



APPENDIX 4: GROWTH PLAN UTILITY ANALYSIS PERFORMED BY STANTEC

The following technical memo was used to inform the development of the Laramie Growth Area (LGA) Plan.

To: Melissa Ruth, AICP
 Logan Simpson
 213 Linden St, Ste. 300
 Fort Collins, CO 80524

From: Trent Rogers, EIT
 Stantec Consulting Services Inc
 7000 Yellowtail Road, Ste. 230
 Cheyenne, WY 82009

Project/File: Project No. 227705061
 Laramie Growth Area Plan

Date: February 28, 2023

Reference: Revised Cost Estimates for Proposed Utilities

This technical memorandum serves to provide the justification of the revised cost estimates for the proposed potable water system and proposed sanitary sewer system to the potential growth areas adjacent to the existing corporate limits of the City of Laramie, Wyoming.

In the technical memorandum dated October 7, 2022, to Cameron Gloss, Stantec provided a table with total quantities of the major items for the proposed potable water and sanitary sewer system expansions. For reference, these quantities are listed in Table 1.

Table 1 - Laramie Growth Area Plan - Potable Water and Sanitary Sewer Major Quantities

No.	DESCRIPTION	UNIT	QTY
1	6" Water Main	LF	34900
2	8" Water Main	LF	24500
3	10" Water Main	LF	39000
4	12" Water Main	LF	20200
5	14" Water Main	LF	1050
6	Pressure Reducing Valve	EA	18
7	Water Pump Station	EA	2
8	Water Storage Tank	EA	2
9	8" Gravity Sewer Main	LF	115100
10	10" Gravity Sewer Main	LF	4410
11	12" Force Pressure Main	LF	1720
12	12" Gravity Sewer Main	LF	850
13	Sewer Lift Station	EA	1

In the aforementioned memorandum, Stantec provided a cost of \$45.5M for the potable water system expansion and \$38.5M for the sanitary sewer system expansion in 2022 dollars. On January 11, Stantec and Logan Simpson met with the City of Laramie staff to discuss the Laramie Growth Area Plan. During this meeting the City of Laramie Public Works mentioned the high cost of ongoing utility projects. Given this information, Stantec deemed it necessary to revise the cost estimate.

Reference: Revised Cost Estimates for Proposed Utilities

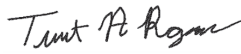
Stantec estimates that the items associated with the potable water system expansion presented in Table 1, may cost \$50M - \$80M in 2022 dollars for complete build out.

Stantec estimates that the items associated with the sanitary sewer system expansion presented in Table 1, may cost \$40M - \$70M in 2022 dollars for complete build out.

If you have any questions about the analysis, please feel free to contact us.

Best regards,

STANTEC CONSULTING SERVICES INC.

 Digitally signed by Trent Rogers
DN: C=US,
E=trent.rogers@stantec.com,
O=Stantec Consulting Services,
OU=Water Group, CN=Trent Rogers
Date: 2023.02.28 17:29:07-07'00'

Trent Rogers EIT
Civil Engineer in Training
Phone: 307-316-6831
Mobile: 307-640-5779
trent.rogers@stantec.com

Attachment: [None]

To: Cameron Gloss
 Logan Simpson
 213 Linden St., Ste. 300
 Fort Collins, CO 80524

From: Trent Rogers, EIT
 Stantec Consulting Services Inc
 7000 Yellowtail Road, Ste. 230
 Cheyenne, WY 82009

Project/File: Project No. 227705061
 Laramie Growth Area Plan

Date: October 7, 2022

Reference: Growth Plan Utility Analysis

This technical memorandum serves to provide the methodology and challenges related to providing potable water and sanitary sewer service to the potential growth areas adjacent to the existing corporate limits of the City of Laramie, Wyoming. The potential growth areas were provided by Logan Simpson and understood to be the most feasible and probable areas for future annexation and development related to the City of Laramie.

Table 1 - Future Land Use Categories

CATEGORY	DESCRIPTION
A	Agricultural
CC	Community Commercial
ER	Estate Residential
LI	Light Industrial
MF	Multi-Family Residential
N	Natural Areas, Parks, Open Space
NC	Neighborhood Commercial
P	Public
R	Ranchette
RR	Rural Residential
SF	Urban Single Family Residential
SR	Suburban Residential
UW	University of Wyoming agricultural

No utilities were assessed or anticipated for the “N”, “P”, and “UW” growth areas.

The assessments of the potential potable water and sanitary sewer service areas was based solely on capacity needs to serve each of these respective uses based on the conditions presented below. Operational performance of the existing water and sewer main networks was not assessed and is considered beyond the scope of this project.

Reference: Growth Plan Utility Analysis

The proposed potable water and sanitary sewer mains were generally located to provide those respective services to existing residences along with providing capacity for increased densities and additional growth associated with the potential growth areas. Where no residences are currently located within the potential growth areas, the proposed potable water and sanitary sewer mains were placed within existing road rights-of-way. Lastly, if no roads are currently present, the proposed potable water and sanitary sewer mains were placed to coincide with future planned roads that are shown in the 2018 Major Street Plan. Potable water mains were placed to maximize looping and minimize the number of dead-ends, and the sanitary sewer mains were placed to minimize the number of lift stations.

The sizing of the potable water and sanitary sewer mains were based on future zoning categories, shown in Table 1 above. This information was provided by Logan Simpson with the associated metadata embedded in the shapefiles of the associated growth areas. An average of 100 gpd/capita and 2.2 persons/residence, per the 2020 Census, were used for sanitary sewer capacity sizing. Minimum lot sizes for each respective future zoning category were provided by Logan Simpson. These lot sizes were used to determine the average daily flow rates for each respective pipe located in the potential future growth areas. By using a peaking factor of 3.0 and an additional sizing factor of 2.0 per WYDEQ requirements, the maximum flow rates for each pipe were estimated. The sewer mains were sized to accommodate the maximum flowrate at 80% capacity.

The potable water mains were sized with a similar methodology. A design peak flowrate of 200 gpd/capita was used for the potable water main sizing. Again, using 2.2 persons/residence and the minimum lot sizes for each respective future zoning category provided by Logan Simpson, the daily peak flow rates were estimated. These estimated flow rates were used to size each proposed potable water main within the respective growth areas. Pressure reducing valves will be necessary in many cases to maintain existing pressure zones with the City of Laramie and to prevent future zones from operating outside of standard pressure ranges. In addition to additional pressure reducing valves, there will be a need for a few additional pump stations to provide system pressure and/or supply water storage tanks to then provide gravity pressure to the expanded service area. For reference, the total quantities of major items are listed in Table 2 2.

Reference: Growth Plan Utility Analysis

Table 2 2 - Laramie Growth Area Plan - Water and Sewer Quantities

No.	DESCRIPTION	UNIT	QTY
1	6" Water Main	LF	34900
2	8" Water Main	LF	24500
3	10" Water Main	LF	39000
4	12" Water Main	LF	20200
5	14" Water Main	LF	1050
6	Pressure Reducing Valve	EA	18
7	Water Pump Station	EA	2
8	Water Storage Tank	EA	2
9	8" Gravity Sewer Main	LF	115100
10	10" Gravity Sewer Main	LF	4410
11	12" Force Pressure Main	LF	1720
12	12" Gravity Sewer Main	LF	850
13	Sewer Lift Station	EA	1

Stantec has identified the following potential challenges to implementing the current growth plan:

1. Unknown phasing
2. Construction Capital and On-going Maintenance Costs
3. Right-of-way
4. Additional pressure zones to serve several areas within the growth boundary
5. Additional water storage capacity needs
6. Existing system capacities may be limiting

Stantec estimates that the items associated with the potable water system expansion presented in Table 2, above, may cost \$45.5M in 2022 for complete build out.

Stantec estimates that the items associated with the sanitary sewer system expansion presented in Table 2, above, may cost \$38.5M in 2022 for complete build out.

As stated above, no existing system capacities were assessed within this study, however, during previous stakeholder meetings it was discussed that the east to west sanitary sewer systems were the critical limiting factor that currently exists within the developed area of the City of Laramie. While these existing system limitations are known, it appears from our assessment of the potential future growth areas, that most of the existing system sizing has been installed to accommodate growth in these new areas. It should be made clear that portions of the existing potable water and sanitary sewer systems will need to be upsized to accommodate expansion in certain areas, but from our assessment this appears to be minimized.

It should also be noted that no right-of-way concerns were assessed during our associated work. It is assumed that acquisition of these utility corridors can be secured through deed or easement as these areas build out.

If you have any questions about the analysis, please feel free contact us.

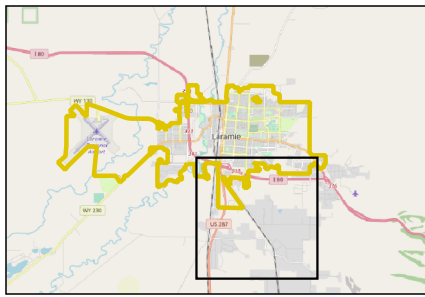
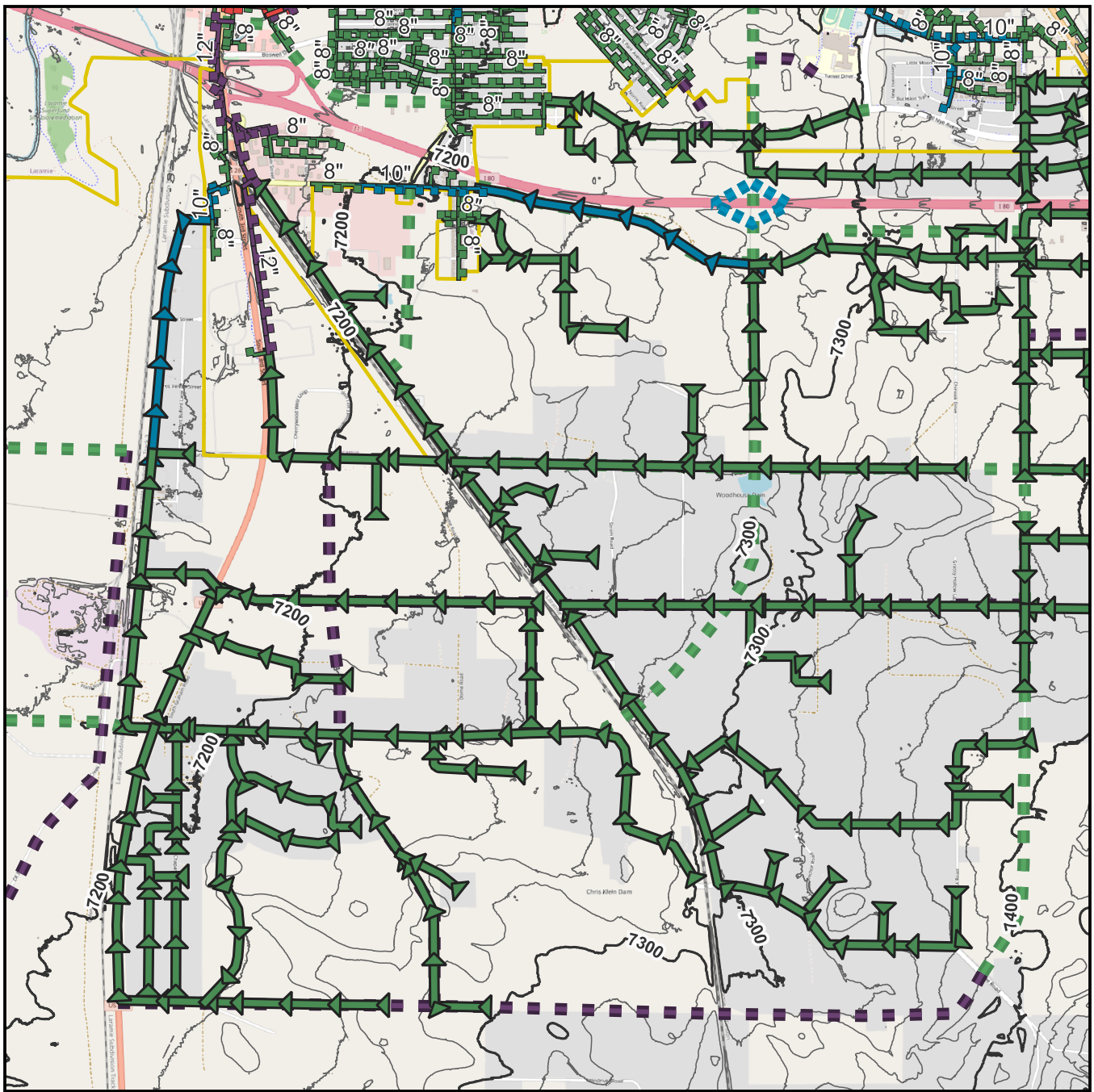
October 7, 2022
Cameron Gloss
Page 4 of 4

Reference: Growth Plan Utility Analysis

Best regards,

STANTEC CONSULTING SERVICES INC.

Trent Rogers EIT
Civil Engineer in Training
trent.rogers@stantec.com



Legend

Existing Sewer Mains	Municipal Boundary
6" - 8"	Municipal Boundary
8" - 10"	Elevation Contours
10" - 16"	100-ft
16" - 24"	20-ft
Proposed Sewer Mains	
8"	
10"	
2018 Major Street Plan	
Future Roadways	
Minor Arterial	
Collector	
Interstate	

0 2,000 4,000 ft

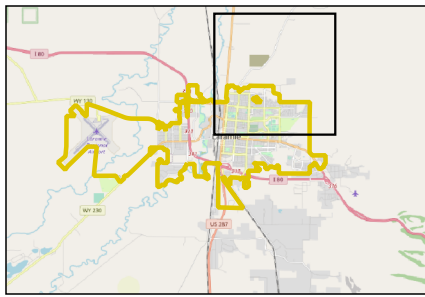
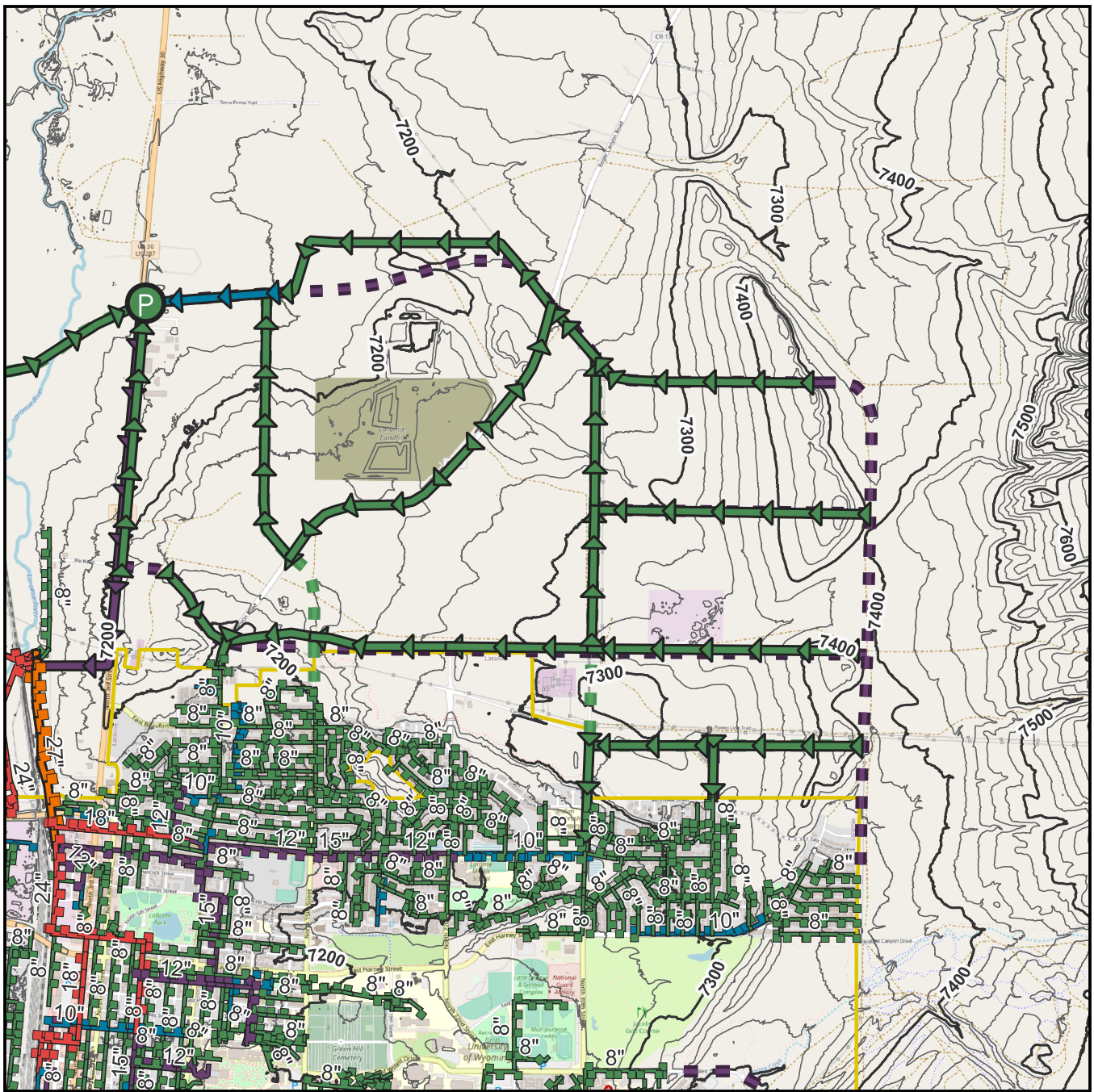
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Project Location: Albany County, WY
Client/Project: 227705061

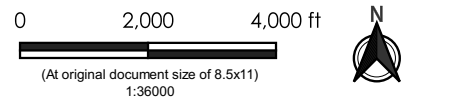
Figure No. 1

Title
Laramie Area Growth Plan - Proposed Sewer Mains for South Growth Area

Notes:
 1. Map Coordinate Reference System = EPSG:3736
 2. Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors.
 3. Elevation contours derived from U.S. Geological Survey, 2022, USGS Original Product Resolution WY South Central 2020 D20.
 4. Data Sources: City of Laramie and Albany County



- Legend**
- Existing Sewer Mains**
 - 6" - 8"
 - 8" - 10"
 - 10" - 16"
 - 16" - 24"
 - > 24"
 - Proposed Sewer Mains**
 - 8"
 - 10"
 - 12"
 - 2018 Major Street Plan**
 - Minor Arterial
 - Collector
 - Municipal Boundary**
 - Municipal Boundary
 - Elevation Contours**
 - 100-ft
 - 20-ft
 - Proposed Lift Station**
 - P



Laramie
AREA GROWTH
PLAN

Stantec

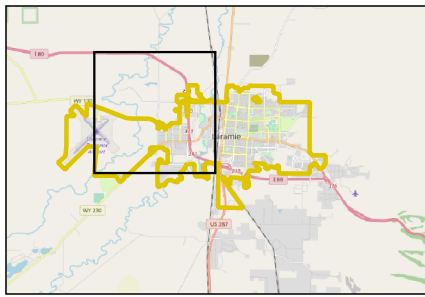
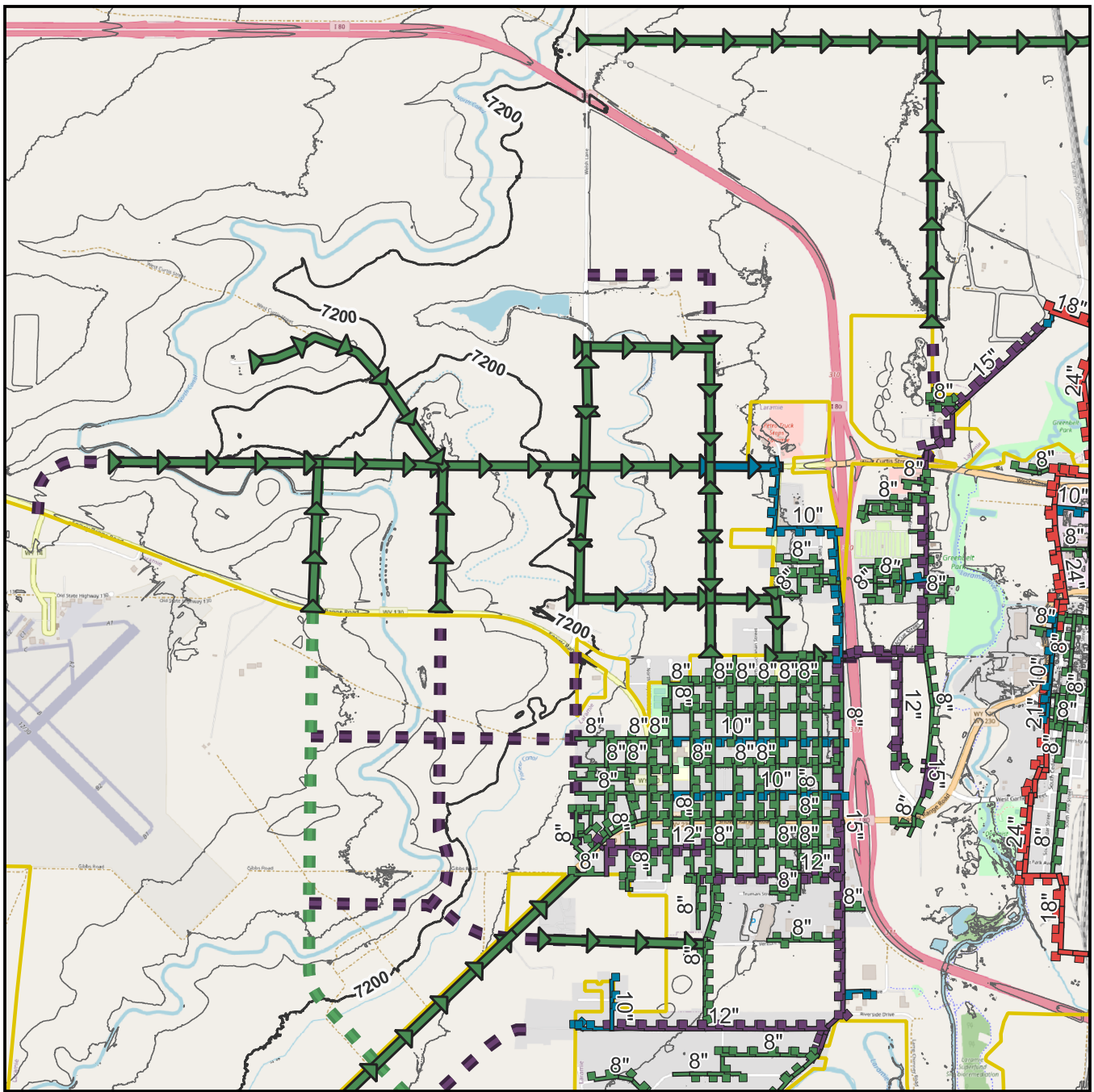
Project Location: Albany County, WY
 Client/Project: 227705061
 Prepared by TAR on 10/05/2022

Notes:

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3. Elevation contours derived from U.S. Geological Survey, 2022, USGS Original Product Resolution WY South Central 2020 D20.
4. Data Sources: City of Laramie and Albany County

Figure No. **3**

Title
Laramie Area Growth Plan - Proposed Sewer Mains for North Growth Area



Legend

Existing Sewer Mains

- 6" - 8"
- 8" - 10"
- 10" - 16"
- 16" - 24"

Proposed Sewer Mains

- 8"
- 10"

2018 Major Street Plan

Future Roadways

- Minor Arterial
- Collector

Municipal Boundary

- Municipal Boundary

Elevation Contours

- 100-ft
- 20-ft

0 2,000 4,000 ft

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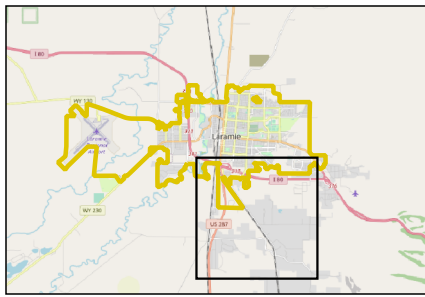
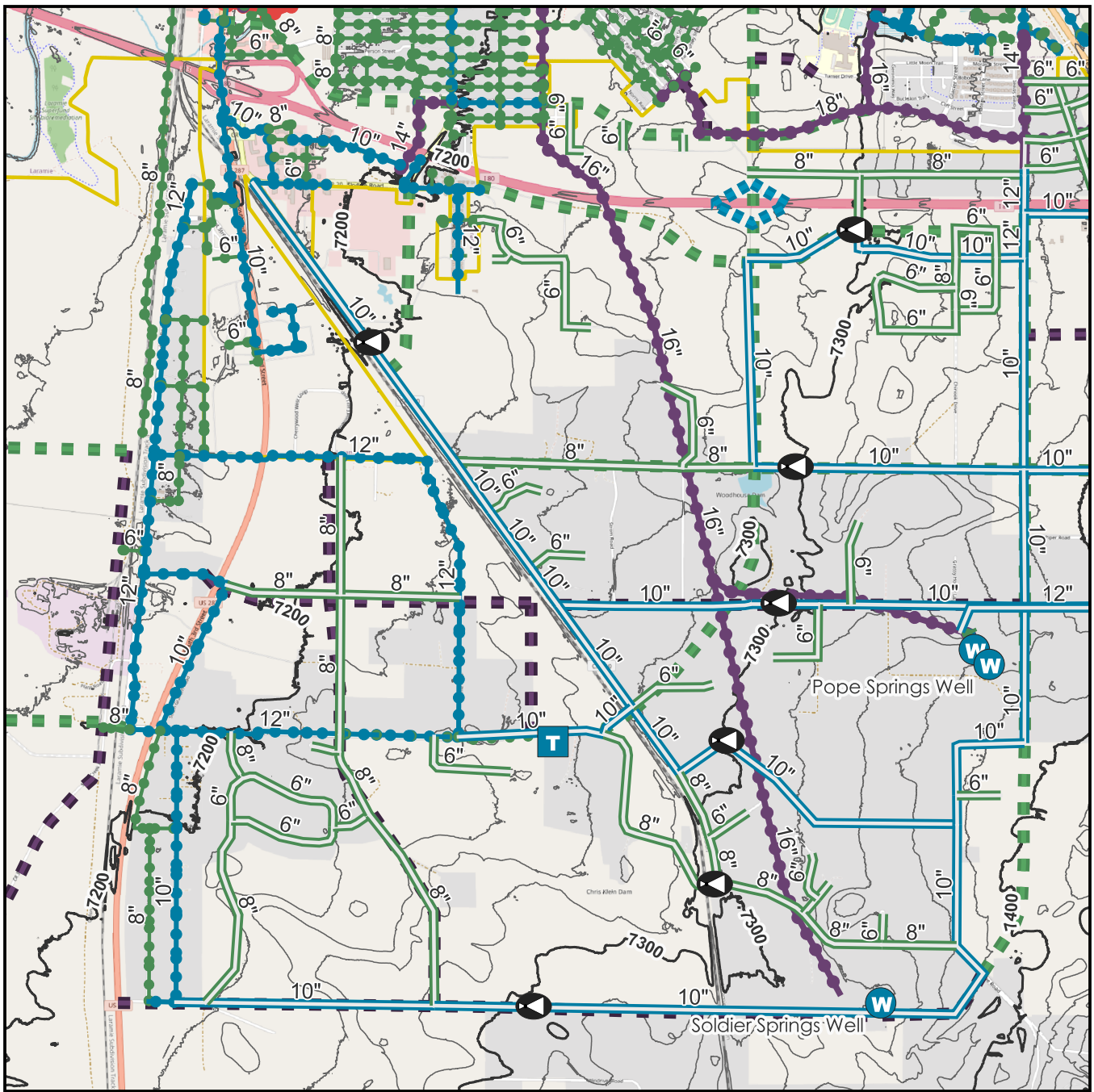
Project Location: Albany County, WY
Client/Project: 227705061
Prepared by TAR on 10/05/2022

Notes:

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3. Elevation contours derived from U.S. Geological Survey, 2022, USGS Original Product Resolution WY South Central 2020 D20.
4. Data Sources: City of Laramie and Albany County

Figure No. 4

Title: **Laramie Area Growth Plan - Proposed Sewer Mains for Northwest Growth Area**



- Legend**
- Existing Water Mains**
 - 4" - 8"
 - 8" - 12"
 - 12" - 18"
 - 18" - 24"
 - Proposed Water Mains**
 - 6" - 8"
 - 8" - 12"
 - 12" - 18"
 - Existing Tanks** (T)
 - Wellfield** (W)
 - Proposed PRV** (circle with triangle)
 - 2018 Major Street Plan**
 - Future Roadways**
 - Minor Arterial
 - Collector
 - Interstate
 - Municipal Boundary** (yellow outline)
 - Elevation Contours**
 - 100-ft
 - 20-ft

0 2,000 4,000 ft

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Laramie AREA GROWTH PLAN

Stantec

Notes:

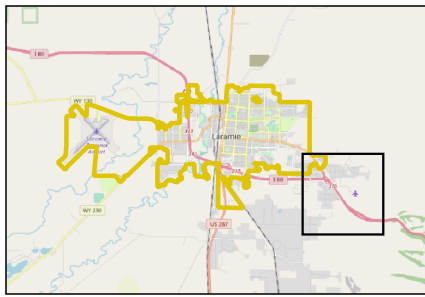
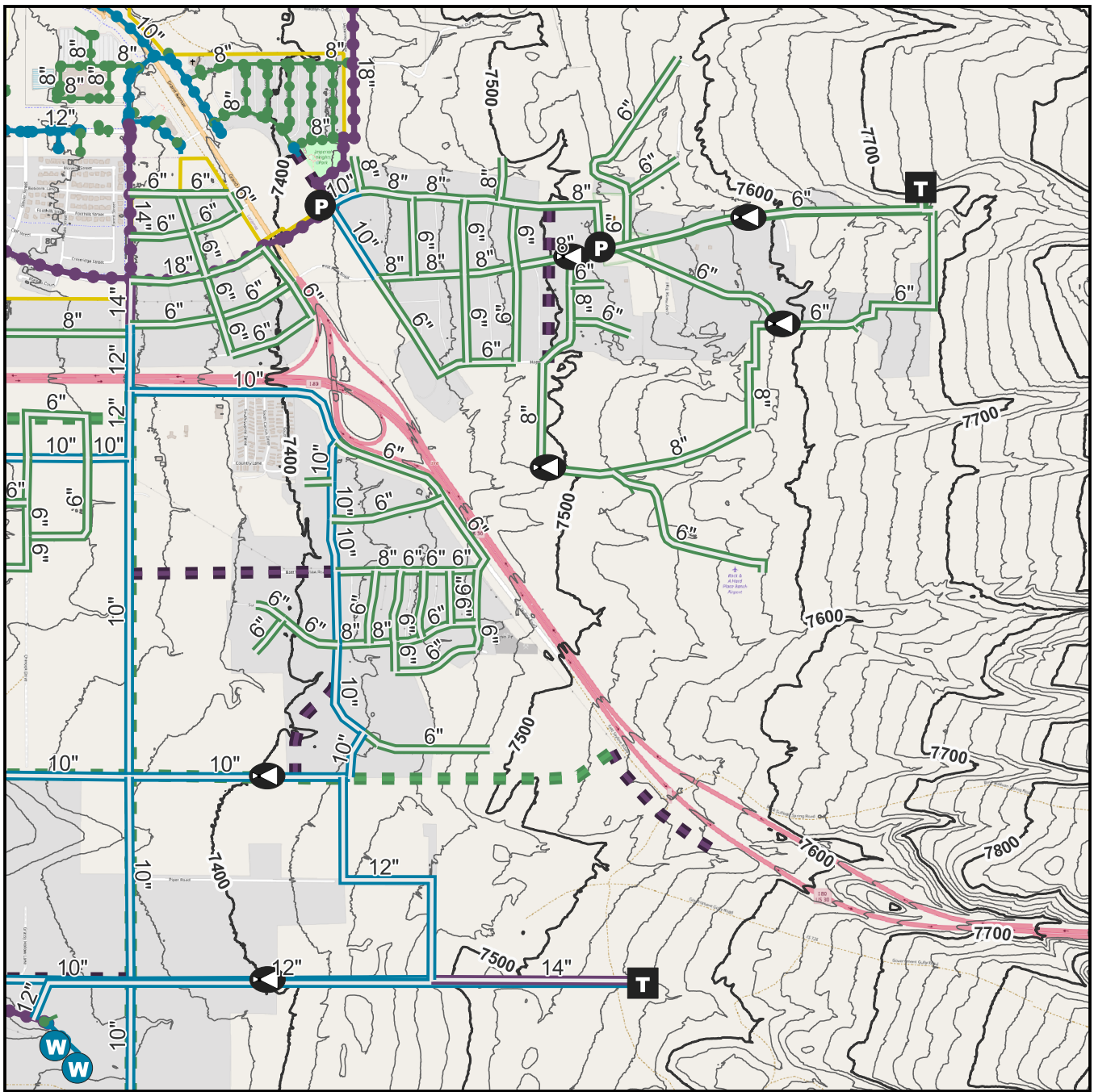
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3. Elevation contours derived from U.S. Geological Survey, 2022, USGS Original Product Resolution WY South Central 2020 D20.
4. Data Sources: City of Laramie and Albany County

Project Location: Albany County, WY
Client/Project: 227705061

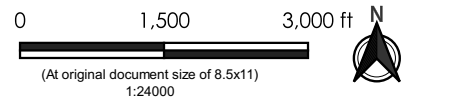
Prepared by TAR on 10/04/2022

Figure No. 1

Title: **Laramie Area Growth Plan - Proposed Water Mains for South Growth Area**



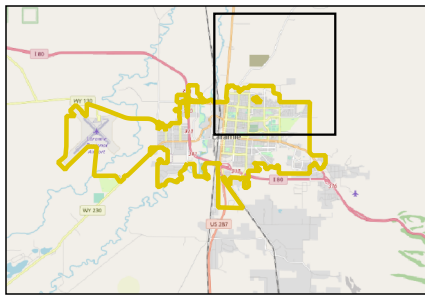
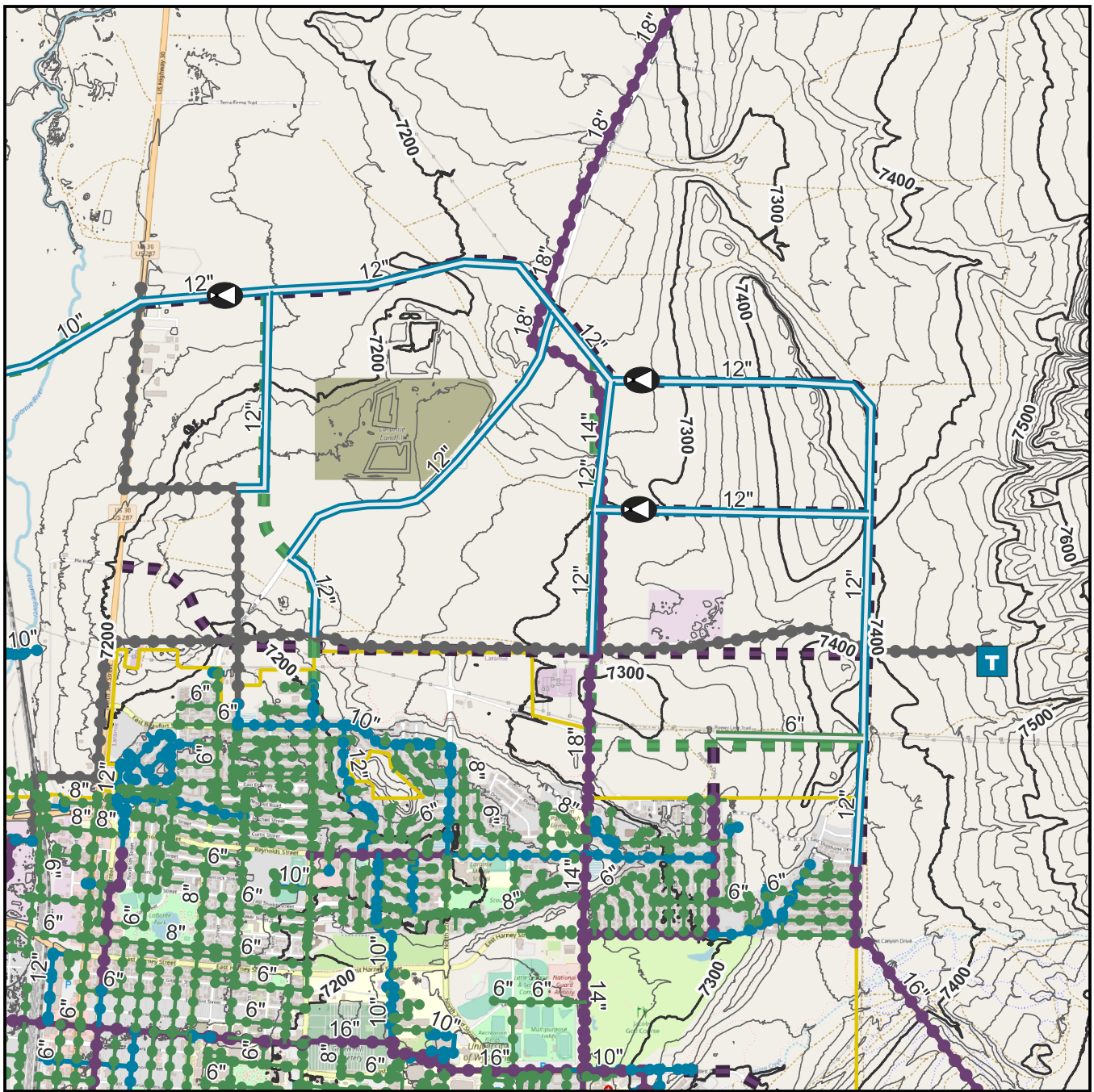
- Legend**
- Existing Water Mains**
 - 4" - 8"
 - 8" - 12"
 - 12" - 18"
 - Proposed Water Mains**
 - 6" - 8"
 - 8" - 12"
 - 12" - 18"
 - Wellfield** (W)
 - Proposed Pumps** (P)
 - Proposed Tanks** (T)
 - Proposed PRV** (circle with dot)
 - 2018 Major Street Plan Future Roadways**
 - Minor Arterial
 - Collector
 - Municipal Boundary** (yellow outline)
 - Elevation Contours**
 - 100-ft
 - 20-ft



Project Location: Albany County, WY
 Client/Project: 227705061
 Prepared by TAR on 10/04/2022

Notes:
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 3. Elevation contours derived from U.S. Geological Survey, 2022, USGS Original Product Resolution WY South Central 2020 D20.
 4. Data Sources: City of Laramie and Albany County

Figure No. **2**
 Title
Laramie Area Growth Plan - Proposed Water Mains for East Growth Area



- Legend**
- Existing Water Mains**
 - 4" - 8"
 - 8" - 12"
 - 12" - 18"
 - Proposed Water Mains**
 - 6" - 8"
 - 8" - 12"
 - Existing Tanks**
 - T
 - Laramie Projects**
 -
 - Proposed PRV**
 -
 - 2018 Major Street Plan**
 - Future Roadways
 - Minor Arterial
 - Collector
 - Municipal Boundary**
 - Municipal Boundary
 - Elevation Contours**
 - 100-ft
 - 20-ft

0 2,000 4,000 ft

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Laramie AREA GROWTH PLAN

Stantec

Project Location: Albany County, WY
Client/Project: 227705061

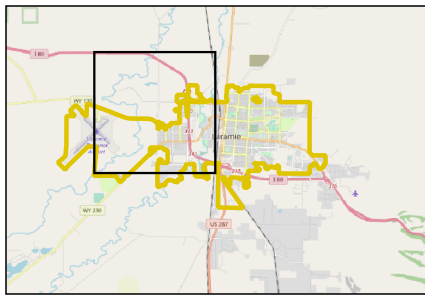
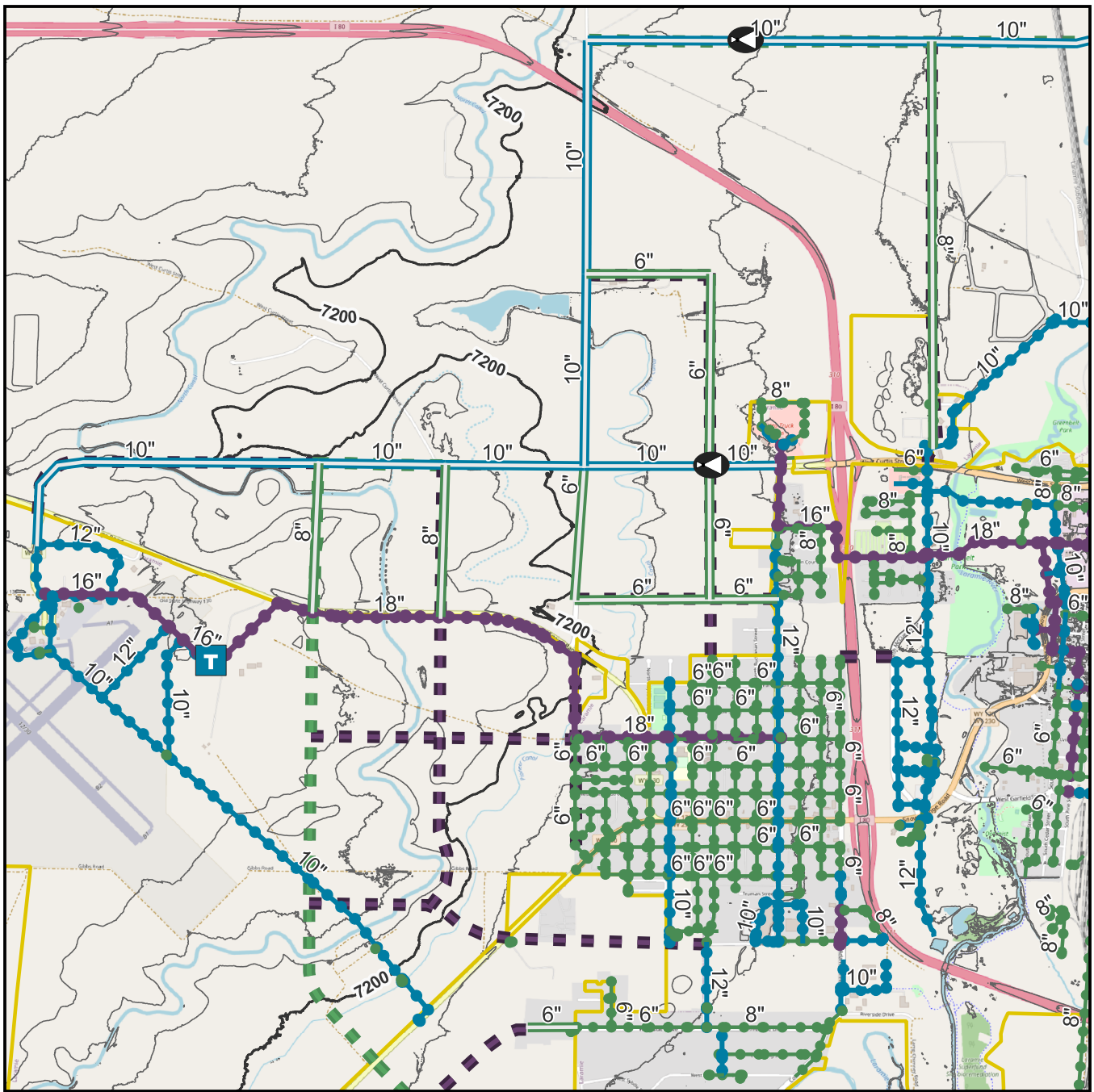
Prepared by TAR on 10/04/2022

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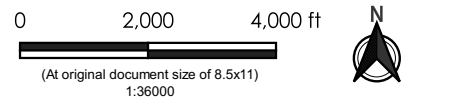
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2. Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors.
3. Elevation contours derived from U.S. Geological Survey, 2022, USGS Original Product Resolution WY South Central 2020 D20.
4. Data Sources: City of Laramie and Albany County

Figure No. **3**

Title
Laramie Area Growth Plan - Proposed Water Mains for North Growth Area



Legend	
Existing Water Mains	2018 Major Street Plan
4" - 8"	Future Roadways
8" - 12"	Minor Arterial
12" - 18"	Collector
Existing Tanks	Municipal Boundary
Proposed Water Mains	Municipal Boundary
6" - 8"	Elevation Contours
8" - 12"	100-ft
Proposed PRV	20-ft



Project Location: Albany County, WY
 Client/Project: 227705061
 Prepared by TAR on 10/04/2022

Notes:
 1. Map Coordinate Reference System = EPSG:3736
 2. Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors.
 3. Elevation contours derived from U.S. Geological Survey, 2022, USGS Original Product Resolution WY South Central 2020 D20.
 4. Data Sources: City of Laramie and Albany County

Figure No. 4
 Title: **Laramie Area Growth Plan - Proposed Water Mains for Northwest Growth Area**