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1945 • 2020

Reviving the Heart of a Collection System

Reserve Street Lift Station

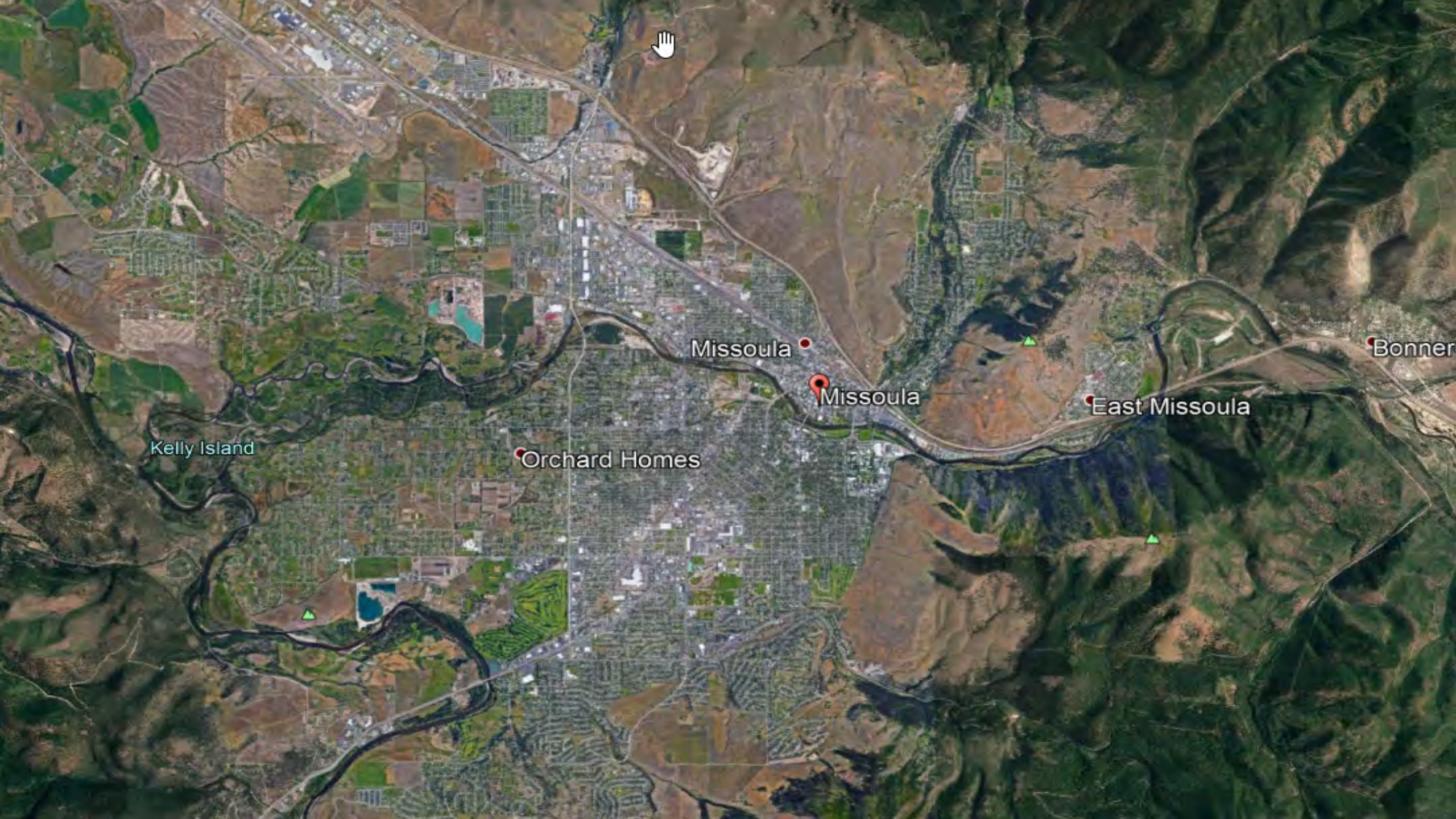
Missoula, MT

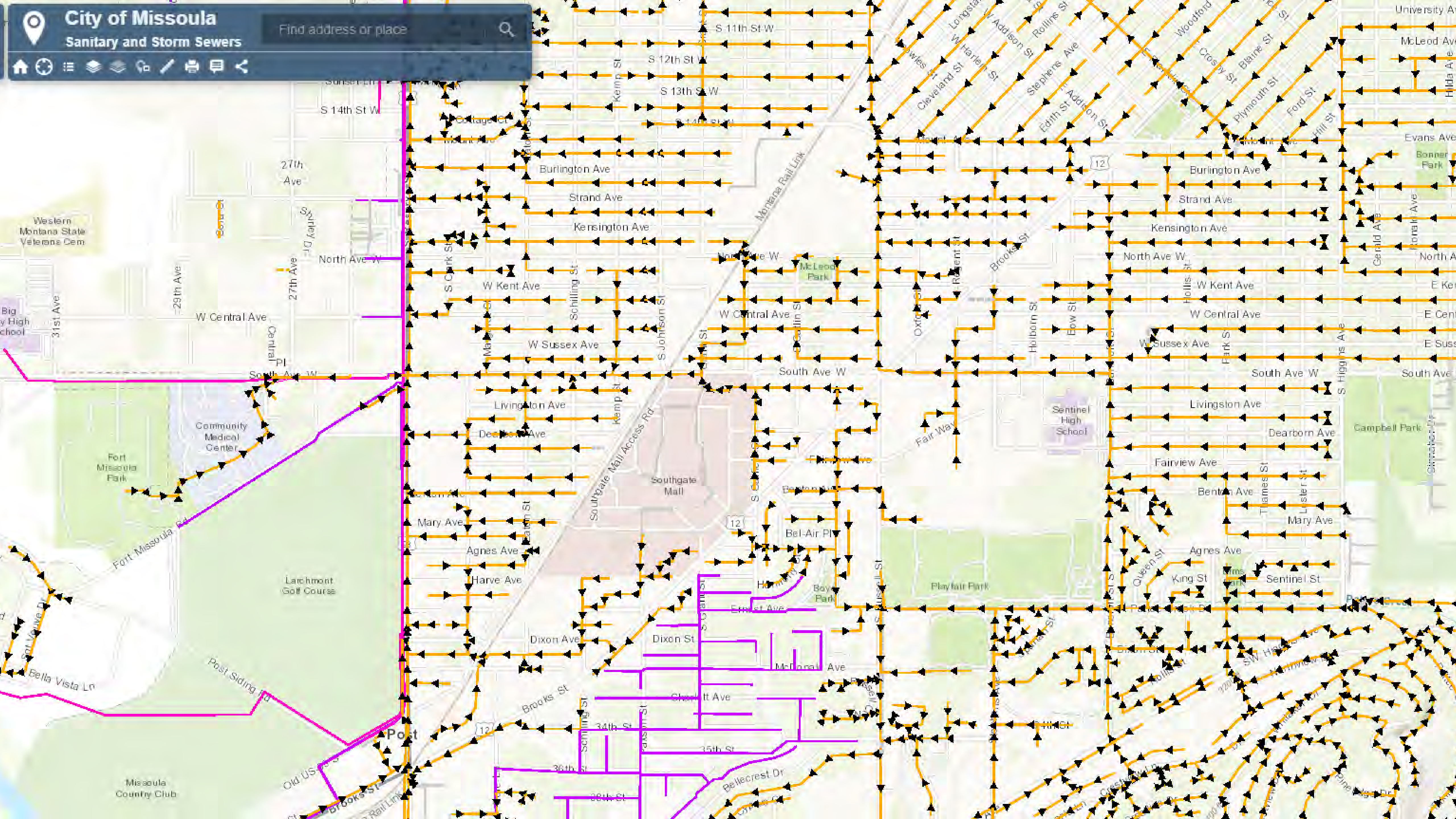
Poll Question

Do you have a lift station in your collection system?

Yes

No


Missoula
Missoula
East Missoula
Bonner
Kelly Island
Orchard Homes


City of Missoula
Sanitary and Storm Sewers
Find address or place
S 11th St W
S 12th St W
S 13th St W
S 14th St W
Cottage Ct
Burlington Ave
Strand Ave
Kensington Ave
North Ave W
W Kent Ave
W Central Ave
W Sussex Ave
South Ave W
Livingston Ave
Dearborn Ave
Fairview Ave
Benton Ave
Mary Ave
Agnes Ave
Harve Ave
Dixon Ave
Dixon St
Ernest Ave
34th St
35th St
36th St
38th St
Bellecrest Dr
Brooks St
Montana Rail Link
Southgate Mall Access Rd
Southgate Mall
Bel-Air Pl
McLeod Park
Boyd Park
Playfair Park
Sentinel High School
Campbell Park
Bonner Park
Evans Ave
University Ave
McLeod Ave
Fair Way
King St
Sentinel St
Queen St
Holborn St
Bow St
Park St
Hollis St
Thames St
Lester St
S Higgins Ave
Gerald Ave
Ronald Ave
Regent St
Oxford St
Schilling St
S Johnson St
Kemp St
S Clark St
Western Montana State Veterans Cem
27th Ave
29th Ave
31st Ave
Shirley Dr
Central Pl
South Ave W
Community Medical Center
Fort Missoula Park
Fort Missoula Rd
Larchmont Golf Course
Post Siding Rd
Bella Vista Ln
Missoula Country Club
Old US 93
Cleveland St
W Harlan St
W Addison St
Rollins St
Stephens Ave
Edith St
Addison St
Woodford
Crosby St
Blaine St
Plymouth St
Ford St
Hill St
Mount Ave
Hilda Ave
South Ave
E Central Ave
E Sussex Ave
North Ave
E Kent Ave

Poll Question

How many lift stations do you have in your system?

1-2

2-5

6+

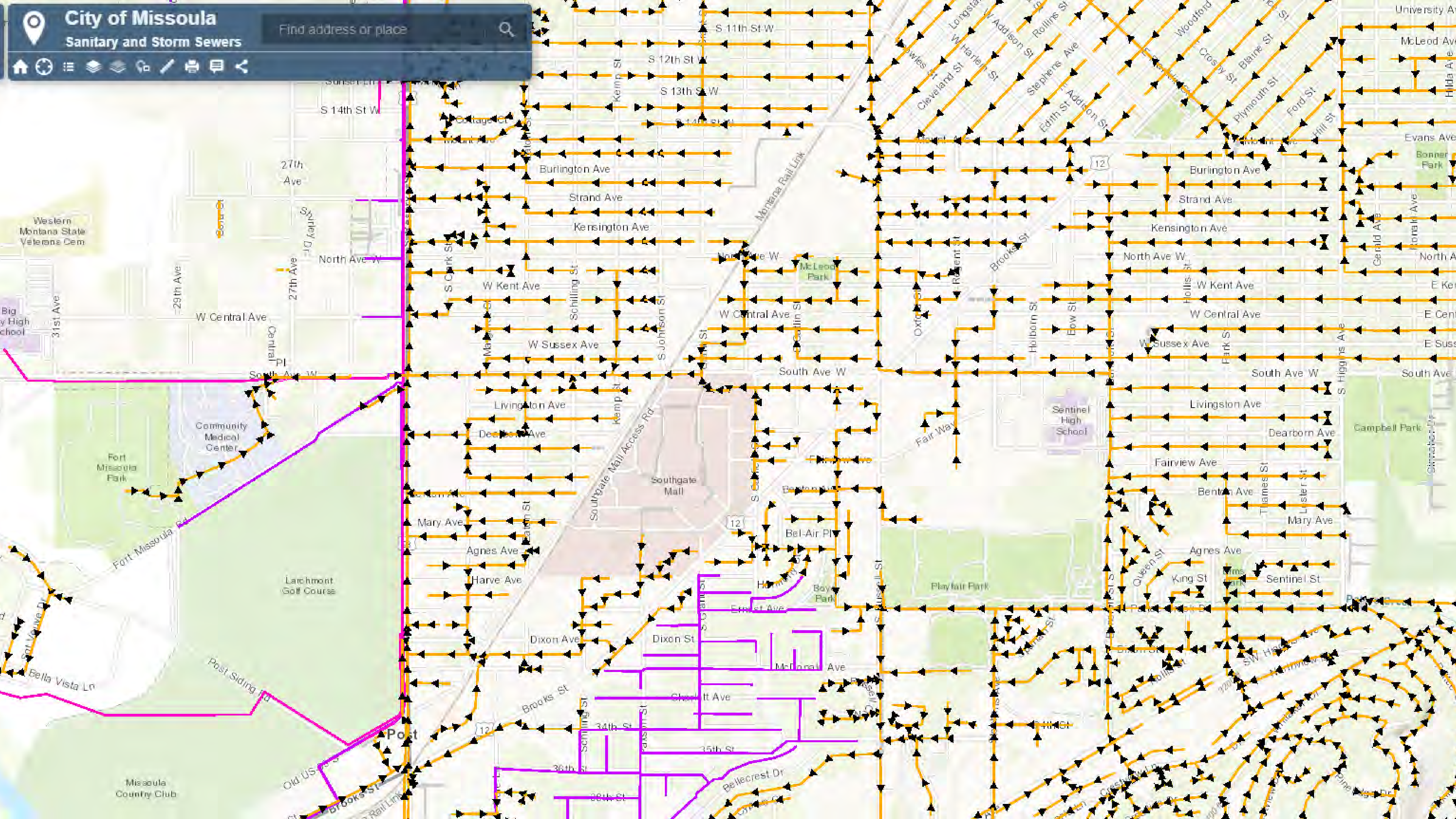
Lift Stations in Missoula

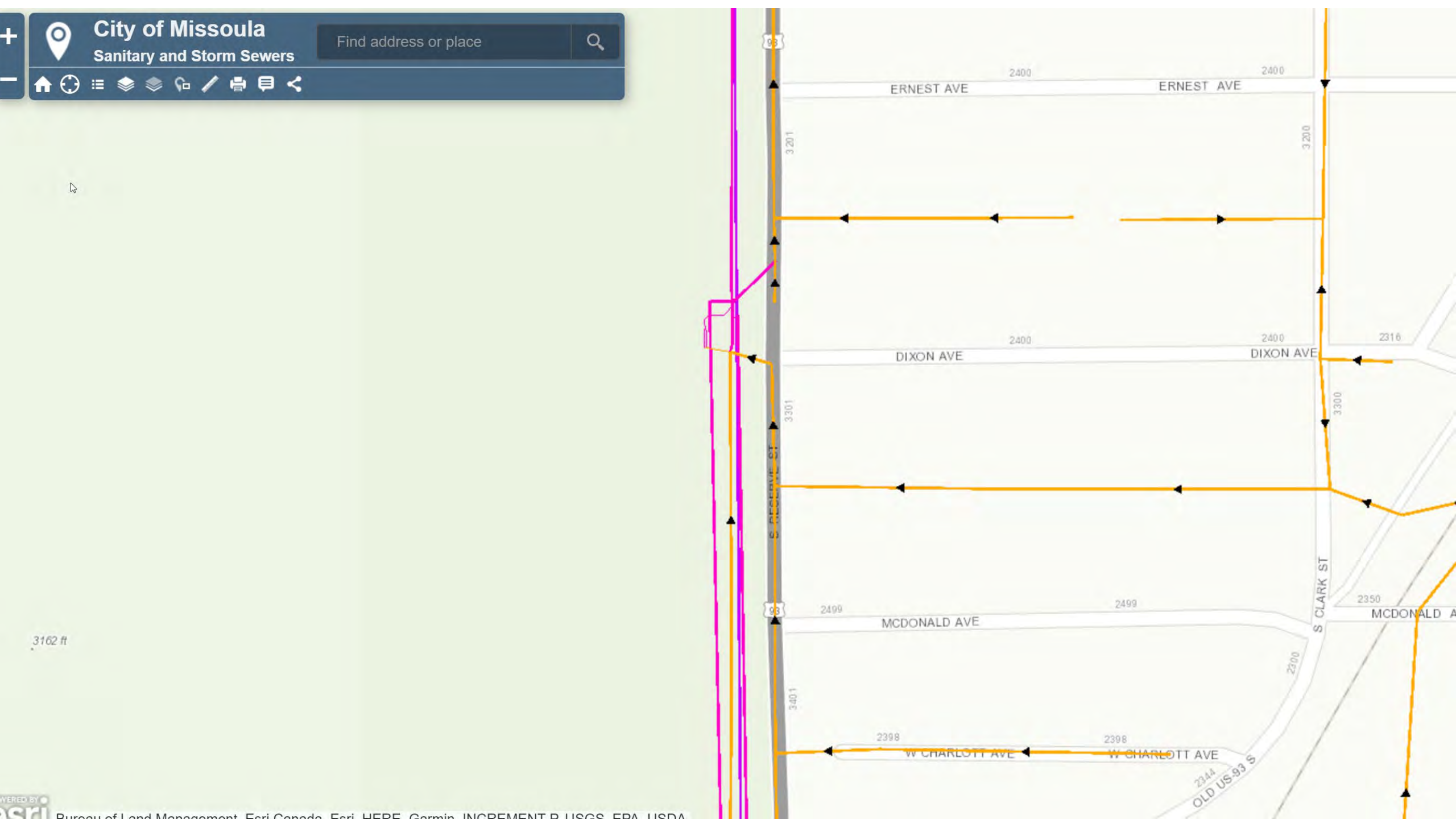
- 39 City-Owned Lift Stations
- 7 Privately-Owned Lift Stations
- 1,442 active STEP Systems

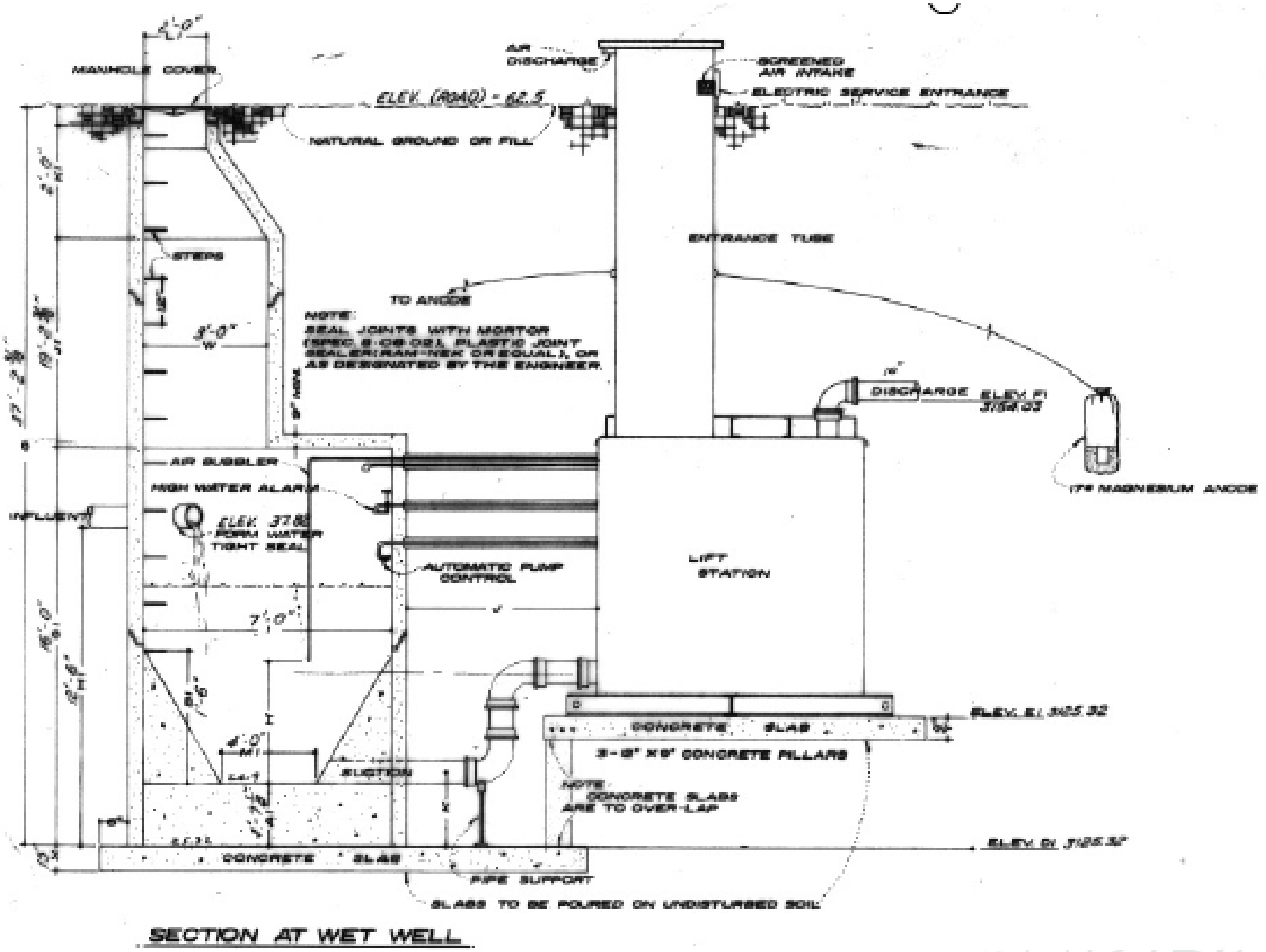
Lift Stations in Missoula

- 39 City-Owned Lift Stations
- 7 Privately-Owned Lift Stations
- 1,442 active STEP Systems

There is a lot of “lifting” in Missoula!


City of Missoula
Sanitary and Storm Sewers
Find address or place
S 11th St W
S 12th St W
S 13th St W
S 14th St W
Cottage Ct
27th Ave
Burlington Ave
Strand Ave
Kensington Ave
North Ave W
W Kent Ave
W Central Ave
W Sussex Ave
South Ave W
Livingston Ave
Dearborn Ave
Fairview Ave
Benton Ave
Mary Ave
Agnes Ave
Harve Ave
Dixon Ave
Dixon St
Ernest Ave
McDonald Ave
34th St
35th St
36th St
38th St
Bellecrest Dr
Brooks St
Old US
Post
Western Montana State Veterans Cem
Community Medical Center
Fort Missoula Park
Fort Missoula Rd
Larchmont Golf Course
Missoula Country Club
Bella Vista Ln
Post Siding Rd
Southgate Mall
Southgate Mall Access Rd
Montana Rail Link
McLeod Park
Bel-Air Pl
Boyd Park
Playfair Park
Sentinel High School
Campbell Park
Bonner Park
Fair Way
Kemp St
Schilling St
Johnson St
Holborn St
Bow St
Hollis St
Park St
S Higgins Ave
Thames St
Lester St
Queen St
King St
Sentinel St
University Ave
McLeod Ave
Evans Ave
Cleveland St
Edith St
Addison St
Plymouth St
Ford St
Hill St
Stephens Ave
Rollins St
Woodford
Crosby St
Blaine St
Big Sky High School
31st Ave
29th Ave
27th Ave
Shirley Dr
Central Pl
S Clark St
Catlin St
Oxford St
Regent St
Brooks St
12


City of Missoula
Sanitary and Storm Sewers
Find address or place
ERNEST AVE
ERNEST AVE
DIXON AVE
DIXON AVE
MCDONALD AVE
MCDONALD A
W CHARLOTT AVE
W CHARLOTT AVE
S CLARK ST
OLD US-93 S
2400
2400
2400
2400
2499
2499
2398
2398
2350
2316
3201
3200
3301
3300
3401
2300
2344
93
3162 ft
Bureau of Land Management, Esri Canada, Esri, HERE, Garmin, INCREMENT P, USGS, EPA, USDA



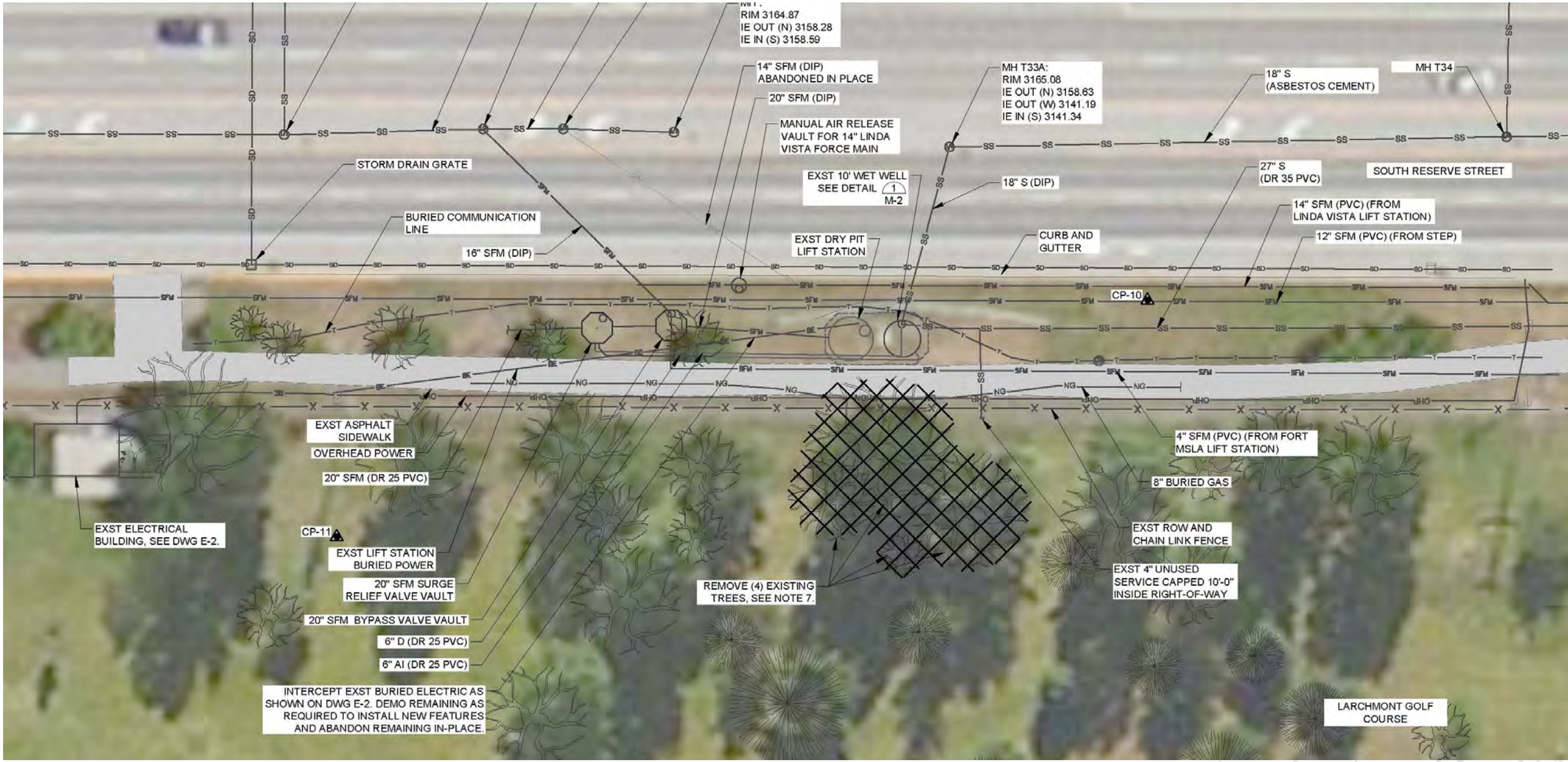
SECTION AT WET WELL


SUBWAY


MURRAY & MICHAELS


LOAD CENTER
LIGHTS
DEH./SUMP
120 V CONV.
COMPRESSOR
CONTROL
BLOWER
HEATER
240V CONVENCE
PUMP 1 RTM
PUMP 2 RTM
PUMP 3 RTM
ENM
HOURS
QUARTZ CHICAGO
PUMP 1
PUMP 2
PUMP 3
OFF
HAND
AUTO
PUMP 1 FAIL
PUMP 2 FAIL
PUMP 3 FAIL
RESET
RESET
RESET
123 213 231


THE GREAT
RECESSION


RIM 3164.87
IE OUT (N) 3158.28
IE IN (S) 3158.59
14" SFM (DIP)
ABANDONED IN PLACE
20" SFM (DIP)
MANUAL AIR RELEASE
VAULT FOR 14" LINDA
VISTA FORCE MAIN
MH T33A:
RIM 3165.08
IE OUT (N) 3158.63
IE OUT (W) 3141.19
IE IN (S) 3141.34
18" S
(ASBESTOS CEMENT)
MH T34
STORM DRAIN GRATE
EXST 10' WET WELL
SEE DETAIL 1
M-2
18" S (DIP)
27" S
(DR 35 PVC)
SOUTH RESERVE STREET
BURIED COMMUNICATION
LINE
16" SFM (DIP)
EXST DRY PIT
LIFT STATION
CURB AND
GUTTER
14" SFM (PVC) (FROM
LINDA VISTA LIFT STATION)
12" SFM (PVC) (FROM STEP)
CP-10
EXST ASPHALT
SIDEWALK
OVERHEAD POWER
20" SFM (DR 25 PVC)
4" SFM (PVC) (FROM FORT
MSLA LIFT STATION)
8" BURIED GAS
EXST ELECTRICAL
BUILDING, SEE DWG E-2.
CP-11
EXST LIFT STATION
BURIED POWER
EXST ROW AND
CHAIN LINK FENCE
20" SFM SURGE
RELIEF VALVE VAULT
REMOVE (4) EXISTING
TREES, SEE NOTE 7.
EXST 4" UNUSED
SERVICE CAPPED 10'-0"
INSIDE RIGHT-OF-WAY
20" SFM BYPASS VALVE VAULT
6" D (DR 25 PVC)
6" AI (DR 25 PVC)
INTERCEPT EXST BURIED ELECTRIC AS
SHOWN ON DWG E-2. DEMO REMAINING AS
REQUIRED TO INSTALL NEW FEATURES
AND ABANDON REMAINING IN-PLACE.
LARCHMONT GOLF
COURSE


1
2
05/04/2009 09:39

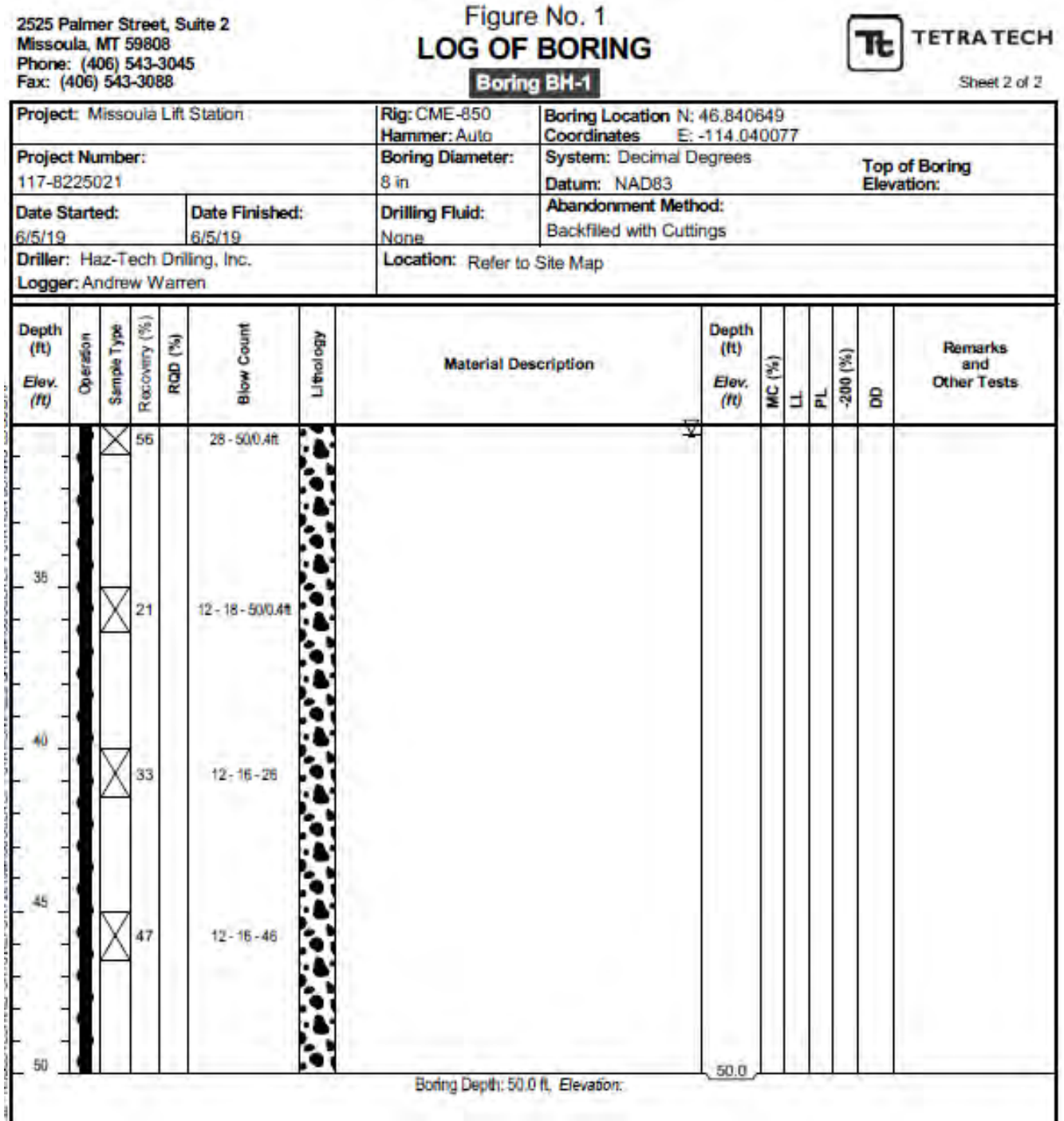

SHADOW

Applying lessons learned

- How do we minimize the impact of groundwater
- Reduce the amount of bypass pumping
- Allow pumps to run longer, more efficiently

Depth of Existing Lift Station

- 37.61 FT
- GW = 30.3 FT



2525 Palmer Street, Suite 2
Missoula, MT 59808
Phone: (406) 543-3045
Fax: (406) 543-3088

Figure No. 1
LOG OF BORING
Boring BH-1

TETRA TECH

Sheet 2 of 2

Project: Missoula Lift Station		**Rig:** CME-850 **Hammer:** Auto	**Boring Location** N: 46.840649 **Coordinates** E: -114.040077
Project Number: 117-8225021		**Boring Diameter:** 8 in	**System:** Decimal Degrees **Datum:** NAD83 — **Top of Boring Elevation:**
Date Started: 6/5/19	**Date Finished:** 6/5/19	**Drilling Fluid:** None	**Abandonment Method:** Backfilled with Cuttings
Driller: Haz-Tech Drilling, Inc. **Logger:** Andrew Warren		**Location:** Refer to Site Map	

Depth (ft) Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD	Remarks and Other Tests
35			56		28 - 50/0.4ft									
40			21		12 - 18 - 50/0.4ft									
45			33		12 - 16 - 26									
50			47		12 - 16 - 46			50.0						

Boring Depth: 50.0 ft. Elevation:

Applying lessons learned

✓How do we minimize the impact of groundwater

✓Reduce the amount of bypass pumping

• Allow pumps to run longer, more efficiently

If two are good is three better?

Poll Question

Do you have any lift stations with more than 2 pumps?

Yes

No

Yes, but just at the treatment plant

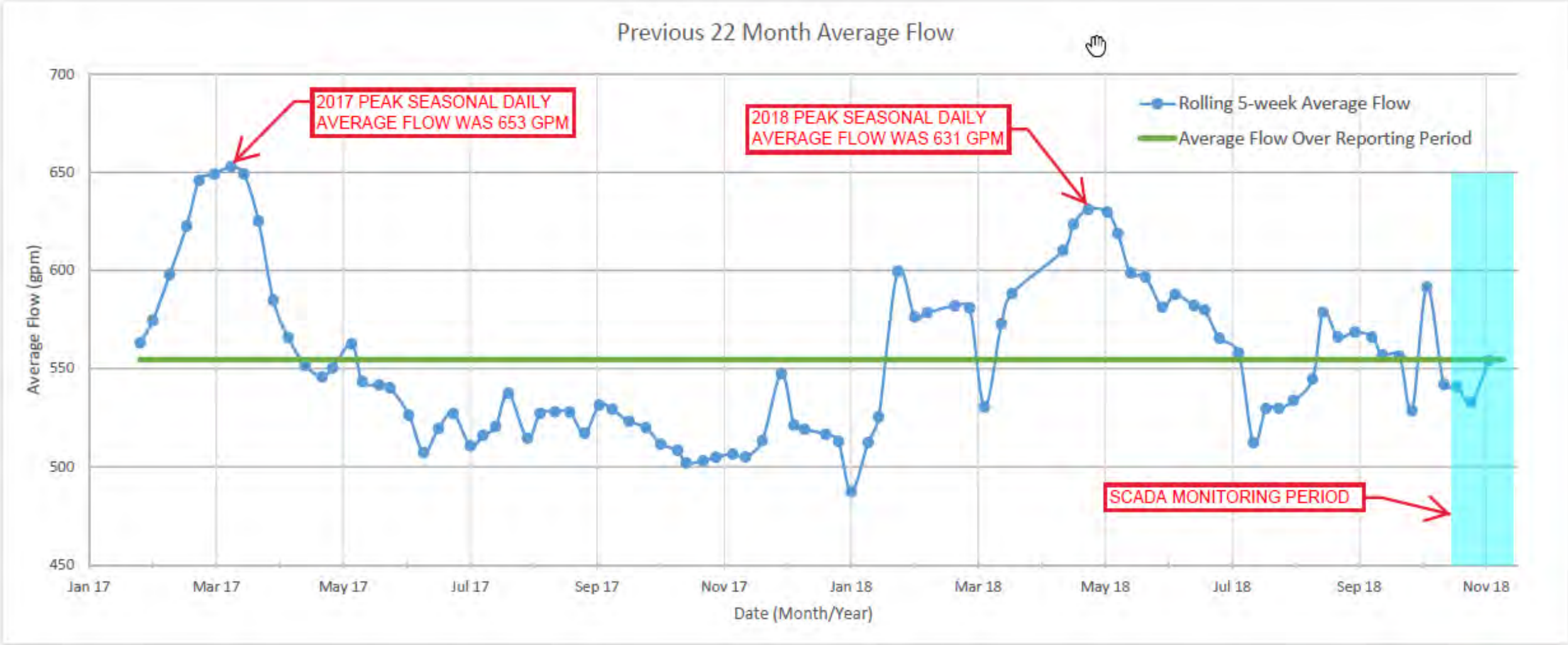
Evaluating Multiple Pumps (near-term)

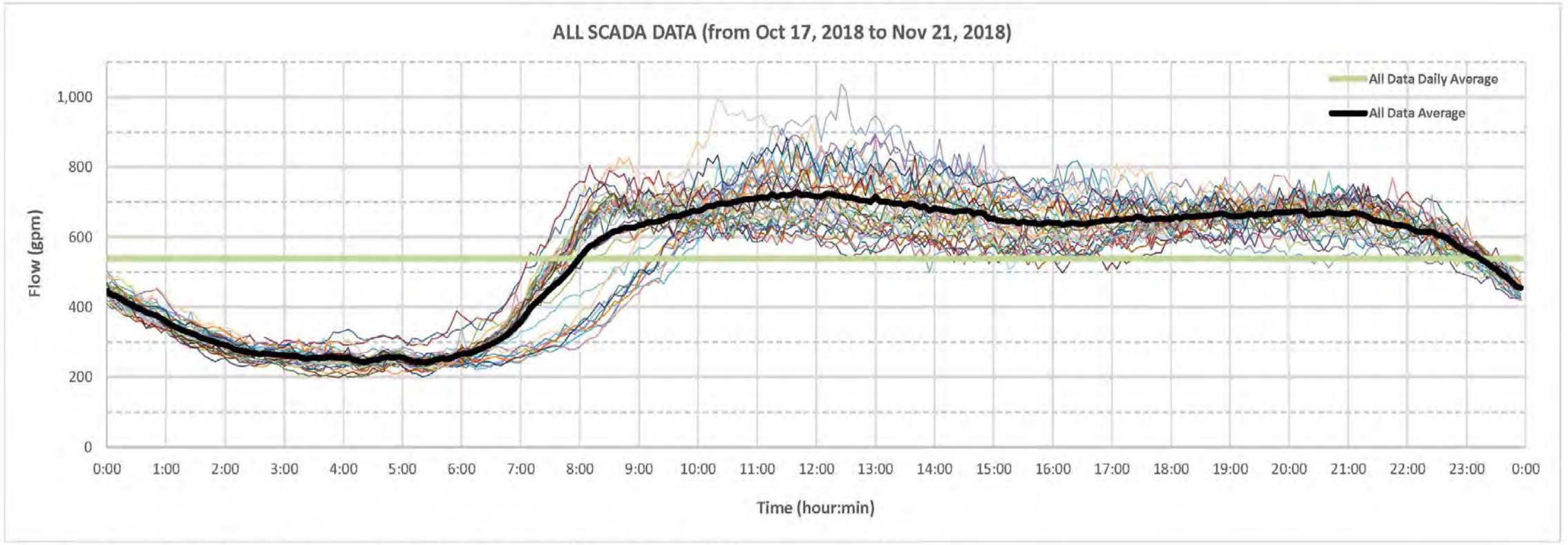
Duplex System

- Each pump @ 2,500 gpm
- Motor = 125 hp
- Efficiency = 73%
- Weight = 900 lbs

Triplex or Quadplex System

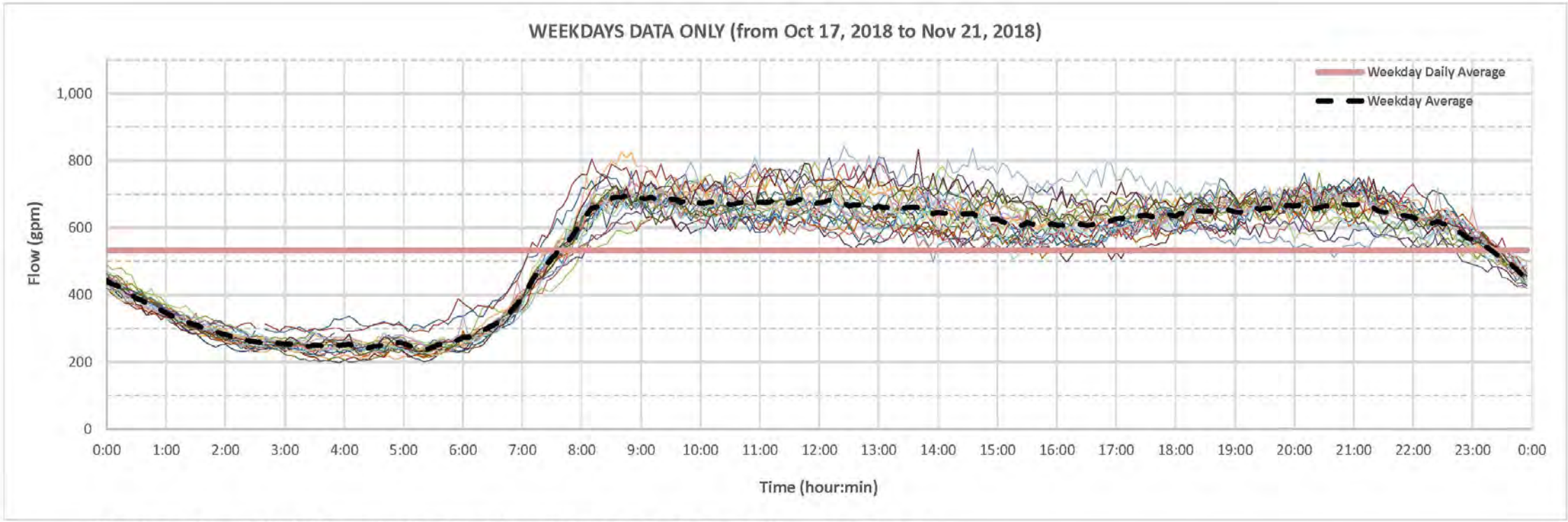
- Each pump @ 1,000 gpm
- Motor = 15 hp
- Efficiency = 88 %
- Weight = 500 lbs


Previous 22 Month Average Flow
2017 PEAK SEASONAL DAILY AVERAGE FLOW WAS 653 GPM
2018 PEAK SEASONAL DAILY AVERAGE FLOW WAS 631 GPM
Rolling 5-week Average Flow
Average Flow Over Reporting Period
SCADA MONITORING PERIOD
Average Flow (gpm)
700
650
600
550
500
450
Jan 17
Mar 17
May 17
Jul 17
Sep 17
Nov 17
Jan 18
Mar 18
May 18
Jul 18
Sep 18
Nov 18
Date (Month/Year)



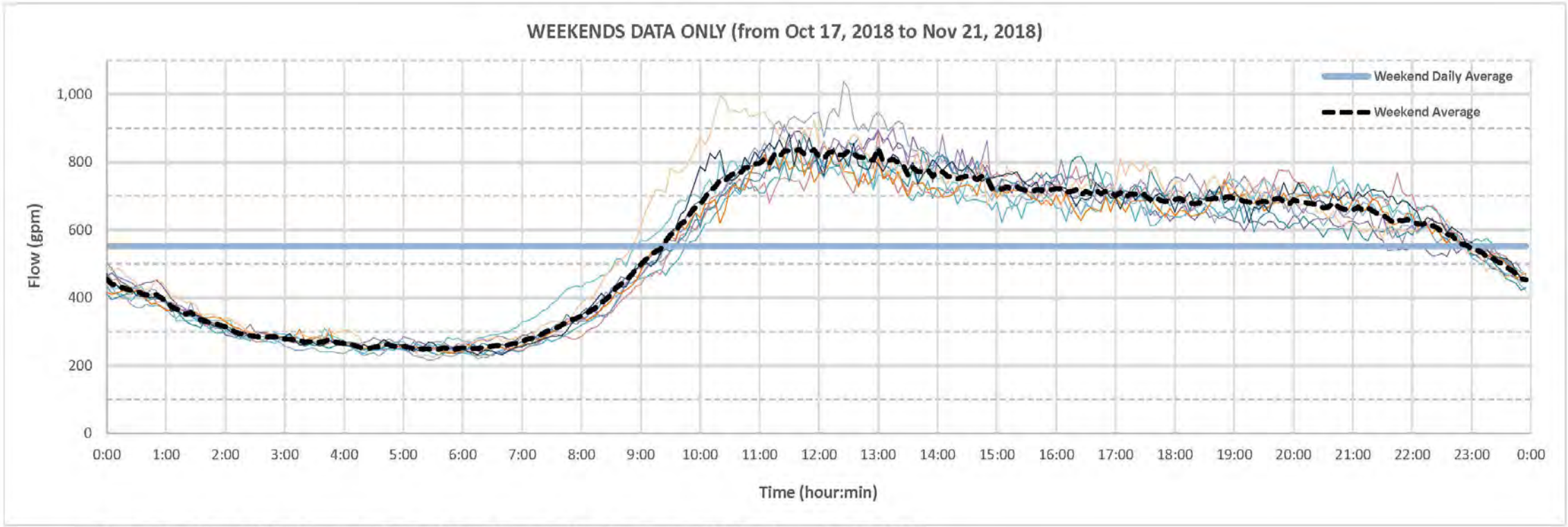
Data derived from SCADA data provided by City of Missoula from October 17, 2018 to November 21, 2018.
Individual lines not shown on the legend represent one day from this reporting period.

All SCADA Data		
Avg	Max	Min
539	1,037	198



Data derived from SCADA data provided by City of Missoula from October 17, 2018 to November 21, 2018.
Individual lines not shown on the legend represent one day from this reporting period.

Week Days		
Avg	Max	Min
533	843	198



Data derived from SCADA data provided by City of Missoula from October 17, 2018 to November 21, 2018.
Individual lines not shown on the legend represent one day from this reporting period.

Week Ends		
Avg	Max	Min
551	1,037	215

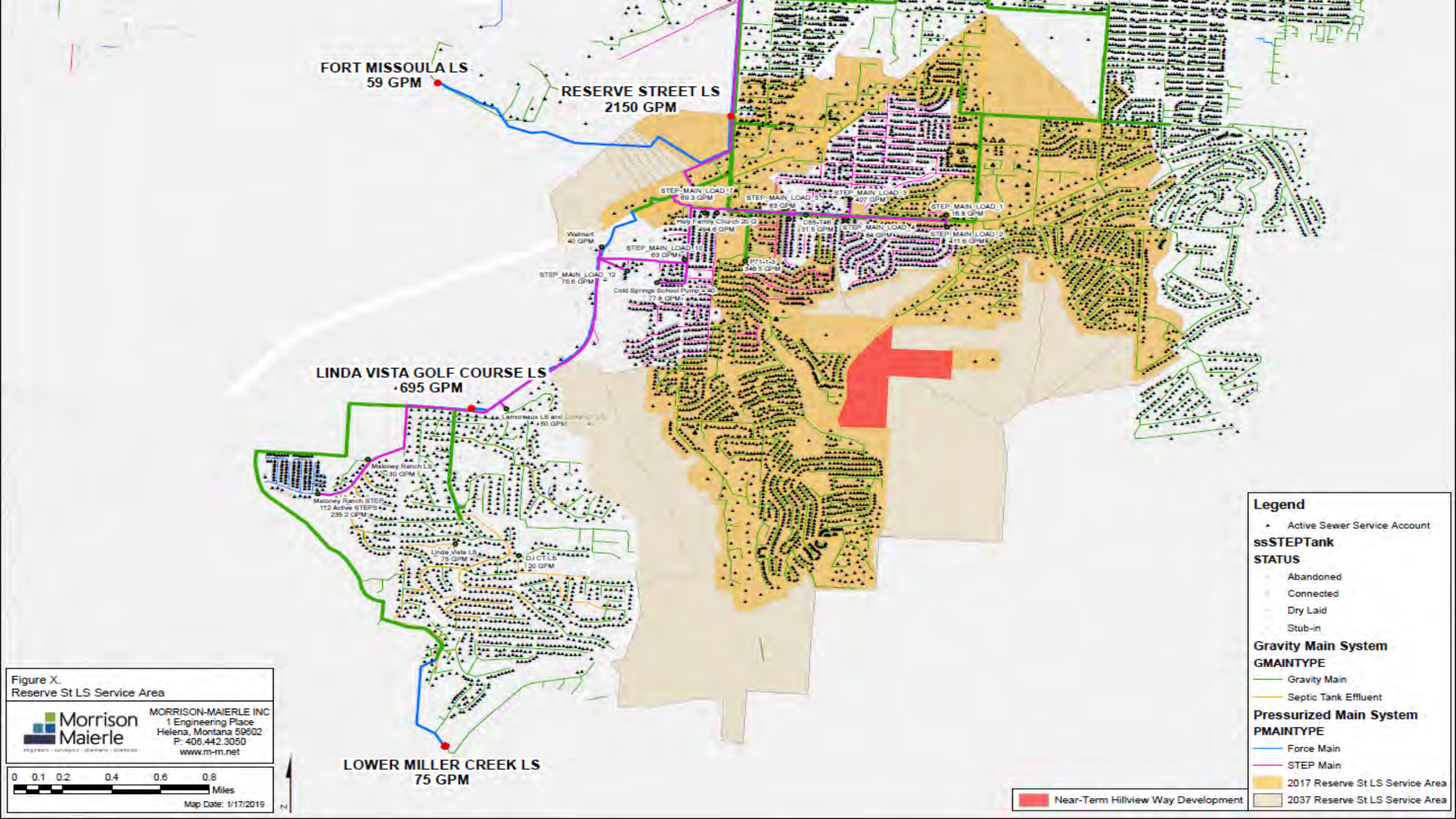


Figure X.
Reserve St LS Service Area

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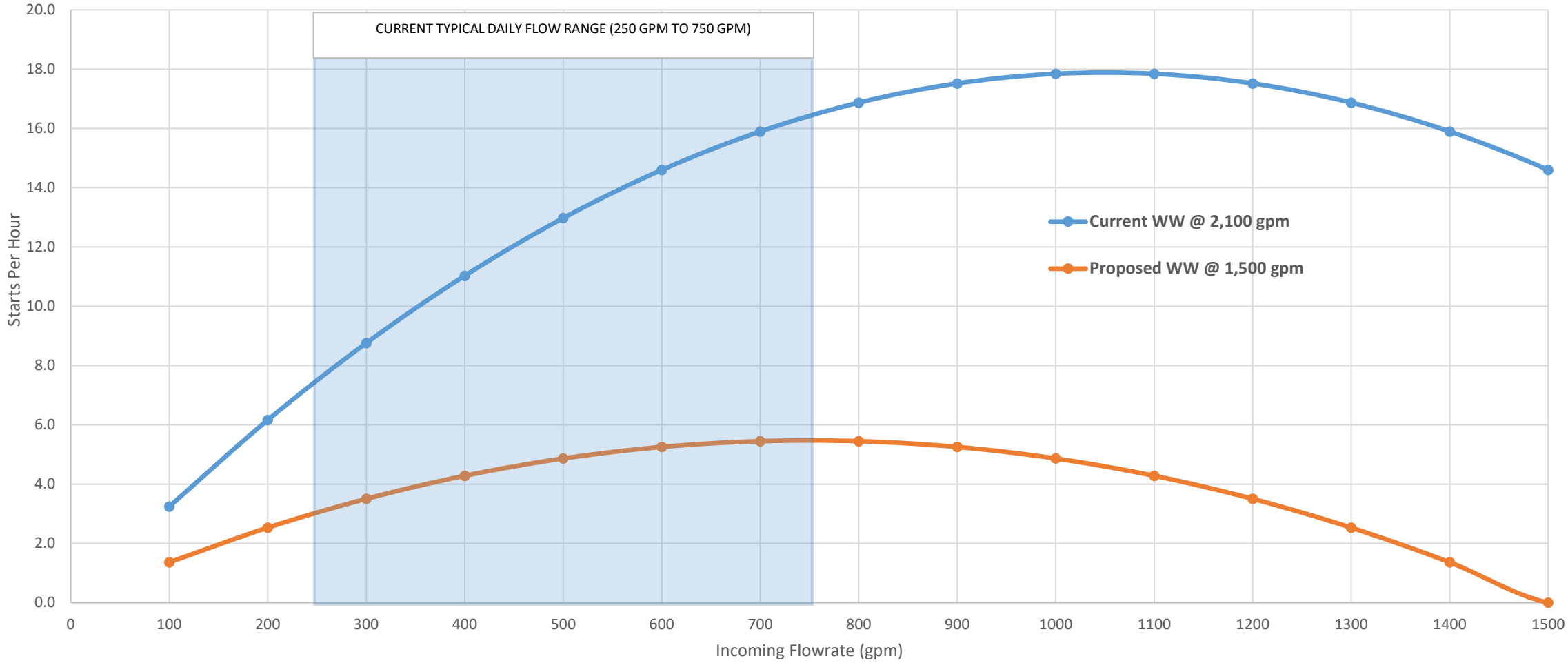
MORRISON-MAIERLE INC
1 Engineering Place
Helena, Montana 59602
P: 406.442.3050
www.m-m.net

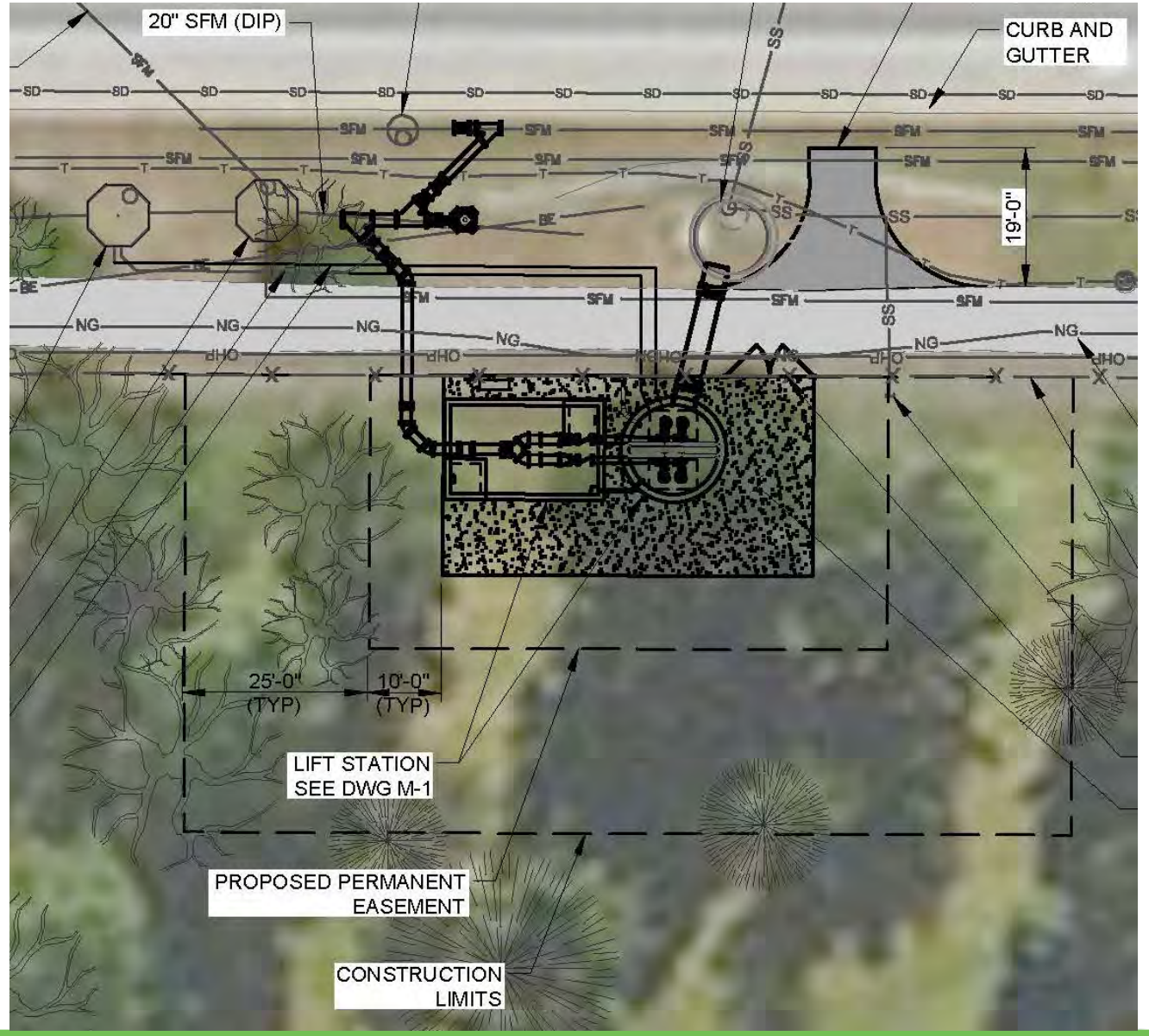
Design Flow Recommendations

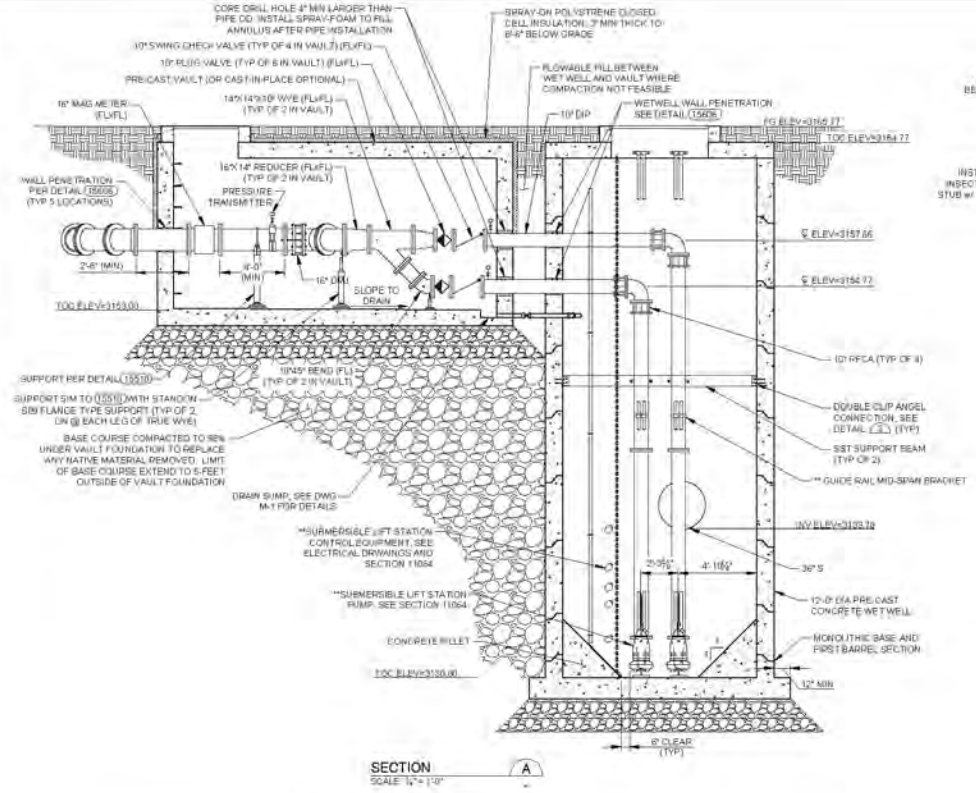
- Current Design Peak Hourly Flow = 1,820 gpm
- Near Term Design Peak Hourly Flow = 2,020 gpm
- Future Design Peak Hourly Flow = 2,550 gpm


CURRENT TYPICAL DAILY FLOW RANGE (250 GPM TO 750 GPM)
Current WW @ 2,100 gpm
Proposed WW @ 1,500 gpm
Starts Per Hour
Incoming Flowrate (gpm)
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500

Design Recommendations

- 12-foot diameter wet-well
- 3 pumps with a 4th slot for future
- Each pump have a capacity of ~1,000 gpm


20" SFM (DIP)
CURB AND GUTTER
19'-0"
25'-0" (TYP)
10'-0" (TYP)
LIFT STATION SEE DWG M-1
PROPOSED PERMANENT EASEMENT
CONSTRUCTION LIMITS



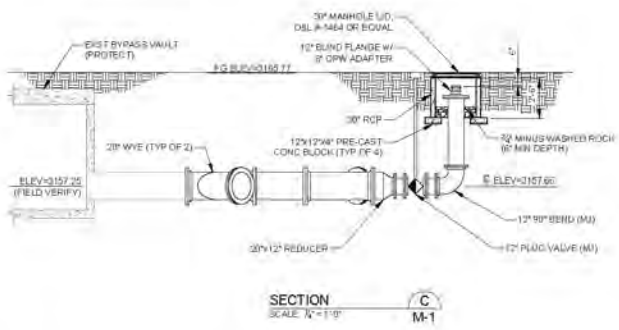
SECTION A
SCALE: 1/4" = 1'-0"

DETAIL 1
SCALE: 1/2" = 1'-0"
M-1

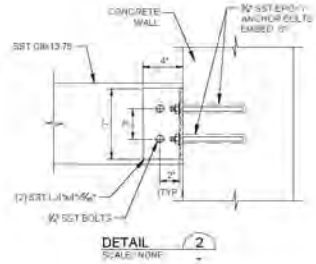
GENERAL NOTES:

1. INSTALL EQUIPMENT AND ACCESSORIES PER MANUFACTURER'S RECOMMENDATIONS. ALL EQUIPMENT INSIDE WET WELL SHALL MEET REQUIREMENTS FOR CLASS I DIVISION 1 LOCATION.
2. PRECAST CONCRETE LIDS AND MANHOLE SECTIONS SHALL CONFORM TO ASTM A48. CONTRACTOR SHALL VERIFY DIMENSIONS AND CONNECTION TYPE PRIOR TO ORDERING. JOINTS SHALL HAVE PREFORMED FLEXIBLE SEALANT MEETING ASTM C990.
3. CONTRACTOR SHALL INSTALL EXTERNAL JOINT WRAP ON ALL MANHOLE JOINTS PRIOR TO APPLYING EXTERNAL COATING. EXTERNAL JOINT WRAP SHALL BE UPPER PENINSULA RUBBER COMPANY (CADILLOC), CONSEAL (CS-212), OR APPROVED EQUAL.
4. CONTRACTOR SHALL APPLY AN EPOXY INTERNAL WATERPROOF COATING (MIN 60 MILS) TO WET WELL. SEE SECTION 07132 FOR DETAILS.
5. CONTRACTOR SHALL APPLY A SPRAY-ON LINER MINIMUM (125 MILS) TO THE INTERIOR OF WET WELL AND MANHOLES. SEE SECTION 09960 FOR DETAILS.
6. SEE SECTION 05510 FOR DETAILS ON WET WELL AND VAULT ACCESS HATCHES.
7. ALL DUCTILE IRON PIPE AND FITTINGS SHALL BE DELIVERED WITH NO ASPHALTIC COATING BUT RATHER A FACTORY APPLIED HIGH-SOLIDS EPOXY PRIMER. FINISH COATING SHALL BE FIELD APPLIED PER SYSTEM NO. 1 FROM SECTION 09900.
8. LEVEL TRANSDUCER AND FLOATS NOT SHOWN FOR CLARITY. SEE ELECTRICAL DRAWINGS FOR DETAILS.

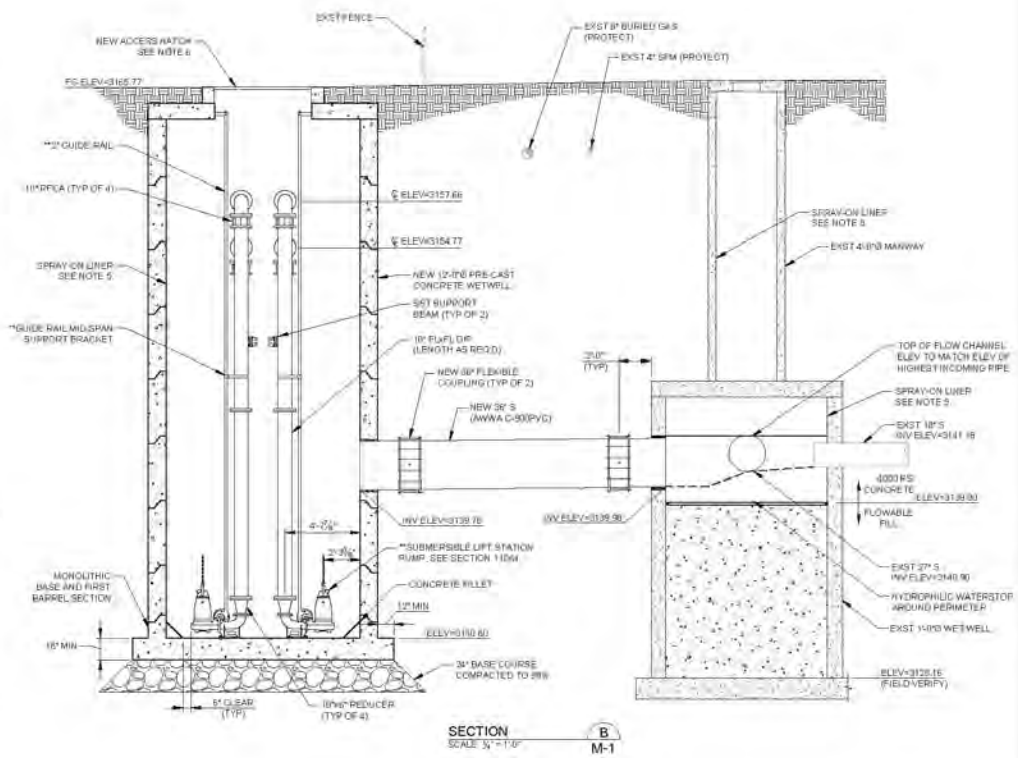
** DENOTES EQUIPMENT OR ITEMS SUPPLIED BY DIVISION 11 MANUFACTURER AS A COMPLETE PACKAGE. CONTRACTOR IS RESPONSIBLE FOR COORDINATING INSTALLATION OF ALL SUPPLIED EQUIPMENT AND INSTRUMENTATION.



SECTION C
SCALE: 1/4" = 1'-0"
M-1



DETAIL 2
SCALE: NONE



SECTION B
SCALE: 1/4" = 1'-0"
M-1

REVISIONS			
NO.	DESCRIPTION	BY:	DATE:

THESE GRAPHICS ARE 1" BY MEASURE. IF LINE BELOW MEASURES LESS THAN 1" ON ORIGINAL DRAWING, MODIFY SCALE ACCORDINGLY.

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1 Engineering Place
Helena, MT 59602
406.442.3060
www.m-m.net

MONTANA
NEAL DEAN LEMOND
10/7/2019
PROFESSIONAL ENGINEER

DRAWN BY:	JAC
DSGN. BY:	NDL
APPR. BY:	CM
DATE:	08/2019
QC. REVIEW BY:	DMH
DATE:	09/2019

RESERVE STREET LIFT STATION

MISSOULA MONTANA

LIFT STATION SECTIONS AND DETAILS

PROJECT NUMBER: 1637.049

SHEET NUMBER:

DRAWING NUMBER: M-2

Construction Starts

- Notice to Proceed

Construction

- Colder Weather Comes

Construction

- Deep Excavation Begins

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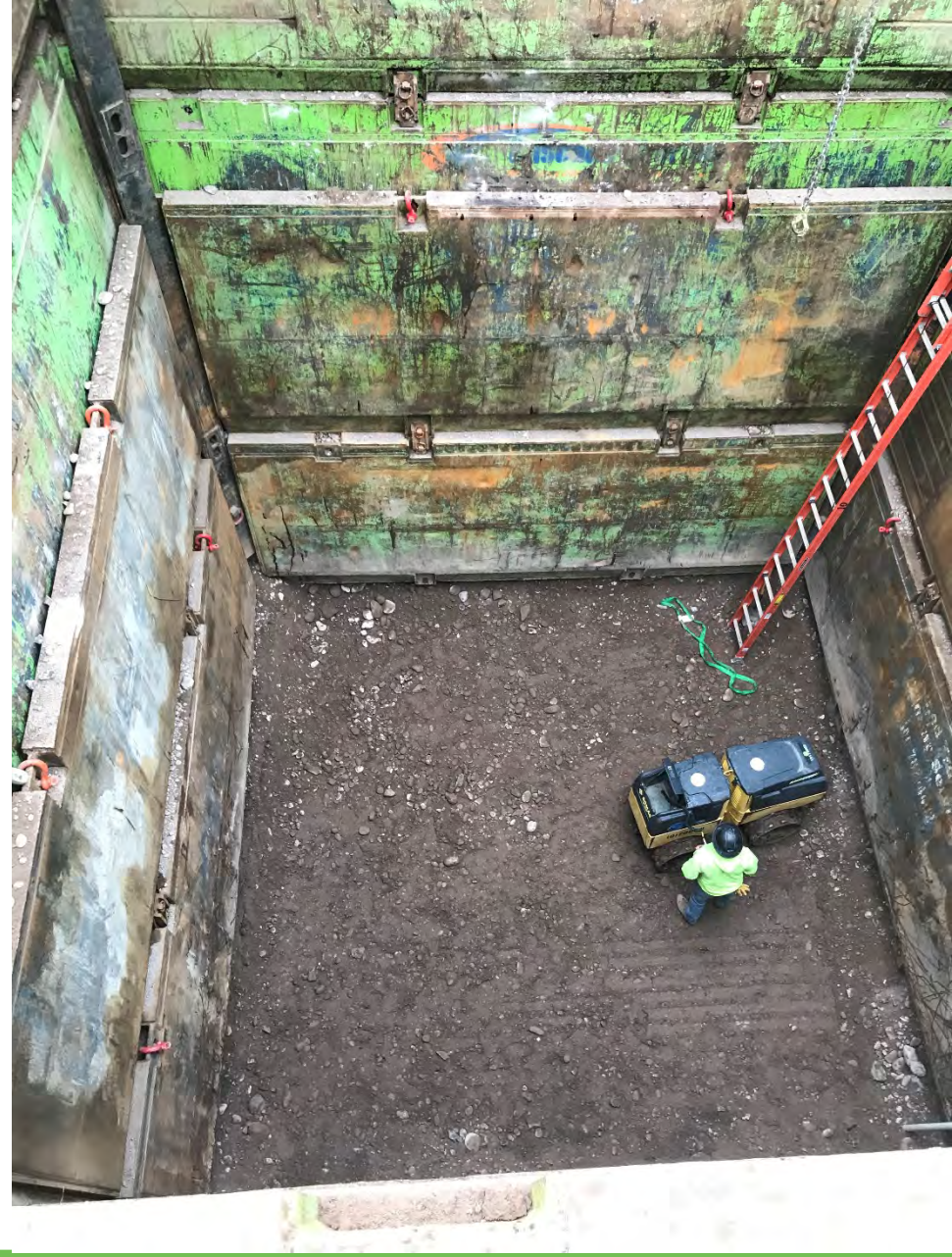
1945 • 2020

Construction

- Deep Excavation Continues
- Groundwater?




CRANE
GROVE
D&G CRANE

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Construction

- Test for leakage

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Construction

- Core the existing lift station

Construction

- Set the valve vault

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Construction

- The valve vault was equipped

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1945 • 2020

Construction

- Start setting pumps

Construction

- Reconnect forcemains and …

Construction

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Construction

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Construction

Construction

- Paved the multiuse path

Construction

Reserve Street Lift Station Stats

- 4 pumps – 1,000 gpm each
- Design Capacity of 3,000 gpm
- Construction Cost - $840,000
- Construction – 90 days

Next Steps

- Fine tuning of the pumps
- Monitor electrical usage

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Questions?

Jason Mercer
Water-Wastewater Market Group Leader
(406) 495-3488
jmercer@m-m.net

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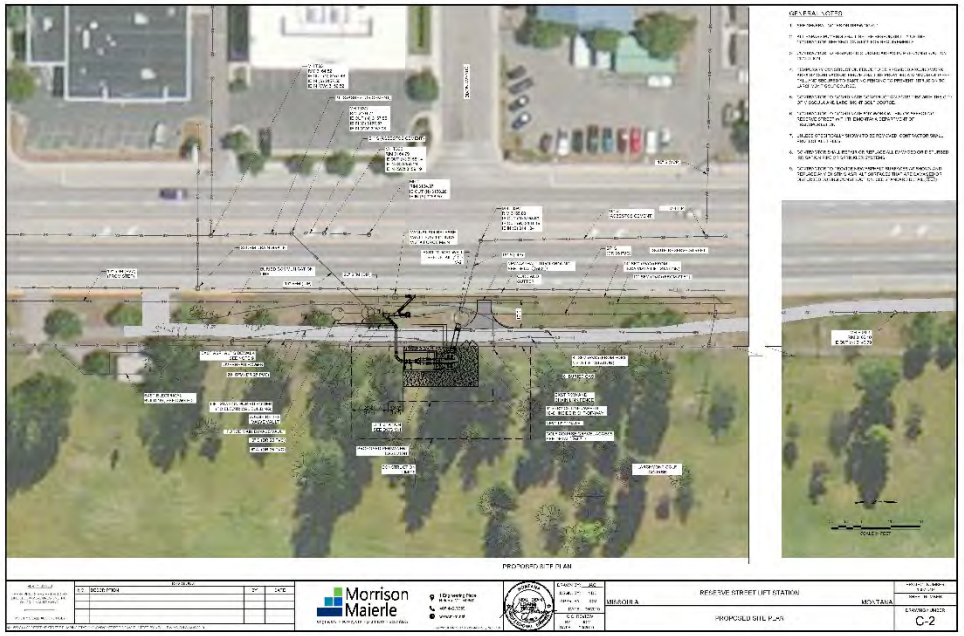
Morrison Maierle
RESERVE STREET LIFT STATION
PROPOSED SITE PLAN
C-2