

FINAL CONCEPTUAL DESIGN REPORT
IVINSON STREET RECONSTRUCTION PROJECT

January 19, 2016

Project #: 415-023-002

SUBMITTED BY: Trihydro Corporation

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1.0 INTRODUCTION

This report documents the conceptual design phase activities performed during the Ivinson Street Reconstruction Project for the City of Laramie (City), as well as the core elements for the path forward for the final design phase. This section includes the project location, scope of conceptual design, and phasing approach.

1.1 PROJECT LOCATION

The Ivinson Street Reconstruction Project (the “project”) conceptual design includes Ivinson Street between 9th Street on the west to 15th Street on the east, and 10th – 14th Streets between Ivinson Street and Grand Avenue. In addition, the project includes 15th Street, extending from Grand Avenue on the south to Willett Drive on the north. Supplemental work has also been identified outside these limits to accommodate utility upgrades and roadway pavement marking transitions. The project limits and additional work locations are presented on Figure 1.

1.2 PROJECT BACKGROUND AND SCOPE

The project includes a full roadway reconstruction. The purpose of the project is to provide a “Complete Street” design for bicycle, pedestrian, and vehicle transportation to meet the long range plans of the City and the University of Wyoming (UW), with the following primary goals in mind:

- Enhance pedestrian and bicycle safety
- Help guide pedestrians to crosswalks
- Maintain vehicular traffic safety and overall streetscape appearance
- Promote a functional multi-modal transit system
- Provide a defined roadway corridor to downtown Laramie

The conceptual phase of the project encompassed preliminary roadway design, traffic data collection and analysis, as well as preliminary analysis of the existing utility infrastructure within the project limits. This included the sanitary sewer system, storm drain system, and water line system.

1.3 PROJECT APPROACH

The conceptual design involved a phased approach, which included a 10%, 50%, and a final concept level, where each phase channeled multiple potential streetscape concepts and utility designs from a conceptual level, to a select, more detailed concept for each street. The roadway cross section concepts developed early in the design process utilized

streetmix.net; a web-based application. This simple, yet quick method, allowed the design team to develop and evaluate numerous cross section alternatives effectively and efficiently.

2.0 STREETScape DESIGN

This section includes the streetscape design options considered for Ivinson Street, 15th Street, and the connecting streets between Ivinson Street and Grand Avenue (10th through 14th Street). This section also details the elimination process to come to the final conceptual design for each location.

2.1 10% CONCEPTUAL DESIGN

Following a project kick-off meeting (Trihydro 2015a) and site walk through, the design team developed the 10% conceptual design memorandum (Trihydro 2015b). This document listed 16 roadway cross sections (8 for Ivinson Street, 8 for 10th Street to 15th Street) for review and consideration, with recommendations provided. The streetscape concepts displayed variations of three major elements; (1) vehicle travel lanes, (2) bicycle lanes, and (3) parking.

Ivinson Street

The conceptual streetscape configurations for Ivinson Street included features such as curbed medians, chicane islands, and shared bicycle-pedestrian lanes. The bicycle facilities also included both a standard “opposite-side” configuration and a cycle-track configuration, where both lanes are located on the same side of the street. Parking arrangements varied between parallel-style, diagonal, back-in diagonal, and no parking. The concepts provided during the 10% level did not include one-way vehicle movement.

15th Street

Two conceptual streetscape configurations were provided for 15th Street at the 10% level, as the existing street section did not warrant significant alteration from a vehicular travel or pedestrian perspective. The two concepts involved one vision with bike lanes on opposite sides of the street with the other using a cycle-track configuration, similar to Ivinson Street that if selected would connect to the cycle track on Ivinson Street.

13th Street

13th Street was described as the “Gateway to the University” during the project kickoff meeting, as a large percentage of multi-modal traffic uses 13th Street to access the core of UW. Three concepts, separate from the remaining side streets were provided at the 10% level. These concepts included one option with a raised center median (no parking), an option with no center median and parallel parking, and an option with diagonal parking on both sides, without separate bike facilities or a median island.

Connecting (10th, 11th, 12th, and 14th) Streets

The connecting streets are classified as local streets, with a lesser volume of vehicle, pedestrian, and bicycle traffic. The options provided at the 10% level for these streets looked to maintain the roadway width and configuration without added traffic or bicycle features, yet provide additional on-street parking.

Roadway Enhancement Features

Additional roadway enhancements were provided at the 10% level to help aid in the vision of a total streetscape design. These elements included raised intersections at 13th/Ivinson, and 15th/Ivinson, as well as intersection curb bulb-outs where feasible to provide enhanced pedestrian connectivity.

10% Conceptual Design Review

A follow-up meeting was held to discuss the streetscape concepts proposed, understand each stakeholder's preferred alternatives, and decide which alternatives/streetscape features to move forward to the 50% conceptual design. An item of note was to incorporate at least two (2) one-way traffic concepts for Ivinson Street, from east to west going into the 50% conceptual design. Transcription from the 10% review meeting were provided in minutes dated August 10, 2015 (Trihydro 2015c).

2.2 50% CONCEPTUAL DESIGN

The 50% conceptual design included the endorsed alternatives from the 10% design, as well as two one-way options on Ivinson Street. The 50% conceptual design was developed and provided to the City on September 1, 2015 (Trihydro 2015d).

Ivinson Street

The conceptual streetscape alternatives included five options, which provided a mix of bike lane, vehicular movement, and parking configurations. These options included:

- Bike Lanes + Crossing Median (2-way traffic)
- Cycle Track + Parallel Parking (2-way traffic)
- Cycle Track + Diagonal Parking (1-way traffic)
- Bike Lanes + Parallel Parking (1-way traffic)
- Cycle Track + Parallel Parking (1-way traffic)

15th Street

Two conceptual streetscape configurations provided at the 10% level were brought forward to the 50% design, maintaining the same configuration, which included:

- Single Vehicular Travel Lanes + Bike Lanes + Median Islands/Turn Lanes
- Cycle Track + Median Islands/Turn Lanes

13th Street

Two of the three conceptual streetscape configurations provided at the 10% level were brought forward to the 50% design, and included:

- Bike Lanes + Parallel Parking
- Bike Lanes + Center Median + No Parking

Connecting (10th, 11th, 12th, and 14th) Streets

Two conceptual streetscape configurations provided at the 10% level were brought forward to the 50% stage, which included:

- Shared-use + Back-In Diagonal Parking and Parallel Parking
- One-way Couplets + Back-In Diagonal Parking

Roadway Enhancement Features

Potential corridor enhancement features were provided in the 50% design. These elements included raised intersections and crosswalks, curb extension “bulb-outs,” the cycle track concept, back-in diagonal parking, a festival street appearance, bioretention areas, wayfinding signage, and public art.

50% Conceptual Design Review

A follow-up meeting was held to discuss the streetscape concepts proposed, removing concepts that did not fit the project vision, as well as preparation for a public meeting to gather public feedback on the options provided.

2.3 PUBLIC MEETING

A public meeting was held at the University of Wyoming – Union Family Room to present the design team’s chosen streetscape alternatives. These alternatives included a total of four options (2 one-way and 2 two-way vehicular traffic)

for Ivinson Street, as well as the City and UW preferred alternatives for 15th Street, 13th Street, and the connecting streets. The configurations brought forth to the public meeting included:

Iverson Street:

- Cycle Track + Parallel Parking (2-way traffic)
- Cycle Track + Back-in Diagonal Parking (1-way traffic)
- Bike Lanes + Back-in Diagonal Parking (1-way traffic)
- Cycle Track + Back-in Diagonal Parking (2-way traffic)

15th Street:

- Cycle Track + Median Islands/Turn Lanes

13th Street:

- Bike Lanes + Center Median + No Parking

Connecting Streets:

- Shared Use + Back-In/Parallel Parking

Based on feedback from the public, the design team could provide better assessment of the configurations, and come to agreement on the preferred alternative.

3.0 FINAL CONCEPTUAL DESIGN

A number of streetscape alternatives were evaluated to meet the project goals. The project team held a review meeting subsequent to the public meeting to evaluate public comments and obtain feedback from the City, UW, and the design team (Trihydro, 2015f). It was decided that the one-way Ivinson Street concepts were not favorable, thus eliminating these concepts from further consideration. Moreover, the back-in diagonal parking posed a new concept that is being used in other communities to add additional, safer parking than traditional pull-in angle parking or parallel parking, and all parties (design team and the public) supported. The overall choice was to pursue the two-way, cycle track, back-in angle parking concept. A schematic of this alternative is shown below.

Ivinson Street Cross Section



3.1 CONCEPT MODIFICATIONS

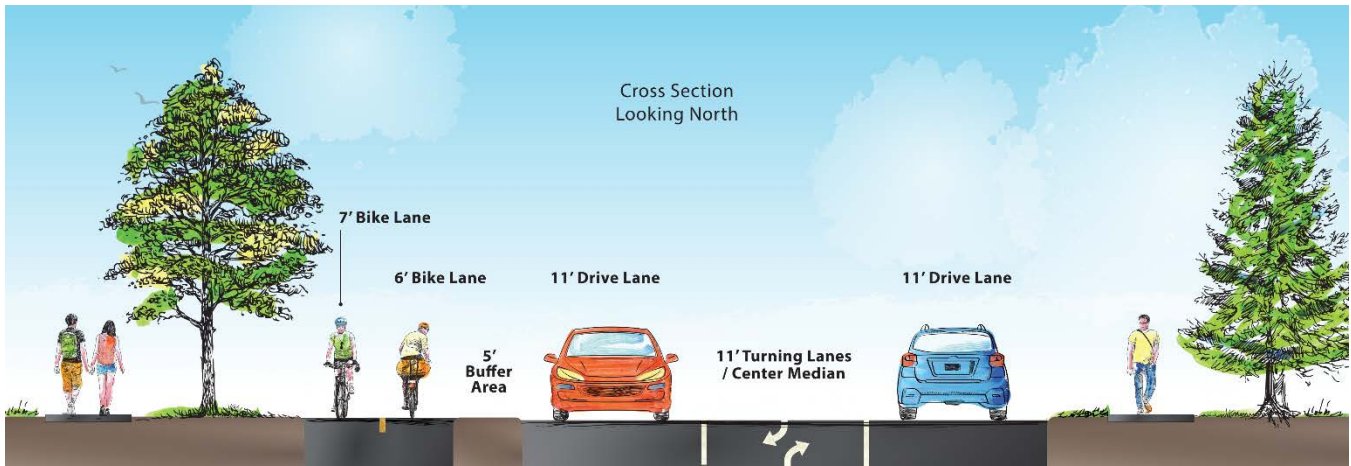
The two-way, cycle track, with back-in diagonal parking alternative presented during the public meeting (shown above) included two (2) six-foot wide bike lanes, two (2) nine-foot wide roadway driving lanes, along with a 16' wide parking area. The City expressed a preference for wider (11-foot preferred) vehicle travel lanes. This is to provide emergency vehicle mobility and give some space cushion for passenger vehicles when driving. The existing roadway survey and features were examined to provide an in-depth cross section and typical roadway sections with greater detail, (see attached Figure 2, each cross section is facing east) and were generally agreed upon.

The proposed roadway footprint in Figure 2 shows a roadway width of approximately 6-inches to 1-foot greater than the existing roadway footprint. This extra space will be utilized from the south side of the street. The City has

determined that the power line located on the south side of the street will be relocated underground which will aid in accommodating this extra width.

15th Street concept was well received by the public, and no revisions to the conceptual cross section were made following the public meeting. The schematic below shows the cross section chosen to proceed into final design. The cycle track between Ivinson Street and Grand Avenue will remain an item for consideration moving into final design, and discussions with WYDOT will need to occur to better understand the path forward for bicycle facilities in this area.

15th Street Cross Section



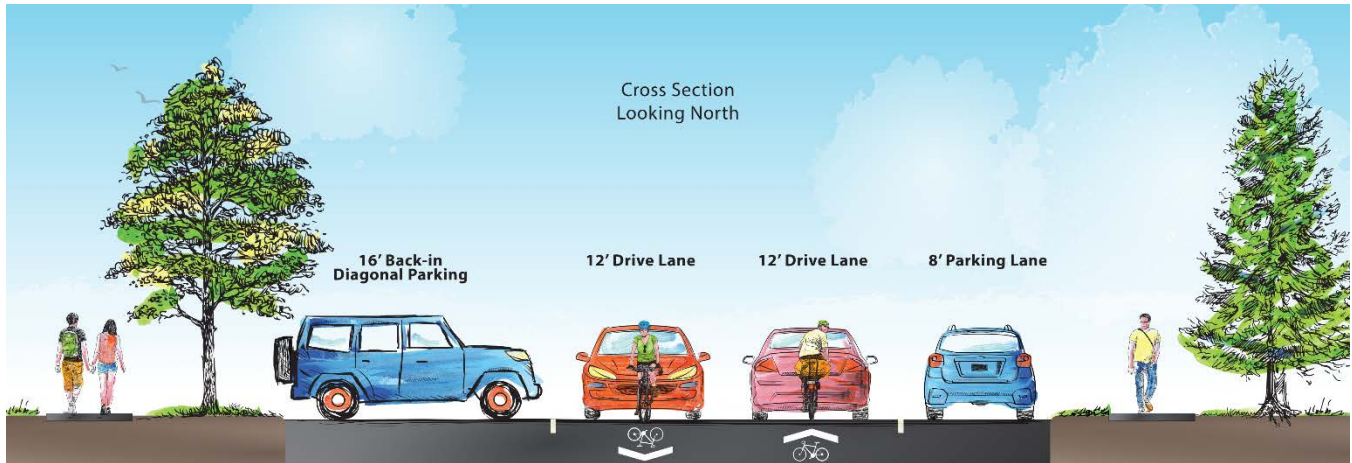
13th Street concept was also well received by the public, and no revisions to the conceptual cross section were made following the public meeting. The schematic below shows the cross section chosen to continue into final design.

13th Street Cross Section



The connecting streets concepts did not have revisions to the conceptual cross section following the public meeting. The schematic below shows the cross section chosen to continue into final design.

Connecting Streets (10th to 14th) Cross Sections



4.0 UTILITY CONCEPTUAL DESIGN

This section provides the conceptual design for the water system, sanitary sewer system, and storm sewer system upgrades proposed with the project.

4.1 WATER SYSTEM

The overall goal for the water system concept is to allow the City of Laramie to install new water lines in conjunction with the proposed street reconstruction project.

The current City of Laramie water system does not include a water main in Iverson Street. The proposed street reconstruction project will provide an opportunity to loop the water system and eliminate the existing dead-end lines on the side streets. This will help improve water quality, equalize pressures, and provide critical system operation redundancy. Existing appurtenances (e.g. fire hydrants) will be replaced, and new installed, where needed.

Figure 3 (Iverson Street/Connecting Streets) and Figure 4 (15th Street) show the conceptual plan for water system improvements. There is a pressure zone break in the study area between Zone 1 and Zone 2. Laterals on 10th, 11th, 12th, and 14th extend from the water main in Grand Avenue to the north. There is also a parallel 8-inch main in 9th Street, which is in pressure Zone 1. An 8-inch main is located on 15th Street that partially extends onto Iverson Street which is served by pressure Zone 2, which would be replaced by a 12-inch main, as shown on Figure 4.

The scenario provided includes a connection to the existing main at the intersection of Iverson and 9th Streets. This would provide a loop of Zone 1 water to tie in the existing Zone 1 laterals, east through 12th Street. Zone 2 could then be connected to the 13th Street main that currently serves the campus and extend the new line east to connect at a location near 15th Street providing a Zone 2 loop. The 14th Street line could be extended to Iverson Street if desired by the City, however it is currently not a dead end. This scenario keeps the pressure zones separated, eliminating the cost of a zone break.

4.2 SANITARY SEWER SYSTEM

There are currently up to 4 sanitary sewer lines in the Iverson Street corridor. The goal of this project is to combine these multiple sanitary sewer lines to one line within the corridor. The four existing sanitary sewer lines within the Iverson Street corridor vary in size, between 6- and 15-inches in diameter. Additional pipe details are provided in the 50% Conceptual Design Memorandum dated September 1, 2015 (Trihydro, 2015d).

Proposed Sanitary Sewer

The preferred option selected by the City during the course of the conceptual phase for Ivinson Street included combining all sanitary sewers along Ivinson Street into one 15-inch sanitary sewer. The Wyoming Department of Environmental Quality (WDEQ) requirements will extend the project limits for the sanitary sewer portion from 9th Street west to 6th Street in order to connect the proposed 15-inch sanitary sewer directly to the City's C-Line Interceptor. It is anticipated that WDEQ might require the replacement of 1.5 blocks of the C-Line Interceptor between 9th Street and the mid-block between University Avenue and Fremont Street. The replacement of this section of the C-Line may be required due to the current parallel configuration of the C-Line interceptor which is a 10-inch pipe and a 15-inch pipe. The use of splitter manholes (which would be required at Ivinson and 6th Streets) typically requires additional effort to receive DEQ approval, including manhole details, justification for a splitter, and a maintenance plan. Additional discussion with WDEQ, including a response to a memo Trihydro prepared dated October 19, 2015 (Trihydro, 2015g), clarified that no design would be approved without sanitary flow measurements or a sanitary sewer flow study being performed. This study is scheduled to be performed as part of the final design. The layout for the proposed sanitary sewer is shown on Figure 5.

Additional sanitary sewer improvements being completed as part of the project include removal and replacement of the existing 8-inch sanitary sewer between Fraternity Row and Ivinson Street. The construction along 15th Street will also include grade modification of the sanitary sewer in order to tie into the proposed 15 inch sanitary sewer at the intersection of 15th Street and Ivinson Street.

4.3 STORM DRAIN SYSTEM

At present, the storm drain system in Ivinson Street consists of 18- to 24-inch pipe along with 29"x45" pipe in 15th Street, with inlets tied to these main lines. Concurrently with the conceptual design, the City is working to revise its South Laramie Drainage Master Plan which includes this area. City staff conveyed that the analysis of this area indicates the existing storm drain network appears to be sized appropriately within the limits of the project. Based on this information, the storm drain network has been identified to be replaced "in-kind." As the Master Plan remains in draft stage, adjustments in pipe sizes may occur during the final design phase.

5.0 SUMMARY

This report represents the final deliverable of the Conceptual Design Phase and the inception of Final Design. The Final Design Phase is projected to encompass 2016, with the project being ready for construction in the Spring 2017. The roadway design will include the base streetscape cross sections listed below:

- **Ivinson Street** – 2-way traffic lanes + cycle track + back-in diagonal parking.
- **13th Street** – 2-way traffic lanes + bike lanes + center median (no parking)
- **15th Street** – 2-way traffic lanes + cycle track + center median/turn lanes (no parking)
- **Connecting Streets** – 2-way shared traffic/bicycle lanes + parallel/back-in diagonal parking

5.1 ENHANCEMENT FEATURES

Enhancement features have been proposed and evaluated thorough the conceptual level design. Features that were not a significant part of the conceptual design but will be involved the final design include:

- Public Art
- Decorative Lighting
- Landscaping

5.2 CONCEPTUAL LEVEL COST ESTIMATE

Applying the streetscape conceptual design alternatives chosen, as well as utility construction and additional enhancement feature efforts, a preliminary construction cost estimate of approximately \$10,600,000 was developed. Table 1 provides the cost breakdown and associated quantities.

6.0 REFERENCES

Trihydro Corporation. 2015a. *Kickoff Meeting Minutes, Ivinson Street Reconstruction*. June 1, 2015.

Trihydro Corporation. 2015b. *10% Plan Submittal - City of Laramie Ivinson Street Reconstruction*.
July 9, 2015.

Trihydro Corporation. 2015c. *10% Conceptual Design Meeting Minutes (held July 23, 2015)*.
August 10, 2015.

Trihydro Corporation. 2015d. *50% Conceptual Design Submittal - City of Laramie Ivinson Street Reconstruction*.
September 1, 2015.

Trihydro Corporation. 2015e. *50% Conceptual Design Meeting Minutes (held September 23, 2015)*. October 2, 2015.

Trihydro Corporation. 2015f. *Public Meeting Recap Meeting Minutes (held October 8, 2015)*.
October 15, 2015.

Trihydro Corporation. 2015g. *Memorandum to WDEQ – City of Laramie Ivinson Street Sanitary Sewer Design*.
October 19, 2015.



TABLE

FIGURES