North Platte River Restoration Project – First Street Reach

Stream Quantification Tool (SQT)
Monitoring Report

December 20, 2022

Prepared for:

United States Army Corps of Engineers
Omaha District
Wyoming Regulatory Office
2232 Dell Range Blvd # 210
Cheyenne, WY 82009

On Behalf of:

City of Casper
200 North David Street
Casper, WY 82601

Prepared by:

Stantec Consulting Services Inc.
3325 S Timberline Rd, Suite 150
Fort Collins, CO 80525

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Prepared by _____
(signature)

Patrick Philbin, PE

Reviewed by _____
(signature)

Grant Ginn, PE

Approved by _____
(signature)

J. George Athanasakes, PE

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1.0 PROJECT BACKGROUND

The City of Casper (City) constructed a river restoration project on the North Platte River through downtown Casper. This project area is called North Platte 1st Street Reach, as the project is approximately bisected by the 1st Street Bridge where it spans the North Platte River. The proposed project begins downstream of the Poplar Street Bridge, extends downstream under First Street, and ends at the Burlington Northern-Santa Fe (BNSF) railroad bridge. A detailed description and project design has been submitted to the Corps as part of the 404 permit application package for the North Platte River - First Street Reach (NPFST) Project (Project).

A Master Plan was developed in 2012 by Stantec, which involved evaluating and prioritizing potential project reaches across the approximate 13 miles of the North Platte River within the City of Casper limits and Natrona County (the Master Plan Study Area). This effort involved a broad assessment of existing conditions of the channel, bed, banks, riparian health, and presence of infrastructure using both qualitative and quantitative techniques. The primary quantitative data collected were Bank Erosion Hazard Index (BEHI) and Near Bank Stress (NBS). Visual observations (Qualitative Data) were assessed in conjunction with the BEHI and NBS assessment to prioritize project reaches. Stantec used this data to identify 7 potential restoration project areas, with the 1st Street Reach being considered as one of the top 3 priority reaches most in need of restoration.

The 1st Street Reach was originally designed (and intended to be implemented) in 2014-2015 but, was put on hold until 2019 due to a combination of challenges. As part of the initial existing conditions assessment in 2014, Stantec collected quantitative geomorphic data to document pre-project conditions and to support the design process. However, the data collected was not conducted with the intent of utilizing the WSQT, as the tool had not yet been developed. Additionally, several years of above average spring runoff occurred between the initial assessment and 2019, which resulted in further bed and bank changes. Therefore, a combination of data collected in 2014, supplemental survey and bathymetric data collected in 2019, and professional judgement based on previous experience were used to estimate the applicable WSQT metrics where physical data did not exist.

To effectively quantify and document the increase in physical and geomorphic function associated with the proposed project, the City has agreed to use the Wyoming Stream Quantification Tool (WSQT) (Version 1.0 - July 24, 2018) to compare the function of pre-project site conditions with those potentially resulting from project implementation. The purpose of this report is to describe the applicability, strengths and limitations of the WSQT to this restoration project; summarize the results of the initial analyses performed; summarize the results of each monitoring year; and to discuss and interpret the results of the WSQT analyses performed for the NPFST project.

Construction of the 1st Street Reach was completed over the course of two construction periods. Due to seasonal flows, construction on the North Platte River is limited to a narrow window of time beginning in the fall and ending once the river freezes over. The first construction period completed the proposed channel work beginning from STA 1+00 to STA 13+00 during the fall of 2019. Construction resumed in the fall of 2020 to complete the remainder of work downstream of the 1st Street Bridge. This year (2022) will serve as the Year 1 monitoring period. The baseline monitoring conditions will be based upon the as-

built survey conducted by (Civil Engineering Professionals Inc.) in February 2021, from which the values of the selected parameters have been obtained. Monitoring year 1 photo log includes photos taken in April 2022 and are documented in Appendix E.

The 2023-2026 monitoring events will serve as Monitoring Periods 2-5. The events will include riffle and pool cross sections, and longitudinal profiles utilizing ground based and bathymetric survey techniques. This data will be collected by a licensed PLS and submitted to Stantec. Stantec will evaluate the survey data to document the Pool Spacing, Pool Depth Ratio, and Aggradation Ratio for input into the WSQT. The remaining WSQT parameters will be collected during field visits by the Stantec team.

2.0 INTRODUCTION TO THE TOOL

The Wyoming Stream Quantification Tool (WSQT) is a Microsoft Excel Workbook that has been developed to characterize stream ecosystem functions by evaluating a suite of indicators that represent structural or compositional attributes of a stream and its underlying processes. The WSQT is an application of the Stream Functions Pyramid Framework (SFPF) (Harman et al. 2012) and uses function-based parameters and measurement methods to assess five functional categories: hydrology, hydraulics, geomorphology, physicochemical and biology. The WSQT approach integrates multiple indicators from these functional categories into a reach-based index score that can be used to quantify the amount of lift or loss of aquatic resource functions related to various impacts or restoration efforts.

The WSQT is a simple spreadsheet tool designed to inform permitting and mitigation decisions within the CWA 404 program. The purpose of the WSQT is to calculate functional loss and/or lift associated with stream impacts and restoration projects. It is best described as a “Delta Tool”, as it seeks to quantify the change (delta) in function between existing- and proposed-conditions.

3.0 APPLICABILITY TO THE PROJECT

The WSQT has been modified from the North Carolina Stream Quantification Tool (Harman and Jones 2016) and regionalized for use in Wyoming. Many of the parameters, measurement methods, and performance standards have been specifically tailored to Wyoming and its ecoregions. The WSQT is intended for the evaluation of impact sites and compensatory mitigation projects and their departure from a reference standard. It is explicitly not a project design tool but is rather a means of project evaluation during the design phase of the project lifecycle.

The successful application of the WSQT is predicated on multiple project-specific parameters. The WSQT User Manual (USACE 2018) explicitly states that “*The WSQT has been primarily designed for application within perennial, wadeable, single-thread stream systems. Other stream situations, such as braided systems, large rivers, or streams with side channels should always be noted and considered in selecting applicable parameters and metrics. Data collection methods may vary in these reaches; discuss proposed sampling plan with the Corps prior to performing the field work*.”

As such, we believe that the WSQT can be a useful assessment tool for this project, but due to the size and dynamics of the North Platte River, as well as the boundary conditions associated with the reach's urban context, the analysis needs to be understood within the limitation of the tool. For example, an analysis of existing vs. proposed sinuosity for the project reach results in a low delta which negatively impacts proposed function scoring. However, floodplain permitting, project easements, and existing entrenchment must all be factored into the project design. Designing under these constraints is external to the WSQT analysis, but significantly impacts project design options. Neither functional assessment nor restoration design occur in a vacuum – each must carefully consider what solutions are possible and practicable to improve aquatic function given social, physical, and biological limitations.

Under ideal circumstances, the restoration project assessment phase would occur in close concert with USACE consultation, such that field sampling plans would meet agreed-upon criteria useful to WSQT analyses early in the project lifecycle. Given that WSQT analyses were performed simultaneously with 100% project design for the NPFST reach well after the assessment and conceptual design phases, several WSQT metrics have not been directly measured. As a result, we have relied upon our previous experience throughout Wyoming and the Rocky Mountain region, on our restoration and design experience on the North Platte River specifically, and on best professional judgement to estimate parameters that have not been field-determined. Such situations are documented in additional detail, below.

4.0 PARAMETERS ANALYZED

Due to the nature of both the scope of the project and the type/size of the North Platte River, only certain Functional Categories and Function-Based Parameters are applicable when utilizing the WSQT as a monitoring tool. The two Functional Categories that have been evaluated to assess functional change throughout the monitoring period are Reach Hydrology & Hydraulics and Geomorphology. Only these parameters will be discussed in this report.

4.1 REACH HYDROLOGY AND HYDRAULICS

The primary function-based parameter evaluated within the Reach Hydrology and Hydraulics category was floodplain connectivity. This parameter is an important indicator of the overall hydraulic connectivity between the active channel and adjacent floodplain and is described by two metrics, Bank Height Ratio (BHR) and Entrenchment Ratio (ER). BHR is a measure of channel incision and an indicator of accessibility of the floodplain during flood flows. The lower the BHR, the more frequently water can access the floodplain, which can be correlated with reduction of in-channel shear stress and increase in potential riparian vegetation communities. ER is a similar metric, except it represents the vertical containment of the river by evaluating the ratio of the flood-prone width to the bankfull width. A higher ER translates to a less confined river/floodplain corridor.

4.2 GEOMORPHOLOGY

The Geomorphology Functional Category is the most broadly appropriate category with which to evaluate this project and interpret functional change during the monitoring period. The following function-based parameters were analyzed as part of this WSQT monitoring analysis: Large Woody Debris, Lateral Migration, and Bed Form Diversity, as they represent the primary indicators of impairment that the project has been designed to mitigate and improve.

5.0 PRE-PROJECT CONDITIONS PARAMETERS

5.1 PRE-PROJECT CONDITIONS REACH HYDROLOGY AND HYDRAULICS

5.1.1 Pre-project Bank Height Ratio (BHR)

The pre-project bank height ratio for the project area was measured at two separate locations, Stations 10+50 and 17+00. Each of these locations are within riffle sections with lengths of 300 feet and 308 feet, respectively. The weighted BHR calculation for these two areas was 1.6, indicating that the two riffle sections are incised and lack effective floodplain connectivity (**Table 1**).

Table 1 Pre-project Conditions Bank Height Ratio

Station ID	Length (RL)	BHR	BHR*RL
10+50	300	2	600
17+00	308	1.2	369
Total	608 ft	**Total**	969
Weighted BHR = 1.6			

5.1.2 Pre-project Entrenchment Ratio (ER)

The pre-project entrenchment ratio measurements were taken at the same riffle sections as BHR, above (STA 10+50 and STA 17+00) and shown in Table 2. The weighted ER calculation for these two areas was 1.6, which is indicative of the North Platte's confined urban corridor. The WSQT considers this ER value as functioning at risk.

Table 2 Pre-project Conditions Entrenchment Ratio

Station ID	Length (RL)	ER	BHR*RL
10+50	300	1.08	324
17+00	308	2.3	708
Total	608 ft	**Total**	1032
Weighted ER = 1.6			

5.2 PRE-PROJECT CONDITIONS GEOMORPHOLOGY

5.2.1 Pre-project Conditions Large Woody Debris

No wood materials quantifiable as Large Woody Debris (LWD) were encountered during field assessment in the project reach prior to construction.

5.2.2 Pre-project Conditions Lateral Migration

The banks on both the right and left side of the channel showed evidence of toe and bank erosion through approximately 50% of the reach length. In locations where erosion was observed, the dominant BEHI/NBS was determined to be H/H. The predominant driver of bank erosion in the project reach is the presence of the fly fisherman statue and associated structure, which creates a mid-channel obstruction, split flow, and localized deep scour holes. The contraction of flows around the fly fisherman statue, combined with the expansion which occurs just downstream due to the presence of an overwide channel through the 1st street bridge, has led to the development of an approximately 800' long mid-channel bar. This bar is directing the dominant flow vectors towards the left and right riverbanks, which has led to significant bank erosion.

5.2.3 Pre-project Conditions Bed Form Diversity

The measured parameters for bed form diversity include Pool Spacing Ratio, Pool Depth Ratio, and Aggradation Ratio. The pre-project Pool Spacing Ratio was determined to be 4.8, which means a pool is spaced approximately every 4.8 bankfull widths along the channel. Pool Depth Ratio, or the measurement of max pool depth to average riffle depth was quantified and determined to be 2.53. However, it should be noted that the pool depth ratio is somewhat exaggerated due to the presence of a large scour hole

immediately downstream of the fly fisherman statue and associated infrastructure. The Aggradation Ratio is the relation of measured width-to-depth ratio (WDR) divided by a reference width-to-depth ratio. The aggradation ratio was determined at approximate STA 15+00, which had a WDR of 38, compared to a reference WDR of 35. The resulting aggradation ratio of 1.08 is considered "functioning", yet a large mid channel bar existed at this location. This metric may thus reflect an issue of scale in applying the WSQT to a large river system.

6.0 PROPOSED CONDITIONS PARAMETERS

6.1 PROPOSED CONDITIONS REACH HYDROLOGY AND HYDRAULICS

6.1.1 Proposed Bank Height Ratio (BHR)

The proposed bank height ratio measurements shown in Table 3 were determined at the same stations as the pre-project conditions measurements. In both locations, the proposed BHR decreased with a combined BHR of 1.14 compared to pre-project BHR of 1.6. The decrease in BHR is captured by the introduction of a bankfull bench providing increased connectivity between the active channel and the adjacent floodplain.

Table 3 Proposed Conditions Bank Height Ratio

Station ID	Length (RL)	BHR	BHR*RL
10+50	300	1.1	330
17+00	308	1.2	369
Total	608 ft	**Total**	699
Weighted BHR = 1.14			

6.1.2 Proposed Entrenchment Ratio (ER)

The proposed Entrenchment Ratio measurements shown in Table 4 were determined at the same stations as the pre-project conditions. The proposed ER increased from a pre-project conditions value of 1.6 to a proposed conditions value of 1.7. It should be noted that on a river of this size, especially through an urban corridor, measurable beneficial change in entrenchment ratio is extremely limited due to lateral infrastructure constraints. However, even small increases in ER have a positive effect during flood

conditions that can reduce stress on the active channel and bank and provide some improved connectivity with the adjacent floodplain.

Table 4 Proposed Conditions Entrenchment Ratio

Station ID	Length (RL)	ER	BHR*RL
10+50	300	1.17	351
17+00	308	2.3	708
Total	608 ft	**Total**	1059
Weighted ER = 1.74			

6.2 PROPOSED CONDITIONS GEOMORPHOLOGY

The Function-Based parameters within the Geomorphology Function Category show the largest functional uplift (delta) for this project. It is within this category that the goals and objectives of this project are primarily addressed, and the WSQT analysis reflects these functional improvements.

6.2.1 Proposed Conditions Large Woody Debris

As detailed above, the pre-project reach contained no large woody debris and thus had no functional uplift from this parameter. The proposed restoration design included approximately 1,268 linear feet of Wood Toe, which required the installation of 633 large rootwads and logs. The calculated metric of "Number of Large Woody Debris Pieces per 100 meters" equals 83, which results in the highest functional score possible for this metric. The Wood Toe structures serve multiple purposes, including bank stabilization, in-stream aquatic habitat, cover, and terrestrial habitat for wildlife and invertebrates. The re-introduction of large woody debris back into this system provided a significant functional uplift compared to pre-project conditions.

6.2.2 Proposed Conditions Lateral Migration

The second largest potential improvement in Function-Based Parameters is the Lateral Migration metric. The Lateral Migration parameters for the pre-project conditions represent the most visible and measurable types of impairments that were occurring within the project area. Addressing these areas of

elevated instability was among the primary goals and objectives of the project. The proposed design utilized a variety of techniques to reduce the “Dominant BEHI/NBS” and “Percent Streambank Erosion” metrics. The Boulder Vane and W-Bar Vane are in-channel boulder structures that provide bank protection and reduction in Near Bank Stress by directing flow away from the banks. In a majority of the project reach, the dominant BEHI and NBS is assumed to be Low/Low. However, the two Bar Vane Structures are designed to function in tandem with Wood Toe structures to enhance Run/Pool habitat along the bank, while also providing the requisite toe and bank scour protection. As such, in the areas immediately downstream of the Bar Vane Structures, it is assumed that the dominant BEHI is low, and the proposed NBS remains High. However, a NBS rating of high is acceptable and even preferred - from an aquatic habitat perspective - as long as the adjacent bank protection is sufficient to withstand the erosional forces.

The removal of a significant tonnage of concrete debris and rubble which was serving as bank armoring was mitigated-for by regrading of the channel, implementation of in-stream structures, or both. The proposed design included supplemental riprap armoring beneath the 1st street bridge to mitigate the pre-project bank erosion and provides a greater level of protection to the bridge infrastructure.

6.2.3 Proposed Conditions Bed Form Diversity

The net change in functional uplift for the Proposed Conditions Bed Form Diversity Function-Based Parameter is small (0.94 vs. 0.90) due to the high score of pre-project conditions. The proposed design enhanced pool depth and reduced overall aggradation potential. However, on a river of this size, the functional change is almost negligible. Although the functional uplift is small, the proposed conditions will likely have improved Bed Form Diversity that is not reflected in the WSQT analysis. The proposed design included the implementation of several Boulder and Bar Vane Structures, Boulder Clusters, and Wood Toe. Each of these in-channel structures provides a different type of Bed Form Diversity not captured in the tool including variable flow depth and vectors in/around boulder vanes, elongated run habitat downstream of Bar Vane Structures, and localized refuge areas behind Boulder Clusters.

7.0 YEAR 1 MONITORING CONDITIONS PARAMETERS

The parameters in this section are measured from the as-built survey performed in February of 2021. The measured parameters in this section reflect the field conditions during the first monitoring year post construction. The initial WSQT assessment comparing pre-project and proposed conditions documented an uplift to the post-project channel. The parameters measured in the Year 1 Monitoring period will reference those set in the initial analysis to gage the functionality of the constructed channel. The results of the Year 1 Monitoring period were recorded by using the standard WSQT Spreadsheet and documented in Appendix D.

7.1 YEAR 1 MONITORING CONDITIONS REACH HYDROLOGY AND HYDRAULICS

7.1.1 Year 1 Monitoring Bank Height Ratio (BHR)

The Year 1 Monitoring bank height ratio measurements shown in Table 5 were determined at the same stations as the pre-project and proposed conditions measurements. In both locations, the completed project BHR has a weighted score of 1.14 resulting in increased connectivity between the active channel and the adjacent floodplain comparative to pre-project conditions.

Table 5 Year 1 Monitoring Bank Height Ratio

Station ID	Length (RL)	BHR	BHR*RL
10+50	300	1.1	330
17+00	308	1.2	369
Total	608 ft	**Total**	699
Weighted BHR = 1.14			

7.1.2 Year 1 Monitoring Entrenchment Ratio

The Year 1 Monitoring Entrenchment Ratio measurements shown in Table 6 were determined at the same stations as the pre-project and proposed conditions. The Year 1 Monitoring ER value is 1.6, which matches the pre-project condition. Minimal uplift of the ER parameter was forecasted when comparing pre-project and proposed conditions. The small variation between Monitoring Year 1 and Proposed parameters results in a negligible impact to the aims of this project.

Table 6 Monitoring Year 1 Entrenchment Ratio

Station ID	Length (RL)	ER	BHR*RL
10+50	300	1.17	351
17+00	308	2.0	616
Total	608 ft	**Total**	967
Weighted ER = 1.6			

7.2 YEAR 1 MONITORING CONDITIONS GEOMORPHOLOGY

7.2.1 Year 1 Monitoring Conditions Large Woody Debris

The calculated metric of "Number of Large Woody Debris Pieces per 100 meters" equals 80, which results in the highest functional score possible for this parameter. The Wood Toe structures serve multiple purposes, including bank stabilization, in-stream aquatic habitat, shading, and terrestrial habitat for wildlife and invertebrates. The re-introduction of large woody debris back into this system provided a significant functional uplift compared to pre-project conditions.

7.2.2 Year 1 Monitoring Conditions Lateral Migration

The parameters measured to document lateral migration include "Dominant BEHI/NBS" and "Percent Streambank Erosion". The Dominant BEHI/NBS and Percent Stream Bank Erosion were determined to be L/H and 10%, respectively. For much of the project reach, the dominant BEHI and NBS is considered to be L/L. Areas downstream of the Bar Vane structures score L/H, as intended, bumping up the overall NBS rating for the project site to High. Bank protection in the areas downstream of the Bar Vane structures are providing sufficient bank stability.

Stream bank erosion is recorded as 10%. Bank erosion in excess of this was documented by Stantec during a site visit in April. The left bank near the upstream side of the wood toe at STA 15+00 was displaying signs of bank erosion. This issue was addressed on November 18, 2022, and summarized in Appendix F. The bank erosion associated with this localized issue is resolved and is not reflected in this monitoring periods stream bank erosion parameter.

As proposed, the armoring beneath the 1st Street Bridge remained in place and was supplemented by additional riprap material. Both left and right armored banks beneath the bridge combine to make up the entire 10% of channel armoring.

7.2.3 Year 1 Monitoring Conditions Bed Form Diversity

Three parameters were measured to assess bed form diversity. The Year-1 pool spacing ratio is identical to the proposed parameter of 4.8. The pool depth ratio is 2.4, which is slightly less than both the pre-project and proposed conditions. This difference is likely due to a variation in depth of the scour pool associated with the fly fisherman statue. The proposed pools created by the bar vane structures were installed and are maintaining design depths. Using a reference width depth ratio of 35, the aggradation ratio is 1.0. The bed form diversity parameter shows a functional uplift when compared to pre-project conditions.

8.0 CONCLUSION & RECOMENDATIONS

The WSQT can be a useful tool for evaluating existing and proposed conditions, as well as recent change in riverine function during monitoring periods. However, the tool does have certain limitations when applied to river systems that deviate from the stream forms and conditions that were used to develop SQT metrics.

Although the North Platte River First Street Reach falls outside of the applicable systems typically evaluated by the WSQT, the WSQT comparing pre-project conditions score (PPCS) to proposed project conditions score (PCS) indicates a functional uplift as a result of the project implementation. The analysis of pre-project conditions indicated that the “Reach Hydrology and Hydraulics” and the “Geomorphology” Functional Categories were “Not Functioning” and “Functioning at Risk,” respectively. Proposed conditions for the two functional Categories are “Functioning at Risk” and “Functioning,” respectively. Table 7 and Table 8**Error! Reference source not found.** below provide the results from both the Functional Category Report Card and the Functional Change Summary generated from the WSQT Spreadsheet.

Table 7 Functional Category Report Card – First Street Reach

FUNCTIONAL CATEGORY REPORT CARD			
Functional Category	**PPCS**	**PCS**	**Functional Change**
Reach Hydrology & Hydraulics	0.08	0.42	0.34
Geomorphology	0.37	0.91	0.54

Functioning
Functioning at Risk
Not Functioning

Table 8 Functional Change Summery - First Street Reach

FUNCTIONAL CHANGE SUMMARY	
Pre-Project Condition Score (ECS)	0.14
Proposed Condition Score (PCS)	0.40
Change in Functional Condition (PCS - ECS)	0.26
Pre-Project Stream Length (ft)	2500
Proposed Stream Length (ft)	2500
Change in Stream Length (ft)	0
Pre-Project Functional Feet (FF)	350
Proposed Functional Feet (FF)	1000
Proposed FF - Existing FF	650
Percent Change in FF (%)	186%

These results show that the proposed conditions increased the overall function of the project reach by 186%, compared to pre-project conditions. As such, it is expected that the proposed project resulted in a significant functional uplift and improvement of the overall riverine and riparian health of the system.

Table 9 documents monitoring conditions in comparison with the initial assessment results. The functional change column displays the functional change between the pre-project conditions score (PPCS) in comparison with Year-1 monitoring results. Both functional categories result in a functional uplift for the project area.

Table 9 Functional Category Report Card - Monitoring Results

FUNCTIONAL CATEGORY REPORT CARD				
Functional Category	**PPCS**	**PCS**	**YR-1**	**Functional Change**
Reach Hydrology & Hydraulics	0.08	0.42	0.40	0.32
Geomorphology	0.37	0.91	0.90	0.53

Functioning
Functioning at Risk
Not Functioning

The results from Monitoring Year 1 show that the project was constructed per the design and functioning as intended. At this time there are no recommended corrective actions. Documentation of observed changes to the channel's functional parameters will continue throughout the remainder of the monitoring period.

9.0 REFERENCES

Harman et al. 2012

Harman and Jones 2016

U.S. Army Corps of Engineers. 2018. Wyoming Stream Quantification Tool (WSQT) User Manual and Spreadsheet. Version 1.0, Omaha District, Wyoming Regulatory Office, Cheyenne Wyoming.

Appendix A NORTH PLATTE FIRST STREET PROJECT CONSTRUCTION PLAN SET

CITY OF CASPER PROJECT # 12-51

CITY OF CASPER

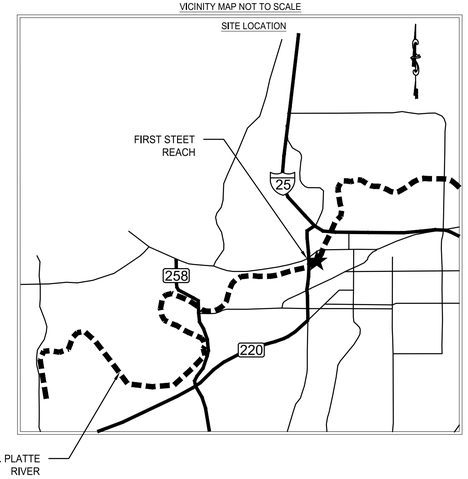
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
WY	172621100	COVER	45

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH

MAY 2019
100% DESIGN
NATRONA COUNTY, WYOMING

Sheet List Table	
Sheet Number	Sheet Title
COVER	COVER SHEET
NOTES	GENERAL NOTES
EX-OV	EXISTING PLAN
OV-1	SITE PLAN
PP-1	PLAN AND PROFILE 1
PP-2	PLAN AND PROFILE 2
PP-3	PLAN AND PROFILE 3
WET PP-1	WETLAND AREA 1 PLAN
WET PP-2	WETLAND AREA 2 PLAN AND PROFILE
DET-01	BAR VANE DETAIL
DET-02	W BAR VANE DETAIL
DET-03	WOOD TOE DETAIL
DET-04	BOULDER VANE DETAIL
DET-05	WILLOW WATTLE GRADE CONTROL DETAIL
DET-06	BOAT RAMP AND ACCESS ROAD DETAIL
DET-07	BOULDER CLUSTER DETAIL
DET-08	ARMORED INNER BERM DETAIL
DET-09	RUBBLE REMOVAL DETAIL
XS-1	CROSS SECTIONS
XS-2	CROSS SECTIONS
XS-3	CROSS SECTIONS
XS-4	CROSS SECTIONS
XS-5	CROSS SECTIONS
XS-6	CROSS SECTIONS
WC-1	ACCESS AND WATER CONTROL OVERVIEW
WC-2	ACCESS AND WATER CONTROL SEQUENCING
ESC-OV	EROSION AND SEDIMENTATION PLAN OVERVIEW
ESC-1	EROSION AND SEDIMENTATION PLAN
ESC-2	EROSION AND SEDIMENTATION PLAN
ESC-DET-01	EROSION AND SEDIMENT CONTROL DETAILS
ESC-DET-02	EROSION AND SEDIMENT CONTROL DETAILS
ESC-DET-03	EROSION AND SEDIMENT CONTROL DETAILS
L-OV	LANDSCAPING OVERVIEW
L-1	LANDSCAPING PLAN
L-2	LANDSCAPING PLAN
L-3	LANDSCAPING PLAN
L-4	LANDSCAPING PLAN
L-5	LANDSCAPING PLAN
L-6	LANDSCAPING PLAN
L-7	LANDSCAPING PLAN
SS-1	OUTFALL A
SS-2	OUTFALL B
SS-3	OUTFALL C 1
SS-4	OUTFALL C 2
SS-5	STORMWATER NOTES AND DETAILS

VICINITY MAP NOT TO SCALE



SYM	DESCRIPTION	
A		
REVISIONS		

GRAPHIC SCALES (SCALE IN FEET)

40 0 40 120
ALL PLAN & PROFILE SHEETS

20 0 20 60
ALL CROSS SECTION SHEETS

8 0 8 24
VERTICAL PROFILE - ALL PLAN & PROFILE SHEETS

10 0 10 30
VERTICAL PROFILE - ALL CROSS SECTION SHEETS

PROJECT LENGTH

RESTORATION = 2,548 FT

Prepared by:

Stantec

Stantec Consulting Services Inc.
3325 South Timberline Road, Suite 150
Fort Collins, Colorado 80525
www.stantec.com

Professional Engineer
TIMOTHY DINKINS
16178
LICENSED
Date 4-24-19
WYOMING

TIMOTHY DINKINS
PROJECT ENGINEER

Prepared for:

SEAL OF THE CITY OF CASPER, WYOMING

Scott Baxter
PROJECT MANAGER

GENERAL NOTES:

1. DRAWINGS BASED ON FIELD SURVEY AS PERFORMED BY CEPI DATED **DECEMBER 3, 2018**. THE LIDAR SURFACE DATA WAS VERIFIED BY CEPI DATED DEC 3, 2018. ALL DRAWINGS ARE REFERENCED TO NAVD88 ELEVATIONS AND WYOMING EAST CENTRAL STATE PLANE COORDINATE SYSTEM. PROPERTY LINES ARE CONSIDERED LIMITS OF CONSTRUCTION ACTIVITIES UNLESS NOTED ON THE PLANS OR APPROVED BY THE OWNER.
2. ALL WORK SHALL BE IN ACCORDANCE WITH CITY OF CASPER STANDARD SPECIFICATIONS AND DETAILS UNLESS FURTHER SPECIFIED IN THESE PLANS AND SPECIFICATIONS.
3. CONTRACTOR SHALL INSPECT SITE PRIOR TO START OF WORK; VERIFY EXISTING CONDITIONS MATCH PLANS AND ACCEPT SITE, OR REPORT ANY DISCREPANCIES IMMEDIATELY TO THE ENGINEER.
4. ANY DISCREPANCIES IN PLANS, OR DEPARTURE FROM PLANS SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY, AND NO WORK SHALL CONTINUE ON THE AFFECTED ISSUE UNTIL DIRECTED BY THE ENGINEER.
5. CONTRACTOR IS RESPONSIBLE FOR SCHEDULING ALL PRE-CONSTRUCITON MEETINGS WITH ALL APPLICABLE GOVERNING JURISDICTIONS.
6. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS TO COMMENCE WORK. A SECTION 404 PERMIT HAS BEEN OBTAINED FOR THE PROJECT FROM THE USACE. NO WORK SHALL BE BEGIN UNTIL ALL PERMITS ARE IN-HAND.
7. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION AND IDENTIFICATION OF UTILITIES ON-SITE. ONE CALL OF WYOMING SHALL BE NOTIFIED BY CONTRACTOR (OR 1-800-849-2476 IF OUT-OF-STATE) AT LEAST TWO BUSINESS DAYS BEFORE EXCAVATION CAN BEGIN.
8. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL CLOSURE OR MANAGEMENT OF TRAIL/PEDESTRIAN TRAFFIC WAYS IN CONJUNCTION WITH CONSTRUCTION ACTIVITIES.
9. THE CONTRACTOR WILL MAKE EVERY EFFORT TO AVOID AND MINIMIZE DAMAGE TO ANY INFRASTRUCTURE, UTILITIES, AND PRIVATE PROPERTY ADJACENT TO THE PROJECT AREA. ANY DAMAGE SHALL BE REPLACED IN-KIND AND BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
10. CONTRACTOR SHALL KEEP JOB SITE FREE OF TRASH AND GARBAGE, AND SHALL IMMEDIATELY COLLECT ANY CONSTRUCTION-RELATED DEBRIS OR TRASH THAT IS IN OR DIRECTLY ADJACENT TO THE PROJECT SITE.
11. ALL SOIL EROSION CONTROL MEASURES REQUIRED BY THE EROSION CONTROL PLANS SHALL BE PERFORMED PRIOR TO GRADING, CLEARING, OR GRUBBING. ALL EROSION CONTROL DEVICES SUCH AS SILT FENCES, ETC. SHALL BE MAINTAINED IN WORKABLE CONDITIONS FOR THE LIFE OF THE PROJECT AND SHALL BE REMOVED AT THE COMPLETION OF THE PROJECT ONLY AFTER THE OWNER'S APPROVAL.
    a. INSPECT ALL EROSION CONTROL MEASURES FOR STABILITY AND OPERATION WEEKLY OR WITHIN 24 HOURS AFTER ANY SIGNIFICANT STORM EVENT.
    b. REMOVE SEDIMENT FROM BEHIND SILT FENCE WHEN THE DEPTH REACHES 0.5 FEET. SEDIMENT SHALL BE DISPOSED OF ON THE PROJECT ONLY IN PROTECTION AREAS OR HAULED AWAY IF NOT SUITABLE FOR FILL MATERIAL.
    c. IF ANY EROSION CONTROL MEASURE IS FOUND TO BE UNSTABLE OR NOT FUNCTIONING PROPERLY, REPAIRS SHOULD BE DONE IMMEDIATELY TO MAINTAIN MEASURES AS DESIGNED OR AS DIRECTED BY THE ENGINEER.
12. THE CONTRACTOR SHALL CONTROL ALL "DUST" BY PERIODIC WATERING AND SHALL PROVIDE ACCESS AT ALL TIMES FOR PROPERTY OWNERS WITHIN THE PROJECT AREA AND FOR EMERGENCY VEHICLES. ALL OPEN DITCHES AND HAZARDOUS AREAS SHALL BE CLEARLY MARKED IN ACCORDANCE WITH GOVERNING REGULATORY BODIES.
13. THE CONTRACTOR SHALL ENTER AND EXIT THE SITE VIA THE TEMPORARY CONSTRUCTION ENTRANCES AS DETAILED IN THE DRAWINGS.
14. PREVENT SPILLING OF FUELS, LUBRICANTS, COOLANTS, HYDRAULIC FLUIDS, AND ANY OTHER PETROLEUM PRODUCTS ONTO THE GROUND OR INTO SURFACE WATERS. DISPOSE OF SPENT FUELS APPROPRIATELY. AS PER LAW, THE CONTRACTOR IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH HAZARDOUS MATERIAL SPILLS INCLUDING REMEDIATION.
15. THE CONTRACTOR IS RESPONSIBLE FOR PROJECT SURVEY INCLUDING STREAM AND STRUCTURE LAYOUT. ALL STAKING WORK SHALL BE DONE BY A LICENSED SURVEYOR REGISTERED IN THE STATE OF WYOMING.
16. FINISHED GRADE TOLERANCES SHALL BE AS NOTED IN THESE PLANS AND THE SPECIFICATIONS. THE ENGINEER MAY MAKE GRADE CHANGES AS REQUIRED IN THE FIELD WITHOUT EFFECTING THE UNIT BID PRICE FOR UNCLASSIFIED EXCAVATION.
17. IN-STREAM WORK SHALL BE CONSTRUCTED FROM THE UPSTREAM WORKING IN THE DOWNSTREAM DIRECTION. CONSTRUCT THE PROPOSED STREAM CHANNEL TO THE GRADE SPECIFIED.
18. CONSTRUCT ONLY A PORTION OF THE CHANNEL THAT CAN BE COMPLETED AND STABILIZED WITHIN THE SAME DAY. ONLY NEW CHANNEL WORK SHALL BE PROTECTED WITH SEED, STRAW, COIR FIBER MATTING, AND LIVE STAKES. ALL OTHER DISTURBED AREAS SHALL BE PROTECTED WITH SEED, FERTILIZER, AND STRAW.
19. ANY AREAS NOT DESIGNATED FOR CHANGE SHALL BE RETURNED TO PRE-PROJECT CONDITIONS UNLESS NOTIFIED BY THE ENGINEER OR OWNER.
20. THE CONTRACTOR IS RESPONSIBLE TO READ, REVIEW, AND FOLLOW THE REQUIREMENTS AND PROTOCOL OUTLINED IN THE CONTAMINATION RELEASE MITIGATION PLAN.

CONSTRUCTION SEQUENCE:

1. ALL EROSION CONTROL BMPS AND IN-STREAM RELEASE CONTROLS WILL BE INSTALLED PRIOR TO CONSTRUCTION ACCESS INTO THE NORTH PLATTE RIVER.
2. WORK WILL PROCEED FROM UPSTREAM TO DOWNSTREAM, WITH REACH 1 BEING THE FIRST TO BE CONSTRUCTED.
3. PRELIMINARY ACCESS AND STAGING AREAS FOR THE PROJECT, DEPICTED ON THE ATTACHED SITE ACCESS FIGURE, WILL BE ESTABLISHED AND SECURED.
4. 5 BED SAMPLES WILL BE EXCAVATED FROM LOCATIONS SLATED FOR EXCAVATION IN THE REACH DOWNSTREAM OF THE FLY FISHERMAN STATUE (REACH 2) AND ANALYZED FOR SUITABILITY AS ACCEPTABLE (I.E., "CLEAN") FILL MATERIAL. THE SAMPLES WILL BE VISUALLY INSPECTED FOR PRESENCE OF OIL SHEEN OR ODOR AND WILL BE SCREENED USING A PHOTO IONIZATION DETECTOR (PID) TO MEASURE A SAMPLE OF THE SOIL USING STANDARD HEADSPACE ANALYSIS PROTOCOLS OR "OILS IN SOILS" FIELD TEST KIT.
5. IF THE MATERIAL IS FOUND TO BE "CLEAN" AS A RESULT OF THIS ANALYSIS, THE CONTRACTOR WILL UTILIZE LOCALLY HARVESTED (AND ENGINEER APPROVED) BED MATERIAL TO BUILD THE ACCESS ROAD AS SHOWN ON THE SITE ACCESS FIGURE TO REACH 1. IMPORTED SELECT MATERIAL MAY BE NECESSARY AS SUPPLEMENTAL BASE MATERIAL TO COMPLETE CREATION OF THE ACCESS ROAD.
6. THE ACCESS ROAD WILL SERVE AS THE PRIMARY ROUTE FOR THE MOVEMENT OF CONSTRUCTION EQUIPMENT TO- AND FROM- REACH 1
7. BED AND BANK GRADING ON RIVER-RIGHT, UPSTREAM OF THE FLY FISHERMAN STATUE, HAS BEEN MINIMIZED IN DESIGN SO AS TO NOT JEOPARDIZE EXISTING INFRASTRUCTURE. ANY BED OR BANK CONSTRUCTION CONDUCTED IN REACH 1 WILL BE PERFORMED IN ISOLATION (E.G., "IN THE DRY", THROUGH IMPLEMENTATION OF COFFER DAMS OR SIMILAR STRUCTURES).
8. ALL EXCAVATED MATERIAL FROM REACH 1 WILL BE HAULED OFF, REMOVED FROM THE PROJECT SITE, AND DISPOSED IN APPROVED LOCATIONS IDENTIFIED BY THE CITY OF CASPER MUNICIPAL SOLID WASTE MANAGER. ALL BED AND BANK MATERIAL (FILL) IN REACH 1 WILL BE IMPORTED FROM APPROVED ON-SITE LOCATIONS OR FROM AN APPROVED OFF-SITE SOURCE.
9. ONCE WORK WITHIN REACH 1 IS COMPLETE AND NO FURTHER BED/BANK DISTURBANCE WILL OCCUR, CONSTRUCTION WILL PROCEED IN THE DOWNSTREAM DIRECTION.

EXISTING LEGEND

EXISTING WETLAND
EXISTING RIPRAP
EXISTING CONCRETE LINED BANK
EXISTING GABIAN BASKETS
EXISTING BRIDGE
EXISTING TREE
EXISTING ROAD/BRIDGE
EXISTING FENCELINE
EXISTING BP BARRIER WALL
EXISTING STORM WATER PIPE
OHWM
EXISTING MONITORING WELLS
PROPERTY LINE
SS — SANITARY LINE
W — WATER LINE
OHP — OVERHEAD UTILITY LINE
GUY WIRE
5105 — MAJOR EXISTING CONTOUR
MINOR EXISTING CONTOUR
EXISTING BANKFULL CHANNEL LIMITS

PROPOSED LEGEND

NATIVE COBBLE
SELECT MATERIAL
INNER BERM GRADING WITH SELECT MATERIAL
PROPOSED BOAT RAMP
PROPOSED BOULDER
PROPOSED WOOD TOE
LOW FLOW CHANNEL LIMITS
PROPOSED BANKFULL CHANNEL LIMITS
5100 — MAJOR PROPOSED CONTOUR
MINOR PROPOSED CONTOUR
PROPOSED BASELINE ALIGNMENT
PROPOSED THALWEG ALIGNMENT
LOD — LIMITS OF DISTURBANCE

PROFILE LEGEND

PROPOSED THALWEG PROFILE
PROPOSED BANKFULL PROFILE
EXISTING SURFACE AT THALWEG PROFILE
EXISTING SURFACE AT CENTERLINE PROFILE

BOULDER SIZING		
L	W	H
3.5	3.5	3.0

Select Material Gradation

% Smaller Than Given Size by Weight	Intermediate Rock Dimensions (in)
70-100	15
50-70	12
35-50	9
2-10	3

Select Material Mixing Requirements

Appropriate Proportions (By Volume)	Material Description
6 Part	D_{50} = 9"
1 Part	Vehicle Tracking Control Rock (Crushed rock with 100% passing 4-inch sieve, 50-70% passing 3-inch sieve, 0-10% passing 2-inch sieve.)
1 Part	4-" minus pit run surge (Round river rock and sand, well graded, 90-100% passing 4" sieve, 70-80% passing 1.5" sieve, 40-60% passing 3/8" sieve, 10-30% passing #16 sieve.)
1 Part	Type II bedding (crushed rock with 100% passing 3" sieve, 20-90% passing ¾" sieve, 0-20% passing #4 sieve,0-3% passing #200 sieve.
½ to 1 Part	Native topsoil

* NOTE IMPORTED MATERIAL SHALL BE MIXED WITH LOCALLY SALVAGED EXISTING CHANNEL SUBSTRATE, FOLLOWING THE COMPOSITION REQUIREMENTS DESCRIBED ABOVE.

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
GENERAL NOTES AND CONSTRUCTION SEQUENCE

Permit-Seal

Project Number: 172621110

File Name: Gen_Notes_N_Platte_1st_Street.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.

Revision	Sheet
0	NOTES

N POPLAR STREET
Pronghorn St.
BLUE EYES, LLC (AE)
TRUE DRILLING, LLC
NICKERSON PROPERTIES (RMP)
BLUE EYES, LLC
WINGFOOT COMMERCIAL TIRE (GOODYR)
STATE HIGHWAY COMMISSION
PLATTE RIVER PARKWAY TRUST
CITY OF CASPER
PLATTE RIVER CROSSING, LLC)
PLATTE RIVER CROSSING, LLC
ROCKING K PROPERTIES, LLC
KEN MOSTELLER
AMOCO OIL CO.
CASPER REDEVELOPMENT COMPANY, LLC
NICHOLS AVE.
FIRST STREET
WEST B ST.
ASH ST.
WEST A ST.
WEST 1ST ST.
Yellowstone Highway
FLOW
OUTFALL C EXISTING 36" CSP
BNSF BRIDGE
DEBRIS REMOVAL (280 CY)
EXISTING WETLAND (TYP.)
EXISTING 4" OUTLET
UTILITY POLE
EXISTING 36" PIPE ELEV 5102.42
GUY WIRE
CONCRETE PAD WITH PICNIC BENCH
UNDERGROUND UTILITY ACCESS
MONITORING WELLS DO NOT DISTURB
PROPERTY LINE (TYP)
FIRST STREET BRIDGE
REMOVE 40 LF OF ABANDONED PIPE
PAVED TRAIL (DO NOT DISTURB)
OUTFALL D EXISTING 36" CSP ELEV 5100.54
OUTFALL A EXISTING 18" PIPE ELEV 5107.06
OUTFALL B EXISTING 24" RCP ELEV 5106.96
DEBRIS REMOVAL (ACCOUNTED FOR IN CONTAMINATED HAUL OFF)
RIP RAP LINED BANK
DEBRIS REMOVAL (80 CY)
FLY FISHERMAN STATUE ON GROUTED STRUCTURE
ARMORED BANK WITH GABION STRUCTURES
ARMORED BANK
OVERHEAD UTILITY LINE (TYP)
BP BARRIER WALL (DO NOT DISTURB)
EXISTING 24" RCP ELEV 5103.30
EXISTING 48" RCP ELEV 5103.35
0 50' 100' 200'
1"=100'

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
EXISTING PLAN

Permit-Seal

Professional Engineer TIMOTHY DINNING WYOMING Date 4-24-19

Project Number: 172621110

File Name: NPFST_Existing_OV.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.

Revision	Sheet
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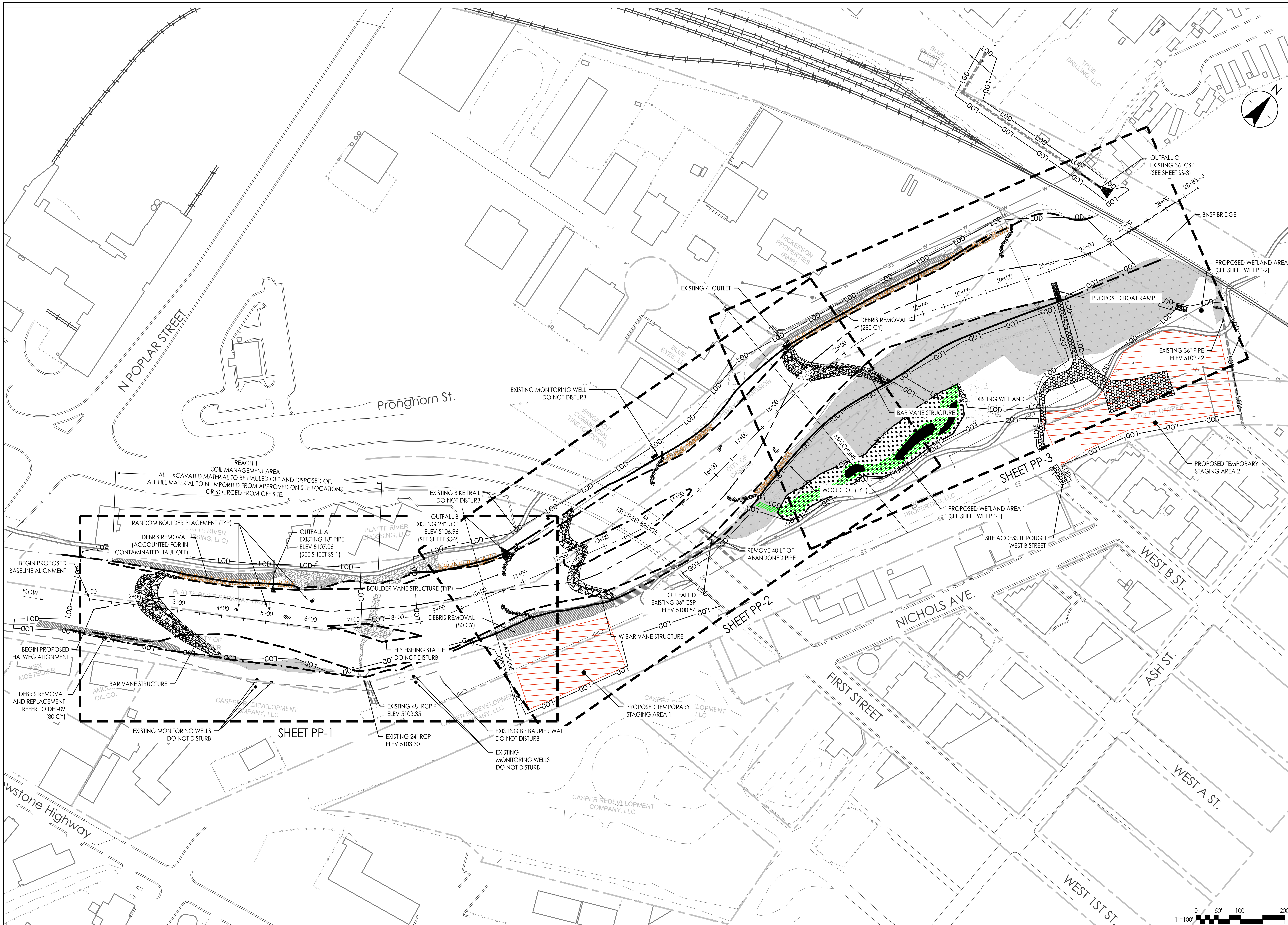
N POPLAR STREET
Pronghorn St.
REACH 1
SOIL MANAGEMENT AREA
ALL EXCAVATED MATERIAL TO BE HAULED OFF AND DISPOSED OF.
ALL FILL MATERIAL TO BE IMPORTED FROM APPROVED ON SITE LOCATIONS OR SOURCED FROM OFF SITE.
EXISTING MONITORING WELL
DO NOT DISTURB
EXISTING BIKE TRAIL
DO NOT DISTURB
RANDOM BOULDER PLACEMENT (TYP)
DEBRIS REMOVAL
(ACCOUNTED FOR IN CONTAMINATED HAUL OFF)
OUTFALL A
EXISTING 18" PIPE
ELEV 5107.06
(SEE SHEET SS-1)
OUTFALL B
EXISTING 24" RCP
ELEV 5106.96
(SEE SHEET SS-2)
BEGIN PROPOSED BASELINE ALIGNMENT
FLOW
BOULDER VANE STRUCTURE (TYP)
DEBRIS REMOVAL
(80 CY)
FLY FISHING STATUE
DO NOT DISTURB
BEGIN PROPOSED THALWEG ALIGNMENT
BAR VANE STRUCTURE
DEBRIS REMOVAL AND REPLACEMENT
REFER TO DET-09
(80 CY)
EXISTING MONITORING WELLS
DO NOT DISTURB
SHEET PP-1
EXISTING 48" RCP
ELEV 5103.35
EXISTING 24" RCP
ELEV 5103.30
EXISTING BP BARRIER WALL
DO NOT DISTURB
EXISTING MONITORING WELLS
DO NOT DISTURB
MATCHLINE
W BAR VANE STRUCTURE
PROPOSED TEMPORARY STAGING AREA 1
OUTFALL D
EXISTING 36" CSP
ELEV 5100.54
SHEET PP-2
1ST STREET BRIDGE
REMOVE 40 LF OF ABANDONED PIPE
EXISTING 4" OUTLET
DEBRIS REMOVAL
(280 CY)
BAR VANE STRUCTURE
WOOD TOE (TYP)
EXISTING WETLAND
PROPOSED WETLAND AREA 1
(SEE SHEET WET PP-1)
SITE ACCESS THROUGH WEST B STREET
SHEET PP-3
PROPOSED BOAT RAMP
EXISTING 36" PIPE
ELEV 5102.42
PROPOSED TEMPORARY STAGING AREA 2
PROPOSED WETLAND AREA 2
(SEE SHEET WET PP-2)
BNSF BRIDGE
OUTFALL C
EXISTING 36" CSP
(SEE SHEET SS-3)
NICHOLS AVE.
FIRST STREET
WEST B ST.
ASH ST.
WEST A ST.
WEST 1ST ST.
Yellowstone Highway
CASPER REDEVELOPMENT COMPANY, LLC
1"=100'
0
50'
100'
200'

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH

CASPER, WYOMING

Title
100% PLANS
SITE PLAN

Permit-Seal

Professional Engineer TIMOTHY DINKINS 16173 Date 4-24-19 WYOMING

Project Number: 172621110

File Name: OV_Sheet_N_Platte_1st_Street.dwg

PTP	JGA	TCD	19.5.17
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Drawing No.

Revision	Sheet
0	OV-1

REACH 1
SOIL MANAGEMENT AREA
ALL EXCAVATED MATERIAL TO BE HAULED OFF AND DISPOSED OF.
ALL FILL MATERIAL TO BE IMPORTED FROM APPROVED ON SITE LOCATIONS OR SOURCED FROM OFF SITE.

PLATTE RIVER CROSSING, LLC

JONAH BANK

PLATTE RIVER CROSSING, LLC

START REACH 2

SL-1 SL-2 SL-3 SL-4 SL-5 SL-6 SL-7

LOD

INNER BERM GRADING WITH SELECT MATERIAL

EXISTING BIKE TRAIL DO NOT DISTURB

WOOD TOE (SEE SHEET DET-03)

OUTFALL A
EXISTING 18" PIPE
ELEV 5107.06
(SEE SHEET SS-1)

MAINTAIN EXISTING BANKFULL CHANNEL LIMITS

BEGIN PROPOSED BANKFULL CHANNEL LIMITS

WOOD TOE (SEE SHEET DET-03)

LIMITS OF DISTURBANCE

SELECT MATERIAL

BEGIN PROPOSED BASELINE ALIGNMENT

1+00

2+00

BEGIN PROPOSED THALWEG ALIGNMENT

PLATTE RIVER RAILWAY TRUST

3+00

4+00

5+00

6+00

7+00

8+00

9+00

10+00

11+00

BAR VANE STRUCTURE (SEE SHEET DET-01)

NATIVE COBBLE

TIE INTO EXISTING STREAMBED

MATCHLINE PP-2

BOULDER CLUSTERS (SEE SHEET DET-07)

FLY FISHING STATUE DO NOT DISTURB

LOW FLOW CHANNEL LIMITS

MAINTAIN EXISTING BANKFULL CHANNEL LIMITS

BEGIN PROPOSED BANKFULL CHANNEL LIMITS

CITY OF CASPER

AMOCO OIL CO.

EXISTING WETLAND DO NOT DISTURB

EXISTING MONITORING WELLS DO NOT DISTURB

EXISTING 24" RCP ELEV 5103.30

EXISTING 48" RCP ELEV 5103.35

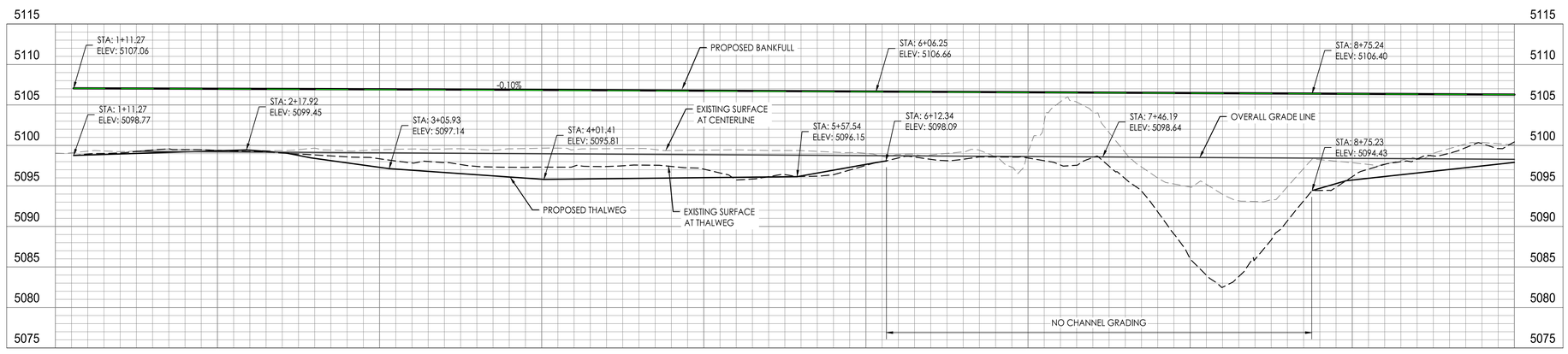
EXISTING MONITORING WELLS DO NOT DISTURB

EXISTING BP BARRIER WALL DO NOT DISTURB

CASPER REDEVELOPMENT COMPANY, LLC

OHP

NOTE: ALL EXCAVATED MATERIAL UPSTREAM OF STATION 7+25 MUST BE REMOVED FROM SITE AND DISPOSED OF PROPERLY. CLEAN FILL SHALL REPLACE MATERIAL IF NEEDED.



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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
PLAN AND PROFILE 1

Permit-Seal

Project Number: 172621110

File Name: PP_80%_Concept_N_Platte_1st_Street.dwg

PTP	JGA	TCD	19.5.17
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Drawing No.

Revision	Sheet
0	PP-1

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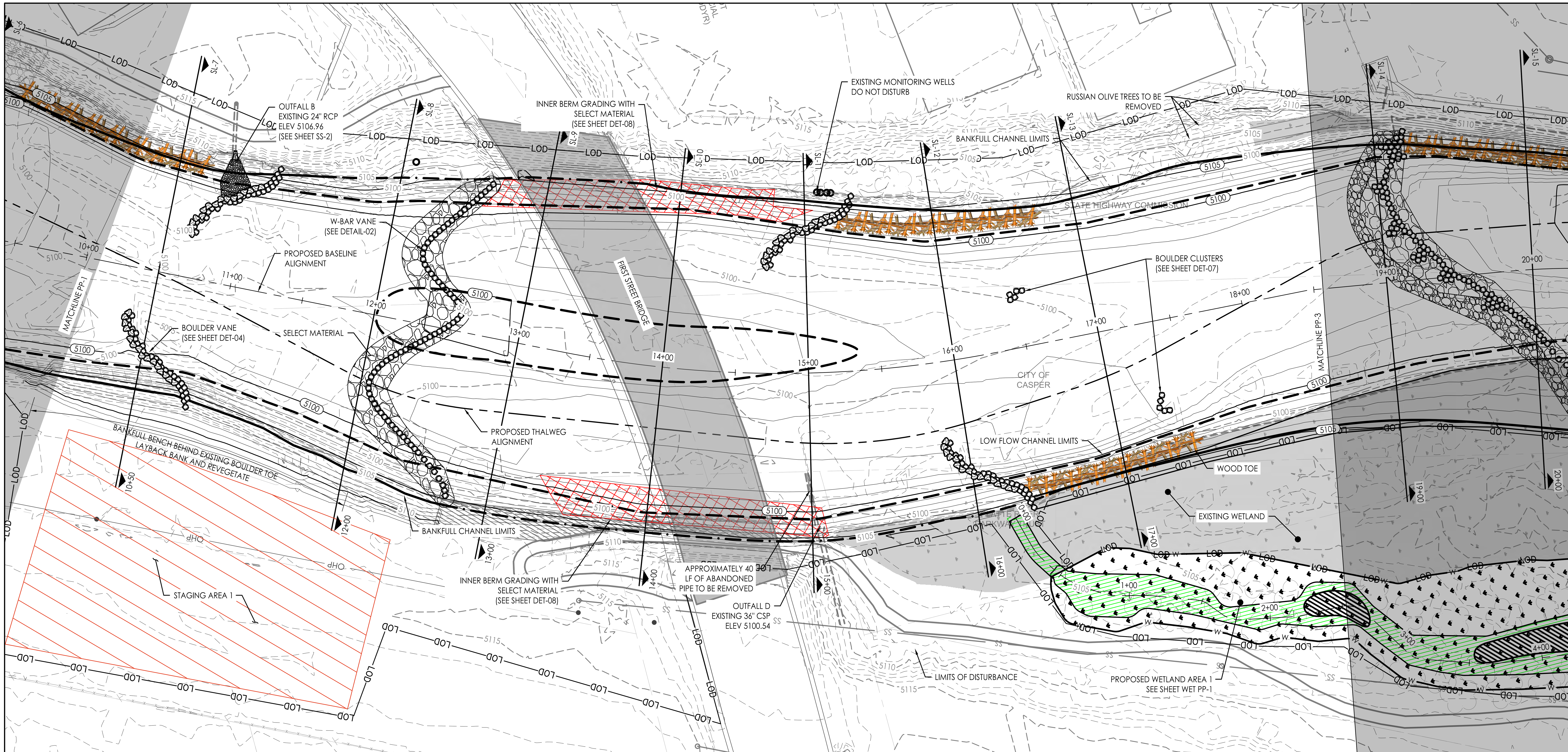

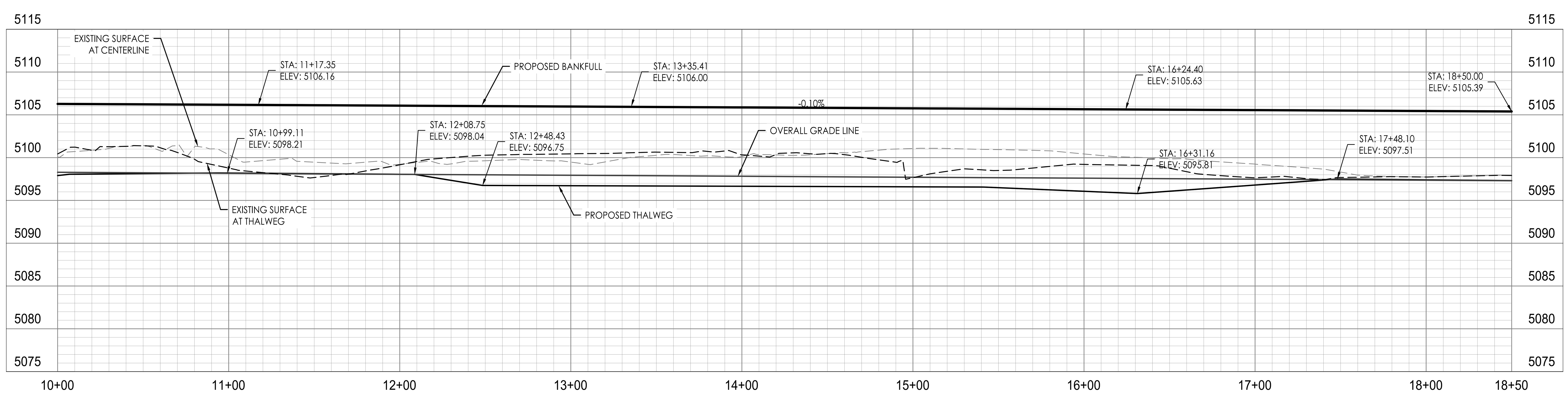

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
PLAN AND PROFILE 2

Permit-Seal

Professional Engineer TIMOTHY DINKINS 16173 WYOMING Date 4-24-19

Project Number: 172621110

File Name: PP_80%_Concept_N_Platte_1st_Street.dwg

PTP	JGA	TCD	19.5.17
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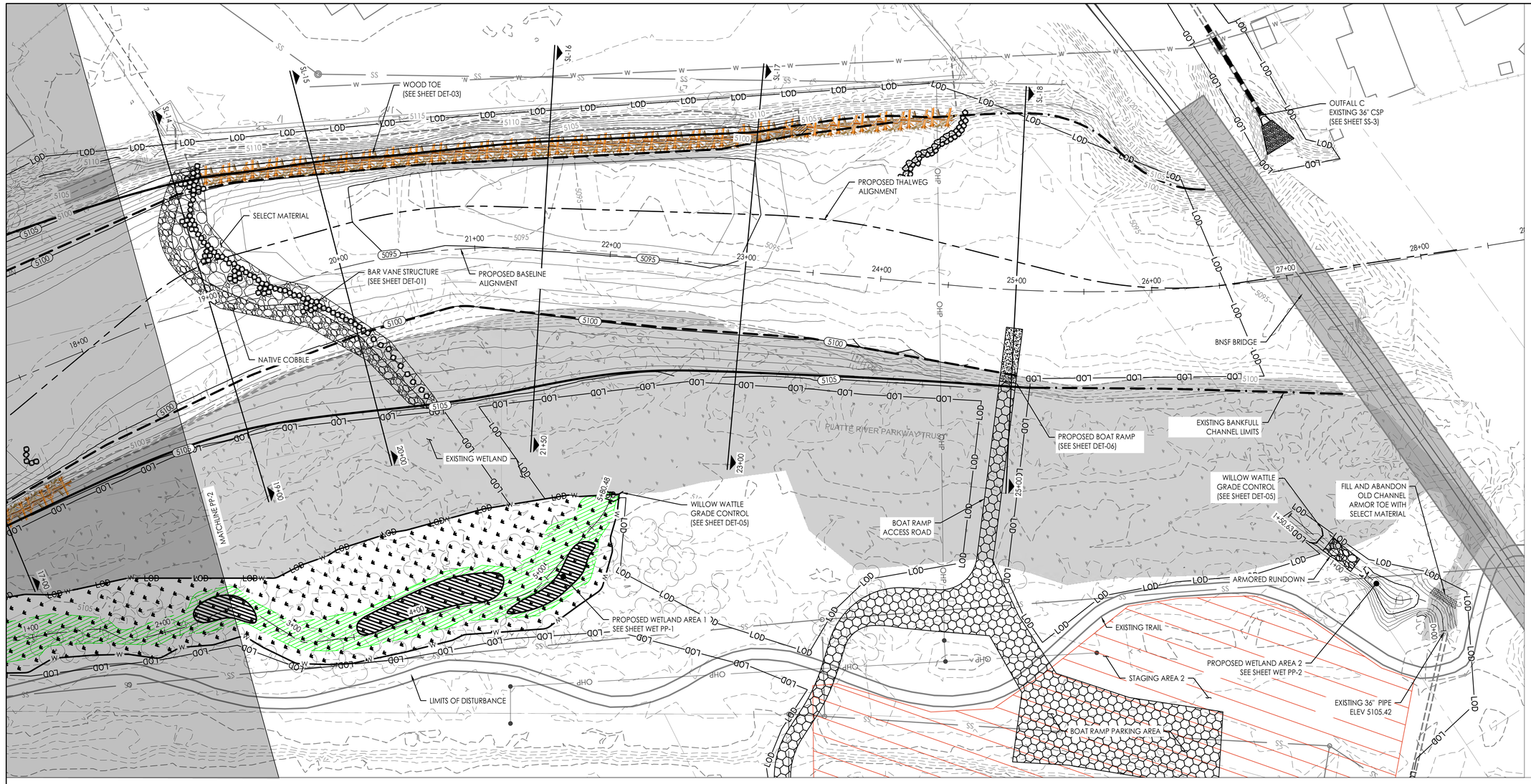
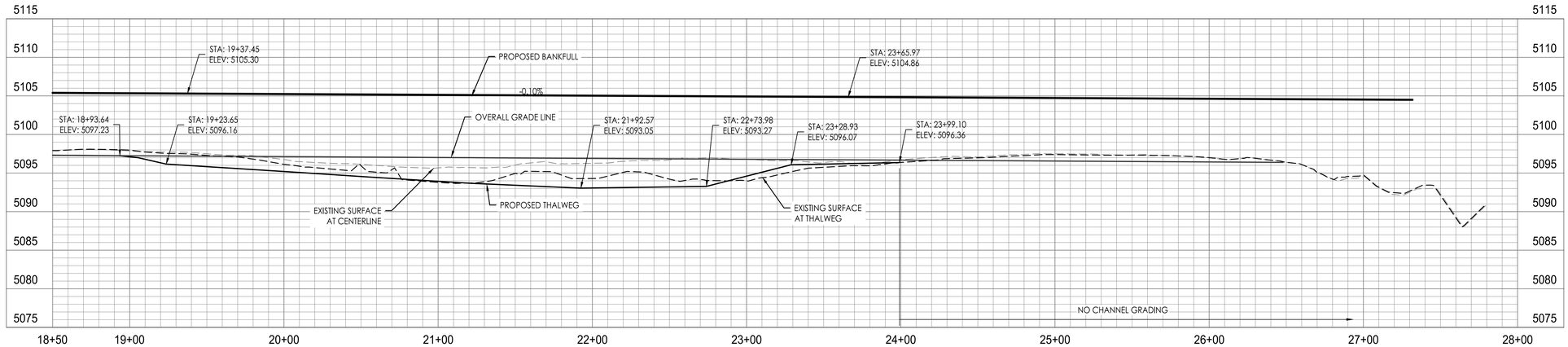
Drawing No.

Revision 0

Sheet PP-2





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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
PLAN AND PROFILE 3

Permit-Seal

Project Number: 172621110

File Name: PP_80%_Concept_N_Platte_1st_Street.dwg

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Drawing No.

Revision	Sheet
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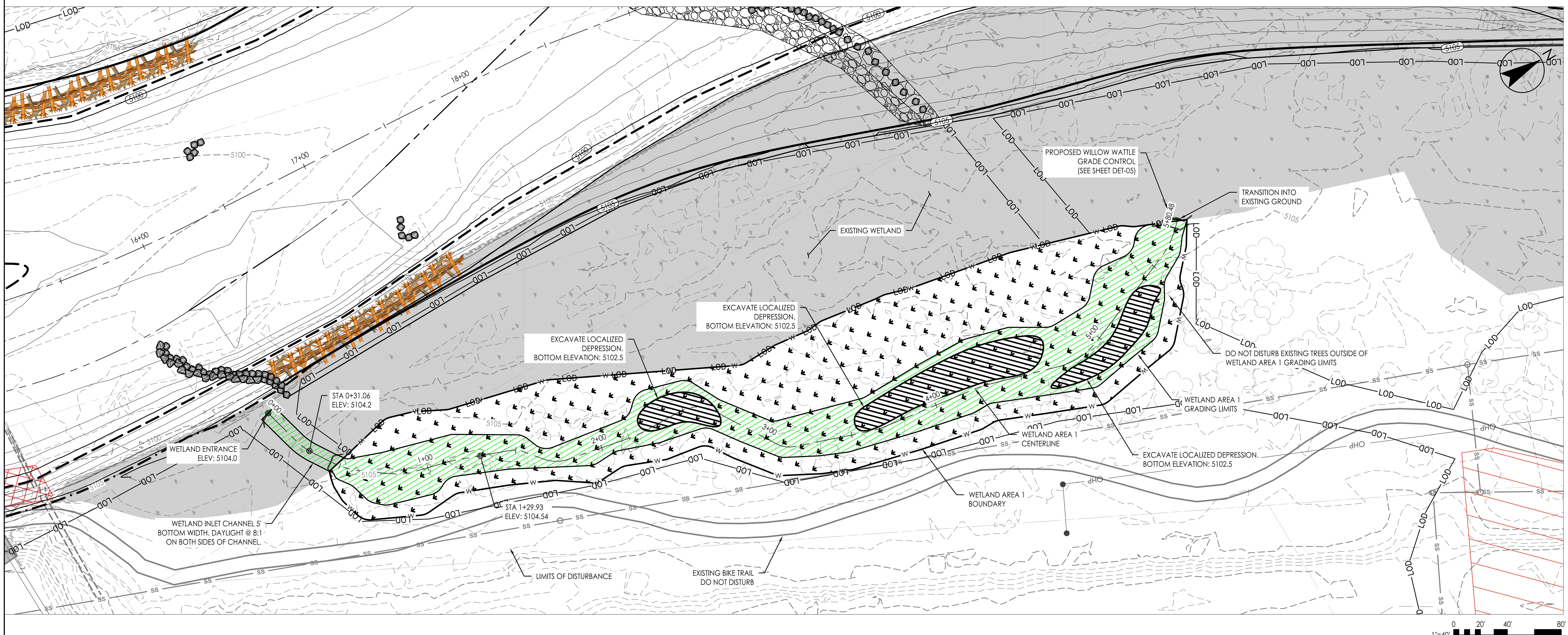

NOTE:

1) CONTRACTOR IS ONLY TO DISTURB GROUND WITHIN THE WETLAND GRADING LIMITS AS DELINEATED IN THE FIELD BY THE ENGINEER.
2) THE LOCALIZED DEPRESSION AREAS ARE TO BE FIELD FIT SUCH THAT THE GRADING ACTIVITIES DO NOT IMPACT TREES INTENDED TO REMAIN.
3) THE AREA OUTSIDE OF THE WETLAND GRADING LIMITS, BUT INSIDE THE PROPOSED WETLAND LIMITS SHALL BE SEEDED AND PLANTED ACCORDING TO THE PROPOSED VEGETATION PLAN.

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
WETLAND AREA 1 PLAN

Permit-Seal

Professional Engineer TIMOTHY DINKINS WYOMING Date 4-24-19

Project Number: 172621110

File Name: N_Platte_1st_Street_Wetland.dwg

PTP	JGA	TCD	19.5.17
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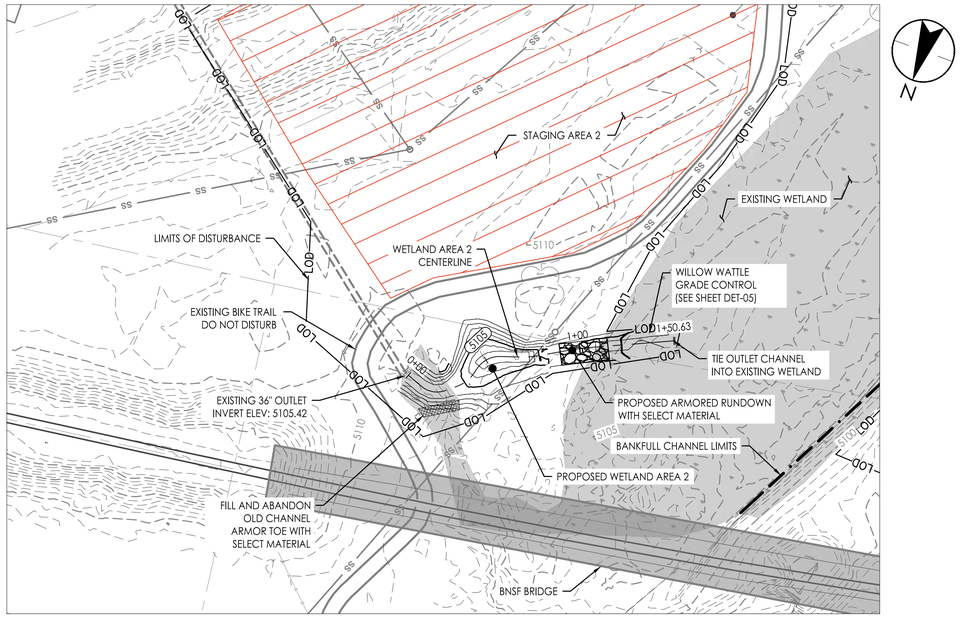
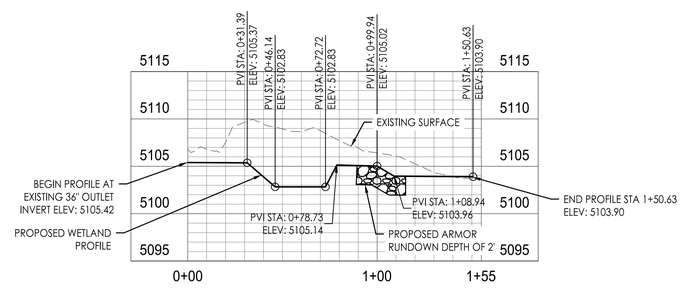
Revision 0 — Sheet WET PP-1





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1"=40'

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
WETLAND AREA 2 PLAN AND PROFILE

Permit-Seal

Project Number: 172621110

File Name: N_Platte_1st_Street_Wetland.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.

Revision	Sheet
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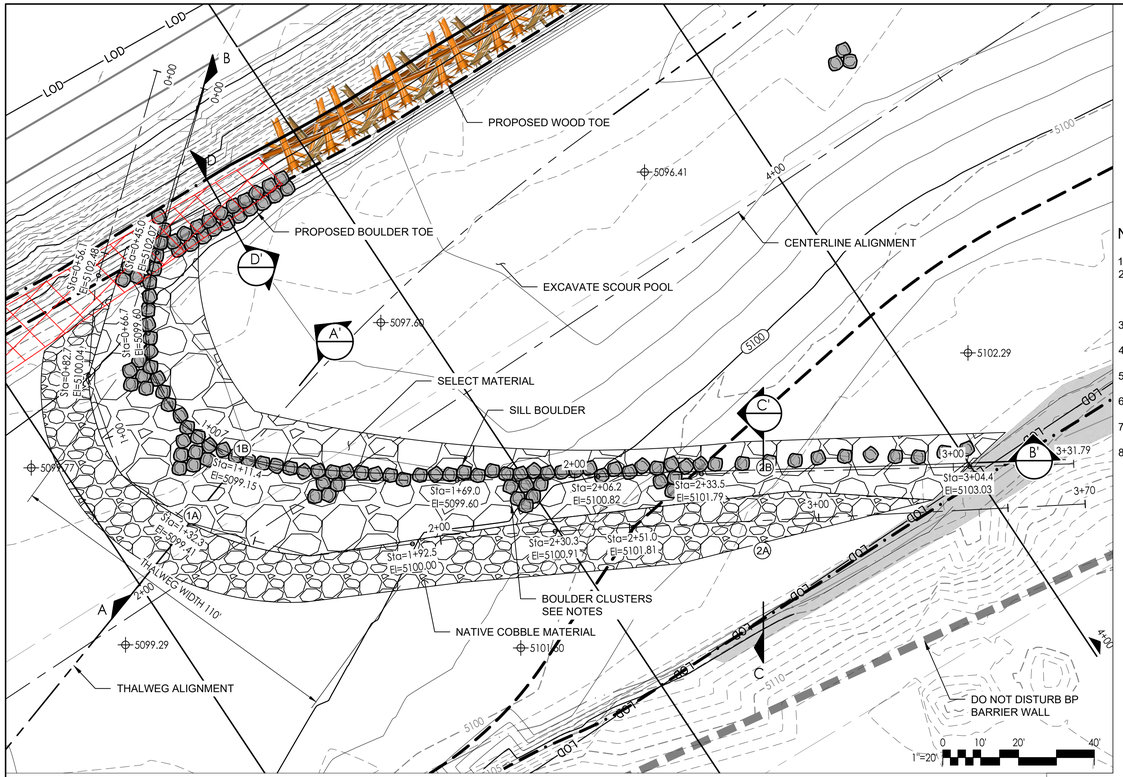
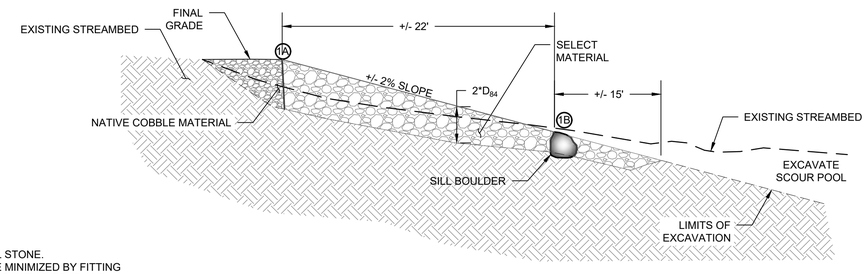


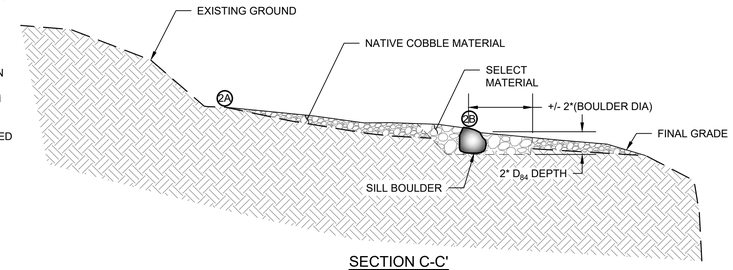
PLANVIEW
BAR VANE 1

NOTES:

1. ALL STONES ARE TO BE STRUCTURAL STONE.
2. GAPS BETWEEN BOULDERS SHALL BE MINIMIZED BY FITTING BOULDERS TOGETHER, AND PLUGGING WITH RIPRAP AND SELECT MATERIAL. THE CONTRACTOR WILL BE REQUIRED TO FIT BOULDERS TIGHTLY.
3. DIMENSIONS AND SLOPES MAY BE ADJUSTED TO FIT BY THE ENGINEER.
4. VANE ARMS SHALL MATCH THE ELEVATIONS SHOWN IN THE PLAN VIEWS
5. BOULDERS SHALL BE NATIVE STONE OR SHOT ROCK, CUBICAL OR RECTANGULAR IN NATURE.
6. ALL MATERIALS ARE TO BE APPROVED BY ENGINEER OR ENGINEER'S ONSITE CONSTRUCTION MANAGER.
7. SEE GENERAL NOTES PAGE FOR SELECT MATERIAL GRADATION AND BOULDER SIZE REQUIREMENTS.
8. BOULDER CLUSTERS SHALL BE PLACED ALONG THE UPSTREAM FACE OF THE SILL BOULDERS AND SPACED APART AT THE ENGINEERS DISCRETION. THE TOPS OF THE BOULDERS SHALL PROTRUDE OUT FROM THE ADJACENT BED BY 1-1.5' AS DIRECTED BY ENGINEER.



SECTION A-A'
NOT TO SCALE



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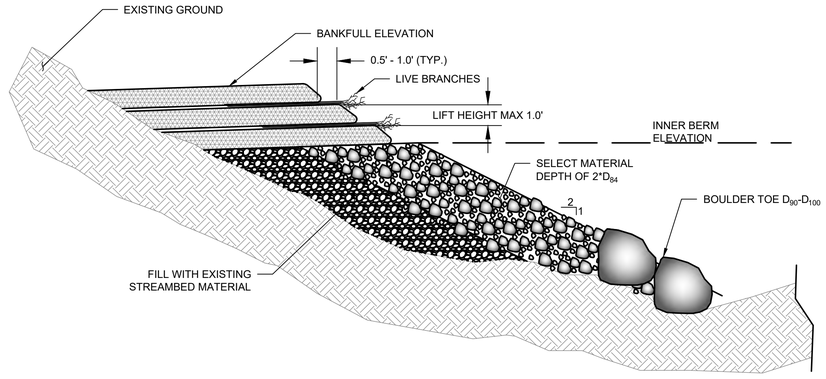

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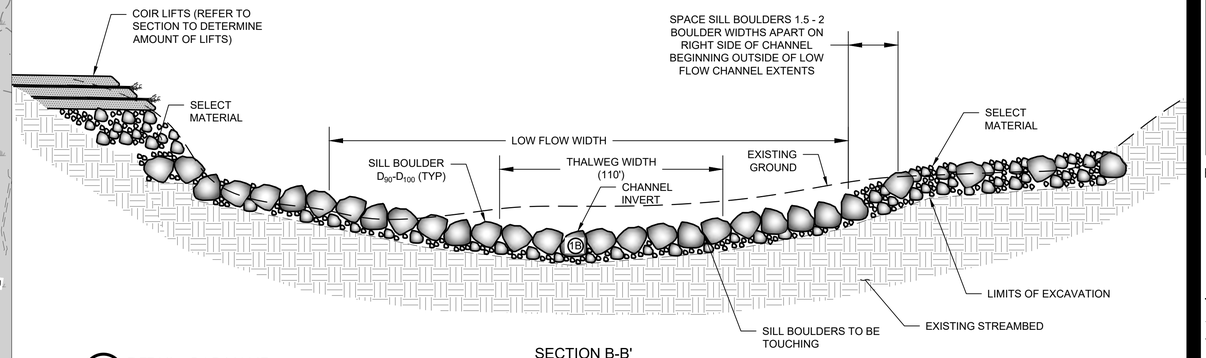

SECTION B-B'
NOT TO SCALE

PLANVIEW
BAR VANE 2

1 DETAIL - BAR VANE
NOT TO SCALE

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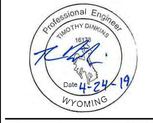
Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
BAR VANE DETAIL

Permit-Seal



Project Number: 172621110

File Name: DET-01_BAR_VANE.dwg

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Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. BAR VANE DETAIL

Revision	Sheet
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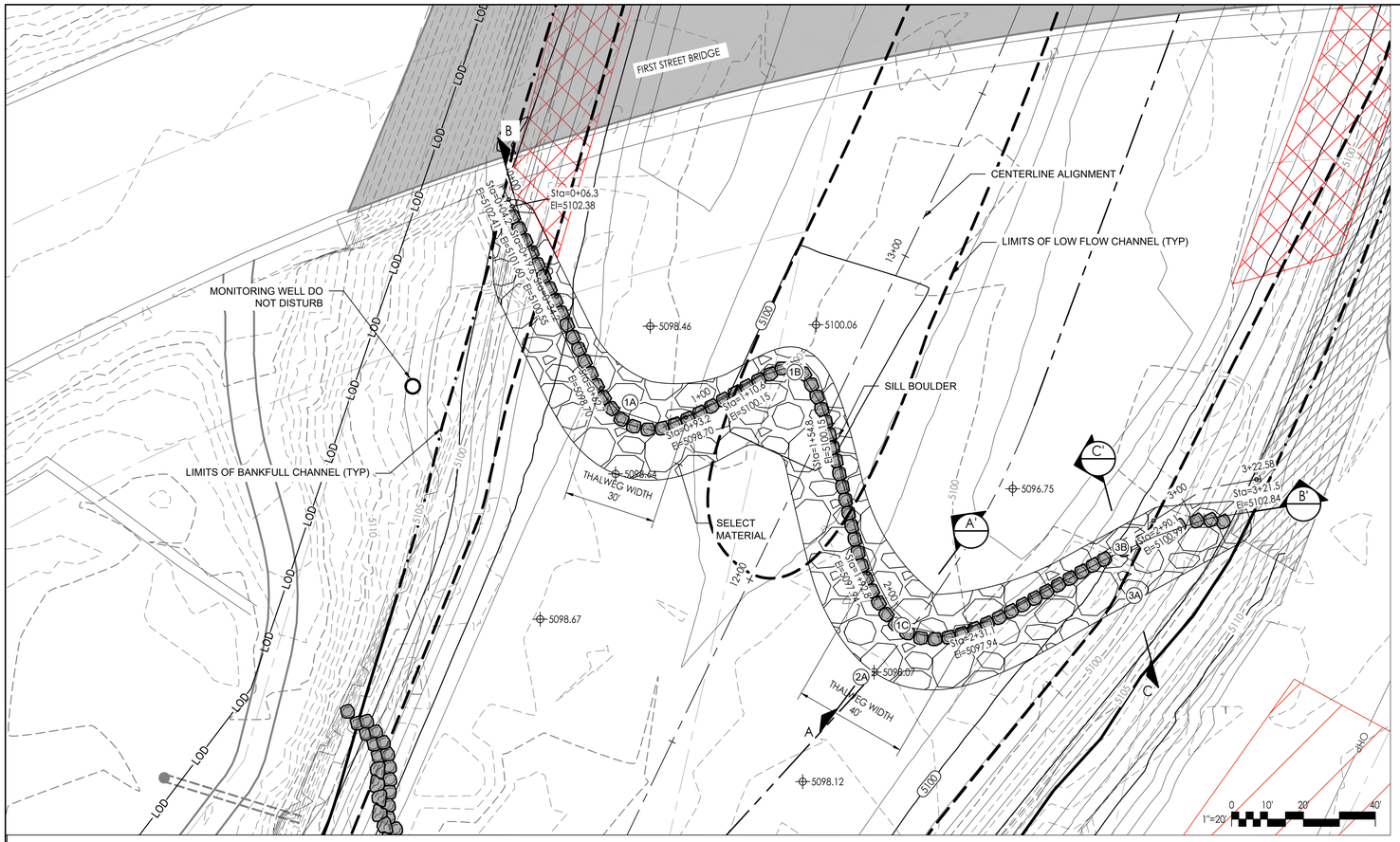
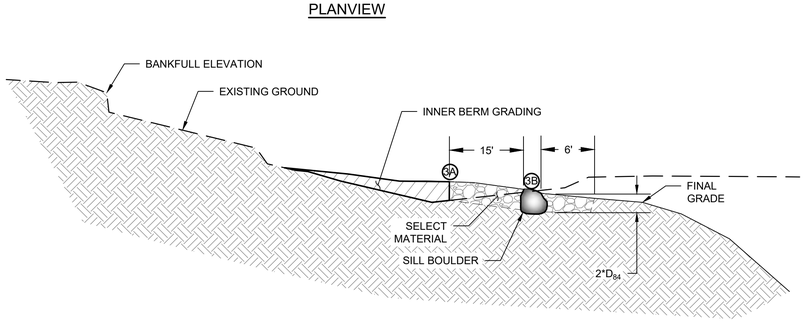


PLANVIEW

NOTES:

1. ALL STONES ARE TO BE STRUCTURAL STONE.
2. GAPS BETWEEN BOULDERS SHALL BE MINIMIZED BY FITTING BOULDERS TOGETHER, AND PLUGGING WITH RIPRAP AND SELECT MATERIAL. THE CONTRACTOR WILL BE REQUIRED TO FIT BOULDERS TIGHTLY.
3. DIMENSIONS AND SLOPES MAY BE ADJUSTED TO FIT BY THE ENGINEER.
4. VANE ARM SHALL TIE INTO THE BANK HALFWAY BETWEEN THE CHANNEL INVERT AND BANKFULL ELEVATIONS. THE ARM SHALL RISE AT 1.0% TO 1.5% FROM THE CHANNEL INVERT AT AN ANGLE OF 20-30 DEG FROM THE ADJACENT TANGENT LINE.
5. BOULDERS SHALL BE NATIVE STONE OR SHOT ROCK, CUBICAL OR RECTANGULAR IN NATURE.
6. ALL MATERIALS ARE TO BE APPROVED BY ENGINEER OR ENGINEER'S ONSITE CONSTRUCTION MANAGER.
7. SEE GENERAL NOTES PAGE FOR BOULDER AND SELECT MATERIAL SIZE REQUIREMENTS



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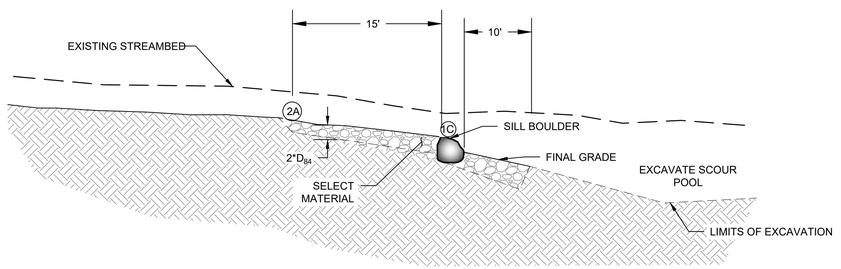

SECTION A-A'
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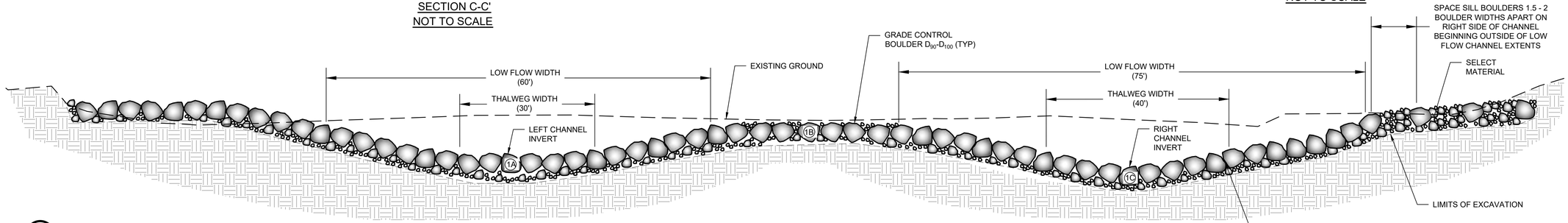

SECTION B-B'
NOT TO SCALE

2 DETAIL - W BAR VANE
NOT TO SCALE

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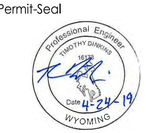
Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
W BAR VANE DETAIL

Permit-Seal



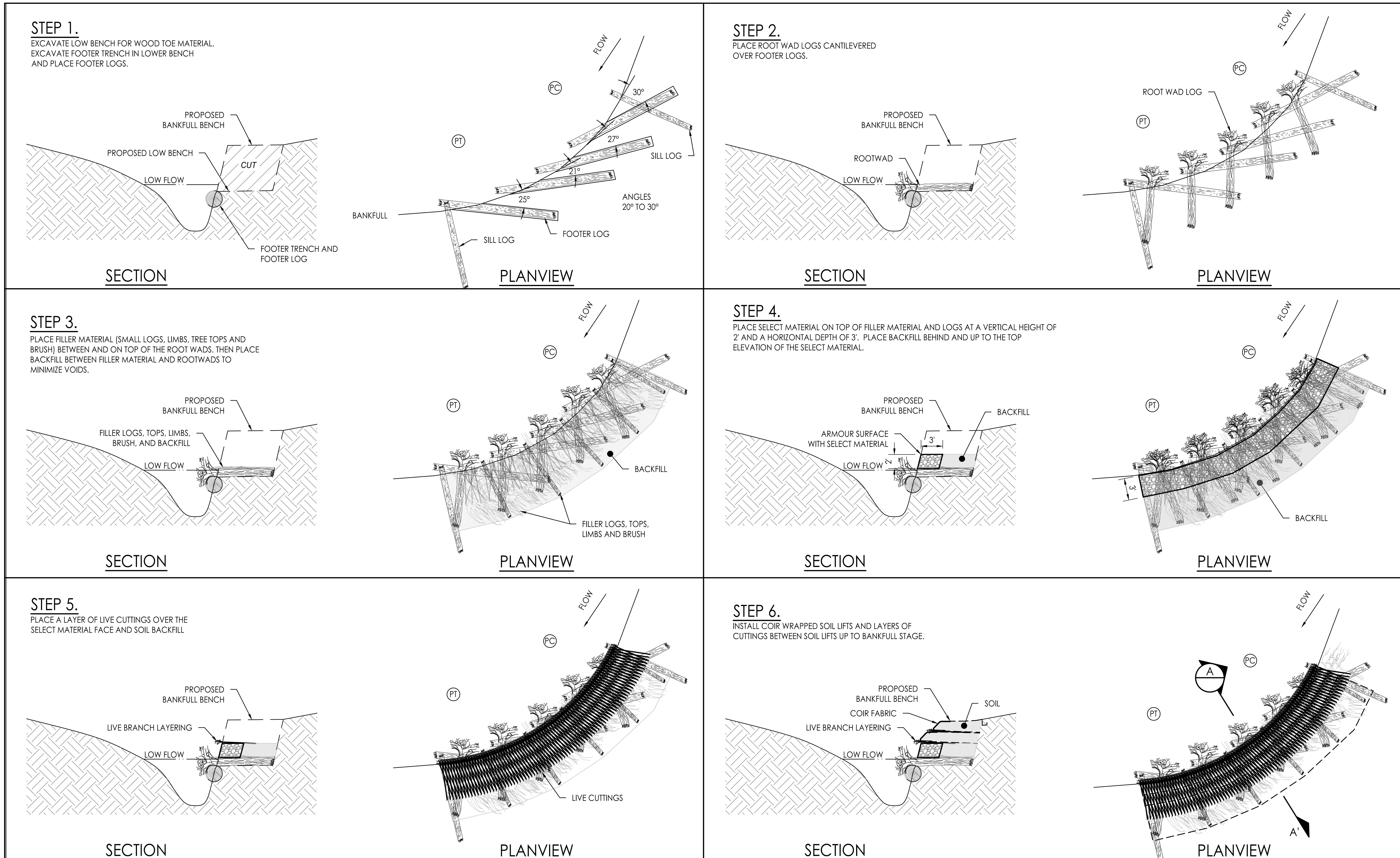
Project Number: 172621110

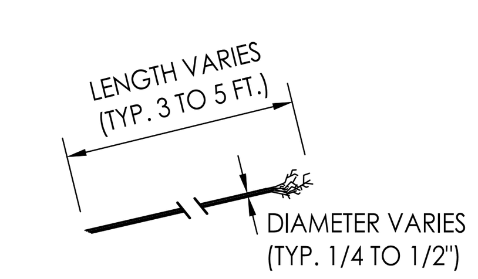
File Name: DET-02_MODIFIED_BAR_VANE.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. W BAR VANE DETAIL

Revision	Sheet
0	DET-02

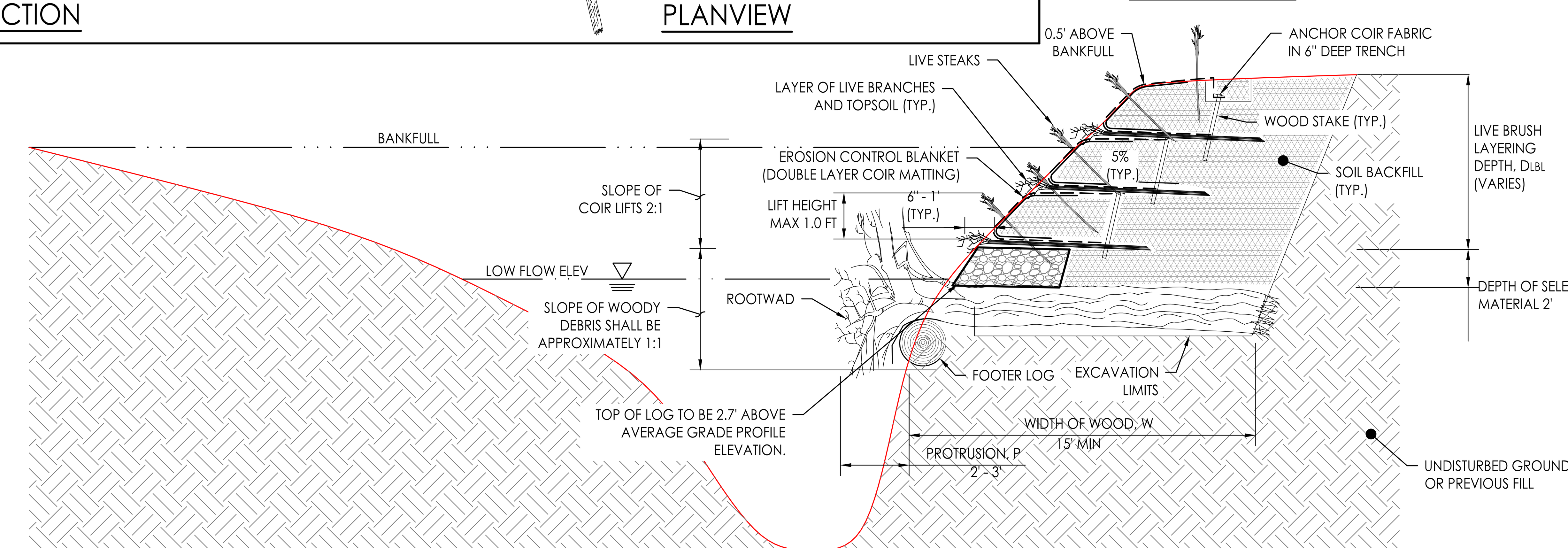




LIVE BRANCH

NOTES:

1. ELEVATION OF COIR LIFT AND TOE WOOD PROTECTION MAY VARY AT TIME OF CONSTRUCTION AS DIRECTED BY THE ENGINEER.
2. COARSE WOODY DEBRIS SHALL CONSIST OF LOGS, ROOTWADS, AND LARGE BRANCHES NOT SUITABLE FOR CONSTRUCTION OF LOG STRUCTURES. ALL MATERIALS ARE TO BE APPROVED BY ENGINEER.
3. COARSE WOODY DEBRIS SHALL BE CONSTRUCTED WITH THE LARGEST MATERIAL PLACED FIRST. NO LOGS SHALL BE PLACED PARALLEL TO THE FLOW OF WATER, UNLESS DIRECTED BY ENGINEER. LOGS SHALL BE PLACED IN A CROSSING PATTERN OR WEAVE SUCH THAT EACH LOG IS ANCHORED BY ANOTHER LOG OR SMALL WOODY DEBRIS.
4. SMALL/FINE WOODY DEBRIS SHALL CONSIST OF MEDIUM TO SMALL LIMBS AND CAN BE BRANCHES, BUSHES, AND/OR LOGS. INVASIVE SPECIES SHALL NOT BE USED.
5. SMALL/FINE WOODY DEBRIS SHALL BE PLACED ABOVE AND BETWEEN THE COARSE WOODY DEBRIS WITH THE LARGEST MATERIAL BEING PLACED FIRST AND THE SMALLEST MATERIAL PLACED LAST.
6. ALL WOODY DEBRIS SHALL BE COMPACTED WITH THE EXCAVATOR BUCKET IN ORDER TO REDUCE THE PRESENCE OF VOIDS IN THE SMALL/FINE WOODY DEBRIS LAYER.
7. THE HORIZONTAL LOCATIONS OF ALL WOODY DEBRIS ARE LOCATED ON THE PLAN/PROFILE SHEETS. NO LOCATIONS OF WOODY DEBRIS SHALL VARY FROM THE PLAN LOCATIONS WITHOUT DIRECTION FROM THE STAMPING ENGINEER.
8. PLACE SELECT MATERIAL ON TOP OF FILLER MATERIAL AND LOGS AT A VERTICAL HEIGHT OF 2' AND A HORIZONTAL DEPTH OF 3'.
9. THE SOIL BACKFILL USED FOR LIFTS AND TOPSOIL USED FOR LAYERING WITH THE LIVE BRANCHES SHALL BE FREE OF ANY LARGE ROOTS OR WOODY DEBRIS AND SHALL GENERALLY BE FREE FROM ANY COBBLE MATERIAL.
10. SOIL BACKFILL SHALL BE COMPACTED SUCH THAT FUTURE SETTLING WILL BE KEPT TO A MINIMUM; YET, NOT SUCH THAT THE UNDERLYING BRUSH IS DISPLACED OR DAMAGED.
11. THE TOP OF THE BACKFILL FOR THE FIRST LIFT SHALL BE SLOPED AT APPROXIMATELY 5% AWAY FROM THE STREAM.
12. PLACE A LAYER OF TOPSOIL AND LIVE BRANCHES ON TOP OF EACH SOIL LIFT SUCH THAT APPROXIMATELY 6 INCHES TO 1 FOOT OF EACH LIVE BRANCH WILL BE EXPOSED AND THE REMAINDER (2' TO 4') OF EACH LIVE BRANCH WILL BE COVERED BY THE NEXT SOIL LIFT.
13. LIVE BRANCHES SHALL BE OF THE SPECIES SPECIFIED FOR LIVE STAKES.
14. PLACE A LAYER of 13.1 FEET WIDE (4 METER) KOIR WRAP 1000 ON TOP OF THE TOPSOIL AND LIVE BRANCHES SUCH THAT THE BLANKET IS 4.5 TO 5-FEET FROM THE FACE OF THE COIR LIFT. ALLOW THE REMAINING BLANKET TO HANG OVER THE PRECEDING SOIL LIFT.
15. PLACE SOIL BACKFILL UP TO THE LIFT HEIGHT SPECIFIED OF NO GREATER THAN 1.5 FT BEING CAREFUL NOT TO PUSH/PULL OR TEAR THE BLANKET PREVIOUSLY PLACED.
16. THE TOP OF THE SOIL BACKFILL SHALL BE FLAT WITHIN THE LIFT SETBACK DISTANCE SPECIFIED IN THE STRUCTURE TABLE. BEYOND THE LIFT SETBACK DISTANCE, THE SOIL BACKFILL SHALL BE SLOPED AT AN APPROXIMATE 5% SLOPE AWAY FROM THE STREAM.
17. TOP DRESS THE SOIL LIFT WITH TOPSOIL FROM THE FACE OF THE SOIL LIFT BACK INTO THE FLOODPLAIN AT LEAST 4FT.
18. WRAP THE FACE AND TOP OF THE SOIL LIFT USING THE EROSION CONTROL BLANKET HANGING OVER THE PREVIOUS LIFT.
19. THE EROSION CONTROL BLANKET SHALL BE PULLED AS TIGHT AS POSSIBLE WITHOUT TEARING OR EXCESSIVELY DISTORTING THE FABRIC.
20. SECURE THE EROSION CONTROL BLANKET IN PLACE BY STAKING THE END OF THE BLANKET A MINIMUM 7-FEET FROM THE FACE OF THE SOIL LIFT WITH WOODEN STAKES ON 1.5-FOOT CENTERS.
21. BEGIN CONSTRUCTION OF THE NEXT SOIL LIFT BY REPEATING THE PREVIOUS NOTES STARTING WITH NOTE 12.
22. THE OVERALL SLOPE CREATED BY THE LIVE BRUSH LAYERING SHALL MATCH THE PROPOSED CROSS SECTION SHAPE FOR THE OUTER BANK OF THE THE TYPICAL POOL CROSS-SECTION FOR EACH REACH.
23. THE COIR BLANKETS USED FOR THE UPPER MOST SOIL LIFT WILL BE SECURED WITHIN A 6 INCH DEEP TRENCH AS SHOWN IN DETAIL.
24. THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR ELEVATIONS SHALL BE WITHIN 0.1 FT OF THE GRADES AND ELEVATIONS INDICATED.
25. RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
26. SOD MAT MAY BE USED INSTEAD OF THE COIR LIFTS ABOVE THE WOOD TOE IF IT IS AVAILABLE AND APPROVED BY ENGINEER.
27. LENGTH SHOWN IN STRUCTURE TABLE REFLECTS LENGTH OF WOOD TOE ALONG THE BANK, NOT THE CENTERLINE.
28. IF LIVE BRANCHES ARE NOT INSTALLED OR DO NOT SURVIVE, LIVE STAKES SHALL BE INSTALLED ALONG THE STRUCTURE BETWEEN LOW FLOW AND BANKFULL. FOR LIVE STAKE INFORMATION ON SPACING AND INSTALLATION, REFER TO SPECIFICATION 02930 - PLANTING.
29. LIVE STAKES ARE INSTALLED DURING DORMANCY ONCE LIFTS AND/OR SOD MATS HAVE BEEN CONSTRUCTED.



SECTION A-A'
NOT TO SCALE

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
WOOD TOE DETAIL

Permit-Seal
Professional Engineer TIMOTHY DINKINS 16173 Date 4-24-19 WYOMING

Project Number: 172621110
File Name: DET-03_WOOD_TOE.dwg

PTP	JGA	TCD	19.5.17
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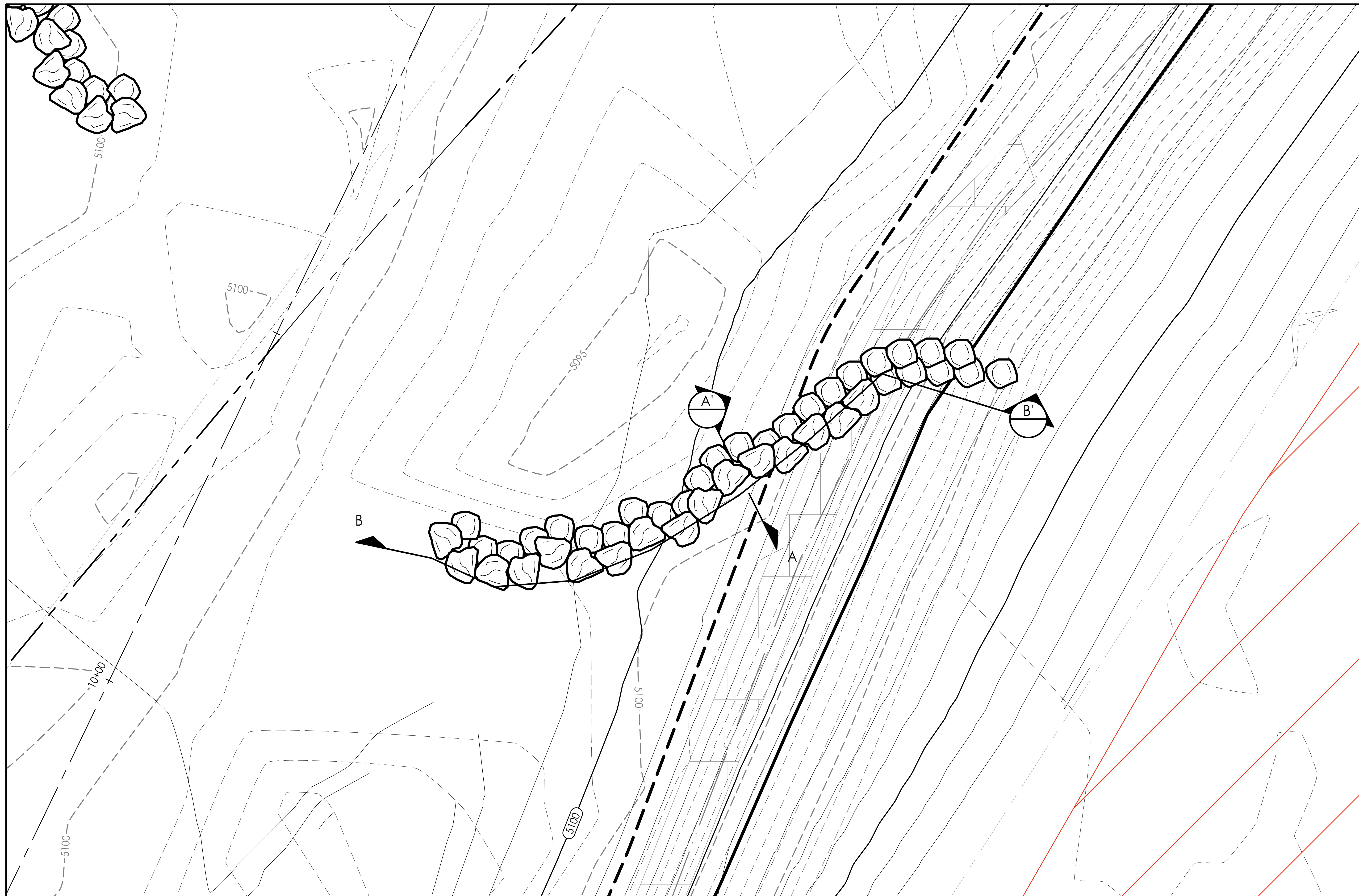
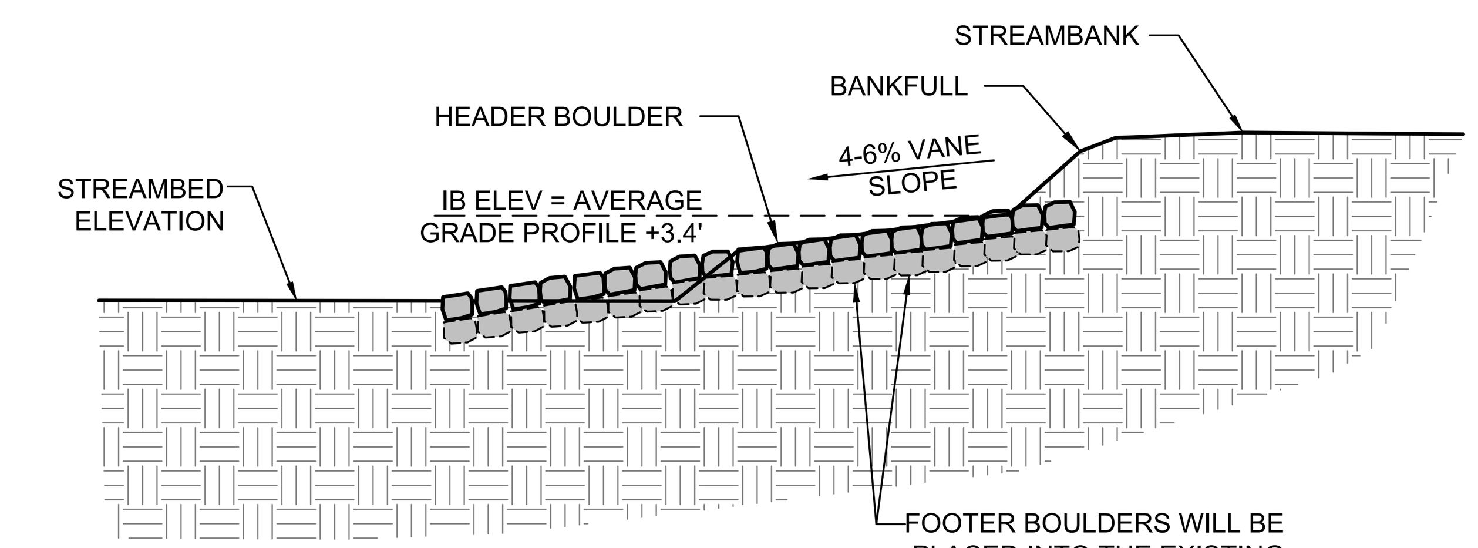
Drawing No. WOOD TOE DETAIL
Revision 0
Sheet DET-03



PLAN VIEW
SCALE 1" = 10'

NOTES:

1. ALL STONES ARE TO BE STRUCTURAL STONE.
2. GAPS BETWEEN BOULDERS SHALL BE MINIMIZED BY FITTING BOULDERS TOGETHER, AND PLUGGING WITH RIPRAP AND SELECT MATERIAL. THE CONTRACTOR WILL BE REQUIRED TO FIT BOULDERS TIGHTLY.
3. DIMENSIONS AND SLOPES MAY BE ADJUSTED TO FIT BY THE ENGINEER.
4. A DOUBLE FOOTER BOULDER MAY BE ADJUSTED TO FIT BY THE ENGINEER.
5. VANE ARM SHALL TIE INTO THE BANK HALFWAY BETWEEN THE CHANNEL INVERT AND BANKFULL ELEVATIONS. THE ARM SHALL RISE AT 2%-4% FROM THE CHANNEL INVERT AT AN ANGLE OF 20-30 DEG FROM THE ADJACENT TANGENT LINE.
6. BOULDERS SHALL BE NATIVE STONE OR SHOT ROCK, CUBICAL OR RECTANGULAR IN NATURE.
7. ALL MATERIALS ARE TO BE APPROVED BY ENGINEER OR ENGINEER'S ONSITE CONSTRUCTION MANAGER.
8. SEE GENERAL NOTES SHEET FOR BOULDER SIZING.



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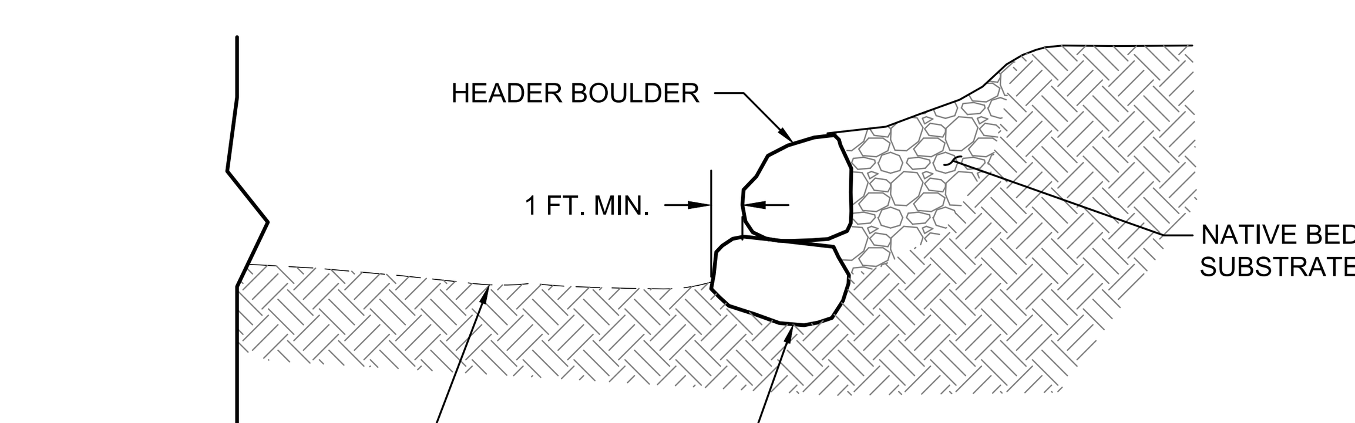

SECTION A-A'
NOT TO SCALE

4 DETAIL - BOULDER VANE
NOT TO SCALE

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH

CASPER, WYOMING

Title
100% PLANS
BOULDER VANE DETAIL

Permit-Seal

Professional Engineer
TIMOTHY DINKINS
WYOMING
Date 4-24-19

Project Number: 172621110

File Name: DET-04_BOULDER_VANE.dwg

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Drawing No. BOULDER VANE DETAIL

Revision	Sheet
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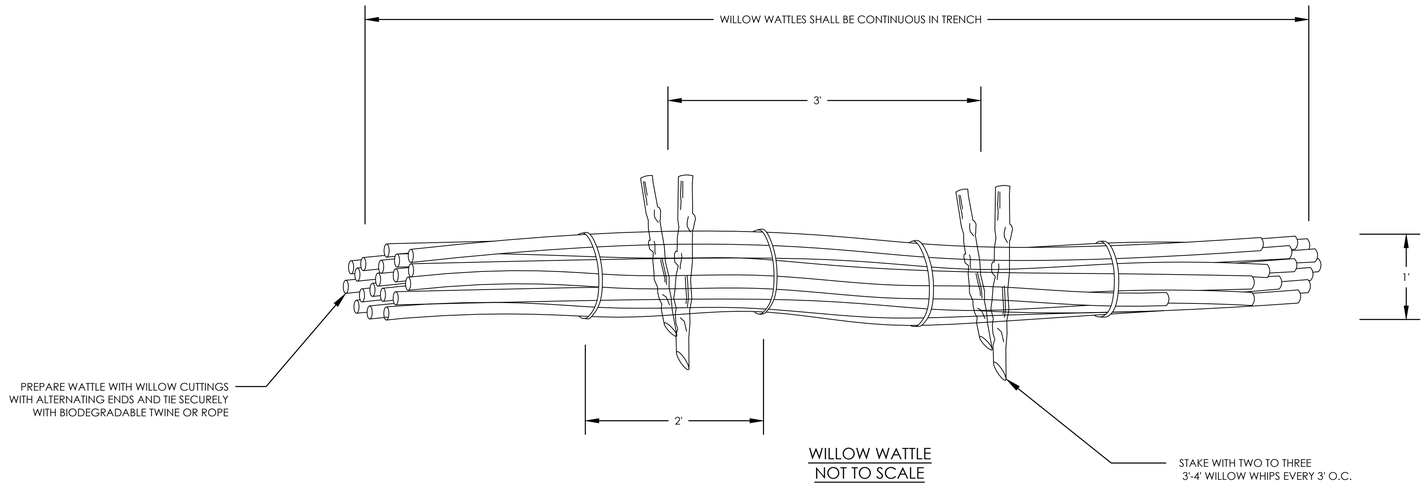
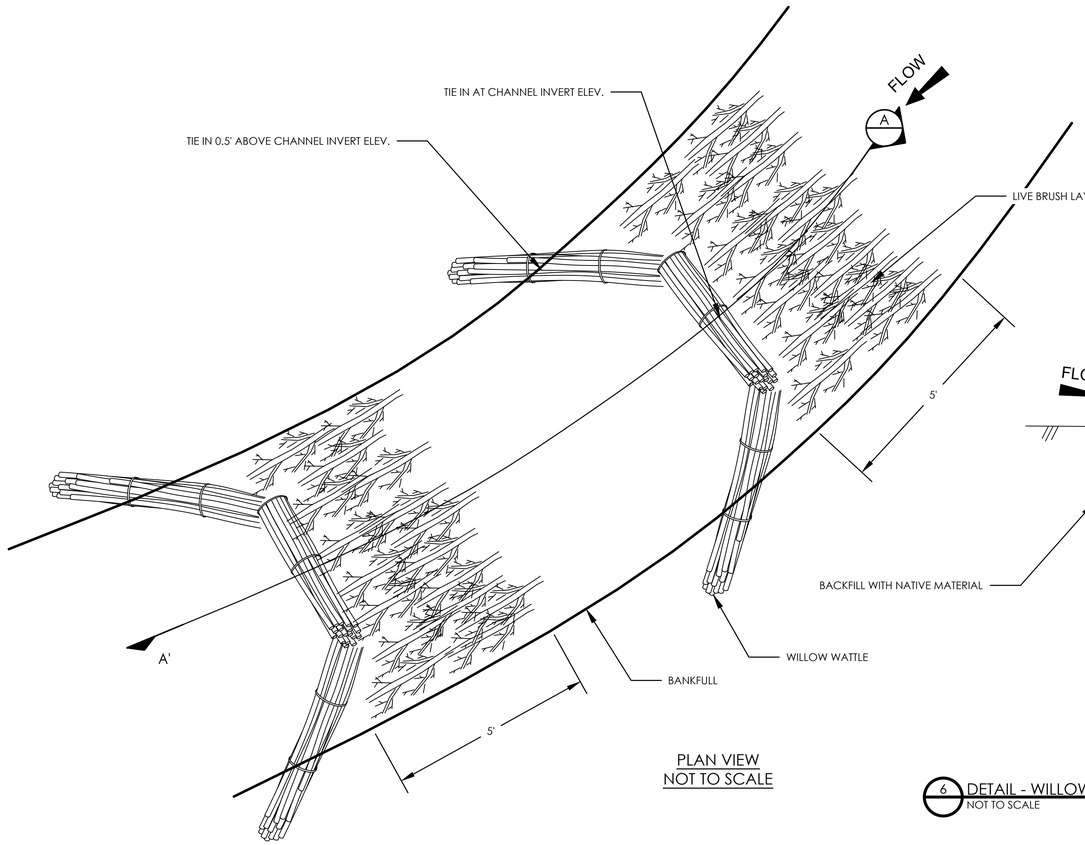


WILLOW WATTLE
NOT TO SCALE



PLAN VIEW
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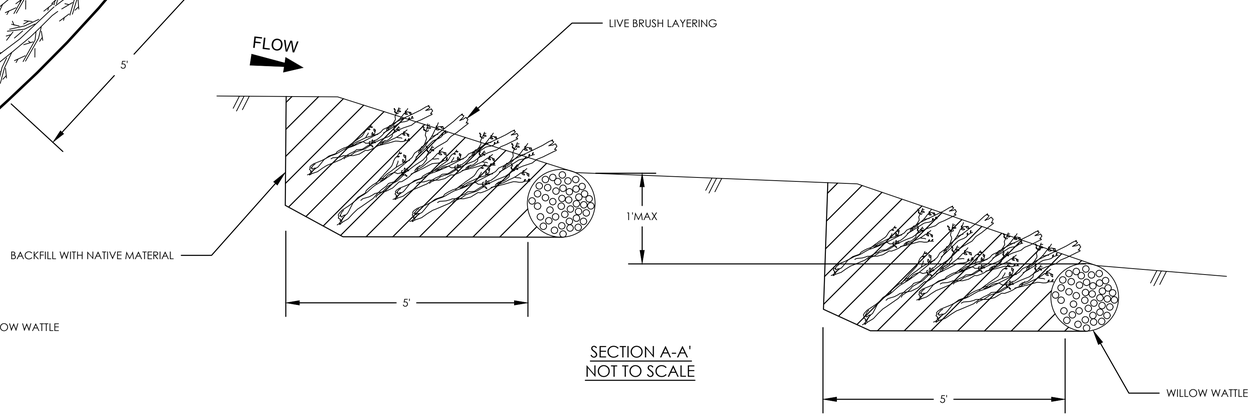

SECTION A-A'
NOT TO SCALE

6 DETAIL - WILLOW WATTLE GRADE CONTROL
NOT TO SCALE

WILLOW FASCINE NOTES:
1. USE A PILOT BAR DURING INSTALLATION IN FIRM SOILS
2. TAMP SOIL AROUND STAKE AND BACKFILL WITH NATIVE MATERIAL
3. COLLECT WILLOWS ONSITE TO CONSTRUCT WATTLES
4. WHILE COLLECTING MAKE CLEAN CUTS, DO NOT DAMAGE STAKES
5. SOAK STAKES AFTER COLLECTION AND UNTIL INSTALLATION

STRUCTURE NOTES:
1. EACH STRUCTURE SHALL BE INSTALLED BY FIRST TRENCHING IN THE WILLOW WATTLE BUNDLE
2. THEN, MOVING UPSTREAM, THE LIVE BRUSH LAYERING SHALL BE INSTALLED WITH SUBSEQUENT LIFTS AND BACKFILLED WITH NATIVE MATERIAL

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
WILLOW WATTLE GRADE CONTROL DETAIL

Permit-Seal

Project Number: 172621110

File Name: DET-06_WILLOW_WATTLES.dwg

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Drawing No.

Revision	Sheet
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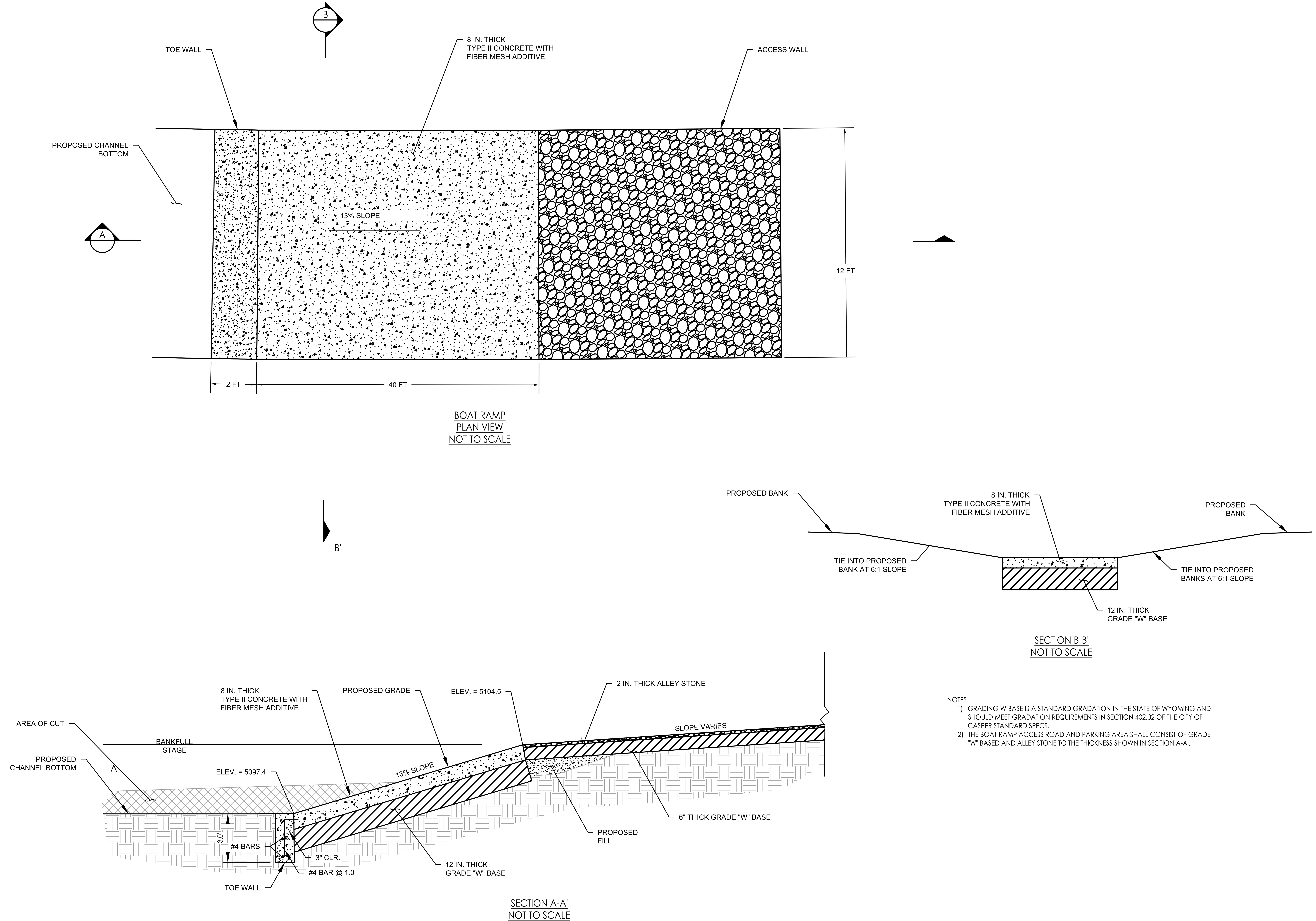

NOTES
1) GRADING W BASE IS A STANDARD GRADATION IN THE STATE OF WYOMING AND SHOULD MEET GRADATION REQUIREMENTS IN SECTION 402.02 OF THE CITY OF CASPER STANDARD SPECS.
2) THE BOAT RAMP ACCESS ROAD AND PARKING AREA SHALL CONSIST OF GRADE "W" BASED AND ALLEY STONE TO THE THICKNESS SHOWN IN SECTION A-A'.

7 DETAIL - BOAT RAMP AND ACCESS ROAD
NOT TO SCALE

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH

CASPER, WYOMING

Title
100% PLANS
BOAT RAMP AND ACCESS ROAD DETAIL

Permit-Seal
Professional Engineer — TIMOTHY DIMMING — WYOMING — Date 4-24-19

Project Number: 172621110

File Name: DET-07_BOAT_RAMP.dwg

PTP	JGA	TCD	19.5.17
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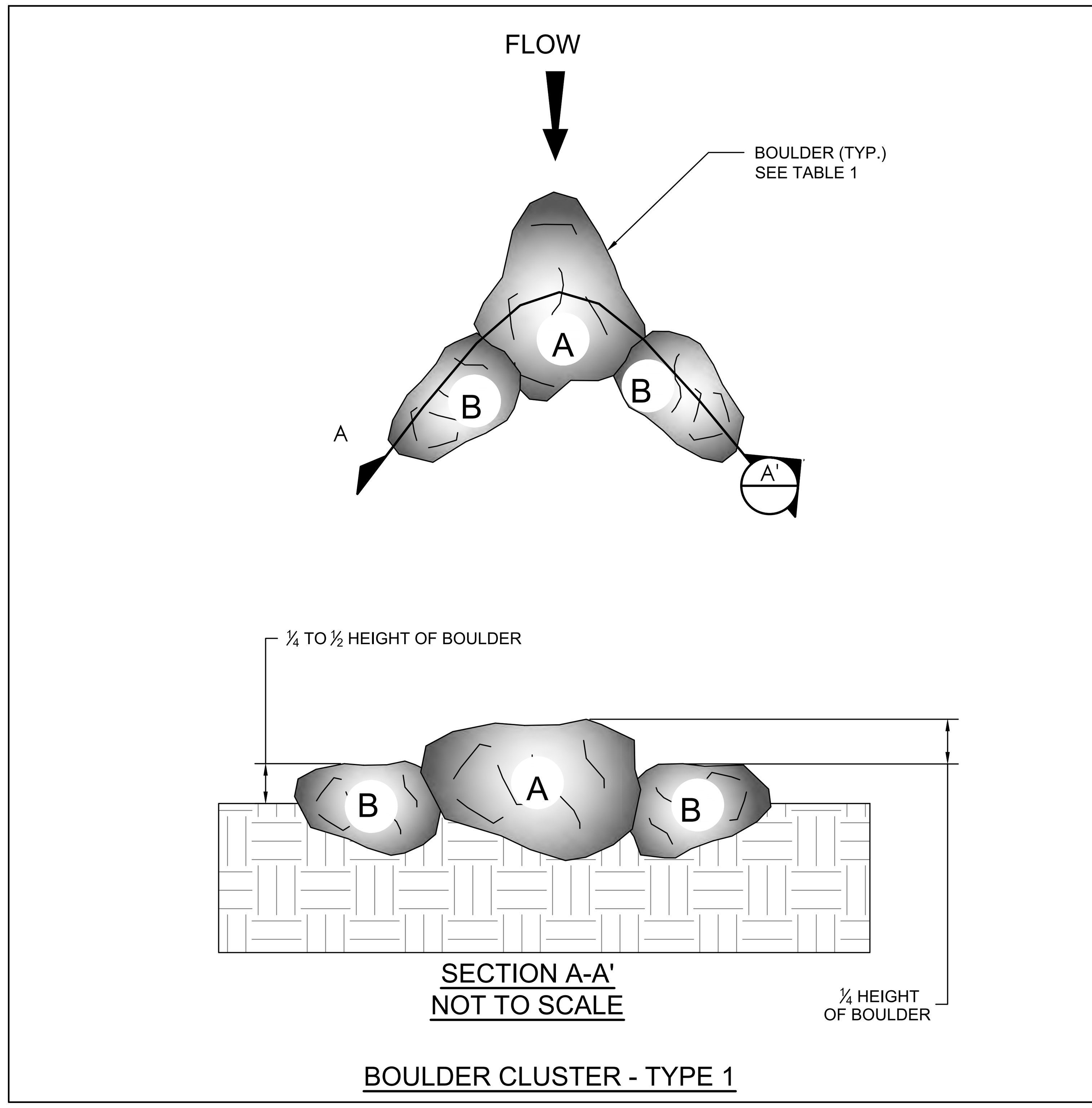
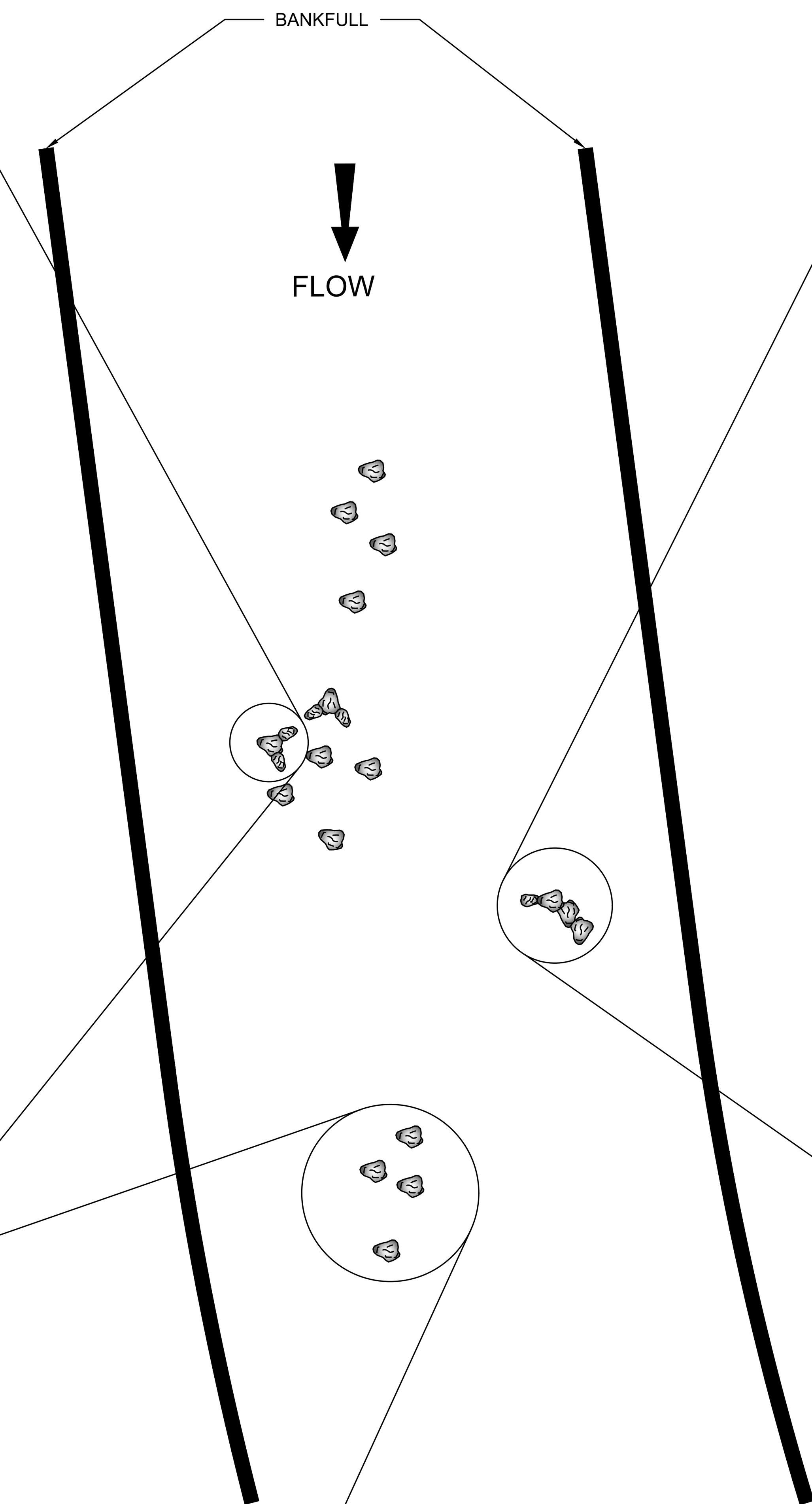
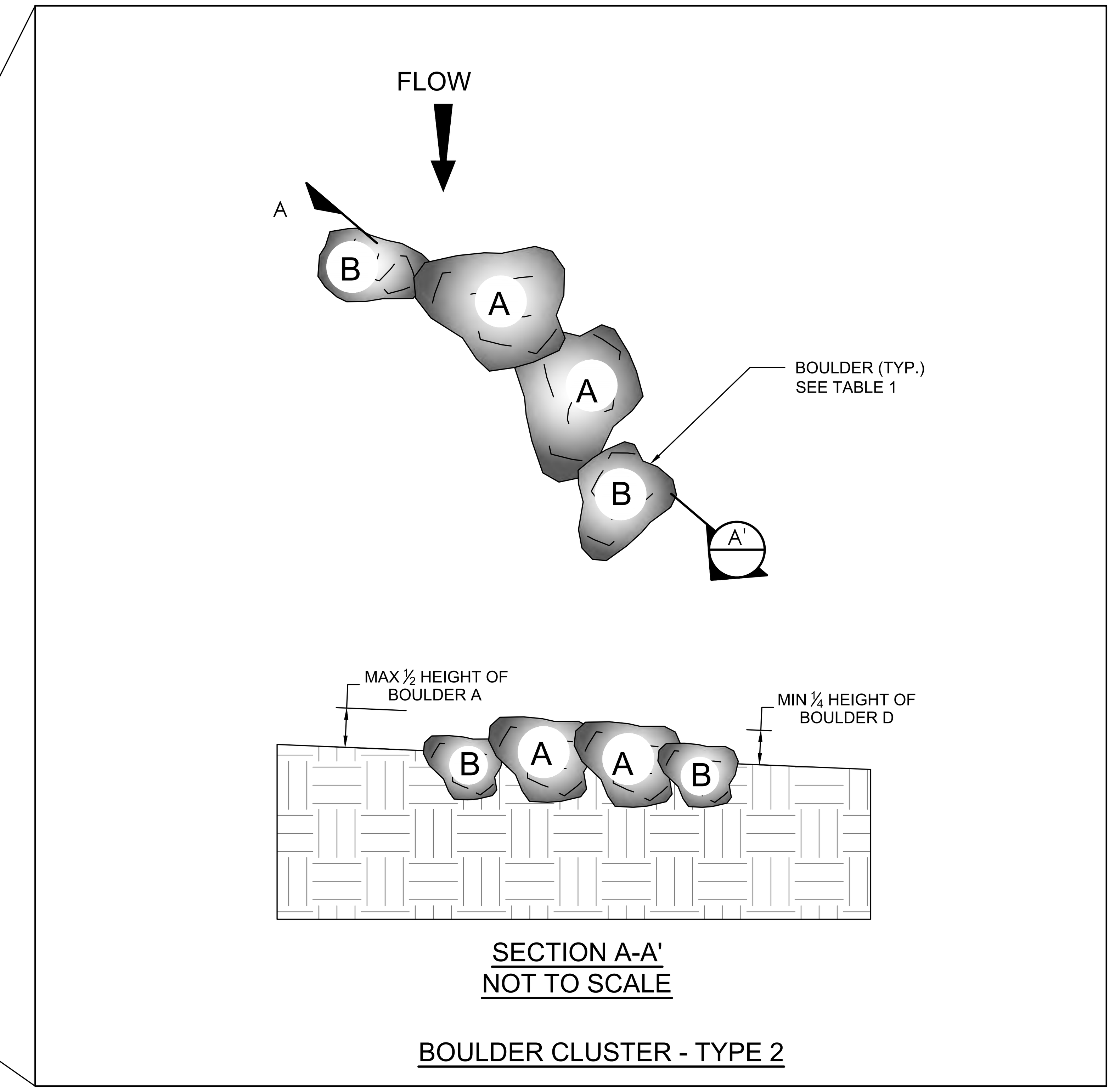
Drawing No.

Revision	Sheet
0	DET-06







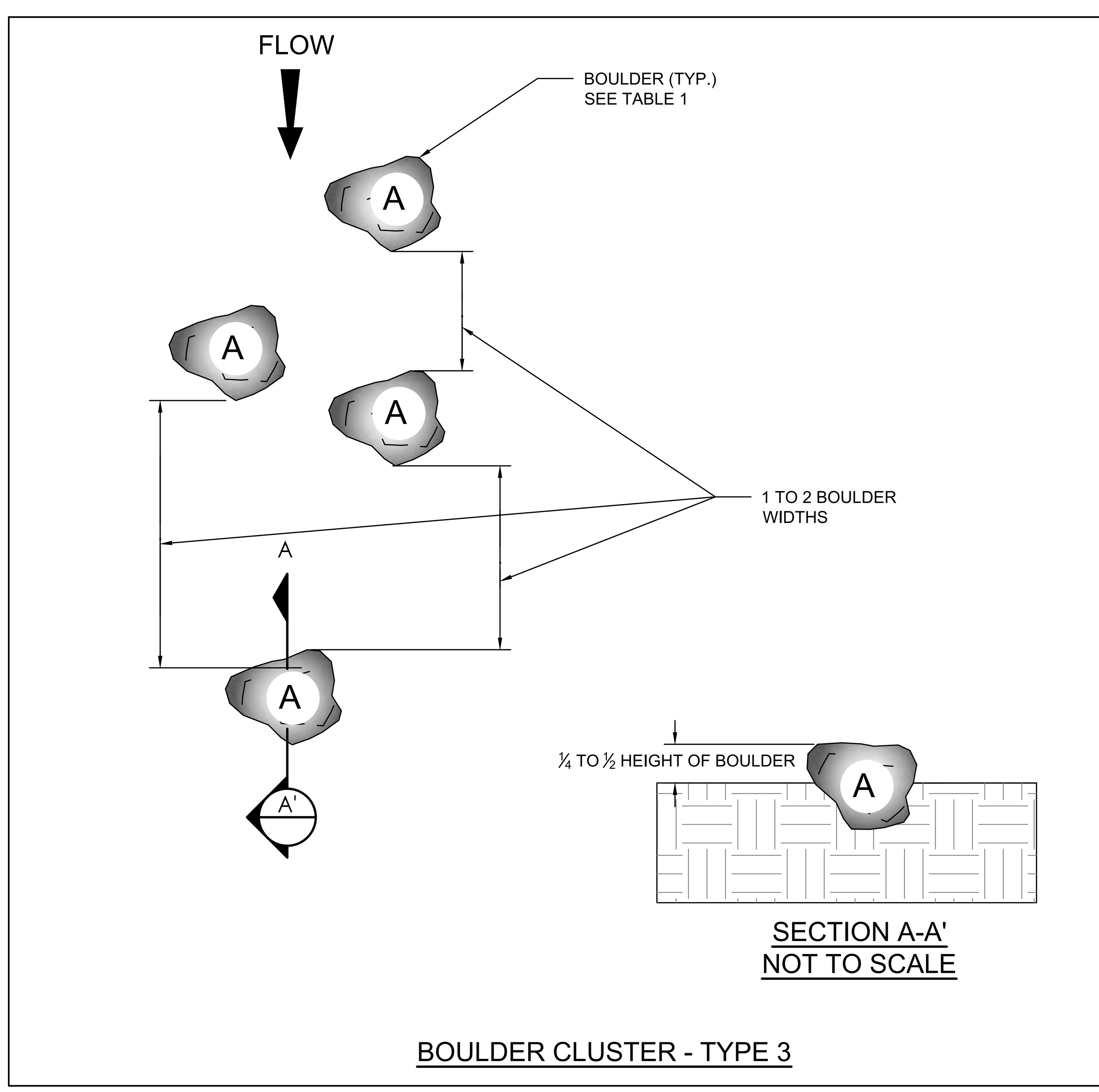


TABLE 1. STONE SIZES

BOULDER	DIMENSIONS		
	L	W	D
A	4 FT.	4.0 FT.	2.5 FT.
B	3.5 FT.	3.0 FT.	2.0 FT.

NOTES:

1. BOULDER CLUSTERS SHALL BE PLACED UNDER THE DIRECTION OF THE ONSITE ENGINEER.
2. ALL STONES ARE TO BE STRUCTURAL STONE.
3. DIMENSIONS AND SLOPE MAY BE ADJUSTED TO FIT BY THE ENGINEER.
4. BOULDERS SHALL BE NATIVE STONE OR SHOT ROCK, SUBICAL OR RECTANGULAR IN NATURE.
5. ALL MATERIALS ARE TO BE APPROVED BY ENGINEER OR ENGINEER'S ONSITE CONSTRUCTION MANAGER.

8 DETAIL - BOULDER CLUSTER
NOT TO SCALE

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

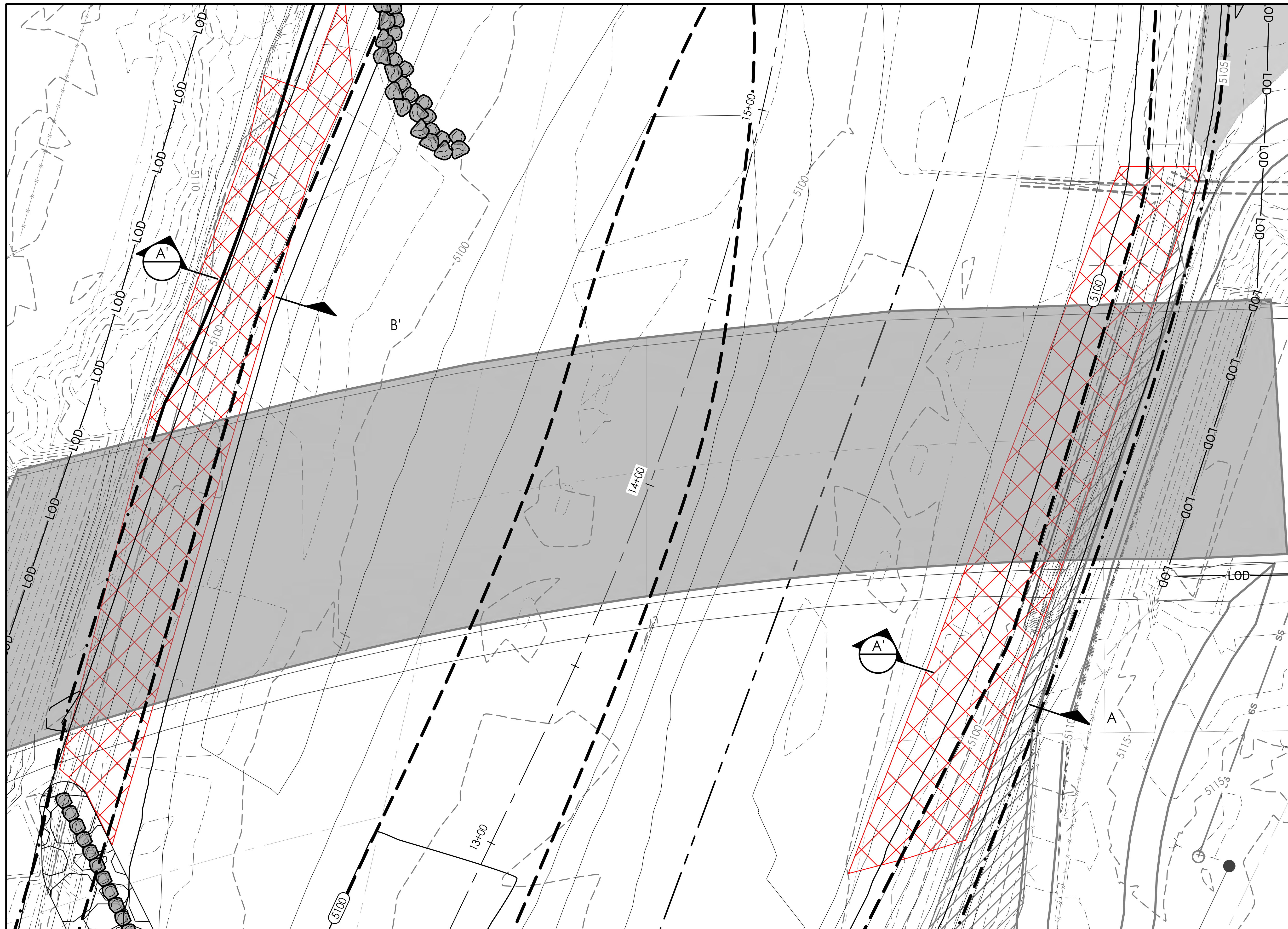
Title
100% PLANS
BOULDER CLUSTER DETAIL

Permit-Seal
Professional Engineer
Date 4-24-19
WYOMING

Project Number: 172621110
File Name: DET-08_BOULDER_CLUSTER.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.
Revision 0
Sheet DET-07



PLANVIEW

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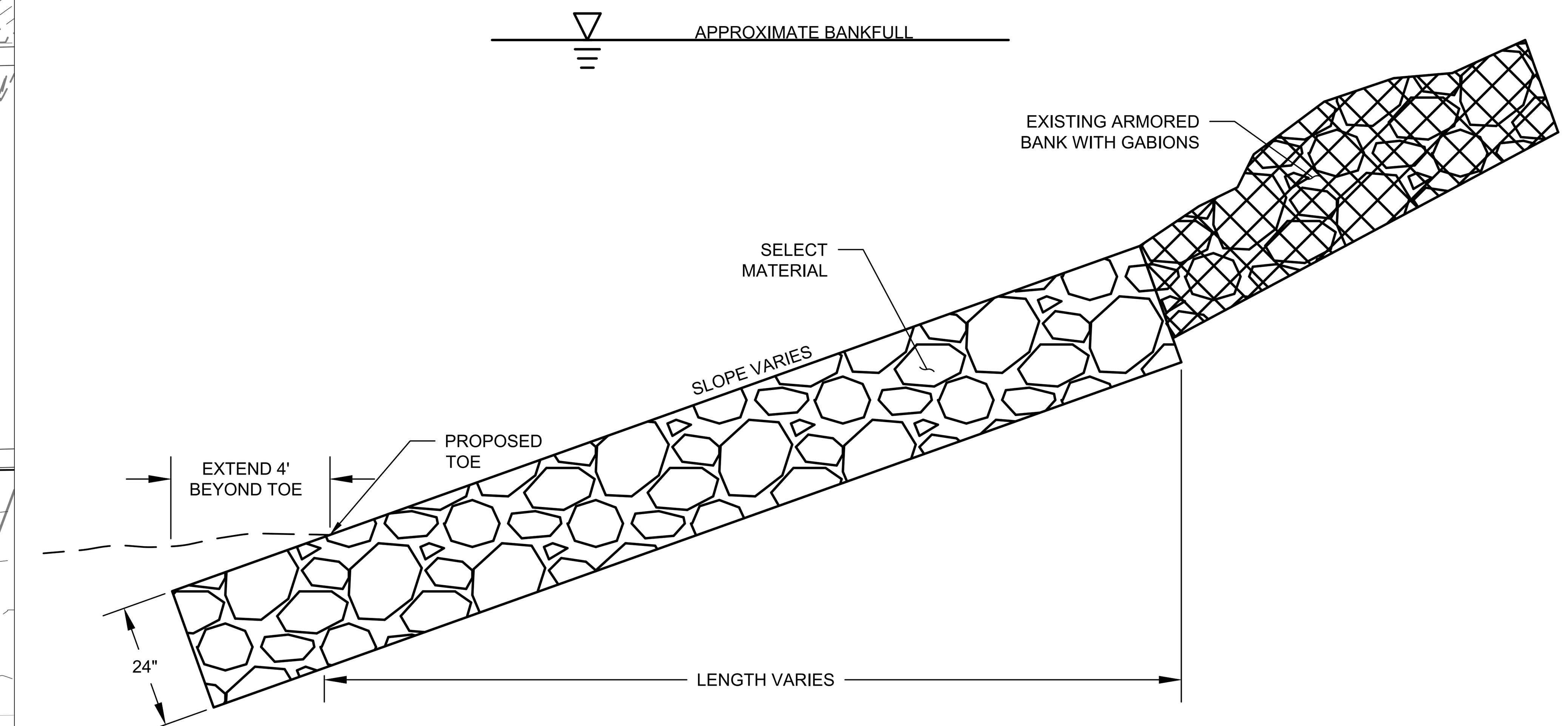

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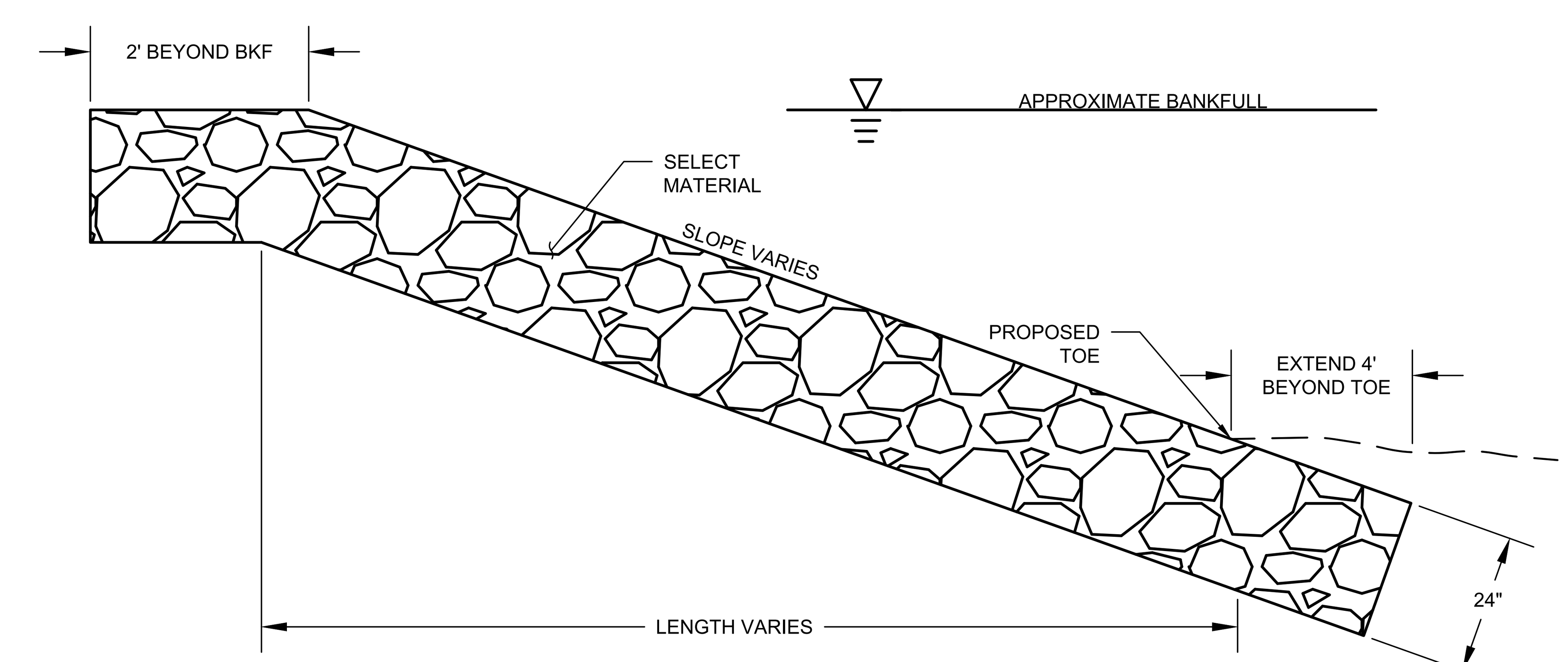

SECTION B-B'
NOT TO SCALE

9 DETAIL - ARMORED INNER BERM
NOT TO SCALE

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
ARMORED INNER BERM DETAIL

Permit-Seal

Professional Engineer TIMOTHY DIMMING WYOMING Date 4-24-19

Project Number: 172621110

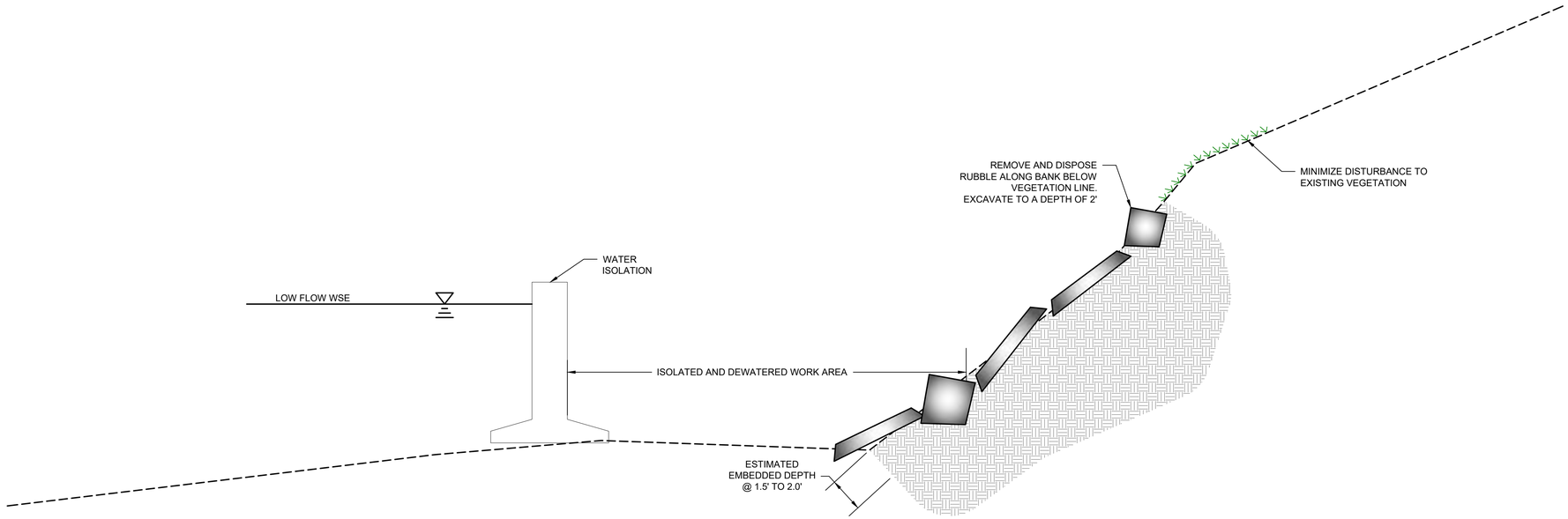
File Name: DET-09_ARMORED_INNER_BERM.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

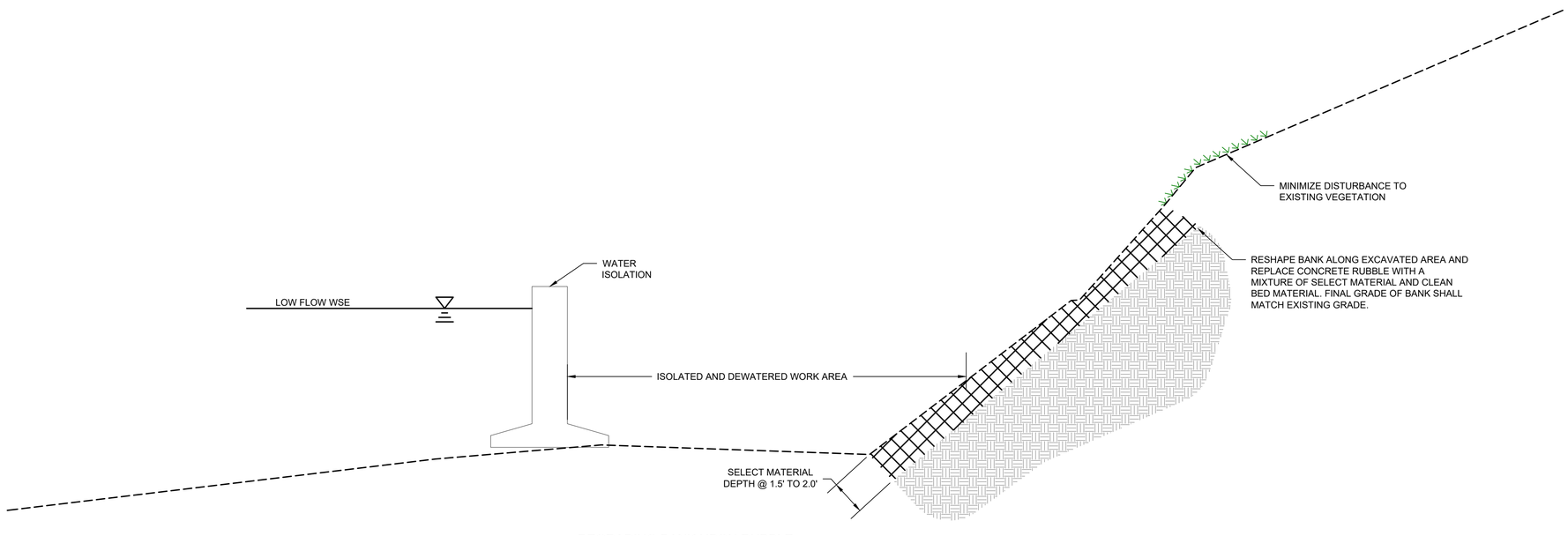
Drawing No.

Revision 0 Sheet DET-08

SaveDate: 2019/05/24 8:11 AM Login: Phillips, Patrick



RUBBLE REMOVAL TYPICAL SECTION



REGRADING BANK UPON RUBBLE REMOVAL TYPICAL SECTION

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
PLAN AND PROFILE

Permit-Seal

Professional Engineer
TIMOTHY DIMMER
18326
WYOMING
Date 4-24-19

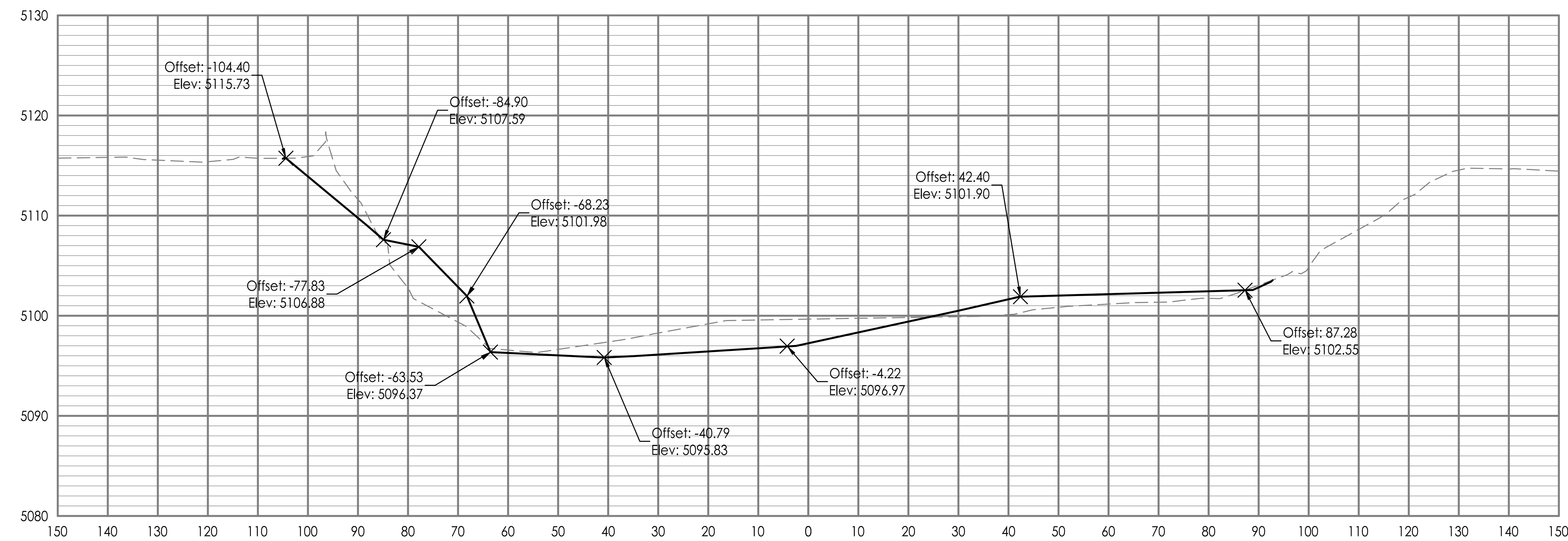
Project Number: 172621110

File Name: DET-10_RUBBLE_REMOVAL.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. RUBBLE REMOVAL DETAIL

Revision	Sheet
0	DET-09



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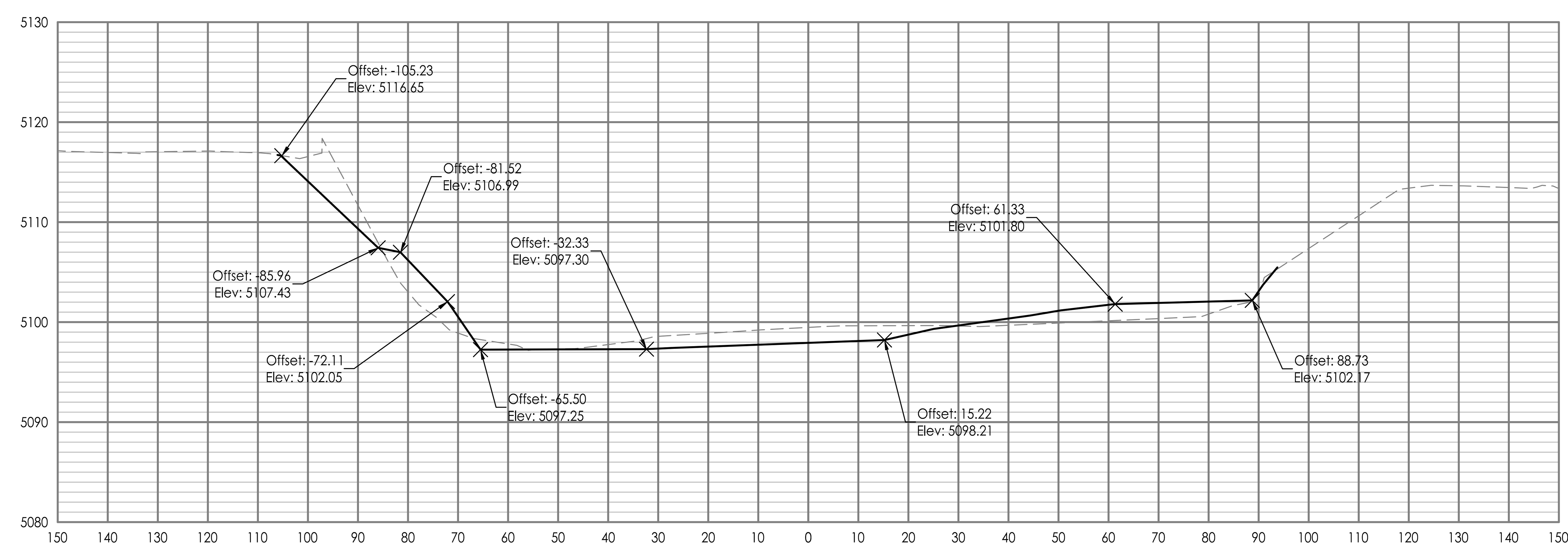

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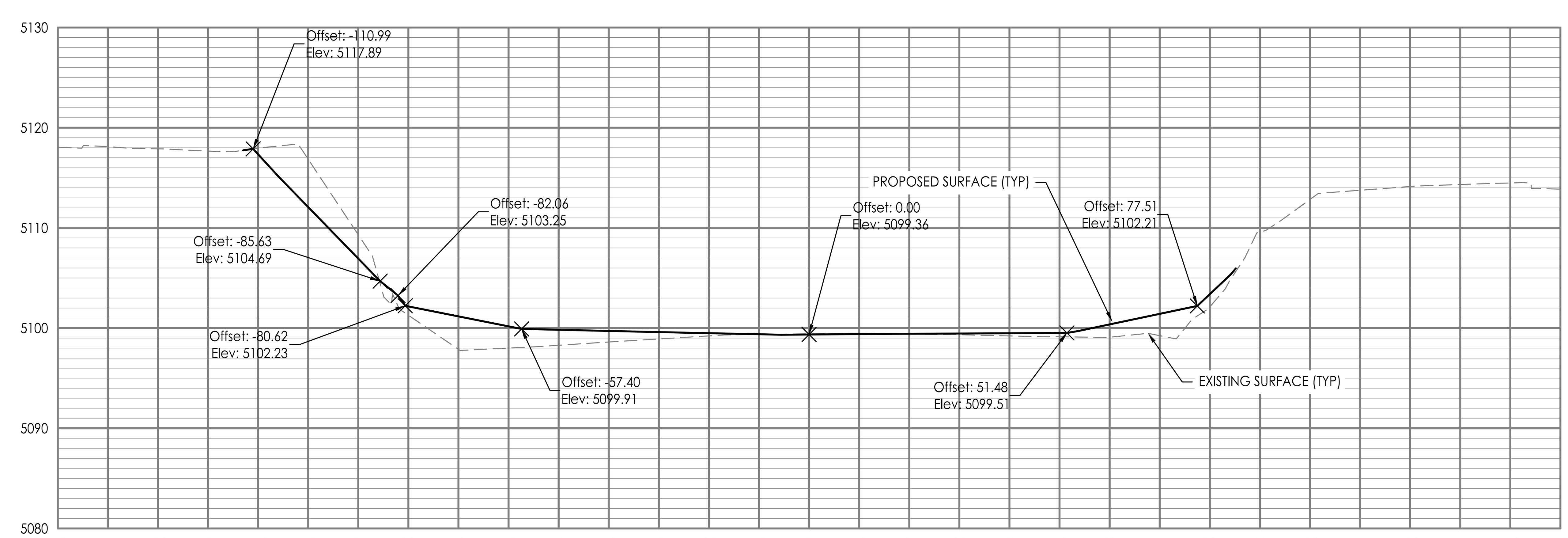

1
2+00

VERTICAL SCALE
0 5' 10' 20'
1"=10'

HORIZONTAL SCALE
0 10' 20' 40'
1"=20'

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
CROSS SECTIONS

Permit-Seal

Professional Engineer
Timothy Dimond
Date 4-24-19
WYOMING

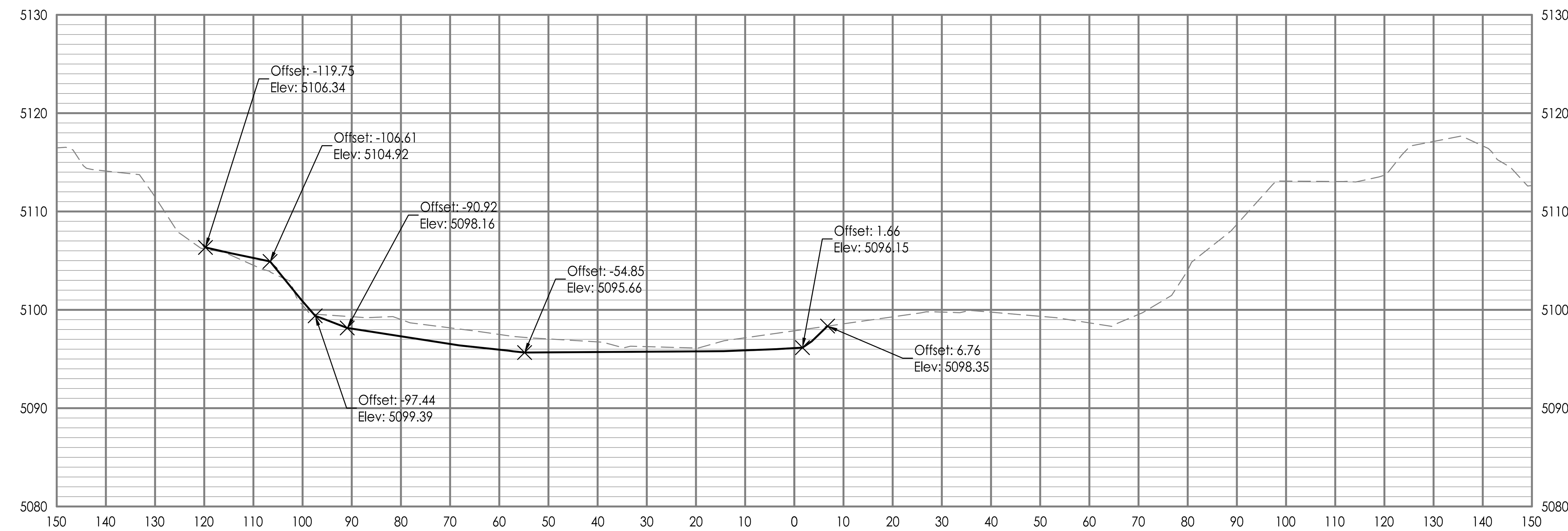
Project Number: 172621110

File Name: XS_80%_Concept_N_Platte_1st_Street.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. CROSS SECTIONS

Revision 0
Sheet XS-1



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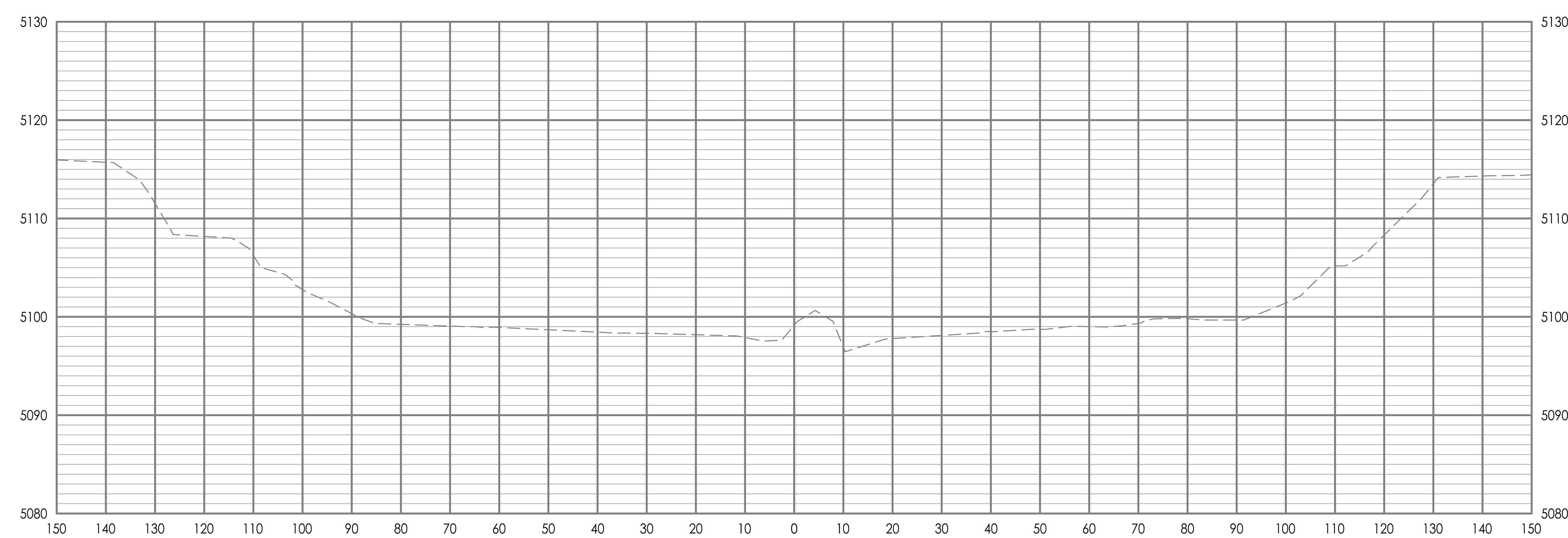

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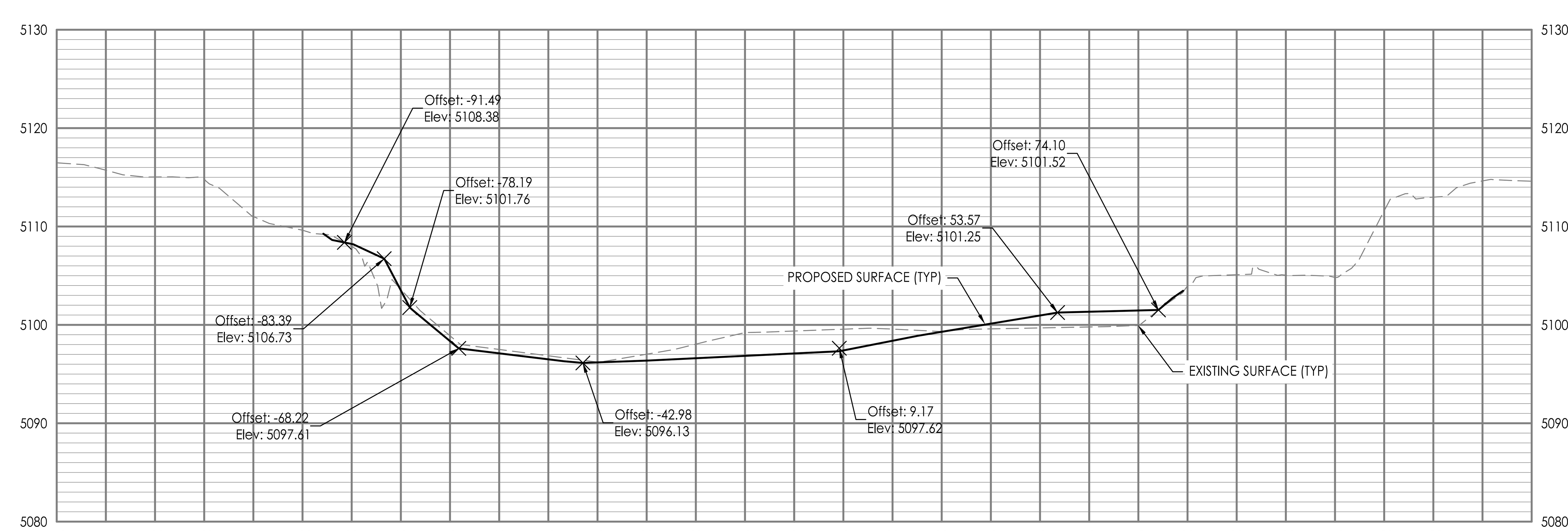

4
5+50

VERTICAL SCALE
0 5' 10' 20'
1"=10'

HORIZONTAL SCALE
0 10' 20' 40'
1"=20'

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH

CASPER, WYOMING

Title
100% PLANS
CROSS SECTIONS

Permit-Seal

Project Number: 172621110

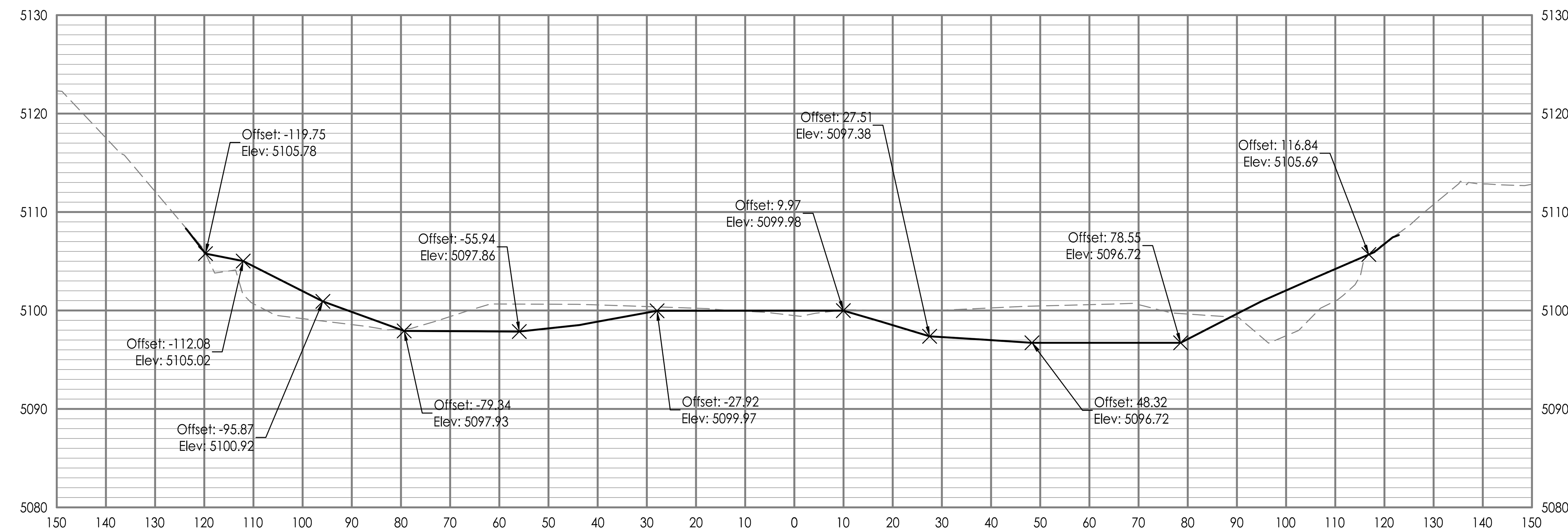
File Name: XS_80%_Concept_N_Platte_1st_Street.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. CROSS SECTIONS

Revision 0

Sheet XS-2



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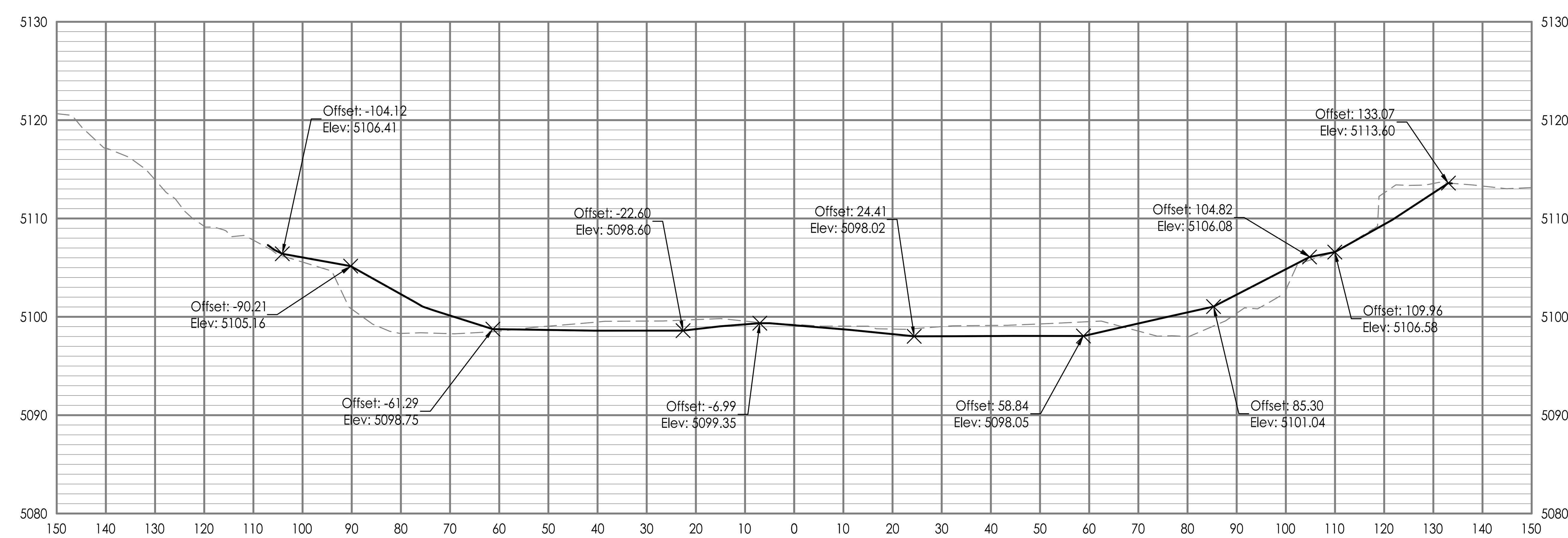

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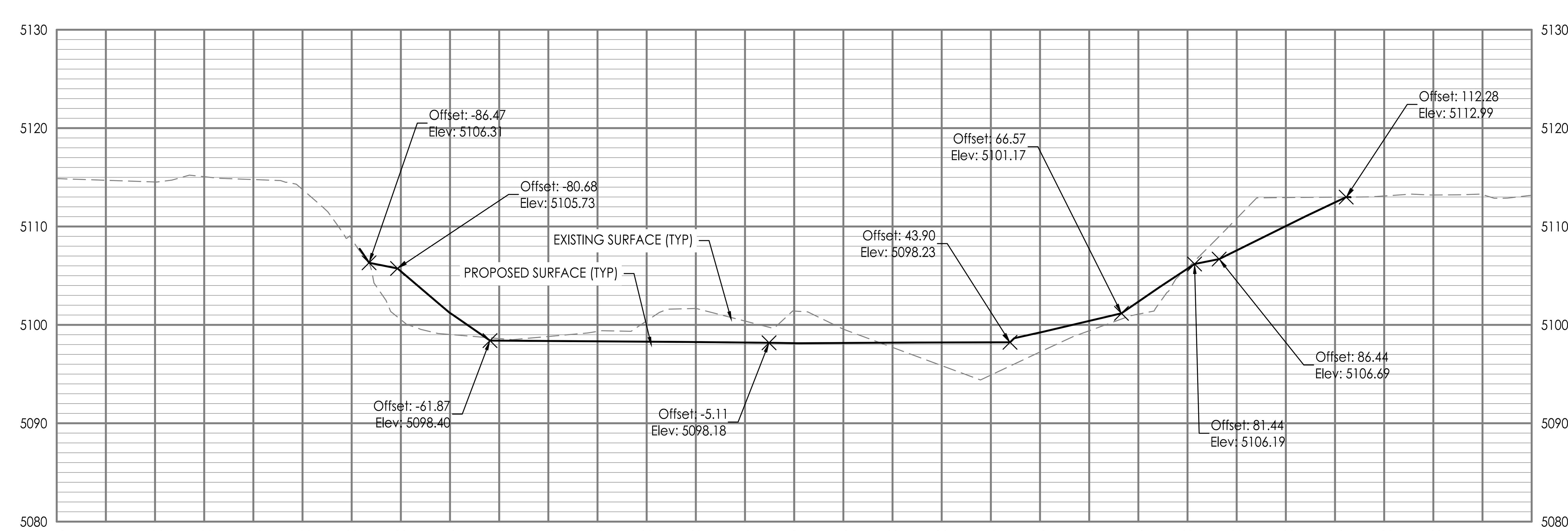

7
10+50

VERTICAL SCALE
0 5' 10' 20'
1"=10'

HORIZONTAL SCALE
0 10' 20' 40'
1"=20'

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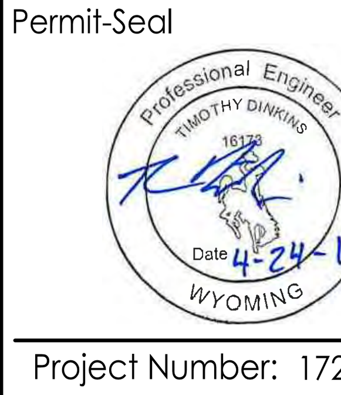
Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
CROSS SECTIONS

Permit-Seal



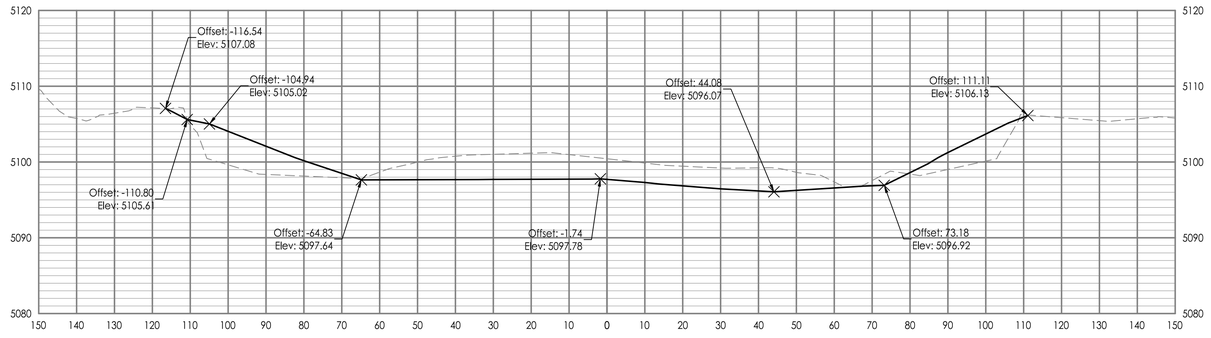
Project Number: 172621110

File Name: XS_80%_Concept_N_Platte_1st_Street.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. CROSS SECTIONS

Revision 0
Sheet XS-3



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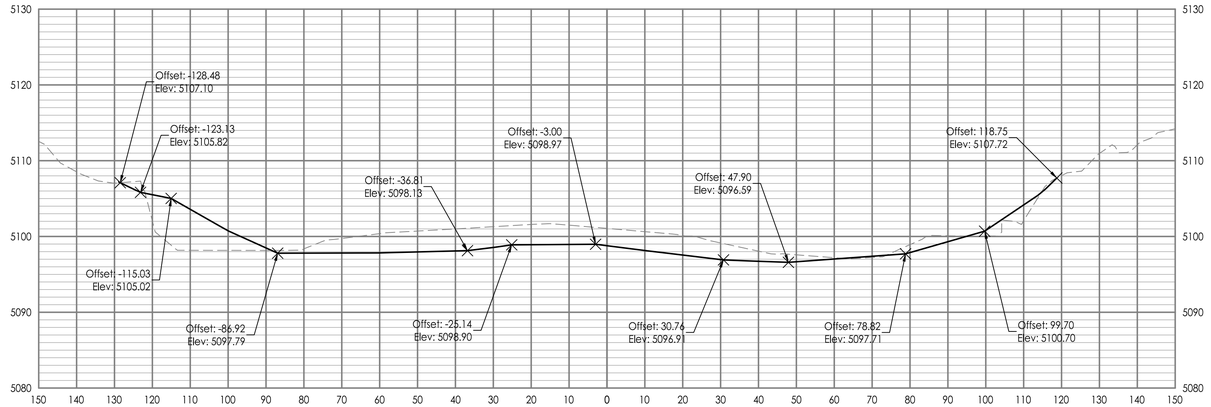

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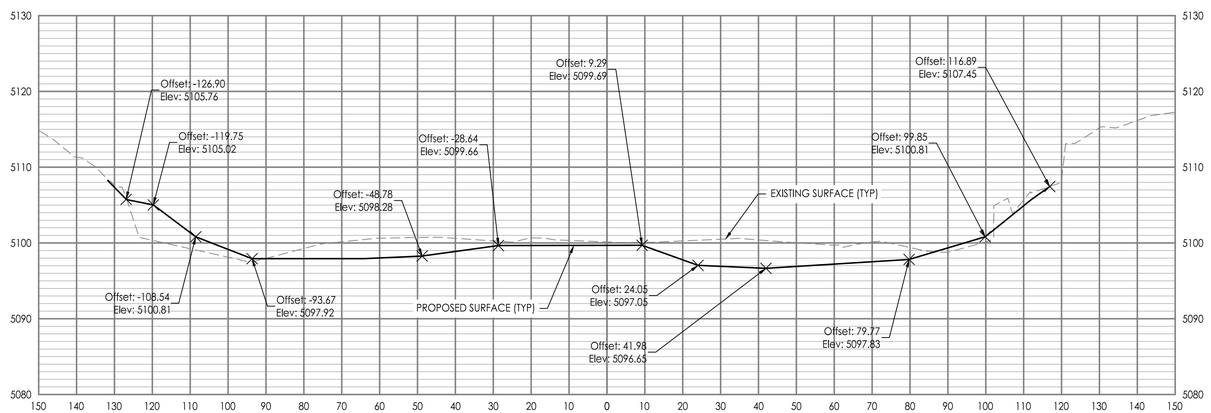

10
14+00

VERTICAL SCALE
1"=10' 0 5' 10' 20'

HORIZONTAL SCALE
1"=20' 0 10' 20' 40'

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
CROSS SECTIONS

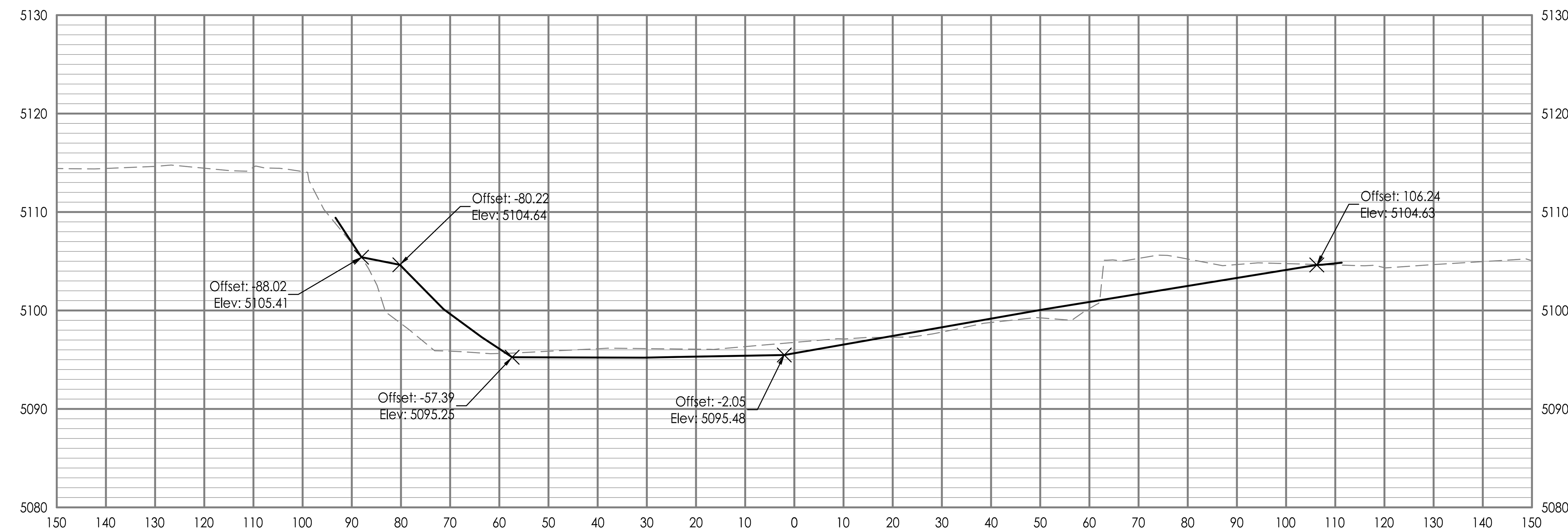
Permit-Seal

Project Number: 172621110

File Name: XS_80%_Concept_N_Platte_1st_Street.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. CROSS SECTIONS
Revision 0
Sheet XS-4



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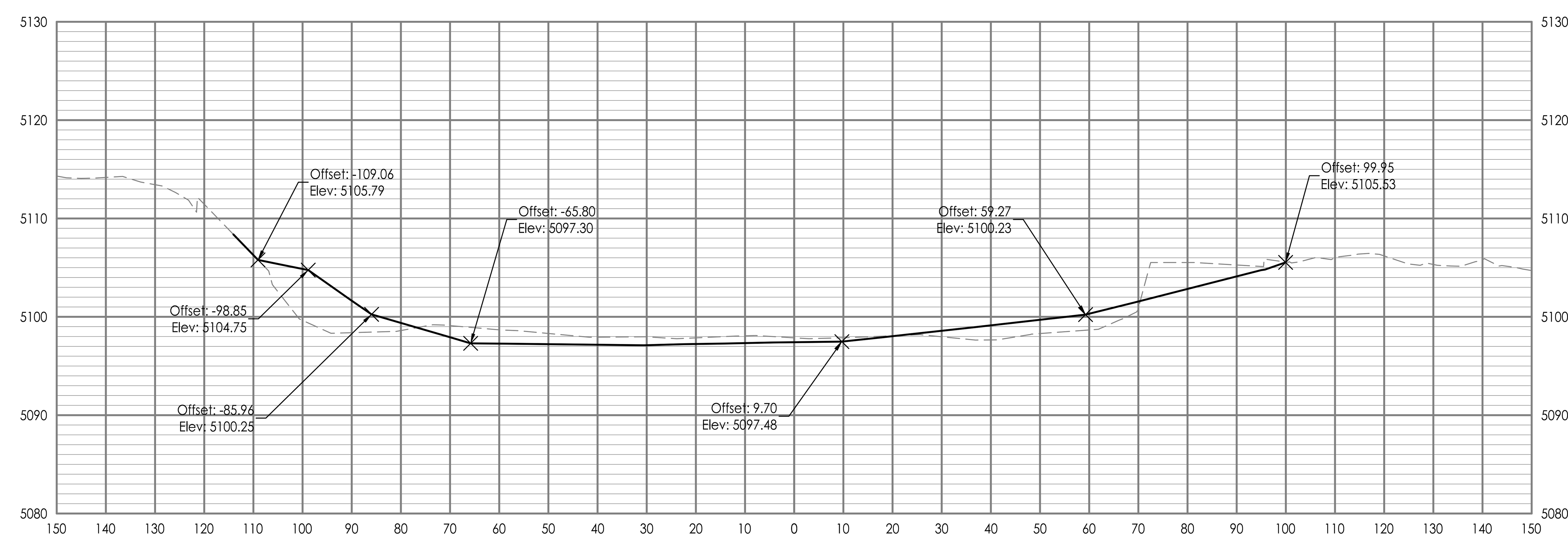

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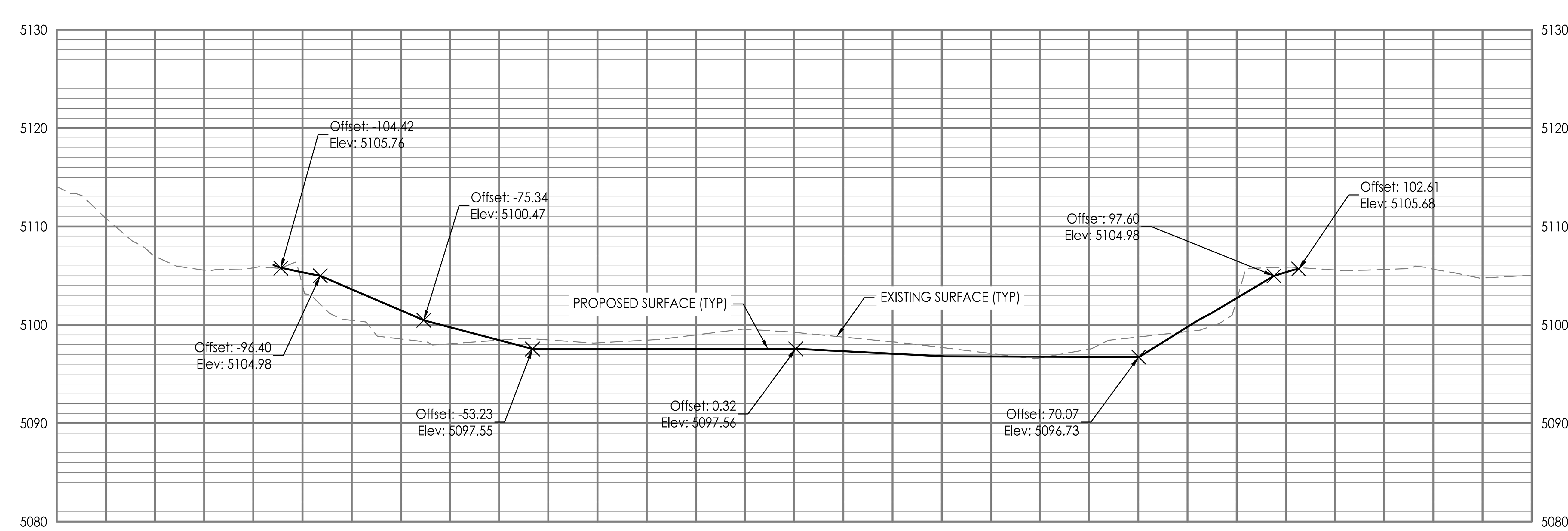

13
17+00

VERTICAL SCALE
1"=10'
HORIZONTAL SCALE
1"=20'

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
CROSS SECTIONS

Permit-Seal

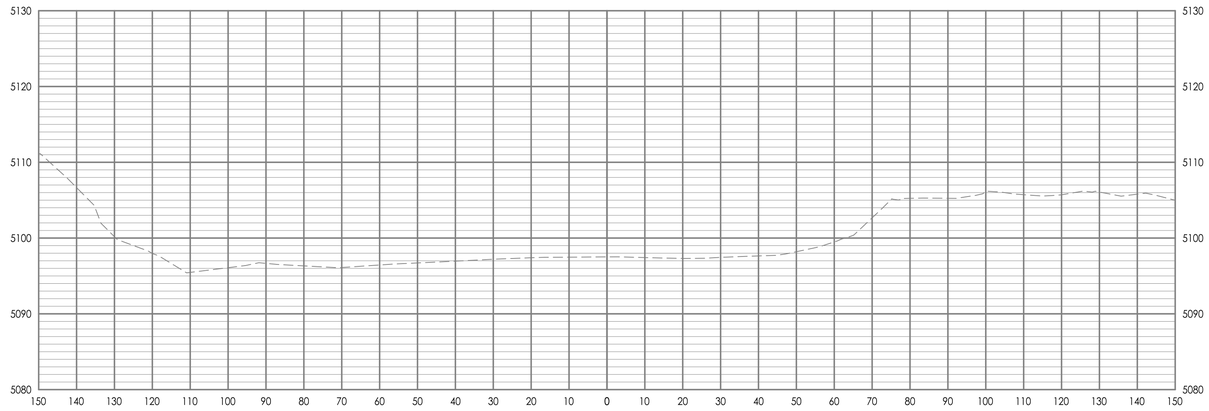
Project Number: 172621110

File Name: XS_80%_Concept_N_Platte_1st_Street.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. CROSS SECTIONS

Revision 0
Sheet XS-5



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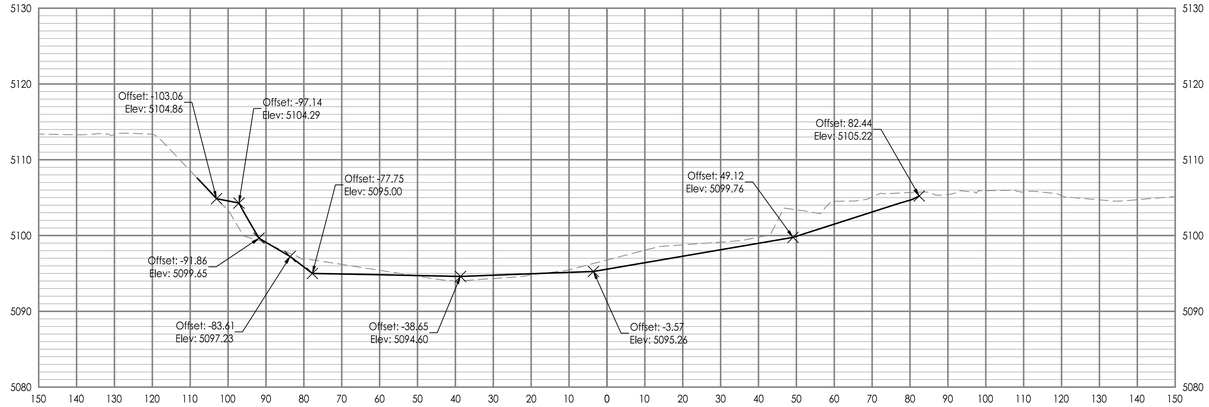

17
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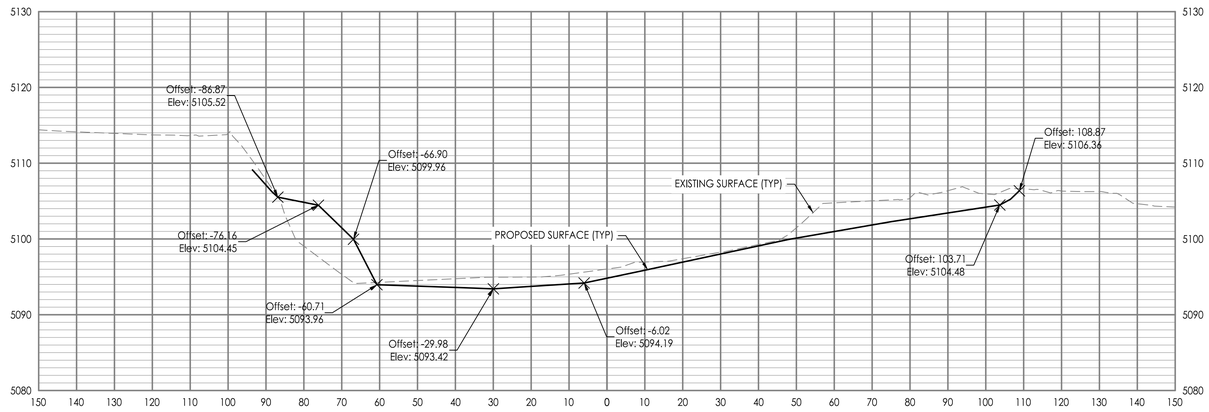

16
21+50

VERTICAL SCALE
1"=10'
0 5' 10' 20'

HORIZONTAL SCALE
1"=20'
0 10' 20' 40'

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
CROSS SECTIONS

Permit-Seal

Project Number: 172621110

File Name: XS_80%_Concept_N_Platte_1st_Street.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. CROSS SECTIONS

Revision	Sheet
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N POPLAR STREET
Pronghorn St.
EXISTING WETLAND (TYP.)
ARMORED TEMPORARY ACCESS ROAD
PROPOSED TEMPORARY STAGING
PROPOSED TEMPORARY ACCESS ROAD
ISOLATION AREA 1
ISOLATION AREA 2
ALTERNATE STAGING AREA PENDING APPROVAL
ARMORED TEMPORARY ACCESS ROAD
NICHOLS AVE.
FIRST STREET
WEST B ST.
ASH ST.
WEST A ST.
WEST 1ST ST.
REACH 1
REACH 2
CASPER REDEVELOPMENT COMPANY, LLC
NICKERSON PROPERTIES (RMP)
BLUE EYES, LLC
WINGFOOT COMMERCIAL TIRE (GOODYR)
PLATTE RIVER CROSSING, LLC
AMOCO OIL CO.
KEN MOSTELLER
CITY OF CASPER
5100.76
5104.26
1"=100'
0
50'
100'
200'

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH

CASPER, WYOMING

Title
100% PLANS
ACCESS AND WATER CONTROL OVERVIEW

Permit-Seal

Professional Engineer TIMOTHY DINKINS 16173 Date 4-24-19 WYOMING

Project Number: 172621110

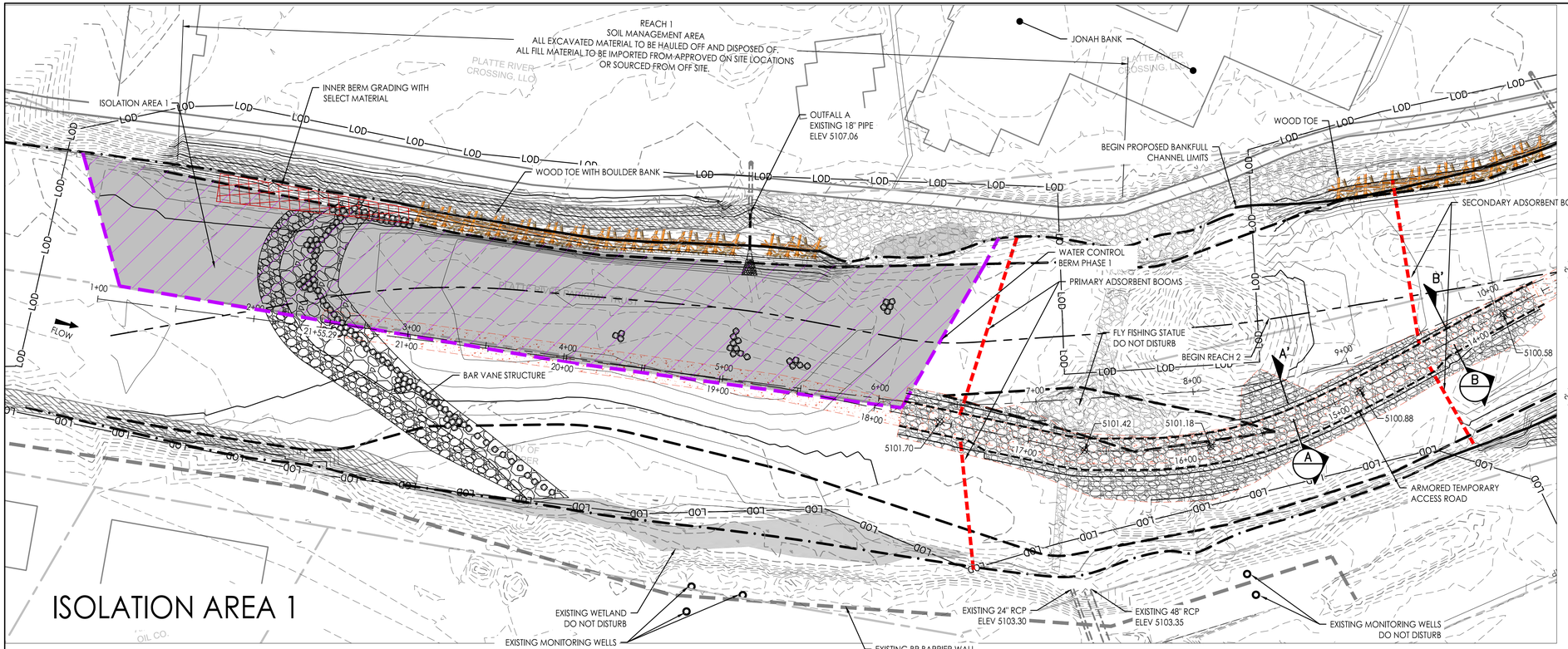
File Name: Site_Access_Figure.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.

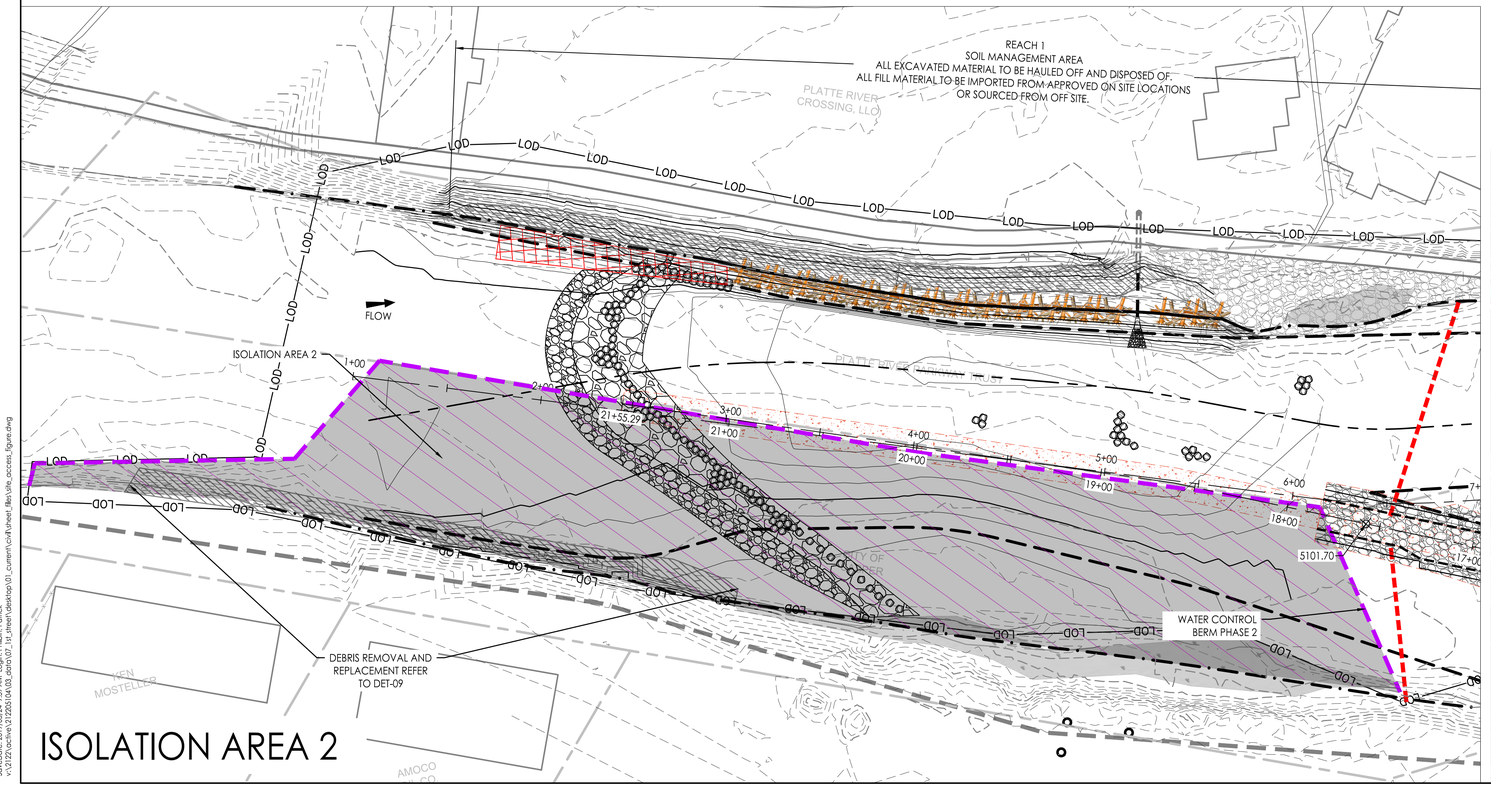
Revision 0

Sheet WC-1



NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR DEVELOPING A WATER CONTROL ISOLATION APPROACH, APPROVED BY THE ENGINEER THAT ALLOWS FOR WORK TO BE COMPLETED IN THE DRY.
2. THE CONTRACTOR SHALL COMPLETE WATER CONTROL ISOLATION MEASURES PRIOR TO CHANNEL CONSTRUCTION.
3. ACCESS TO REACH 1 SHALL BE LIMITED TO THE PROPOSED TEMPORARY ACCESS ROAD.
4. THE ARMORED PORTION OF THE TEMPORARY ACCESS ROAD SHALL BE CONSTRUCTED WITH IMPORTED SELECT MATERIAL WITH GRADATIONS MATCHING PROJECT SPECIFICATIONS.
5. THE CONTRACTOR IS RESPONSIBLE FOR DAILY INSPECTIONS AND MAINTENANCE OF THE TEMPORARY ACCESS ROAD PRIOR TO START OF WORK.
6. IT IS ASSUMED THAT 75-80% OF THE SELECT MATERIAL NEEDED FOR CONSTRUCTION OF THE ACCESS ROAD WILL BE HARVESTED AND RECLAIMED FOLLOWING COMPLETION OF REACH 1.
7. THE CONTRACTOR WILL BE RESPONSIBLE TO REPAIR ANY DAMAGE TO THE EXISTING GROUTED BOULDER WEIR AT STA: 7+25, AS A RESULT OF BUILDING/RECLAIMING THE ACCESS ROAD



ISOLATION AREA 2

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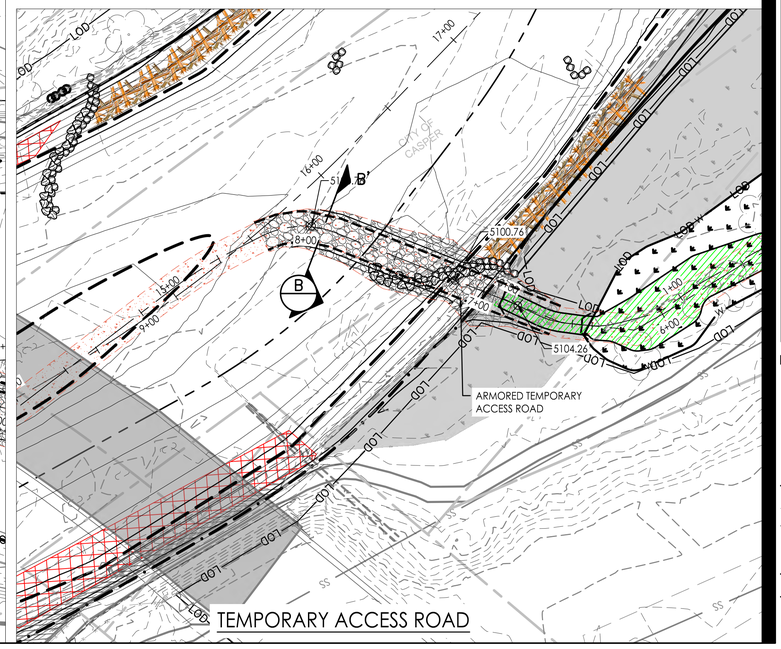

TEMPORARY ACCESS ROAD

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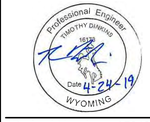
Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
ACCESS AND WATER CONTROL SEQUENCING

Permit-Seal



Project Number: 172621110

File Name:	Site_Access_Figure.dwg		
PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.

Revision	Sheet
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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH

CASPER, WYOMING

Title
100% PLANS
EROSION AND SEDIMENTATION PLAN OVERVIEW

Permit-Seal

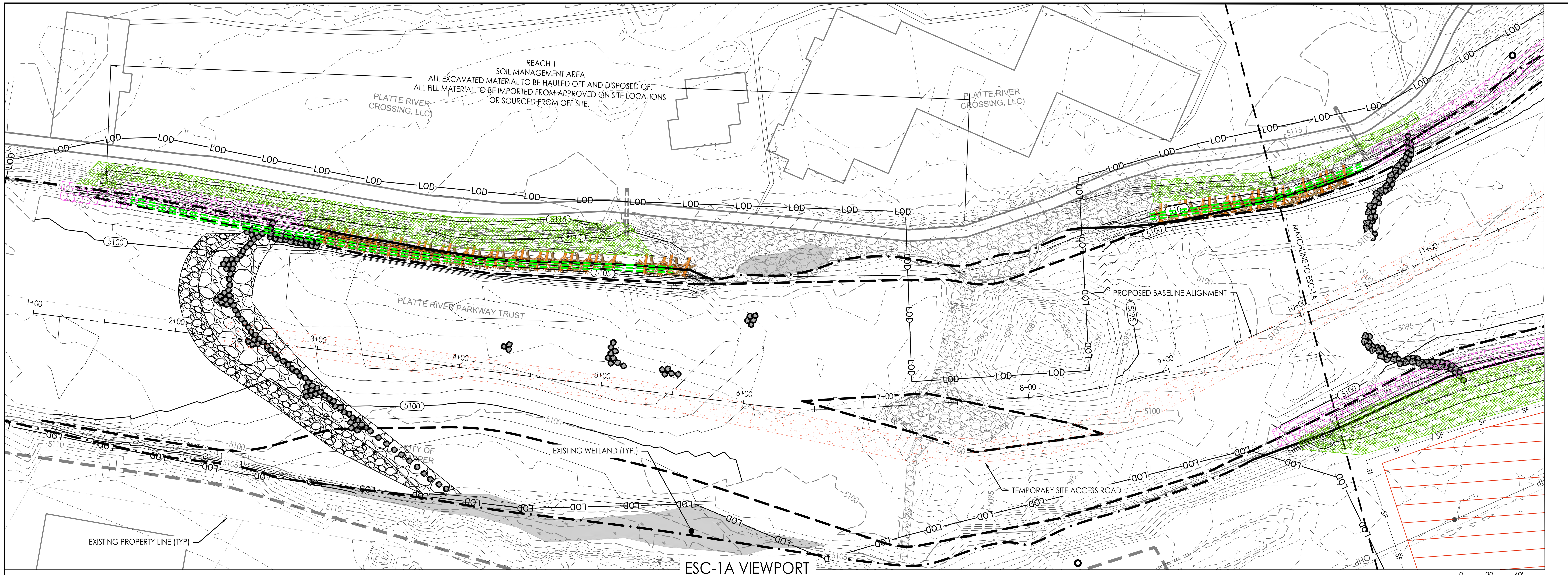
Professional Engineer TIMOTHY DINKINS 16173 Date 4-24-19 WYOMING

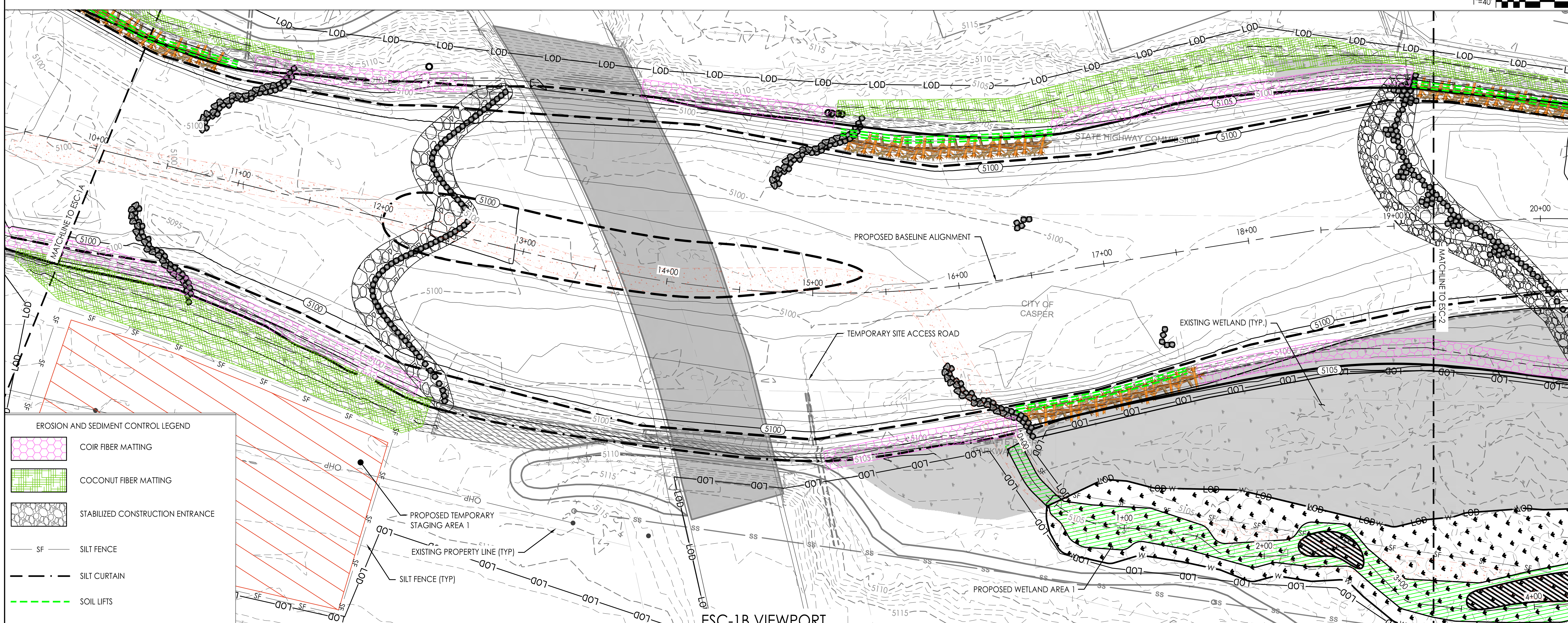
Project Number: 172621110

File Name: NPFST_ESC_OV.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.
Revision 0
Sheet ESC-OV





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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
EROSION AND SEDIMENTATION PLAN

Permit-Seal

Professional Engineer TIMOTHY DINKINS 16173 Date 4-24-19 WYOMING

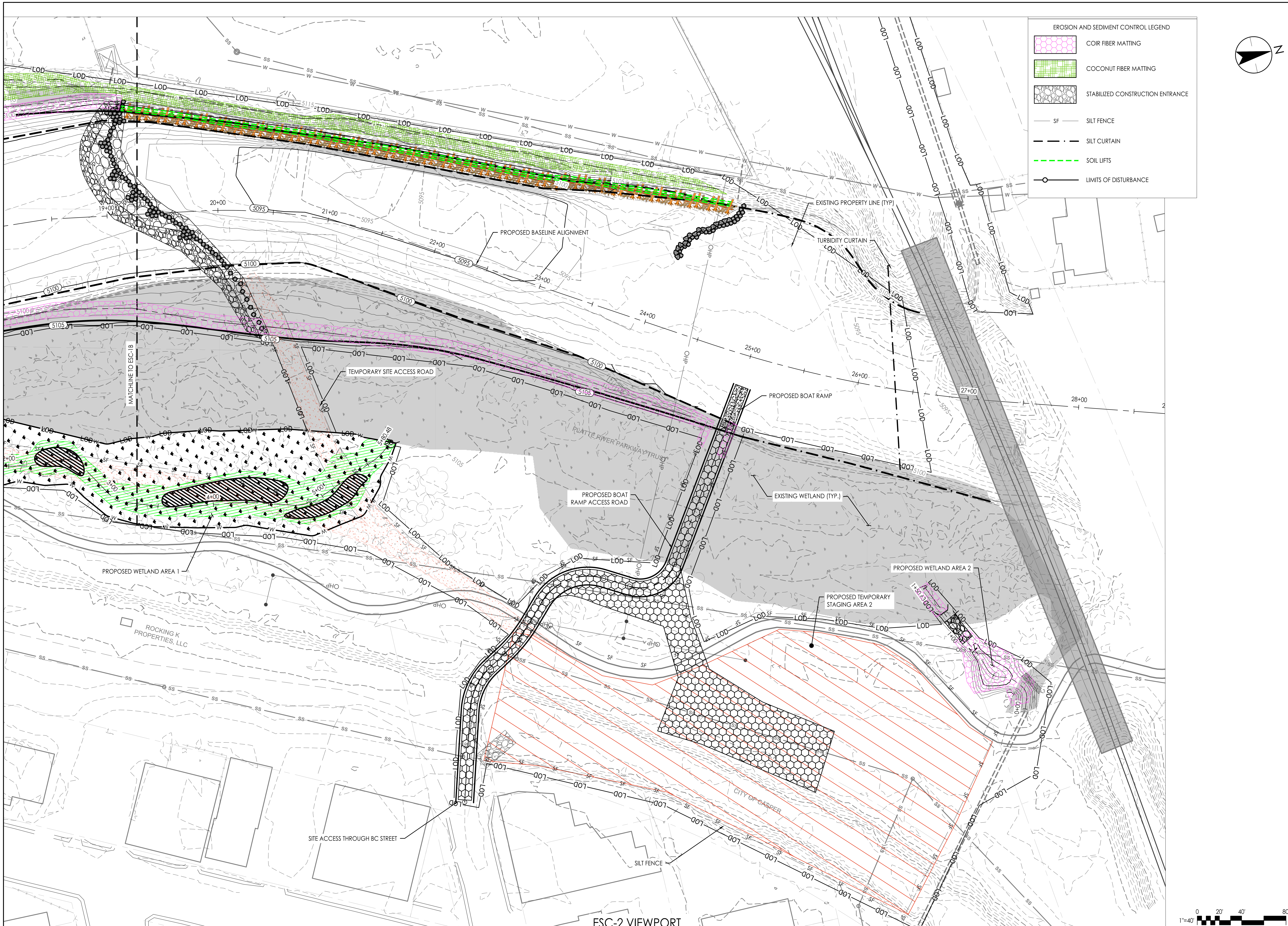
Project Number: 172621110

File Name: NPFST_ESC_PLAN.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.

Revision 0
Sheet ESC-1



ESC-2 VIEWPORT

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200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
EROSION AND SEDIMENTATION PLAN

Permit-Seal

Professional Engineer TIMOTHY DINKINS 16173 WYOMING Date 4-24-19

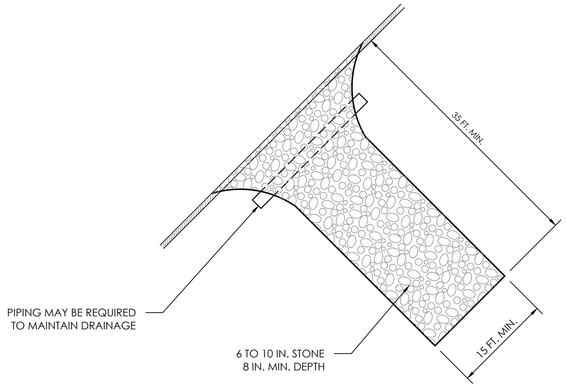
Project Number: 172621110

File Name: NPFST_ESC_PLAN.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.

Revision 0
Sheet ESC-2

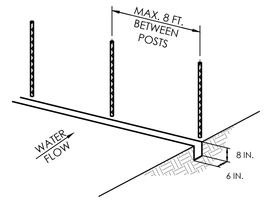


NOTES:

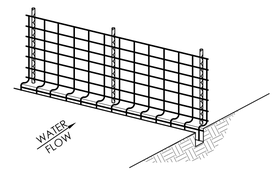
1. TURNING RADIUS SUFFICIENT TO ACCOMMODATE LARGE TRUCKS SHALL BE PROVIDED.
2. ENTRANCE(S) SHOULD BE LOCATED TO PROVIDE FOR UTILIZATION BY ALL CONSTRUCTION VEHICLES.
3. MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS. PERIODIC TOP DRESSING WITH STONE WILL BE NECESSARY.
4. ANY MATERIAL TRACKED ONTO THE ROADWAY MUST BE CLEANED UP IMMEDIATELY.
5. GRAVEL CONSTRUCTION ENTRANCE SHALL BE LOCATED AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED. FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE MUST BE PROVIDED.
6. FILTER FABRIC TO BE PLACED BENEATH STONE.
7. ALL MATERIALS ARE TO BE APPROVED BY ENGINEER OR ENGINEERS ONSITE CONSTRUCTION MANAGER.

ESC DET 1 — DETAIL - STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE

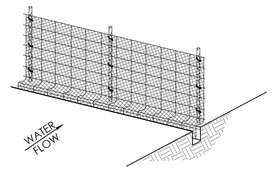
STEP 1:
DRIVE STEEL POSTS 24 IN. INTO GROUND AND EXCAVATE A 6 IN.x 8 IN. TRENCH UPHILL ALONG THE LINE OF POSTS.



STEP 2:
ATTACH WIRE FENCE TO POSTS AND EXTEND THE BOTTOM OF THE FENCE 8 IN. INTO THE EXCAVATED TRENCH.



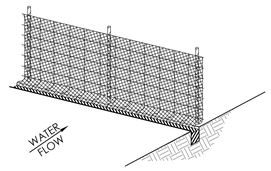
STEP 3:
ATTACH THE FILTER FABRIC TO POST WITH 3 TIES AND EXTEND THE BOTTOM OF THE FABRIC 8 IN. INTO THE TRENCH.

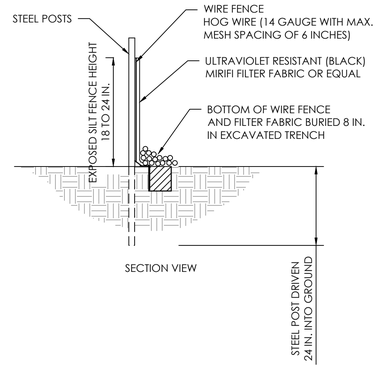


NOTES:

1. BOTTOM OF FILTER MUST BE PLACED IN TRENCH AND SECURED BY EITHER BACK-FILLING WITH SOIL MATERIAL AND TAMPING OR BY PLACING WASHED STONE TO A HEIGHT OF 6 IN. ABOVE GROUND LEVEL.
2. ALL MATERIALS ARE TO BE APPROVED BY ENGINEER OR ENGINEER'S ONSITE CONSTRUCTION MANAGER.
3. CONSTRUCT SEDIMENT FENCE ON LOW SIDE OF TOPSOIL STOCKPILE TO PREVENT SEDIMENT FROM BEING WASHED INTO THE DRAINAGE SYSTEM; FENCE TO EXTEND AROUND APPROXIMATELY 70% OF THE PERIMETER OF THE STOCKPILE.
4. LOCATE POSTS DOWNSLOPE OF FABRIC TO HELP SUPPORT FENCING.
5. BURY TOE OF FENCE APPROXIMATELY 8 IN. DEEP TO PREVENT UNDERCUTTING.
6. WHEN JOINTS ARE NECESSARY, SECURELY FASTEN THE FABRIC AT A SUPPORT POST WITH OVERLAP TO THE NEXT POST.
7. FILTER FABRIC TO BE ON NYLON, POLYESTER, PROPYLENE OR ETHYLENE YARN WITH EXTRA STRENGTH-50LB/LIN. IN. (MINIMUM) AND WITH A FLOW RATE OF AT LEAST 0.3 GAL./FT./MINUTE; FABRIC SHOULD CONTAIN ULTRAVIOLET RAY INHIBITORS AND STABILIZERS.

STEP 4:
BACKFILL THE TRENCH AND COMPACT THE SOIL FIRMLY TO ANCHOR THE BOTTOM OF THE SILT FENCE SO THAT RUNOFF IS FORCED TO GO THROUGH THE FENCE AND CANNOT GO UNDER IT.

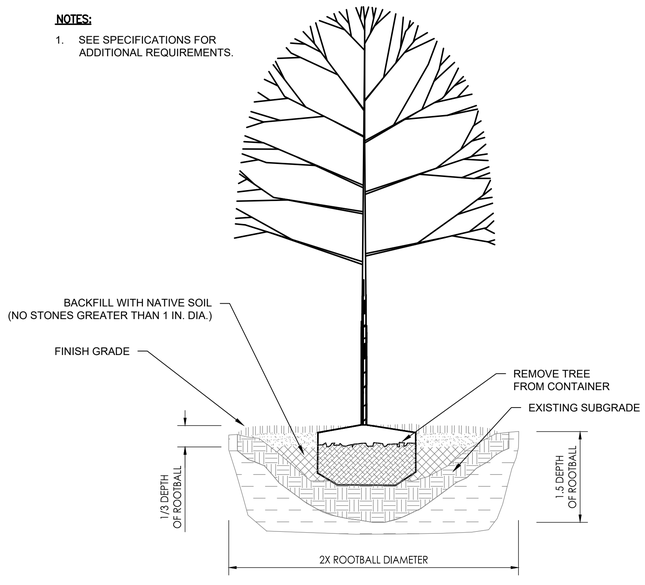




ESC DET 2 — DETAIL - SILT FENCE
NOT TO SCALE

NOTES:

1. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.



ESC DET 3 — DETAIL - TREE/SHRUB AND PLANTING
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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
EROSION AND SEDIMENT CONTROL DETAILS

Permit-Seal

Project Number: 172621110

File Name: ESC_DET-01.dwg

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Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.

Revision	Sheet
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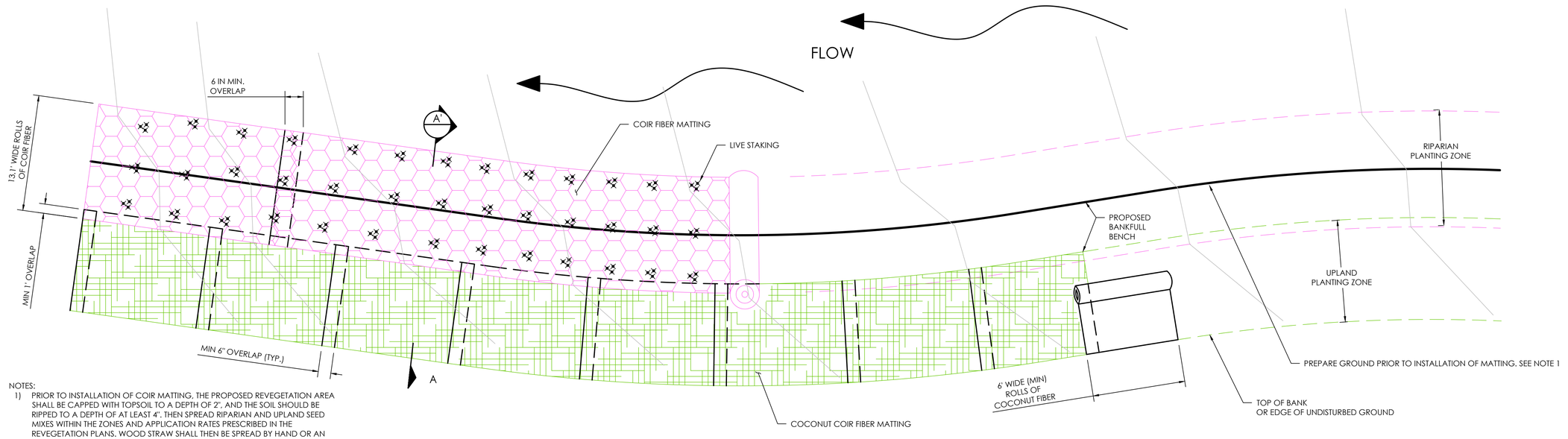
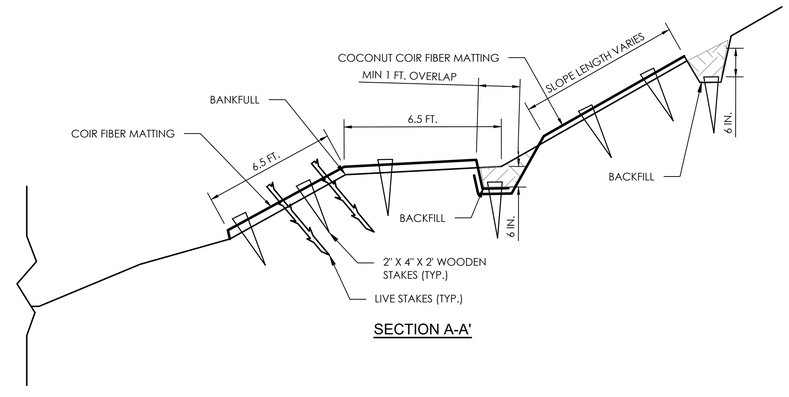


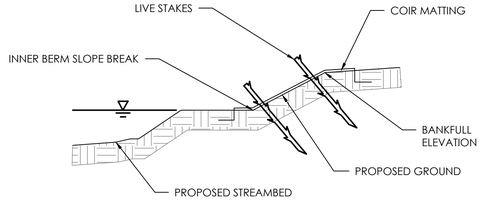
PLANVIEW

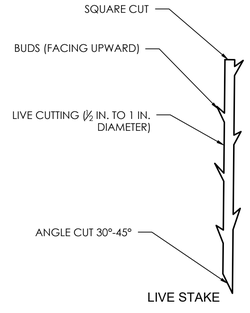
NOTES:

1) PRIOR TO INSTALLATION OF COIR MATTING, THE PROPOSED REVEGETATION AREA SHALL BE CAPPED WITH TOPSOIL TO A DEPTH OF 2', AND THE SOIL SHOULD BE RIPPED TO A DEPTH OF AT LEAST 4". THEN SPREAD RIPARIAN AND UPLAND SEED MIXES WITHIN THE ZONES AND APPLICATION RATES PRESCRIBED IN THE REVEGETATION PLANS. WOOD STRAW SHALL THEN BE SPREAD BY HAND OR AN APPROVED STRAW BLOWER @ A RATE OF 280 REGULAR SIZED BALES PER ACRE. SEE SPECIFICATION FOR WOOD STRAW REQUIREMENTS.
2) BEGIN BY INSTALLING COCONUT COIR FIBER MATTING AT DOWNSTREAM EXTENTS. ANCHOR MATERIAL AT THE TOP OF DISTURBED SLOPE. EXTEND MATERIAL 1 FOOT DOWNSLOPE OF PROPOSED COIR FIBER MATTING FOOTPRINT.
3) DOWNSLOPE SIDE OF COCONUT COIR FIBER MATTING SHALL BE LEFT UNSECURED TO ALLOW FOR SIMULTANEOUS ANCHORING WITH UPSLOPE SIDE OF COIR FIBER MATTING.
4) CONTINUE INSTALLATION PROCESS IN THE UPSTREAM DIRECTION. UPON COMPLETION OF COCONUT COIR FIBER MATTING, BEGIN INSTALLATION OF COIR FIBER MATTING AT DOWNSTREAM EXTENTS.
5) UNROLL COIR FIBER MATTING PARALLEL TO FLOW IN THE UPSTREAM DIRECTION. ANCHOR UPSLOPE SIDE OF COIR FIBER MATTING IN THE SAME 6" DEEP TRENCH AS COCONUT COIR FIBER MATTING.
6) SECURE REMAINDER OF COIR FIBER MATTING WITH 2" X 4" WOODEN STAKES AS DEPICTED IN MATTING STAKING VIEW.
7) UPSTREAM MATTING SHALL ALWAYS OVERLAP DOWNSTREAM MATTING SO THAT FLOWS DO NOT DISTURB FUNCTIONALITY OF ECB.
8) COIR FIBER MATTING SHALL NOT SEPERATE FROM THE UNDERLYING SOIL BY MORE THAN 2" UNDER A REASONABLE PULL. IF SEPERATION DOES OCCUR, ADDITIONAL STAKES SHALL BE ADDED AND WILL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.



SECTION A-A'



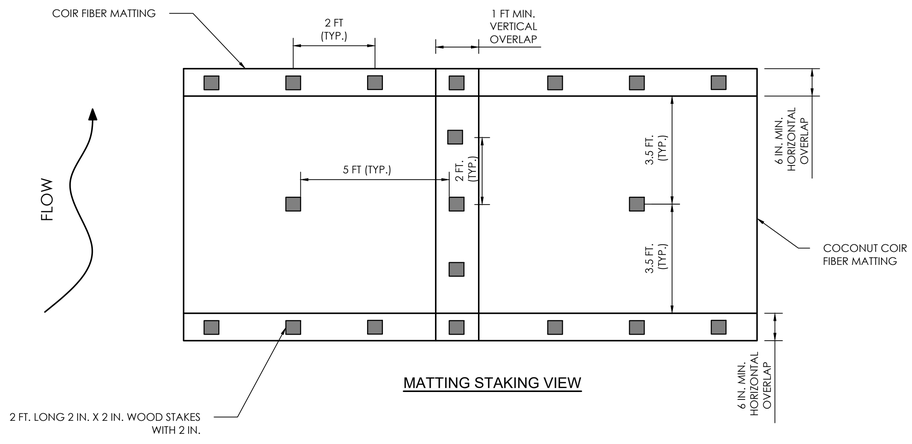


LIVE STAKE

NOTES:

1. LIVE STAKES SHALL BE PLANTED EVERYWHERE COIR MATTING IS CALLED FOR.
2. LIVE STAKES SHALL BE SPACED APPROXIMATELY 3' ON CENTER, WITH RANDOM SPACING, BETWEEN THE BANKFULL AND INNER BERM STAGE.
3. LIVE STAKES SHALL BE PLANTED ON BOTH SIDES OF RIFFLES AND ON THE OUTSIDE BANK OF POOLS.
4. LIVE STAKES SHALL BE DRIVEN UNTIL APPROXIMATELY 3/4 OF LIVE STAKE IS WITHIN GROUND.
5. A STARTER HOLE MAY BE REQUIRED IF STAKING THROUGH MATTING, ROCK OR COMPACTED SOILS.
6. DRIVE REBAR INTO GROUND TO START HOLE, AND COMPACT HOLE AROUND STAKE AFTER INSTALLATION.
7. ALL MATERIALS ARE TO BE APPROVED BY ENGINEER OR ENGINEER'S ONSITE CONSTRUCTION MANAGER.
8. CONTRACTOR SHALL COORDINATE WITH ON-SITE ENGINEER OR RESTORATION ECOLOGIST PRIOR TO START OF RE-VEGETATION ACTIVITIES.

ESC DET 4 DETAIL - EROSION CONTROL BLANKET
NOT TO SCALE



MATTING STAKING VIEW

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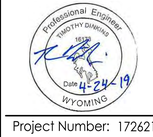
Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
EROSION AND SEDIMENT CONTROL DETAILS

Permit-Seal



Project Number: 172621110
File Name: ESC_DET-02.dwg

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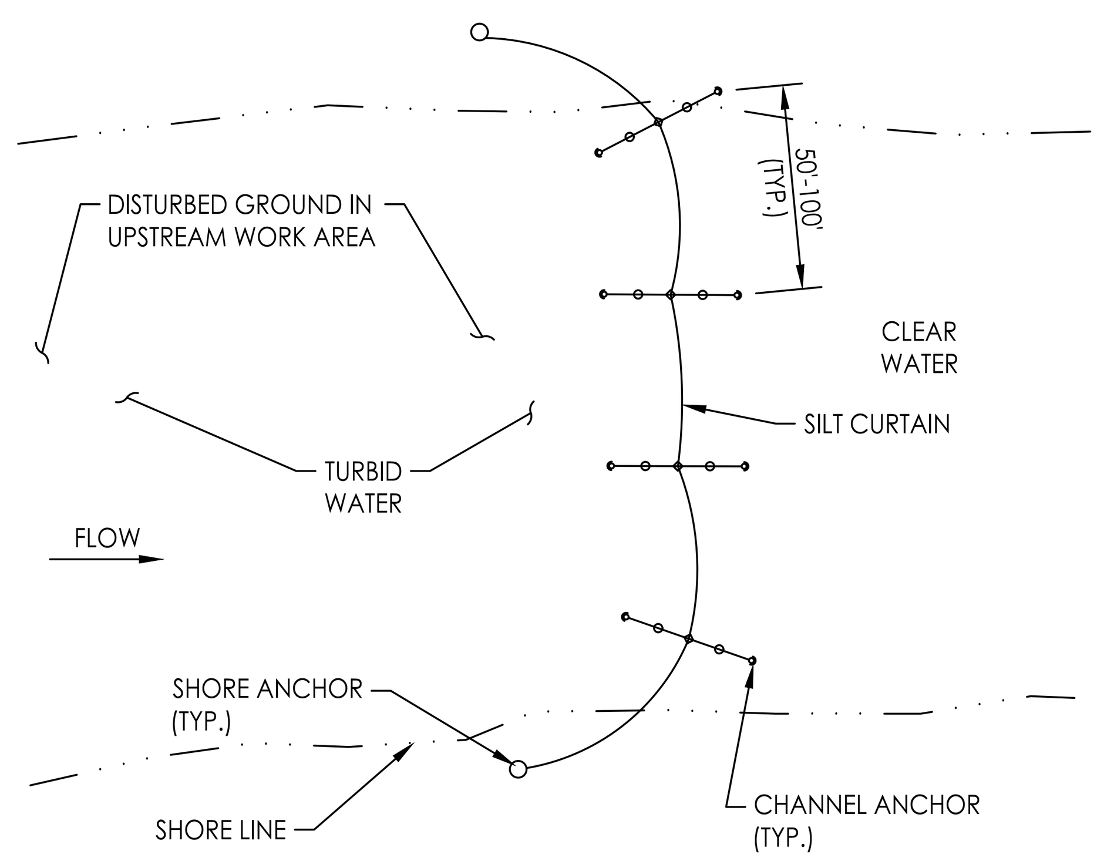
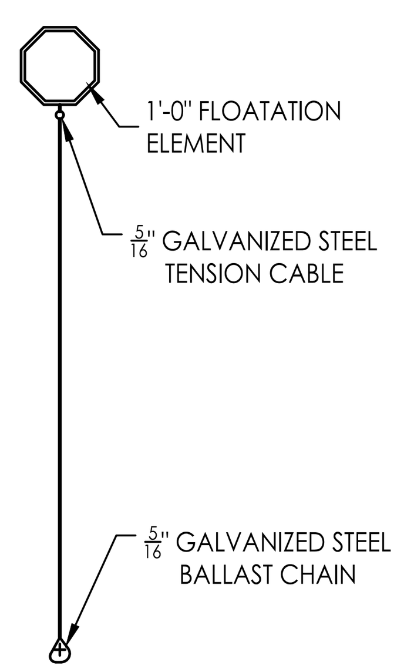
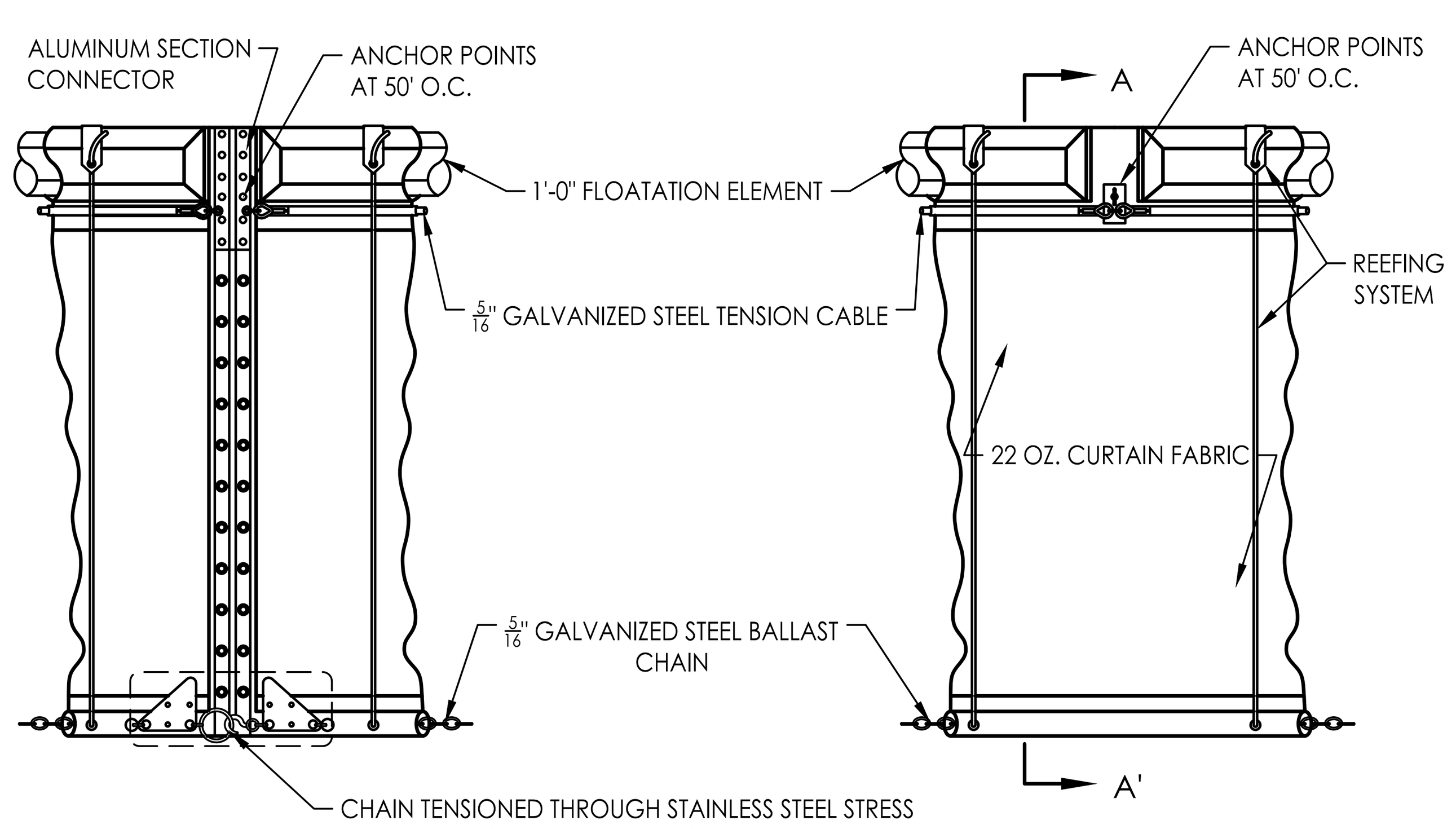
Revision 0
Sheet ESC-DET-02



PLAN

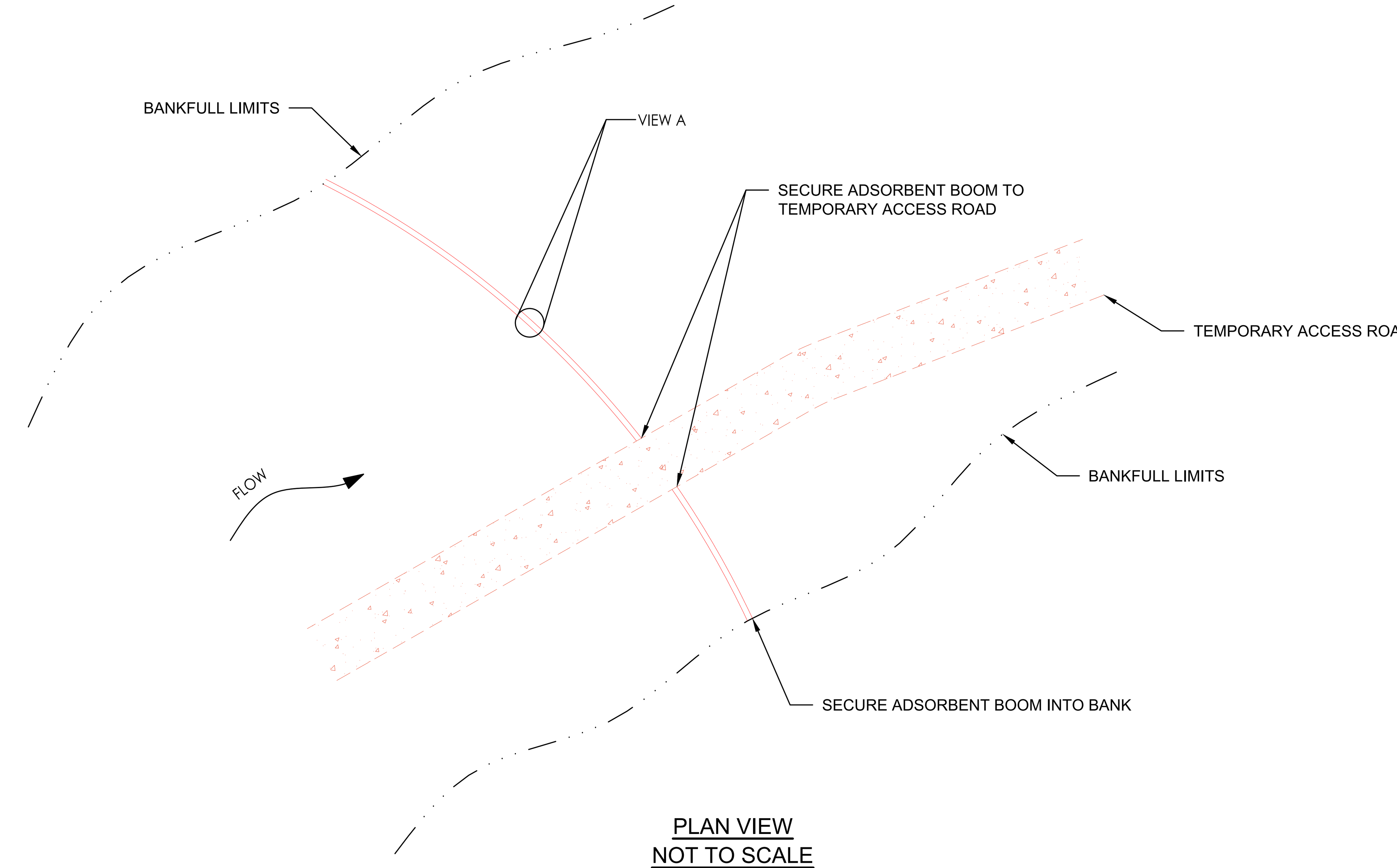


SECTION A-A'

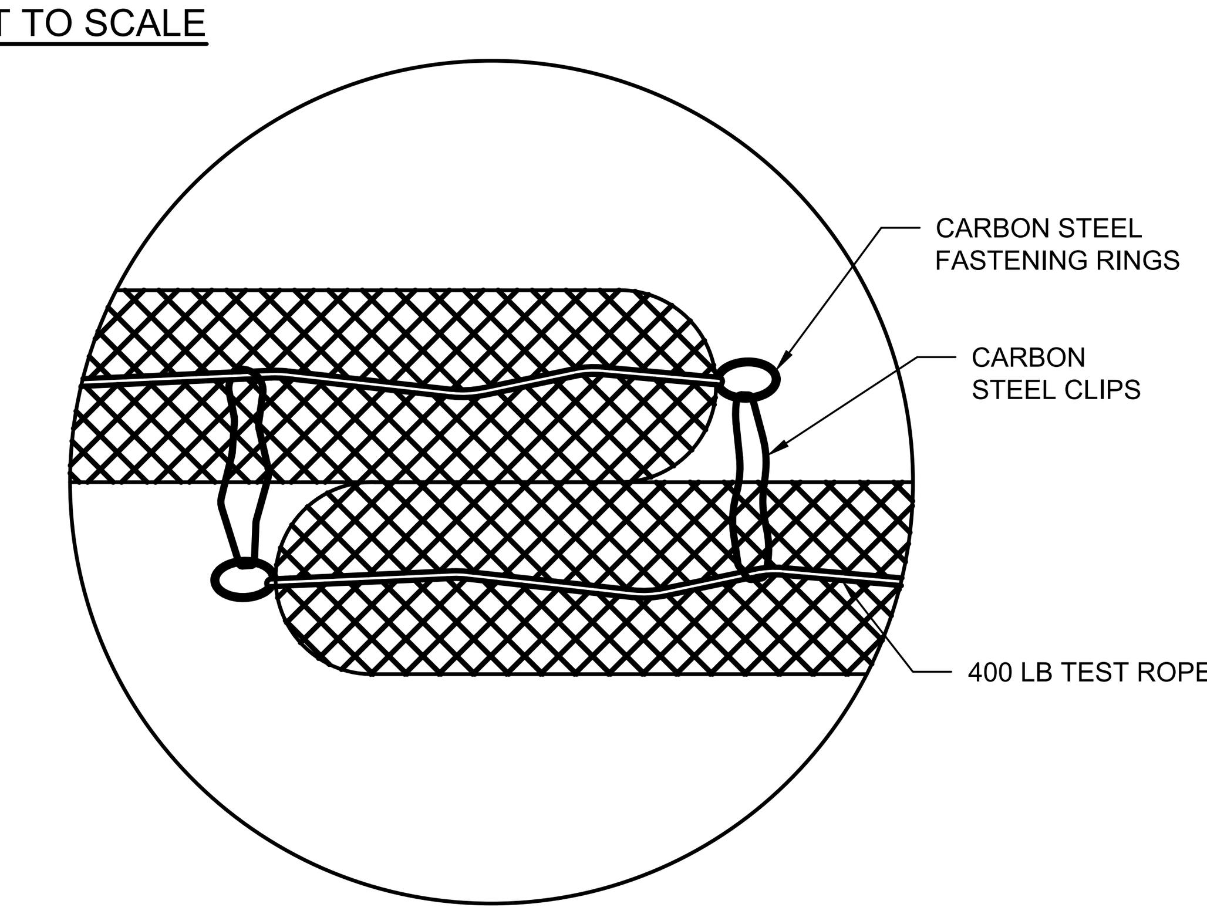


ELEVATION

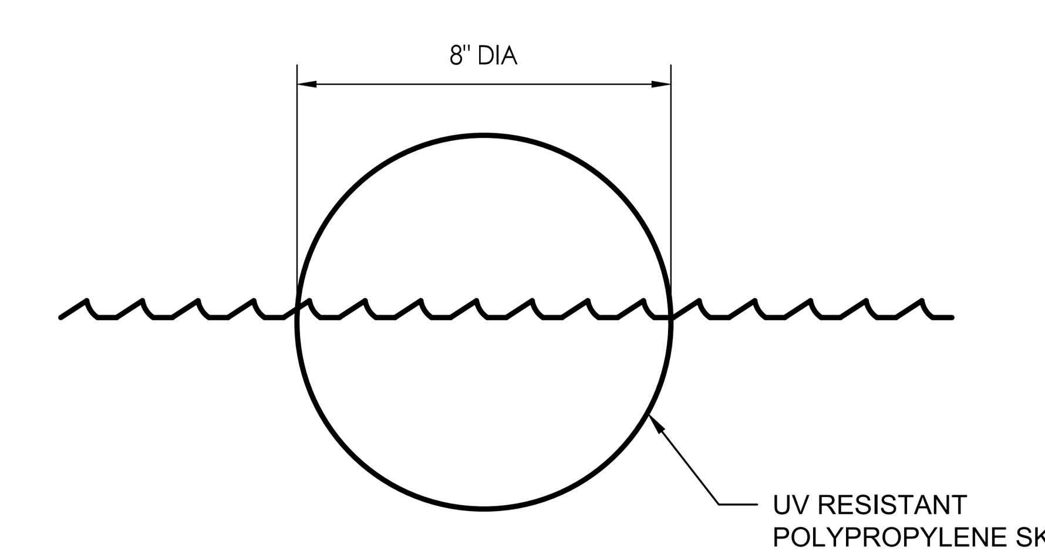
ESC DET 5 DETAIL - SILT CURTAIN
NOT TO SCALE



PLAN VIEW
NOT TO SCALE



VIEW A



SECTION VIEW

NOTES:

1. ADSORBENT BOOMS FLOAT ON WATER SURFACE.
2. ATTACH 10' SECTIONS OF BOOMS AS SHOWN IN VIEW A UNTIL THE BOOM SPANS THE ENTIRE CHANNEL.
3. EACH 10' SECTION IS CAPABLE OF ABSORBING 12 GALLONS OF OIL AND OIL BASED LIQUIDS. IN EVENT OF A CONTAMINANT RELEASE MAINTAIN BOOMS TO ALLOW FOR EFFECTIVE TREATMENT.
4. DISPOSE OF ADSORBENT BOOMS IN COMPLIANCE WITH LOCAL REGULATIONS.

ESC DET 6 DETAIL - ADSORBENT BOOM
NOT TO SCALE

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Client/Project
CITY OF CASPER
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NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
EROSION AND SEDIMENT CONTROL DETAILS

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Project Number: 172621110

File Name: ESC_DET-03.dwg

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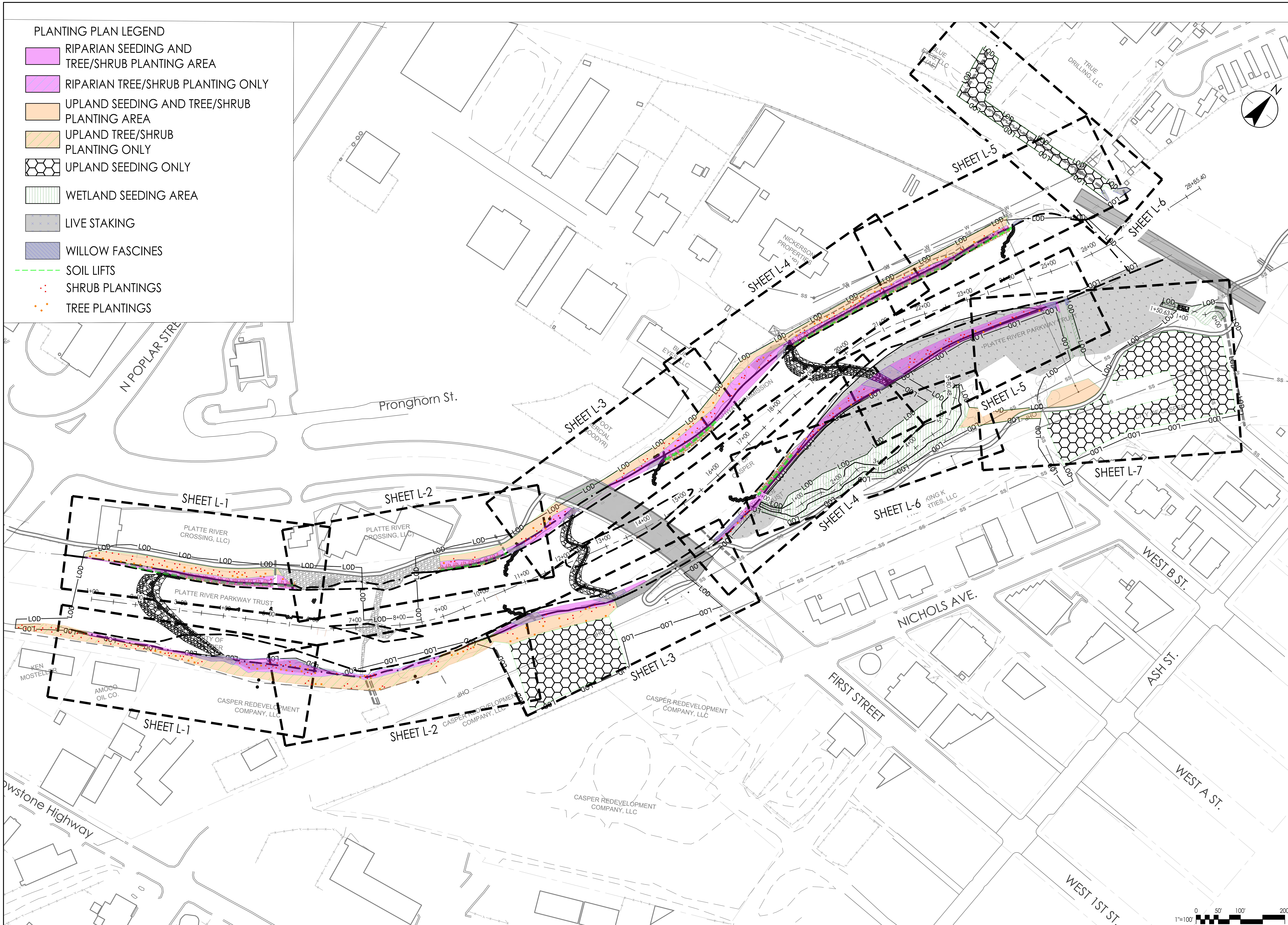
Revision 0 Sheet ESC-DET-03



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NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
LANDSCAPING OVERVIEW

Permit-Seal

CERTIFIED ECOLOGICAL RESTORATION PRACTITIONER BY THE SOCIETY FOR ECOLOGICAL RESTORATION

Project Number: 172621110

File Name: NPFST_LANDSCAPING_OV.dwg

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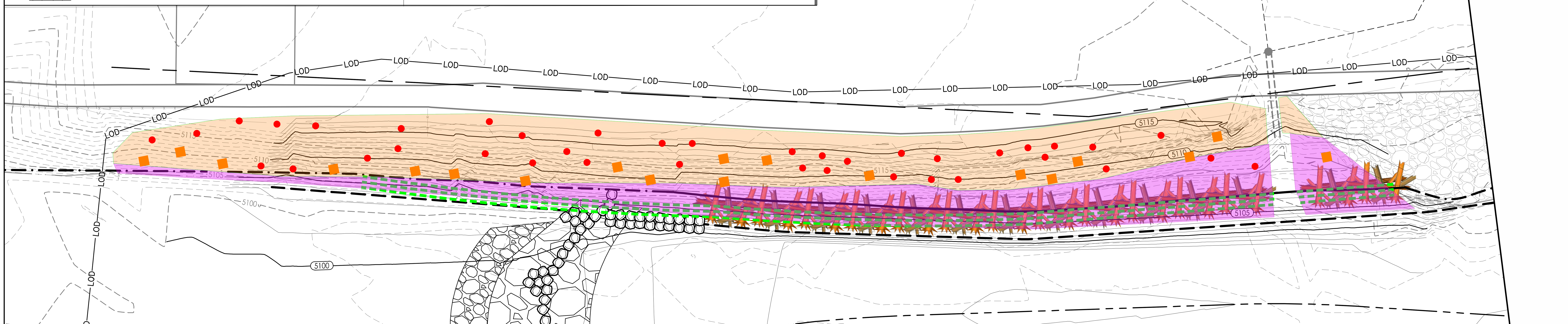
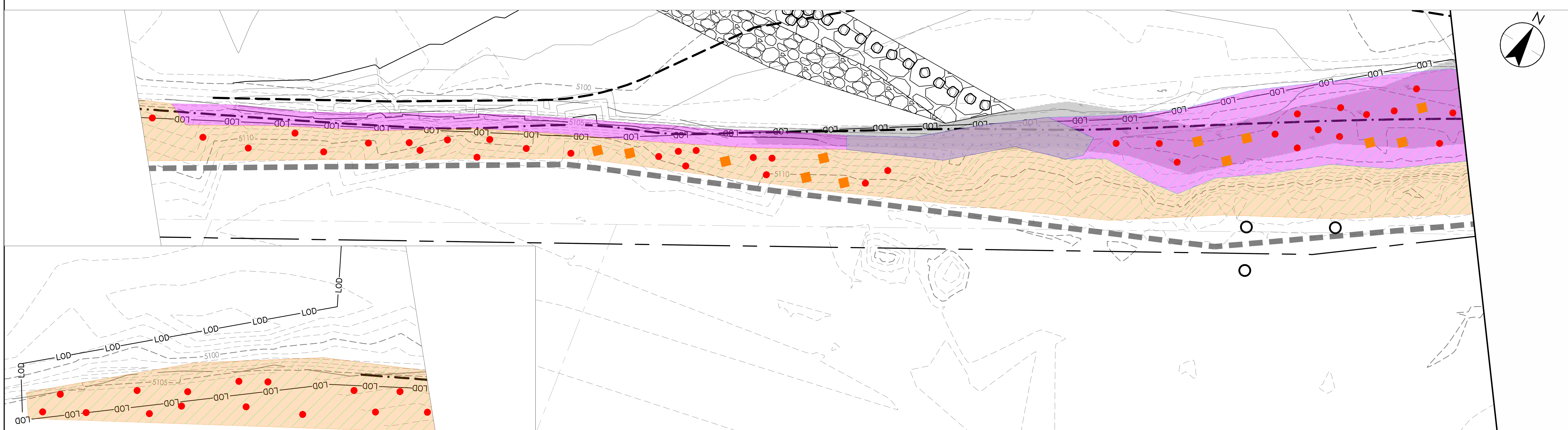
Revision	Sheet
0	L-OV

PLANTING PLAN LEGEND

- RIPARIAN SEEDING AND TREE/SHRUB PLANTING AREA
- RIPARIAN TREE/SHRUB PLANTING ONLY
- UPLAND SEEDING AND TREE/SHRUB PLANTING AREA
- UPLAND TREE/SHRUB PLANTING ONLY
- UPLAND SEEDING ONLY
- WETLAND SEEDING AREA
- LIVE STAKING
- WILLOW FASCINES
- SOIL LIFTS
- SHRUB PLANTINGS
- TREE PLANTINGS



LEFT BANK VIEWPORT 1



NOTES:

1) EXISTING NATIVE VEGETATION (TREES/SHRUBS) WILL BE RETAINED WHEREVER POSSIBLE.
2) AREAS INDICATING TREE/SHRUB PLANTING ONLY WILL INVOLVE HAND PLANTING OF INDIVIDUAL CONTAINER GROWN STOCK TO MINIMIZE DISTURBANCE IN THESE AREAS. FINAL PLANTING LOCATIONS WILL BE DETERMINED BY THE DESIGNER IN THE FIELD AT THE TIME OF INSTALLATION.
3) TREES AND SHRUBS WILL BE PLANTED IN ALL PLANTING ZONES AT DENSITIES INDICATED IN THE PROJECT SPECIFICATIONS.
4) ONCE FINAL GRADING IS COMPLETE, "RIPARIAN", "UPLAND", AND "WETLAND/RIPARIAN" PLANTING ZONES WILL BE SEEDED WITH THE APPROPRIATE SEED MIXTURE, HAND PLANTED WITH THE VEGETATION STOCK AT DENSITIES LISTED IN THE PROJECT SPECS.
5) FOLLOWING SEEDING AND PLANTING, WOOD STRAW SHALL BE SPREAD BY HAND OR AN APPROVED STRAW BLOWER AT THE RATE OF 280 REGULAR-SIZED BALES PER ACRE. AREAS NOT SEEDED DO NOT REQUIRE WOOD STRAW. SEE SPECIFICATION FOR WOOD STRAW REQUIREMENTS.

RIGHT BANK VIEWPORT 1

0 10' 20' 40'
1"=20'

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
LANDSCAPING PLAN

Permit-Seal

CERTIFIED ECOLOGICAL RESTORATION PRACTITIONER BY THE SOCIETY FOR ECOLOGICAL RESTORATION

Project Number: 172621110

File Name: NPFST_Landscaping.dwg

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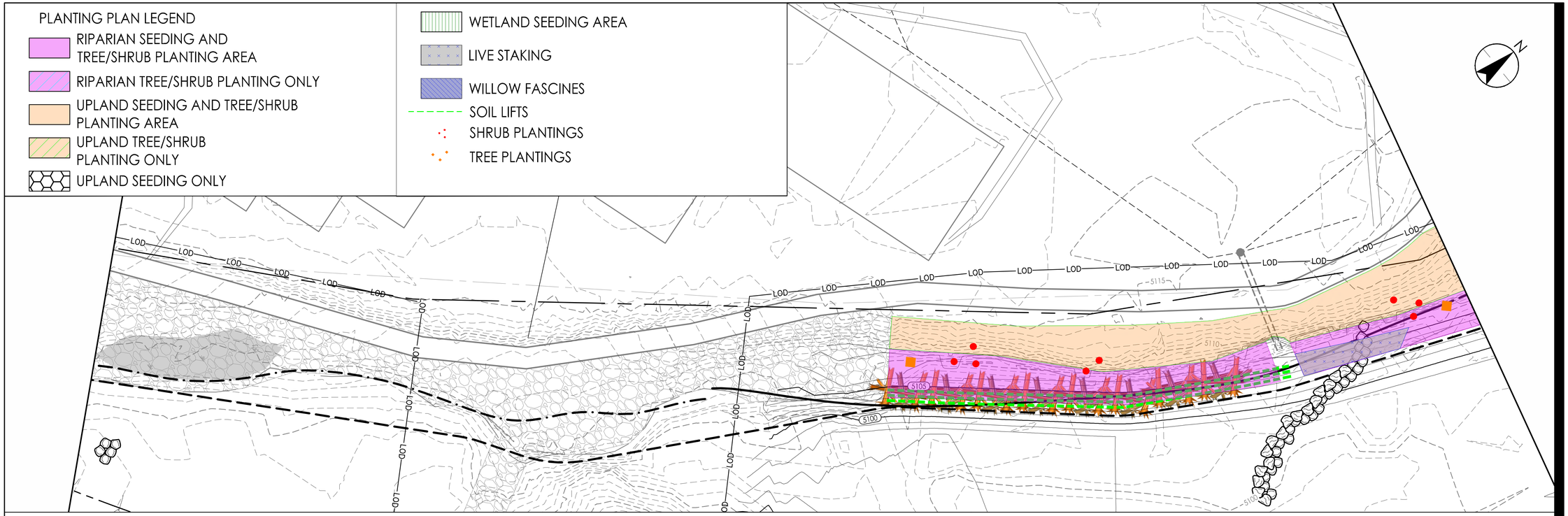
Drawing No. LANDSCAPING PLAN

Revision 0

Sheet L-1

PLANTING PLAN LEGEND

- RIPARIAN SEEDING AND TREE/SHRUB PLANTING AREA
- RIPARIAN TREE/SHRUB PLANTING ONLY
- UPLAND SEEDING AND TREE/SHRUB PLANTING AREA
- UPLAND TREE/SHRUB PLANTING ONLY
- UPLAND SEEDING ONLY
- WETLAND SEEDING AREA
- LIVE STAKING
- WILLOW FASCINES
- SOIL LIFTS
- SHRUB PLANTINGS
- TREE PLANTINGS



LEFT BANK VIEWPORT 2

RIGHT BANK VIEWPORT 2

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Drawing No. LANDSCAPING PLAN

Revision	Sheet
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PLANTING PLAN LEGEND

- RIPARIAN SEEDING AND TREE/SHRUB PLANTING AREA
- RIPARIAN TREE/SHRUB PLANTING ONLY
- UPLAND SEEDING AND TREE/SHRUB PLANTING AREA
- UPLAND TREE/SHRUB PLANTING ONLY
- UPLAND SEEDING ONLY
- WETLAND SEEDING AREA
- LIVE STAKING
- WILLOW FASCINES
- SOIL LIFTS
- SHRUB PLANTINGS
- TREE PLANTINGS

LEFT BANK VIEWPORT 3

RIGHT BANK VIEWPORT 3

1"=20'

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
LANDSCAPING PLAN

Permit-Seal

CERTIFIED ECOLOGICAL RESTORATION PRACTITIONER by the SOCIETY FOR ECOLOGICAL RESTORATION

Project Number: 172621110

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Drawing No. LANDSCAPING PLAN

Revision 0

Sheet L-3

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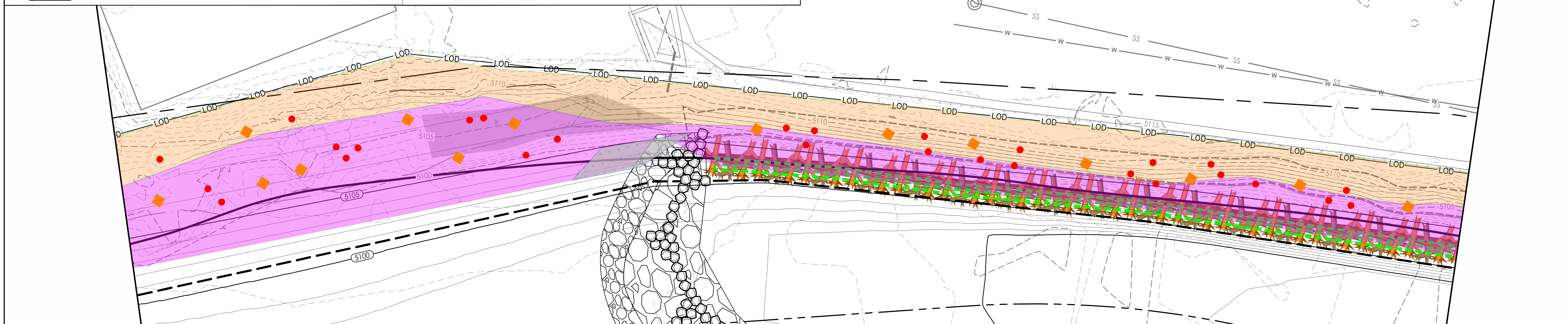
PLANTING PLAN LEGEND

- RIPARIAN SEEDING AND TREE/SHRUB PLANTING AREA
- RIPARIAN TREE/SHRUB PLANTING ONLY
- UPLAND SEEDING AND TREE/SHRUB PLANTING AREA
- UPLAND TREE/SHRUB PLANTING ONLY
- UPLAND SEEDING ONLY
- WETLAND SEEDING AREA
- LIVE STAKING
- WILLOW FASCINES
- SOIL LIFTS
- SHRUB PLANTINGS
- TREE PLANTINGS



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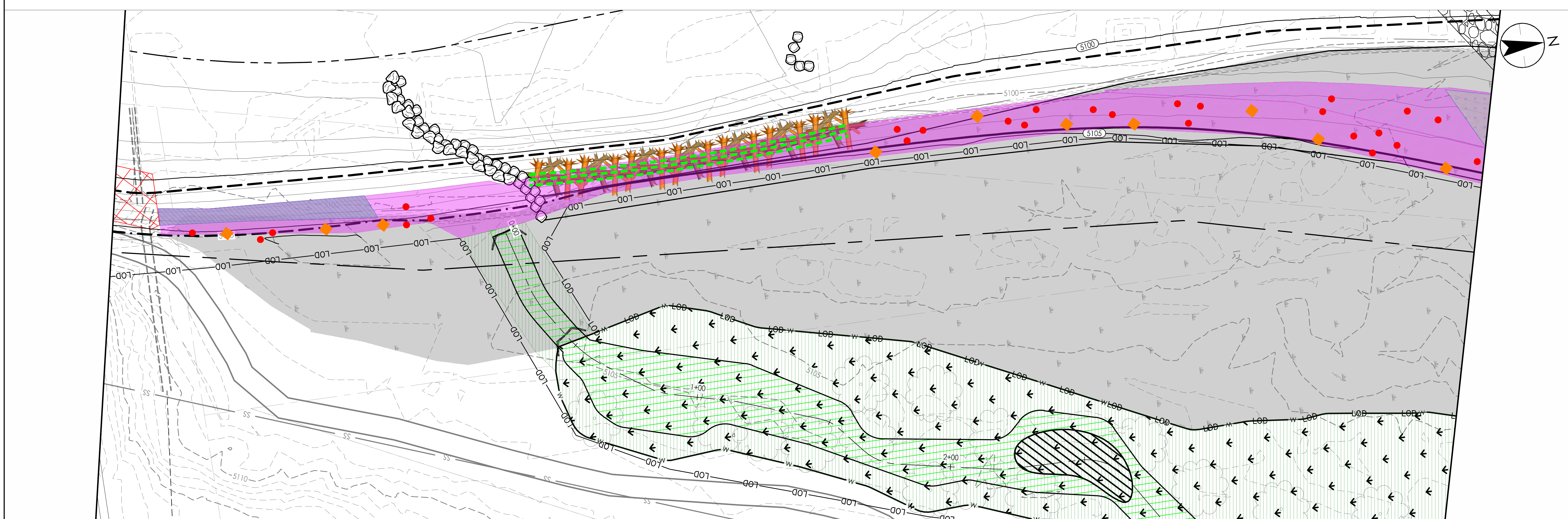

RIGHT BANK VIEWPORT 4

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200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
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CERTIFIED ECOLOGICAL RESTORATION PRACTITIONER BY THE SOCIETY FOR ECOLOGICAL RESTORATION

Project Number: 172621110

File Name: NPFST_Landscaping.dwg

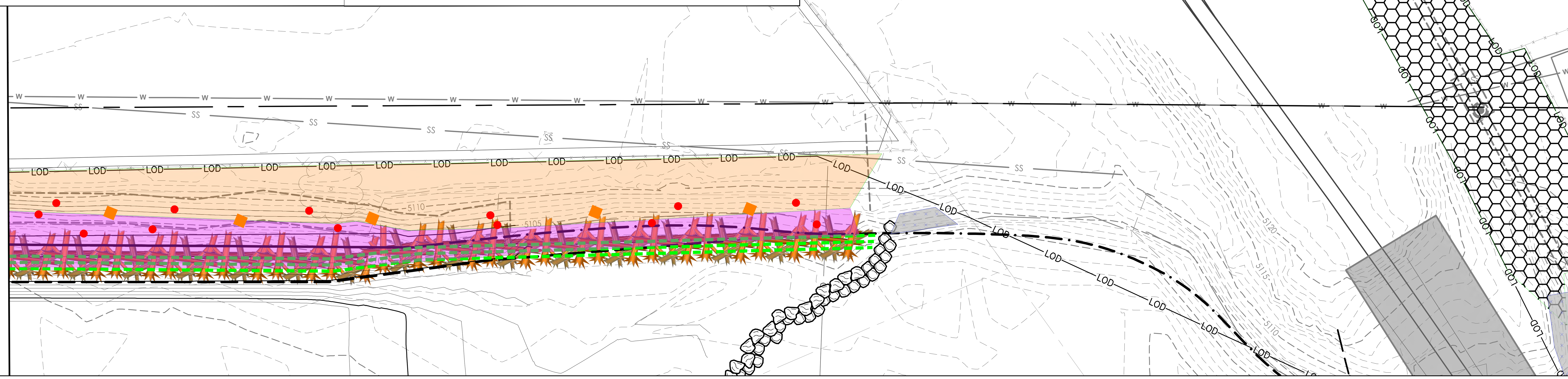
PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. LANDSCAPING PLAN

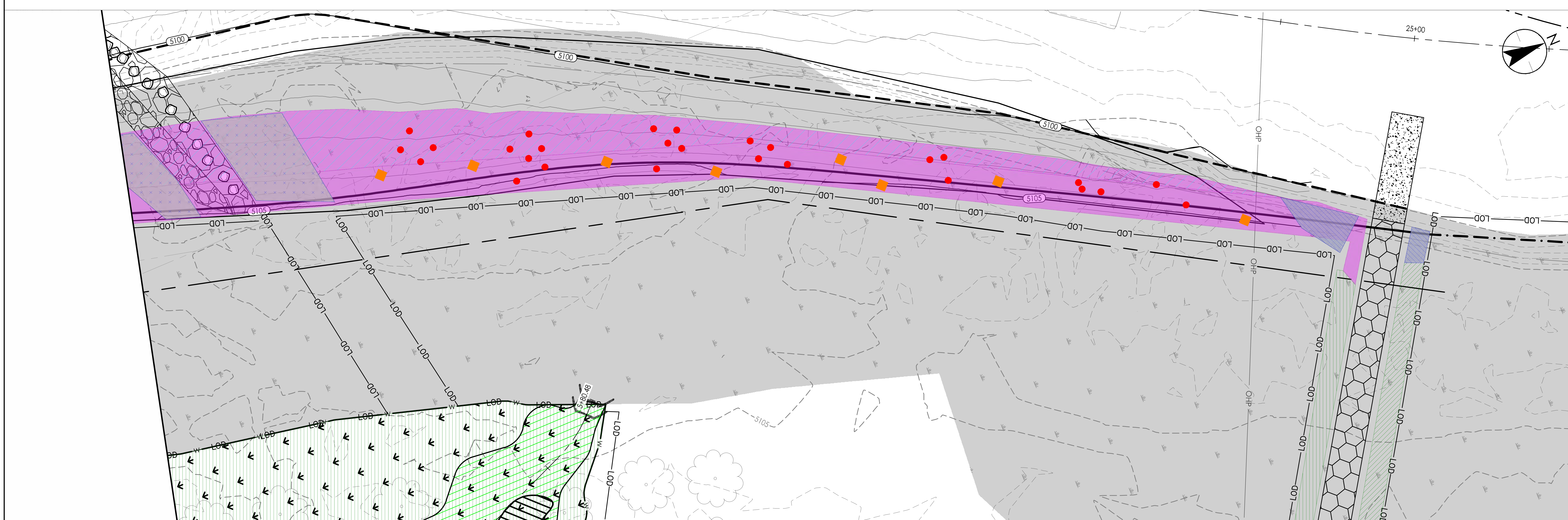
Revision 0 Sheet L-4

PLANTING PLAN LEGEND

- RIPARIAN SEEDING AND TREE/SHRUB PLANTING AREA
- RIPARIAN TREE/SHRUB PLANTING ONLY
- UPLAND SEEDING AND TREE/SHRUB PLANTING AREA
- UPLAND TREE/SHRUB PLANTING ONLY
- UPLAND SEEDING ONLY
- WETLAND SEEDING AREA
- LIVE STAKING
- WILLOW FASCINES
- SOIL LIFTS
- SHRUB PLANTINGS
- TREE PLANTINGS



LEFT BANK VIEWPORT 5



RIGHT BANK VIEWPORT 5

0 10' 20' 40'
1"=20'

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Revision | By | Appd. | YY.MM.DD

Issued | By | Appd. | YY.MM.DD

Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
LANDSCAPING PLAN

Permit-Seal

Project Number: 172621110

File Name: NPFST_Landscaping.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

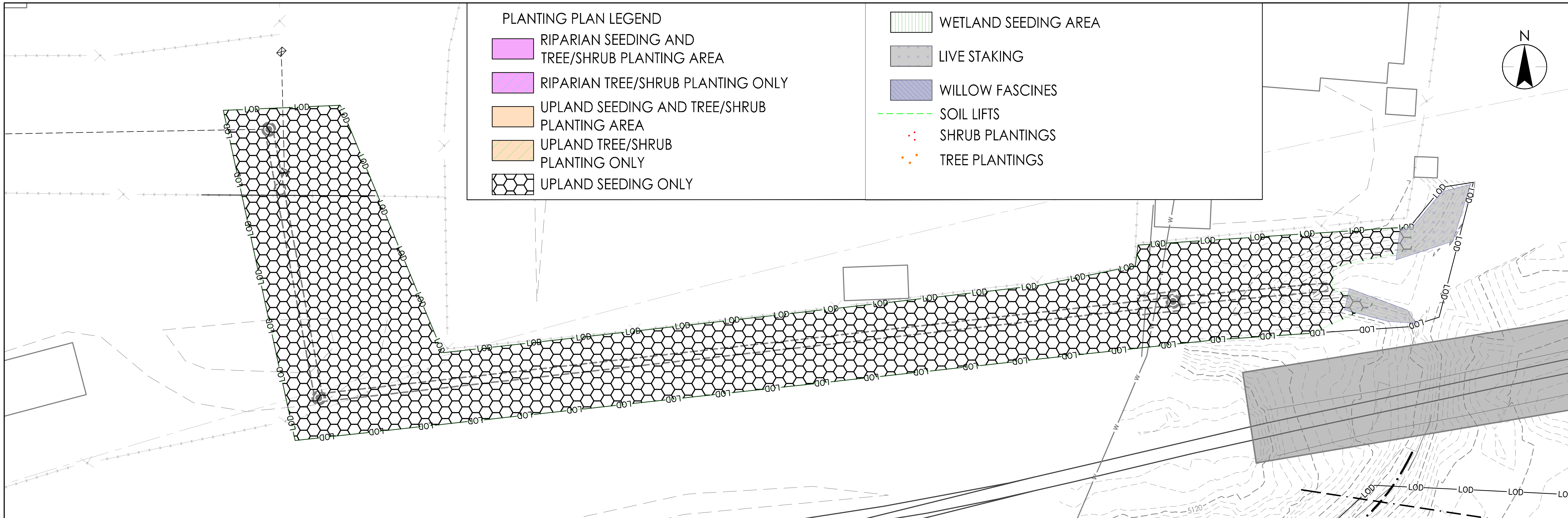
Drawing No. LANDSCAPING PLAN

Revision 0

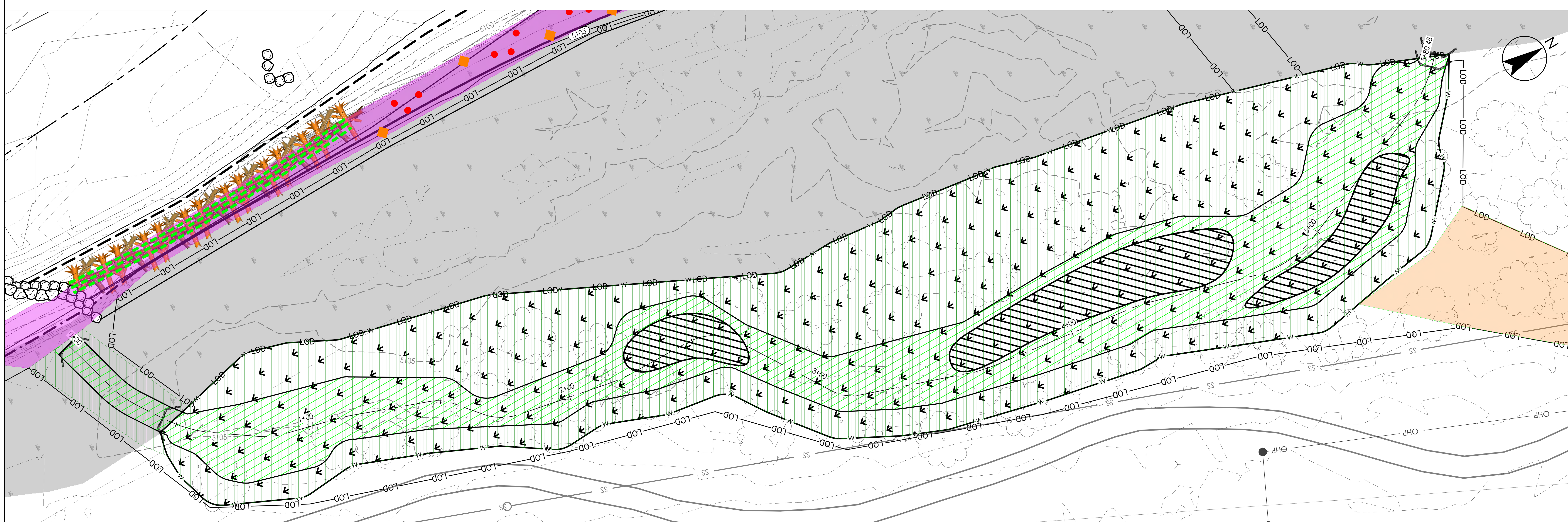
Sheet L-5

PLANTING PLAN LEGEND

- RIPARIAN SEEDING AND TREE/SHRUB PLANTING AREA
- RIPARIAN TREE/SHRUB PLANTING ONLY
- UPLAND SEEDING AND TREE/SHRUB PLANTING AREA
- UPLAND TREE/SHRUB PLANTING ONLY
- UPLAND SEEDING ONLY
- WETLAND SEEDING AREA
- LIVE STAKING
- WILLOW FASCINES
- SOIL LIFTS
- SHRUB PLANTINGS
- TREE PLANTINGS



BNSF OUTFALL



WETLAND AREA 1

1"=20' 0 10' 20' 40'

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Issued	By	Appd.	YY.MM.DD

Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
LANDSCAPING PLAN

Permit-Seal

CERTIFIED ECOLOGICAL RESTORATION PRACTITIONER (CERP) BY THE SOCIETY FOR ECOLOGICAL RESTORATION

Project Number: 172621110

File Name: NPFST_Landscaping.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. LANDSCAPING PLAN

Revision 0

Sheet L-6

PLANTING PLAN LEGEND

- RIPARIAN SEEDING AND TREE/SHRUB PLANTING AREA
- RIPARIAN TREE/SHRUB PLANTING ONLY
- UPLAND SEEDING AND TREE/SHRUB PLANTING AREA
- UPLAND TREE/SHRUB PLANTING ONLY
- UPLAND SEEDING ONLY
- WETLAND SEEDING AREA
- LIVE STAKING
- WILLOW FASCINES
- SOIL LIFTS
- SHRUB PLANTINGS
- TREE PLANTINGS

STAGING AREA 1/ WETLAND AREA 2

0 10' 20' 40'
1"=20'

N

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Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD

Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
LANDSCAPING PLAN

Permit-Seal

CERTIFIED ECOLOGICAL RESTORATION PRACTITIONER BY THE SOCIETY FOR ECOLOGICAL RESTORATION

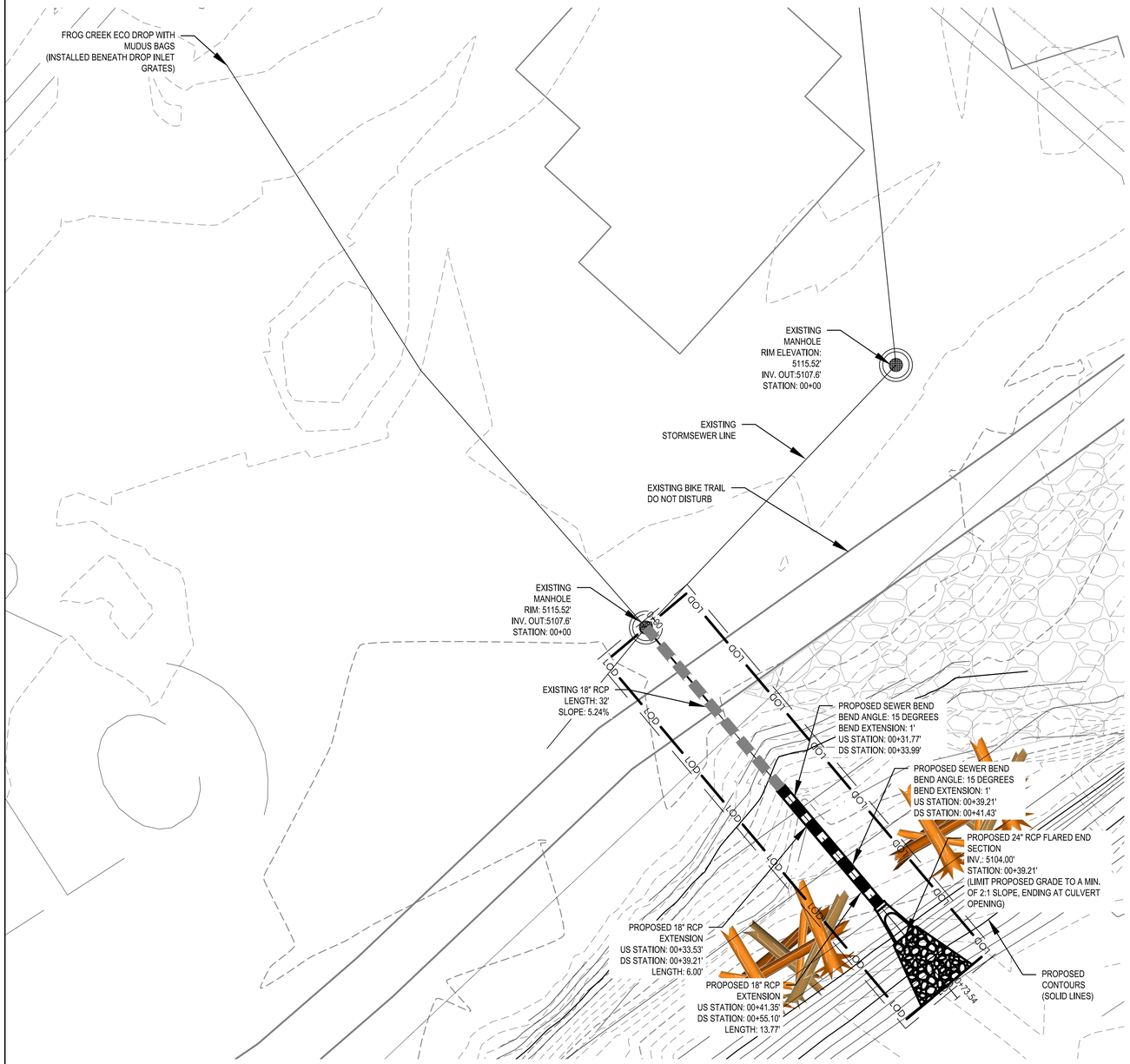
Project Number: 172621110

File Name: NPFST_Landscaping.dwg

PTP	JGA	TCD	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. LANDSCAPING PLAN

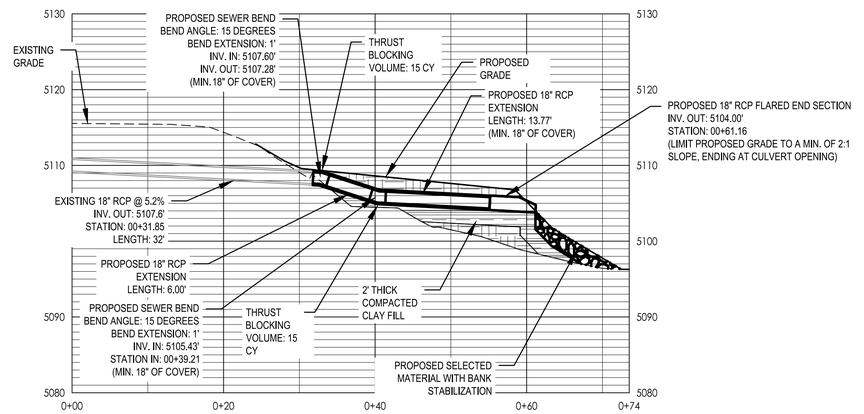
Revision	Sheet
0	L-7



NOTE: SURVEY DATA SHOWN IN DASHED LINES PROVIDED BY THE CITY OF CASPER. ACTUAL ELEVATIONS MAY VARY.

LEGEND

- PROPOSED SELECT MATERIAL BANK PROTECTION
- SUPER SILT FENCE
- LIMITS OF DISTURBANCE (LOD)
- EXISTING SANITARY SEWER MANHOLE
- EXISTING CULVERT (WIDTH MAY VARY)
- PROPOSED CULVERT (WIDTH MAY VARY)



OUTFALL A 0+00 - 0+74

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No.	Revision	By	Appd.	YY.MM.DD

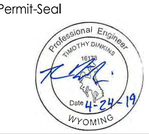
No.	Issued	By	Appd.	YY.MM.DD

Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
OUTFALL A

Permit-Seal



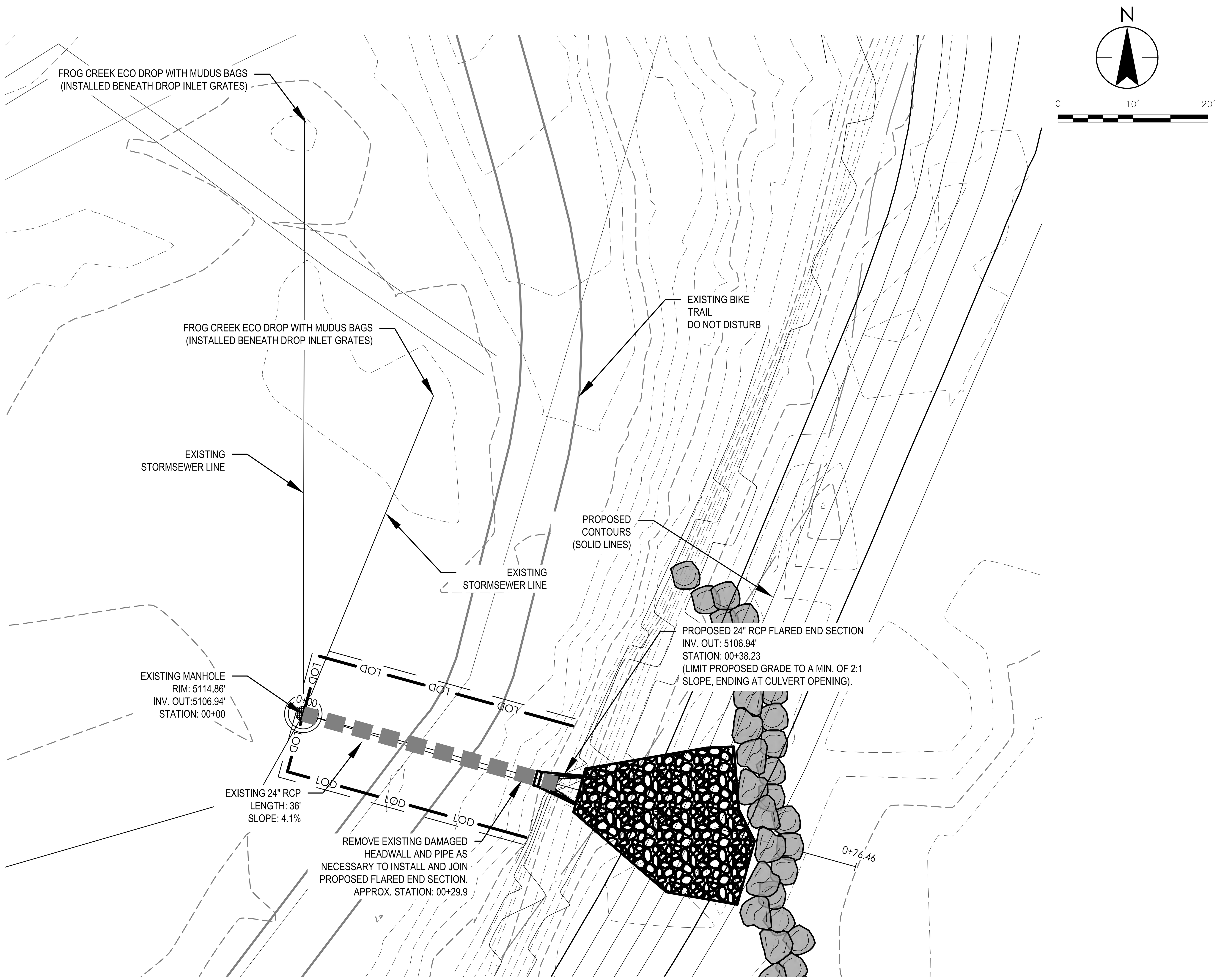
Project Number: 172621110

File Name: 21110_strm_retrofits.dwg

DAR	CA/TCD	DAR/CA	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.

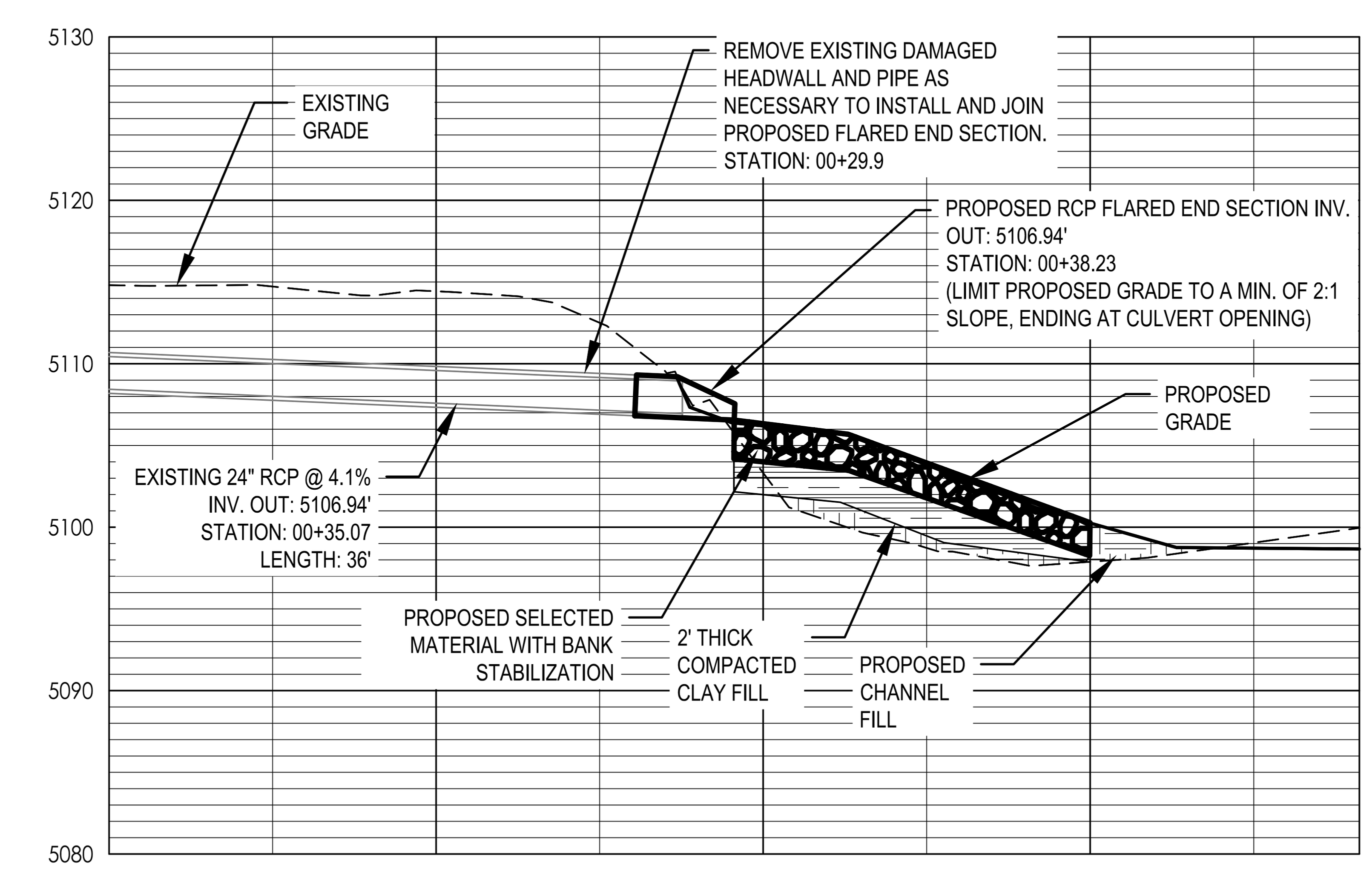
Revision	Sheet
0	SS-1



NOTE: SURVEY DATA SHOWN IN DASHED LINES PROVIDED BY THE CITY OF CASPER. ACTUAL ELEVATIONS MAY VARY.

LEGEND

- PROPOSED SELECT MATERIAL BANK PROTECTION
- SUPER SILT FENCE
- LIMITS OF DISTURBANCE
- EXISTING SANITARY SEWER MANHOLE
- EXISTING CULVERT (WIDTH MAY VARY)
- PROPOSED CULVERT (WIDTH MAY VARY)



OUTFALL B 0+00 - 0+76

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Revision | By | Appd. | YY.MM.DD

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH

CASPER, WYOMING

Title
100% PLANS
OUTFALL B

Permit-Seal
Professional Engineer
TIMOTHY DINKINS
WYOMING
Date 4-24-19

Project Number: 172621110

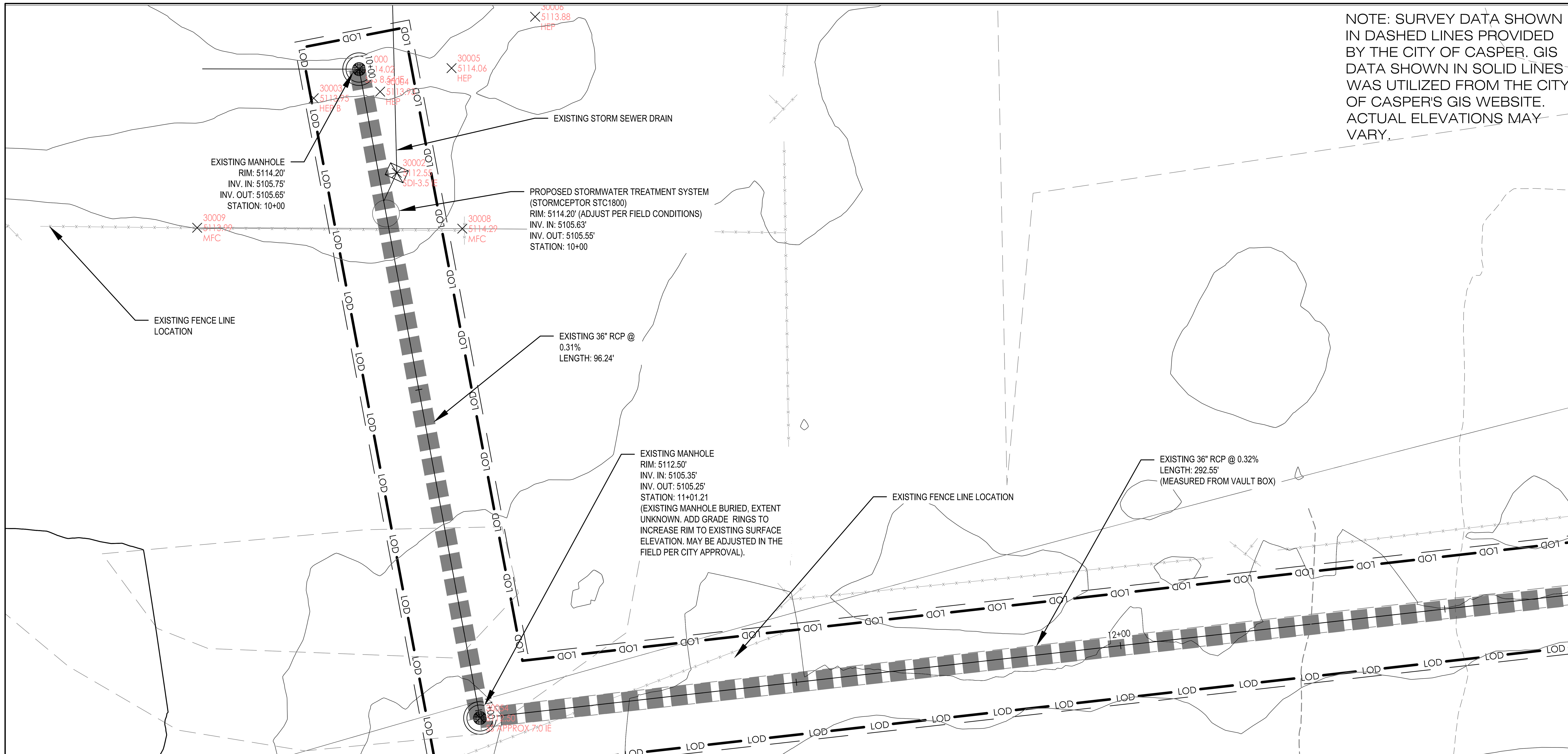
File Name: 21110_strm_retrofits.dwg

DAR	CA/TCD	DAR/CA	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.

Revision: 0
Sheet: SS-2

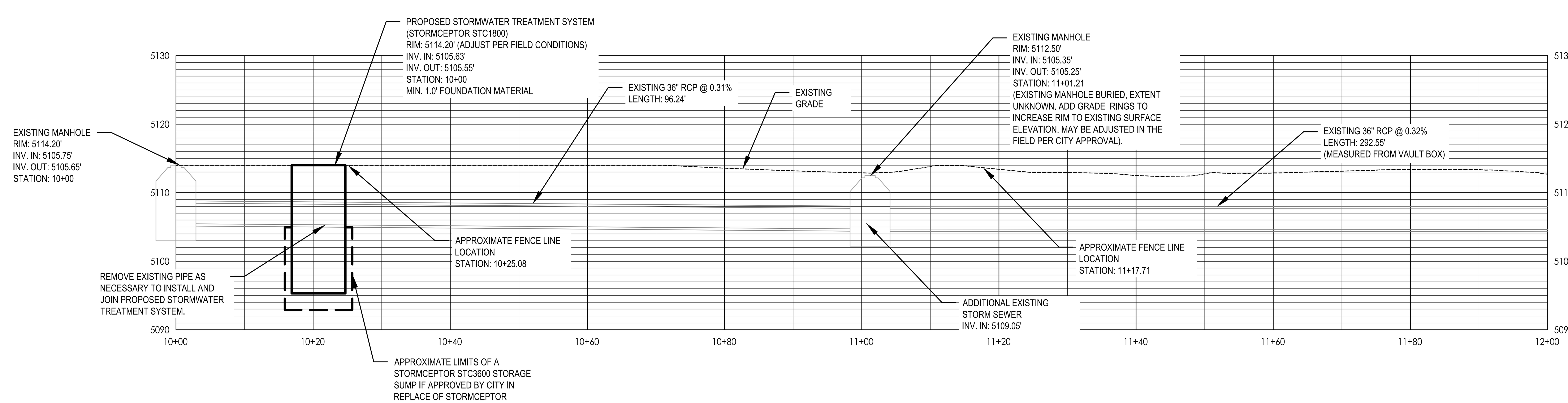
NOTE: SURVEY DATA SHOWN IN DASHED LINES PROVIDED BY THE CITY OF CASPER. GIS DATA SHOWN IN SOLID LINES WAS UTILIZED FROM THE CITY OF CASPER'S GIS WEBSITE. ACTUAL ELEVATIONS MAY VARY.



N
0 10' 20'

LEGEND

- PROPOSED SELECT MATERIAL BANK PROTECTION
- SUPER SILT FENCE
- LIMITS OF DISTURBANCE
- EXISTING SANITARY SEWER MANHOLE
- EXISTING CULVERT (WIDTH MAY VARY)
- PROPOSED CULVERT (WIDTH MAY VARY)



OUTFALL C 10+00 - 12+00

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Revision	By	Appd.	YY.MM.DD

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
BNSF-STORMWATER LINE-OUTFALL C 1

Permit-Seal
Professional Engineer TIMOTHY DINKINS WYOMING Date 4-24-19

Project Number: 172621110

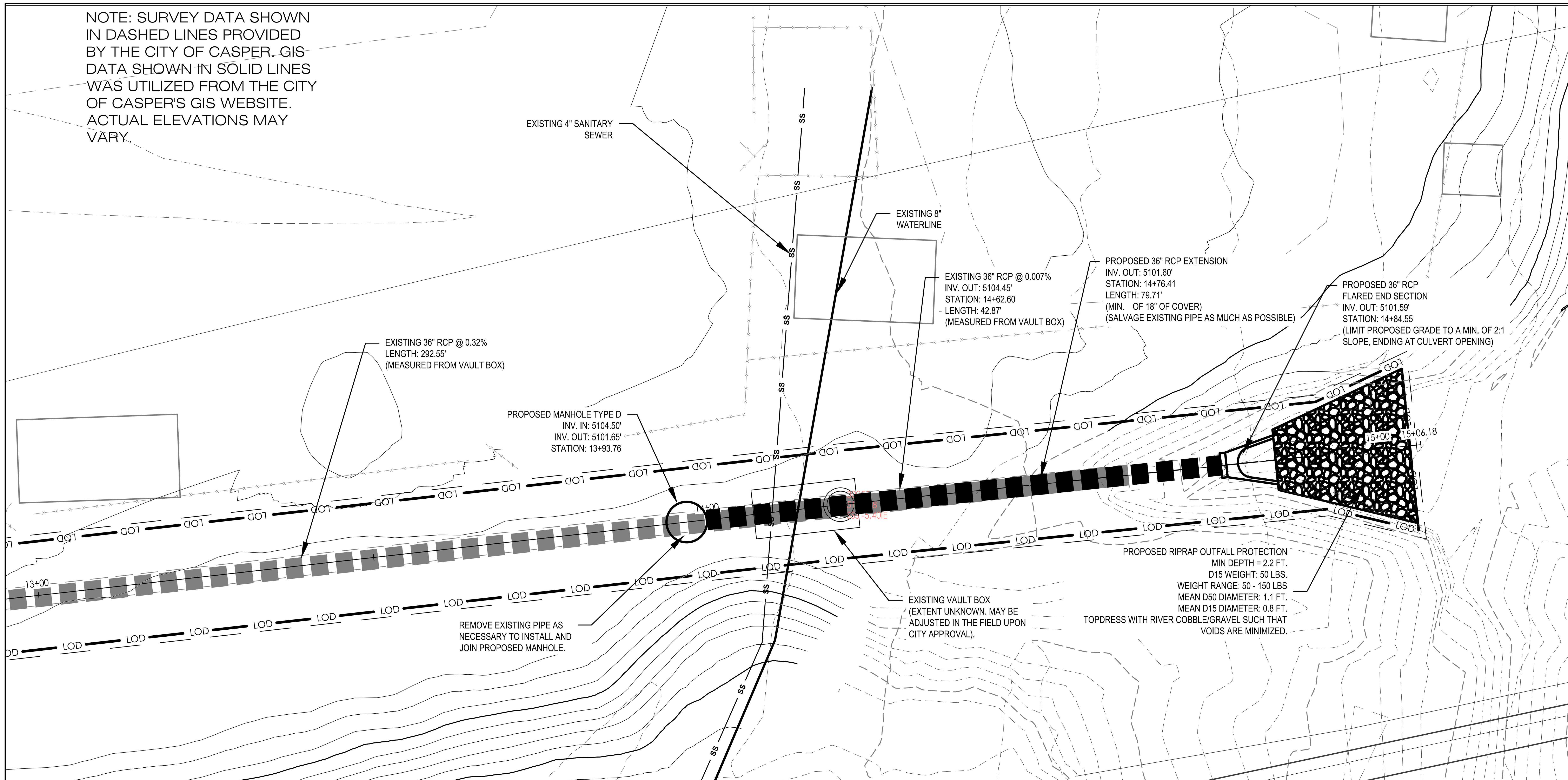
File Name: 21110_strm_retrofits.dwg

DAR	CA/TCD	DAR/CA	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.

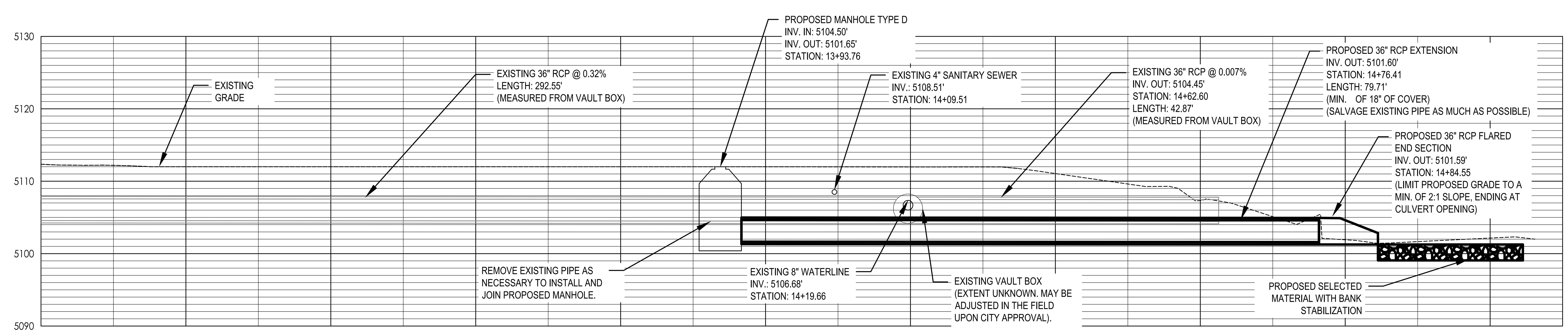
Revision	Sheet
0	SS-3

NOTE: SURVEY DATA SHOWN IN DASHED LINES PROVIDED BY THE CITY OF CASPER. GIS DATA SHOWN IN SOLID LINES WAS UTILIZED FROM THE CITY OF CASPER'S GIS WEBSITE. ACTUAL ELEVATIONS MAY VARY.



LEGEND

- PROPOSED SELECT MATERIAL BANK PROTECTION
- SUPER SILT FENCE
- LIMITS OF DISTURBANCE
- EXISTING SANITARY SEWER MANHOLE
- EXISTING CULVERT (WIDTH MAY VARY)
- PROPOSED CULVERT (WIDTH MAY VARY)



OUTFALL C 13+00 - 15+10

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Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD

Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
BNSF-STORMWATER LINE-OUTFALL C 2

Permit-Seal
Professional Engineer TIMOTHY DINKINS WYOMING Date 4-24-19

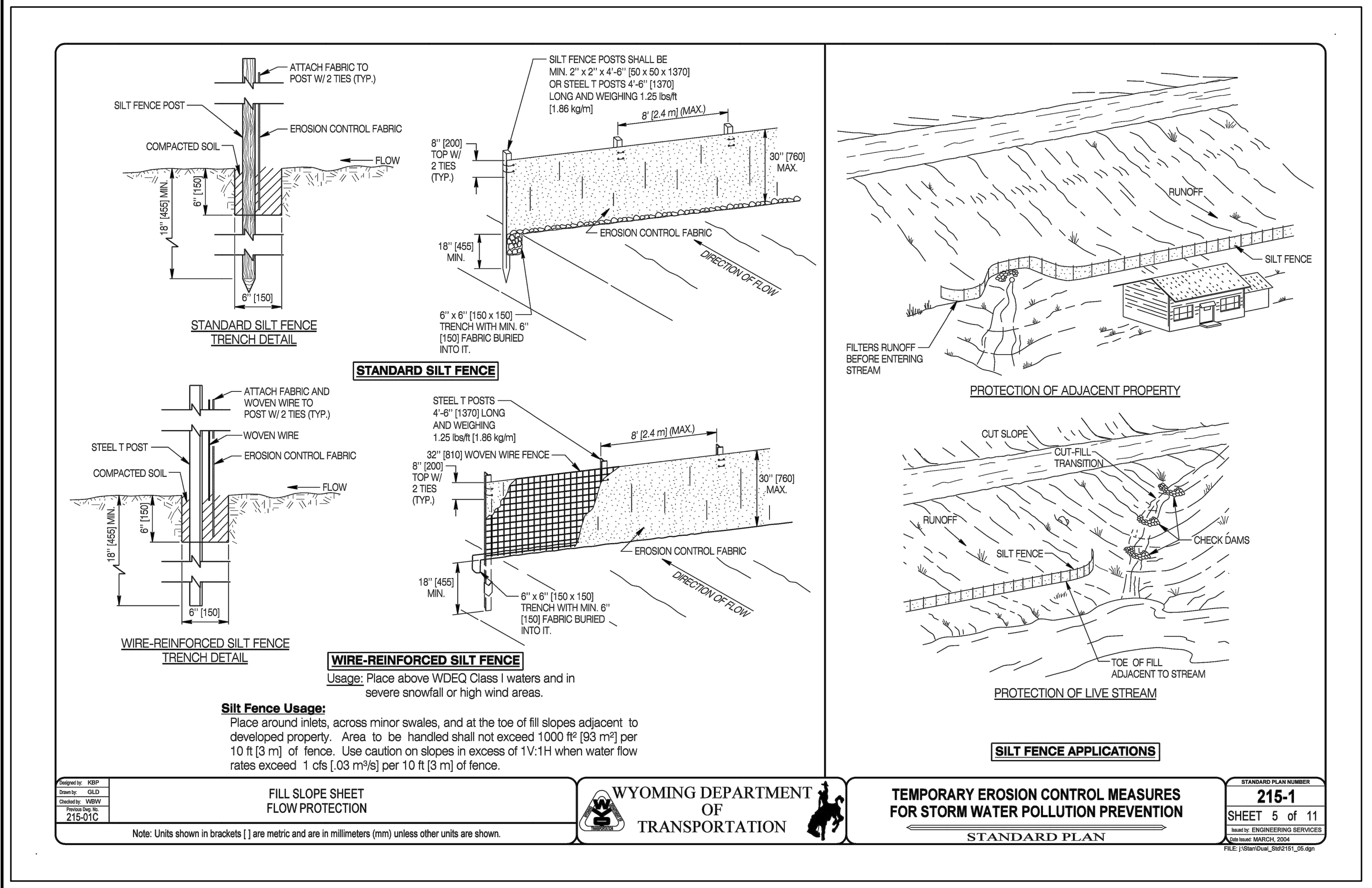
Project Number: 172621110

File Name: 21110_strm_retrofits.dwg

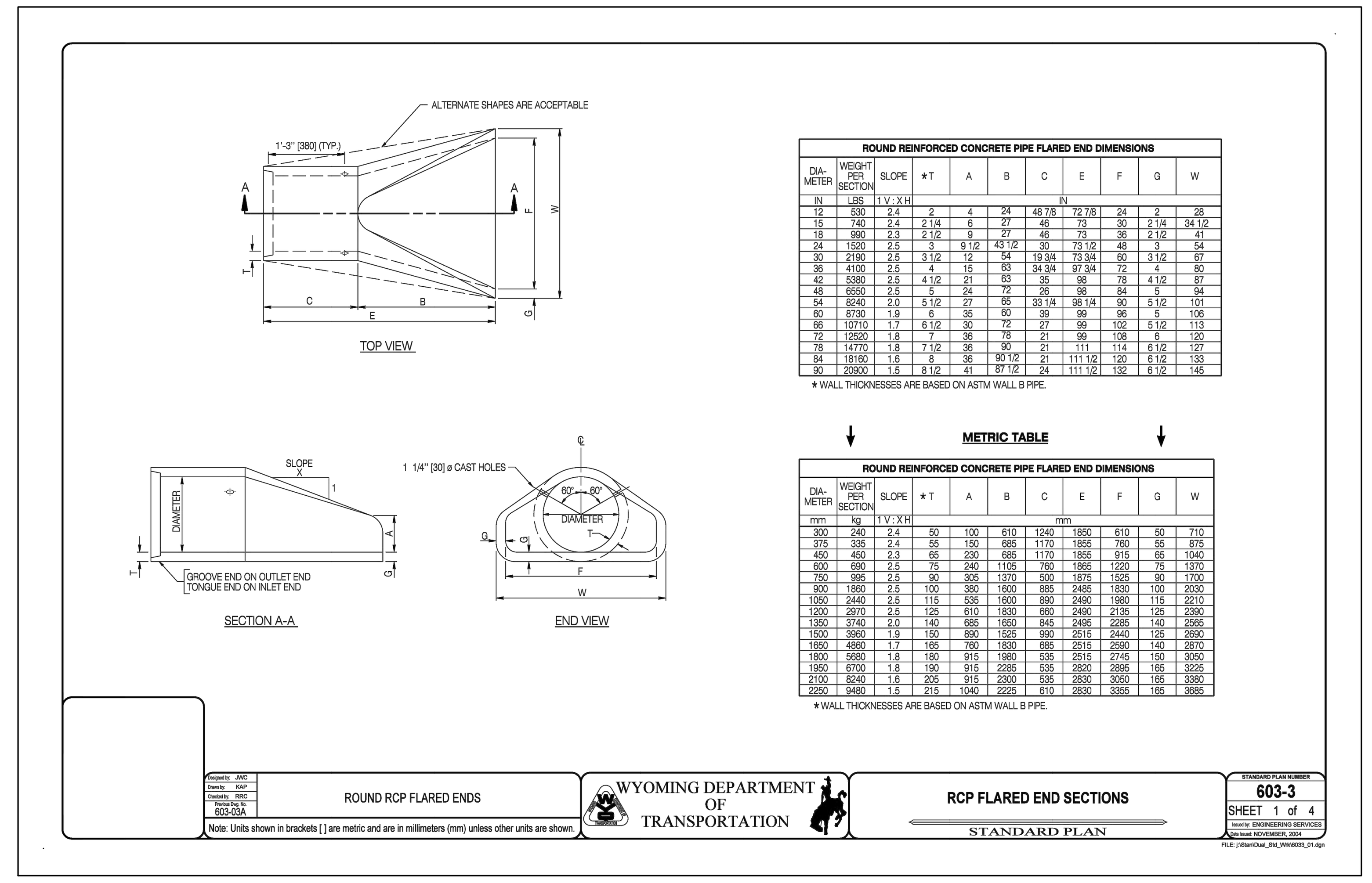
DAR	CA/TCD	TCD	DAR/CA
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.

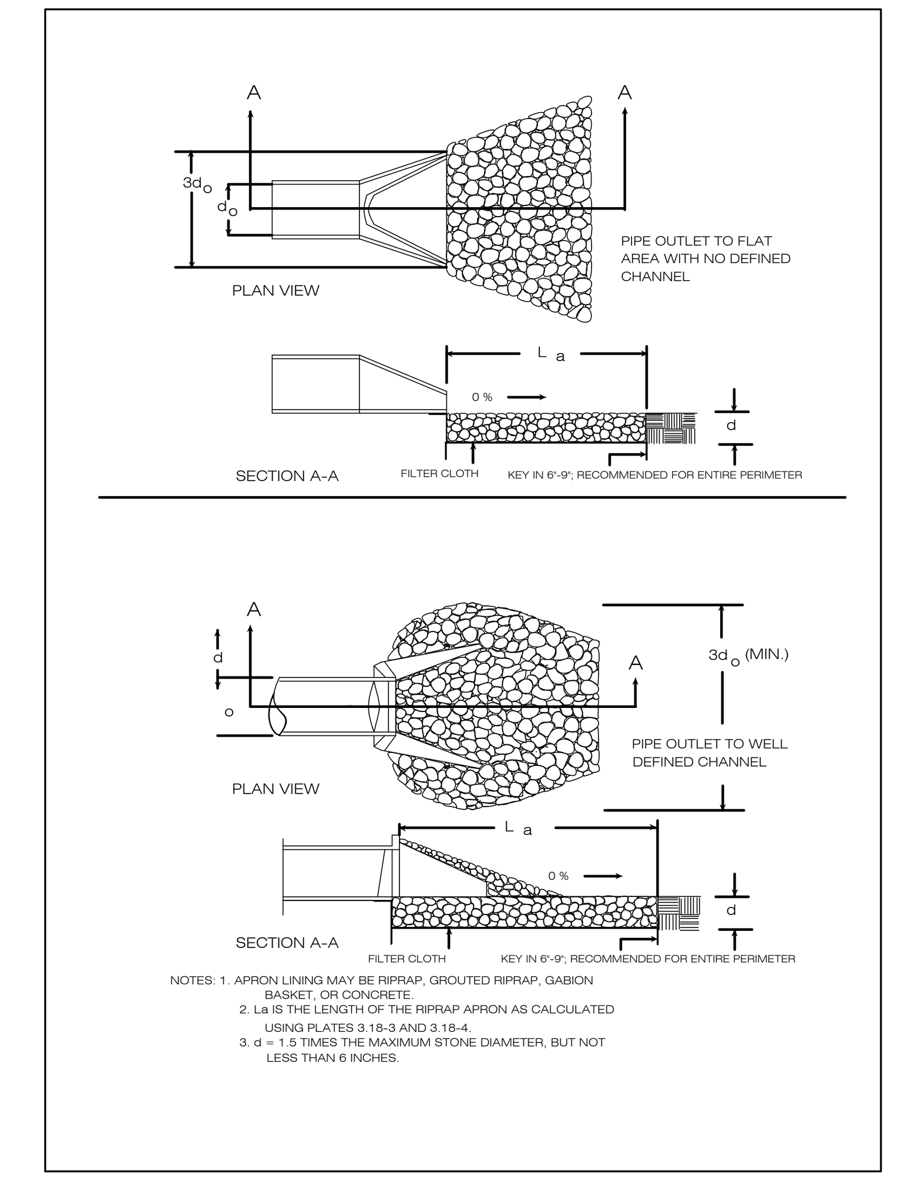
Revision	Sheet
0	SS-4



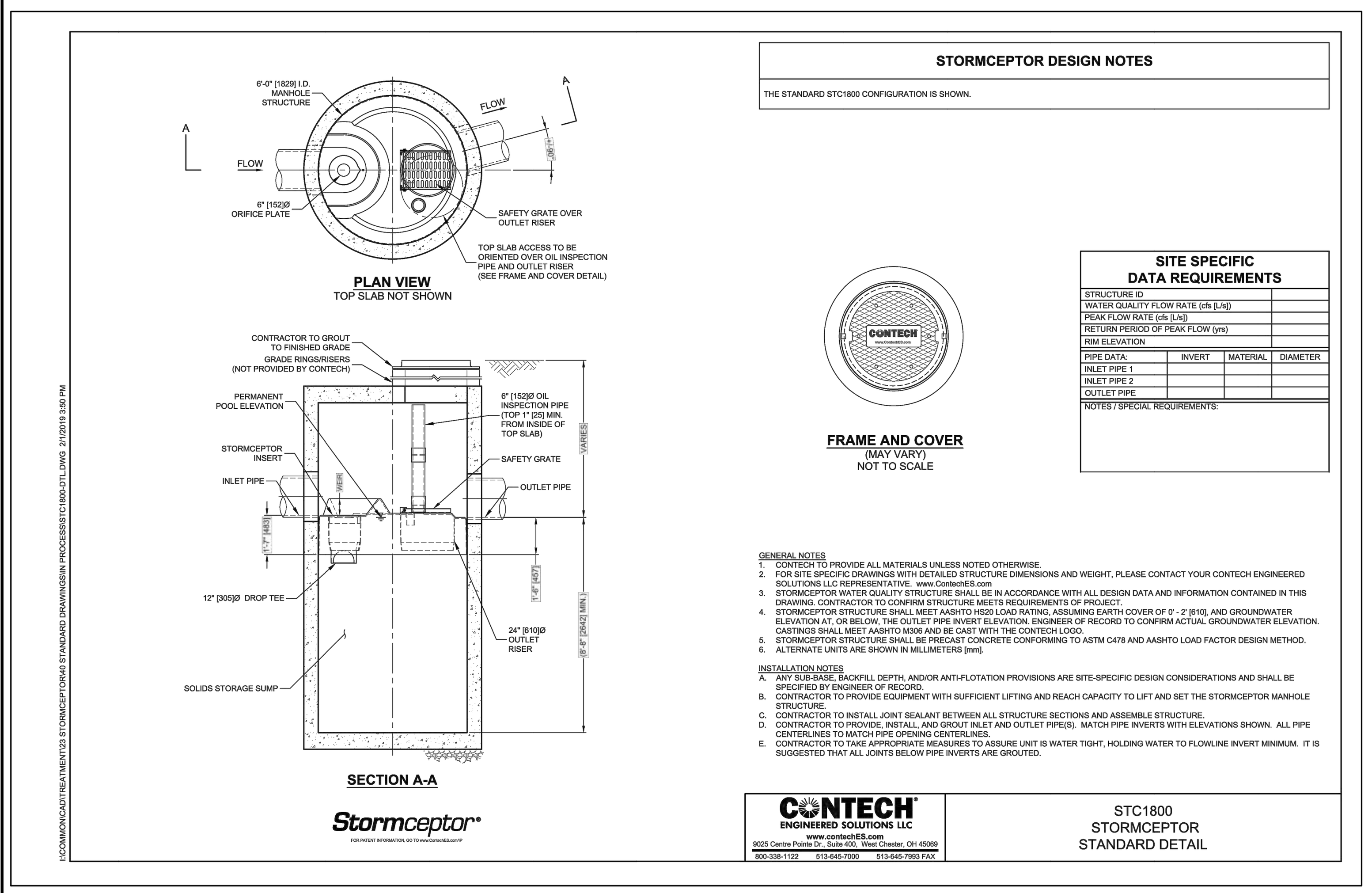
1/9 **DETAIL: TEMPORARY SILT FENCE**
NTS



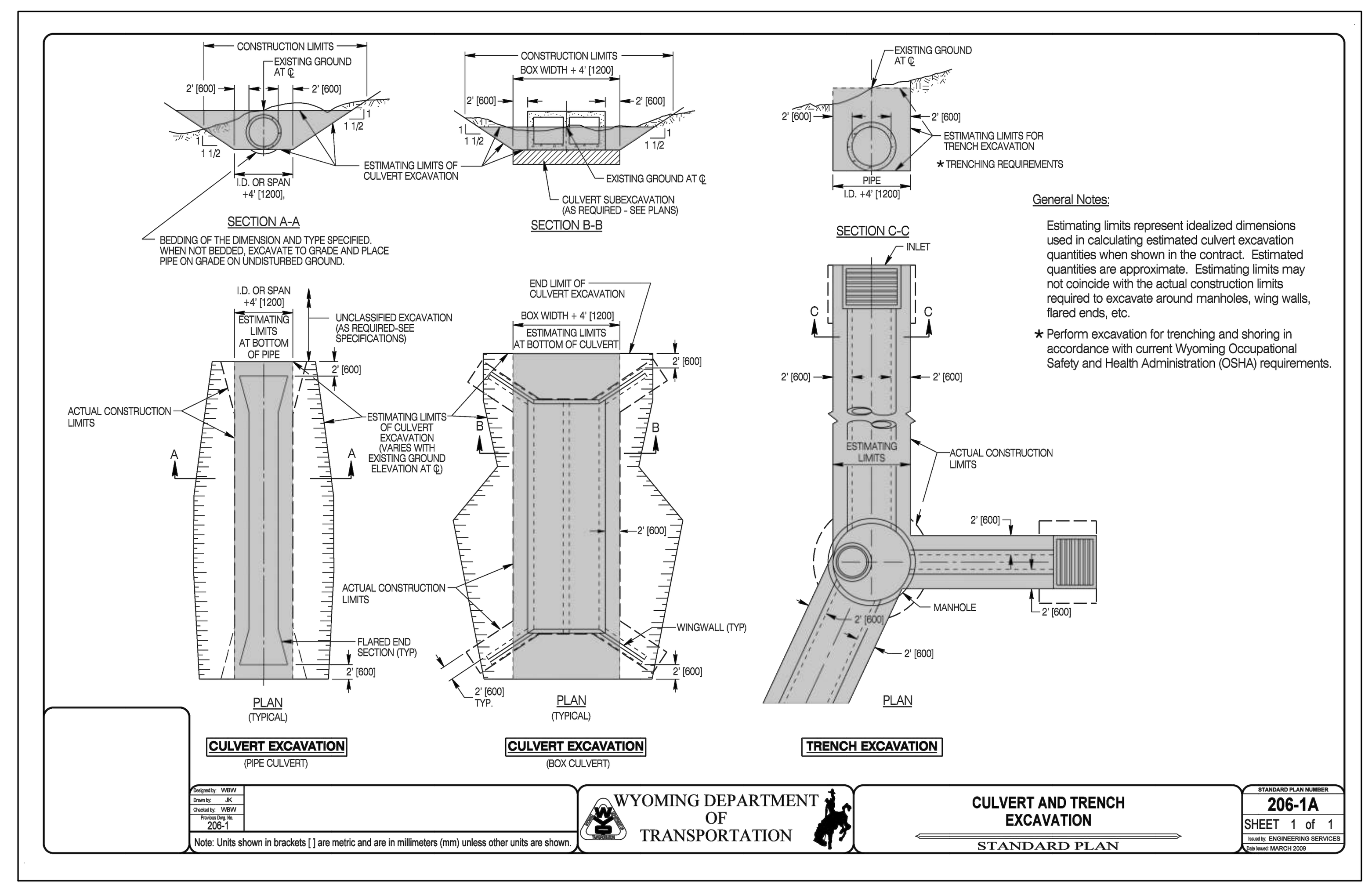
2/9 **DETAIL: FLARED END SECTION**
NTS



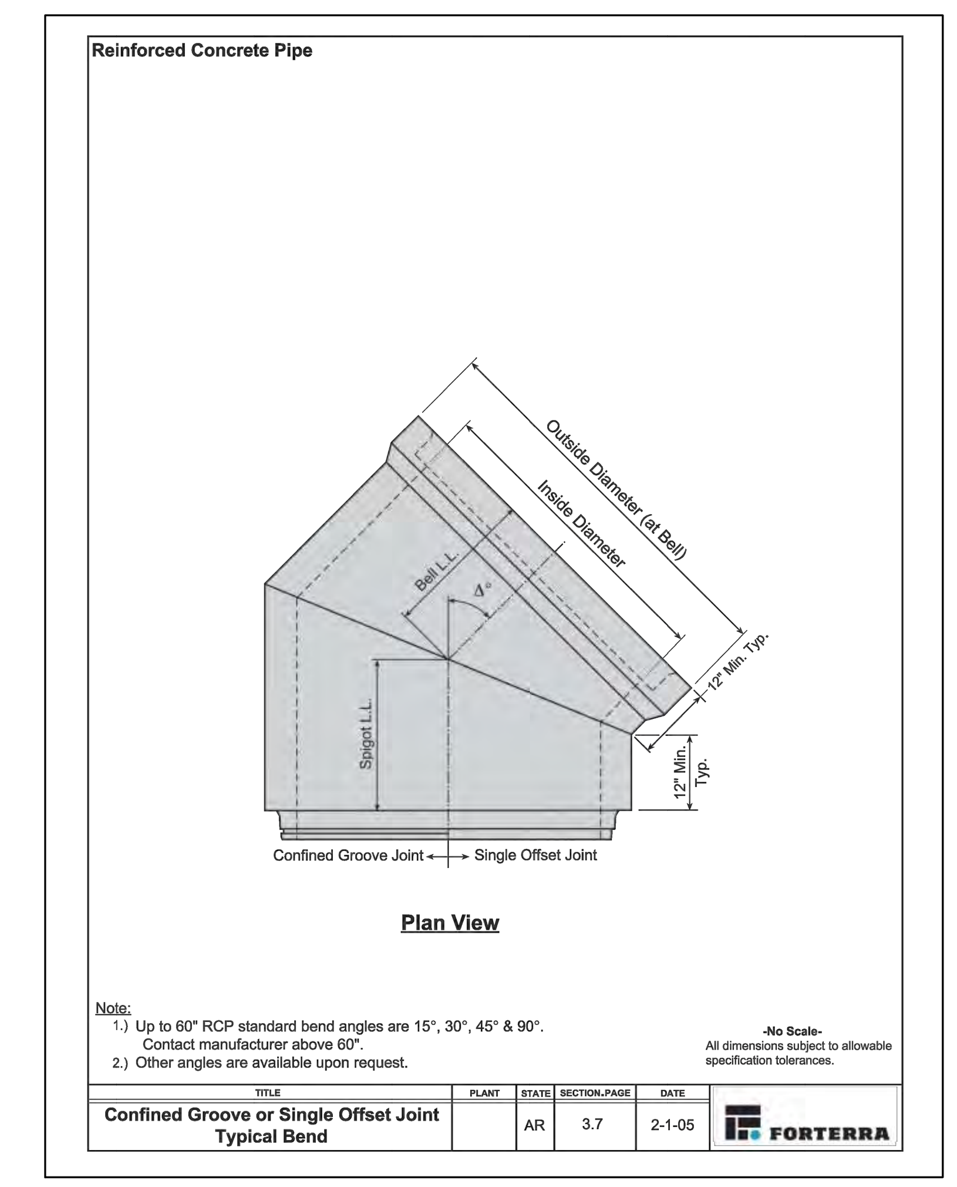
3/9 **DETAIL: PIPE OUTLET PROTECTION**
NTS



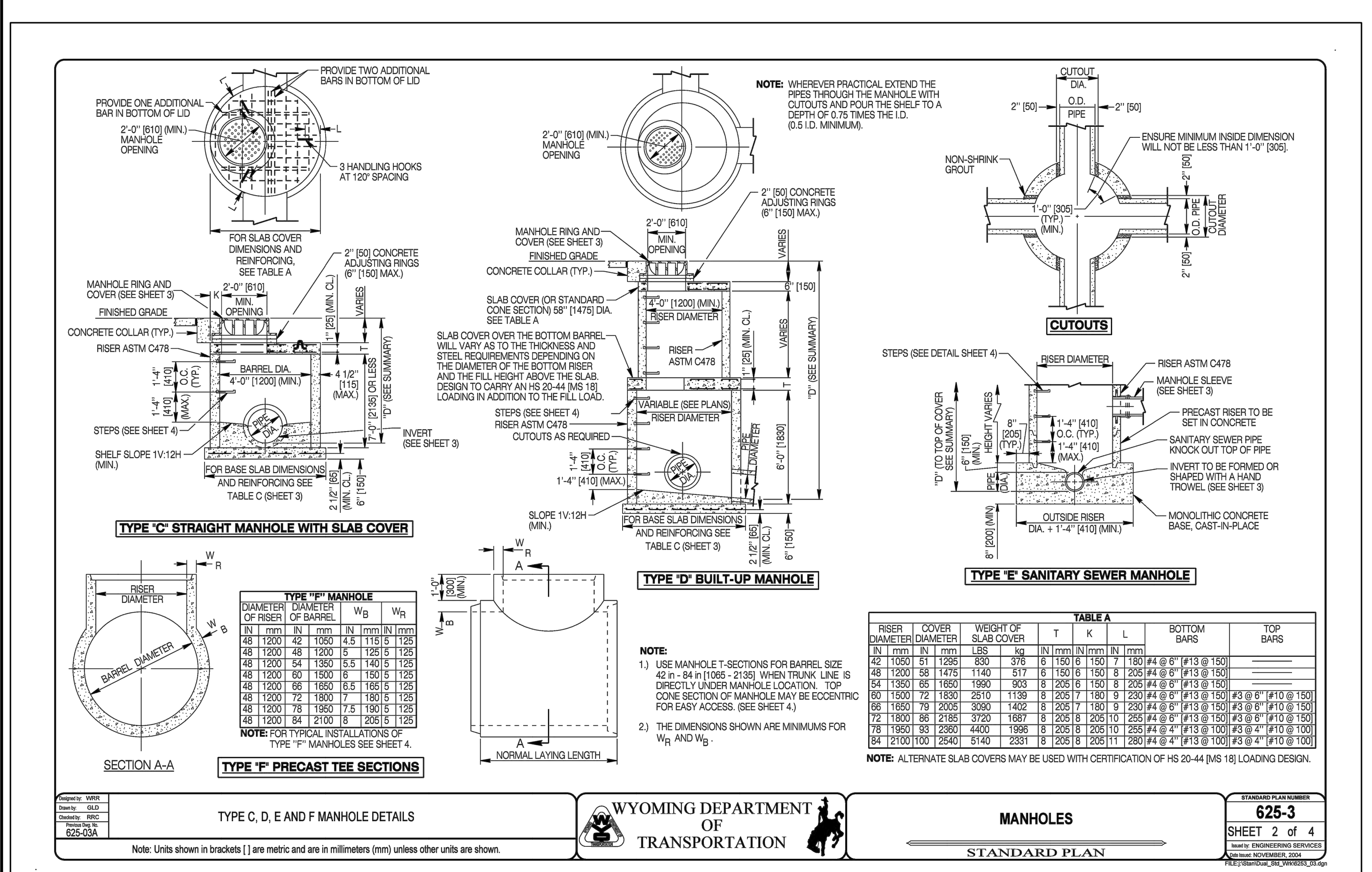
4/9 **DETAIL: STORMCEPTOR (STC1800)**
NTS



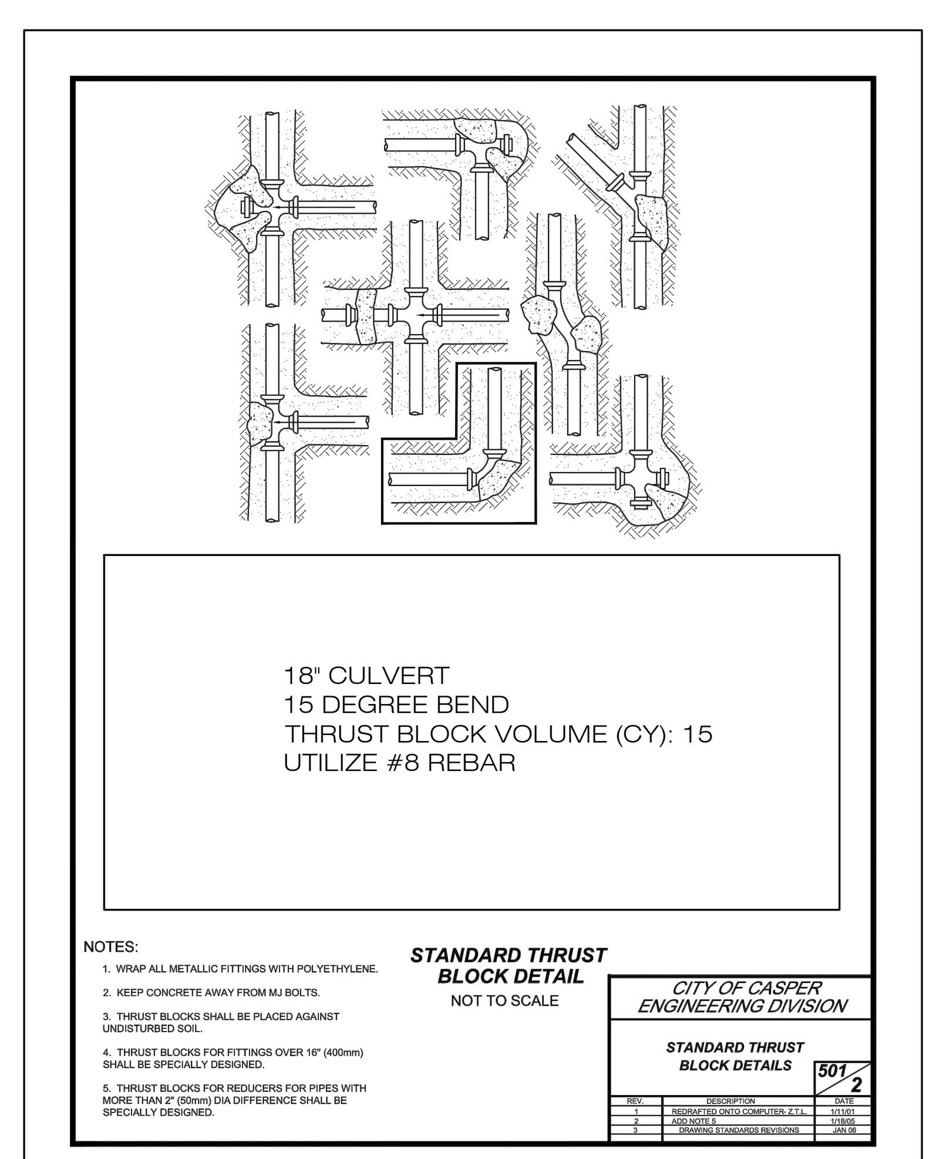
5/9 **DETAIL: TRENCH EXCAVATION**
NTS



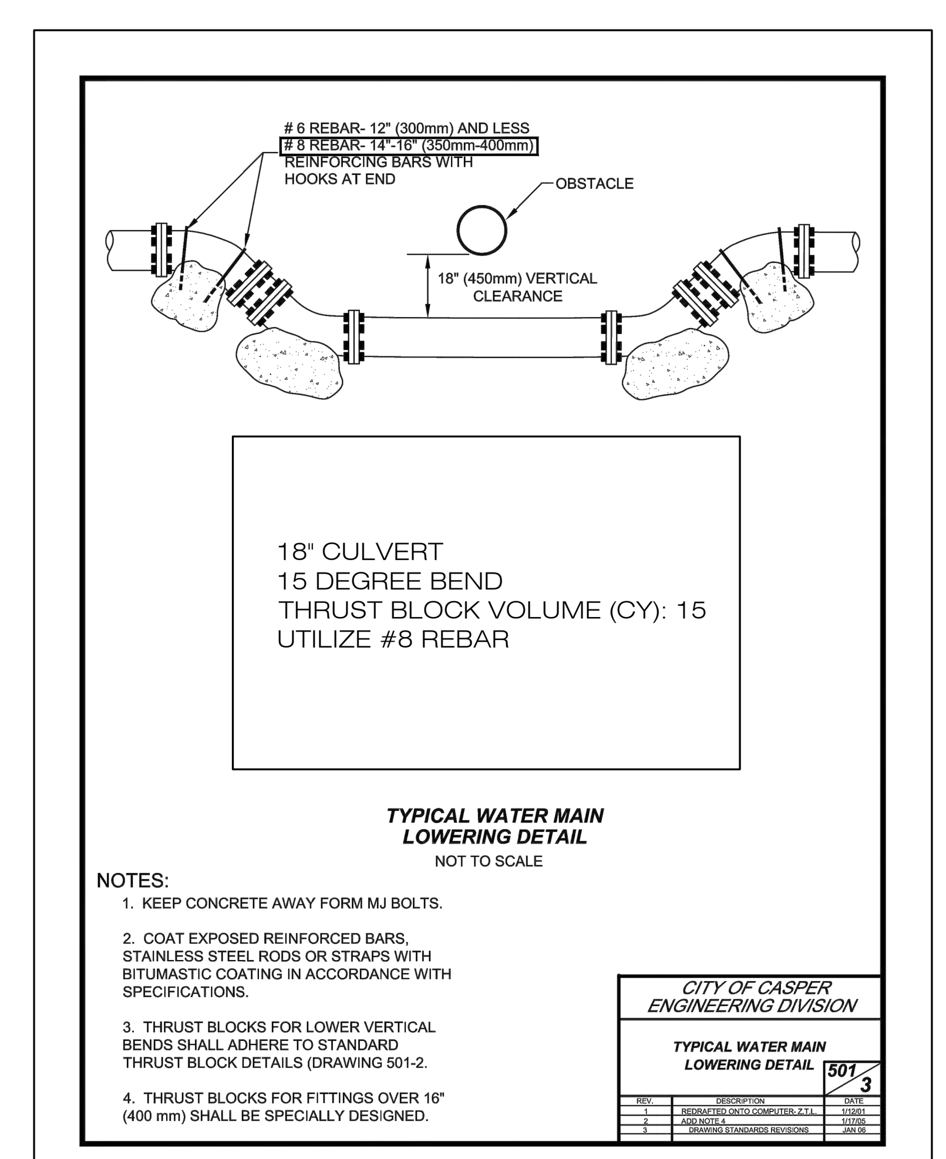
6/9 **DETAIL: PIPE ELBOW BEND**
NTS



7/9 **DETAIL: CONCRETE MANHOLE**
NTS



8/9 **DETAIL: THRUST BLOCKING**
NTS



9/9 **DETAIL: LOWERING THRUST BLOCKING**
NTS

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Issued | By | Appd. | YY.MM.DD

Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
100% PLANS
STORMWATER NOTES AND DETAILS

Permit-Seal

Project Number: 172621110

File Name: 21110_stm_retrofits.dwg

DAR	CA/TCD	DAR/CA	19.5.17
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.

Revision 0 | Sheet SS-5

Appendix B MONITORING YEAR 1 PLAN SET

CITY OF CASPER PROJECT # 12-51

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
WY	203722810	COVER	9

CITY OF CASPER

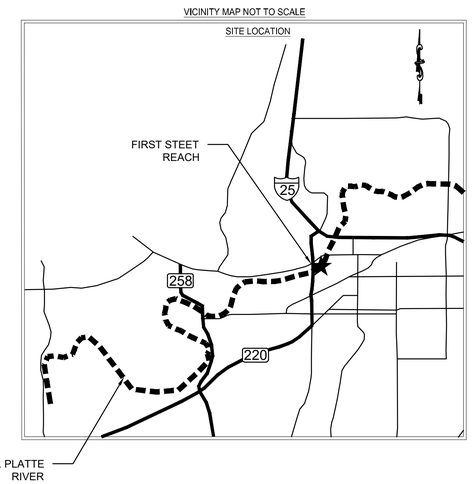
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH SQT MONITORING

FEBRUARY 2021

YEAR 1 MONITORING PLANS

NATRONA COUNTY, WYOMING

VICINITY MAP NOT TO SCALE



SYM	DESCRIPTION
A	

REVISIONS

GRAPHIC SCALES (SCALE IN FEET)

40 0 40 120
ALL PLAN & PROFILE SHEETS

20 0 20 60
ALL CROSS SECTION SHEETS

8 0 8 24
VERTICAL PROFILE - ALL PLAN & PROFILE SHEETS

10 0 10 30
VERTICAL PROFILE - ALL CROSS SECTION SHEETS

PROJECT LENGTH

RESTORATION = 2,548 FT

Prepared by:

Stantec

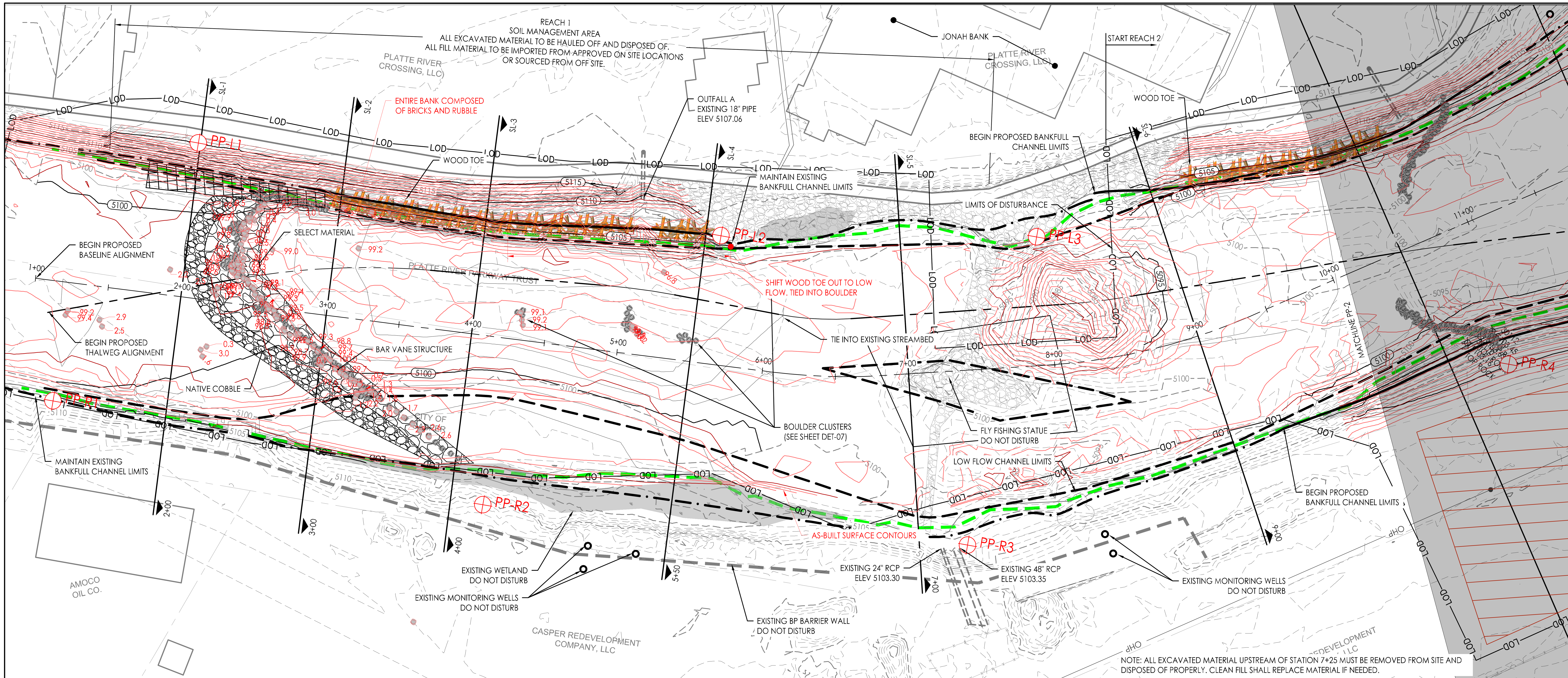
Stantec Consulting Services Inc.
3325 South Timberline Road, Suite 150
Fort Collins, Colorado 80525
www.stantec.com

PATRICK PHILBIN
PROJECT ENGINEER

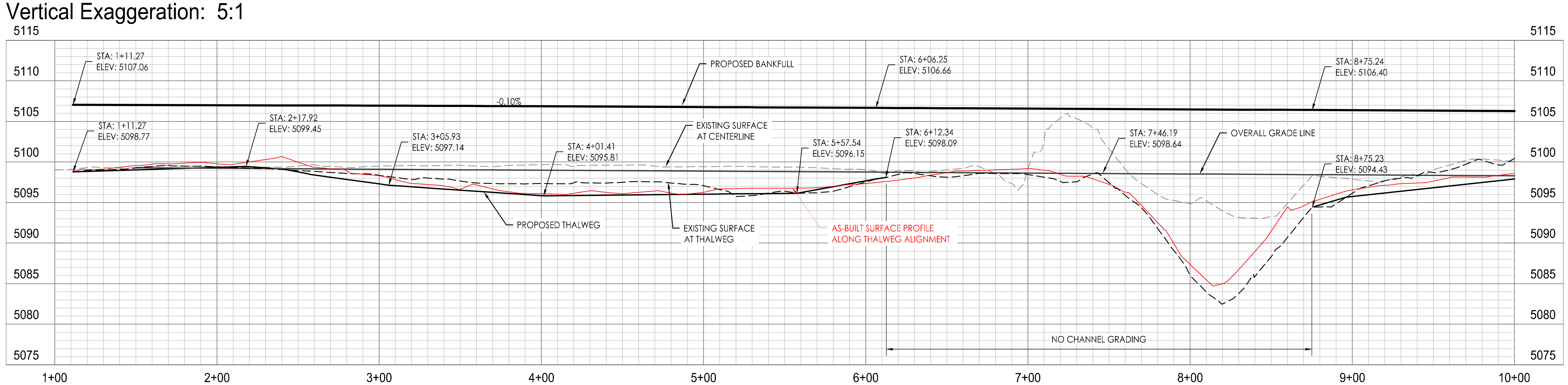
Prepared for:

SEAL OF THE CITY OF CASPER, WYOMING

Scott Baxter
PROJECT MANAGER


REACH 1
SOIL MANAGEMENT AREA
ALL EXCAVATED MATERIAL TO BE HAULED OFF AND DISPOSED OF.
ALL FILL MATERIAL TO BE IMPORTED FROM APPROVED ON SITE LOCATIONS OR SOURCED FROM OFF SITE.
PLATTE RIVER CROSSING, LLC)
ENTIRE BANK COMPOSED OF BRICKS AND RUBBLE
OUTFALL A
EXISTING 18" PIPE
ELEV 5107.06
JONAH BANK
START REACH 2
WOOD TOE
BEGIN PROPOSED BANKFULL CHANNEL LIMITS
MAINTAIN EXISTING BANKFULL CHANNEL LIMITS
LIMITS OF DISTURBANCE
SELECT MATERIAL
BEGIN PROPOSED BASELINE ALIGNMENT
SHIFT WOOD TOE OUT TO LOW FLOW, TIED INTO BOULDER
TIE INTO EXISTING STREAMBED
BEGIN PROPOSED THALWEG ALIGNMENT
BAR VANE STRUCTURE
NATIVE COBBLE
BOULDER CLUSTERS
(SEE SHEET DET-07)
FLY FISHING STATUE
DO NOT DISTURB
LOW FLOW CHANNEL LIMITS
MAINTAIN EXISTING BANKFULL CHANNEL LIMITS
BEGIN PROPOSED BANKFULL CHANNEL LIMITS
MATCHLINE PP-2
AS-BUILT SURFACE CONTOURS
EXISTING WETLAND
DO NOT DISTURB
EXISTING MONITORING WELLS
DO NOT DISTURB
EXISTING 24" RCP
ELEV 5103.30
EXISTING 48" RCP
ELEV 5103.35
EXISTING MONITORING WELLS
DO NOT DISTURB
EXISTING BP BARRIER WALL
DO NOT DISTURB
AMOCO OIL CO.
CASPER REDEVELOPMENT COMPANY, LLC
PP-L1
PP-L2
PP-L3
PP-R1
PP-R2
PP-R3
PP-R4
NOTE: ALL EXCAVATED MATERIAL UPSTREAM OF STATION 7+25 MUST BE REMOVED FROM SITE AND DISPOSED OF PROPERLY. CLEAN FILL SHALL REPLACE MATERIAL IF NEEDED.

Profile View: B-NPFST-CL-OVR4
Alignment: B-NPFST-CL-OVR
Start Sta: 1+00.00
End Sta: 10+00.00
Horizontal Scale: 1" = 20
Vertical Scale: 1" = 4'
Vertical Exaggeration: 5:1


5115
5110
5105
5100
5095
5090
5085
5080
5075
STA: 1+11.27
ELEV: 5107.06
PROPOSED BANKFULL
STA: 6+06.25
ELEV: 5106.66
STA: 8+75.24
ELEV: 5106.40
-0.10%
STA: 1+11.27
ELEV: 5098.77
STA: 2+17.92
ELEV: 5099.45
STA: 3+05.93
ELEV: 5097.14
STA: 4+01.41
ELEV: 5095.81
EXISTING SURFACE AT CENTERLINE
STA: 5+57.54
ELEV: 5096.15
STA: 6+12.34
ELEV: 5098.09
STA: 7+46.19
ELEV: 5098.64
OVERALL GRADE LINE
STA: 8+75.23
ELEV: 5094.43
PROPOSED THALWEG
EXISTING SURFACE AT THALWEG
AS-BUILT SURFACE PROFILE ALONG THALWEG ALIGNMENT
NO CHANNEL GRADING
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
9+00
10+00

0 20' 40' 80'
1"=40'

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Issued | By | Appd. | YY.MM.DD

Permit-Seal

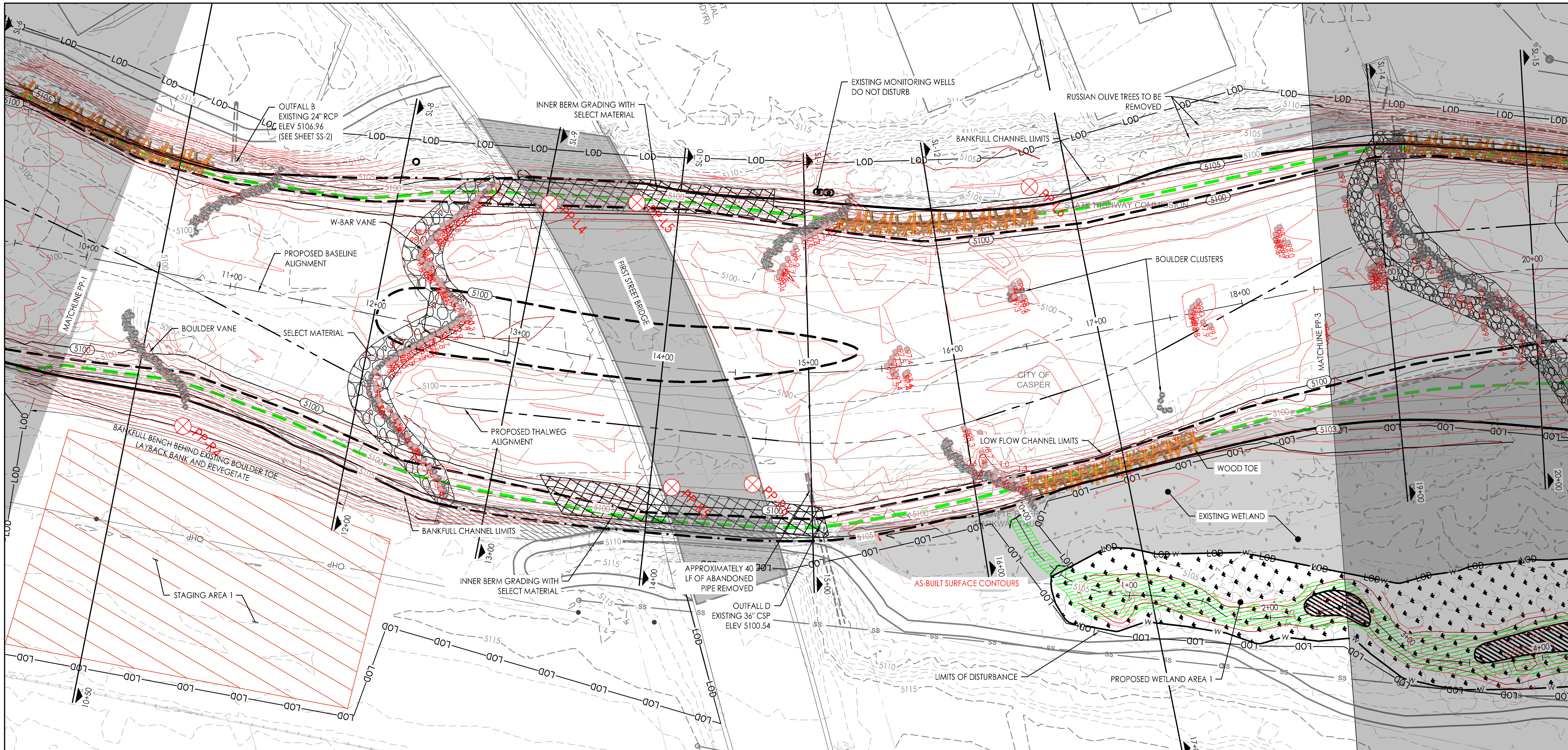
Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601
NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH SQT MONITORING
CASPER, WYOMING

Title
YEAR 1 MONITORING
PLAN AND PROFILE

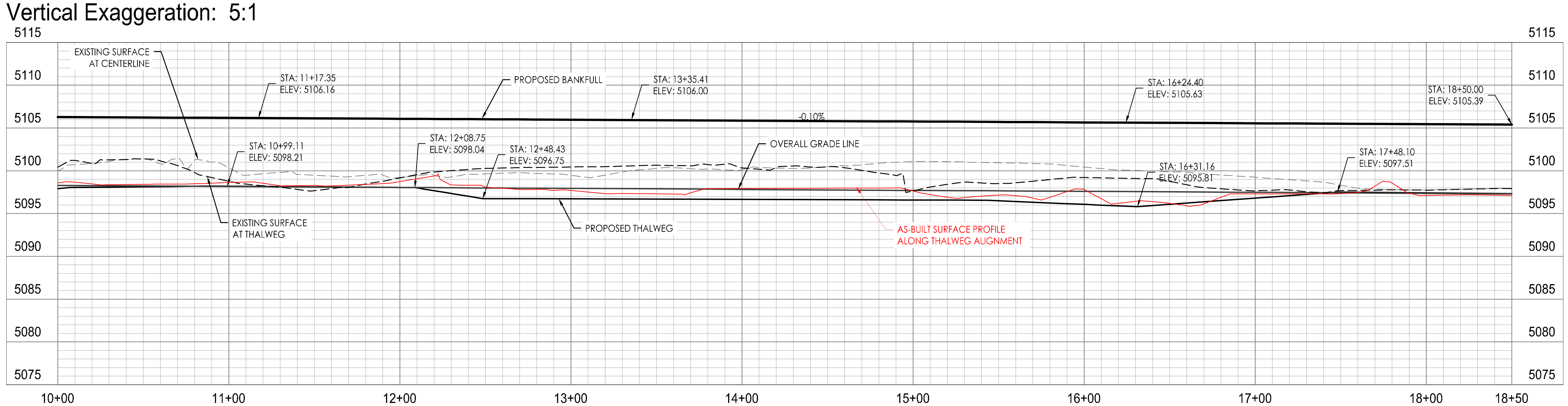
Project Number: 172621110
File Name: monitoring_yr-1.dwg

PTP	JGA	TCD	21.2.25
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.
Revision 0
Sheet 1



End Sta: 18+50.00
Horizontal Scale: 1" = 20
Vertical Scale: 1" = 4'
Vertical Exaggeration: 5:1



1"=40' 0 20' 40' 80'

Stantec

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Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD

Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH SQT MONITORING

CASPER, WYOMING

Title
YEAR 1 MONITORING
PLAN AND PROFILE

Permit-Seal

Project Number: 172621110

File Name: monitoring_yr-1.dwg

PTP	JGA	TCD	21.2.25
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.

Revision	Sheet
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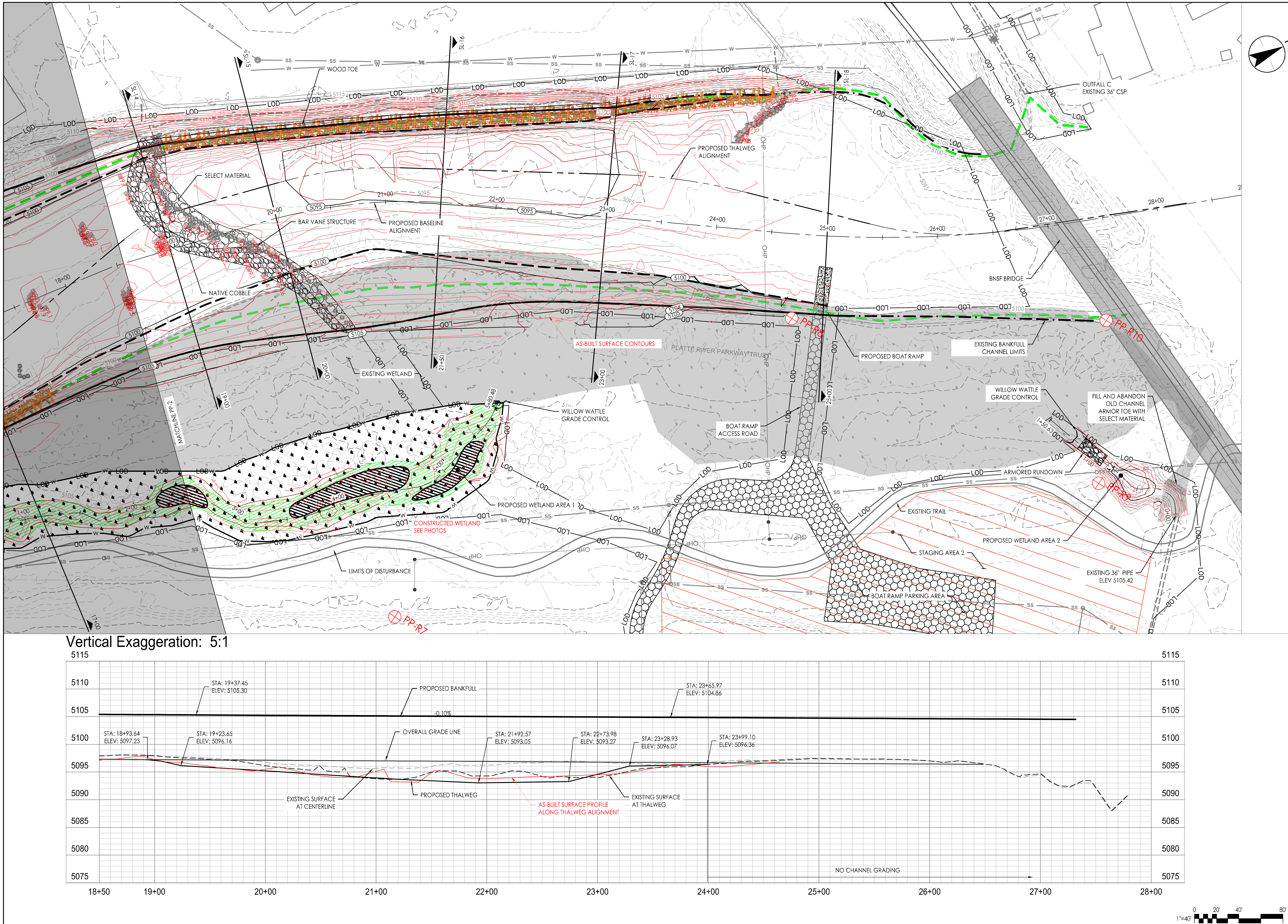

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PTP	JGA	TCD	21.2.25
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.

Revision 0

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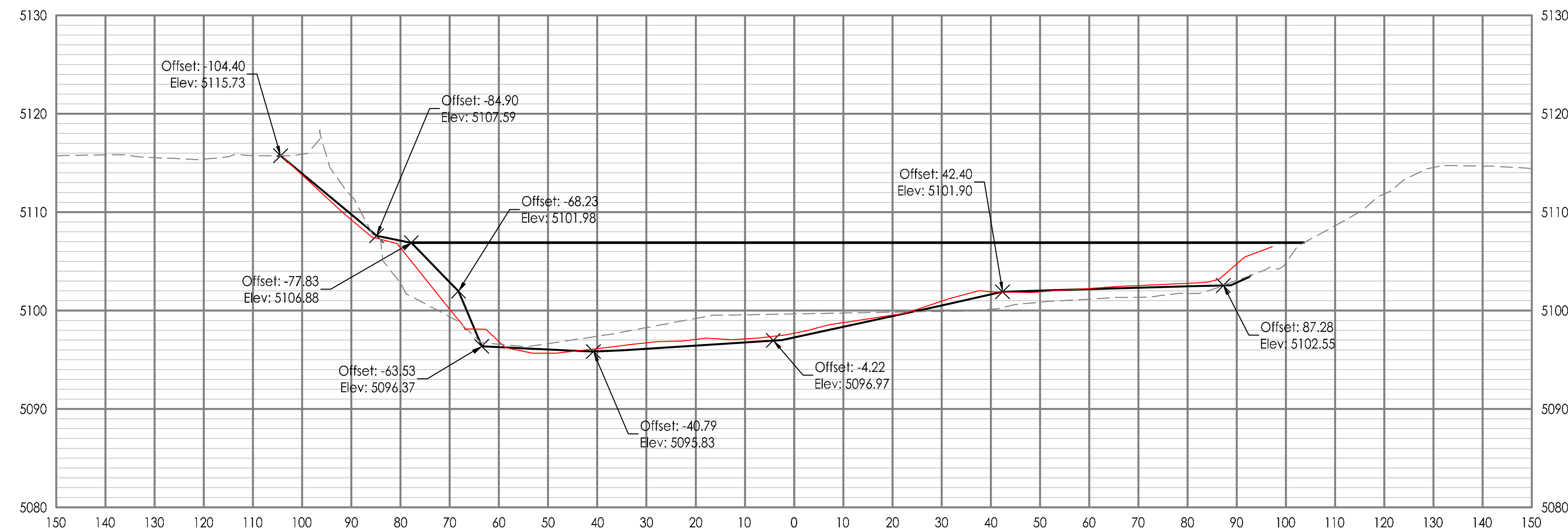

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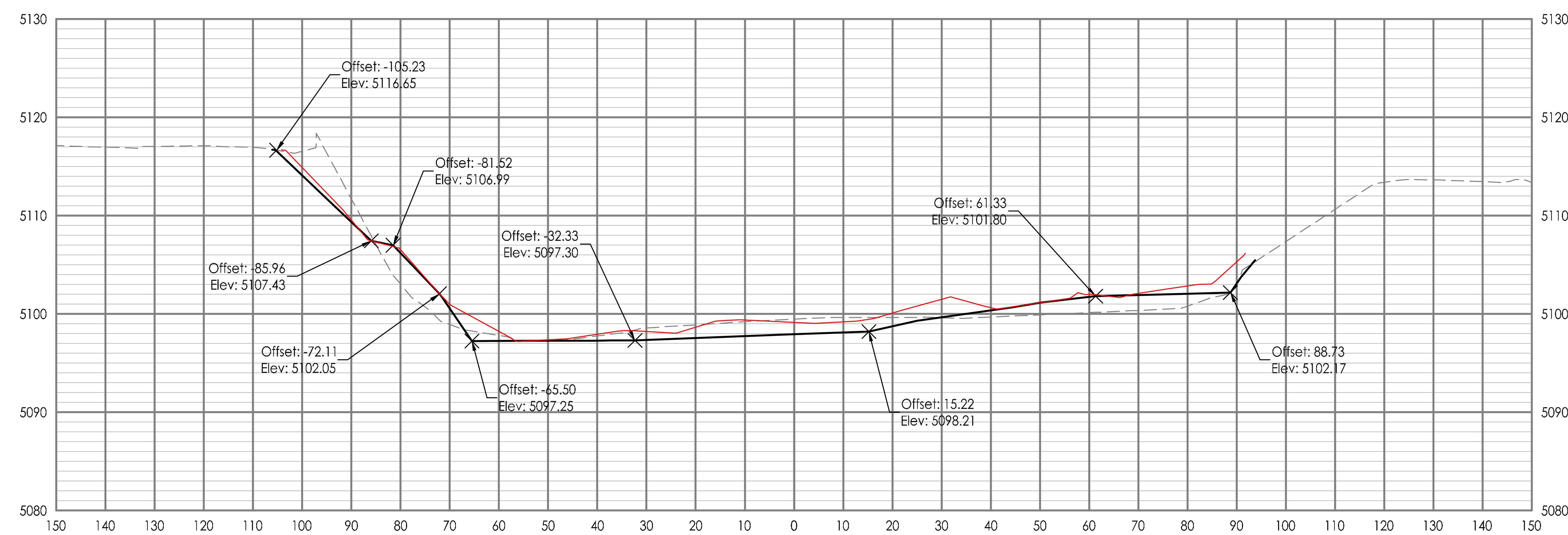

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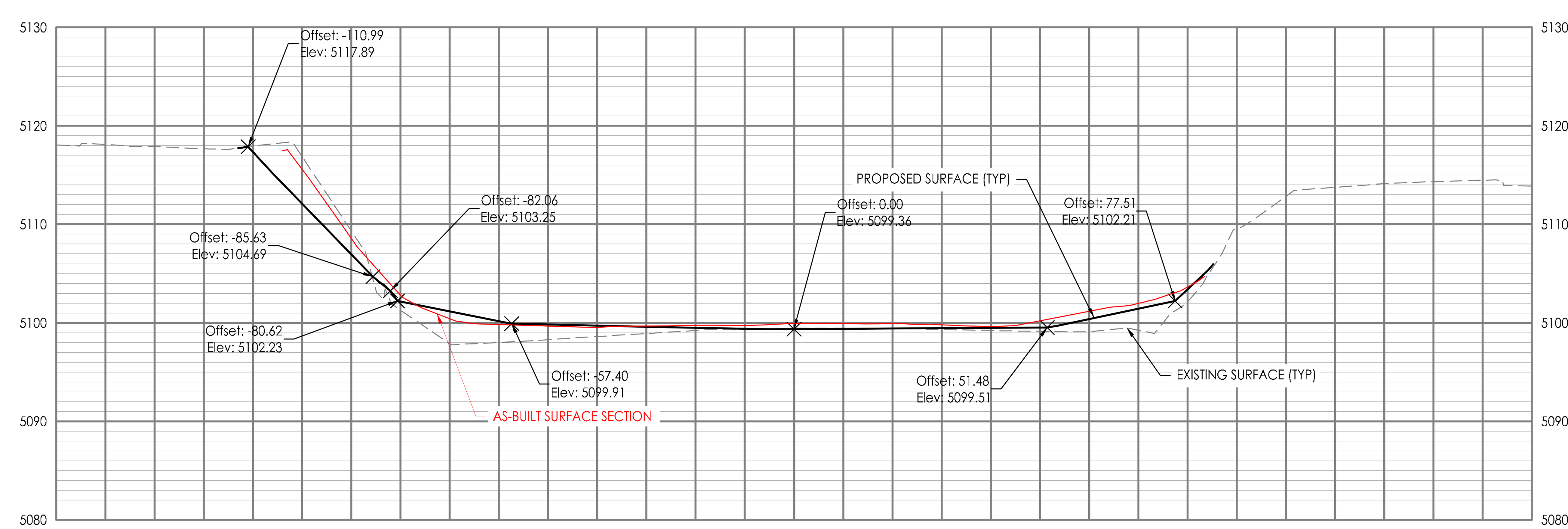

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VERTICAL SCALE
0 5' 10' 20'
1"=10'

HORIZONTAL SCALE
0 10' 20' 40'
1"=20'

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CROSS SECTIONS

Project Number: 172621110

File Name: monitoring_yr-1.dwg

PTP	JGA	TCD	21.2.25
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. XS-1

Revision	Sheet
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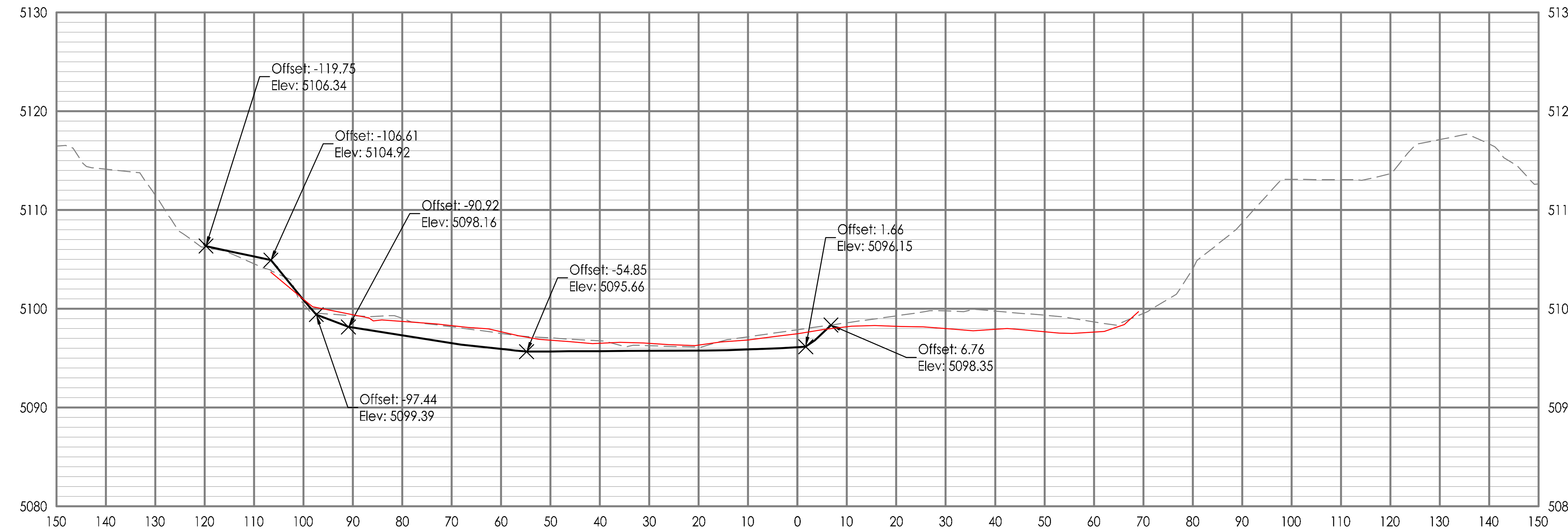

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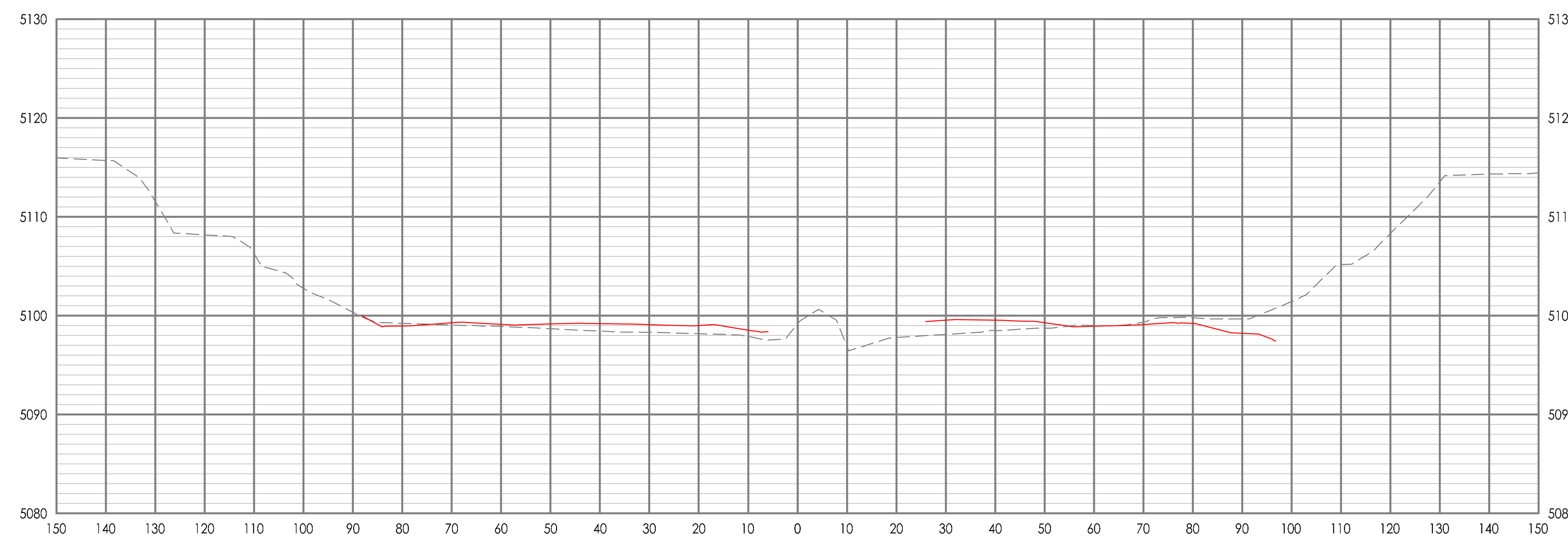

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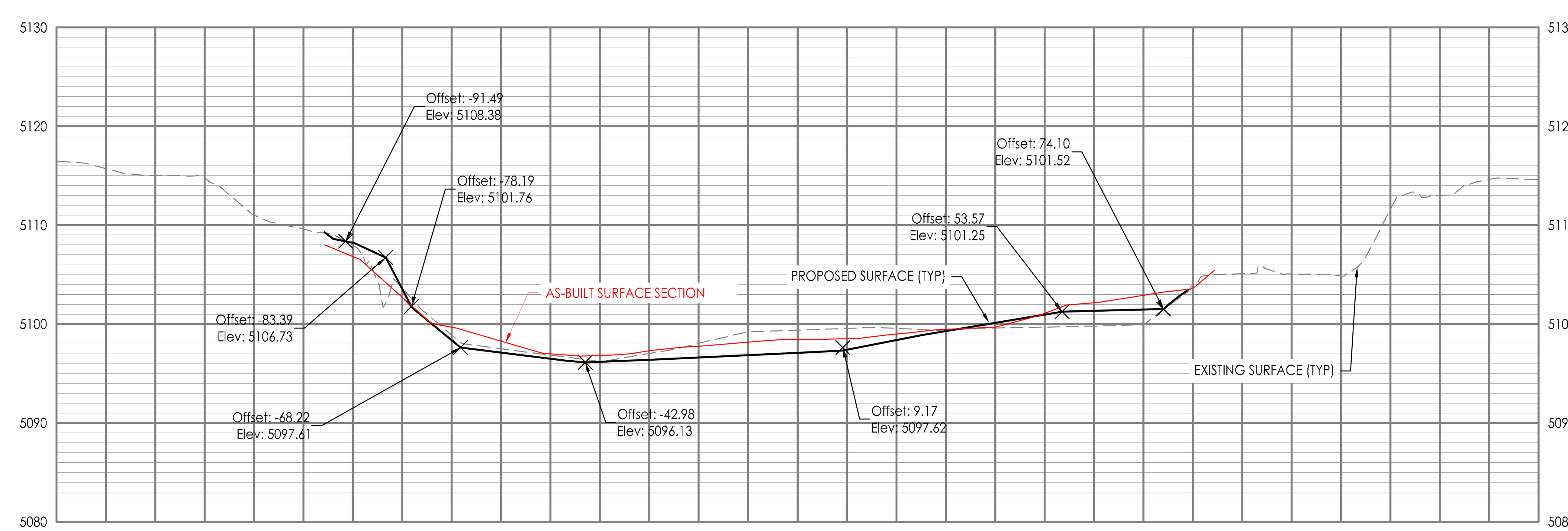

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0 5' 10' 20'
1"=10'

HORIZONTAL SCALE
0 10' 20' 40'
1"=20'

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CROSS SECTIONS

Permit-Seal

Project Number: 172621110

File Name: monitoring_yr-1.dwg

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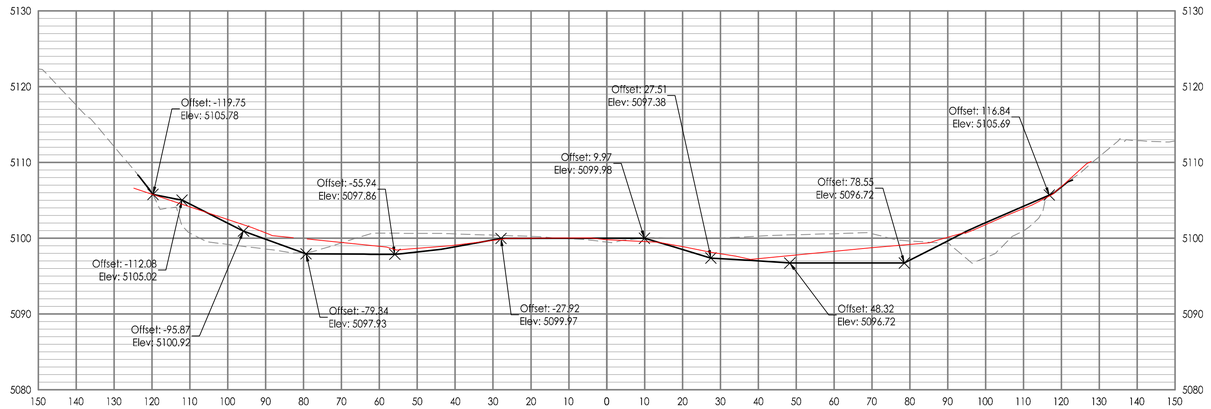
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. XS-2

Revision 0
Sheet 5



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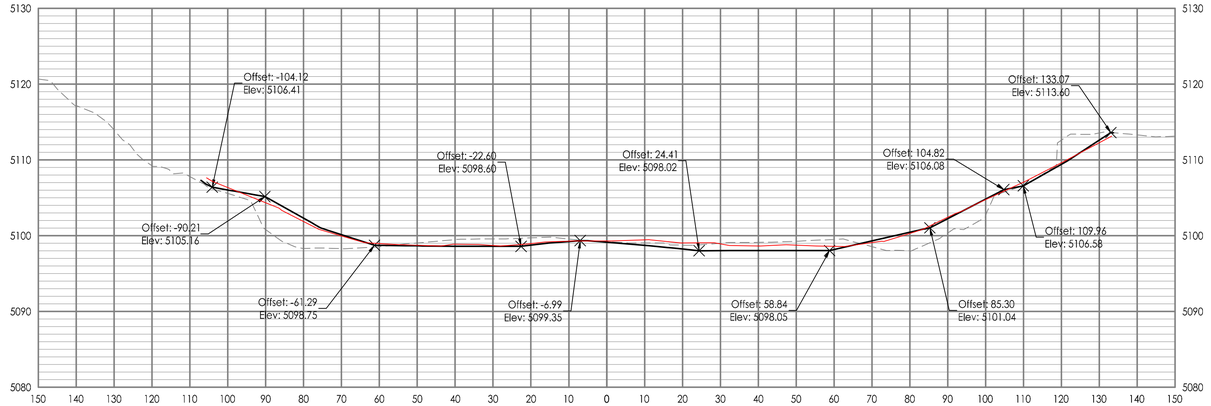

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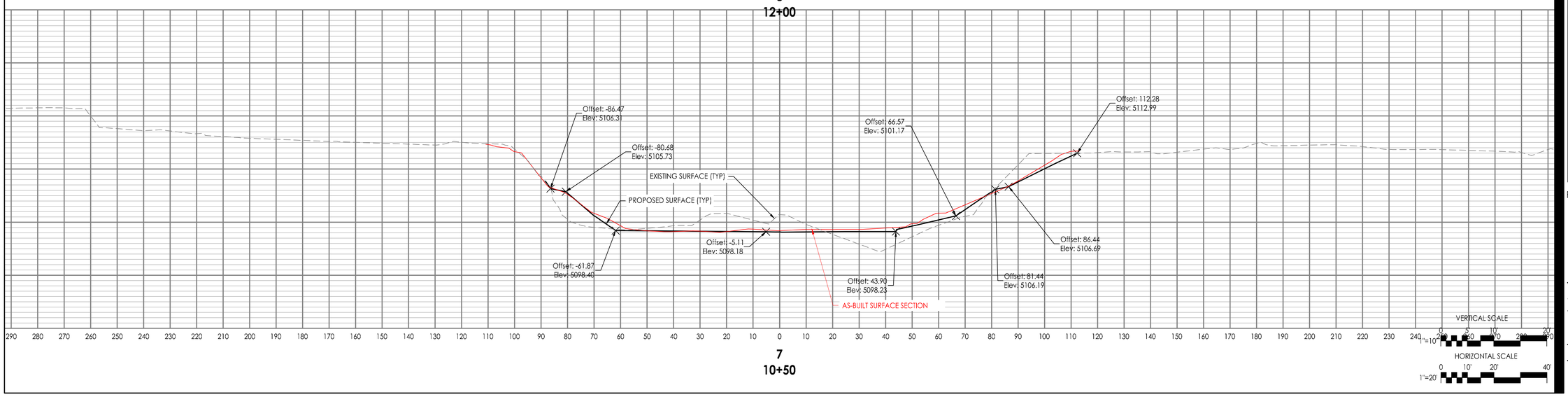

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CASPER, WYOMING

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Title
YEAR 1 MONITORING
CROSS SECTIONS

Project Number: 172621110

File Name: monitoring_yr-1.dwg

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Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. XS-3

Revision	Sheet
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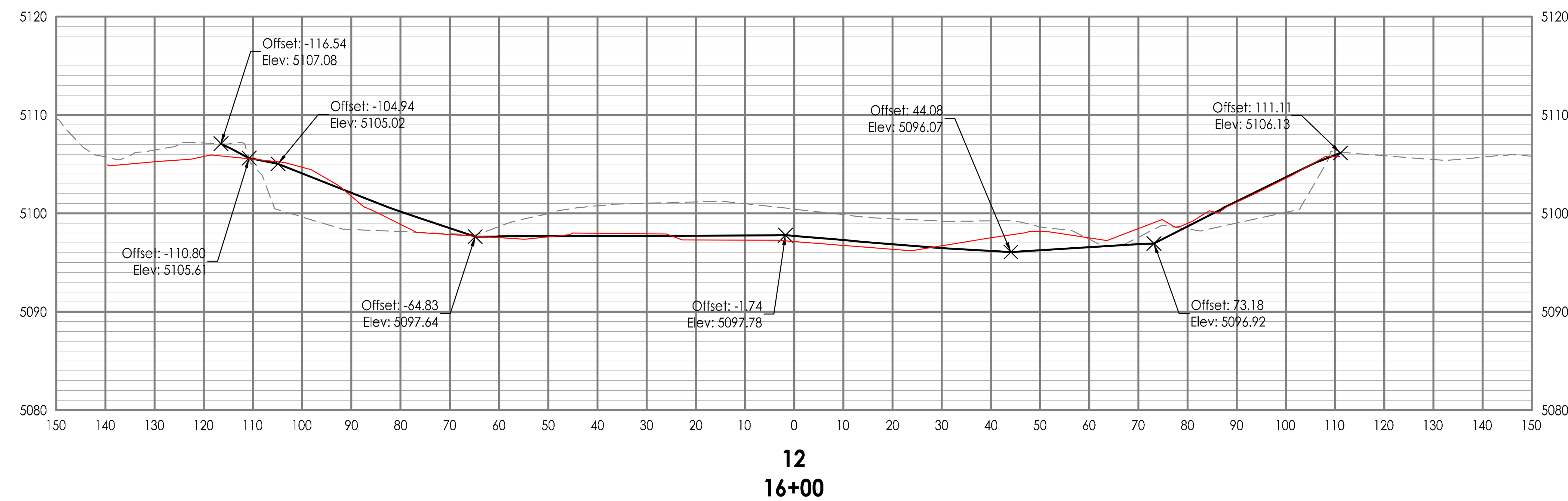

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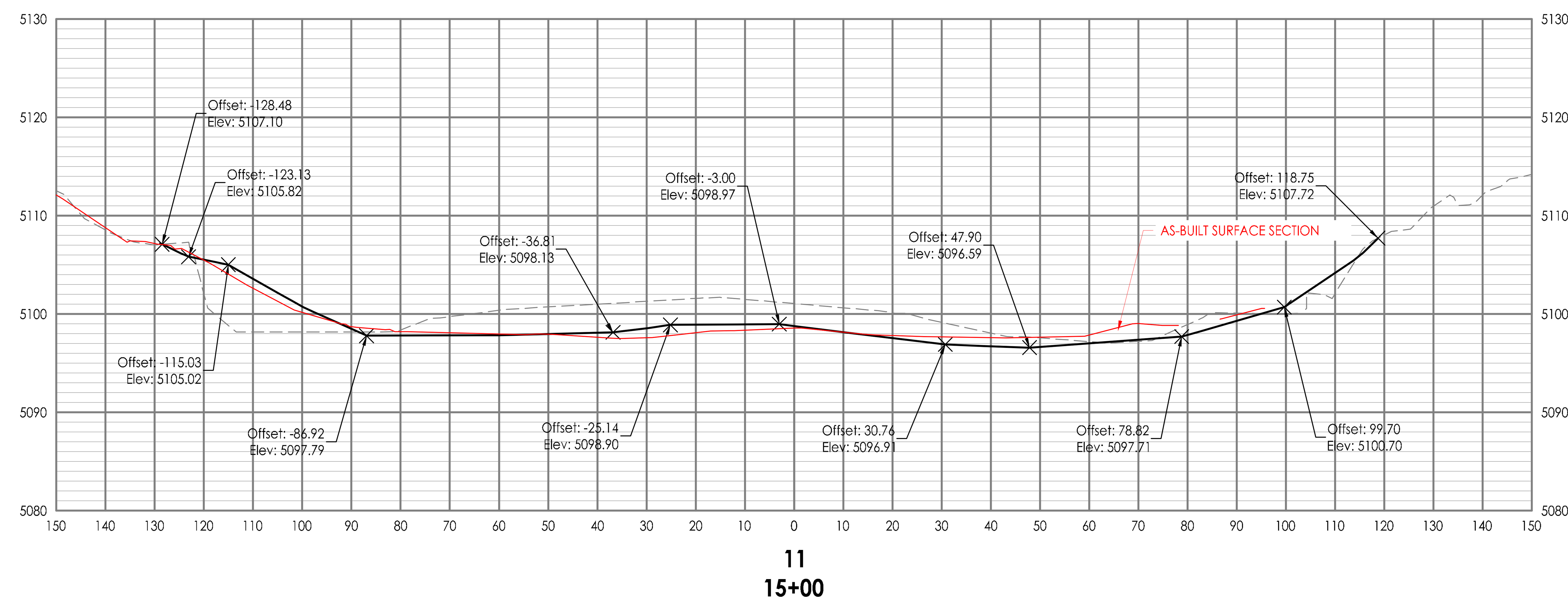

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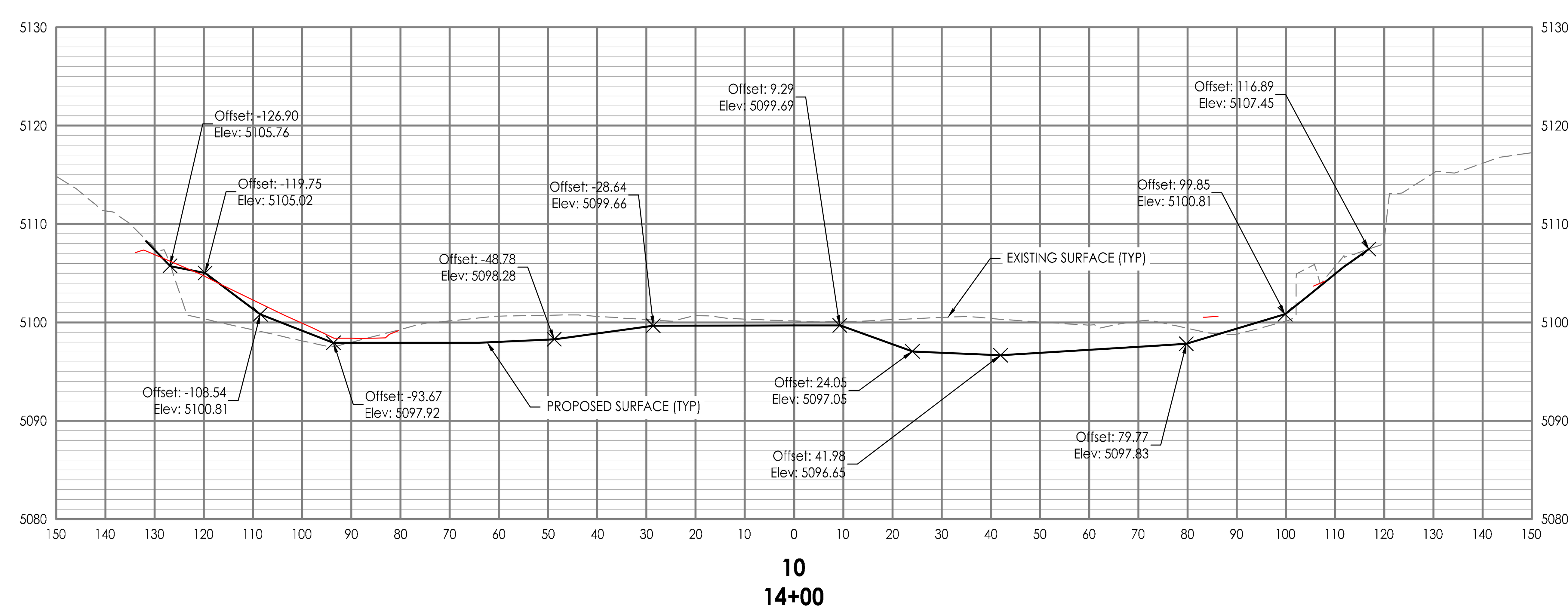

10
14+00

VERTICAL SCALE
0 5' 10' 20'
1"=10'

HORIZONTAL SCALE
0 10' 20' 40'
1"=20'

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FIRST STREET REACH SQT MONITORING
CASPER, WYOMING

Title
YEAR 1 MONITORING
CROSS SECTIONS

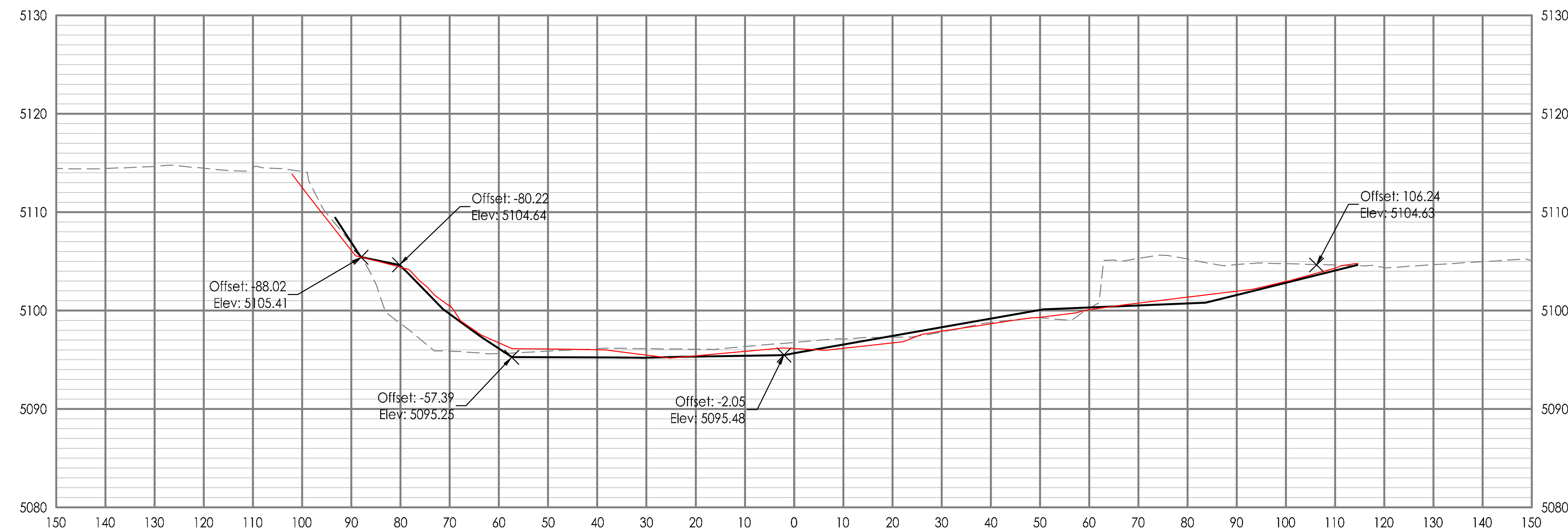
Project Number: 172621110

File Name: monitoring_yr-1.dwg

PTP	JGA	TCD	21.2.25
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. XS-4

Revision 0 Sheet 7



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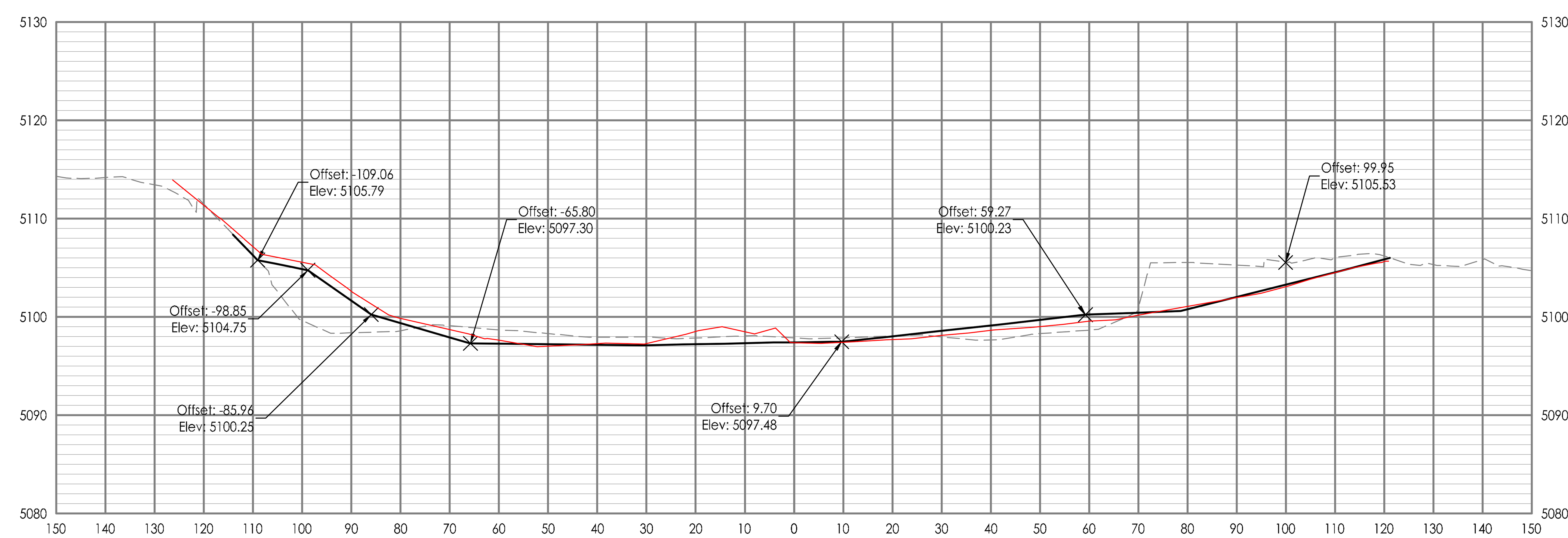

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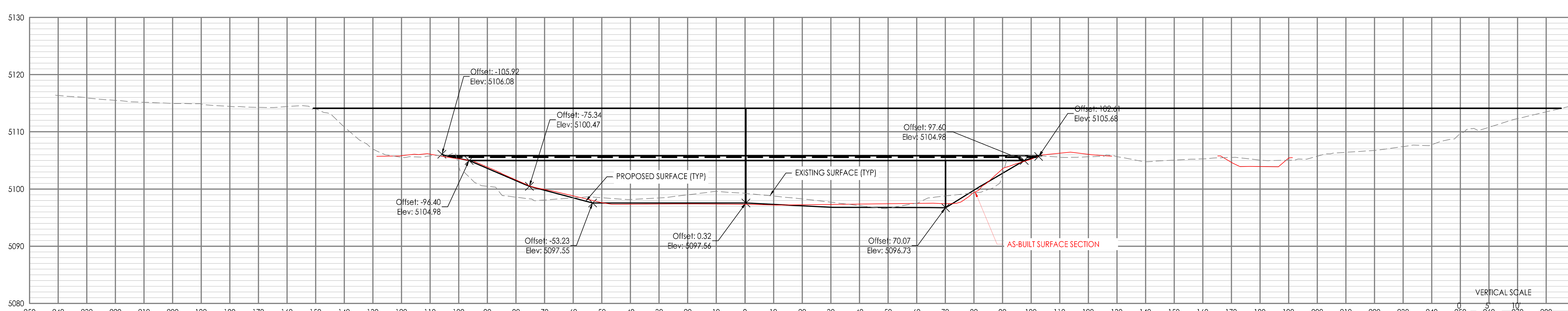

13
17+00

VERTICAL SCALE 1"=10'
HORIZONTAL SCALE 1"=20'

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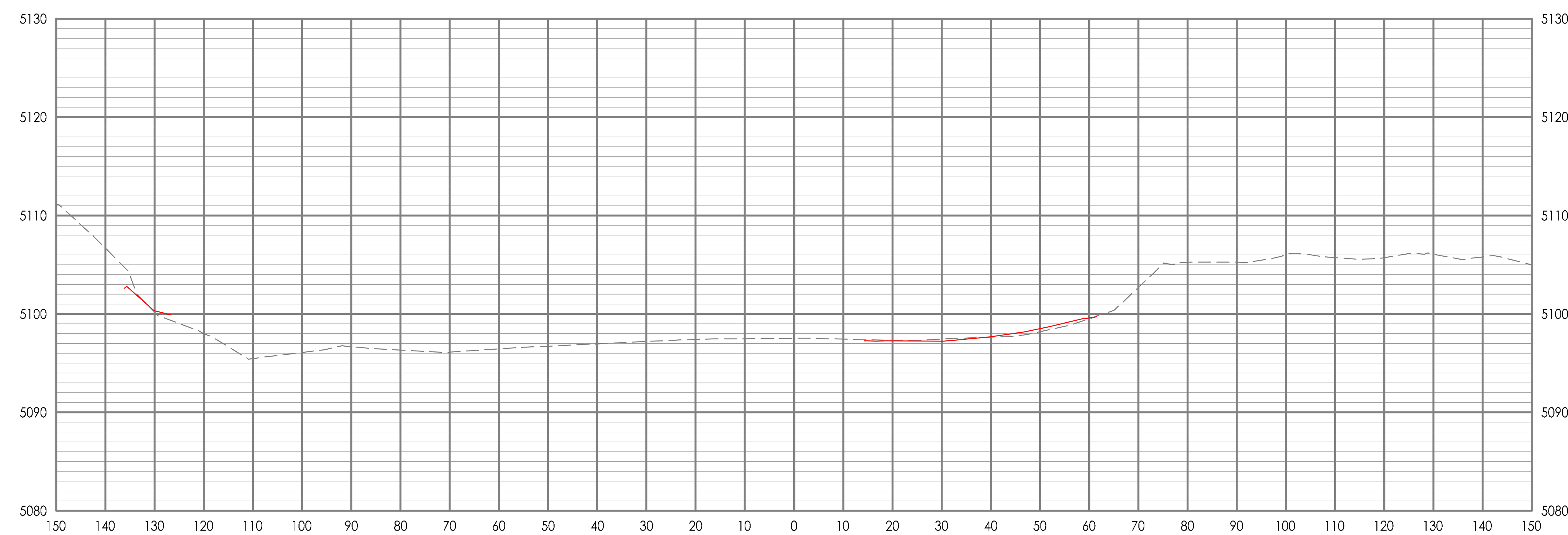
Title
YEAR 1 MONITORING
CROSS SECTIONS

Permit-Seal

Project Number: 172621110
File Name: monitoring_yr-1.dwg

PTP	JGA	TCD	21.2.25
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. XS-5
Revision 0
Sheet 8



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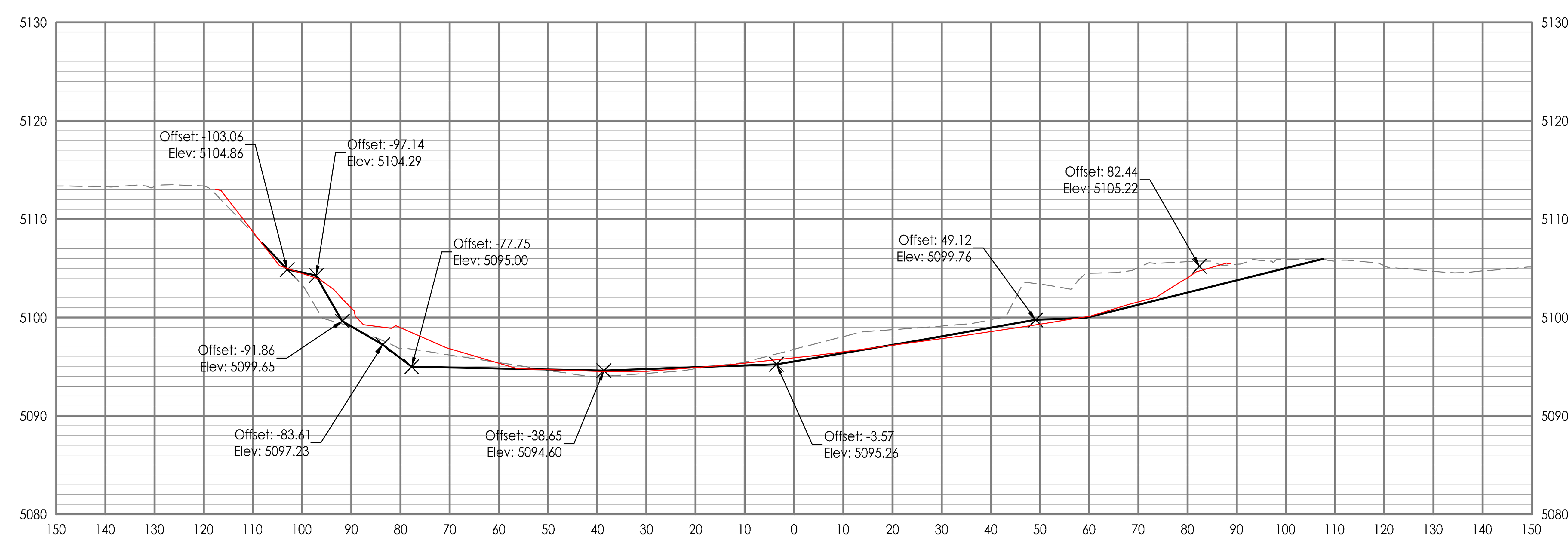

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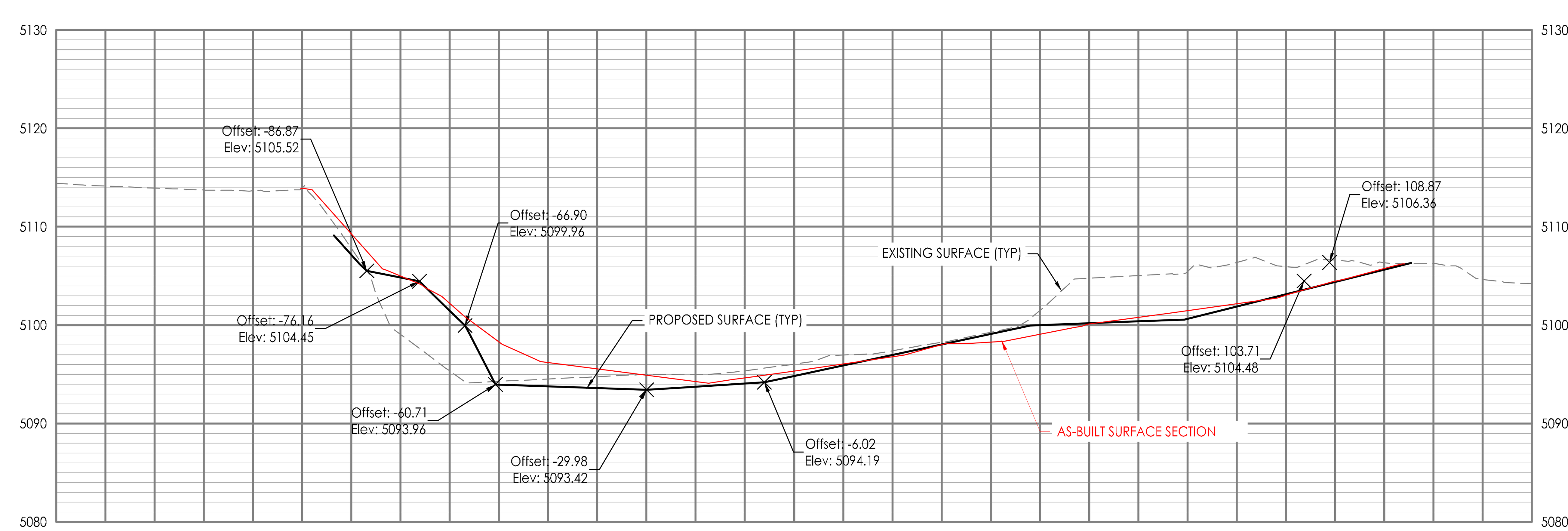

16
21+50

VERTICAL SCALE
0 5' 10' 20'
1"=10'

HORIZONTAL SCALE
0 10' 20' 40'
1"=20'

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Client/Project
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200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH SQT MONITORING

CASPER, WYOMING

Title
YEAR 1 MONITORING
CROSS SECTIONS

Project Number: 172621110

File Name: monitoring_yr-1.dwg

PTP	JGA	TCD	21.2.25
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. XS-6

Revision	Sheet
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Appendix C INTIAL ASSESSMENT WSQT SCORE SHEET

Site Information and Reference Selection	
Project Name:	NPR Restoration Project
Reach ID:	First Street Reach
Restoration Potential:	Partial
Existing Stream Type:	C
Reference Stream Type:	C
Ecoregion:	Plains
Bioregion:	NE Plains
Drainage Area (sq.mi.):	
Proposed Bed Material:	Gravel
Project Reach Stream Length - Existing (ft):	2500
Project Reach Stream Length - Proposed (ft):	2500
Stream Slope (%):	0.001
River Basin:	Platte River
Stream Temperature:	Tier I (Cold)
Reference Vegetation Cover:	Scrub-Shrub
Stream Productivity Rating:	Blue Ribbon and non-trout
Valley Type:	Unconfined Alluvial

Notes
1. Users input values that are highlighted based on restoration potentia
2. Users select values from a pull-down menu
3. Leave values blank for field values that were not measured

FUNCTIONAL CHANGE SUMMARY	
Existing Condition Score (ECS)	0.14
Proposed Condition Score (PCS)	0.40
Change in Functional Condition (PCS - ECS)	0.26
Existing Stream Length (ft)	2500
Proposed Stream Length (ft)	2500
Change in Stream Length (ft)	0
Existing Functional Feet (FF)	350
Proposed Functional Feet (FF)	1000
Proposed FF - Existing FF	650
Percent Change in FF (%)	186%

MITIGATION SUMMARY		
650	(FF)	Lift

WARNING: Data are not provided for Floodplain Connectivity, Lateral Stability, Riparian Vegetation, or Bed Form Diversity Parameters.

FUNCTION BASED PARAMETERS SUMMARY			
Functional Category	**Function-Based Parameters**	**Existing Parameter**	**Proposed Parameter**
Reach Hydrology & Hydraulics	Reach Runoff		
	Flow Alteration		
	Floodplain Connectivity	0.08	0.42
Geomorphology	Large Woody Debris	0.00	1.00
	Lateral Migration	0.22	0.79
	Bed Material Characterization		
	Bed Form Diversity	0.90	0.94
	Plan Form		
	Riparian Vegetation		
Physicochemical	Temperature		
	Nutrients		
Biology	Macroinvertebrates		
	Fish		

FUNCTIONAL CATEGORY REPORT CARD			
Functional Category	**ECS**	**PCS**	**Functional Change**
Reach Hydrology & Hydraulics	0.08	0.42	0.34
Geomorphology	0.37	0.91	0.54
Physicochemical			
Biology			

EXISTING CONDITION ASSESSMENT					Roll Up Scoring		
Functional Category	**Function-Based Parameter**	**Metric**	**Field Value**	**Index Value**	**Parameter**	**Category**	**Category**
Reach Hydrology & Hydraulics	Reach Runoff	Land Use Coefficient Concentrated Flow Points				0.08	Not Functioning
	Flow Alteration	Q_Low, Measured / Q_Low, Expected					
	Floodplain Connectivity	Bank Height Ratio Entrenchment Ratio	1.6 1.6	0.16 0.00	0.08		
Geomorphology	Large Woody Debris	LWD Index No. of LWD Pieces/ 100 meters	0	0.00	0.00	0.37	Functioning At Risk
	Lateral Migration	Greenline Stability Rating Dominant BEHI/NBS Percent Streambank Erosion (%) Percent Armoring (%)	H/H 50 25	0.20 0.28 0.17	0.22		
	Bed Material Characterization	Size Class Pebble Count Analyzer (p-value)					
	Bed Form Diversity	Pool Spacing Ratio Pool Depth Ratio Percent Riffle (%) Aggradation Ratio	4.8 2.53 1.08	1.00 0.80 0.90	0.90		
	Plan Form	Sinuosity					
	Riparian Vegetation	Riparian Width (%) Woody Vegetation Cover (%) Herbaceous Vegetation Cover (%) Percent Native Cover (%)					
Physicochemical	Temperature	MWAT (^{o}C)					
	Nutrients	Chlorophyll (mg/m2)					
Biology	Macroinvertebrates	WSII RIVPACS					
	Fish	Native Fish Species Richness (% of Expected) SGCN Absent Score Game Species Biomass (% Change)					

PROPOSED CONDITION ASSESSMENT					Roll Up Scoring		
Functional Category	**Function-Based Parameter**	**Metric**	**Field Value**	**Index Value**	**Parameter**	**Category**	**Category**
Reach Hydrology & Hydraulics	Reach Runoff	Land Use Coefficient Concentrated Flow Points				0.42	Functioning At Risk
	Flow Alteration	Q_Low, Measured / Q_Low, Expected					
	Floodplain Connectivity	Bank Height Ratio Entrenchment Ratio	1.14 1.74	0.80 0.04	0.42		
Geomorphology	Large Woody Debris	LWD Index No. of LWD Pieces/ 100 meters	83	1.00	1.00	0.91	Functioning
	Lateral Migration	Greenline Stability Rating Dominant BEHI/NBS Percent Streambank Erosion (%) Percent Armoring (%)	L/H 10 10	1.00 0.70 0.67	0.79		
	Bed Material Characterization	Size Class Pebble Count Analyzer (p-value)					
	Bed Form Diversity	Pool Spacing Ratio Pool Depth Ratio Percent Riffle (%) Aggradation Ratio	4.8 2.68 1.02	1.00 0.84 0.98	0.94		
	Plan Form	Sinuosity					
	Riparian Vegetation	Riparian Width (%) Woody Vegetation Cover (%) Herbaceous Vegetation Cover (%) Percent Native Cover (%)					
Physicochemical	Temperature	MWAT (°C)					
	Nutrients	Chlorophyll (mg/m2)					
Biology	Macroinvertebrates	WSII RIVPACS					
	Fish	Native Fish Species Richness (% of Expected) SGCN Absent Score Game Species Biomass (% Change)					

FUNCTIONAL CATEGORY REPORT CARD			
Functional Category	**ECS**	**PCS**	**Functional Change**
Reach Hydrology & Hydraulics	0.08	0.42	0.34
Geomorphology	0.37	0.91	0.54
Physicochemical			
Biology			

Appendix D MONITORING YEAR 1 WSQT SCORE SHEET

Monitoring Year	YR-1 (2022)	Date Feb 2021 Survey			Roll Up Scoring		
Functional Category	**Function-Based Parameters**	**Measurement Method**	**Field Value**	**Index Value**	**Parameter**	**Category**	**Category**
Reach Hydrology & Hydraulics	Reach Runoff	Land Use Coefficient Concentrated Flow Points				0.40	Functioning At Risk
	Flow Alteration	Q_Low, Measured / Q_Low, Expected					
	Floodplain Connectivity	Bank Height Ratio Entrenchment Ratio	1.14 1.6	0.80 0	0.40		
Geomorphology	Large Woody Debris	LWD Index No. of LWD Pieces/ 100 meters	 80	 1.00	1.00	0.90	Functioning
	Lateral Migration	Greenline Stability Rating Dominant BEHI/NBS Percent Streambank Erosion (%) Percent Armoring (%)	 L/H 10 10	 1 0.70 0.67	0.79		
	Bed Material Characterization	Size Class Pebble Count Analyzer (p-value)					
	Bed Form Diversity	Pool Spacing Ratio Pool Depth Ratio Percent Riffle (%) Aggradation Ratio	4.8 2.4 1	1.00 0.76 1.00	0.92		
	Plan Form	Sinuosity					
	Riparian Vegetation	Riparian Width (%) Woody Vegetation Cover (%) Herbaceous Vegetation Cover (%) Percent Native Cover (%)					
Physicochemical	Temperature	MWAT (ºC)					
	Nutrients	Chlorophyll (mg/m2)					
Biology	Macroinvertebrates	WSII RIVPACS					
	Fish	Native Fish Species Richness (% of Expected) SGCN Absent Score Game Species Biomass (% Change)					

Appendix E PHOTO LOG

North Platte River Restoration
1st Street Reach SQT Monitoring

2022 YR-1 Monitoring Photo Log
Client: City of Casper, Wyoming
Design Engineer: Stantec Consulting Services
Contractor: Shamrock Environmental

Photo Point – Right 1 (PP-R1)

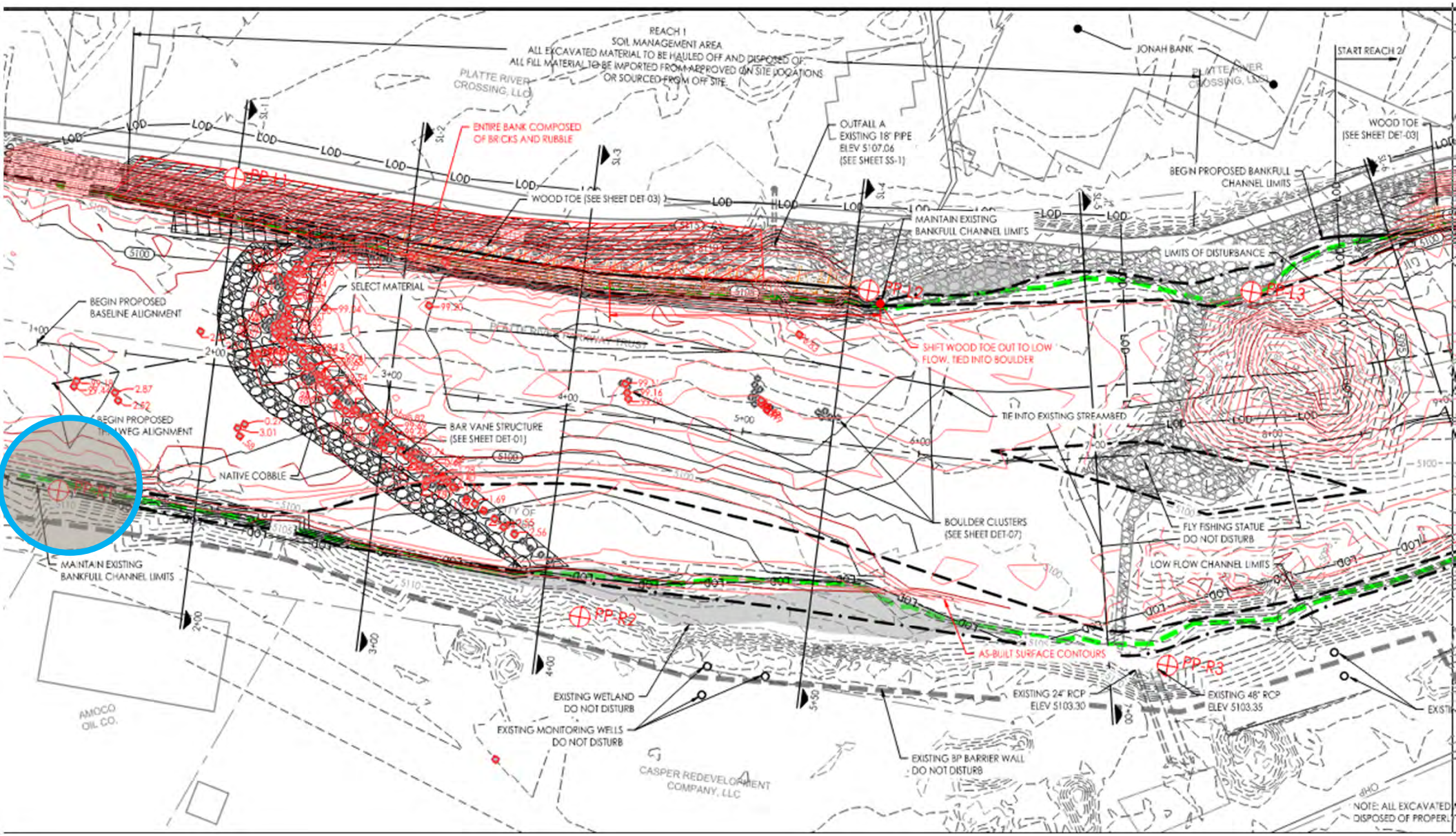

Photo Point R1 Looking Upstream 04-21-2022

Photo Point R1 Looking Downstream 04-21-2022

Photo Point R1 Panoramic 04-21-2022

Photo Point – Right 2 (PP-R2)

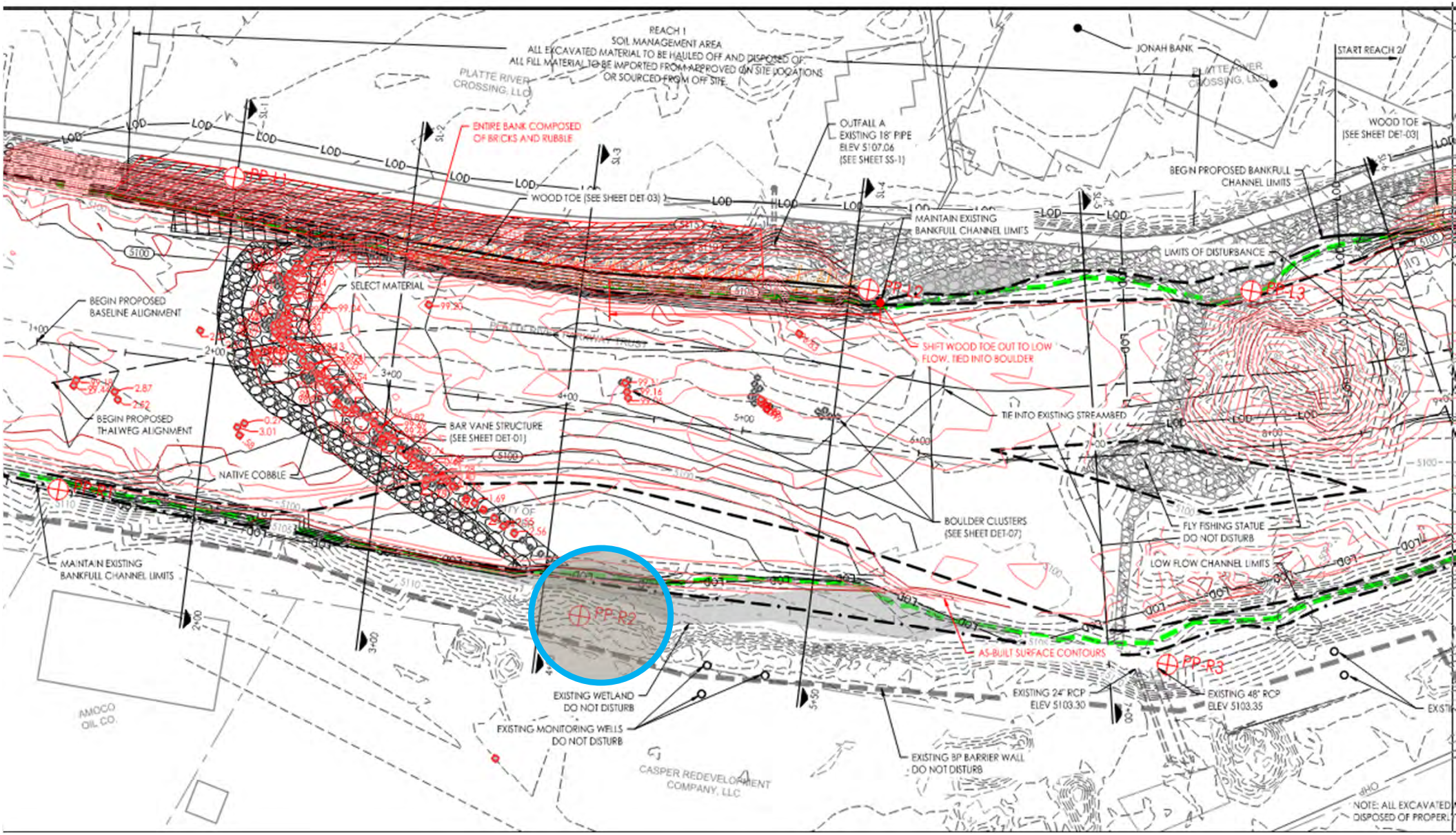

Photo Point R2 Looking Upstream 04-21-2022

Photo Point R2 Looking Downstream 04-21-2022

Photo Point R2 Panoramic 04-21-2022

Photo Point – Right 3 (PP-R3)

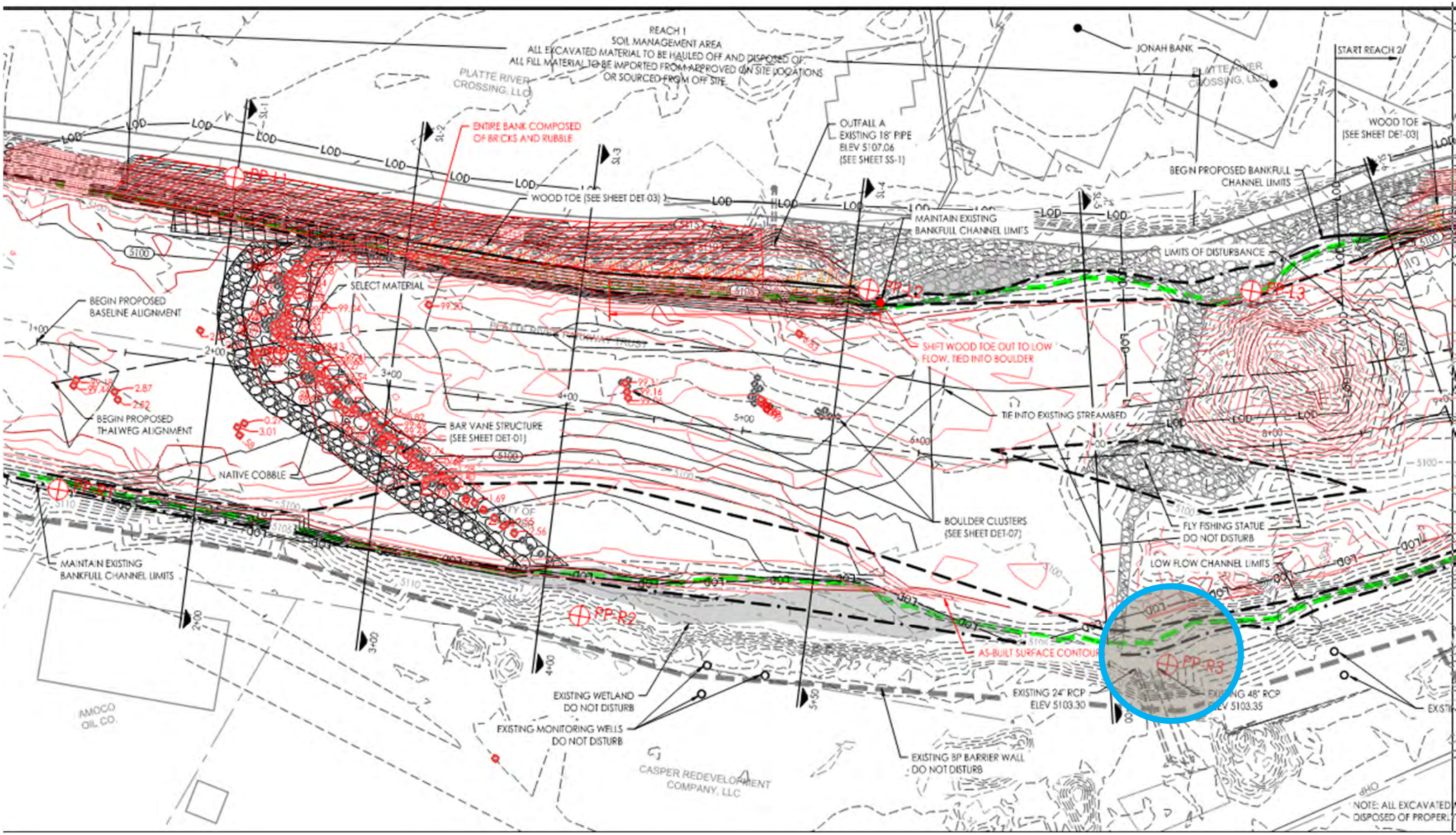

Photo Point R3 Looking Upstream 04-21-2022

Photo Point R3 Looking Downstream 04-21-2022

Photo Point R3 Panoramic 04-21-2022

Photo Point – Right 4 (PP-R4)

Notes:
Preconstruction and

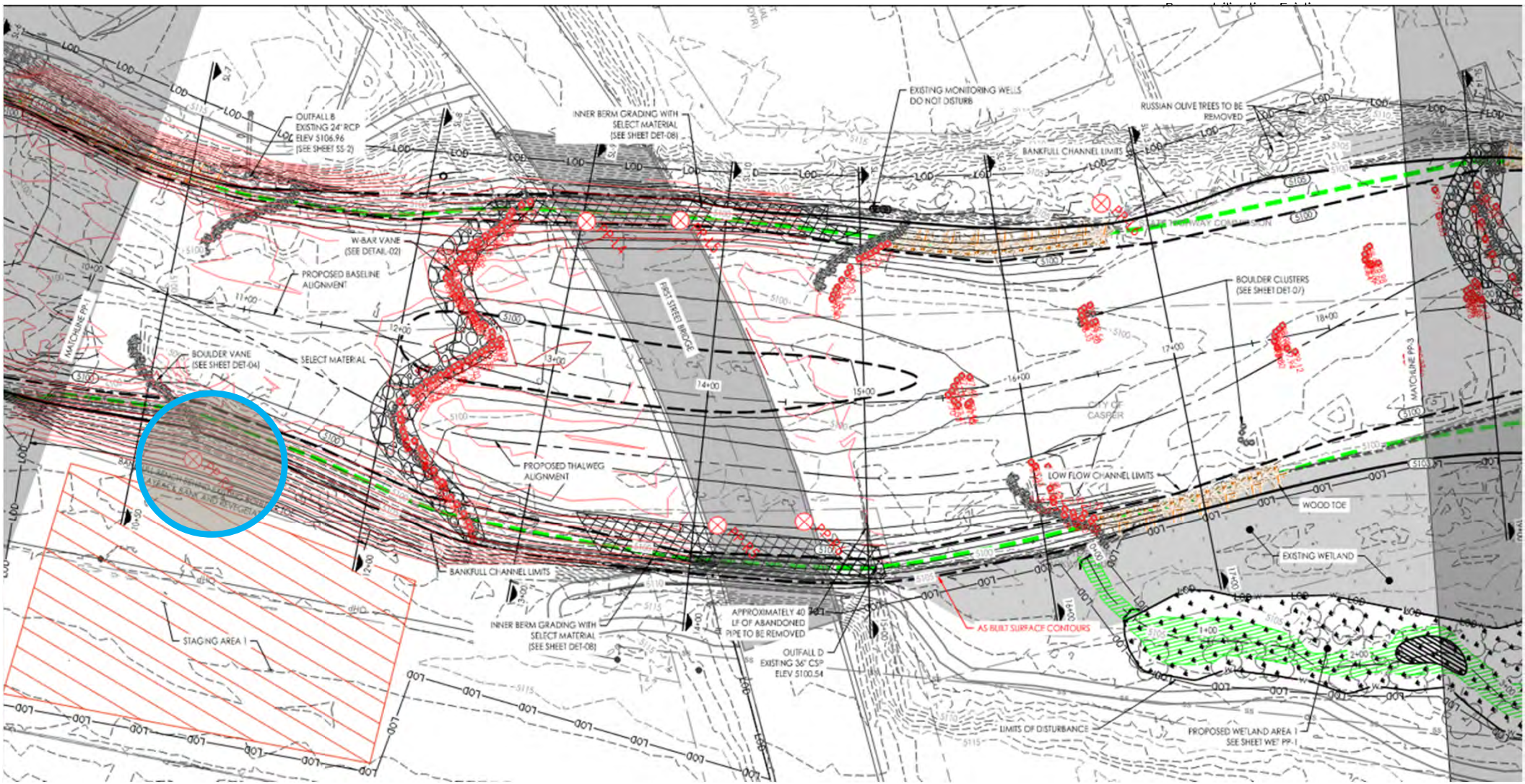

Photo Point R4 Looking Upstream 04-21-2022

Photo Point R4 Looking Downstream 04-21-2022

Photo Point R4 Panoramic 04-21-2022

Photo Point – Right 5 (PP-R5)

Notes:
Preconstruction and

Photo Point R5 Looking Upstream 04-21-2022

Photo Point – Right 6 (PP-R6)

Notes:
Preconstruction and

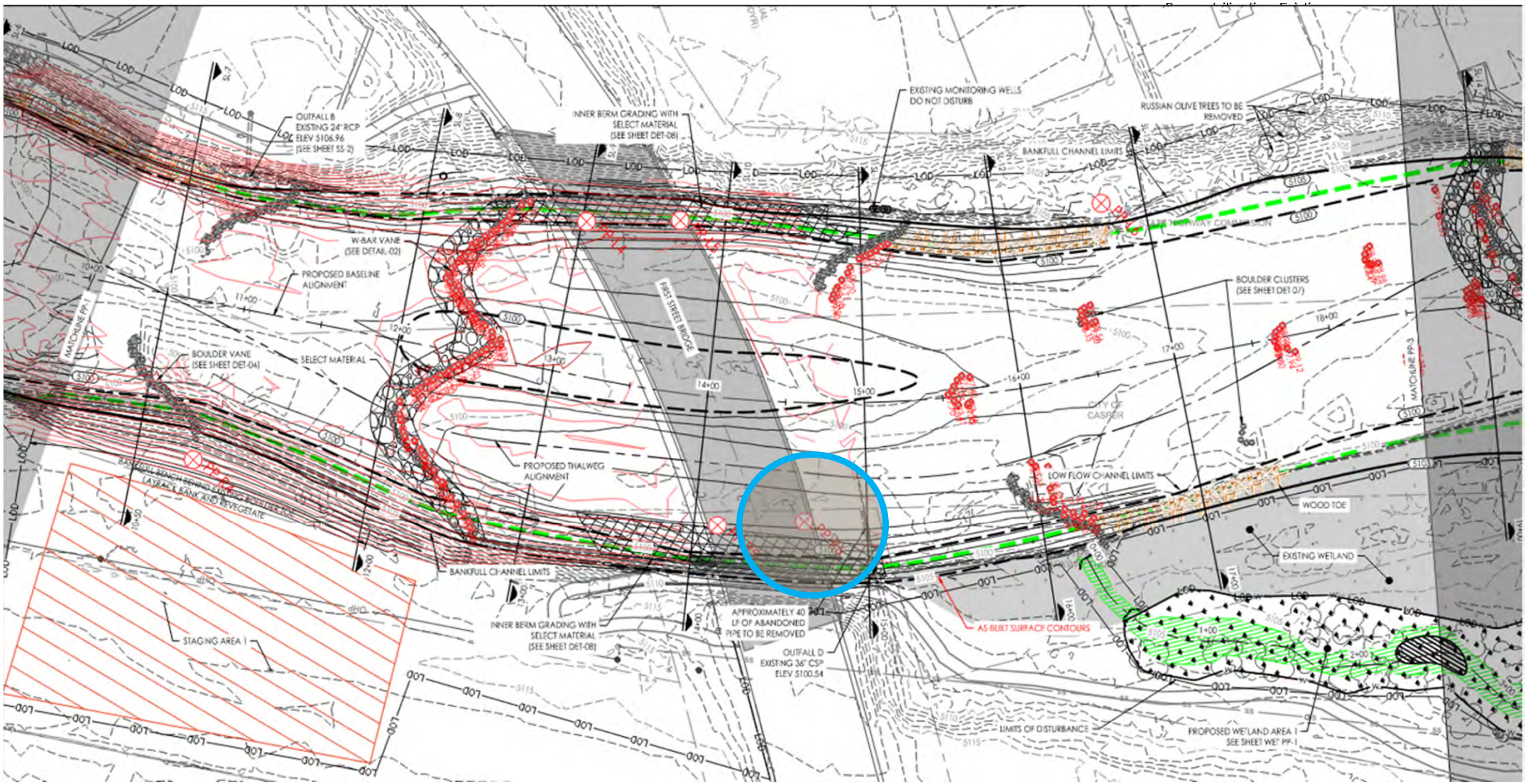

Photo Point R6 Looking Downstream 04-21-2022

Photo Point R6 Looking Downstream 04-21-2022

Photo Point – Right 7 (PP-R7)

Photo Point R7 Looking South 04-21-2022

Photo Point R7 Looking North 04-21-2022

Photo Point – Right 8 (PP-R8)

Photo Point R8 Looking Upstream 04-21-2022

Photo Point R8 Looking Downstream 04-21-2022

Photo Point R8 Panoramic 04-21-2022

Photo Point – Right 9 (PP-R9)

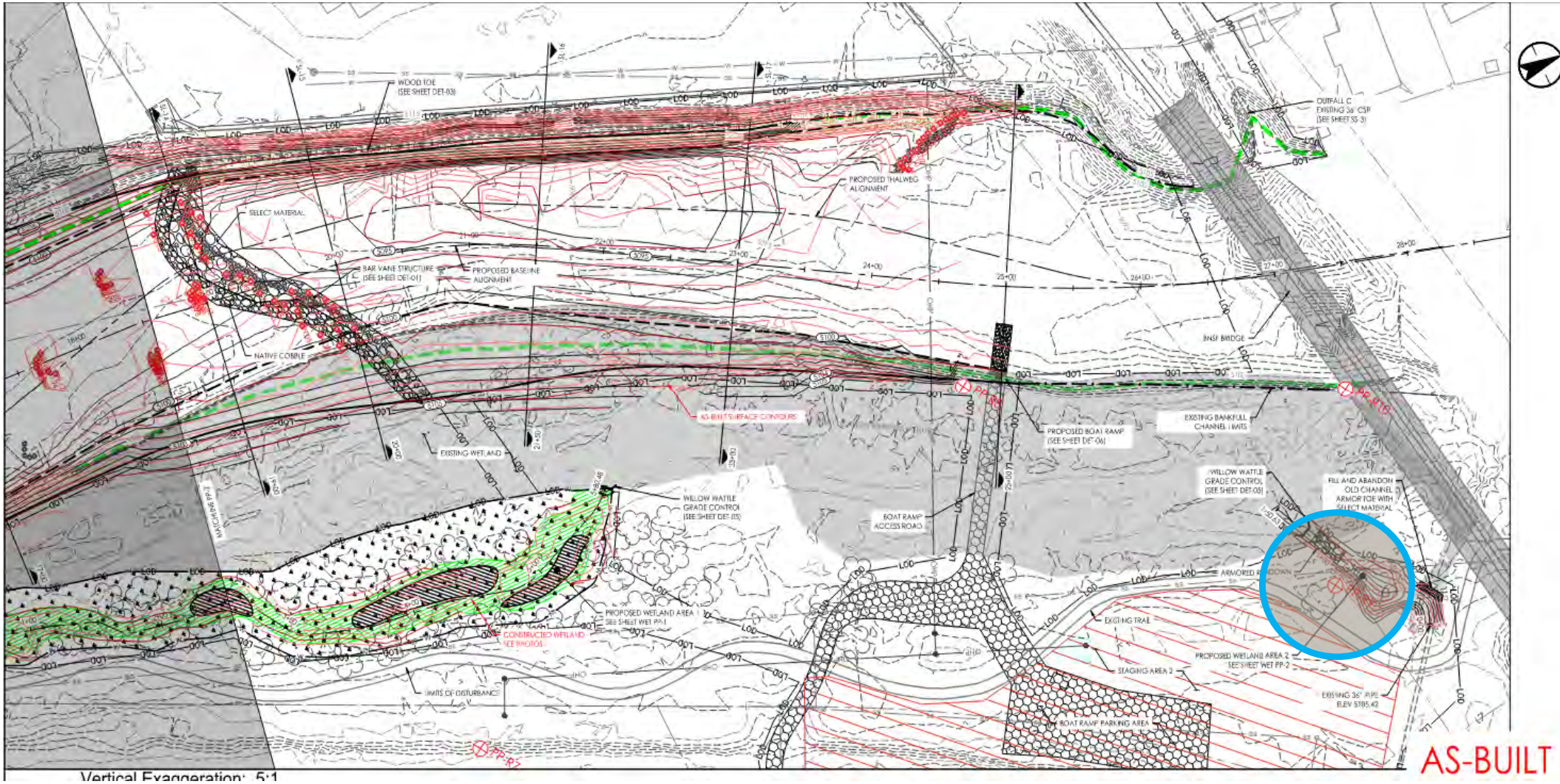

Photo Point R9 Looking Northeast 04-21-2022

Photo Point R9 Looking Northwest 04-21-2022

Photo Point – Right 10 (PP-R10)

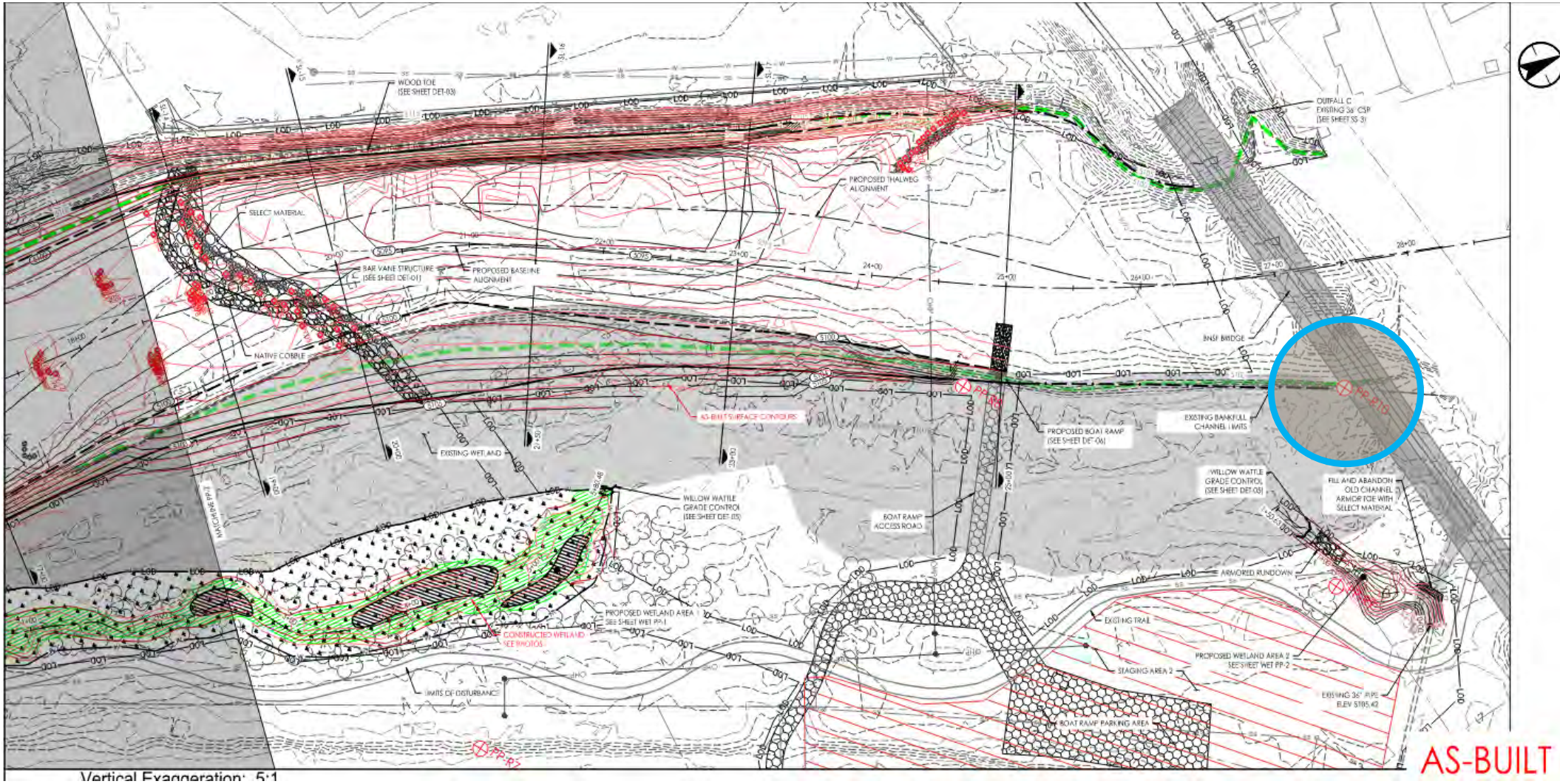

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Photo Point R10 Looking Downstream 04-21-2022

Photo Point – Left 1 (PP-L1)

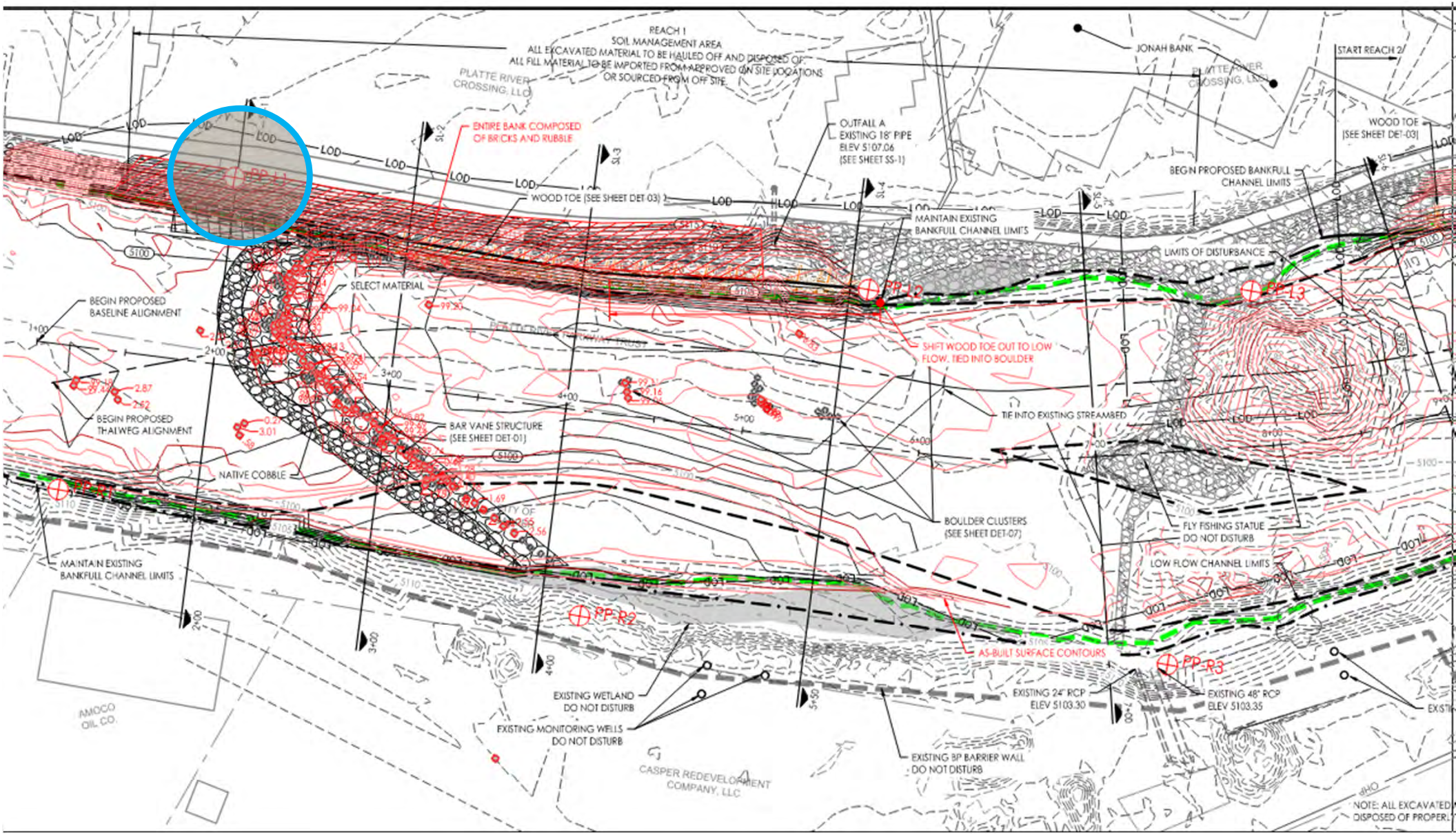


Photo Point L1 Looking Upstream 04-21-2022

Photo Point L1 Looking Downstream 04-21-2022

Photo Point L1 Panoramic 04-21-2022

Photo Point – Left 2 (PP-L2)

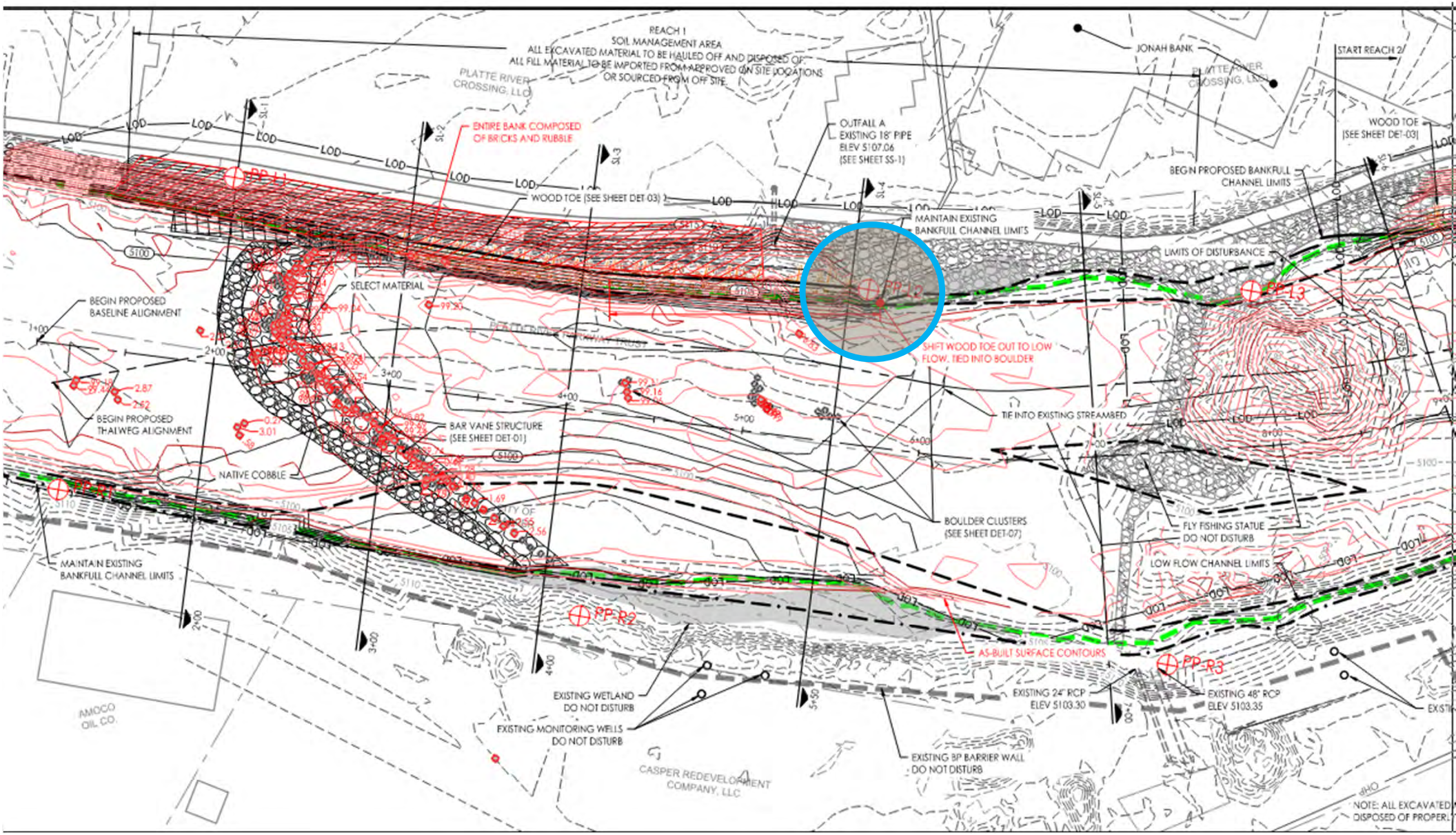


Photo Point L2 Looking Upstream 04-21-2022

Photo Point L2 Looking Downstream 04-21-2022

Photo Point L2 Panoramic 04-21-2022

Photo Point – Left 3 (PP-L3)

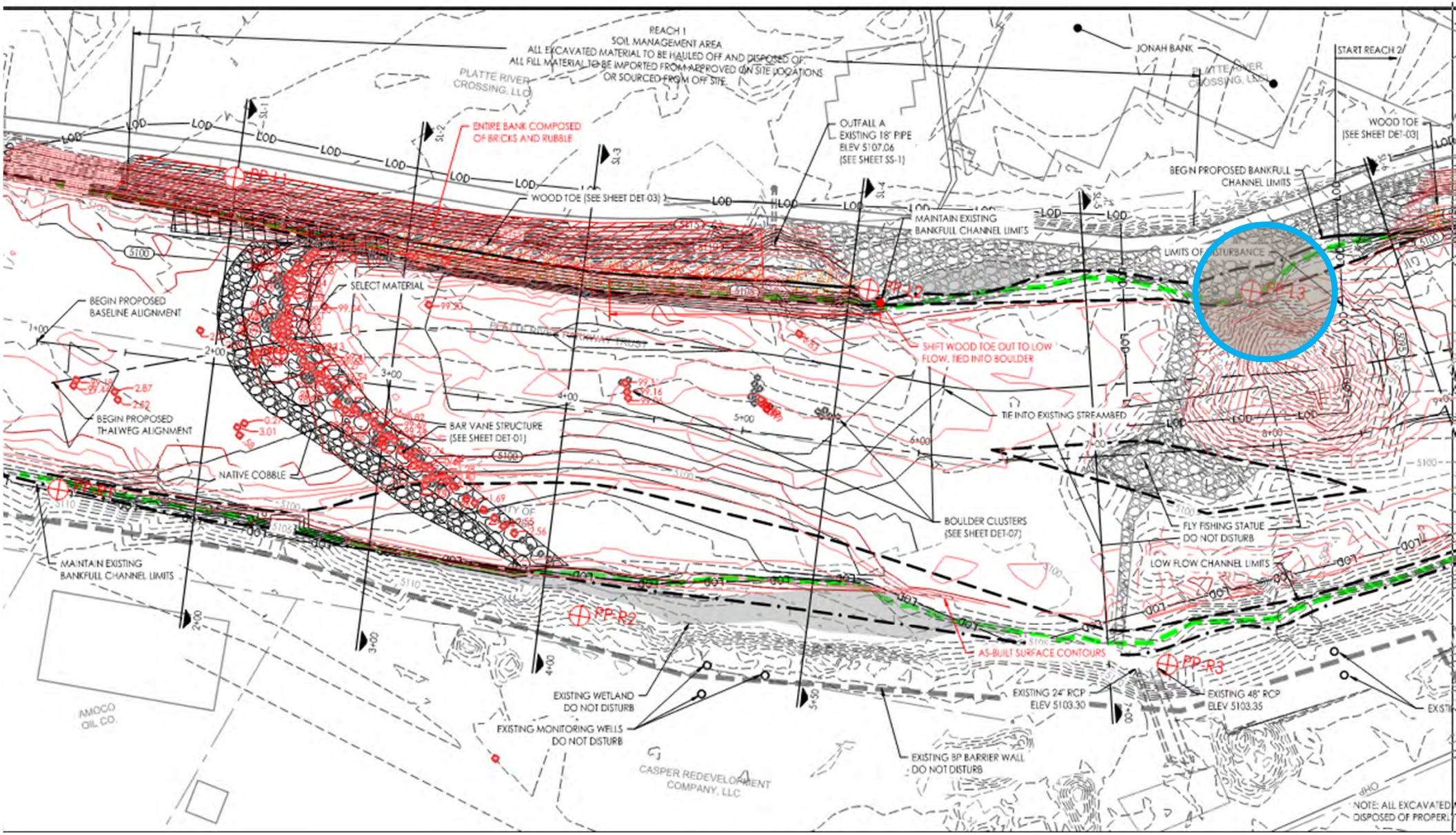


Photo Point L3 Looking Upstream 04-21-2022

Photo Point L3 Looking Downstream 04-21-2022

Photo Point L3 Panoramic 04-21-2022

Photo Point – Left 4 (PP-L4)

Photo Point L4 Looking Upstream 04-21-2022

Photo Point L4 Looking Upstream 04-21-2022

Photo Point – Left 5 (PP-L5)

Photo Point L5 Looking Downstream 04-21-2022

Photo Point L5 Looking Downstream 04-21-2022

Photo Point – Left 6 (PP-L6)

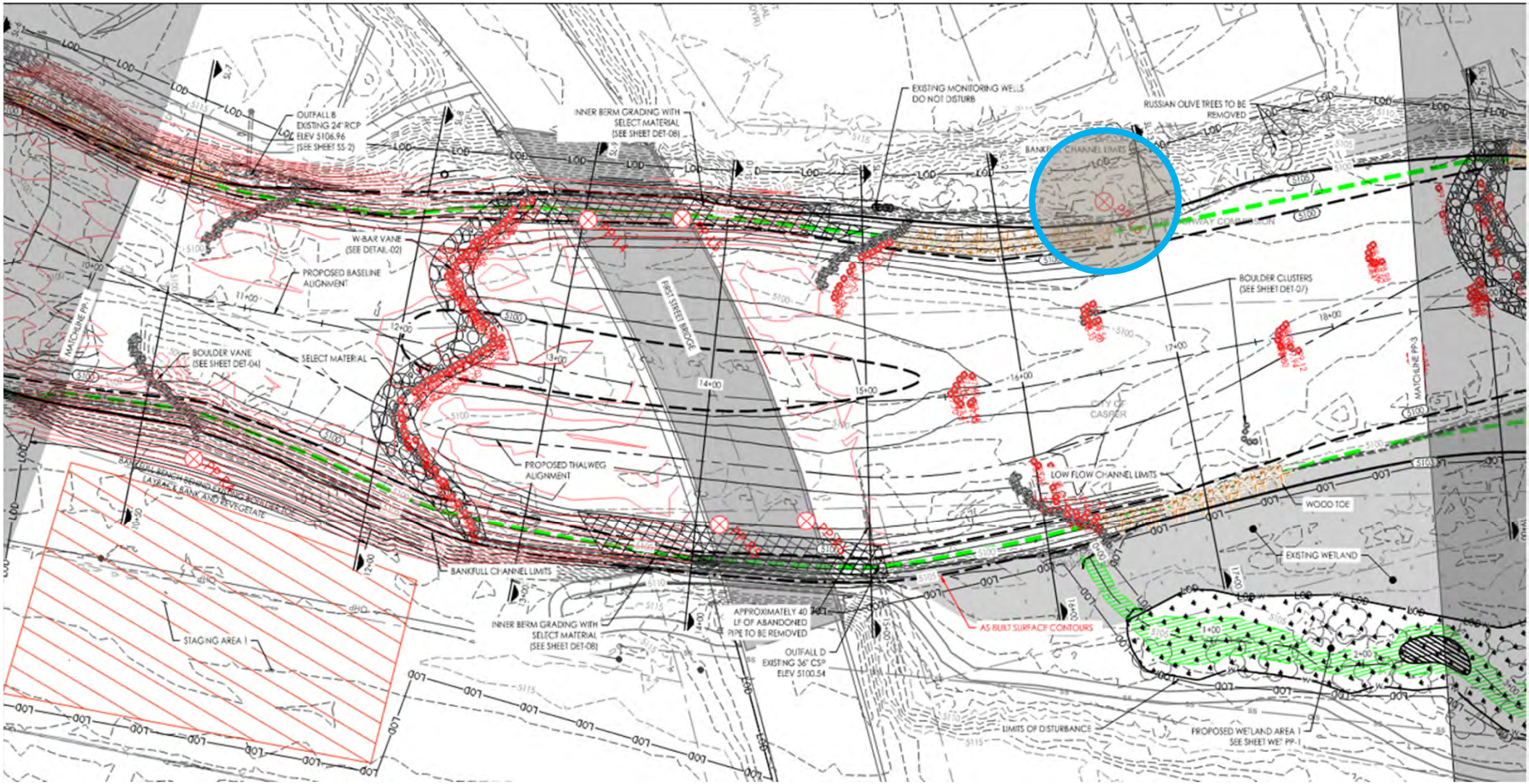


Photo Point L6 Looking Upstream 04-21-2022

Photo Point L6 Looking Downstream 04-21-2022

Photo Point L6 Panoramic 04-21-2022

Appendix F WARRANTY REPAIR MEMO

Stantec

Memo

To:	Jolene Martinez 200 North David Street Casper, WY 82601	From:	Pat Philbin Stantec Consulting Ltd. 3325 S. Timberline Road, Suite #150 Fort Collins, CO 80525
Project/File:	North Platte 1st Street Reach Warranty Repair	Date:	November 22, 2022

Reference: Warranty Repair 2022

As a follow up to Stantec's site visit on April 21, 2022, warranty repair work was initiated on November 18, 2022 by Shamrock on the First Street Reach project. The purpose of this warranty work was to repair bank erosion along the left bank downstream of the First Street bridge just before the start of the wood toe previously installed during the initial construction work. This was achieved by placing approximately 20 large 2-3' diameter boulders repurposed from the nearest bar vane structure, along the toe of the bank extending upward matching the upstream bank slope. Boulder placement began at the furthest upstream log of the wood toe, extending 20 feet upstream. Larger boulders were placed at the toe and hammered into the streambed through the force of the excavator arm. Once the toe was set, smaller boulders were placed in a manner that fosters the transition from the upstream bank into the wood toe. The channel bed area impacted by boulder removal was regraded with existing channel bed material to maintain the existing channel bed grade, removing any localized depressions and material pile ups resulting from this activity. This work was observed by Stantec and documented through a series of photographs included in Appendix A. A more detailed description of the work completed is shown on the marked up As-Built Survey included in Appendix B.

Sincerely,

STANTEC CONSULTING SERVICES INC.

Pat Philbin PE
Stream Restoration Design Engineer
Mobile: 412-651-3936
patrick.philbin@stantec.com

APPENDIX A

PHOTO DOCUMENTATION

Figure 1: Prior to repair work. Image is taken on river left looking downstream. Erosion on bank can be seen between the existing bar vane and wood toe structures.

Figure 2: Prior to repair work. Image is taken on river left looking upstream. Erosion on bank can be seen between the existing bar vane and wood toe structures.

Figure 3: Image is taken on river left looking upstream. Setting boulder toe along area of bank erosion.

Figure 4: Image is taken on river left looking upstream. Finished product displaying the transition of the upstream bank into the wood toe.

Figure 5: Boulder tie-in to wood toe structure.

Figure 6: Image is taken on river left looking downstream. Finished product displaying the transition of the upstream bank into the wood toe.

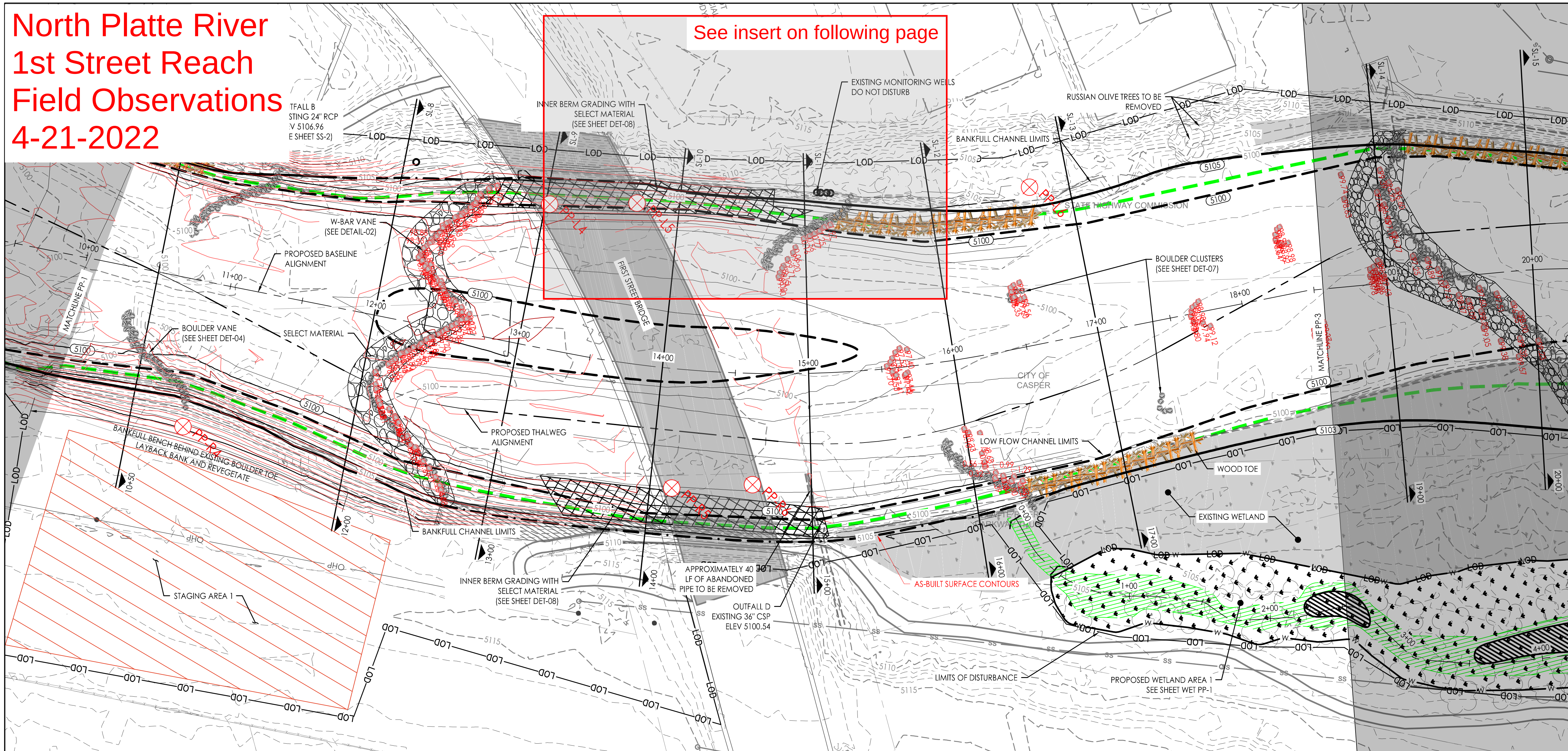
Figure 7: Image is taken on river left looking downstream displaying finished product.

APPENDIX B

04-21-2022 FIELD OBSERVATION FIRST
STREET WARRANTY

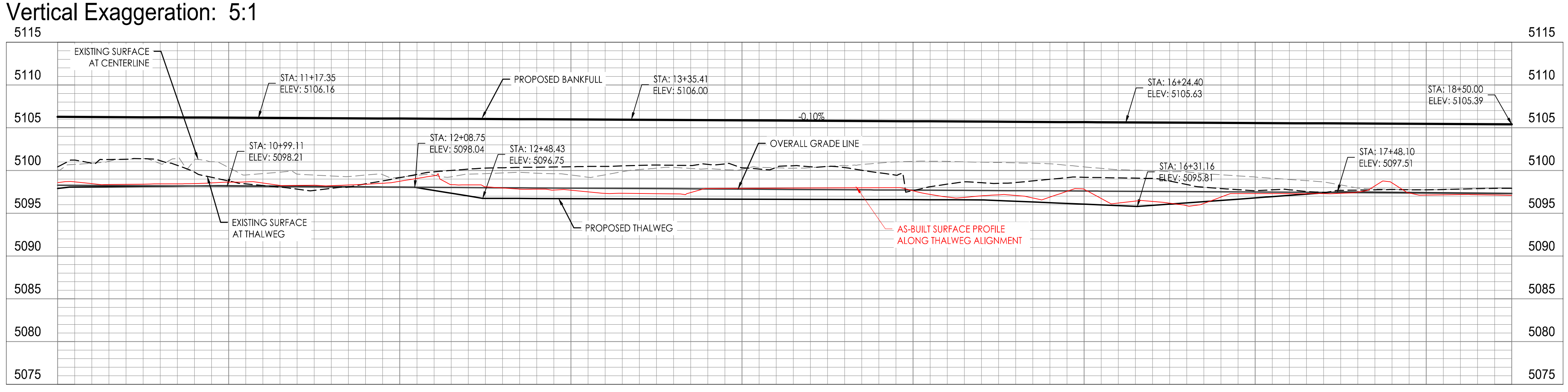
North Platte River
1st Street Reach
Field Observations
4-21-2022

See insert on following page



AS-BUILT

End Sta: 18+50.00
Horizontal Scale: 1" = 20
Vertical Scale: 1" = 4'
Vertical Exaggeration: 5:1



1"=40' 0 20' 40' 80'

Stantec

3325 S Timberline Road, Suite #150
Fort Collins, Colorado 80525
www.stantec.com

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Client/Project
CITY OF CASPER
200 NORTH DAVID STREET CASPER, WY 82601

NORTH PLATTE RIVER RESTORATION
FIRST STREET REACH
CASPER, WYOMING

Title
AS-BUILT
PLAN AND PROFILE 2

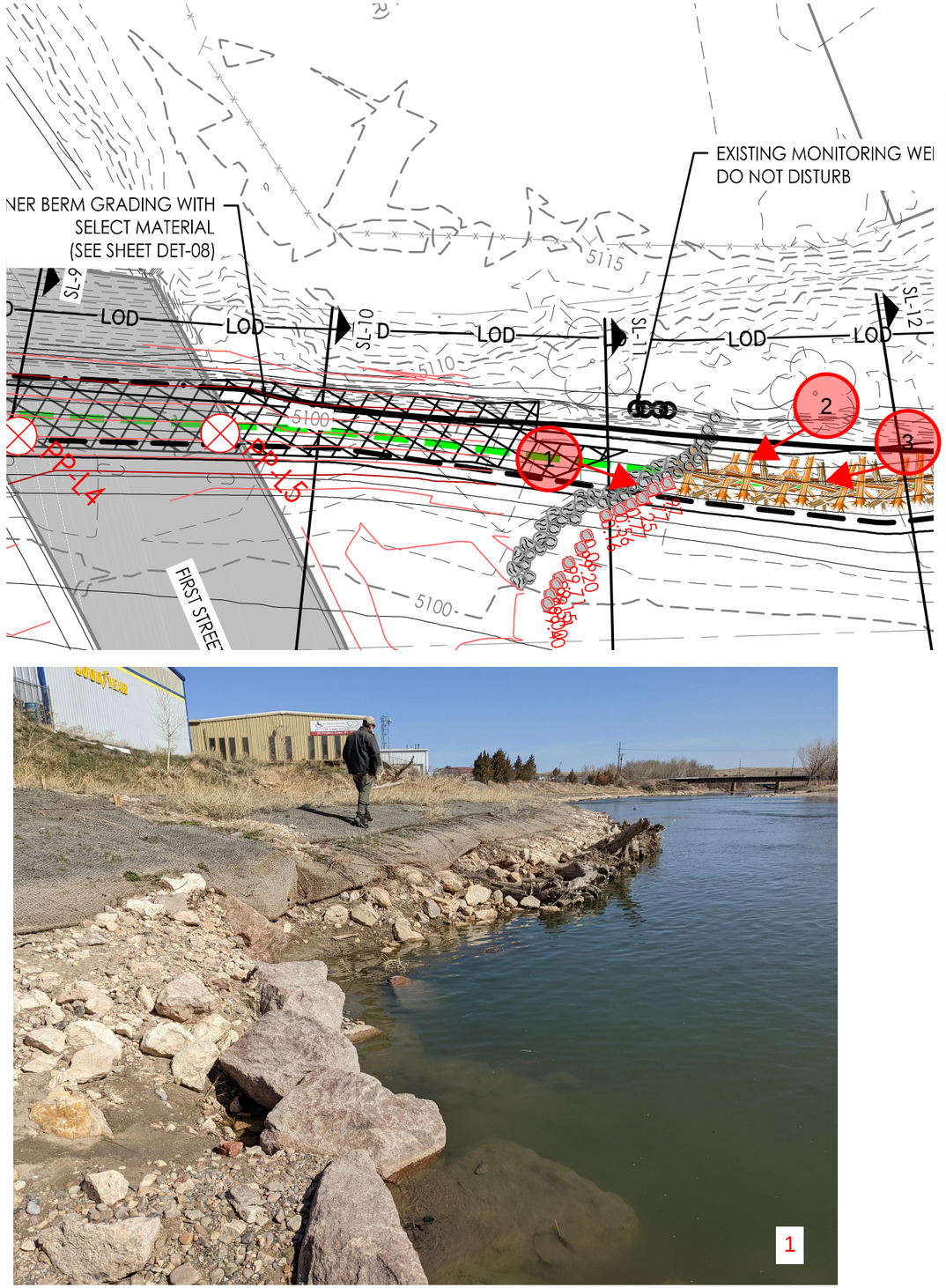
Permit-Seal

Project Number: 172621110

File Name: NPFST_AS-BUILT_PP_SHEETS.dwg

PTP	JGA	TCD	21.2.25
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No.
Revision 0
Sheet PP-2



4-21-2022 Field Observation

During a field walk, minor bank erosion was noted just downstream of the boulder vane adjacent to approximate station 15+25. A back eddy effect that occurs during high flows has caused approximately 10-15' long area bank and toe bank erosion. The design called for the woody toe to begin at the boulder sill location, but there is a noticeable gap between the two structures. This was not by design or part of a field change, and is the primary cause of the observed erosion.

It is recommended that this bank repair should be covered under the construction warranty. The recommended repair involve salvaging and re-purposing boulders from the channel side of the boulder vane structure and placing them as boulder toe protection in the gap between sill and wood toe. This location could be easily accessed by the 1st street eastern right-of-way and the repair could be done from the bank, not requiring machinery in the water.