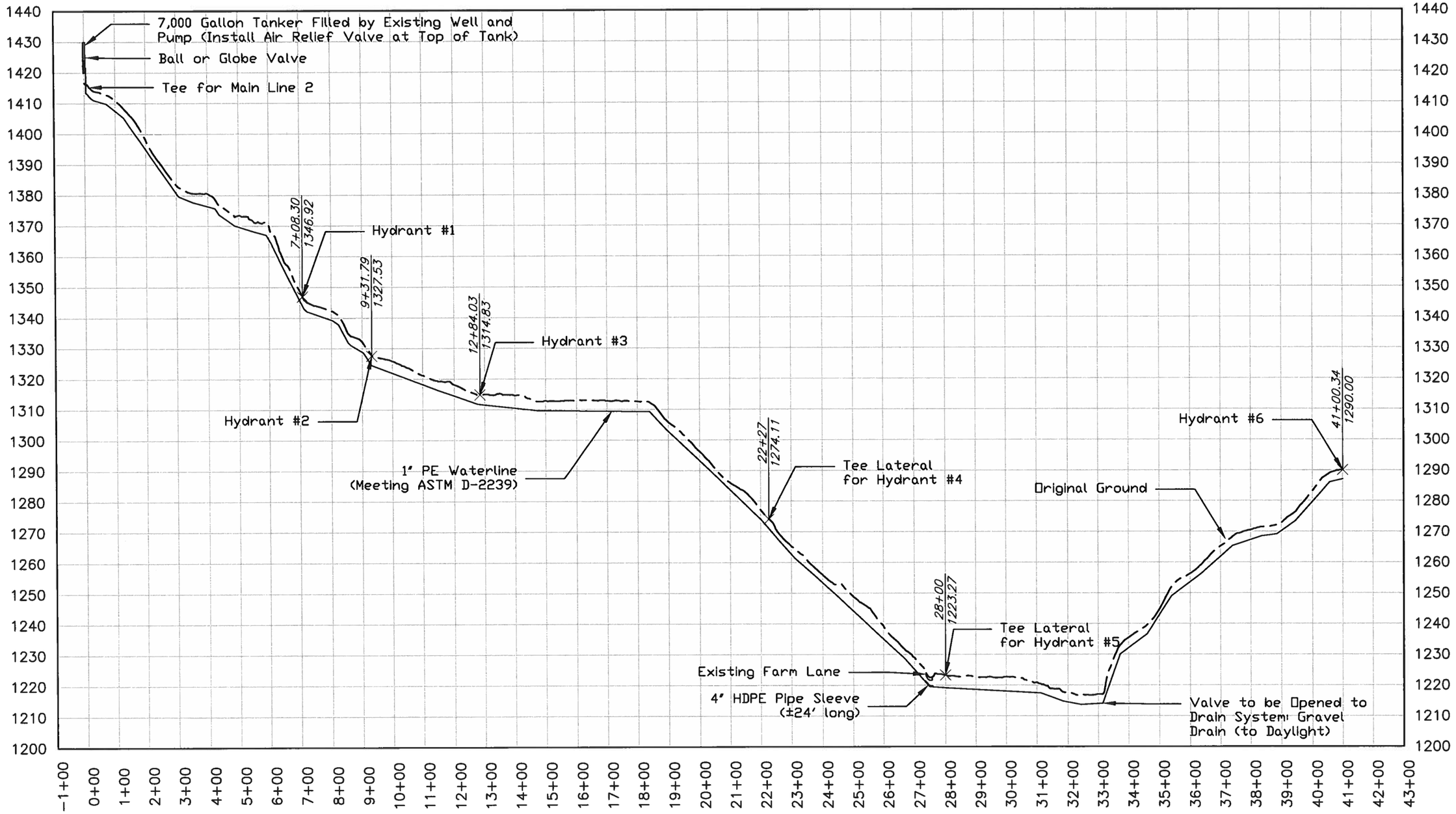
FILE NO. SCHWEIGHOFER WATER FACILITY DESIGN.DW
DRAWING NO.
SHEET 4 OF 11

Main Line 1



- Install 2" continuous acting air vent at Hydrant #6
- Install pipe on grade with no high spots
- Maintain 3' cover over pipeline

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CASSILYN SCHWEIGHOFER
MAIN LINE 1 PROFILE
(NO SCALE)

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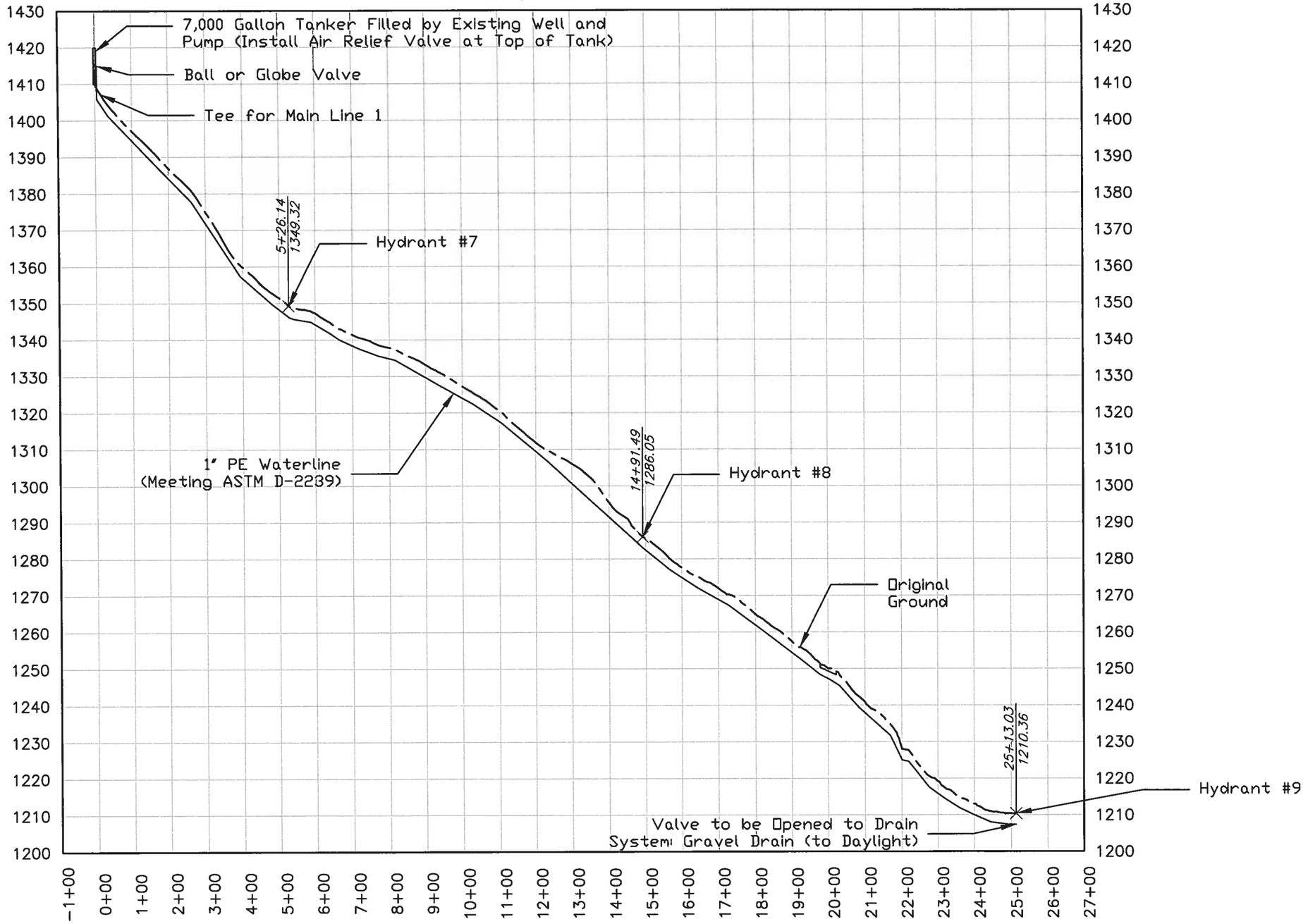
SHEET 5 OF 11

Main Line 2



- Install 2" continuous acting air vent at any location with a rise in pipe elevation
- Maintain 3' cover over pipeline

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MAIN LINE 2 PROFILE
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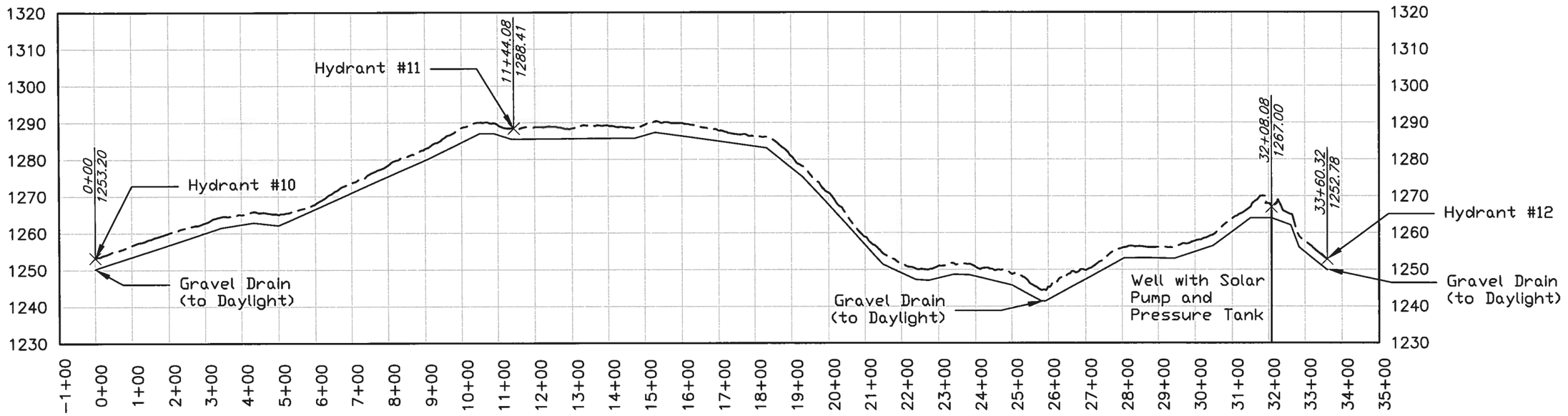
SHEET 6 OF 11

Main Line 3



- Install 2" continuous acting air vent at each hydrant and at high points in pipeline

- Maintain 3' cover over pipeline

- Install valves at gravel drain locations. Valves to be opened to drain the system; valves to be closed while system is in operation.

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MAIN LINE 3 PROFILE
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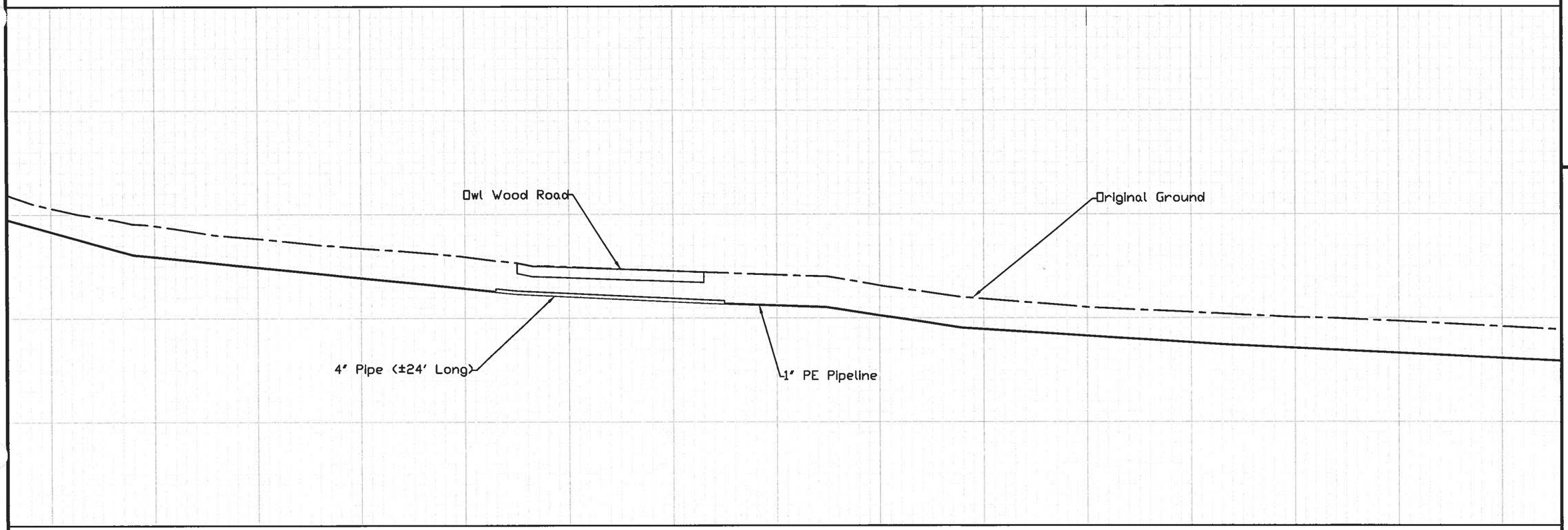
SHEET 7 OF 1

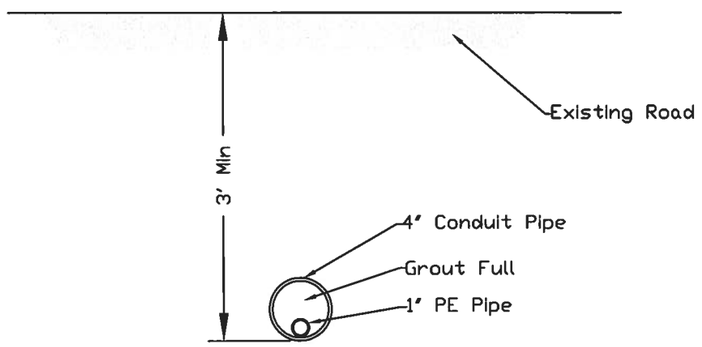
Lateral from Main Line 1 to Hydrant #4



NOTES:

No work may begin prior to obtaining permits.

The cavity between the 4" pipe and 1" pipe must be grouted full. This will prevent movement/separation of the pipe and collapse of the road.



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CASSILYN SCHWEIGHOFER
PROFILE VIEW AT ROAD CROSSING
(10 SCALE)

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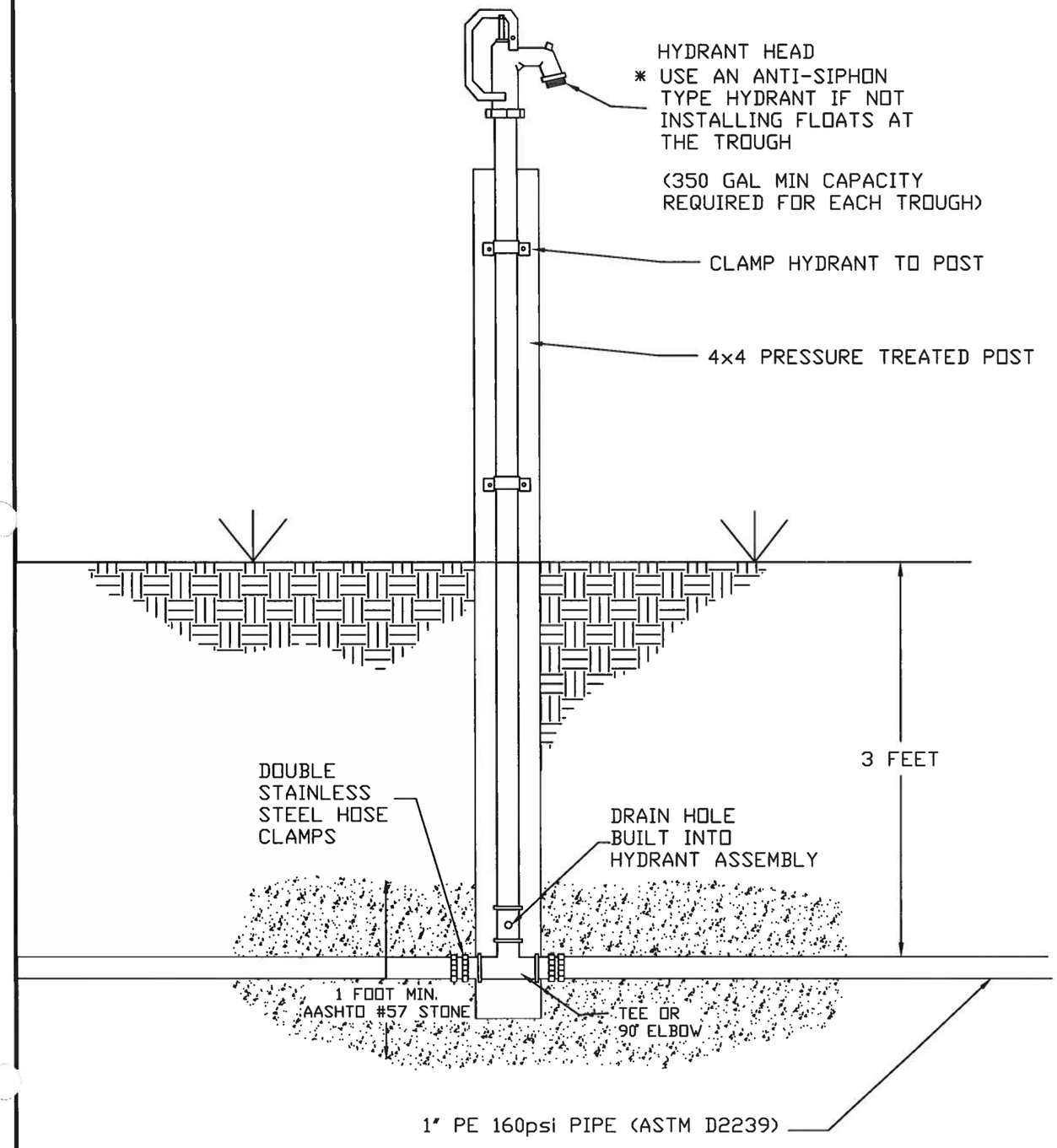
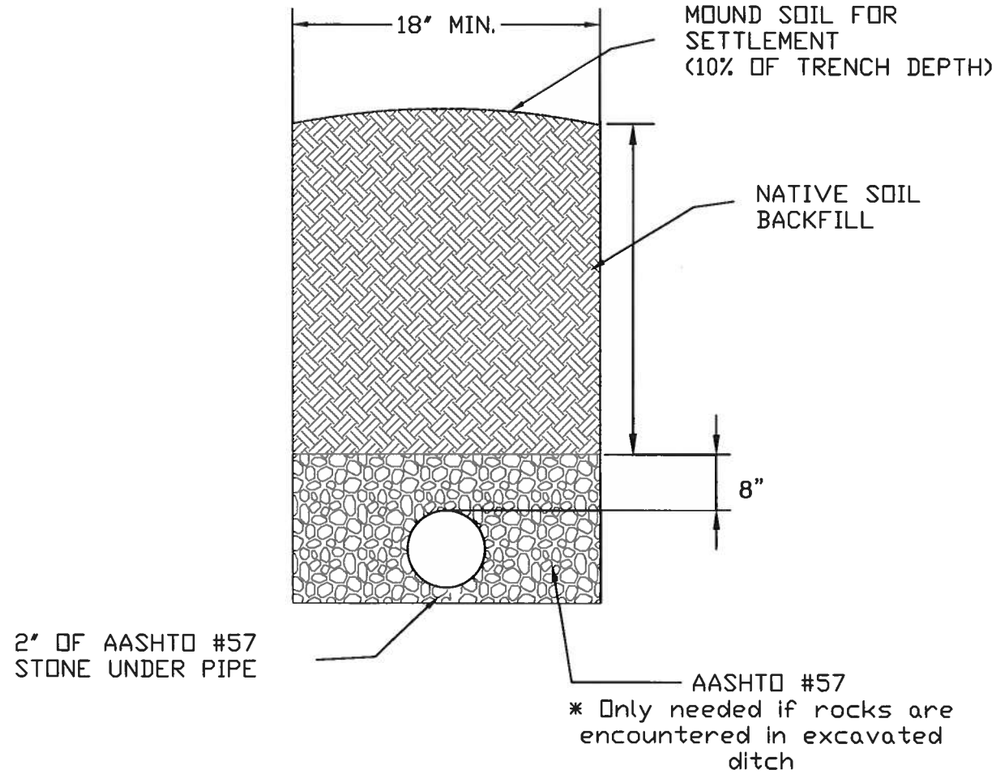
SHEET 8 OF 1

FROST-FREE HYDRANT DETAIL



PIPE INSTALLATION DETAIL



NOT TO SCALE

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FROST-FREE HYDRANT AND PIPE INSTALLATION DETAILS

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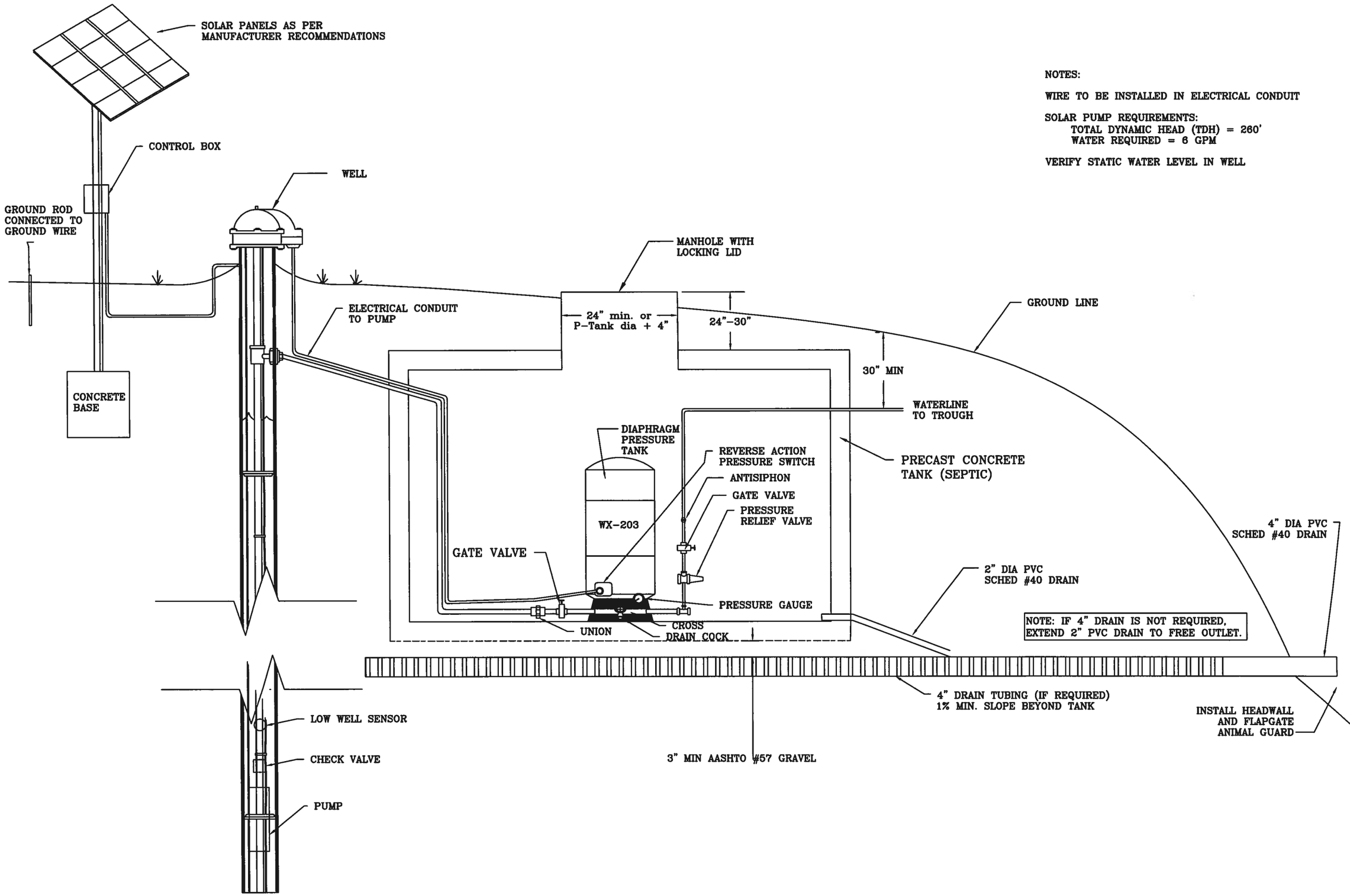
SHEET 9 OF 11



NOTES:

WIRE TO BE INSTALLED IN ELECTRICAL CONDUIT

SOLAR PUMP REQUIREMENTS:
TOTAL DYNAMIC HEAD (TDH) = 260'
WATER REQUIRED = 6 GPM

VERIFY STATIC WATER LEVEL IN WELL

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PRESSURE TANK AND SOLAR PUMP DETAILS

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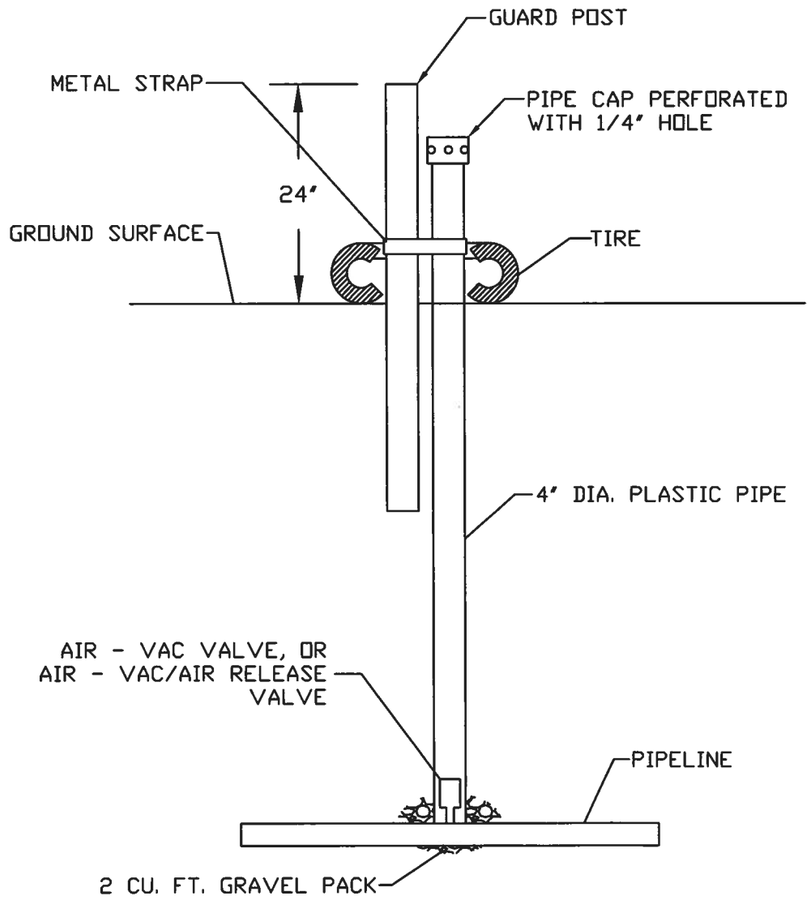
SHEET 10 OF 11

AIR VALVE INSTALLATION



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AIR VALVE DETAIL

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SHEET 11 OF 11