File CG3821

Cando Rail & Terminals

Cando Sturgeon Rail Terminal West Expansion Detailed Project Description Under the Impact Assessment Act
N ½ 34-55-22-W4M
Sturgeon County, Alberta

Clifton

24 May 2024 **File CG3821**

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Detailed Project Description Under the *Impact Assessment Act*
N ½ 34-55-22-W4M
Sturgeon County, Alberta

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List of Acronyms

ACIMS	Alberta Conservation Information Management System
ACO	Government of Alberta's Aboriginal Consultation Office
ACSW	Alberta Ministry of Arts, Culture and Status of Women
AD	Arrival/Departure Railyard
AEPA	Alberta Environment and Protected Areas
AER	Alberta Energy Regulator
AF	Activity Factor
amp	Ampere
ATEC	Alberta Transportation and Economic Corridors
BAT/BEP	Best Available Technologies / Best Environmental Practices
CEAA	Canadian Environmental Assessment Agency
Cando	Cando Rail & Terminals
CH_4	Methane
CF	Conversion Factor
Clifton	Clifton Engineering Group Inc.
CN	Canadian National Railway Company
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_{2e}	Carbon Dioxide Equivalent
dB	decibel
DFO	Fisheries and Oceans Canada
DPD	Detailed Project Description
ECCC	Environment and Climate Change Canada
EDI	EDI Environmental Dynamics Inc.
EF	Emission Factor
ESDC	Employment and Social Development
USEIA	United States Energy Information Agency
ESA	Environmental Site Assessment
FWMIS	Fisheries and Wildlife Management Information System
GHG	Greenhouse Gas
GPS	Global Positioning System
GWP	Global Warming Potential
ha	Hectare
HC	Health Canada
HP	Horsepower
HRA	Historical Resources Act

IAAC	Impact Assessment Agency of Canda
IPCC	Intergovernmental Panel on Climate Change
IPD	Initial Project Description
ISC	Indigenous Services Canada
km	Kilometer
kV	kilovolt
kVA	kilovolt amps
kWh	kilowatt hour
LPG	Liquefied Petroleum Gas
LUC	Land Use Change
MBCA	Migratory Birds Convention Act
Mt	Million metric tonnes
MW	Megawatt
MWh	Megawatt hour
NCIA	Northeast Capital Industrial Association
NG	Natural gas
NO_x	Nitrous oxides
N_2O	Nitrous oxide
NRCan	Natural Resources Canada
PHC	Petroleum Hydrocarbons
$PM_{2.5}$	Fine Particulate Matter
PM_{10}	Particulate Matter
RAP	Restricted Activity Period
SARA	Species at Risk Act
scf	Standard cubic feet
SO_2	Sulphur dioxide
SOI	Summary of Issues
SWMP	Stormwater Management Plan
t	Metric tonne
TDG	Transportation of Dangerous Goods
TDS	Total Dissolved Solids
TC	Transport Canada
USEPA	United States Environmental Protection Agency
WAGE	Women and Gender Equality
WAIF	Wetland Assessment and Impact Form
WAIR	Wetland Assessment and Impact Report

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Introduction

This application is being submitted by Clifton Engineering Group Inc. (Clifton) on behalf of Cando Rail & Terminals Ltd. (Cando) to conform with the requirements of a Detailed Project Description under the Government of Canada's *Impact Assessment Act, 2019*. Cando is a Canadian company founded in Manitoba that provides custom rail solutions. Since the company's beginnings in 1978 they have expanded to include multi-purpose rail facilities throughout Canada and the eastern United States.

This application is in support of the expansion of Cando's existing rail terminal located in Sturgeon County, approximately 23 km to the northeast of Edmonton, Alberta. The existing rail terminal was previously approved in 2019 under the *Canadian Environmental Assessment Act, 2012* (CEAA), and the reference number of the project was 80167. Since the original approval, the legislation has changed, and this application is being presented to the Impact Assessment Agency of Canada (IAAC) under the *Impact Assessment Act*. The existing and proposed expansion rail terminal are not considered a Class 1 railway; therefore, the operation of the terminals themselves will be regulated by Alberta Transportation and Economic Corridors (ATEC) rather than Transport Canada.

The information included in this application has been prepared in accordance with the Annex II – Contents of a Detailed Project Description. Annex II aligns with Schedule 1 of the Information and Management of Time Limits Regulation. Throughout the report under the main section headings there is blue italicized text that includes the guidance language from the Annex II – Contents of a Detailed Project Description to which the section is directly applicable. This was included for the convenience of the reviewers and readers to correlate the section content with the guidelines and demonstrate concordance with the Annex II.

1.0 Updated General Information

1.1 Project's Name, Type/Sector, and Proposed Location

The project's name, type or sector, and proposed location.

Table 1.1 – General Project Information	
Name	Cando Sturgeon Rail Terminal West Expansion
Type/Sector	Railyard
Proposed Location of the Railyard	Municipality: Sturgeon County Alberta Zoning: Industrial Land Use – Alberta's Industrial Heartland Alberta Township Survey System Description: N ½ 34-55-22-W4M Approximate GPS Coordinates: 53°47'59.43"N (latitude), and 113°11'11.97"W (longitude) Legal Land Descriptions: NE 34-55-22-W4M, NW 34-55-22-W4M, Railway Plan 0824867 Area C (short legal 0824867;C), and Plan 0824867 Area D (short legal 0824867;D)

The project applicable to this submission is the expansion of Cando's existing rail terminal located in Sturgeon County, Alberta. The existing rail terminal consists of a railyard that covers a half section of land. The expansion is to include the half section immediately to the west of the existing rail terminal. The expansion rail terminal will cover roughly the same amount of land as the existing rail terminal essentially doubling the terminal's capacity. The official project name for this application is the Cando Sturgeon Rail Terminal West Expansion; however, it will be referred to as the Project or the expansion rail terminal throughout this document. For reference, the previous submission for the existing rail terminal to CEAA was similarly named the Cando Sturgeon Rail Terminal Project. The location of the project within the Province of Alberta is depicted in Figure 1.

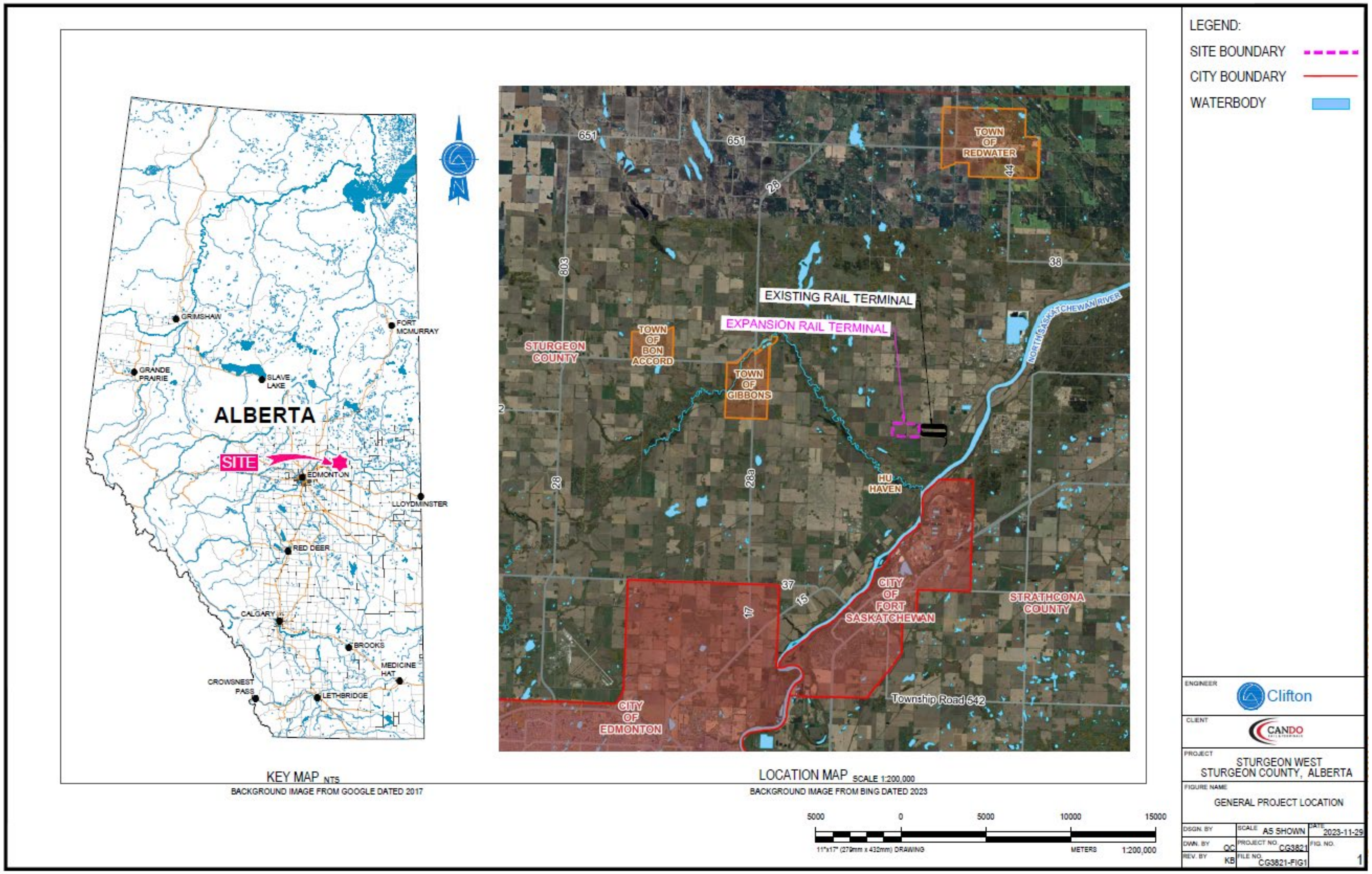

Figure 1 – General Project Location

After initial discussions with the IAAC the project was determined to be an expansion of an existing rail terminal as the two rail terminals are adjacent, which establishes a clear connection between the two railyards. In addition, the two rail terminals will be directly connected by track, and components of the existing rail terminal, notably its connection to the Canadian National Railway Company (CN) rail line, will be necessary for the function and operation of the expansion rail terminal.

An important component of the project location is that it is in the Sturgeon County portion of Alberta's Industrial Heartland, a Designated Industrial Zone. Alberta's Industrial Heartland consists of 582 km^2 of land within the City of Fort Saskatchewan and the Counties of Lamont, Strathcona, and Sturgeon as well as a portion within the boundaries of the City of Edmonton (Alberta's Industrial Heartland, 2023). The North Saskatchewan River also runs through the Industrial Heartland zoning separating the portions of land which are within Sturgeon County from those within Strathcona County and Lamont County. The majority of the region is zoned for heavy industrial land use and offers a concentrated location for chemical, petrochemical, and oil and gas facilities (Alberta's Industrial Heartland, 2023). The region offers an attractive location for industrial development and investment as well as provincial regulatory streamlining and cumulative environmental management (Alberta's Industrial Heartland, 2023). Figure 2 shows the location of the project within the boundaries of Alberta's Industrial Heartland.

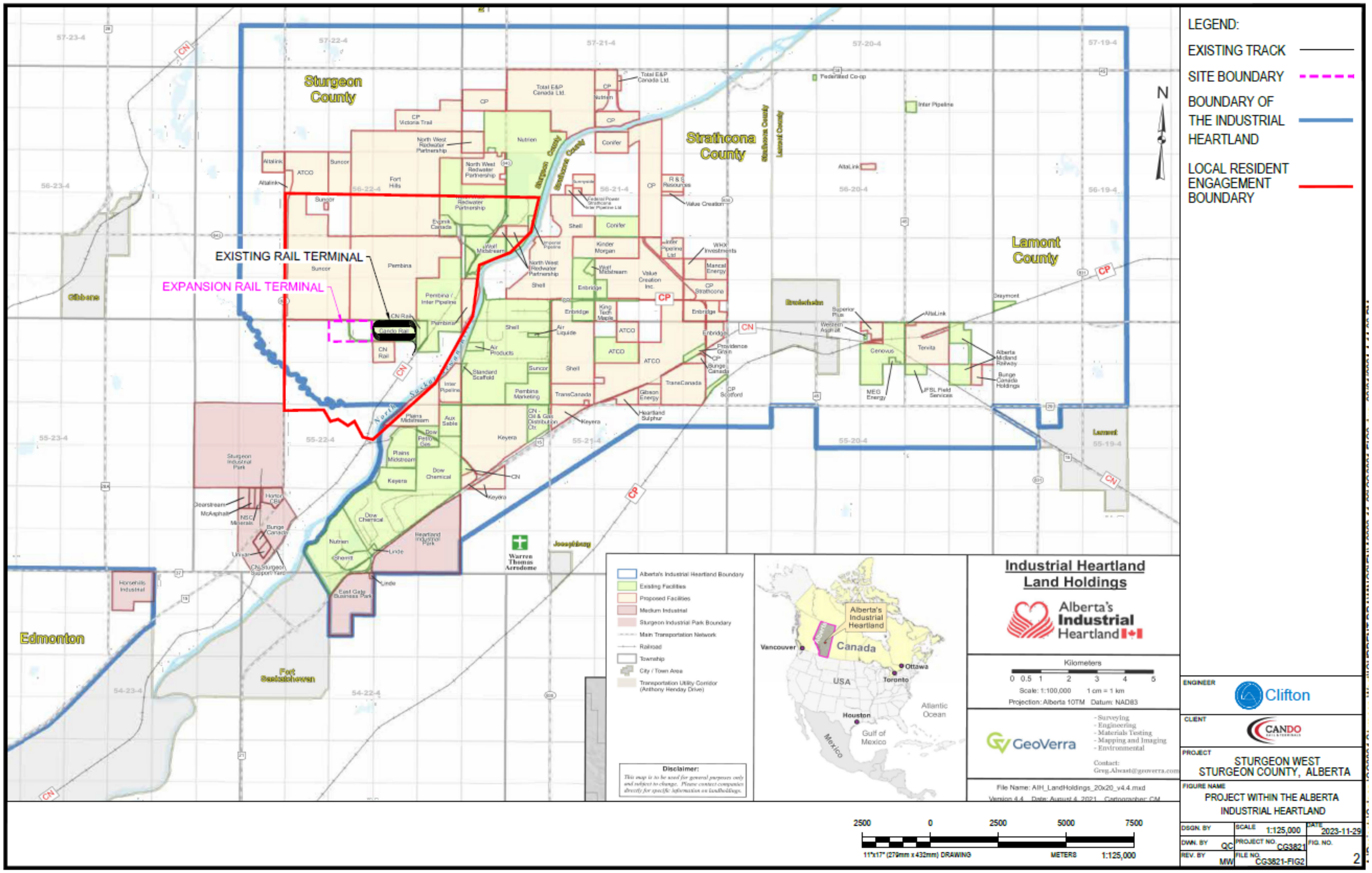

Figure 2 – Project Within the Alberta Industrial Heartland

The two quarter sections to be used for the expansion rail terminal are the northeastern and northwestern quarters of section 34, township 55, region 22, west of the 4th meridian (N ½ 34-55-22-W4M). The approximate latitude and longitude of the project are 53°47'59.43"N and 113°11'11.97"W, respectively. The legal land descriptions for the expansion rail terminal are: NE 34-55-22-W4M, NW 34-55-22-W4M, Railway Plan 0824867 Area C (short legal 0824867;C), and Plan 0824867 Area D (short legal 0824867;D). The two land titles for the quarter sections are privately owned whereas the two titles under Plan 0824867 are owned by CN Rail; however, CN Rail does not operate on the land. It is currently cultivated agricultural land. The total area to be used for the expansion rail terminal is approximately 130 hectares (ha).

A secondary component to the project consists of the creation of a bypass road. The connection between the existing rail terminal and the expansion rail terminal will cross Range Road 222. These connections may be in use at almost any time of the day for long periods of time with railcar crossings. For the safety and convenience of the surrounding residents, Cando is working with Sturgeon County to permanently close the portion of Range Road 222 between the two rail terminals. The bypass will enable continued local road connectivity and include upgrades to the existing Sturgeon County operated Range Road 223 to the west of the W ½ 34-55-22-W4M, and the intersection of Range Road 222 and Township Road 560 to the northeast of the property. To complete the bypass, roadways will also be constructed to the south of the S ½ 34-55-22-W4M (extension of Township Road 555) and a cul-de-sac will be constructed to the south of the expansion rail terminal where Range Road 222 ends. Once the road is constructed Sturgeon County will take over ownership and be responsible for the operation and maintenance. The bypass road is shown in Figure 3.

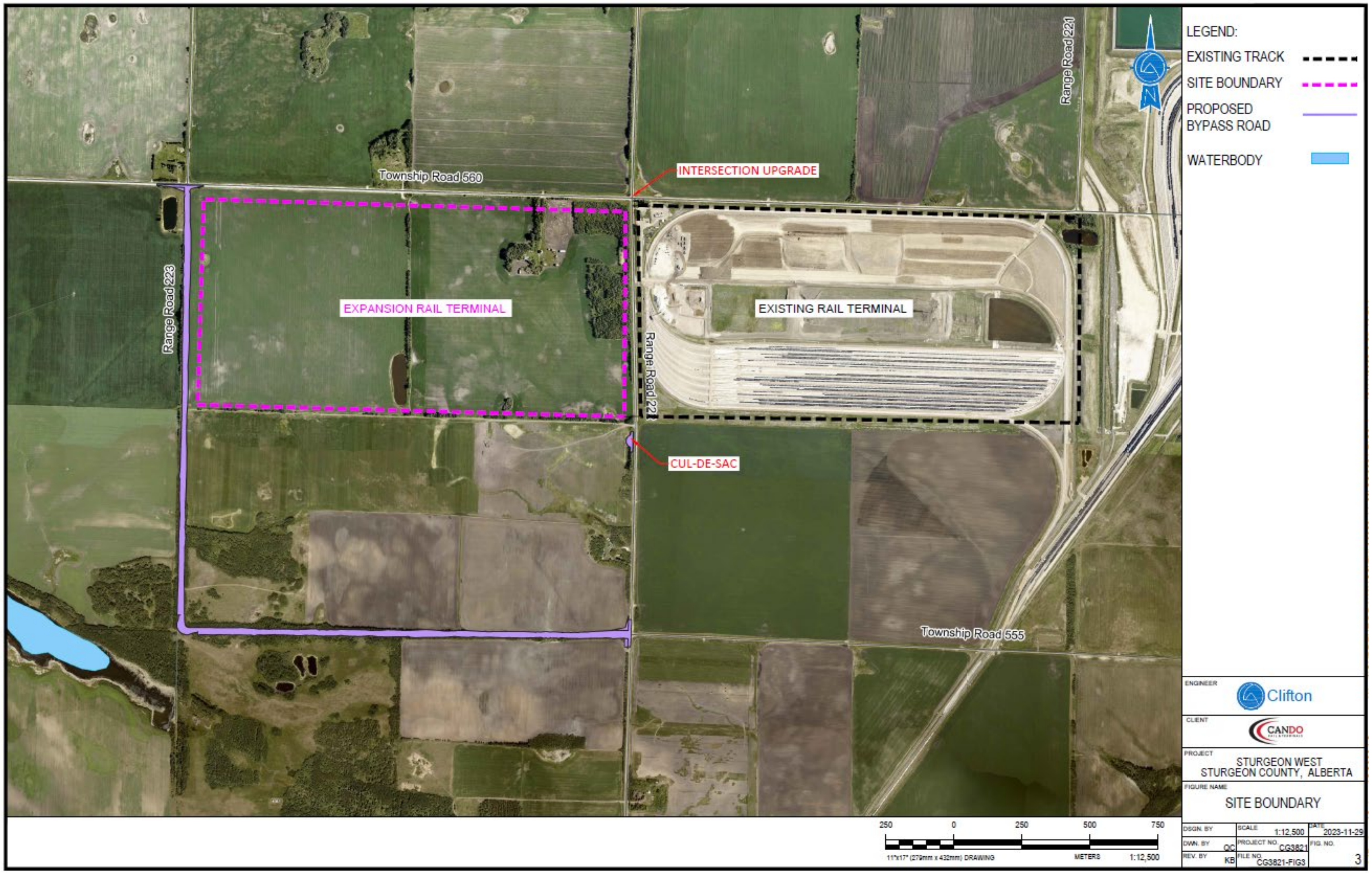

Figure 3 – Site Boundary

1.2 Proponent Contact Information

The proponent's name and contact information and the name and contact information of their primary representative for the purpose of the description of the project.

The proponent contact information for the purpose of this application is detailed below in Table 1.2.

Table 1.2 – Proponent Information	
Name of Project	Cando Sturgeon Rail Terminal West Expansion
Name of Proponent	Cando Rail & Terminals Ltd.
Proponent's Contact Information	Unit 400 – 740 Rosser Avenue Brandon, Manitoba R7A 0K9 info@candorail.com Toll-Free: 1-866-989-5310 Phone: 204-725-2627 Fax: 204-725-4100
Primary Representative	Maxim Delisle GM Infrastructure Development
Primary Representative's Contact Information	Maxim.Delisle@candorail.com 1-416-799-5998

2.0 Planning Phase Results

2.1 Engagement with Jurisdictions or Agencies

A summary of and the results of any engagement undertaken with any jurisdiction or other party, including a description of how the proponent intends to address the issues raised in the Summary of Issues

Through the completion of the existing rail terminal, Cando has established a strong relationship with stakeholders in the area and an understanding of the project location. Cando has followed in the successful model of the existing rail terminal project and has completed engagement activities with various stakeholders including landowners, residents, industry, and Sturgeon County throughout the planning phase of the expansion rail terminal. Clifton, on Cando's behalf, has also been engaging in conversations with federal and provincial regulatory officials. Indigenous engagement is covered in Section 2.2. A list of the parties engaged is detailed below Table 2.1.

Table 2.1 – Public and Regulatory Stakeholders
Federal Stakeholders • Impact Assessment Agency of Canada (IAAC)
Provincial Stakeholders • Alberta Environment and Protected Areas (AEPA) • Alberta Transportation and Economic Corridors (ATEC) • Alberta Ministry of Arts, Culture and Status of Women (ACSW)
Municipal Stakeholders • Sturgeon County
Individual Stakeholders • Landowners • Residents • Surrounding Industry

Project engagement began in the Spring of 2023. Engagement with all stakeholders is ongoing and will continue, as necessary, throughout the lifespan of the project. Cando will continue to respond to and resolve any issues that may arise throughout the planning and implementation phases of the project. Cando is open to discussing any potential issues or complaints with stakeholders through in-person meetings, phone calls, or emails. Further information related to engagement is kept within Cando records and has been logged. To organize the responses received and accommodate a timely response Cando created a dedicated email (candolistens@candorail.com) for all non-government stakeholders. The email can be accessed by select Cando employees who are designated liaisons with the public for the project. A summary of specific engagement details for each stakeholder are described in the following sections.

2.1.1 Federal Stakeholder Engagement

Clifton began correspondence with the IAAC in June 2023 to determine whether the project would meet the criteria requiring the completion of an Initial Project Description. It was determined that the project would fall under the federal jurisdiction of the *Impact Assessment Act, 2019*. Following this evaluation, a meeting was conducted between Clifton and the IAAC to discuss the known details of the project including the project location and its connection to the existing rail terminal. Through this meeting and correspondence with the IAAC it was determined that the project would be considered an expansion of the existing rail terminal. Discussions and correspondence related to the project continue to the present date with topics including potentially affected Indigenous groups, project timelines, changes to the review process, and any studies, plans, or strategic assessments completed in the area.

As the existing and expansion rail terminals are not a Class 1 railway the operation is under the jurisdiction of ATEC to approve and oversee rather than Transport Canada.

Clifton submitted, on behalf of Cando, the IPD to the IAAC in February 2024. Following closing of the comment period, Cando received the IAAC's Summary of Issues (SOI) on April 12, 2024. Engagement with representatives of the IAAC has been ongoing to discuss project progress, next steps in IAAC's planning process and recently, to align on the process and responses to the SOI.

The following Federal agencies provided comments to the IPD and are included in the IAAC's SOI:

- Health Canada (HC).
- Women and Gender Equality (WAGE).
- Employment and Social Development (ESDC).
- Transport Canada (TC).
- Environment and Climate Change Canda (ECCC).
- Indigenous Services Canada (ISC).
- Natural Resources Canada (NRCan).
- Fisheries and Oceans (DFO).

Cando's responses to the SOI are provided in Appendix A. Where applicable, the DPD also includes the information requested.

2.1.2 Provincial Stakeholder Engagement
Clifton has spoken to various individuals within the Government of AEPA between September 2023 and the present. Clifton initially held a meeting with AEPA representatives working in permitting for the Industrial Heartland and the Designated Industrial Zone in October 2023. The discussion included an introduction to the project scope and location and conversations around applicable legislation and provincial submissions.

Clifton continues to correspond with the AEPA representatives and will work with the province to ensure provincial legislative requirements are met. It was determined that the project does not trigger an application through the *Environmental Protection and Enhancement Act*; however, approvals for the Stormwater Management Plan (SWMP) and the Wetland Assessment and Impact Reports (WAIRs) will require approval under the *Water Act*. The status of engagement with AEPA for these approvals are as follows:

- Two separate WAIR reports were submitted to AEPA: one for the site of the expansion and another for the bypass road. Cando received the *Water Act* approval in early May 2024 for the railyard site (Reference: DAUT0015982). The *Water Act* approval for the bypass road is currently under review with AEPA.
- AEPA has reviewed Clifton's preliminary SWMP developed for the project; the SWMP has been finalized since the IPD and has been provided to AEPA for approval.

Provincial applications submitted under Alberta's *Water Act* require the completion of a Pre-Consultation Assessment through the Aboriginal Consultation Office (ACO). The results of the ACO's assessment were returned to Cando in April 2024 and the ACO has determined that further consultation is not required for the approvals related to wetlands (Reference: FNC202450136). A request for a Pre-Consultation Assessment has also bene submitted for the SWMP.

Clifton reached out to representatives of the ATEC department to discuss the Operating Permit requirements under the *Railway (Alberta) Act*. This discussion was specific to the additional requirements and timeline for review necessary for approval. Specific project details were not included as part of this discussion. Cando's existing rail terminal complies with all the necessary provincial requirements to operate a rail terminal and they continue to have a strong relationship with officials within the Rail Safety Department of ATEC.

A historical resources application detailing the physical location of the project was submitted to ACSW for evaluation as is required prior to beginning any development project in Alberta. Cando received approval under the *Historical Resources Act* for the project in April 2024 (Reference: 4715-23-0102-002).

Although approval has been granted, the project is still subject to section 31 of the *Historical Resources Act* which relates to the chance discovery of a historical resource. Cando will be adapting the chance find protocol developed for the existing Sturgeon Rail Terminal for the project, which includes how to identify historic artifacts, and steps to take in the event of a chance find, including stopping and resuming construction work, notification procedures, and instructions on how to document the find and the information to collect. The protocol also includes working with an archaeologist for recommendations on subsequent steps, and for compliance with the Standard Requirements under the *Historical Resources Act*: Reporting the Discovery of Historic Resources.

According to IAAC, AEPA was the only provincial agency to provide comments to the IPD. Cando's responses to the SOI are provided in Appendix A. Where applicable, the DPD also includes the information requested.

2.1.3 Municipal Stakeholder Engagement

Cando has an ongoing, collaborative relationship with Sturgeon County since the commencement of the existing rail terminal project. Numerous meetings and correspondence between Sturgeon County Administration and Cando have been completed throughout the planning phase of the Project. Representatives of Sturgeon County have been providing advice and support regarding the County's interest in the project including development of the railyard, partial closure of Range Road 222, construction of the Bypass Road, traffic management for these components, development permit obligations, resident, and business interests. Formal engagement activities have also included creation of a formal Project engagement email address (CandoListens@candorail.com), and a municipal vote by Sturgeon County Council for the proposed partial closure of Range Road 222.

Cando worked with Sturgeon County Administration to mail Project Notification Letters to stakeholders (residents, landowners, and industry) near the Project area on October 24, 2023 (see Figure 2). This letter provided an overview of Project elements including scope, location, the intended operating and connection plan of the combined terminals, information on the proposed closure of Range Road 222 and Bypass, and Project timeline. The notification letter also encouraged use of the Project engagement email address, provided direct contact information to Cando representatives, and invited stakeholders to attend a Project Information Session scheduled on November 2, 2023.

The Project Information Session was used to inform nearby stakeholders about Project elements. The Information Session was lightly attended, although some residents and industry stakeholders did ask questions related to the Project. Few concerns were noted, and most attendees seemed to be gathering information to better understand the Project. One stakeholder/farm family noted concern about the proposed closure of Range Road 222 and committed to bringing that forward at the Public Hearing (below).

The First Reading by Sturgeon County Council of the road closure bylaw (Bylaw 1638/23 – Road Closure for Portion of Range Road 222) took place on November 14, 2023, and was carried/passed unanimously by Council. Following statutory guidelines, a Public Hearing about the proposed closure of Range Road 222 was held on January 16, 2024, to formally gather public input and to inform Sturgeon County Council ahead of a referral/submission to ATEC about the proposed closure. Although it is a local road closure, ATEC sign-off is needed before the road closure bylaw can progress to Second and Third Readings municipally.

At the Public Hearing, four people noted concerns about the road closure. Two noted concerns about increased traffic and development near their properties, and the protection of trees and irrigation routes, although they have suggested mitigation measures both publicly and privately to Cando. One speaker noted concerns about industrial development of any kind in the area, given local farming history. Cando notes the area has been zoned for heavy industrial development for decades and is seeing increased development interest and projects as it is part of Alberta's Industrial Heartland and the provincial Designated Industrial Zone. One resident claimed the road closure and the extra length of time needed to drive large trucks and farm equipment around using the Bypass would be detrimental to farm operations. Cando indicated at the Public Hearing (and to the resident privately) that the proposed closure and Bypass (mitigation) are critical needs of the Project to increase safety. There is a high likelihood of trains always blocking Range Road 222 for extended periods throughout the day, and it is simply not safe or feasible to have a local road and public access through an active railyard. While the Bypass may create a minor inconvenience by adding a small distance to a rural travel route, it also substantially increases safety and is the best possible mitigation to ensure safe rail-based development in the area. Cando has continued to take appropriate action to address concerns from the Public Hearing and has been actioning mitigations in partnership with nearby residents, landowners, and the county as feasible.

Following referral of the Road Closure Bylaw to ATEC, and assuming Ministerial sign-off, a Second and Third Reading by Sturgeon County Council of the Bylaw will take place. Timing of the Second and Third Readings, and the likely approval of the partial closure of Range Road 222 by Sturgeon County, are dependent on a response from ATEC, the receipt of which is still pending as of the date of this DPD but is still anticipated in the first half of 2024. Cando is continuing to work with the County regarding the road closure and Bypass, and notes both the County Administration and Council have indicated their support throughout the process.

Cando has continued to collaborate with the County on stormwater management planning for the project. The county has reviewed both Clifton's preliminary and final SWMP developed for the project and provided approval of the final version of the SWMP to Clifton in early May 2024. The final SWMP has been submitted to AEPA for approval.

2.1.4 Landowner

The land allocated for the use of the project is currently owned by a variety of individuals including private residents and businesses. These individuals or representatives of the businesses have been informed of the project with inquiries and negotiations regarding land transactions underway. Cando continues to work closely with the landowners to resolve any issues and to keep them informed on the progress of the project. Currently, there do not appear to be any issues or concerns regarding the land sales and the properties have been accessed for preliminary assessments including geotechnical and environmental investigations. Cando is coordinating with landowners as required for the planning and execution of any additional required site-based evaluations and other related items as the project progresses.

2.1.5 Resident Stakeholder Engagement

Through working closely with Sturgeon County, Cando has sent notification letters to residents that would be potentially affected by the project. This included residents of Sturgeon County within the area outlined in Figure 2 and Figure 4. The total area encompasses approximately 5,765 ha of land within Sturgeon County. To maintain the privacy of the residents contacted, Sturgeon County facilitated mailing out the letters. The letters provided the residents with contact information for Cando and encouraged feedback from the community. Cando, in conjunction with Sturgeon County, also advertised and assisted in organizing an information session for the residents which took place on November 2, 2023. The information session included a presentation by Cando that included a project overview, location, scope, plan, design, engagement activities, timeline, and safety considerations. The residents in attendance at the information session were also able to ask questions and sign up to receive a copy of the presentation. Any concerns noted during the information session were logged by Cando and are being taken into consideration during the remaining portions of the planning phase. All residents who reached out to Cando have been provided an individual response. An example of the letter sent is included in Appendix B.

Cando is not aware of resident stakeholders on the project submitting comments during the review period of the IPD to the IAAC.

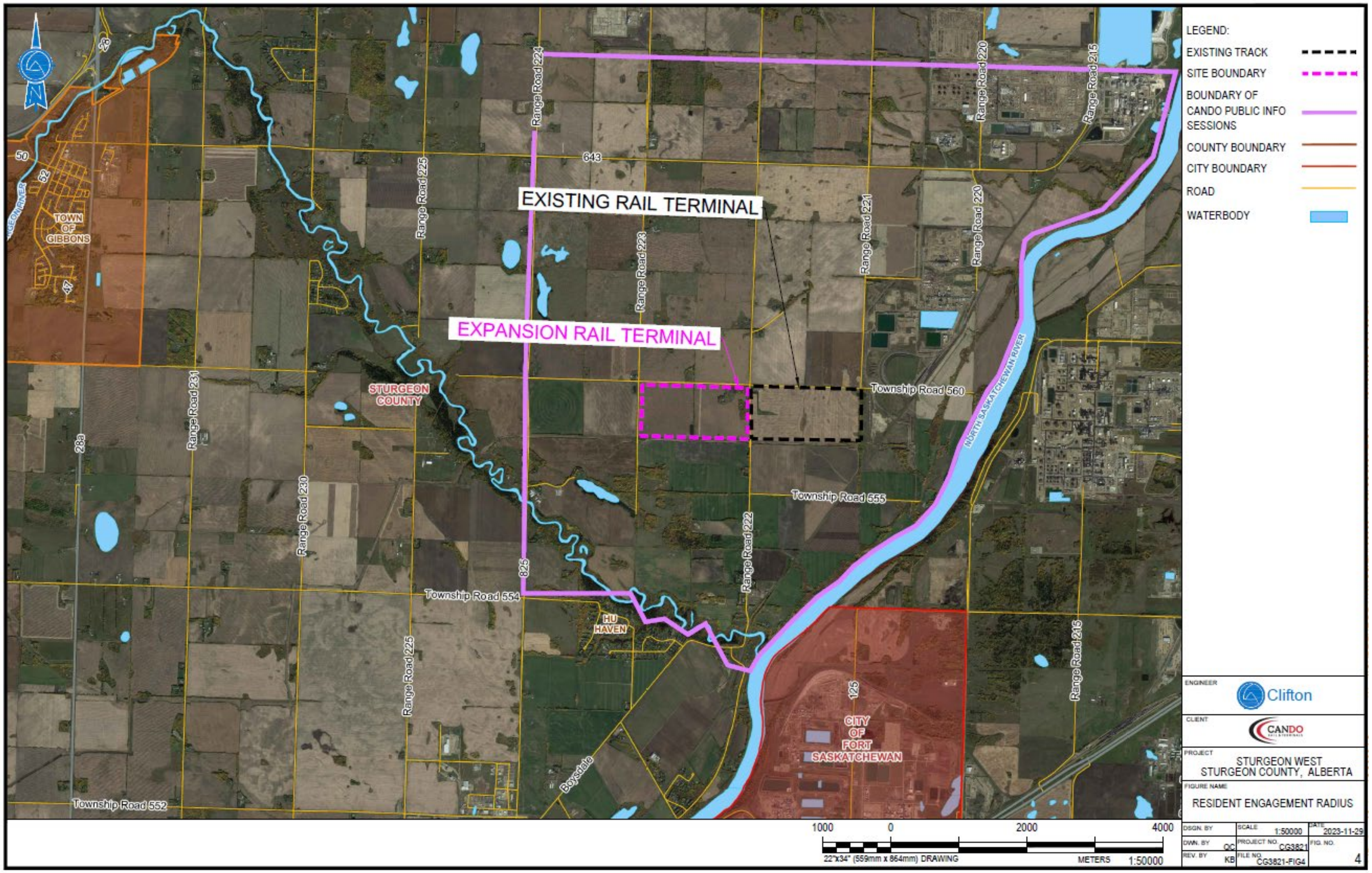

Figure 4 – Resident Engagement Radius

2.1.6 Industry Stakeholder Engagement

Cando continues to work closely with local industry in Alberta's Industrial Heartland especially some of the surrounding industrial facilities who are customers of Cando's existing rail terminal using the facility for railcar storage. As part of the project, all industrial facilities within the Sturgeon County portions of the Industrial Heartland were emailed an information package on the project. Some of the letter recipients were: Nutrien, ATCO, Pembina Pipeline, Suncor, AltaLink, Wolf Midstream, and NorthWest Redwater Partnership. The package included a letter describing the project and figures detailing the project location and a preliminary design drawing of the facility. The letters provided contact information and encouraged feedback. An example of the letter sent is included in Appendix B.

To date no objections or concerns regarding the project have been brought forward by industry stakeholders, and Cando is not aware of industry stakeholders on the project submitting comments during the review period of the IPD to the IAAC.

2.2 Indigenous Engagement

A summary of and the results of any engagement undertaken with Indigenous peoples of Canada, including:

- *A list of the Indigenous groups that may be affected by the project, including those that identified themselves during the planning phase as being potentially affected.*
- *A description of how the proponent intends to address the issues raised in the Summary of Issues.*

Following Clifton's initial meeting with representatives of IAAC, a list of Indigenous groups which may be potentially impacted by the project was provided by the IAAC. This list of the 15 Indigenous groups was provided via email. In addition to the list provided by IAAC, Cando also contacted the Alexis Nakota Sioux Nation and Paul First Nation which are both located just west of Edmonton. The following Table 2.2 is the list of Indigenous groups contacted.

Table 2.2 – Name of Indigenous Community or Group		
Alexander First Nation	Montana Cree Nation	Otipemisiwak Métis Government
Alexis Nakota Sioux Nation	Paul First Nation	Otipemisiwak Métis Government – Region 4
Enoch Cree Nation	Saddle Lake Cree Nation	Buffalo Lake Métis Settlement
Ermineskin Cree Nation	Samson Cree Nation	Kikino Métis Settlement
Kehewin Cree Nation	Foothills Ojibway Society	Lac Ste. Anne Métis Community Association
Louis Bull Tribe	Kelly Lake First Nation	

Following receipt of the Indigenous groups list from IAAC, contact information was collected from the ACO, IAAC, or the Indigenous group's website to initiate engagement activities by notifying each group of the project. Following responses to the Project Notification Letters, Cando completed subsequent engagement activities with the identified Indigenous groups. The main engagement initiatives are summarized in Table 2.3 below, and results of the engagement completed with are summarized in the sections following the table.

Table 2.3 – Main Engagement Initiatives with Indigenous Groups

Initiative	Issued/Occurred	Indigenous Groups Involved	Description
Project Notification Letters	Sent between September and December 2023	All groups listed in Table 2.3	Letters emailed with a 30-day response period requested to Cando (candolistens@candorail.com)
Follow-up Correspondence	January 2024 - ongoing	All groups listed in Table 2.3	Cando has been regularly corresponding with Indigenous groups as the project progresses
In-person and Virtual Meetings	October 2023 - ongoing	Enoch Cree Nation, Ermineskin Cree Nation, Samson Cree Nation, Buffalo Lake Métis Settlement, Lac Ste. Anne Métis Community Association	Cando met with Indigenous groups following Project Notification that expressed interest in meeting. Meetings to be scheduled as required.
Consultation Update Letters	Sent April 2024	Alexander First Nation, Buffalo Lake Métis Settlement, Enoch Cree Nation, Ermineskin Cree Nation, Kehewin Cree Nation , Lac Ste. Anne Métis Community Association, Paul First Nation, Samson Cree Nation	Response letters emailed in response to the Project Notification Letters and follow-up consultation

Table 2.3 – Main Engagement Initiatives with Indigenous Groups

Initiative	Issued/Occurred	Indigenous Groups Involved	Description
SOI of Comments to IAAC	April to May 2024	Michel Calihoo Nation Society, Montana First Nation, Otipemisiwak Métis Government, Friends of Michel Society, Enoch Cree Nation, Foothills First Nation, Lac Ste. Anne Métis Community Association	Responses to SOI are included throughout this DPD document
Continuing Engagement	Ongoing	Applicable Indigenous groups as required	Engagement activities will continue to include email correspondence, telephone discussions, meetings and site visits, as required

Cando's responses to the SOI are provided in Appendix A. Where applicable, the DPD also includes the information requested. The outcome and current status of ongoing engagement activities is summarized by each Indigenous group in the sections below:

Enoch Cree Nation (ECN)

Engagement activities have included numerous emails and an in-person meeting with ECN corporate representatives and senior management from Willows Construction (an ECN-owned business). In its comment submitted to IAAC, ECN identified concerns that land developments within and around their nation has resulted in a reduction in lands available for harvesting, as well as knowledge holders and elders with experience on the land. The project is not within or near ECN lands, which are approximately 63 km from the site. Most of the correspondence has been in relation to Cando's upcoming needs for contractors and Project-related services. Cando is currently developing its procurement strategy and will continue to engage with ECN as the project progresses to evaluate the potential for future collaboration or procurement opportunities. Cando has also offered to introduce ECN to project team who will be involved with procurement.

Ermineskin Cree Nation

A letter was received by Ermineskin Cree Nation requesting an in-person meeting. The letter further stated that the project is located on their ancestral territory and as such they would like to complete a site assessment to ground truth all potential impacts and to offer recommended mitigation measures to ensure seven generations of use. The letter stated that it was not Ermineskin's intent to impede the proposed project but as stewards of the land it is their duty to protect the safety of flora, fauna, birds, water, soil, air, and culturally sensitive areas. Cando has acknowledged receipt of the letter and has since held an in-person meeting with Ermineskin Cree Nation representatives to discuss the scheduling of a site assessment, the responses to the SOI and DPD, access to supporting studies and opportunities for community partnerships or scholarships.

Kehewin Cree Nation

An email was received by Cando from a representative of Kehewin Cree Nation requesting clarification on the Cando contact information for the project. Cando has responded to the request and has had several subsequent correspondence with representatives of Kehewin Cree Nation. Cando is coordinating a site visit with representatives of Kehewin Cree Nation and has confirmed their commitment to these arrangements in writing.

Kelly Lake First Nation

A representative of Kelly Lake First Nation contacted Cando stating that they had no objections to the project as outlined in the information letter. They did indicate that they would like to be informed about Project milestones.

Samson Cree Nation

An in-person meeting was conducted between Cando and representatives of Samson Cree Nation. The meeting went through an overview of the project with follow-up discussions and questions. During the meeting the representatives of Samson Cree Nation discussed having access to any wood following tree clearing activities and potentially providing a monitor during construction activities for spiritual safety and artifact identification. The Samson Cree representative also asked about contractor or procurement opportunities. Following the meeting, Samson Cree Nation was also to provide a list of companies and services they could potentially provide Cando for future collaborations, as well as the potential for community partnerships and scholarships. Cando is continuing to work with Samson Cree Nation regarding these requests. Cando is coordinating a site visit with representatives of the Samson Cree Nation and has confirmed their commitment to these arrangements in writing.

Lac Ste. Anne Métis Community Association

A virtual meeting was held to provide a Project overview and see if there were any initial questions or concerns by Lac Ste. Anne Métis Community Association. Representatives noted they would like additional mapping of the Project location (provided), asked how they were added to consultation lists for contact (IAAC, ACO), asked when IAAC would be making decisions, noted concern that Cando did not yet have a formal Indigenous Consultation Policy (in development), asked Cando to share early site works activities and opportunities for involvement, and noted interest in a site assessment. The group also requested to conduct a site visit prior to construction to assess potential impacts and expressed interest in procurement and contracting opportunities for its partner companies. Cando is coordinating a site visit with representatives of the Lac Ste. Anne Métis Community Association and has confirmed their commitment in writing.

Paul First Nation

Cando and representatives of the Paul First Nation have been corresponding via email since the issuance of the Project Notification Letters. Paul First Nation has expressed interest in completing a site visit prior to construction, and Cando is coordinating a site visit with Paul First nation representatives and has confirmed their commitment in writing.

Buffalo Lake Métis Settlement

Following the issuance of the Project Notification Letter, Buffalo Lake Metis Settlement met and corresponded with Cando where they expressed an interest in procurement and contracting opportunities for the project. Cando representatives were subsequently introduced to the General Manager of Buffalo Lake Development Corporation (BLDC). Cando will communicate with Buffalo Lake Metis Settlement and BLDC as it finalizes its procurement strategy to discuss potential opportunities.

Alexander First Nation (AFN)

Representatives of the Alexander Business Centre (ABC) expressed interest in procurement, contracting and investment opportunities for project. Cando is currently finalizing its Indigenous Relations Guidance Principles and Guidelines. Investment opportunities will be evaluated once the IR Principles and Guidelines are completed, which Cando expects at the end of May 2024 and has communicated this timeframe to AFN/ABC. Cando will advise Alexander Business Centre of procurement and contracting opportunities once a procurement strategy is finalized. In the interim, Cando has requested that ABC provides an overview of its industrial project capabilities, past project experience, labour availability, and equipment lists.

Alexis Nakota Sioux Nation

Representatives of the Alexis Nakota Sioux Nation informed Cando that they had completed a visit of the site in January 2024. Alexis Nakota Sioux Nation indicated that they were satisfied with the status and land usage of the site and did not have issues with the project proceeding but would like to be informed if there were any changes to the scope of the proposed project.

To date, Cando has not received responses or feedback from its Project Notification Letters or subsequent attempts at engagement from Montana Cree Nation, Saddle Lake Cree Nation, Foothills Ojibway Society, Louis Bull Tribe and Otipemisiwak Métis Government and Kikino Métis Settlement. Montana Cree Nation and Otipemisiwak Metis Government have elected to provide comments through the IAAC regulatory process; responses for these comments are addressed in this DPD.

Based on the engagement activities conducted to date since the issuance of the initial Project Notification Letters, the main outcomes of Cando's consultation program are summarized below:

- One group indicated that they wanted to have a monitor on site during the construction period. Cando has indicated that given the prior use of the site as a farm the likelihood of cultural artifacts being found is very low. Cando will have a chance find protocol in place in the unlikely event that a historic resource is discovered.
- Five groups have indicated that they would like a site visit in the spring and Cando considers this a reasonable request. Cando will coordinate with groups to accommodate and to make arrangements.

Cando's preference is to make the site available for a day or two for groups, though not all groups may be open to having other First Nations or Indigenous organizations attend at the same time. These considerations will be discussed with the five Indigenous groups as arrangements progress.

- One group has indicated they would like access to the firewood when the site is cleared and grubbed. Cando is willing to accommodate the lumber salvage request, however, they have relayed that the group will need to arrange transport of the firewood.
- Several Indigenous groups have made requests for contracting and procurement opportunities, especially in clearing and grubbing, roads and civil earthworks. Cando is maintaining a list of interested contractors and their capabilities as engagement progresses and while finalizing its procurement strategy for the project.
- There were some requests for technical documents generated for the project and Cando indicated that some will be available online once regulatory submissions are available to the public, and that any that are not included in a report or submission are considered confidential. Cando has relayed during consultation that they are willing to discuss the findings of confidential reports in a summary manner.

Consultation, communications, and clarification with Indigenous groups is ongoing, and is now focussing on addressing and closing the comments and feedback received either through its own consultation program or as submitted through the IAAC regulatory process. Cando will be continuing consultation activities as the project progresses. These include facilitating and attending site visits, gathering input on the potential for the Project to impact treaty and other rights and traditional land uses, and working to address concerns or comments in a manner that is both respectful and feasible. Cando continues to maintain its contact email and phone line to receive any requests to engage, comments and complaints and maintain their service standard for response to those inquiries or complaints. Cando will also respond to requests for information, meetings, and site visits where practicable.

Cando is currently finalizing its Indigenous Relations (IR) Guiding Principles and Guidelines, which will outline opportunities for partnerships with First Nations and Indigenous organizations. Cando is also developing its procurement strategy for the project and is establishing if there will be procurement and contracting opportunities for Indigenous communities and organizations. Through the course of ongoing engagement, Cando has requested that Indigenous groups interested in participating in procurement and contracting opportunities provide information relating to the capabilities of their owned or affiliated companies, including industrial project experience, specialized skills and capabilities, labour pool, and equipment fleets capabilities.

Cando strives to build long-standing partnerships in the communities where it operates. Across its network, Cando provides scholarships and sponsorships that focus on four pillars of social responsibility: safety and protection of the community, environmental conservancy, leadership development and the "Cando Spirit". Cando also provides charitable donations through the Cando Cares Fund, supporting youth development programs, healthcare and health-related initiatives, educational programs and community development and building. Cando has relayed this information to Indigenous groups and has requested that interested groups engage with Cando as they are looking to expand partnerships with First Nations communities and Indigenous organizations near their operations.
Cando is committed to maintaining community mindedness and ensuring a sustainable future. Cando's sustainability plan is grounded in four pillars: environmental stewardship, indigenous relations,

workforce/people, and community giving. Cando is committed to Indigenous awareness and leveraging business relationships and opportunities with Indigenous partners. Cando is a member of the Aboriginal Chamber of Commerce in its head office jurisdiction. Cando is an active member of the Canadian Council for Aboriginal Business.

In addition to the engagement activities undertaken for this submission, provincial applications submitted under Alberta's *Water Act* require the completion of a Pre-Consultation Assessment through the ACO. Results of the assessment indicated that no further consultation is required however Cando is continuing engagement with Indigenous groups . Cando's First Nations Consultation number with ACO is: FNC202450136. An additional Pre-Consultation Assessment is also being submitted for the SWMP.

2.3 Studies and Plans

Any study or plan relevant to the project that is being or has been conducted of the region where the project is to be carried out, including any regional assessment that is being or has been carried out under section 92 or 93 of the Act, or by any jurisdiction, including by or on behalf of an Indigenous governing body, if the study or plan is available to the public.

Based on correspondence between Clifton and the IAAC there are no known studies or plan, relevant to the project, under section 92 or 93 of the *Impact Assessment Act* or by any jurisdiction, including by or on behalf of an Indigenous governing body.

There are several environmental initiatives in the region as set out by the province and the Industrial Heartland. These initiatives include the following (Government of Alberta, 2023a):

- An air quality management framework with local air quality monitoring through the Fort Air Partnership. A greenhouse gas (GHG) inventory and a discussion on air quality management is included in this report,
- A topsoil guideline document specific to the Industrial Heartland which outlines conservation, off-site storage, and off-site use of topsoil. Cando will continue to discuss the topsoil management with Sturgeon County.
- Water quality will be managed through the North Saskatchewan Region Surface Water Quality Management Framework. Surface water quality management is discussed in this report and, although this item does not require specific approvals or permits, Cando will implement best management practices to conserve the quality of the regional surface waters.
- Water drainage will be managed through municipal master drainage plans and *Water Act* approvals. Cando is working with qualified professionals to manage the on-site wetlands and future surface water drainage. Both project components are provincially regulated by AEPA through the *Water Act*.

Through the planning phase of the existing and expansion rail terminals Cando is aware of the interests in preserving the environmental quality of the air, soil, and water. Cando is working with qualified professionals and government agencies to ensure that all regional requirements are considered prior to the implementation of the expansion rail terminal.

2.4 Strategic Assessments

Any strategic assessment, relevant to the project, that is being or has been carried out under section 95 of the Act.

Based on correspondence between Clifton and the IAAC there is one strategic assessment that would be applicable to the project. The Strategic Assessment of Climate Change, published in 2020, would be relevant to the project; it is a strategic assessment conducted under subsection 95(2) of the *Impact Assessment Act*, and it applies to all designated projects under the *Impact Assessment Act*.

3.0 Project Information

3.1 Project Purpose and Need

An updated statement of purpose of and need for the project, including any potential benefits.

Purpose

The purpose of the project remains to leverage connections to a Class 1 railroad (Canadian National) to provide rail services to clients in the petrochemical industry located in Sturgeon County and the adjacent Strathcona County, within the Alberta Industrial Heartland Zone and beyond. Those rail services include rail car storage, train marshalling and assembly especially for unit trains, limited transloading of hazardous and non-hazardous materials, minor repairs and servicing to railcars and locomotives, and other rail services as may be identified by rail customers. The Cando Sturgeon Rail Terminal West Expansion is intended to be a full-service, multi-purpose facility for the storage, grouping, maintenance, and transloading of rail cars from various industries. This has resulted in the need to expand the existing Sturgeon East Railyard to handle demand.

The primary objective of the expansion project is to provide a large enough railyard for unit trains to arrive and depart with a classification railyard for breaking down and assembling those unit trains. In addition, there is need for a mechanical area to service and repair locomotives and rollingstock. The project is intended to be developed in multiple stages, with the timing of staging dependent on market conditions and customer demand

Need

There is no change in the need for the project. Class 1 railroads in Canada have largely stopped storing railcars for customers creating a national need for railcar storage facilities. Combined with the increasing industrial presence around the Project, and the increasing need for the transport of bulk products, there is a need for railyards to service customer railcars. The petrochemical industry located in Sturgeon County and the adjacent Strathcona County use large numbers of predominantly tank and hopper cars to transport their products to customers. The tank cars are privately owned and require rail facilities to store cars when they are not actively in use at either a production facility, a user’s facility or in transit. Consolidating rail staging operations in one area removes the need for each individual industry to provide its own facility, assists with network fluidity for the Class 1 Railroads and improves railcar handling efficiency at the end destination. This in turn lowers industry infrastructure and capital costs and increases competitiveness.

To meet the local needs for handling and servicing unit trains (trains that contain a single commodity) and to maintain connections to the CN Rail line and the rest of the North American market, it is imperative that the expansion rail terminal be comprised of long tracks with connections on both the north and south sides to the existing rail terminal.

In addition, Cando is committed to creating sustainable, long-term economic development opportunities that expand market access, make support chains more resilient, and generating up to 40 new full-time jobs. Additional financial benefits include an approximate $140 million dollar spend and an increased tax assessment to all levels of government.

The project layout, as shown in Figure 5, includes the following main components:

- The construction of the arrival/departure yard wrapping around the entire property.
- The classification yards for sorting railcars shown on the east side of the railyard.
- The mechanical area for locomotive and railcar repairs shown in the centre of the property.

Within the mechanical repair area, it is intended that in time additional ancillary facilities would be built to support railway operations based upon customer requirements. Further facilities that may be constructed include storage tanks for fueling, mobile transloading, and an expansion of the repair facilities. These uses may be developed in time along with appropriate permits and support infrastructure including power and surface and stormwater management.

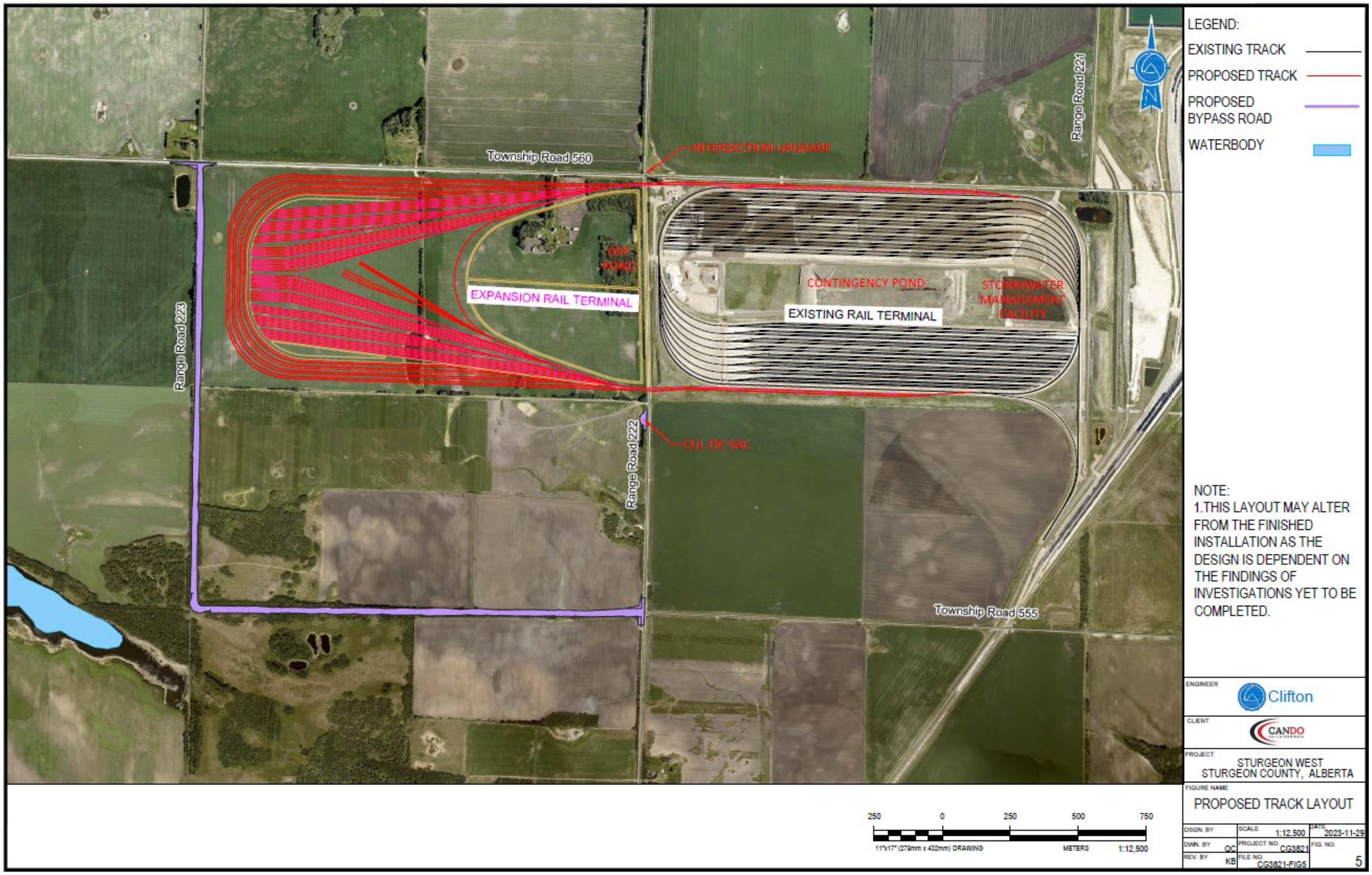

Figure 5 – Proposed Track Layout

3.2 Project Applicable Physical Activities Regulation

The provisions in the schedule to the Physical Activities Regulations describing the project, in whole or in part.

The project is subject to Section 55 of the Physical Activities Regulation which states the following:

"The expansion of an existing railway yard, if the expansion would result in an increase of its total area by 50% or more and a total area of 50 ha or more".

The project is subject to a review of the Initial Project Description by the IAAC as the area of the expansion railyard encompasses a total area of approximately 130 ha of land which is greater than the 50 ha indicated. The expansion rail terminal would also increase the capacity of the overall facility by approximately 50%.

There are no other criteria presented in the Physical Activities Regulation which would be applicable to the project.

There do not appear to be any other federal authorities that would have direct jurisdiction over the expansion rail terminal. The operations of the terminal would be regulated by ATEC and any spills or complaints would be under AEPA's control. That said, Cando is aware of the need to comply with the *Migratory Birds Convention Act* (MBCA) and the *Species at Risk Act* (SARA) in developing the project and they have retained biological consultants to advise on these aspects of the project.

3.3 Project Activities, Infrastructure, and Physical Works

A description of all activities, infrastructure, permanent or temporary structures and physical works to be included in and associated with the construction, operation, decommissioning of the project, including their purpose, size and capacity.

Throughout this Section 3.3 and subsections details of all activities will be presented including permanent infrastructure, temporary structures, and physical works related to the construction, operation, and decommissioning phases of the project.

3.3.1 Proposed New Infrastructure

The following project description includes items related to the project that will be discussed further in the construction, operation, and decommissioning activities sections. The proposed new infrastructure for the project is detailed below in Table 3.1.

Table 3.1 – Proposed New Infrastructure for the Expansion Rail Terminal

Proposed Infrastructure	Description
Arrival/Departure Yard	The arrival/departure (AD) yard is to become the primary spot for the inbound and outbound train traffic to the existing rail terminal. The AD tracks, ranging in holding capacity from 99 to 179 railcars, would provide a total of approximately 1,088 railcar spots. There is the potential to add locomotive storage tracks on both the north and south sides of the AD yard to allow staging of locomotive power while trains are being built.
Classification Yards	The classification yards are comprised of four smaller yards, with a combined railcar capacity of 1,860 railcars. These yards would be used to support the railcar demands of local industries and be used to assist in breaking up inbound unit trains and building outbound unit trains.
Mechanical Yards	The mechanical yard or railcar repair facility is in the center of the project area and is intended to connect the classifications yards and the AD yard. It contains a small staging yard with 70 railcar spaces and locomotive parking in addition to locomotive and railcar maintenance and servicing areas. These areas would be intended for minor repairs such as replacing wheels, trucks, brake components, and couplers. It also includes a connecting track to assist in movements between the north and south of the facility.
Rail Connection	The new terminal is to be connected at both the northern and southern track extents to the existing rail terminal located to the east of Range Road 222. It is imperative that both facilities be extended as shown in Figure 5. The extension of both the south and the north line is to be completed to ensure that all operations on both the expansion and existing rail terminals can occur simultaneously without disturbing the ability of either facility to meet customer demands.
Access Roads	Roadways will be constructed for crew and staff access by personal vehicle, for truck traffic to enter to refuel locomotives, and for service vehicles to provide water and remove waste products. The portion of Range Road 222 between the expansion and existing rail terminals is to be repurposed into the designated access point. Primary access is planned to be on the south side of the expansion rail terminal property from Range Road 222 with a second access from Township Road 560.

Table 3.1 – Proposed New Infrastructure for the Expansion Rail Terminal	
Proposed Infrastructure	**Description**
Internal Roads	Internal gravel service roads will be constructed beside the tracks along with gravel pads in the designated repair and transload areas (if constructed in the future) to allow for inspections and light maintenance of rail cars and equipment, and to provide access to emergency service vehicles. The service roads will be crowned to provide positive drainage away from the rail tracks and into the stormwater management system.
Water Management Infrastructure	Water supply for the expansion rail terminal is to be trucked to site and stored in cisterns until it is needed. As additional facilities and processes are added, it is expected that additional infrastructure may require water supply wells. If installed, water supply wells will be completed in accordance with all provincial licensing requirements under Alberta's *Water Act*. Surface and stormwater management will consist of drainage ditches and culverts strategically placed to collect and direct surface runoff to the on-site surface water management pond and into the County's stormwater management system. Stormwater management is described in the project's SWMP, which has since been finalized and provided to AEPA for approval (the final SWMP is provided in Appendix C).
Offices	Offices used during project construction will be housed in mobile, temporary trailers. Offices for the operation of the rail terminal are expected to be housed in a series of modular buildings with portable services (tanks for water, sewer, and gas connections) along with suitable gravel parking areas for employees. As services expand, it is expected that offices could migrate into structures, such as maintenance shops, with fixed utility connections.
Services	Services including electrical power and internet will be connected to the expansion rail terminal from the existing rail terminal. Electrical power for the project is to be upgraded to support 3-phase power requirements and to power the various equipment, facilities, and offices as necessary. The power feed and distribution lines will be constructed and operated in accordance with an arrangement between Cando and the electrical service provider. A small motor control center building may be required to house major electrical components. Internet and radio connections will be installed and operated in agreement with a third-party provider.
Security	Planned security measures for the expansion rail terminal includes a standard 6 feet high chain link fence along with intermittent lights and

Table 3.1 – Proposed New Infrastructure for the Expansion Rail Terminal	
Proposed Infrastructure	**Description**
	security cameras. The fence is to be installed around the perimeter with strategically placed gates and emergency egress points. The lights and cameras are to be placed to cover important operational areas, gates, and office locations. The fence will limit unpermitted access from both humans and wildlife.
Bypass Road	Due to the closure of Township Road 222 between the two railyards Cando, with guidance from Sturgeon County, is to create a bypass road. The bypass will include upgrades to the existing Sturgeon County operated Range Road 223 to the west of the W ½ 34-55-22-W4M and the intersection of Range Road 222 and Township Road 560 to the northeast of the property. To complete the bypass, roadways will also be constructed to the south of the S ½ 34-55-22-W4M (an extension of Township Road 555) and a cul-de-sac will be constructed at the end of Range Road 222 south of the expansion rail terminal.

Based on the currently known tasks of the project the only temporary structures are the mobile office and workspaces to be used during the project construction phase. The remaining infrastructure will be permanent. The temporary structures will be removed once the construction phase of the project is complete.

3.3.2 Existing Infrastructure

Some infrastructure that will be critical to the project is already in place at the existing rail terminal. This existing infrastructure includes:

- Utilities and third-party infrastructure services are already in place in the area or have been upgraded for the existing rail terminal. These services include internet and upgraded electrical power to 600-amp peak usage services – 300 kVA 3 phase power.
- Once the tracks of the expansion rail terminal and the existing rail terminal are connected this will in turn provide the connection to the CN Rail line.
- The surface and stormwater management system on the existing rail terminal will also be part of the stormwater management system for the expansion rail terminal.
- There are facilities for staff such as offices and washrooms on the existing rail terminal that may be used for staff of the expansion rail terminal.
- The bypass road will include upgrades to the existing roadways including Range Road 223, the intersection of Township Road 560 and Range Road 222, and Range Road 222 to the south of the expansion rail terminal where a cul-de-sac will be constructed.

3.3.3 Project Activities

Although activities associated with the project are being completed by third-party consultants and contractors they remain under the care and control of Cando. All of the potential contractors and services cannot be determined at this time but have included, or may include as the project progresses, mechanical, civil, structural, electrical, earthworks, and environmental contractors. The contractors/consultants will be procured by Cando and will be subject to Cando's safety and environmental standards.

Potential activities to be completed outside of the care and control of Cando are those related to utilities. These activities will be directed by the utility provider with Cando's involvement as required.

Planning Activities

Prior to the completion of any construction activities the project is undergoing an extensive planning period. Components of the project planning include desktop studies, field testing, reporting, and design. Specific activities include:

- A desktop biophysical baseline review with field verification to assess the project in context of the siting, landscape, land use, terrain, soils, vegetation, wildlife, habitat, surface water, and hydrology.
- A Wetland Assessment and Impact Report (WAIR) for each of the expansion rail terminal and the bypass road meeting AEPA requirements.
- A Phase I Environmental Site Assessment (ESA) for both the expansion rail terminal and the bypass road meeting the AEPA requirements to determine the potential for contamination to the subsurface soil and groundwater.
- A Phase II ESA to collect surface, subsurface soil and groundwater samples targeting areas identified in the Phase I ESAs for having potential contamination. The Phase II ESA was completed to meet applicable requirements and included assessment of baseline soil (surface and subsurface) and groundwater conditions.
- A geotechnical investigation to determine the soil characteristics in the area to support the design of the expansion rail terminal.
- A Wetland Assessment and Impact Form (WAIF) was completed to allow for the temporary disturbance to the wetland areas caused by the completion of the geotechnical drilling program in accordance with AEPA requirements.
- A final SWMP has been completed and reviewed by Sturgeon County in May 2024. The county has indicated it is satisfied with the SWMP and the plan has been provided to AEPA to finalize the *Water Act* approval for stormwater management.
- A traffic impact assessment to support the design of the bypass road.
- Field surveys to determine the elevations and topographical terrain of the expansion rail terminal.

These investigations have been completed to adhere to regulatory requirements, support regulatory applications and submissions, and to inform the project design. The planning activities were completed with landowner permissions and were of minimal disturbance to the lands with the mobilization of small track mounted drill rigs to collect subsurface soil samples. Some samples and observations, notably those for the biophysical assessment, were collected by foot.

As design and as the project progresses, Cando and Clifton are planning additional assessments at the site in 2024, including Clifton completing a supplemental sampling at the site to further characterize baseline soil conditions and to inform on soil handling and management practices for the project. Cando is currently, or will be, working with interested parties in the planning and execution of additional field-based assessments that may become required at a later date.

Construction Activities

The physical works associated with the construction activities include the implementation of the rail tracks and associated components, site access roads, surface water drainage infrastructure, and the bypass road. These activities will take place subsequent to the acquisition of the proper permits and approvals from AEPA following the review of the WAIRs and the SWMP, and the county. Cando is working directly with the county to ensure that all their necessary requirements are met.

A safety plan including emergency response procedures will be created prior to beginning construction. In addition, security measures will be implemented throughout the construction phase for safety purposes to limit access to the property by unauthorized personnel, and animals. Equipment used during the construction activities will be stored on the expansion rail terminal property when not in use. The area will undergo extensive utility locates to ensure the safety of on-site workers and to avoid damage to the utilities. Cando anticipates that the procurement plan for the project will be complete by late 2024.

Land Preparation – Vegetation Clearing and Demolition

The first stage of construction activities includes the preparation of the land. This would include planning with any on-site utility providers, the removal of vegetation, and the demolition of existing structures. The vegetation includes the cropland, grasses, and trees in any of the areas to be used for the construction of the expansion rail terminal and the bypass road. Only the vegetation within the footprint of the project is to be removed. The demolition or removal of any structures or objects related to the rural residential property would also include the removal of any concrete foundations. The construction materials will be properly recycled or disposed of off-site by a third-party contractor. During the demolition activities remedial excavation activities may also take place, if indicated by the results from the Phase II ESA. If considered necessary, a Hazardous Building Materials Assessment will be completed on the structures to determine if there are designated materials such as asbestos, lead, or ozone depleting substances that will require abatement prior to demolition. Prior to vegetation clearing and demolition activities (within five days), a qualified professional will complete appropriate wildlife sweeps, including breeding bird surveys and a sweep of bat roosting habitat, if required.

Soil Stripping

The construction footprint areas will then be stripped. The stripping activities will segregate the topsoil and the subsoil, which will be stockpiled separately. The topsoil management plan has not been finalized but based on conversations with AEPA the topsoil management aspects of the project would fall under the sole jurisdiction of Sturgeon County. It is most likely that the topsoil materials stripped will be stockpiled on the property for potential future reuse or repurposed at another location (e.g., soil amendments for farming operations).

Cut/Fill Activities

Once the topsoil has been stripped the area will be cut/filled as determined to be appropriate and with the reuse of soil from high elevations to areas of lower elevation if the material is deemed suitable. If imported material is required, it will be tested for environmental and geotechnical suitability prior to placement. It was determined that the northwest corner of the expansion rail terminal is at a higher elevation than the land on the southeastern corner. The material will be moved using excavators and rock trucks. Material will be spread primarily using a dozer and will be compacted using a pad foot packer.

As the material is being excavated any additional work necessary for the completion of the approved SWMP such as specific on-site grading or ditches will also take place. The current stormwater management design ties into the existing stormwater system on the operating rail terminal and will require the installation of a culvert to the north of the property, ditches and grading throughout the project footprint, a dry pond on the expansion rail terminal, and a contingency pond on the existing rail terminal. All onsite stormwater flows into the stormwater management facility on the existing rail terminal.

The final SWMP has been approved by the county in May 2024 and the final SWMP has been provided to AEPA for the *Water Act* approval. If any underground infrastructure such as placement of power lines and natural gas connections is deemed necessary, it will be completed to the standards of the specific utility provider. It is possible that dewatering activities will be necessary during the cut/fill activities. The groundwater removed may be discharged following any necessary approvals from AEPA or the County to ensure that the water quality and quantity will not cause adverse effects. The main contaminant to be considered during dewatering activities would be the potential for suspended solids. The presence of suspended solids can be reduced if the water is retained prior to discharging, allowing the solids to settle. The final SWMP is included in Appendix C.

Grading

Once the fill/cut is complete and the material has been compacted to meet specifications the granular material for the road surfaces, pit run gravel, and sub ballast will be placed. Granular material will be trucked over and spread out with dozers and graders. Material will be compacted with a smooth drum packer and placed in engineered lifts with testing completed to ensure that site-specific compaction specifications are met.

Track Construction

Once the grade has been completed and inspected, track construction can begin. During the construction phase of the project, it is likely that portions of the expansion and existing rail terminals will be used to store the construction materials including soil and aggregate stockpiles and track materials. Track construction includes material distribution, skeleton track construction, and ballasting and surfacing. The material distribution includes getting the ties, rail and other track materials positioned on the grade where it is required for assembly. This is a necessary step to be completed prior to the skeleton track. The skeleton track construction consists of laying out the ties on the prepared grade at the correct spacing, connecting the sections of rail to each other and the ties while getting the track on the design alignment. The ballast will be brought to the property and placed around the skeleton track. The track is then raised, and the ballast is compacted under and between the ties while the alignment and elevation are aligned.

Bypass Road Construction

The bypass road construction will follow some similar steps to the track construction in which any vegetation in place will be cleared, the topsoil will be stripped, and fill material will be placed in engineered lifts and tested to meet specifications. The design of the roadway will be crowned with ditches to direct surface water drainage. The design of the bypass roadway will meet the necessary provincial and municipal requirements.

Vegetation Control

In general, to manage weeds and vegetation on the property the construction equipment and any vehicles and equipment are to be brought to site clean and free of vegetation, debris, soil/mud and seeds. This is primarily to limit the potential for the spread of noxious weeds or other invasive species. To avoid unnecessary erosion to undeveloped portions of the property weed-free seed mixtures will be used. Any weed control activities will be done in accordance with the Alberta *Weed Control Act* and Sturgeon County requirements.

Operation Activities

The expansion rail terminal will come into operation following the commencement of construction. The construction will be phased, and some railway operations may be able to take place at the same time as some construction activities. The operation of the rail terminal and repair functions of the project would be completed by Cando employees.

The main activities to take place at the expansion rail terminal include sorting incoming and outgoing railcars, storing railcars, and assembling unit trains for departure. There may be nine shunting locomotives with six working at any given time: two in the north, two in south, and two in the terminals with the remaining three locomotives kept on-site as spares.

The actual operations of the expansion rail terminal will be under the jurisdiction of ATEC. To ensure compliance with ATEC, updates to the existing site-specific General Operating Instructions, Emergency Response Plan, Safety Management System (completed to Transport Canada standard), and the Operating Certificate (which is issued under the *Railway (Alberta) Act*) would be completed. Other internal guidance that would dictate the operation of the expansion rail terminal are Cando's Environmental, Social and Governance Policy, and the Occupation Health and Safety policy and procedures.

The primary purpose of both the expansion and existing rail terminal is to allow a singular location for the storage of railcars for the use of local industry. Additionally, the expansion rail terminal will offer some maintenance and repair services for cars and locomotives. Between the expansion and existing rail terminals there could be up to 120 employees with 40 employees working per shift. The expansion rail terminal will operate 24 hours a day, seven days a week.

Decommissioning Activities

The project will operate without a defined end point. The decommissioning activities will be completed in accordance with the industry standards and regulations in place at that time.

In general, the decommissioning activities will include disconnecting any on-site utilities and removing any in-place infrastructure including buildings, tracks, tanks, etc. The materials will be removed from site by a qualified contractor. It is intended that the removal will include the recycling of any applicable construction materials with the remaining materials disposed of properly.

The decommissioning process will include an assessment of potential contamination to the subsoil or groundwater. If determined to be necessary, the decommissioning process will also include the reclamation of contaminated soil and groundwater. Reclamation will likely begin by first removing the source of the contamination. Once the source is removed residual contamination will then potentially be addressed by excavating contaminated soils for off-site disposal. The entire region is zoned for industrial land use with it intended to continue to be used for industrial purposes; therefore, all remediation activities would be completed to meet the province's industrial land use environmental quality standards applicable at the time of decommissioning.

3.3.4 Incidental Activities

Include a description of the physical activities that are incidental to the designated project.

The primary project is the completion of the expansion rail terminal. To make the expansion rail terminal project safe and feasible additional roadways are required to be constructed. This includes the completion of the bypass road works. There are no physical activities other than those described for the project.

3.4 Production Capacity

An estimate of the maximum production capacity of the project and a description of the production processes to be used.

The arrival/departure yard is anticipated to consists of multiple tracks, with holding capacities ranging from 99 railcars to 179 railcars, with a total of approximately 1,088 railcar spots (approximately 60 ft or 18.3 m/rail spot). As this concept progresses, it is intended to add locomotive storage tracks to allow staging of locomotive power while trains are being built.

The classification yards are comprised of four smaller yards, with a combined railcar capacity of approximately 1,860 railcars. These four yards would be used to support the railcar demands of local industries and be used to assist in breaking up inbound unit trains and building outbound unit trains.

The mechanical yard is in the center of the facility and is intended to connect the classifications yards and the AD yard. It contains a small staging yard of approximately 70 railcar spaces, locomotive parking, as well as locomotive and railcar maintenance and servicing areas. It also includes a connecting loop to assist in movements between the north and south of the facility.

The track and associated activities are thought to encompass the entirety of the half section, approximately 130 ha in size. The expansion rail terminal will operate 24/7 and the anticipated traffic is approximately as follows:

- CN Arrival: 4 to 5 Trains/day
- CN Departure: 4 to 5 Trains/day
- Customer Inbound: 2 to 3 Trains/day
- Customer Outbound: 2 to 3 Trains/day
- Up to 2,000 railcars arriving and departing daily
- Up to 730,000 railcars arriving and departing yearly

3.5 Anticipated Schedule

The anticipated schedule for the project's construction, operation, decommissioning, and abandonment, including any expansions of the project.

The first phase of the physical works is anticipated to beginning in the last quarter of 2024. Construction activities will begin with the AD yard. The construction activities will then be phased over 6 to 7 years at which point the railyard will be at full build out. The first phase of construction will take approximately 1 to 2 years to complete. Following the first phase of construction the expansion rail terminal can begin limited operations. The remaining construction phases will occur while the terminal is in operation. The anticipated construction schedule without an Impact Assessment is as follows Table 3.2.

Table 3.2 – Anticipated Construction Schedule Without a Federal Impact Assessment

Project Task	Timeframe
From approval to full build out	6-7 years
Site Preparation	November 2024 to February 2025
Construction Phase 1	February 2025 to February 2026
Further Construction Phases	2027 to 2030
Project Lifespan	TBD – No fixed end
Decommission	TBD – >50 years

The anticipated construction schedule with an Impact Assessment is shown in Table 3.3.

Table 3.3 – Anticipated Construction Schedule – With a Federal Impact Assessment

Project Task	Timeframe
IAAC Planning Phase	2024
Impact Assessment Completion	2024 – 2026 (assumes limited federal scope requirements)
Assessment and Decision Making	Early 2027
From concept to full build out	6-7 years
Site Preparation	March 2027 to July 2027
Construction Phase 1	July 2027 to July 2029
Potential Further Construction Phases	2029 to 2033
Project Lifespan	TBD – No fixed end date
Decommission	TBD – >50 years

3.6 Potential Alternatives

A list of potential:

- *Alternative means of carrying out the project that the proponent is considering and that are technically and economically feasible, including through the use of best available technologies; and,*
- *Alternatives to the project that the proponent is considering and that are technically and economically feasible, and directly related to the project.*

There are limited alternate means of delivering a project of this type. While Cando will start this project with conventional diesel electric locomotives, the proponent is exploring the use of low-carbon fuels for combustion engines in the short-term and the electrification of its fleet of locomotives using batteries, hydrogen fuel cells or a hybrid of both. Cando, in cooperation with Emissions Reduction Alberta, is a leading participant in the lithium-ion battery-powered locomotive initiative. Battery powered trains use multiple locomotives that would carry batteries to provide traction power for in-service use. The traction system of a battery powered train is based on that of a conventional electric train, but which is selfcontained with the addition of on-board battery storage, supporting power converters, and temperature management for the batteries.

The only practical alternative to the expansion yard is to require clients to build their own storage yards and assemble trains there. This would result in many storage yards that would require significant additional land, as a minimum area is required to provide for proper train movement, switching and storage. These customer yards would likely be under utilized relative to the Sturgeon East and West yards, which will be managed full time to maximize the yards utilization. Individual facilities are generally not able to take advantage of economies of scale, efficiency of train movements, nor the marshalling and assembly of unit trains for the Class 1 railways and receiving destinations which may require railcars from multiple individual customers. By effectively managing the yard, Cando can service multiple clients.

Multiple track layout alternatives have been and continue to be assessed, but the overall functionality of the expansion has not changed. There have been alternative track design drawings created by Clifton that will be reviewed and potentially approved by Cando. The track design laid out in this application is approximate based on Cando's original concept but does not necessarily represent the exact final design. The overall track design will still include the same basic concept of the AD yard, the classification yards, the mechanical yards, and rail connections. In addition, there is the potential to add locomotive storage tracks to allow staging of locomotive power while unit trains are being built.

In addition to the above there are potential items that may be included in the expansion rail terminal. These items are not included as part of the initial design but are those that Cando may want to implement in the future depending on the physical space available within the expansion rail terminal and customer demands in Table 3.4. All potential future infrastructure would fall under provincial jurisdiction and require review and approval.

Table 3.4 – Potential Infrastructure Development

Railcar Repair Shop	Staging of railcars in need of maintenance and light repairs would be performed outside, with heavy repairs completed within a three-bay structure. If constructed, the structure would be comprised of a main shop with an office and support area. The railcar repair shop would include flaring and purging capabilities, to ensure that works can be safely conducted on railcars. The construction of a railcar repair shop does not trigger a specific approval under Alberta's jurisdiction, but the facility will be required to implement spill prevention and would be subject to Alberta's Release Reporting Regulation should a spill or release occur.
Locomotive Repair Shop	A full-service locomotive repair facility along with infrastructure to complete heavy repairs within the building may be constructed at the expansion rail terminal. Light maintenance activities such as minor repairs, watering, sanding, and fueling the locomotives would be completed outside the building in a designated area. Additional electrical charging infrastructure

Table 3.4 – Potential Infrastructure Development	
	associated with Emissions Reduction Alberta and Cando's lithium-ion battery locomotive initiative would be included in the locomotive repair shop area. More on the lithium-ion batteries is included in Section 6.5.4.3. The construction of a locomotive repair shop does not trigger a specific approval under Alberta's jurisdiction, but the facility will be required to implement spill prevention and would be subject to Alberta's Release Reporting Regulation should a spill or release occur.
Storage Tanks	Temporary and modular buildings will require storage or holding containers for potable water, liquid waste including domestic wastewater, and solid waste. Other above ground storage tanks associated with the activities noted within this project description are thought to consist of: • Diesel Fuel for operations. • Gasoline for operations. • Nitrogen for equipment, maintenance, and shops. • Recovery Tank for equipment, maintenance, and shops. • Used oil from equipment, maintenance, and shops. • Glycol for equipment, maintenance, and shops. The amount of storage for the above items is not known at this time but is expected to remain below the provincial Activities Designation Regulation which states that an approval is required for a facility with a chemical storage capacity of 5,000 m^3 or more. The tanks will be registered with the province or county as necessary. This includes the procurement of an Operating Permit through Alberta Safety Codes Council which issues permits of flammable and combustible liquid storage tank systems that have a capacity of 2,500 L or greater. Due to the proposed chemicals to be stored, Cando will also work with the local emergency response system, such the fire department.
Mobile Transload	There is a potential to provide a small scale mobile transload services to move products between railcars and trucks in support of local industries. Products to be transloaded are expected to consist of dry bulk, aggregates, biodiesel, refined fuels, liquefied petroleum gases (LPGs), and other products. The quantity of materials is expected to be limited to a maximum of 4 railcars per day, generating a maximum of 24 truck movements in/out of the facility. Infrastructure needed for this is expected to consist of gravel pads along tracks to accommodate truck traffic, grounding and bonding on designated tracks, minor electrical services, and other spill management equipment. The requirements regarding the transloading of products have been discussed with ATEC as well as

Table 3.4 – Potential Infrastructure Development	
	AEPA. ATEC is the governing body for the transload of dangerous goods by rail and requires the following be in place prior to issuing a permit: • Safety Management Plan. • General Operating Instructions. • Emergency Response Plan. • Confirmation of communication with local emergency response. • The tracks be insulated, bonded, grounded, and resistance tested. • TDG training of all on-site staff and compliance with TDG regulations including *The Transportation of Dangerous Goods Act*; and • Compliance with the *Railway (Alberta) Act* and associated circulars. Including, spill prevention methods, spill containment, and spill/release response protocols.

4.0 Location Information and Context

4.1 Geographic Coordinates

Provide a description of the designated project's proposed geographic coordinates, including, for linear development projects, the proposed locations of major ancillary facilities that are integral to the project and a description of the spatial boundaries of the proposed study corridor.

The geographic centre of the expansion rail terminal is approximately 53°47'59.43"N (latitude), and 113°11'11.97"W (longitude). The terminal itself will cover a half section of land, approximately 130 ha in size. The Alberta township description is N ½ 34-55-22-W4M.

The bypass road is expected to have the following approximate geographic extents as shown in Table 4.1.

Table 4.1 – Bypass Road Geographical Extents

Description	Latitude	Longitude
Intersection of Township Road 560 and Range Road 222	53°48'12.32"N	113°10'27.87"W
Upgrades to Range Road 223	53°48'12.43"N - 53°47'19.54"N	113°11'56.77"W - 113°11'55.95"W

Table 4.1 – Bypass Road Geographical Extents		
Description	**Latitude**	**Longitude**
Southern Side – New Road Construction	53°47'19.54"N - 53°47'20.56"N	113°11'55.95"W - 113°10'25.15"W
Cul-de-sac	53°47'44.39"N	113°10'25.56"W

The majority of the bypass road is contained either within properties that are to be used for the rail terminal or within existing rights-of-way. There will be small portions that will need to be acquired from local landowners prior to construction. The exact amount of land to be purchased depends on the final design of the roadway. Drawings of the current, preliminary road design are included in Appendix D.

4.1.1 Site Maps

Site maps produced at an appropriate scale in order to determine the project's proposed general location and the spatial relationship of the project components.

Figure 6 – Local Residents

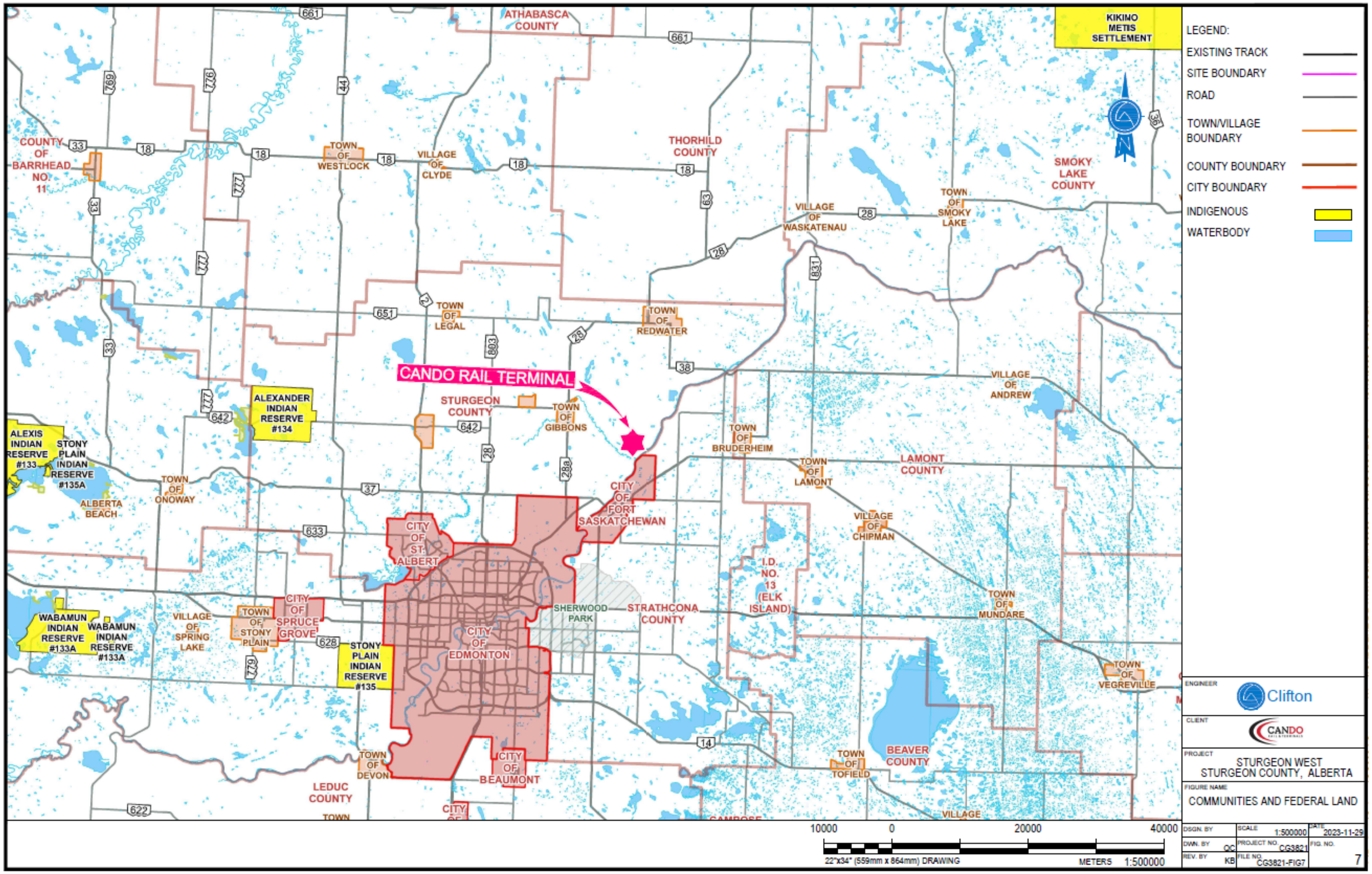

Figure 7 – Communities and Federal Land

4.1.2 Legal Land Descriptions and Landowner Documents

The legal description of land to be used for the project, including, if the land has already been acquired, the title, deed or document and any authorization relating to a water lot. The level of detail should be appropriate for the project type.

The legal land descriptions of the expansion rail terminal properties are NE 34-55-22-W4M, NW 34-55-22-W4M, Railway Plan 0824867 Area C (short legal 0824867;C), and Plan 0824867 Area D (short legal 0824867;D).

Based on the current design the legal land descriptions and portions of land that may be purchased for the bypass road are as follows in Table 4.2.

Table 4.2 – Bypass Road Legal Descriptions

Location	Legal Land Description
Intersection of Township Road 560 and Range Road 222	Existing right-of-way and approximately 24 m^2 of SE 3-56-22-W4M
Intersection of Township Road 560 and Range Road 223	Existing right-of-way and approximately 340 m^2 of NE 33-55-22-W4M
Range Road 223	Existing right-of-way, 8,021 m^2 of SW 34-55-22-W4M, and approximately 8,121 m^2 of NW 34-55-22-W4M
Intersection of Range Road 223 and new construction on southern boundary	Existing right-of-way and approximately 150 m^2 of SW 34-55-22-W4M
Southern Boundary along the S ½ 34-55-22-W4M	Undeveloped right-of-way in SW 34-55-22-W4M and portions of SE 34-55-22-W4M and NE 27-55-22-W4M
Cul-de-sac	Approximately 1,110 m^2 in the northern half of SE 34-55-22-W4M

Cando is currently in the process of completing land acquisitions for the project but all landowners have been engaged by Cando and discussions are proceeding as planned.

4.1.3 Proximity to Residents and Communities

The project's proximity to any permanent, seasonal or temporary residences and to the nearest affected communities.

The zoning of the land in most of this portion of Sturgeon County within the Industrial Heartland is I5 – Heavy Industrial District (Sturgeon County, 2023 Land Use Bylaw). As noted, Alberta's Industrial Heartland is also a Designated Industrial Zone within the province of Alberta (Figure 2). There is no indication of a future change in land use. No future residential development will occur within at least 800 m of the project boundaries. The railyard project property is cultivated agricultural land with a single residence that will be vacated prior to construction.

To the north of the property is Township Road 560 followed by heavy industrial-zoned land that is primarily cultivated agricultural land leased out to local farmers. To the east is the existing rail terminal. To south is a pipeline right-of-way followed by a sod farm. To the west is Range Road 223 followed by land that is primarily cultivated agricultural land but is zoned heavy industrial. There are treed areas within the cultivated properties. Based on a review of Google Earth© there appear to be four residences located within a 1.5 km radius of the site; two to the south of the site and the remaining two to the southwest.

The nearest residence is 500 metres south of the edge of the proposed expansion yard. Currently, this land is zoned heavy industrial, and it is for sale. After the January 16th Public Hearing closed, a member of the owner's family indicated that the owner/occupant of this residence did not consider the existing East Yard noisy. The (existing) Sturgeon Terminal site GM and Supervisor have not received any noise complaints about the East Yard from the public to-date. (M. Richard, personal communications, 2024).

4.1.4 Project Proximity to Traditional Indigenous Uses

The project's proximity to land used for traditional purposes by Indigenous peoples of Canada, land in a reserve as defined in subsection 2(1) of the Indian Act, First Nation land as defined in subsection 2(1) of the First Nations Land Management Act, land that is subject to a comprehensive land claim agreement or a self-government agreement and any other land set aside for the use and benefit of Indigenous peoples of Canada.

The properties designated for the project are located on Treaty 6 land. The closest First Nation's reserves are the Alexander First Nation which is 49 km away to the west; the Enoch Cree Nation located 48 km to the southwest; and the Saddle Lake Cree Nation 89 km to the northeast. While there are other First Nations located further away, none are within 150 km to the north, east, southeast, or south of the Project. These locations are based on a review of the documented reserves as mapped by the province (Government of Alberta, 2021, see Figure 6 and Figure 7).

The project is located within Otipemisiwak Métis Government Region 4 and District 11 – St. Albert Métis District (Otipemisiwak Métis Government, 2023). The closest documented Métis Settlement is Kikino Métis Settlement which is located approximately 84 km to the northeast of the project.

Traditional land uses specific to the project location have not been identified. The larger area has been historically used by Indigenous communities through harvesting, fishing, and hunting. There may be some ancestral connections to the lands and Cando will continue to engage when and as needed throughout the lifespan of the project. The landscape in the area has changed through cultivation and the more recent industrial developments as Alberta's Industrial Heartland. The project location itself has been used as cultivated agricultural land since at least 1950 (Clifton, 2023).

4.1.5 Proximity to Federal Lands

The project's proximity to any federal lands.

The Edmonton Garrison (Canadian Forces Base) is located to the north of the City of Edmonton and is approximately 18.5 km to the southwest of the project boundary. Elk Island National Park is located approximately 20 km to the southeast of the Project. Elk Island National Park is located within the Beaver Hills Biosphere. The Beaver Hills Biosphere has national partners including Nature Conservancy of Canada. The boundary of the biosphere is approximately 16 km to the southeast of the Project (Beaver Hills Biosphere, 2023).

4.2 Physical and Biological Environment

A description of the physical and biological environment of the project's location, based on information that is available to the public.

Cando retained the services of EDI Environmental Dynamics (EDI) to complete a Biophysical Baseline assessment for the project. The biophysical assessment includes a desktop review with field verification. Their findings have been documented below and the full report can be found in Appendix E. Following a summary of the publicly available information is a brief description of the site-specific field observations, potential risks, and mitigation measures.

4.2.1 Terrain and Soil Summary of Publicly Available Information

4.2.1.1 Summary of Publicly Available Information

The project is located within the southern Dry Mixed Wood Natural Subregion (Natural Regions Committee, 2006). This region is typically characterized by undulating or hummocky surface expression with variable relief including some low-relief and inclined areas. The local topography was described as generally flat with a downward slope towards to the south and east. This would correspond with topography sloping downwards towards the Sturgeon River to the south and the North Saskatchewan River to the east.

There are three soil mapping polygons consisting of five soil series listed within the project area (Government of Alberta and Alberta Agricultural and Forestry, 2023). The soil series are Hobbema, Ponoka, Peace Hills, Primula, and Gleyed Peace Hills. Each soil series has its own characteristics but generally the soils were described as eluviated or orthic black chernozems, the Gleyed Peace Hills was described as gleyed black chernozems. The majority of the project footprint was noted to be Hobbema and Ponoka which were eluviated black chernozems with loam, silty loam, silt loam, and very fine sandy loam textures. Three of the five soil series listed were deposited by wind and water.

4.2.1.2 Site-Specific Risks and Mitigation

Field results from EDI's investigation as well as Clifton's geotechnical investigation generally confirmed these surface soil results from the desktop review. It was noted that the black topsoil material (A horizon) was approximately 20 to 40 cm thick. EDI described the A horizon as a silty clay loam or clay loam. The B horizon was an additional 20 to 40 cm thick and was described by EDI as clay loam or clay. The A and B horizon soils in the footprint of the project, notably the expansion rail terminal, will be stripped prior to construction. Prior to any construction activities Cando will discuss the soil management of the project with Sturgeon County. In discussions between Clifton and AEPA it was determined that the conservation and management of the surface soils would fall under the jurisdiction of Sturgeon County, typically under a stripping or development permit. The management of the soils must still comply with Alberta's *Soil Conservation Act*.

The risks to the soil due to the project include:

- Loss of soil due to erosion.
- Degradation of stockpiled materials.
- Soil compaction due to rutting and moving equipment.
- Potential for soil contamination.

Table 4.3 – Soil Risks and Mitigations

Risk	Mitigation
Erosion	• Limit the area stripped as much as practicable. • In dry, windy conditions use water on the surface of exposed soils to reduce the potential of erosion. • If possible, strategically place any stockpiled fine-grained materials away from low-lying areas and drainage courses and in locations with wind coverage to avoid the migration of material from entering waterbodies. • If possible, cover the stockpiled materials with a tarp, or if they are intended for long term storage seed the stockpiles with an acceptable mixture. • To reduce siltation to nearby waterbodies, construct earthen berms, or ditches to control the surface water runoff. Based on the proposed SWMP completed by Clifton the surface water runoff is to be directed to retention ponds on the existing rail terminal which will allow for the settlement of suspended solids.
Degradation	• Test the soils for Clubroot. Clubroot is a soil borne disease which can affect canola, mustard, and other crops in the cabbage family. • The A and B horizons are to be stockpiled separately so the soils can be properly reused. • Reuse and/or remove soils from the site pending the approval of Sturgeon County to avoid degradation from long-term storage. • If soils are to be stockpiled long-term, consider testing and amending the soil to improve the chemical/physical characteristics prior to reuse.

Table 4.3 – Soil Risks and Mitigations

Risk	Mitigation
Compaction	• Avoid using equipment on off-site areas to reduce the effects of compaction as compact soils result in the reduction of plant rooting and growth. • Use designated paths when running equipment.
Contamination	• Prevent contamination to soil by preventative use of drip pads and spill containment during activities with a higher risk of a spill/release occurring. For exampling, place a drip tray below the nozzle when completing refueling activities. • Properly dispose of all deleterious materials. • Keep all on-site vehicles and equipment in good condition and free of leaks. Inspect equipment regularly. If equipment is determined to be leaking it should be removed from site for the proper repairs to be completed. • Keep spill response materials on-site and clean-up any spill or release immediately with proper disposal of all contaminated materials including any soil or water to avoid the migration of the contaminants. • Ensure compliance will all TDG regulations including the handing and storage of materials and the use of placards. • Engage a qualified third-party for the proper remediation and removal of any contaminated materials.

4.2.2 Vegetation

4.2.2.1 Summary of Publicly Available Information

The Dry Mixed Wood Subregion of the Boreal Natural Region (Natural Regions Committee, 2006) is composed of aspen forests and cultivated lands with wetlands and low-lying areas. A review of the Alberta Conservation Information Management System (ACIMS) system did not indicate the presence of a listed vegetation species within the project area (AEPA, 2023a). A large portion of the project area consists of cultivated land with limited native species. The remaining areas of the project consisted of a mix of deciduous trees, graminoid marshes, and deciduous swamps.

4.2.2.2 Site-Specific Risks and Mitigations

The complete list of observed vegetation species is included in EDI's biophysical report (Appendix E). Five different noxious weed species were observed within the project area. There was also one listed plant, clammy hedge-hyssop, identified in two different locations. The plant is not federally listed in the *Species at Risk Act* (SARA). The plan is also known to be present in disturbed wetlands, is locally abundant, and was reported to ACIMS.

Potential risks to vegetation include:

- Loss of native vegetation.
- Introduction and spread of invasive plants and noxious weeds.

Table 4.4 – Vegetation Risks and Mitigations	
Risk	**Mitigation**
Vegetation Loss	• Limit clearing activities to the extents necessary and practicable. • Clearing actives should occur during the winter months to avoid disturbance to wildlife, especially birds, as per the Alberta *Wildlife Ac*t and Canada's *Migratory Birds Convention Act*. In addition, winter clearing will avoid disturbing dormant plant species. • Use the existing and expansion rail terminals for equipment storage and laydown areas as much as is practical. The second option would be to use cultivated lands to avoid disturbing native plant species. • Native vegetation remaining in the project area is not to be harvested. • If culturally significant flora or fauna is identified in the area, specifically by an Indigenous group, Cando will engage with the party to come to a mutually agreed upon plan. • If possible, the listed plants will be salvaged prior to Project construction and translocated to waterbodies adjacent to the existing Sturgeon Terminal East.
Invasive Species	• To avoid the spread of invasive species and noxious weeds control measures approved by Sturgeon County will be implemented. These control measures should still conform to Alberta's *Weed Control Act*. These measures could include the physical removal of the weeds, mowing the areas to prevent seeding, landscaping, tilling the soils, and the use of approved herbicides.

4.2.3 Wildlife and Wildlife Habitat

4.2.3.1 Summary of Publicly Available Information

The project is not located in any designated wildlife sensitivity zones. The closest sensitive zone is the Key Wildlife and Biodiversity Zone located approximately 280 m from the project and is associated with the Sturgeon and North Saskatchewan River Valleys (Government of Alberta, 2022). The project is located 200 m from a sharp-tailed grouse survey area and a sensitive raptor zone for the bald eagle (Government of Alberta, 2022). The project area does not overlap with any federally designated critical habitats (DFO, 2022; ECCC, 2022b) or any important bird areas, migratory bird sanctuaries, or national wildlife areas (Government of Alberta, 2022).

Known wildlife to the area include mule and white-tailed deer, moose, many bird species, and small mammals. Three bird species have historically been reported within 2 km of the project and there is documented fish presence within the Sturgeon and North Saskatchewan Rivers (AEPA, 2023b). These species were not listed with the federal or provincial government. The cultivated lands may provide habitat for deer, some birds, and small mammals. The treed areas within the project area would provide habitat for birds, ungulates, and small mammals.

4.2.3.2 Site-Specific Risks and Mitigations

During the visit activity from woodpeckers was noted and there was an unoccupied stick nest observed. Other trees were noted to be large enough to support habitat for raptor nests and pileated woodpecker nest cavities. No active nests/cavities were noted during the site visit. Thirteen different bird species, deer tracks, mule deer, and red squirrel were observed during the site visit. A stick nest/nest cavity survey will be conducted within suitable habitat within 1 km of the Project Footprint during leaf-off conditions in 2024, with a follow-up survey in late May 2024 to verify the status (i.e., active or inactive) of the nest and identify the occupant species. A pre-disturbance wildlife and nest clearance sweep will be completed prior to the commencement of construction following the Wildlife Sweep Protocols (Alberta Environment and Parks 2020b).

Risks to the wildlife and wildlife habitat due to the project include:

- Loss of habitat.
- Disturbance to present wildlife including the potential for nested birds.
- Increased human interference in the area due to the presence of workers.

Table 4.5 – Wildlife Risks and Mitigations

Risks	Mitigations
Loss of Habitat	• Limit the removal of habitat to the areas necessary. • Concentrate construction activities, such as vehicle parking, to areas that have already been disturbed to avoid the unnecessary loss of habitat.
Disturbance	• Complete clearing activities in the winter months and outside of the migratory bird nesting period (generally beginning of April to end of August) to avoid disturbing an occupied nest. • Complete wildlife sweeps and a stick nest/cavity survey prior to construction activities. If occupied nests or other sensitive species are encountered complete mitigation measures to ensure the health and safety of the wildlife. Mitigations would be specific to the findings but could include revisions to the construction plan or monitoring the wildlife for signs of stress. • Manage dust and noise as much as practicable to avoid stress on wildlife.
Human Interference	• If practicable, install temporary fencing around construction activities to avoid wildlife activities during construction. • The stormwater pond may become a desirable place for birds and wildlife. As the quality of the water may not be suitable for animal consumption and poses a drowning risk. The pond should be maintained to avoiding plant growth which can be desirable habitat and regularly remove the water from the pond.

Table 4.5 – Wildlife Risks and Mitigations	
Risks	**Mitigations**
	• If the water in the pond is suspected of having been affected by a deleterious substance it should be tested promptly and disposed of properly by a qualified professional to avoid interactions with wildlife. • Wildlife incidents, including accidental vehicle collisions, should be included in site-specific protocols. These protocols should include the steps to report an incident. • Avoid interactions with wildlife including hunting, chasing, or feeding.

4.2.4 Water – Surface Water, Wetlands, and Groundwater

4.2.4.1 Summary of Publicly Available Information

The project is located within the North Saskatchewan River watershed and the North Saskatchewan River Beaverhill Basin and Sub-basin. The Sturgeon River runs to the west, southwest, and south of the project. The nearest point is located more than 1 km to the southwest. The Sturgeon River flows southeast into the North Saskatchewan River which is primarily located approximately 1.5 km to the east of the project. The North Saskatchewan River then flows to the northeast. The regional surface water runoff generally follows in alignment with local topography. This means that the project would generally receive surface water from the northwest and that runoff from the project would generally flow to the south and east. Maps show a tributary of the North Saskatchewan River which may be connected to a wetland partially located within the project footprint (AEPA, 2023a).

Another aspect of water is the groundwater. The groundwater in the area underwent a regional assessment in 2001 (Hydrogeological Consultants Ltd., 2001). Based on this assessment, the aquifer in the region of the project is the Oldman Aquifer. There were 305 water well records reviewed with 41 records indicating dry or insufficient water. The yield of the Oldman Aquifer was, on average, less than 10 m^3/day. The quality of the groundwater is mainly sodium-bicarbonate based and includes naturally elevated total dissolved solids (TDS) between 500 and 1,500 mg/L. Sulfate concentrations were generally below 500 mg/L. The chloride concentrations were expected to be mainly greater than 250 mg/L which is the Canadian Drinking Water Guideline for chloride. It should be noted that the 250 mg/L is an aesthetic objective and does not necessarily indicate that there is an imminent risk to human health (Government of Canada, 2023d). There are also instances of fluoride levels above the Canadian drinking water quality guideline of 1.5 mg/L.

4.2.4.2 Site-Specific Risks and Mitigations

The local surface water runoff will be altered to direct the runoff to the engineered SWMP. In addition, the surface water runoff in the area would be directed and altered based on the presence of roadways, ditches, irrigation, cultivation, and berms. It was also noted that there is a sluice gate located north of the project within the northern ditch of Township Road 560. The sluice gate has the potential to alter the surface water flow. When the gate is closed to the south the water flows east along the northern ditch of Township Road 560. However, when the sluice gate is open to the south the water flows south onto the land allocated for the expansion rail terminal. It was also noted that there was 400 m of irrigation pipeline running north-south along SE 34-55-22-W4M, an 80 m shallow ditch running north-south along SE 34-55-22-W4M, and an irrigation pipeline with an intermittent ditch along Township Road 555 where the bypass road will be located.

Thirty-two wetlands, described as land saturated with water for long enough to promote the formation of water altered soils, growth of water tolerant vegetation, and biological activity adapted to a wet environment (Government of Alberta, 2013), were identified within the footprint of the expansion rail terminal. Nine wetlands were also identified within the footprint of the bypass road. These wetlands are shown in Figure 8. There were also ephemeral waterbodies and anthropogenic waterbodies (dugouts) identified within the project boundary. Ephemeral waterbodies are described as low-lying areas where water is briefly ponded in the spring or after a heavy precipitation events, but do not meet the requirements of a wetland (Government of Alberta, 2015). There were 18 ephemeral waterbodies, 13 ephemeral drainages, and three dugouts located within the project footprint. Detailed reports regarding the wetland assessment have been completed under separate covers for submission to AEPA under the *Water Act*. Two separate WAIR documents, one for the expansion rail terminal and one for the bypass road, have been submitted. The WAIR are designed to receive approval from AEPA for the removal of wetlands within the project footprint subject to approved offsets or financial compensation for the wetlands.

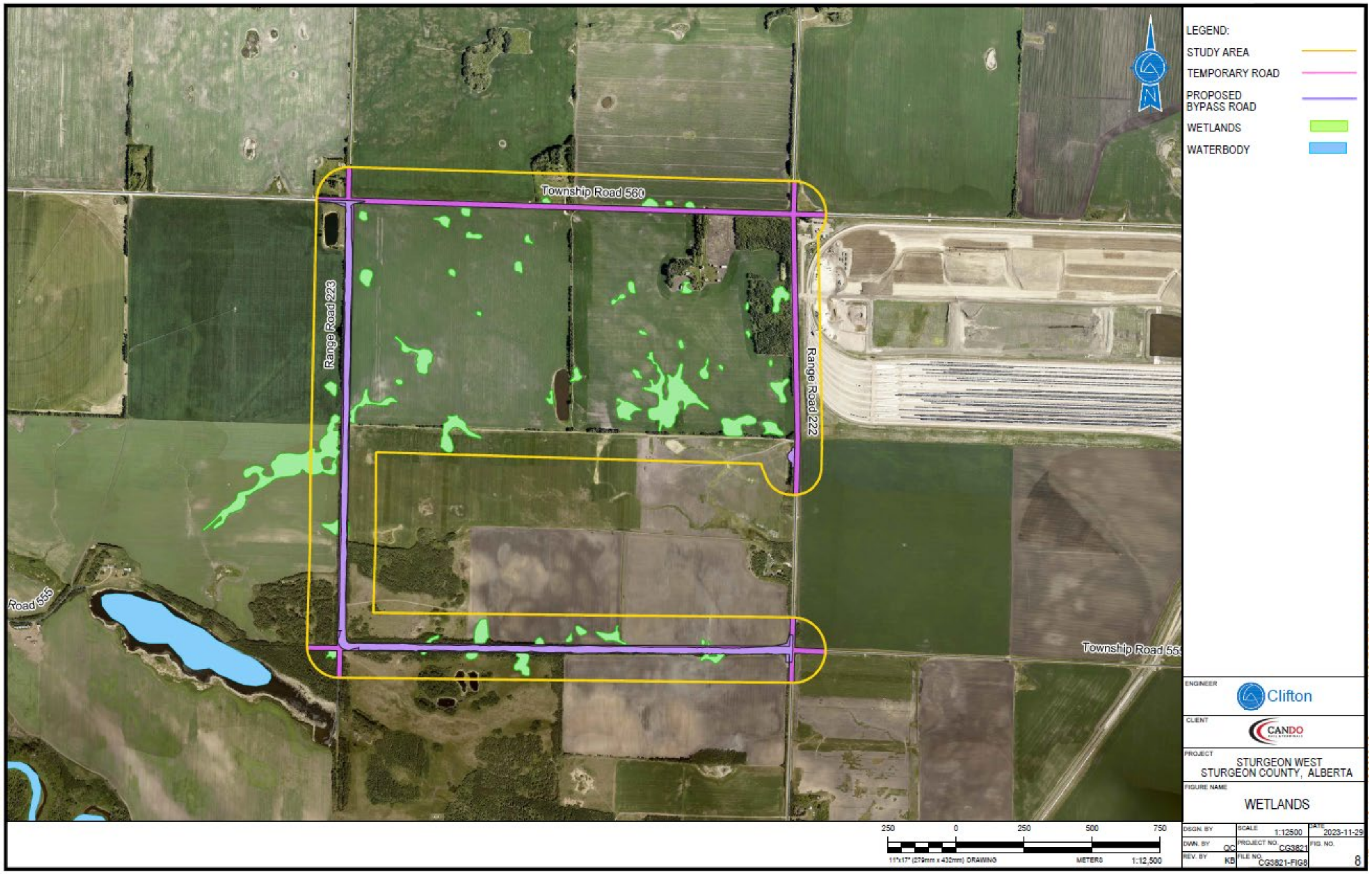

Figure 8 – Wetlands

Clifton completed a subsurface investigation to support a Phase II ESA on the rural residential property within the footprint of the expansion rail terminal. A baseline environmental assessment was completed with surficial soil samples and groundwater samples collected throughout the footprint of the expansion rail terminal. Groundwater samples were collected and analyzed for a variety of analytes during these investigations. In addition, there was a geotechnical investigation completed on the property which included the installation of piezometers to determine the groundwater elevations. These assessments are designed to give Cando an understanding of the current groundwater chemistry, any design implications because of the groundwater table, and an understanding of any preexisting contamination that may need to be addressed. The results of the subsurface investigation are being reviewed and analyzed. The results of the baseline environmental investigation may support the determination of site-specific soil and groundwater chemistry prior to the implementation of the expansion rail terminal.

The risks to groundwater, surface water, and wetlands due to the project include:

- Contamination due to a spill or release.
- Sedimentation to surface waterbodies.
- Changes to drainage courses causing alterations to waterbodies.
- Destruction of wetland habitat.

Table 4.6 – Water Risks and Mitigations

Risk	Mitigations
Contamination	• Potential for contamination is known to exist on the rural residential property due to former activities including fuel storage. These potential sources should be properly assessed and, if contamination is present, specific handling procedures should be created by a qualified environmental professional. These could include removal and proper disposal of the contamination source and if contaminated groundwater is encountered and in need of dewatering the water should be contained for proper disposal. • Prevent contamination by using proper primary and secondary containment when storing hazardous substances. If any hazardous substances, including waste oil, are to be stored in above ground storage tanks the tanks should be double walled, or have other secondary containment capable of holding 110% of the contents of the container. • Ensure that there is an emergency response procedure if a spill or release is to occur this would include reporting procedures and clean-up using on-site spill kits. • Use drip trays or absorbents when completing activities that may be high risk for the release of a deleterious substance such as fueling and maintenance.

Table 4.6 – Water Risks and Mitigations	
Risk	**Mitigations**
	• If the surface water stored in the on-site ponds appears to have a hydrocarbon sheen or is known to have been affected by a deleterious substance use skimmers and booms to remove as much oil as possible. • Surface water accumulated in the SWMP will be tested prior to release and if the water has physical/chemical characteristics above discharge criteria, then the material would be removed and properly disposed of by a qualified third-party. Based on conversations with AEPA, physical/chemical characteristics will not be provincially regulated but should follow local precedence based on *Water Act* approvals issued to other industry stakeholders within Alberta's Industrial Heartland. • Complete high-risk activities in designated areas, potentially with berms separating the area from the rest of the on-site drainage. • Inspect equipment and vehicles regularly for leaks. If a leak is observed ensure the equipment is properly repaired or fitted with a drip tray in the interim. • Use proper TDG protocols for the handling and transportation of hazardous materials and ensure staff are properly trained for the tasks they complete.
Sedimentation	• Prevent erosion. • Allow retention of surface waters in the on-site ponds to allow for the settlement of suspended solids. • Reduce dust and airborne particles by watering the ground surface (or using other dust prevention amendments) during dry, windy conditions. • If possible, cover or vegetate areas with a high potential for erosion. • Reduce dust generation through the implementation of speed limits.
Drainage Courses	• Ensure that a properly engineered SWMP is implemented that follows the provincial *Water Act* regulations and municipal master drainage plan. The SWMP has been submitted to AEPA for approval prior to implementation.
Destruction of Wetland Habitat	• Avoid wetlands outside of the project footprint to reduce unnecessary destruction of habitat. • Complete a thorough investigation of the wetlands within the project footprint and document the investigation in a WAIR for AEPA approval. The approval is contingent on compensation for all wetlands destroyed. The compensation is part of a wetland replacement program which aims to re-establish wetlands in other parts of the province to offset the habitat lost.

4.2.5 Air Quality and Noise

4.2.5.1 Summary of Publicly Available Information

The air quality in Alberta's Industrial Heartland is managed on a regional basis. The purpose of the Capital Region Air Quality Management Framework is to regulate air emissions on a regional basis, rather than regulating emissions from individual facilities. Four concentration level limits have been established for four contaminants of concern: nitrogen dioxide (NO_2), sulphur dioxide (SO_2), fine particulate matter ($PM_{2.5}$) and ozone (O_3). These limits are based on the Alberta Ambient Air Quality Objectives (AAQO) for NO_2 and SO_2, and Canada Wide Standards for $PM_{2.5}$ and O_3 and are reviewed on an annual basis. Mitigative management actions are to be implemented as needed in response to triggering of limit thresholds.

Air quality in the region of the project is monitored by the Fort Air Partnership, which currently operates ten continuous and sixty-three passive air monitoring stations. Data is compared to provincial AAQOs and is used to calculate the Air Quality Health Index. The Air Quality Health Index is a publicly accessible report which provides daily risk ratings on a scale from low to very high risk related to outdoor activity. The closest continuous monitor to the project is located southeast at the Scotford Shell Refinery. The closest passive monitor lies approximately 65 km east of the project. The Air Quality Trend Health Index for 2019-2021 indicates that hourly readings were in the low-risk range for 85 to 90 percent of monitoring period.

Noise levels in the area are managed for member companies under the Northeast Capital Industrial Association (NCIA) Regional Noise Management Plan. The development of the Regional Noise Management Plan was based on a predictive computer noise model that incorporates noise models from various facilities in the region, as well as road and rail traffic noise levels. The model is publicly accessible via Google Earth and displays four model cases. Case 3D shows 'Existing Facilities plus main Road and Rail Contributions' using 2019 roadway traffic data and estimated rail traffic volume on the main lines over a 24-hour period in 2020. The industrial facilities model assumes all equipment is running at 100% capacity 100% of the time. The regional model is updated every few years and considers significant changes in noise levels at industrial facilities and new data provided by ATEC and rail companies (if available). The current model predicts sound levels to be 43 to 48 dBA.

The nearest noise monitoring stations are located at the southwest fence line of the Pembina Redwater Fractionation facility to the east of the project, with another located more than 1,500 m from the project. Measured noise levels at most locations were shown to be generally consistent with model predictions. The field validation annual report conducted on behalf of NCIA also indicated that noise levels at most locations consisted of low frequency components with occasional mid/high frequency components. Trend analysis indicated no significant increasing or decreasing trends over baseline sound levels. Regarding rail transport activities, noise from train passages through the monitoring regions dominated the noise climate, although there had not been an increase of rail passages over 2019 observations.

4.2.5.2 Site-Specific Risks and Mitigations

Air contaminant emissions are expected to be negligible, or minimal during all project phases. Expected emissions during the construction phase will be transient in nature. During construction, the major sources of atmospheric emissions are expected to be exhausts from the onsite mobile equipment and fugitive dust. The key contaminants from mobile equipment combustion will be sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), petroleum hydrocarbons (PHC), and particulate matter (PM). The construction phase is planned to extend for 12 hours/day, 6 days/week for up to seven years. The presented emissions estimates are for one construction year for the onsite mobile equipment and diesel fuel is assumed to be used in the mobile equipment. Details regarding the estimate are included in Appendix F but the total compounds in air due to construction were estimated to be: 64.8 kg of SO_2; 51,129 kg of NO_x; 33,436 kg of CO; 8,617.4 kg of HC, and 4,752.7 kg of PM.

During operation, the main source of air emissions will be the combustion of diesel fuel in the locomotives. These emissions are expected to be predominately SO_2, NO_x, CO, HC, and PM from the locomotive exhaust. A total of eighteen GP-38 locomotives are estimated to be in use. The preliminary expected emissions during the operation were estimated to be: 20 tonnes/year of SO_2; 20 tonnes/year of NO_x; 20 tonnes/year of CO; 0.5 tonnes/year of PM_{10}; and 0.3 tonnes/year of $PM_{2.5}$.

Additional sources of emissions during the operations include fugitive emissions from the loaded rail cars, fugitive emissions from fuel storage, and fugitive dust resulting from the traffic on unpaved internal roads. These emission sources are expected to be negligible compared to the locomotives operation and will be transient in nature.

During the construction phase, noise will result from vehicles and equipment conducting activities including earthworks, material deliveries, and rail installation. Construction noise will be transient in nature. The primary noise sources during operation will be train shunting, coupling of rail cars, and the operation of locomotives. These activities will continue daily. The project will result in increased noise levels in the vicinity of the site; however, the increased noise during either construction or operation is not expected to contribute significantly to increasing trends at a regional level.

Noise receptors are expected to be occupied residences within a 5 km radius. It is not expected that increased noise levels will adversely affect receptors as the overall increase in noise levels over background is expected to be minor.

Table 4.7 – Air Risks and Mitigations

Risk	Mitigation
Fugitive Dust	• Limit the area of disturbance by earthworks as much as practically possible. • Implement reduced vehicle speed limits or other speed control measures on the site. • Suppress dust as necessary using water trucks. • Conduct visual monitoring of dust to determine when suppression is needed.
Air Emissions	• Avoiding unnecessary vehicle and equipment idling. • Implement a regular maintenance program of vehicles, locomotives, and equipment to reduce combustion emissions and maximize fuel efficiency.
Potentially Disturbing Noise	• Notify nearby residents (landowners and lessees) of the intended project schedule before the start of construction to prevent or reduce the impact on their operations or activities. • Maintain equipment, machinery and locomotives in good working order, including noise abatement equipment. • Schedule operations to occur during daytime hours, whenever practical. • Reduce the amount of time that switchers are left idling at the yard.

4.3 Health, Social, and Economic Context

A description of the health, social and economic context in the region where the project is located, based on information that is available to the public or derived from any engagement undertaken.

4.3.1 Health Context

Based on a profile report completed by Alberta Health in 2022 there were 6,102 people located in Sturgeon County East, the portion of Sturgeon County which includes the project area. This portion of Sturgeon County reportedly had a population increase of 35.9% between 2001 and 2022. There was 42.0% of the population within the region between the ages of 35-64 years old, individuals 17 and under were 22.8% of the population, and individuals 65 years and older were 13.8% (Alberta Health, 2022).

Important health indicators were also listed in the report. The percentage of obese individuals and those with mental health issues were like the provincial averages. Approximately 1.2% of the population identified as First Nation. The percentage of single parent households and low-income households were lower than provincial averages as were the general and teen birth rates. The childhood immunization rates were higher than the provincial average (Alberta Health, 2022).

The most common disease in Sturgeon County was hypertension at a rate of 23.6 per 100 people which was marginally higher than the provincial average of 20.6. The next most common chronic illnesses were diabetes, ischemic heart disease, and chronic obstructive pulmonary disease. The mortality rate per

100,000 people over the three-year period of 2019 to 2021 was 759.8 which was slightly higher than that of the province which was 700.3. The three main causes of death were neoplasms (cancer), circulatory system issues, and external causes (injury). All three of these causes of death had three year averages higher than that of the province (Alberta Health, 2022).

Semi-urgent and non-urgent emergency room visits accounted for 35.7% of all visits in 2020/2021. The most common reason for emergency room visits was upper respiratory infections. The rate of upper respiratory infections was like that of the province. The top three reasons for inpatient care were ischemic heart disease, diabetes, and mental/behavioural disorders due to psychoactive substance use. It was noted in the report that 100% of ambulance visits resulted in the patient receiving care outside of the geographical area. In addition, 73.2% of residents had a primary care physician outside of their geographical range; the provincial average was 53.2% (Alberta Health, 2022).

The project is not anticipated to contribute any impacts to human health. Cando is committed to ensuring the health and safety of all individuals who work on the project. All staff and workers receive training to complete their assigned duties and are mandated to follow Cando's health and safety protocols. The rail industry is heavily regulated and part of gaining the Operating Permit under the *Railway (Alberta) Act* includes the submission of General Operating Instructions, an Emergency Response Plan, and a Safety Management System (completed to Transport Canada standard). All of these documents provide detailed, site-specific, and comprehensive information regarding the safe procedures and emergency protocols. Safety is paramount to Cando and is a top priority - Cando is committed to operating safely and with minimum impact on communities and the environment. Cando works closely within the community and is working with all regulatory agencies to ensure compliance. Cando has an award-winning safety program and in 2023 won a Railway Association of Canada Safety and Environment Award for their Good Catch Campaign (Cando Rail & Terminals. 2021). The Good Catch Campaign is an employee driven program that recognizes and rewards exceptional safety hazard identification and action. This process is designed for field staff to proactively identify safety hazards and risks encountered.

4.3.2 Social Context

The population of Sturgeon County in 2021 was 20,061 people. This was a 2.1% decrease between 2016 and 2021. The population distribution is as such: 19.2% 14 years and younger, 65.2% 15 years old to 64 years old, 15.6% 65 years and older, and 1.3% 85 years and older (Statistics Canada, 2023). The median age of the population is 41.2 (Statistics Canada, 2023). Sturgeon County represents an area of 2,146.8 km^2 and has 0.46% of Alberta's population (Government of Alberta, 2023d).

There is a total of 7,021 private residences that are occupied with the vast majority at 6,295 being single detached homes. On average there are 2.8 people per household and a population density of 9.6 people per km^2. Of the population over 15 years old, a total of 16,200 people, 10,945 are married or are living common-law. There are reportedly 5,870 families in private households with the following demographics: 4,700 of those are married households with 2,495 of those having children; 695 are common-law with 305 having children; and 475 are single parent households with 270 being single mothers and 205 single fathers. A total of 330 households were intergenerational (Statistics Canada, 2023).

The majority of the population at 17,725 people state that English is their mother tongue, 675 identified French as their mother tongue, and 10 people identify an Indigenous language as their mother tongue. The majority of people speak English in the home at 18,490, 150 speak French, and no households identified Indigenous languages as the household language. The most common household languages, other than French and English were Polish and Portuguese with both listed as having 25 people speaking the language (Statistics Canada, 2023).

There were 1,640 people who identified as Indigenous. There were 415 that identified as First Nation, 1,085 identified as Métis, 80 who identified as Inuit, and the remainder either had multiple or no identifications. There were 350 responses from Registered or Treaty Indians. The Alexander First Nation Reserve is located within Sturgeon County. The reserve is located on the western boundary of the county. The majority of the population of Sturgeon County, at 19,245 people, are Canadian citizens. Approximately, 14,895 are third generation (or greater) Canadian citizens. There have been 70 people who have immigrated to the area between 2016 and 2021. A total of 800 people in Sturgeon County identified as a visible minority in 2021 (Statistics Canada, 2023). In 2021, 3.83% of the population identified as a visible minority and 8.4% of this group identified as aboriginal (Government of Alberta, 2023d).

Of the population 25 to 64 years old which was reportedly 10,450 people, 9,380 have their high school diploma or equivalent, 6,795 have postsecondary education, and 1,915 have a Bachelor’s degree or higher (Statistics Canada, 2023).

Sturgeon County has five towns within its boundaries: Bon Accord, Gibbons, Legal, Morinville, and Redwater. The county has an active recreation and parks department including community events, trail maps, golfing, ice skating, and ski trails. The county also offers a variety of adult, child, and youth programs. There are also family and community support services such as counselling, grants, and scholarship programs. The county is involved in other community initiatives including truth and reconciliation through active engagement, partnering with four local food banks, and industrial and economic growth initiatives. They are also involved in several environmental initiatives such as tree establishment, vegetation management, wetland replacement, and a clean energy improvement program (Sturgeon County, 2023).

As a company with rural roots, Cando is committed to fostering and maintaining strong relationships in the community and helping to build a sustainable future. Some of Cando’s initiatives include monitoring and working towards lowering emissions, charitable donations, long-term community partnerships, sponsorships, and a national scholarship program. Cando has four core values that they stand by in every community they work; these are environmental stewardship, indigenous relations, workforce/people, and community giving. Through genuine engagement, Cando becomes a community partner in all the areas in which they work (Cando Rail & Terminals, 2021).

4.3.3 Economic Context

In 2020, 15,070 people in Sturgeon County over the age of 15, earned an income and 5,800 individuals worked full-time. The median income of full-time workers was $77,000/year and the average income was $91,200. The median income of part time workers was $22,000 and the average income was $38,800. In 2020, the median household income was $124,000 and $105,000 after taxes. The median income for single person households was $56,400 and $48,800 after taxes and the average incomes was $68,400 and $56,500 after taxes. The median income of households with two-or-more people was $139,000 and $117,000 after taxes. The average household income was $151,400 and $120,900 after taxes. The average income for two or more people households was $166,400 and $132,600 after taxes (Statistics Canada, 2023). The median income for lone parent households was $92,000 (Government of Alberta, 2023d).

The top five employment sectors, in order from the most employed to the least were: construction; public administration; health care and social assistance; retail trading; and agriculture, forestry, fishing, and hunting. There were 20 different employment sectors listed for the people of Sturgeon County (Statistics Canada, 2023).

In 2022, Sturgeon County produced 34.9 million cubic meters of natural gas and 141,548 m^3 of oil. There was approximately $744.6 million spent on major projects and 302 building permits were issued. The working population of Sturgeon County had a participation rate of 68% in 2021. This had declined by 4.76% from 2016 when the participation rate was 71.4%. In 2021, the unemployment rate was reportedly 8% which represented an 11.1% increase since 2016 when the unemployment rate was 7.2%. The employment rate was 62% which had declined by 6.49% since 2016 when it was 66.3% (Government of Alberta, 2023d).

It is estimated that the project will generate an additional 40 full-time jobs. There would also be the necessity of part-time skilled labour throughout the construction phase of the project which is scheduled to take more than six years to full-build out. Additional financial benefits include an approximate $140 million dollar spend and an increased task assessment to all levels of government. The project is also ideally suited to Sturgeon County's goal of investment in the transportation and logistics sector. According to their website:

> "Sturgeon County is a large municipality that covers 2,100 square kilometers, serviced by 14 highways and six industrial areas. Owing to its large size, proximity, and connectivity to both the Edmonton Metro Region and Alberta's Industrial Heartland, Sturgeon County boasts modern infrastructure and a large transportation and logistics sector."

The website also states that the county has multiple rail-ready sites available for development with properties that enable a direct connection to critical rail transportation and logistics infrastructure (Sturgeon County, 2023). The project would provide an overall economic benefit to the area though the capital spend and the creation of both part-time and full-time jobs. Sturgeon County has publicly expressed interest in the development of rail transportation projects and there has been an overall increase in the unemployment rate in the county over the last five years. With all these factors in mind, the project is ideally suited to continue within Sturgeon County.

5.0 Federal, Provincial, Territorial, Indigenous and Municipal Involvement and Effects

5.1 Federal Financial Support

A description of any financial support that federal authorities are, or may be, providing to the project.

The project is not receiving any federal funding as Cando is the sole financer of the project.

5.2 Federal Project Lands

A description of any federal lands that may be used for the purpose of carrying out the project.

There are no federal lands within the footprint of the project or adjacent to the project's boundaries.

5.3 Jurisdictions with Powers, Duties, or Functions

A list of the permits, licenses, or other authorizations that may be required by jurisdictions that have powers, duties, or functions in relation to an assessment of the project's environmental effects. A description of any changes to the environment or to health, social or economic conditions that may occur in Canada that are directly linked or necessarily incidental to the involvement of a federal authority that would permit or enable the project to be carried out in whole or in part.

The project requires authorizations through the provincial and municipal governments. No other approvals will be sought from other federal agencies in pursuit of the project.

The other agencies requiring approval would be:

- AEPA through the *Water Act.*
- ATEC through the *Railway (Alberta)* Act.
- ACMW through the *Historical Resources Act.*
- Sturgeon County through the Planning and Development Department.
- Alberta's Safety Codes Council.

AEPA will regulate the removal and compensation for the wetlands located within the footprint of the expansion rail terminal and bypass. Cando received a *Water Act* approval for the site in May 2024 (Ref.# DAUT0015982) and the approval for the bypass road is currently under review. AEPA is also the authority for the approval of the SWMP; Sturgeon County has provided approval of the SWMP and Cando has provided the final SWMP to AEPA for final approval. The existing rail terminal received a *Water Act* approval from the province for the removal, and subsequent compensation, of the wetlands and the implementation of the existing stormwater management facility.

ATEC will approve the expansion rail terminal for operation. If, in the future, the transloading of dangerous goods is to be added to the services of the facility it would also require approval through ATEC. The bypass road will also require a submission to ATEC by the county. The existing rail terminal has received all applicable documentation through ATEC to operate.

An application for a *Historical Resources Act* approval has been sent and ACSW has confirmed in March 2024 that an approval is not required (Reference: 4715-23-0102-002). This is consistent with the existing rail terminal which also received approval to proceed without a historical resources impact assessment. Although clearance was received, Cando is aware of its requirement to comply with Section 31 of the Act regarding the reporting of discovered historical resources. Cando will modify its chance find protocol developed for the existing rail terminal so that it can be used for the project, as well as report chance finds in accordance with the Standard Requirements under the *Historical Resources Act*: Reporting the Discovery of Historic Resources.

Sturgeon County would be the authority for the operation of the bypass roadway, as it would ultimately be a county owned and operated road. The project will also require a development permit through the county. Based on discussions with AEPA the county would also be the authority for the management and conservation of topsoil. Cando continues to work closely with the county throughout the planning phase of the project.

The Alberta Safety Codes Council manages the permitting and inspection of storage tanks within unaccredited areas of Alberta. The portion of Sturgeon County which includes the project is in an unaccredited area which means that any storage tanks containing flammable or combustible liquids would be permitted and licensed through Alberta Safety Codes Council.

6.0 Potential Effects of the Project

6.1 Relevant Environmental Legislation

A description of any changes that, as a result of the carrying out of the project, may be caused to the following components of the environment that are within the legislative authority of Parliament:

a. Fish and fish habitat as defined in subsection 2(1) of the Fisheries Act.
b. Aquatic species, as defined in subsection 2(1) of the Species at Risk Act (marine plants).
c. Migratory birds, as defined in subsection 2(1) of the Migratory Birds Convention Act, 1994.

6.1.1 Fish and Fish Habitat

The are no waterbodies within the project footprint that support fish or fish habitat. No activities associated with the project will take place in areas that support fish, fish habitat, or marine plants. There is the potential that fish habitat downgradient to the project could be affected. Two known fish-bearing watercourses are located within 2 km of the project footprint (AEPA 2023b). The Sturgeon River, located approximately 1 km southwest of the project footprint, flows southeast approximately 3 km to its confluence with the North Saskatchewan River, which then flows northeast. The North Saskatchewan River is located approximately 1.7 km southeast of the project footprint. The Sturgeon River is a large permanent Class C watercourse with a Restricted Activity Period (RAP) from April 16 to June 30, and the North Saskatchewan River is a large permanent Class C watercourse with a RAP from April 16 to July 31 (Alberta Environment and Sustainable Resource Development, 2012). One potential watercourse was indicated by FWMIS (Waterbody ID 41751) which is located outside of the project footprint but within proximity to the south. However, no evidence of this watercourse was observed within 100 m of the project footprint during the field assessments.

Cando will mitigate potential effects to downgradient receptors through the engineered management of surface water runoff. The SWMP is designed so that all surface water generated within the footprint of the existing and expansion rail terminals will be retained on the property. The main water quality criteria thought to currently be affecting the surface water is sedimentation; however, this may change if additional services are to be provided on-site. The retention of the water on the property will allow for sediments to settle prior to discharge. Other criteria required for the discharge of surface water will be documented in a yet to be completed stormwater management guidance document. Once the quality criteria are met the surface waters will be released to Sturgeon County's drainage system which discharges into the North Saskatchewan River. The quality criteria is currently thought to include pH, electrical conductivity, turbidity, and oil and grease; this is based on the precedence set by *Water Act* approvals received by other industries within Alberta's Industrial Heartland. Based on conversations with AEPA, there are no current provincial regulations regarding the quality of the water to be discharged from the project property. The current stormwater management criteria is based on AEPA's recommendations and may change as the project progresses.

Other water sources required for the general operation of the expansion rail terminal including washroom facilities. The water for washrooms will be trucked to and stored on-site. Any wastewater generated will be kept in tanks or containers designed for this specific purpose. The wastewater will be removed from the property by a qualified third-party contractor.

Based on Cando's current operating procedure for the existing rail terminal and the mitigations measures to be put in place for the expansion rail terminal there are no known risks to fish or fish habitat as defined in the *Fisheries Act*.

6.1.2 Species at Risk Act: Aquatic Species/Marine Plants

The *Species at Risk Act* prohibit the killing, harming, harassing, or capturing of species listed within the Act. Due to the nature of the property and the surrounding areas as primarily industrial and agricultural land use it is not expected that species at risk would be present within the project footprint. Cando will comply with the prohibitions in the *Species at Risk Act* throughout all stages of the project. There were no federally listed species at risk identified during the field verification portion of the biophysical assessment nor during the desktop assessment. No listed species are thought to be present within the footprint of the project.

6.1.3 Migratory Birds

The *Migratory Birds Convention Ac*t (MBCA) prohibits the harming of migratory birds or the disturbance/destruction of their nests and eggs. Bird species were noted to be located within the project footprint during the desktop review and the field verification. The general nesting period for the area is from mid-April to late August. There are treed areas within the footprint of the project which could potentially be used as habitat for breeding birds as well as tall plants within the cultivated sections. No active nests/cavities were noted during the field verification; however, there was an unoccupied stick nest and habitat suitable for raptor nests and pileated woodpeckers. Given the proximity of the existing rail terminal which is an industrial facility it is anticipated that wildlife would prefer the landscape of the nearby Sturgeon River and North Saskatchewan River in comparison to the project area.

Due to the potential for migratory birds to be present within the project footprint mitigation measures must be considered. A wildlife sweep will be conducted by a qualified biologist prior to the commencement of construction activities. Trees within the footprint of the project will be cleared outside of the breeding bird window and grasses will be mowed to prevent ground nesting birds. Additional mitigation measures can be implemented if there is the presence of migratory birds noted at the time of construction. These include adjusting the construction schedule by postponing activities near occupied nests, implementing a barrier between the occupied nest and the activity, moving equipment daily, relocating nests or wildlife, and monitoring the nest to determine if the inhabitant is showing signs of stress. With the primary mitigation measures in place, it is unlikely that an issue to migratory birds would occur during construction/operation but if an occupied nest is observed and there is any potential to harm migratory birds, additional mitigations will be put in place.

6.2 Changes to Federal Lands

A description of any changes to the environment that, as a result of carrying out the project, may occur:

- *On federal lands.*
- *In a province other than the province in which the project is proposed to be carried out.*
- *Outside of Canada.*

No changes to federal lands are anticipated as part of this project, nor will the footprint of the project cross provincial or international boundaries. The footprint of the project and the lands within proximity are wholly located within the province of Alberta and Alberta's Industrial Heartland. Due to the direction and distance to the nearest federal lands, provincial boarders, and international boarders it is not anticipated that the project would create any changes to lands outside of the project footprint and the lands within proximity.

6.3 Impact to Indigenous Peoples

With respect to the Indigenous peoples of Canada, the description of any impact — that, as a result of the carrying out of the project, may occur in Canada and result from any change to the environment — on:

- *Physical and cultural heritage.*
- *The current use of lands and resources for traditional purposes.*
- *Any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, based on information that is available to the public or derived from any engagement undertaken with Indigenous peoples of Canada.*

A description of any change that, as a result of the carrying out of the project, may occur in Canada to the health, social or economic conditions of Indigenous peoples of Canada, based on information that is available to the public or derived from any engagement undertaken with Indigenous peoples of Canada.

Cando is a company dedicated to building strong relationship within the communities that they work in and service. This includes long-term collaborations and continuous engagement. They have taken a hands-on approach to the engagement process with all Indigenous groups by issuing information packages as described in Section 2.2 of this document. All communications received from Indigenous groups throughout the process have been responded to directly by Cando. This has included phone calls, emails, and in-person meetings. Cando believes the importance of understanding unique perspectives and will continue to work closely with all project stakeholders.

Potential effects to the physical and cultural heritage or the socio-economic health of the Indigenous peoples of Canada may continue to be revealed throughout the project engagement process. If any potential effects are brought forth, Cando will work with the party to help mitigate any issues. Given the responses receive to date following the initial engagement process there are not anticipated to be any effects to the physical heritage, cultural heritage, or traditional land uses for Indigenous people.

The area in which the project is located is entirely zoned for industrial purposes and is designed to be a consolidated location for industrial purposes. The land has been cultivated agricultural and privately owned for more than 70 years. The project footprint also contains a rural residential property. Given the zoning, current land use, and historical land use the potential for traditional land use is low as it would not be used for hunting, fishing, plant gathering, or spiritual use. There is no identified pathway for which the project would affect Indigenous peoples physical or cultural heritage.

There are no listings of historical resources within the footprint of the project. The closest historical resource listings are to the north of the project and to the south along the North Saskatchewan and Sturgeon Rivers, and those listings are primarily 5a and 5p which indicate areas with a high potential for an archaeological or palaeontological finding (ACSW, 2023).An application for a *Historical Resources Act* approval has been submitted and ACSW has confirmed in March 2024 that an approval is not required (Ref. 4715-23-0102-002), which is consistent with existing rail terminal which also received approval to proceed without a historical resources impact assessment. Although clearance was received, Cando is aware of its requirement to comply with Section 31 of the Act and will modify the chance find protocol it developed for the existing rail terminal so that it can be used for the project, as well as report chance finds in accordance with the Standard Requirements under the *Historical Resources Act*: Reporting the Discovery of Historic Resources.

Given the location of the project and the mitigations planned for the construction and operation there are thought to be no negative health effects. The site will be primarily used as a storage yard for rail cars. Some additional site uses may be performed including the maintenance of locomotives and refueling. These activities will be performed in specific locations with the use of containment materials, as necessary. If a spill or release is to occur, Cando will implement a spill response plan that conforms to the provincial regulations. The extents of any negative health or environmental effects due to the project will be localized and would be unlikely to affect Indigenous communities.

The project is not expected to increase travel or use to lands that are currently used for traditional land use purposes nor is it thought to cause disturbance to lands that are currently used for traditional purposes. The construction and operation activities will be limited to the project footprint and established roadways within the Industrial Heartland. The labour force to complete the construction of the project is likely to be sourced locally and should not result in a significant increase in a transient population. Based on all the information available there are thought to be low social impacts to Indigenous people.

The economic impacts to the area include a capital investment into the construction and building of the expansion rail terminal. There will also be an increase in the workforce during the construction phase of the project and the creation of up to 40 full-time jobs for operation. There is the potential for Indigenous economic benefits through the procurement of vendor services, primarily used during the construction phase. There has been some interest from Indigenous groups engaged with to have the opportunity to bid on or provide vendor services. Cando will work with qualified Indigenous peoples with skills and services required for the project during the procurement process.

6.4 Greenhouse Gas Estimate

An estimate of any greenhouse gas (GHG) emissions associated with the project.

Section 6.4 and subsequent subsections include a summary of the GHG estimate completed by Clifton. Further information regarding the GHG estimate and methodology can be found in Appendix F. In general, the equation used to calculate the carbon dioxide equivalent is as follows:

$$CO_{2e} \text{ (tonnes/year)} = AF * EF * GWP * CF$$

Where:

- CO_{2e} (tonnes/year) – estimated GHG emissions expressed as CO_{2e} equivalent in metric tonnes per year
- AF – Activity Factor
- EF – Emission Facto
- GWP – Global Warming Potential for an evaluated GHG gas
- CF – Units Conversion Factor

Applied GWP conversion factors are based on the IPCC 5th Protocol are 1 for CO_{2e}, 28 for CH_4, and 265for N_2O.

6.4.1 Construction Phase

Identified significant sources (i.e., more than 1 % of the overall GHG emissions) for the construction phase of the proposed project (excluding any GHG emissions from the existing terminal operation) can be summarized as follows:

- **Direct GHG Emissions**:
  - Mobile Combustion:
    - Mobile Diesel Combustion.
  - Land Use Change:
    - Biomass Oxidation.

- **Indirect GHG Emissions:**
  - Construction Personnel Travel by Road.

6.4.1.1 Mobile Combustion – Diesel

The estimated GHG emissions contribution during the construction phase of the project, as a result of the diesel mobile combustion, were calculated by Clifton. The information required for the calculation including the equipment type, number of units, and usage was estimated based on information provided by Cando and their affiliated contractors/consultants. Other information required for the calculation including EF and equipment horsepower were obtained from public information sources.

Based on all the information available, and as outlined in Appendix F, the total GHG emissions in carbon dioxide equivalents for one year of construction was estimated to be 6,743.7 tonnes CO_{2e}/year.

6.4.1.2 Land Use Change – Biomass Oxidation

Estimated GHG emissions contribution to the overall project's GHG emission profile as a result of the Land Use Change (LUC) contains two types of the carbon-related impacts:

- Emissions caused by the removal and oxidation of biomass during construction.
- The carbon not trapped by native vegetation that would have remained at the site should the project not have been constructed referred to as the lost carbon sequestration potential.

Calculations assumed a permanent removal of approximately 25 hectares (ha) of the forest and 7.505 ha of the wetlands in the expansion area of the project during the construction phase. Estimated LUC-related GHG emissions for the construction phase of the project were estimated to be 8,460.64 tonnes CO_{2e}.

6.4.1.3 Construction Personnel Travel by Road

Estimated GHG emissions released during the construction phase of the project as a result of the construction personnel travel between the site and Fort Saskatchewan were quantified. The EF for gasoline was obtained from a public source and the AF was calculated using the estimated average construction personnel count based on the information provided by Cando and their affiliated contractors/consultants. It was estimated that 35 people would travel to site, assuming a schedule of 6 days a week for construction and a travel distance of Fort Saskatchewan to the site (about 30 km round trip). For estimate purposes the assumption considered gasoline fuel consumption for a light pickup truck, 2015 or newer. This resulted in a total estimate of 109.29 tonnes CO_{2e}/year.

6.4.1.4 Estimated Net Total GHG Emissions – Construction Phase

Estimated net total GHG emissions for the construction phase are as follows:

Table 6.1 – Estimated Net Total GHG Emissions – Construction Phase of the Project		
Construction Year	**Estimated GHG Emissions CO_{2e} (tonnes)**	
	Mobile Diesel Combustion	**Biomass Oxidation**
Y-6	6,743.7	8,460.64
Y-5	6,743.7	
Y-4	6,743.7	
Y-3	6,743.7	
Y-2	6,743.7	
Y-1	6,743.7	
Subtotal	40,462.2	8,460.64
Estimated Net Total GHG Emissions		**48,922.84**

6.4.2 GHG Emission Sources – Operation Phase
Identified significant GHG emission sources for the operation phase of the proposed project (including GHG emissions from the existing terminal operation) can be summarized as follows:

- **Direct GHG Emissions**:
  - Static Combustion:
    - Propane Combustion.
  - Mobile Combustion:
    - Mobile Diesel Combustion – Locomotives.
    - Mobile Diesel Combustion – Auxiliary Vehicles and Equipment.

- **Indirect GHG Emissions** (Formerly Scope 2 GHG Emissions):
  - Acquired Energy GHG Emissions.

- **Indirect GHG Emissions:**
  - Employees Travel by Road.

6.4.2.1 Static Combustion – Propane Combustion
Propane is the primary heating source for the project and its combustion would be a contributing factor to the project's GHG profile. The EF for propane was determined from publicly available sources. The

proposed expansion does not require new propane-burning emission sources, and therefore, the AF is based on the average propane usage at the existing terminal. Estimated GHG emissions for this category is 11.24 CO_{2e} tonnes/year.

6.4.2.2 Mobile Combustion – Diesel Combustion, Locomotives

The EF for the combustion of diesel fuel due to the locomotives operating on site was collected from a publicly available source and the AF was estimated based on the information provided by Cando. The GHG emissions calculated for this category were 4,068 CO_{2e} tonnes/year.

6.4.2.3 Mobile Combustion – Diesel Combustion, Auxiliary Vehicles and Equipment

This category covers the estimated GHG emissions due to the use of diesel fuel by auxiliary vehicles and equipment. The AFs were calculated using the estimated requirements for the on-site equipment. The equipment and usage were based on the information provided by Cando. Other information was collected from public sources. The estimated GHG emission for the usage of equipment/vehicles on-site was 3,721.2 CO_{2e} tonnes/year.

6.4.2.4 Acquired Energy GHG Emissions

The AF for the energy imports to the site from the public electric grid were estimated using assumed requirements based on information provided by Cando. Other information was collected from publicly available sources. The estimated GHG emissions for this category are 164.91 CO_{2e} tonnes/year.

6.4.2.5 Employees Travel by Road

The AF was calculated using the estimated average railyard terminal personnel count based on the information provided by Cando (90), assuming 3 rotating shifts, 7 days a week operations schedule and a road distance between the site and Fort Saskatchewan (about 30 km round trip). The average gasoline fuel consumption for the light pickup truck road travel, 2015 or newer, was estimated using the data from public sources. This resulted in an estimate GHG emissions of 318.76 CO_{2e} tonnes/year.

6.4.2.6 Estimated Net Total GHG Emissions – Operation Phase

Estimated net total GHG emissions for an average operation year of the proposed project is summarized as follows:

Table 6.2 – Estimated Net Total GHG Emissions – Operation Phase of the Project

Estimated GHG Emissions CO_{2e} (tonnes/year)				Estimated Net Operation GHG Emissions CO2e (tonnes/year)
Static Combustion	Mobile Combustion Diesel-Locomotives	Mobile Combustion Diesel Vehicles	Acquired Energy	
11.24	4,068	3,721	164.91	7,965

6.4.2.7 Estimated Carbon Intensity of the Project

Estimated carbon intensity of the project per a year of the operation phase is presented as a ratio between the calculated net GHG emissions and railcars spots after the terminal expansion is as follows:

Table 6.3 – Estimate Carbon Intensity

Estimated Net Operation GHG Emissions CO_{2e} (tonnes/year)	Projected Capacity (railcars spots)	Estimated Carbon Intensity (t CO_{2e}/railcars spots per a year)
7,965	5,000	1.59

6.4.3 Decommissioning Phase

The project will operate for the foreseeable future (>50 years) and there are plans for decommissioning at this time. As a conservative approach, GHG contributions at decommissioning, including types of direct and indirect sources, are anticipated to be of similar nature and magnitude as the estimates calculated for the construction phase and include the following stages:

- Tracks and infrastructure will need to be removed.
- Re-grading and recontouring of the site to restore pre-development drainage to the extent practicable.
- Topsoil spreading, grading and revegetation.

Specific plans and estimates would be calculated in a more realistic timeframe for the project's end-of-life and using updated tools and information available at that time. At present, emissions at decommissioning are conservatively estimated to be the equivalent of 2 years of construction emissions (13,487.4 CO_{2e} tonnes).

6.5 Additional Considerations

6.5.1 Carbon Sinks Impact

Carbon sinks impacts related to the LUC/vegetation removal as a part of the project were quantified using the methodology described in Section 5.4.1.2. Estimated GHG emissions resulting from a loss of carbon sequestration were estimated to be 342.7 CO_{2e} tonnes/year.

6.5.2 Carbon Sinks Mitigation Measures

Based on the current project design and footprint options, a total area of approximately 7.505 ha of wetlands will be removed during the project development. In accordance with the Alberta Wetland Policy, Cando has submitted applications to AEPA for a *Water Act* approvals. As part of the approval process Cando has provided compensation for loss of wetlands which will go into the wetland replacement program.

Wetlands will not be disturbed and vegetation clearing in the vicinity of the wetland will not be conducted until *Water Act* approvals for wetland removal has been received. Mitigation will include the applicable compensation for the affected wetlands. The effect of the proposed wetland mitigations is estimated to be as follows:

Table 6.4 – Carbon Sinks Mitigation Measures Summary

Area Classified As	Estimated Removal/Restoration Area (ha)	CO_{2e} (tonnes/year)
Forest	25	319.5
Wetlands	7.505	23.2
Estimated GHG Emissions Total (Before Mitigation)		**342.7**
Wetlands	18.617	- 57.5
Estimated GHG Emissions Total (After Mitigation)		**285.2**

6.5.3 Estimation of Uncertainty

Qualitative estimation of the impact of uncertainties on the accuracy of the presented GHG assessment is presented below:

Table 6.5 – Uncertainty Ranking

Propane Combustion	Low Uncertainty – Propane consumption is based on the quantity of fuel purchased. Minimal loss is expected from storage or leakages. Propane emission factors are consistent and accurate.
Diesel Combustion	Medium Uncertainty – Diesel consumption is based on the utilization rates estimated by Cando and power rating. Minimal loss is expected from storage or leakages. Diesel emission factors are consistent and accurate.
Acquired Energy	Low Uncertainty – Electricity consumption is based on the metered electricity data purchased that is calibrated. The emission factor is based on an annual provincial grid average that includes all the province’s controllable fuel sources.
Road Travel	High Uncertainty – Annual road transport is an estimate based on available information regarding future staffing levels. Gasoline emission factors are consistent and accurate.

6.5.4 Net-Zero Plan
The presented net-zero plan is based on the Best Applicable Technology/Best Environmental Practices (BAT/BEP) as outlined in the Delphi Group: *Towards Net Zero: Developing a Rail Decarbonization Roadmap for Canada,* December 2022, document. The proposed decarbonization path applicable to the project consists of the following implementation steps:

6.5.4.1 Efficiency Improvements
Efficiency improvements to existing and new equipment and infrastructure have been the focus of railway decarbonization efforts to date and will continue to be prioritized. All efficiency improvements will serve to reduce the decarbonization burden placed on fuels and propulsion technologies.

Description: There are numerous ways to continue to enhance rail efficiency including further enhancing aerodynamics of locomotives and rail cars, automation, and data-driven solutions, among others.
Carbon Reduction Potential: less than 7 %.
Implementation Timeframe: Available immediately.

6.5.4.2 Low-Carbon Fuels
Through low-carbon/renewable fuel regulations, federal and provincial governments have already mandated minimum blending requirements of up to 5% renewable content in diesel, and these will continue to increase. Efficiency improvements may be supplemented by the blending of renewable and low-carbon fuels beyond what is regulated.

Description: Biodiesel is a renewable fuel that can be manufactured from vegetable oils, animal fats, or recycled cooking oil for use in diesel vehicles or any equipment that operates on diesel fuel. Biodiesel's physical properties are like those of petroleum diesel, with some notable exceptions including inferior cold weather properties and reduced energy content.
Carbon Reduction Potential: up to 16 %.
Implementation Timeframe: Estimated around 2030.

6.5.4.3 Alternative Propulsion
As railways seek to move past the limits of what low-carbon fuels and combustion engines can offer, electrification via battery, or hydrogen fuel cells are likely to prevail in the long-term. Cando, in cooperation with Emissions Reduction Alberta, is a leading participant in the lithium-ion battery-powered locomotive initiative.

Description: Battery powered trains are electric multiple units and locomotives which carry batteries in order to provide traction power for in-service use. The traction system of a battery powered train is based on that of an electric train but with the addition of on-board battery storage and supporting power converters and temperature management for the battery, if required.
Carbon Reduction Potential: up to 100 %.
Implementation Timeframe: Estimated around 2035 (provided further technology development and successful testing).

6.6 Types of Waste and Emissions

A description of waste and emissions that are likely to be generated — in the air, in or on water and in or on land — during any phase of the project.

6.6.1 Air

The emissions to air include dust, emissions generated by equipment during the construction phase, and emissions generated by operations. In addition, the equipment operating will generate localized noise.

As discussed in detail in previous sections, and outlined in Appendix F, the GHG emissions, fugitive emissions, and noise generation due to the project are thought to be minimal in comparison to the background conditions within Alberta's Industrial Heartland. The fugitive emissions generated are thought to be primarily SO_2, NO_x, CO, PHC, and PM due to exhaust. Cando will still implement general mitigation measures including dust suppression, speed limits, vehicle/equipment maintenance programs, and avoiding idling whenever practicable.

Cando, in conjunction with the Government of Alberta, is currently developing a lithium-ion battery powered switching locomotive. This program will provide long-term GHG reductions. Cando's innovative solution to retrofit locomotives with a battery propulsion system will provide a scalable solution that is customized to their switching operations. Once the retrofit is complete Cando plans on evaluating the locomotive's performance at the Fort Saskatchewan rail terminal. The lithium-ion battery powered locomotives, which will be zero emission units, will have the potential to perform all the work required of diesel-powered locomotives currently used in switching operations. Overall, the program will result in fuel savings and GHG emissions reductions (Cando Rial & Terminals, 2023).

6.6.2 Water

There will be limited liquid waste generated as part of the project. The waste would include the generation of stormwater, liquid domestic waste, and waste oils.

Stormwater within the footprint of the project are to be stored on-site within the stormwater management facility. The storage of the stormwater will allow for the settlement of suspended solids. Given that the current purpose of the existing and expansion rail terminals is primarily for rail car storage there is thought to be little generation of dangerous goods or risk of contamination to the surface waters. The primary risk to surface waters is sediment and the resultant suspended solids load. The stormwater retained in the SWMP will be tested for turbidity to ensure that it meets the environmental quality guidelines prior to its release to the Sturgeon County's drainage system. If it is suspected that the water has come into contact with a deleterious substance, then further tests specific to the suspected substance would be performed by a qualified professional. If the water is deemed unsuitable to be diverted to the municipal drainage system, then it will be collected by a third-party for removal off-site to a designated treatment facility. Receipts or waste manifests documenting the removal of the material for disposal will be kept on record.

Liquid domestic waste will be generated on-site and will be retained in tanks or containers specific to this purpose. Once required, the materials will be removed from the tanks or containers by a qualified third-party for proper disposal. This is similar to the disposal method for waste oil/hazardous liquid materials. Any hazardous liquid waste generated on site due to the project will be stored in appropriate containers/tanks and will be disposed of by a qualified third-party. Receipts or waste manifests documenting the removal of the material for disposal will be kept on record.

6.6.3 Land

Potential solid waste generated by the construction and operation of the project includes contaminated soils, hazardous building materials, and garbage/scrap materials.

A Phase II Environmental Site Assessment with the collection of subsurface soil and groundwater materials is being completed within the project footprint. There is the potential that the Phase II ESA will reveal contaminated soils within the project footprint. If there are contaminated materials on-site that will be disturbed, then a soil management strategy will be created. This may include the segregation and off-site treatment or disposal of contaminated soils with confirmatory samples collected to determine if all contaminated materials were collected. The Phase II ESA being completed is specific to the areas identified as being potentially contaminated during the Phase I ESA.

Prior to the demolition of any on-site buildings suspected of containing hazardous building materials such as lead, asbestos, or ozone depleting substances, a Hazardous Building Materials Assessment may be completed. This assessment would include the collection and analysis of representative building materials. If the materials are found to contain hazardous substances, then further abatement will be completed with the materials disposed of off-site by a qualified third-party.

Cando is committed to reducing landfill waste and follows the waste reduction hierarchy starting with the source reduction of materials. This includes understanding quantities and project needs and not over ordering materials. Generally, waste will be separated on-site, and care will be taken to recycle or reuse materials whenever appropriate. Refuse generated by Cando will be stored within the boundaries of the project footprint with appropriate storage containers, such as dumpsters, used for refuse. Other non-hazardous materials that are not in danger of being transported off-site by wind or rain may be stored external to storage containers. All materials will be properly removed from site whether that be by a third-party to the landfill or to scrap metal recycling. All solid waste materials that may be generated can not be anticipated at this time but based on Cando's experience and commitment to waste reduction care will be taken to ensure proper removal.

7.0 Summary

A plain-language summary of the information in parts A to E is required in English and in French.

Two plain language summaries of the contents of this main DPD document have been prepared in French and English. The French language summary document has been prepared using a qualified, third-party and in-house translators.

Note: Despite the best efforts in translation, if there are any discrepancies between the French and English versions, the English version of the main document will be deemed correct.

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Appendix A
Summary of Issues Responses

Clifton

Issue #	Issue from SOI	Proponent Response	Reference in DPD
Accidents and Malfunctions			
1	Need for additional information about the potential effects of accidents, spills, and malfunctions on the surrounding environment, including migratory birds, species at risk, local healthcare resources, and emergency services. Include avoidance, mitigation and monitoring measures.	The Sturgeon Rail Terminal West Expansion (i.e., West Railyard) will be incorporated into Cando's Emergency Response Plan (ERP) for its operating Sturgeon Rail Terminal (i.e., East Railyard). Cando retained emergency response professionals to help develop its ERP in accordance with the requirements of Alberta Transportation and Economic Corridors (ATEC), which has approved the ERP for the East Railyard. The ERP includes procedures for incident response including those relating to derailments, fire, dangerous goods, security, and releases/spills. Cando also retains a waste handling supplier for any potential incidents, as outlined in a response matrix in the ERP. This ERP will be updated to include operational information from the addition of the West Railyard; since both yards will be operating with similar objectives and practices, no material changes to the ERP are anticipated and both railyards will operate as one facility under the same ERP. Cando is working in consultation with the local fire chief to ensure that appropriate plans and measures are in place to mitigate risks. The West Railyard site will be fully cleared and be fenced off and will prevent wildlife entrance and passage. Yard operations are expected to also act as a deterrent. No species at risk were identified at or in proximity to the site, and therefore, as stated previously in the Initial Project Description (IPD), no impacts to species at risk are anticipated. The stormwater Pond will be used for surface runoff, so there are no impacts to wildlife anticipated. Site personnel will include monitoring for wildlife presence at Site in routine inspections and proactively engage a qualified environmental professional to provide guidance on managing any potentially emerging wildlife issues (e.g., nesting birds and pond use by waterfowl, nuisance wildlife, etc.), should they be observed. Incidents with potential for environmental impacts are anticipated to consist mostly of fluid releases which would remain within the project site. Cando will engage the services of a qualified environmental professional to provide support in the assessment and response to any incident that has the potential to impact, or has impacted, off-site lands. The qualified environmental professional will support the design and application of corrective actions. Spill response and reporting will be completed in accordance with applicable provincial regulations. For construction, roles and responsibilities, environmental constraints, measures to be employed as mitigations, incident response measures and permit/approval commitments will be managed under project-specific plans. Local healthcare and emergency services are anticipated to be sufficient during construction and operations. Construction personnel are expected to be ~40 workers. The increase in personnel for operational stages is expected to be minor and not require increases in the capacity of healthcare resources or emergency services.	3.3.1, 3.3.3, 4.2.1.2, 4.2.4.2, 6.1.2, 6.3, SOI Table, Appendix A
2	Clarify the role of the stormwater ponds and stormwater management facility within the context of an accident or malfunction, including how the release of hazardous materials will be handled in the event of a spill.	The preliminary Stormwater Management Plan (SWMP) included in the IPD has since been updated, and a final version was provided to Sturgeon County for review and approval. Sturgeon County has indicated it approves of the SWMP and it will now be provided to Alberta Environment and Protected Areas (AEPA) for approval. The final SWMP is provided in Appendix C of the DPD. The West Railyard stormwater infrastructure will be tied into the system already in place on the currently operational East Railyard, therefore, stormwater management will be integrated and operated as one stormwater management system. The current facility is already designed to accommodate 1:100 year 24-H flood events, and this includes runoff from the West Railyard once constructed. The system will use the same single outlet located at the East Railyard, which is gate controlled. The perimeter ditch network is also designed to not allow off-site water to infiltrate on site. Specific to the context of accidents and malfunctions, all runoff from site is channeled through the ditch network into the retention ponds, and discharge only occurs when water quality meets applicable discharge criteria. Releases from spills are expected to remain close to the release site. If necessary, liquids from larger-volume spills would be managed at either the west pond or the stormwater management facility. Spills and releases at the site would follow reporting and response procedures in the ERP and Cando will report as per provincial spill response requirements. Contaminated liquids and soils from spills would be contained, characterized, handled, and disposed of at approved waste facilities.	3.3.1, 3.3.3, Appendix C
3	Clarify whether transloading operations are considered a "high-risk activity" and what mitigation measures are proposed for mobile transload services.	The Sturgeon Rail Terminal does not currently perform transloading operations; however, it is an activity that may be added in the future based on customer demand. Transloading is not considered a high-risk activity as it is an activity that is done safely throughout the province every day, and which Cando already conducts safely at several other locations in Canada. If transloading operations are incorporated in the future at the Sturgeon Rail Terminal, Cando will be following approved procedures and practices. Mitigations may include, but are not limited to:	SOI Table, Appendix A

Issue #	Issue from SOI	Proponent Response	Reference in DPD
		• All personnel involved in transloading activities are trained for the task. • Transloading occurs in designated areas only using dedicated loading and offloading equipment. • Barriers and spill prevention equipment are used and available, including drip trays, and are regularly inspected and maintained as required. • Spill response materials (i.e., "spill kits") are available and approved by ATEC; these kits are regularly inspected, and consumables are replenished as required. • Mechanical equipment and vehicles used in the transloading activity are inspected regularly, and preventative maintenance is performed as required. Equipment with parts that show wear, or failing or have failed are tagged out, replaced, and inspected prior to being put in service. • Releases are recorded and findings communicated to personnel to disseminate learnings, with continual improvements incorporated into ERP.	
Climate Change and Greenhouse Gas Emissions			
4	Clarify the Project's GHG emissions and contribution to climate change with consideration of the Strategic Assessment of Climate Change and the Government of Canada's long-term goal to achieve net-zero emissions by 2050. Include the planned mitigation measures, technologies, and best practices to be applied, including measures being considered to reduce the Project's GHG emissions on an ongoing basis.	The Sturgeon Rail Terminal West Expansion project will not lead to a substantial increase in direct (Scope 1) emissions as the intended track itself is not emission producing. While new locomotives may be needed to aid in additional railcar volumes, Cando's local operations team is already working to reduce the fuel consumption of the existing Sturgeon Rail Terminal locomotive fleet by optimizing the locomotive trainsets they currently use. Cando recently started using a MATE (motors for added tractive effort) locomotive. The MATE is not powered by its own diesel engine but is instead connected to its partner locomotive. This two-unit set (regular locomotive and connected MATE) provides the tractive power of two locomotives while consuming up to 45% less fuel. Where practical, Cando locomotives are equipped with Hotstart or other auxiliary heating systems that allow the locomotive to be plugged into wayside electrical systems. These systems, along with a local locomotive shut down policy, provide optimal fuel conservation. These learnings will be applied to the expansion as best-practice. Scope 2 (indirect emissions – owned) and Scope 3 emissions (indirect emissions – not owned) will also be mitigated by Cando's customers. The Sturgeon Rail Terminal West Expansion is backed by customers with robust Environmental, Social and Governance (ESG) policies and reporting guidelines. Sturgeon West's anchor customer projects are planning for low or net-zero emissions facilities. Cando is also exploring the longer-term possibility of developing a zero-emission locomotive fleet by using batteries, hydrogen fuel cells or both. In cooperation with Emissions Reduction Alberta, Cando is trialing a Lithium-Ion battery-powered locomotive to understand the efficacy and potential of battery-powered locomotives in rail staging and storage operations.	6.4, 6.5, 6.6, Appendix F (Section 6.4)
5	Describe the Project's resilience to future climate change, and where relevant, how it was or will be considered in project design.	The project is designed to operate in a variety of representative weather conditions for the area, and the site can handle an increase in rainfall whether as general rainfall or additional episodic events. The current facility is already designed to accommodate 1:100 year 24-H flood events, and this includes runoff from the West Railyard once constructed. Otherwise, there are no other expected impacts from climate change on the project. Variations in water and precipitation would also not be problematic for the project, as there are no water withdrawal requirements.	SOI Table, Appendix A, Appendix C
6	Need for additional information on the impact of the Project on carbon sinks, including a description of the activities that would impact carbon sinks. Consider breaking down land use change related GHG emissions by year and ecosystem type.	As the entire site will be cleared and stripped, the GHG contribution from biomass oxidation (removal of forests and wetlands) has been assessed at 8,460.64 CO_2e tonnes with an additional 342.7 CO_2e tonnes/year from the loss of the carbon sequestration in the wetlands. Table 5.3 of Appendix F provides the data by ecosystem type (forests and wetlands). Cando partners with Tree Canada on various tree planting initiatives to help offset its carbon footprint and improve communities in which it operates. At the end of 2023, Cando contributed $43,220 to Tree Canada's National Greening Program to plant 8,644 trees in areas with the greatest need to offset locomotive fuel consumption (Kamloops, Sturgeon, Winnipeg, Sarnia, and Kingston Multi-purpose Terminals). Trees will be planted in British Columbia, Alberta, and the Northwest Territories to help reforest after the devastating fires in 2023. Since 2021, Cando has contributed $96,625 to plant 19,325 trees. Cando sees the benefit in participating in this program.	6.4, 6.5, Appendix F
7	Need for a GHG emissions estimate for the decommissioning phase of the Project.	The Project is expected to be in operation for the foreseeable future (>50 years) therefore, specific plans and estimates will be calculated in a more realistic timeframe for the project's end-of-life and using updated tools and information available at that time. At present, emissions at decommissioning are conservatively estimated to be the equivalent of 2 years of construction emissions (13,487.4 CO_{2e} tonnes).	6.4.3
Cumulative Effects			
8	Need for additional information on plans to assess the Project's contributions to cumulative health effects in the region.	Cando does not plan to assess the Project's contributions to cumulative health effects in the region. The project is Alberta's Industrial Heartland and there is a broader monitoring approach by the provincial government in that region. Additionally, air quality and noise levels are monitored at a regional level by the Fort Air Partnership and the Northeast Capital Industrial Association, respectively. Water discharges will be compliant with provincial and county limits as outlined in the SWMP.	2.3, 4.2.5, Appendix C
9	Concerns related to cumulative impacts on Indigenous Peoples' harvesting areas, traditional land use, and changes to land access, including impacts to Indigenous peoples' rights. Include avoidance, mitigation, and monitoring measures to	Cando has been engaging Indigenous groups and no concerns have been raised by such groups with regards to site-specific traditional land use. The site has not been available to access as it has been privately-owned farmland. Cando is currently working with five Indigenous groups that have expressed interest in doing a pre-construction site survey. Cando has recently issued response letters reaffirming their commitment to host representatives on site for this purpose. Their recommendations will be considered in project planning.	2.2, 4.1.4, 6.3

Issue #	Issue from SOI	Proponent Response	Reference in DPD
	address the Project's contribution to cumulative effects.		
Health Conditions of Indigenous and Non-Indigenous Peoples			
10	Clarify if there are any traditional land use activities occurring within the study area of the Project, and if so, how the Project could impact the health of nearby Indigenous peoples.	See response to Issue #9.	n/a
11	Clarify whether the Project could result in an increase of non-local project personnel and any associated strains on housing and race-based violence. Include proposed mitigation and monitoring measures.	The main source of employees is local or commuting from the Edmonton area, so no significant demand for housing or increase in race-based violence is anticipated as a result. Cando is not proposing mitigation or monitoring measures unless an indicated need to do so arises.	SOI Table, Appendix A
12	Need for additional information about how atmospheric emissions (i.e. air, noise) and exposure pathways associated with the Project could adversely impact human health.	Air quality and noise levels are monitored at a regional level by the Fort Air Partnership and members of the Northeast Capital Industrial Association (NCIA), respectively. The Fort Air Partnership operates ten continuous and sixty-three (63) passive air monitoring stations, and data is compared against the Ambient Air Quality Objectives (AAQO). The Fort Air Partnership also calculates and publishes an Air Quality Health Index. The NCIA monitors noise levels in accordance with its Regional Noise Management Plan, which uses a predictive noise model that incorporates noise from industrial facilities and from road and rail. NCIA and industry along with municipalities, non-governmental organizations, airsheds and the federal and provincial governments completed the Capital Region Air Quality Management Framework (for nitrogen dioxide, sulphur dioxide, fine particulate matter, and ozone), a shared vision of ambient air quality management in the Capital Region. Noise levels and air quality contributions from Cando's project are expected to be negligible and within acceptable and predictable regional ranges and levels. As of the date of publication, Cando has not received any noise complaints about its existing Sturgeon Rail Terminal, which operates 24/7.	2.3, 4.2.5, Appendix F
Indigenous Engagement and Consultation			
13	Need for meaningful and ongoing engagement with Indigenous groups, including with respect to social impacts, climate change, and cumulative effects.	Cando has submitted consultation records to the Aboriginal Consultation Office (ACO) of Alberta for evaluation on the engagement activities conducted and assessment of future engagement needs. The ACO's Pre-Consultation Assessment Recommendation was returned to Cando in March 2024 and the ACO has determined that no further consultation was required. While the ACO's assessment indicates that no further consultation is required, Cando is continuing its engagement with Indigenous groups so that their concerns, inputs and information can be taken into consideration. Cando is also working with Indigenous groups that have expressed an interest in participating in the project's employment and procurement opportunities.	2.2
14	Request for details pertaining to internal policies regarding racism and discrimination, as well as cultural sensitivity training available for employees.	While Cando has operations across Canada and the United States, the proposed project is in Alberta. The employment relationship between Cando Rail & Terminals and its employees is governed by an offer of employment, the applicable province's employment standards legislation and, if applicable, a collective agreement. The *Alberta Human Rights Act* (AHRA) protects against discrimination in the workplace whereby workers have a right to a respectful workplace free from discrimination. Workers can expect to be "*accommodated for their needs based on protected grounds to the point of undue hardship*" to the company. Protected grounds include: • Mental and physical disability. • Gender, gender identity, or gender expression. • Sexual orientation. • Race and colour. • Religious beliefs. • Ancestry and place of origin. • Age. • Marital and family status. • Source of income. Cando is committed to a workforce whereby employees and customers "*have the right to be treated in a fair, reasonable, and respectable manner*". Cando is committed to the principles in the AHRA and supplements that with internal policies and procedures on Safety, Alcohol and Drug, Workplace Harassment, Violence Prevention, Social Media, Training and Career Development, and Discipline. All Cando employees review these requirements	SOI Table, Appendix A

Issue #	Issue from SOI	Proponent Response	Reference in DPD
		during the onboarding process when employees are first hired, and sign documents acknowledging they have reviewed and understand them as part of onboarding. Cando also provides additional training in these areas to management-level employees in their Leadership Development Program.	
15	Consider engaging with Employment and Social Development Canada (ESDC) programs. Consider sharing information with the Indigenous Skills and Employment Training (ISET) service delivery providers and meeting with ISET agreement holders.	Cando is finalizing their procurement and hiring plans for the project. Six of the seventeen (17) Indigenous groups Cando has engaged with on the project are identified as delivery organizations under the Indigenous Skills and Employment Training (ISET) program. Cando will continue to work with Indigenous groups to explore partnership opportunities for procurement, training and employment while ensuring that any group or contractor (including potential Indigenous partners) meet relevant safety, operational and project capability requirements.	2.2
Indigenous Knowledge			
16	Clarify the Project's potential impacts on intergenerational Indigenous Knowledge transmission and proposed mitigation measures to protect Indigenous identity and Knowledge sharing.	See response to Issue #9.	n/a
Indigenous Peoples' Current Use of Lands and Resources for Traditional Purposes			
17	Need for additional information regarding potential downstream impacts to reserve lands.	The closest reserve downstream along the North Saskatchewan River is Saddle Lake 125, which is over 100-km downstream (as the water flows) from the site. There are no downstream impacts to this reserve. All water discharged from site must meet discharge quality requirements. Air emissions are considered minor within the larger Alberta Industrial Heartland emissions and are not anticipated to measurably affect airshed quality.	3.3.3, 4.1.4, 4.2.4, Appendix C
18	Clarify potential or perceived project effects to wildlife and vegetation, the corresponding potential effects to traditional food sources and food security of Indigenous peoples, and how these effects will be mitigated.	See response to Issue #9.	n/a
19	Clarify land use of the project area by Indigenous groups, including locations, and how access to traditional land use may be affected.	The land that the site will occupy has been privately-owned and cultivated farmland for almost 100 years. Ongoing engagement activities are occurring and concerns pertaining to this aspect can be incorporated as engagement progresses. Access to traditional land use in the area is not expected to be impacted as the portion of Range Road 222 to be permanently closed will be replaced by a bypass route. So far in its engagement activities with Indigenous groups, no site-specific use of the land has been identified. If the five Indigenous groups interested in site assessments inspect the site and indicate otherwise, Cando will engage in discussions on how to respectfully address and accommodate any concerns or issues.	1.1, 2.2, 4.1.4, 6.3
20	Need for mitigation measures to address potential impacts to Indigenous peoples' current use of the land as a result of Project effects to air quality, surface water, and fish.	Comments thus far regarding air, water and fishing/hunting do not relate to the current use or access of the site by Indigenous groups; no mitigation measures are proposed except as described in the response to Issue #19 above. Ongoing engagement activities are occurring and concerns pertaining to this aspect, if they arise, can be incorporated as engagement progresses.	6.3
Indigenous Peoples' Rights			
21	Clarify how land reclamation will occur and what policies are in place to ensure long-term future use of the land.	The railyard is planned to be used for the foreseeable future (>50 years) and as such, decommissioning and reclamation plans will be prepared in conjunction with the planning and preparations for that stage of the project life cycle. Reclamation plans will be prepared at that time according to provincial regulations. It is Cando's intent to return the land to acceptable conditions in accordance with future land-use designations, which will likely be industrial. In preparation for construction activities, Cando does plan to incorporate practices to maximize soil conservation, including segregating and storing topsoil for future reuse, and (if possible) partnering with local agricultural producers to access and use the topsoil.	3.3.3, 4.2.1, 6.4.3
Indigenous Peoples' Spiritual, Physical, and Cultural Heritage			
22	Need for a chance finds protocol in the event that sites of importance are discovered. Need for involvement of Indigenous groups in the identification of sites or artifacts of importance.	Cando has received clearance under the provincial *Historical Resource Act* and a Historical Resources Impact Assessment (HRIA) is not required at the site. Although approval has been granted, the project is still subject to section 31 of the Historical Resources Act which relates to the chance discovery of a historical resource. Cando will be adapting the chance find protocol developed for the existing Sturgeon Rail Terminal for the project, which includes how to identify historic artifacts, and steps to take in the event of a chance find, including stopping and resuming construction work, notification procedures, and instructions on how to document the find and the information to collect. The protocol also includes working with an archaeologist for recommendations on subsequent steps, and for compliance with the Standard Requirements under the Historical Resources Act:	2.1.2, 5.3

Issue #	Issue from SOI	Proponent Response	Reference in DPD
		Reporting the Discovery of Historic Resources. Cando is also currently in the process of arranging site visits with Indigenous groups that have expressed interest in doing so.	
Indigenous Peoples' Social and Economic Conditions			
23	Clarify Indigenous employment, economic and contracting opportunities, including any barriers, Indigenous employment targets, and how the Proponent will ensure equitable outcomes for Indigenous communities.	Cando is currently finalizing its Indigenous Relations (IR) Guiding Principles and Guidelines, which will outline opportunities for partnerships with First Nations and Indigenous organizations. Cando is currently developing its procurement strategy for the West Railyard project and is establishing if there will be procurement and contracting opportunities for Indigenous communities and organizations. Through the course of ongoing engagement, Cando has requested that Indigenous groups that have expressed interest in participating in procurement and contracting opportunities provide information relating to the capabilities of their owned or affiliated companies, including industrial project experience, specialized skills and capabilities, labour pool, and equipment fleets capabilities. Cando strives to build long-standing partnerships in the communities where it operates. Across its network, Cando provides high school scholarships and sponsorships that focus on four pillars of social responsibility: safety and protection of the community, environmental conservancy, leadership development and the "Cando Spirit". Cando also provides charitable donations through the Cando Cares Fund, supporting youth development programs, healthcare and health-related initiatives, educational programs and community development and building. Cando has relayed this information to Indigenous groups and has requested that interested groups engage with Cando as they are looking to expand partnerships with First Nations communities and Indigenous organizations near their operations. Cando is committed to maintaining community mindedness and ensuring a sustainable future. Cando's sustainability plan is grounded in four pillars: environmental stewardship, indigenous relations, workforce/people, and community giving. Cando is committed to Indigenous awareness and leveraging business relationships and opportunities with Indigenous partners. Cando is a member of the Aboriginal Chamber of Commerce in its head office jurisdiction.	2.2, 6.3
Migratory Birds, Other Birds, and their Habitat			
24	Concerns about potential impacts to migratory birds from the Project, related to road construction, increased traffic, sensory disturbances, and linear disturbances. Need for additional information about sources of sensory disturbances, migratory paths, monitoring, and how potential effects will be mitigated.	While there will be new sources of activity, those sources are the same as the existing yard and will not create new sensory disturbances, as the proposed project is being built adjacent to an already operating railyard. The bypass road replaces an existing road which will be closed off to traffic. A minimal traffic increase is expected from the project and the bypass road addition, mostly from adding operations employees. The site is surrounded by agricultural land on all sides except for its eastern boundary, which is adjacent to East Railyard. The site and surrounding lands are all zoned for heavy industrial development and have been for many years. Land cover within the study area is predominantly comprised of cultivated fields, with small remnant deciduous treed upland along the field margins, and at the northeast portion of the study area associated with an existing residence. The study area does not overlap with any federally designated critical habitats, Important Bird Areas, Migratory Bird Sanctuaries, or National Wildlife Areas. Adverse effects on migratory birds will be minimized to the extent practicable with the implementation of the best management practices and mitigation measures, including: • Disturbance will not exceed the project footprint and is being limited as much as possible. • Vegetation clearing will be targeted for the fall/winter to avoid sensitive wildlife timing windows, as feasible. • If construction is scheduled to occur during sensitive wildlife timing windows such as the general nesting period for migratory birds (mid-April to late-August), and the amphibian breeding period (mid-April to mid-June), qualified personnel will conduct nest surveys and/or amphibian salvages prior to construction. • A wildlife sweep will be completed by a qualified professional (QP) within five days of planned clearing activities, and mitigations will be applied as recommended by the QP. Additional mitigations are described in Sections 4.2.3 and 6.1.3.	4.2.3, 6.1.3
Social and Economic Conditions			
25	Clarify the proposed hiring strategy for the Project, including direct and indirect job creation, number of anticipated permanent positions, sources of labour, potential	The total number of full-time employees for the expanded Sturgeon Rail Terminal (current East Railyard operations plus West Railyard once operational), is estimated to be up to 120 at full build-out. The project could add another 40 full-time employees at full build-out. The remaining contingent will consist of a mix of part-time, seasonal, and contractual employees. Personnel are expected to be sourced locally or commute to site from the wider Edmonton region. Cando provides internal training and development programs for its employees.	3.1, 3.3.3.

Issue #	Issue from SOI	Proponent Response	Reference in DPD
	training programs, and proactive equality, diversity, and inclusion measures.		
26	Need for additional information about the project budget and local spending to help evaluate the local economic impact. Consider providing more information about employee compensation and working conditions to clarify the Project's impact on the local economy.	The project's capital expenditure is estimated to be up to $140 million, excluding potential development of railcar and locomotive maintenance facilities and Cando offices. Investment is expected to be phased over several years.	SOI Table, Appendix A
Species at Risk, Terrestrial Wildlife, and their Habitat			
27	Request for additional information about potential impacts to terrestrial wildlife as a result of increased rail traffic and frequency. Include proposed mitigation measures.	Impacts to terrestrial wildlife will be mitigated by fencing of the site and, once operational, the yard itself will be fenced off as part of industry best-practice and regulatory safety and security protocols. Range Road 222 is also being partially closed to ensure public safety. Rail travel and storage areas will be isolated. It is anticipated that the construction and operational activities at the site will be the main deterrent to wildlife.	3.3.1, 4.2.3
28	Need for information on measures that will be taken to avoid or lessen the potential effects of the Project on species at risk, including potential impacts to habitat suitable for Tiger Salamander (i.e. wetlands) and Myotis maternity roosts (i.e. existing structures).	Land cover within the study area is predominantly comprised of cultivated fields, with small remnant deciduous treed areas along the field margins, and at the northeast portion of the study area associated with an existing residence. The study area does not overlap with any provincially or federally designated critical habitats or wildlife areas. Wetlands and surface water management with applicable mitigations and compensation are being managed through the provincial process under the *Water Act*. A wildlife sweep including potential bat roosting habitat and buildings will be completed by a qualified professional (QP) within five days of planned clearing activities, and mitigations will be applied as recommended by the QP.	3.3.3., 4.2.3, 4.2.4
Surface Water and Groundwater			
29	Need for consideration of potential effects to groundwater, including potential contamination from spills.	There are no impacts to groundwater anticipated during construction and operation of the West Railyard, however, mitigation measures to protect groundwater will be employed according to best industry practices. Measures will include, but not be limited to, the following preventative and management strategies during construction: • Dewatering of cuts and excavations may be required if groundwater infiltration occurs; water quality will be determined, and groundwater will be removed and placed in the stormwater management system. • Groundwater that comes into contact with known or suspected contamination will be sampled, characterized and disposed of at an approved waste disposal facility if required. • Spill prevention methods will be employed during construction, including drip trays and regular inspections. • Spill kits will be available at the site; these kits will be regularly inspected and replenished as required. • Contaminated soil, water and/or consumables will be disposed of at approved waste disposal facilities. Releases that occur during construction and operation of the West Railyard will be managed according to Cando's ERP which include best industry practices and compliance with applicable provincial regulations.	3.3.3, 4.2.4, 4.3.1, Appendix C
Vulnerable Population Groups and Gender Based Analysis Plus (GBA+)			
30	Consider GBA+ throughout the project lifecycle, including in relation to engagement, consultation, mitigation measures, and to establish baseline conditions. Include information about potential gender-based recruitment and hiring practices.	Cando will focus on recruitment of local workers with hiring practices in alignment with Cando's hiring practices that are non-discriminatory and inclusive of age, ethnicity, education, religion, disability, and gender. Opportunities to hire local and Indigenous workers will be maximized to the extent possible. Also see the response to #14.	SOI Table, Appendix A
Waste and Emissions			
31	Request to include site-specific monitoring of the Project's localized emissions and impacts on air quality.	The Sturgeon Rail Terminal West Expansion project will not lead to a substantial increase in direct (Scope 1) emissions as the intended track itself is not emission producing. Air quality monitoring is completed at a regional level already by Fort Air Partnership. Cando is also currently exploring the use of low-carbon fuels for combustion engines in the short-term and the electrification of its fleet of locomotives using batteries, hydrogen fuel cells	2.3, 3.6, 4.2.5, 6.5.4, Appendix F

Issue #	Issue from SOI	Proponent Response	Reference in DPD
		or a hybrid of both. Cando, in cooperation with Emissions Reduction Alberta, is trialing a zero-emission Lithium-Ion (Li-Ion) battery-powered locomotive in late 2024/early 2025. Many of Cando's customers have defined ESG mandates and are very interested in the potential for the zero-emission locomotive to be used to meet their rail operating needs. Link: https://www.eralberta.ca/projects/details/electrification-of-industrial-railway-switching-in-closed-loop-operations/.	
32	Need for additional information about anticipated air emissions during the construction and operation phases and how these emissions will be distributed spatially, including dispersion of air contaminants from project activities.	The anticipated air emissions described in the DPD are expected to be minimal and temporary in nature (during construction). Most emission sources during construction will be related to exhausts from mobile equipment, with the potential for dust. Emissions during operations will be from the combustion of diesel fuel in locomotives, with negligible emissions from fuel storage, railcar loading and dust from unpaved roads within the site. The spatial distribution of these emissions will vary due to their non-point sources. Building effects are expected to be minimal, therefore, dispersion is expected to largely follow local meteorological conditions.	4.2.5, Appendix F
33	Need to assess additional chemicals of potential concern (COPC), such as carbon monoxide and fine particulates. Consider following the Canadian Ambient Air Quality Standards (CAAQS) to assess project impacts to air quality.	Air quality monitoring is completed at a regional level by the Fort Air Partnership, which monitors eighteen (18) contaminants of potential concern including carbon monoxide and particulate matter. Link: https://www.fortair.org/.	4.2.5
34	Recommend using equipment with engines that meet Tier 4 emissions standards to assist in mitigating the air quality impacts of the Project.	See responses to Issues #4 and 32.	n/a
Wetlands			
35	Need for additional information on potential impacts to wetlands and associated impacts to migratory birds, wildlife species at risk, and Indigenous peoples, including the potential for direct and indirect impacts, types of wetlands that may be impacted, potential mitigation measures, the regional importance of potentially impacted wetlands, and regional cumulative impacts due to wetland loss.	Wetlands are common near the project, and the location of the project footprint was minimized to reduce effects on wetland area to the extent practical, while meeting operations and safety requirements. A detailed wetland assessment was completed in accordance with the Alberta Wetland Policy with applicable mitigations and compensation managed through the provincial process under the *Water Act* which has included review by the Alberta Aboriginal Consultation Office. A summary of the wetlands identified for the project is provided in the DPD, as well as in the Biophysical Baseline Report prepared by EDI in Appendix E of the DPD. Cando received the *Water Act* approval for project site in May 2024, and the Water Act approval for the bypass road is anticipated shortly.	4.2.4
Other			
36	Need for additional information about how increased rail traffic associated with the Project may impact adjacent railway crossings.	The project will not result in an increase in public railway crossings. The existing public crossings are operated in (and will continue to operate in) compliance with the Canadian Rail Operating Rules regulated by Transport Canada. Rail traffic between the existing and expansion railyards is being mitigated by the bypass road.	SOI Table, Appendix A

Appendix B
Example Engagement Letter

Clifton

Unit 400 – 740 Rosser Avenue
Brandon, MB R7A 0K9

November 30, 2023

Duane Kootenay
Manager, Lands Consultation Department
Alexis Nakota Sioux Nation
Box 337 Glenevis, Alberta T0E 0X0

SENT VIA EMAIL: duane.kootenay@ansn.ca

Project Notification – Cando Rail & Terminals Sturgeon Terminal, Sturgeon County, AB

Dear Duane,

Cando Rail & Terminals (Cando) is committed to creating sustainable, long-term economic development opportunities that expand market access for Canadian manufacturers, make supply chains more resilient, and generate new jobs in the communities we call home. To that end, Cando is proposing to expand its Sturgeon Multi-Purpose Rail Terminal, adding two additional quarter sections of land directly west of the current railyard (the Project).

When fully developed, the combined operation will provide a safe, long-term transportation and storage advantage for industrial customers throughout Alberta's Industrial Heartland and Canada. These producers primarily use railcars for the bulk transport of products, and Cando is in the unique position to provide consolidated, large-scale rail services to assist in product staging, storage, transportation, and handling. Consolidating rail staging operations removes the need for each individual facility to provide its own rail loading and staging operations, lowering industry infrastructure and capital costs, and increasing competitiveness.

This package provides information on the Project, which is located within Sturgeon County's portion of Alberta's Industrial Heartland (the Heartland). Cando is seeking input on the potential for the Project to impact Indigenous, treaty and other rights, and traditional land uses.

Project Location
The Project, depicted in Figure 1, is located within the province of Alberta, north of the City of Fort Saskatchewan, approximately 1.6 kilometres east of Highway 825.

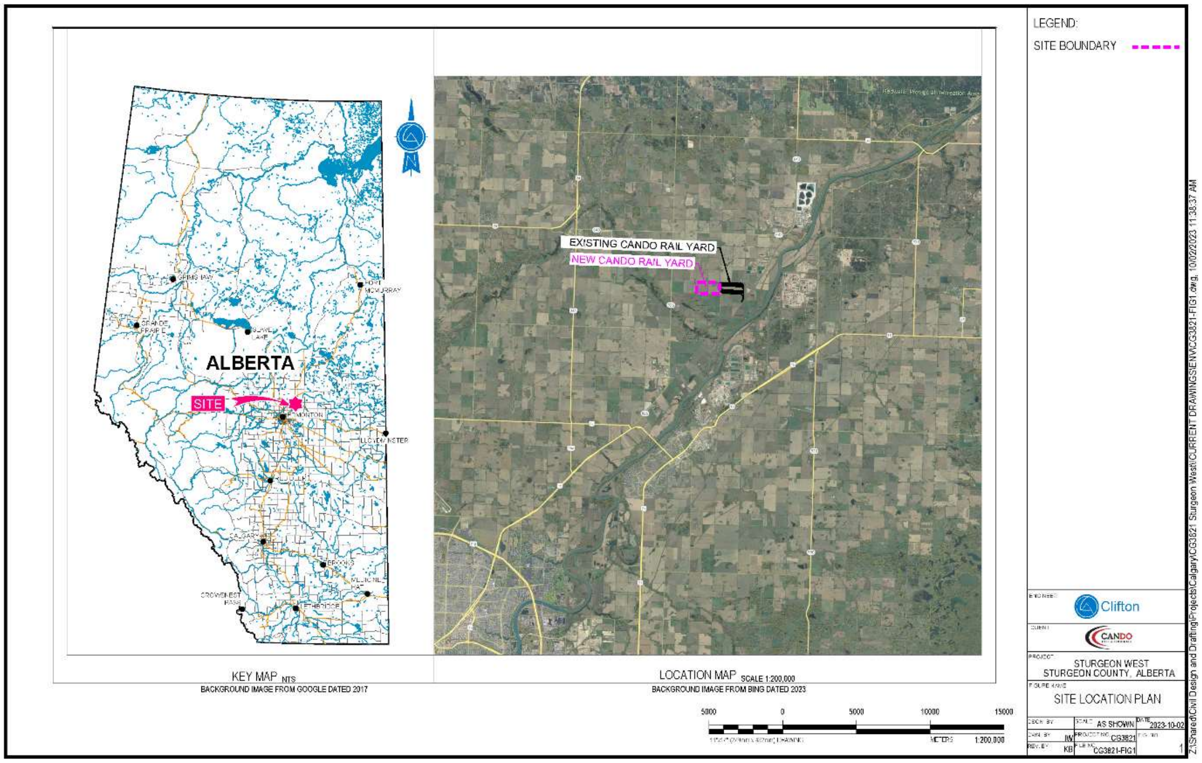


Figure 1: Site Location Plan

Figure 2 depicts the location of the proposed Project within the boundaries of Sturgeon County's portion of Alberta's Industrial Heartland. The Project will be located adjacent to and west of the existing Cando Sturgeon Terminal.

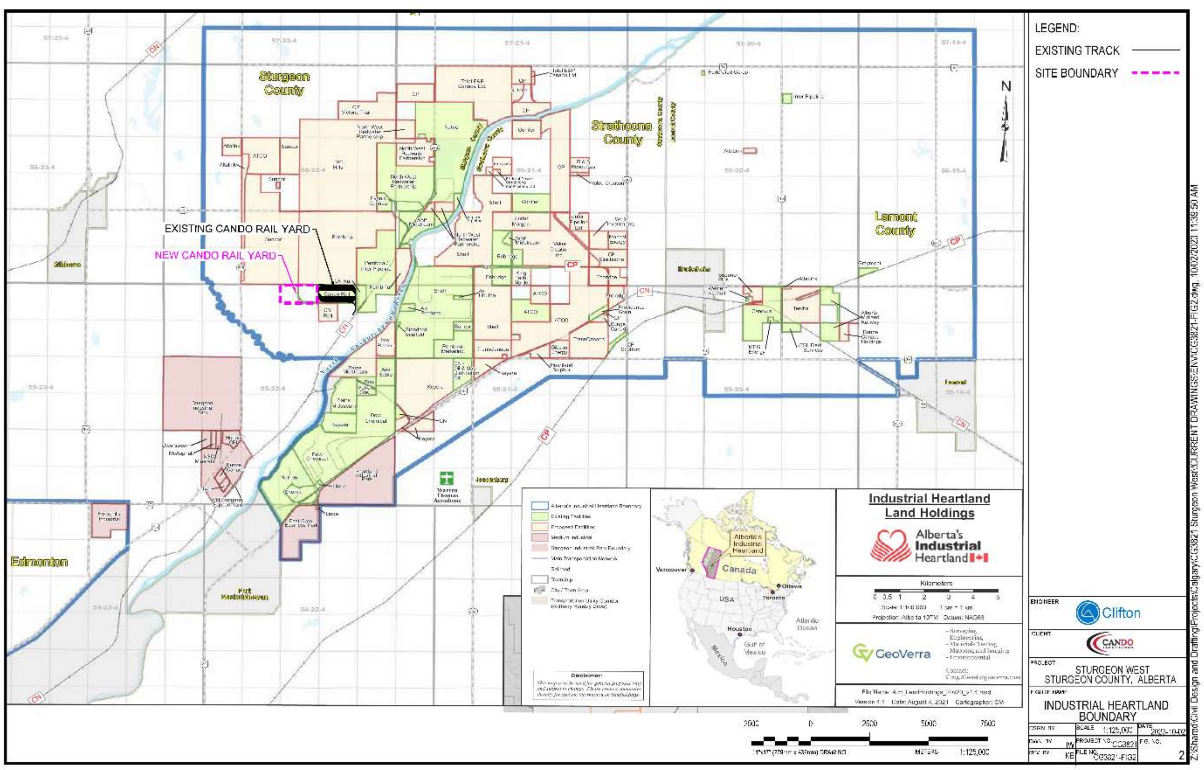


Figure 2: Industrial Heartland Boundary

Figure 3 shows the location of the Project in proximity to the existing Cando Sturgeon Terminal, and the proposed road Bypass. More information on the road Bypass is given on page five.

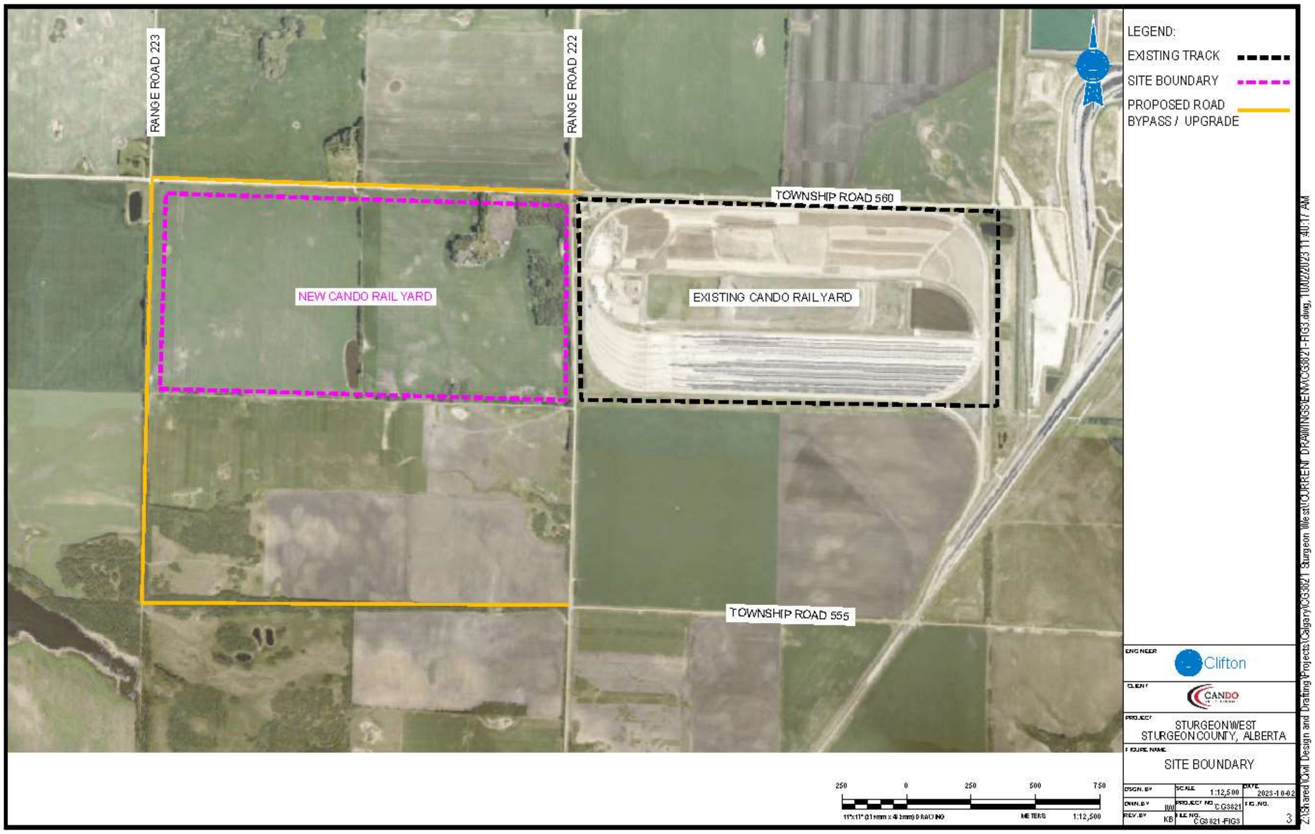


Figure 3: Site Boundary

The Project will be located adjacent to and west of the existing Cando Sturgeon Terminal. The legal land description of the proposed rail terminal is the north half of Section 34, Township 55, Range 22, West of the Fourth Meridian (N ½ 34-55-22-W4M) with a total area of approximately 130 hectares.

Currently, the site is zoned I5 – Heavy Industrial District within Sturgeon County's Land Use Bylaw and is being used as agricultural land with rural residential properties. The current terminal is connected to Canadian National (CN) rail right-of-way (ROW) and the Project would connect to the existing railyard. Through this proposed connection, the Project will connect to North American markets and ports, allowing for global distribution of Alberta-made products.

Project Scope

The proposed footprint and design of the Project is depicted in Figure 4.

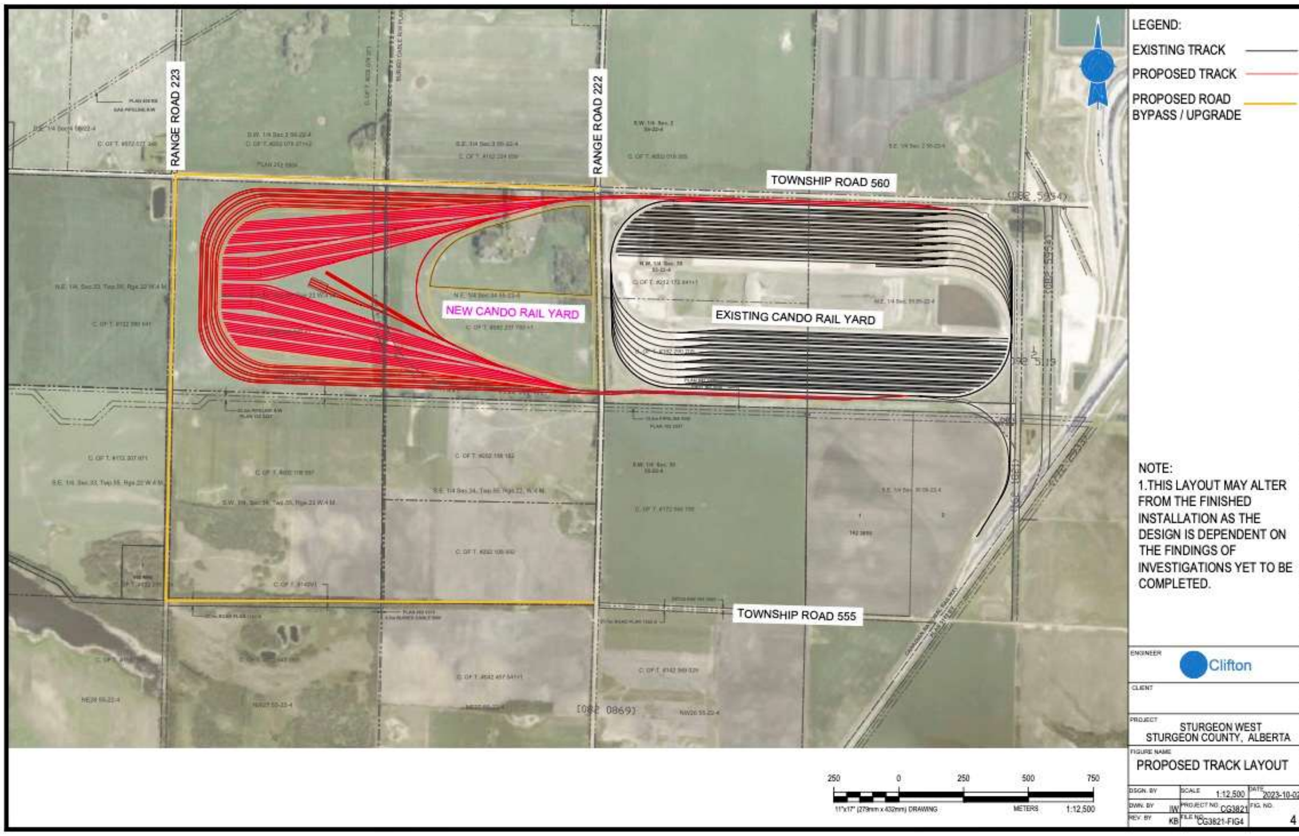


Figure 4: Proposed Track Layout

In general, the Project consists of a series of long tracks along the inside of the property boundary for inbound and outbound trains, a series of interior tracks for the sorting and storage of railcars, and an interior space for additional tracks and facilities to support operations. Additional infrastructure on site to support operations, such as roads, stormwater management and security measures will also be constructed.

All potential future facilities cannot be anticipated at this time, but based on Cando's knowledge of the customer base in the area these facilities may include repair shops for locomotives and rollingstock, mobile transloading services, and other facilities to support railway and customer operations.

Operating Plan

Cando is committed to safety. We operate in a highly regulated industry with oversight provided by Transport Canada and the Government of Alberta. Our operating and development plans also face vigorous analysis by Class I railways. Trains will arrive and depart on the outermost tracks, and Cando crews will use the interior tracks to sort the traffic for use by Heartland customers. The terminal is planned to operate on a 24/7/365 days/year basis. At full build-out, anticipated traffic includes multiple unit-trains arriving and departing the combined terminal, handling up to 2,000 on-site railcar movements daily.

Connection Plan
The tracks (leads) connecting the existing Sturgeon Terminal to the Project will be the main arteries connecting both railyards. These connecting tracks will serve as the main working leads for rail traffic within the new terminal. These leads will be used by Cando crews sorting traffic between the leads and interior tracks; therefore, train traffic will occupy planned crossings over Range Road 222 for prolonged periods.

RR 222 Closure & Bypass
The Project design is predicated on having at-grade connections (leads) with the existing terminal and will need to cross Range Road 222 (RR 222) to do so. These crossings will be in use at almost all times throughout the day, and they will often have loaded railcars crossing over them. For the public's safety, it is critical that a small portion of RR 222, in between the current Sturgeon Terminal and the Project, be closed.

As such, Cando is working with Sturgeon County and the Government of Alberta to provide alternate access (the Bypass) to accommodate the permanent closure of RR 222 in between the Sturgeon Terminal and the Project. The Project proposes to upgrade and expand adjacent roadways as needed to maintain and improve existing connections.

Project Timeline
The Project is intended to be developed in multiple stages, with the timing of the development of additional trackage or supplemental services dependent on market conditions. The first phase is proposed to include the yard wrapping around the site and sufficient interior tracks to meet customer rail staging demands. Additional services and facilities may be constructed in subsequent stages to support customer and railway operations. The construction of the first phase of the rail terminal is anticipated to begin in the final quarter of 2024, following a rigorous design, permitting, and approval process required by federal and provincial and municipal entities.

Next Steps and Contact Information
Cando is requesting that the information contained in this package be shared with First Nations communities and Indigenous groups. We are looking to understand if the proposed activities will adversely impact on rights holders and traditional land users. All responses will be responded to, and all correspondence provided for the record in the approvals process. Cando is happy to meet by whichever means suits you. We welcome any comments or questions from the community and request that any correspondence regarding the proposed activities be sent to the contact information below within 30 days from the date of this notification.

Mike Richard - Director, Property & Business Development, Cando Rail & Terminals
780-499-9270

Or

Julie Pomehichuk - Director, Marketing & Communications, Cando Rail & Terminals
204-868-5542

We ask that all email correspondence be sent to the Project engagement email address at:
CandoListens@candorail.com.

Yours sincerely,

Mike Richard

Appendix C
Final Stormwater Management Plan

Clifton

File CG3821

Cando Rail & Terminals Ltd.

Cando Sturgeon West Rail Terminal

Storm**water** Management Plan

Sturgeon County, AB

Clifton

Clifton

23 April 2024 File CG3821

Cando Rail & Terminals Ltd.

Cando Sturgeon West Rail Terminal
Stormwater Management Plan
Sturgeon County, AB

<original signed by>

<original signed by>

Prepared by:
Fang Guo PEng
Water Resources Engineer

Reviewed by:
Michael Bender PhD PEng
Principal Water Resources Engineer

Distribution List

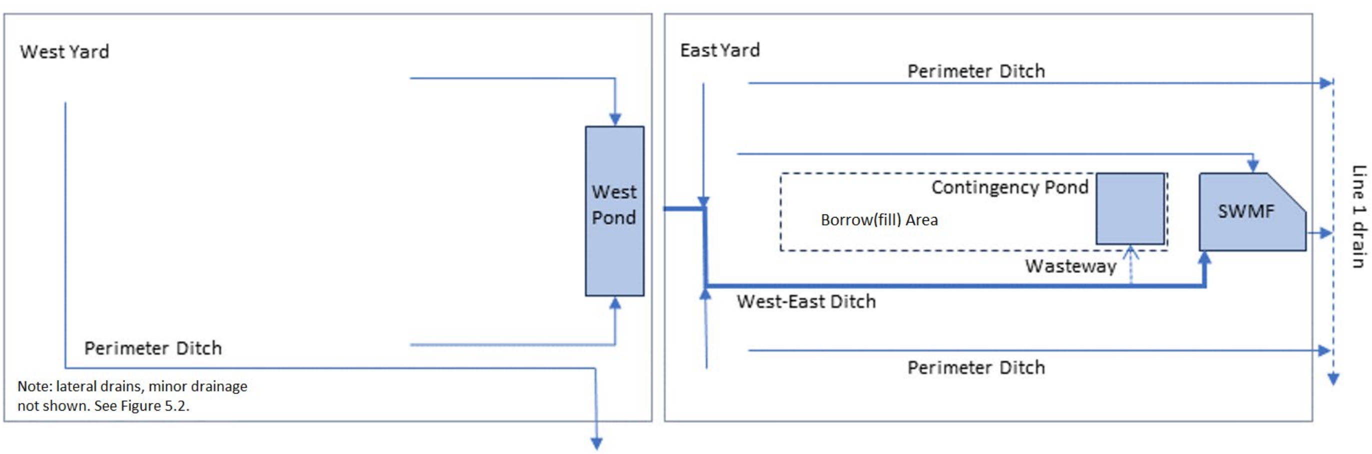
Recipient	Date	Revision No.	By	Sent Via	Document Type	Description	No. of Hard Copies
Cando Rail & Terminals Ltd.	23 April 2024	0	FG	E-mail	PDF	Final Report	0

Executive Summary

Clifton Engineering Group Inc. (Clifton) was commissioned by Cando Rail & Terminals Ltd. (Cando) to prepare a Stormwater Management Plan (SWMP) for the proposed Sturgeon West Rail Terminal (West Yard or West Terminal, the Project). The proposed Project would increase Cando's current rail storage capacity at the Sturgeon Rail Terminal (East Yard). It is understood that the proposed facility will need to meet Sturgeon County's stormwater and drainage requirements, plus provincial stormwater guidelines.

The SWMP has been developed as an integrated plan for both the West Yard and East Yard. The integrated plan has only one outlet at the existing East Yard, plus perimeter drainage to prevent off-site drainage from entering the West Yard. The integrated plan results in operating simplicity and reliability for Cando, simplicity of regulatory compliance reporting at a single location, and potential benefits for the County master drainage plan by avoiding flow to the proposed County Line 2 ditch (Line 2 drain).

The integrated Stormwater Management Plan (SWMP) is configured as follows. In the West Yard, the West Pond is intended to attenuate the stormwater peak flow via a stormwater pond with a passive (culvert) discharge to the East Yard. Stormwater will be conveyed from the West Yard to the East Yard via the West-East Ditch, and stormwater releases will occur at the existing Stormwater Management Facility (SWMF) outlet where releases will discharge to the County Line 1 ditch near RR 221 (Line 1 drain). The existing outlet consists of a manhole structure with a gated culvert and orifice that can be controlled to release water up to the approved release rate. In other words, the integrated project will have a single stormwater release location in the existing East Yard. The SWMP design concept is illustrated below.



A key component of the integrated SWMP is the Contingency Pond, an existing below-grade location that was the borrow source for construction of the East Yard. The SWMP therefore uses the borrow area in the East Yard to provide temporary 'contingency' storage that will need to be pumped out periodically (because the pond is below-grade). Inflow to the Contingency Pond will be via spillway or 'wasteway' along the West-East Ditch, but only during high flow events that overtop the wasteway invert. During normal storm conditions, stormwater will be conveyed directly to the SWMF. In this way, the Contingency Pond will remain relatively dry except during storms larger than a 1:2-year rainfall event.

Releases will be based on SWMF gate operations, which normally operate with the gate in a closed position. Therefore, the releases will occur after water quality requirements are met, and the timing of the releases is expected to be offset from the storm peak.

The County stormwater release limit is 7 L/s/ha during a 1:100-year return period rainfall storm event, based on the post-development recommended release rate for Drainage Basin 7 of the Sturgeon Industrial Heartland (SamEng, 2016) and confirmed by the Sturgeon County (personal communication with Chris Pullen, Sr. Industrial Engineering Officer, Transportation / Engineering Services, Sturgeon County dated 25 July 2023). The existing approved release rate is 0.76 m^3/s for the SWMF.

Cando is proposing to leave the release rate unchanged at the existing approved rate of 0.76 m^3/s, equivalent to a release rate of 3.3 L/s/ha. The Project will double the size of the existing rail terminal without increasing the release rate or creating a second stormwater release location. Based on the surface area of the integrated Project, the new release rate for the 7 L/s/ha County policy would be about 1.56 m^3/s. Cando can propose the unchanged rate because the stormwater ponds have an available storage capacity that meets or exceeds the entire 146,200 m^3 volume of runoff created during a 1:100-year storm. Cando therefore has the option of storing the entire design storm volume or releasing water during the storm at the approved rate of 0.76 m^3/s.

There will be no adverse impacts on regional drainage because peak flow along the Line 1 drain will be unchanged and Cando does not propose any additional stormwater outlets. There will be a benefit to the County by reducing the natural runoff peak flow from the proposed 130 ha property. The reduced peak flow will benefit RR 222 and TWP 555 drainage infrastructure south of the proposed west yard. Other potential impacts to wetlands are avoided or mitigated as part of the wetland assessment (EDI, 2024).

Engineering for the stormwater management plan is presented in Appendix A. Stormwater modelling results using PCSWMM are presented in Appendix B. The model results confirm that the ponds, as configured, will store the entire design storm volume with the outlet gate closed. The model also confirms that the release rate will remain below the approved existing rate if the outlet gate is open.

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1.0 Introduction

1.1 Background

Clifton Engineering Group Inc. (Clifton) was commissioned by Cando Rail & Terminals Ltd. (Cando) to prepare a Stormwater Management Plan (SWMP) for the proposed Sturgeon West Rail Terminal (West Yard or West Terminal, the Project). For the West Yard, Cando is proposing to develop a new facility adjacent to the Sturgeon Rail Terminal (East Yard) previously constructed east of Range Road (RR) 222 and south of Township Road (TWP) 560. The proposed new facility is west of RR 222, located on approximately 320-acre (130 ha) parcel, NW, and NE 34-55-22-W4M in Sturgeon County's Industrial Heartland.

The proposed Project would increase Cando's current rail storage capacity via connections to the adjacent existing east facility and would provide several loop tracks to allow for the marshalling of large trains. It is understood that the proposed facility will need to meet Sturgeon County's stormwater and drainage requirements, plus provincial stormwater guidelines.

The Project area is currently used for agricultural grain production and is generally sloping from the northwest to the southeast. A grove of trees exists in the northeast corner where a farmyard currently exists. In addition, an unused CN easement (or Right-of-Way) exists along the south edge and SW corner of NE 34-55-22 W4M and along the east edge of NW 34-55-22-W4M.

1.2 Purpose

The purpose of this report is to describe the West Terminal SWMP, including site-wide stormwater management requirements, the proposed drainage infrastructure, and the expected performance during operations. The SWMP report is intended to solicit approval from the County and to support an Alberta Environmental Protection and Enhancement Act (EPEA) approval application.

1.3 Available Information

The SWMP is based on the following available information:

- Cando Sturgeon County Yard Stormwater Management Plan by WSP (September 2019).
- Cando Sturgeon Terminal Issued for Construction Drawings by WSP (March 2020).
- Phase I Environmental Site Assessment (ESA) for the construction of the Cando Sturgeon West Rail Terminal (Clifton, 2023).
- Alberta Transportation (AT) Flow Profile Tool (V2.1) for Culvert Sizing. (February 2022).
- Alberta Flow Estimation Tool for Ungauged Watersheds (AFETUW).
- LiDAR topography (1 m grid) supplied by Challenger to Clifton (2023).
- ESRI World Imagery dated 20 June 2021.
- Hydrography from Altalis (Government of Alberta).

- Precipitation data at climate Station Edmonton Blatchford (1999-2023) and Edmonton City Center Airport (1937-2005) operated by Environment and Climate Change Canada (ECCC).
- Shallow lake evaporation data at Edmonton City Center Airport (Data period 1912-2009) by Alberta Environment and Sustainable Resource Development (AESRD, 2013).
- Short Duration Rainfall Intensity-Duration-Frequency (IDF) data for Edmonton Blatchford and City Center (Climate ID:3012209).

2.0 Design Basis

2.1 Water Management Regulations

The SWMP is based on the following wastewater and stormwater management regulations:

- Stormwater Management Plan for Drainage Basin 7 of Sturgeon Industrial Heartland, prepared for Sturgeon County (SamEng, 2016).
- Sturgeon County Surface Drainage Bylaw 1558/21. August 2021.
- Sturgeon County General Municipal Servicing Standards, May 2002 and amended in May 2009.
- Alberta Stormwater Management Guidelines, Alberta Environment Protection (AEP), 1999.
- Alberta Transportation Design Guidelines for Bridge Size Culverts, September 2011.
- Alberta Environment Municipal Policies and Procedures Manual, April 2011.
- Alberta Wastewater and Storm Drainage Systems: Part 5 – Stormwater Management Guidelines, 2013.
- Alberta Surface Water Quality Management Framework for the North Saskatchewan and Battle Rivers Guidelines for use in Alberta, 2022.

2.2 Design Criteria

The SWMP overall design basis is to meet or exceed regulatory expectations for stormwater releases. The Sturgeon County stormwater release limit is 7 L/s/ha for a 1:100-year return period rainfall storm event, based on the recommended release rate for Drainage Basin 7 of the Sturgeon Industrial Heartland (SamEng, 2016) and confirmed by the Sturgeon County (personal communication with Chris Pullen, Sr. Industrial Engineering Officer, Transportation / Engineering Services, Sturgeon County dated 25 July 2023).

The selected design basis for the SWMP is:

- Design storm event for stormwater management is the 1:100 year 24-hour storm event.
- Stormwater release limit is 7 L/s/ha during the design storm event.
- Stormwater releases to comply with EPEA approval conditions for water quality.
- Pond configuration to achieve a minimum 85% removal of sediments of particle size 75 μm or greater based on the Alberta Stormwater Management Guidelines (1999) and Municipal Policies and Procedures

Manual (2011), which requires a minimum pond settling length of 140 m for the particle size 75 µm or greater to settle.
- Perimeter ditching to be provided with tie-ins to road ditches to divert off-site drainage before it can run onto the Terminal.

Other detailed design specifications include:

- Ponds and drainage to be excavated below ground where possible to avoid creating a dam.
- Pond containment to provide 0.5 m minimum freeboard.
- Pond overflow spillway to be included as needed to prevent an uncontrolled off-site flow during a 1:100-year design event.
- Lateral drains to provide drainage within the Yard, installed below the rail lines.
- Ditches will provide gravity outlets for lateral drains.
- Ditches to be sized to convey the 1:100-year flood peak flow, with a configuration allowing overland flow during extreme flood conditions but without inundating adjacent road and rail infrastructure.
- Ditch erosion protection to be provided as needed based on best practices.
- Culverts to be sized to convey the 1:100-year flood peak without submerging the inlet (i.e. headwater/depth ratio of 1.0).
- Ditch dimensions to be 1 m minimum depth, 1 m minimum bottom width, 0.2% minimum slope, and about 3H:1V side slope subject to geotechnical approval.

The water management design standards are based on standard municipal wastewater and stormwater management methods for settling ponds, drainage ditches, and culverts. Pond storage capacity, hydraulic conveyance capacity of drainage ditches and culverts are all designed for the 1:100-year 24-hour rainfall event. The hydraulic conveyance capacity of each ditch was estimated using Manning's Equation for ditches. Culverts were sized using the Alberta Transportation (AT) Flow Profile Tool (AT, 2022).

Surface runoff hydrology for the 1:100-year rainfall event was derived from the Rational Method as a conservative basis for the SWMP general arrangement conceptual design. The Rational Method was selected to remain consistent with the basis for approval at the adjacent existing East Yard. Detailed engineering utilized a PCSWMM model to optimize the design.

3.0 Existing Drainage

The Project is situated in Section 34-55-22-W4M within Sturgeon County's Industrial Heartland Drainage Basin 7 (SamEng, 2016). The location is currently under agricultural production. The proposed new footprint area is bounded on the east by RR 222, on the west by RR 223, on the north by TWP 560 and a Pembina Pipeline Right-of-Way on the south. The proposed West Yard and the existing East Yard are separated by RR 222. The natural flow direction is from northwest to southeast.

The Project will occupy a footprint of 130 ha for the Proposed West Yard plus 130 ha of the existing East Yard. The combined footprint for both the proposed West Yard and the existing East Yard properties is 260 ha. The entire project area is about 14% of the Basin 7 area (260 ha out of 1,852 ha).

Regional existing drainage is shown on Figure 3.1, adapted from a County map (SamEng, 2016). There are no mapped water bodies that drain the property based on the Alberta Land Information System (AltaLIS) hydrography, but there are drainage paths derived by SamEng and small wetlands (described separately as part of the wetlands assessment).

Drainage from areas north of the property currently flows along the north side of TWP 560 to RR 221 where the County Line 1 ditch near RR 221 (Line 1 drain) conveys regional drainage south towards the County outfall along the North Saskatchewan River.

Drainage within the East Yard is controlled at the existing Stormwater Management Facility (SWMF) pond which releases stormwater via 900 mm gated culvert and orifice to the Line 1 drain. The approved release rate from the SWMF is 0.76 m^3/s based on the County's 7 L/s/ha guideline. The SWMF manages stormwater from the rail loop, with natural drainage outside of the rail loop diverted by perimeter ditches along the north and south edges of the property.

The proposed West Yard is currently cropland (88%), plus a farmyard, a dugout, and a wooded area along RR 222. The topography is generally sloped from the northwest toward the southeast with an elevation change of approximately 15 m within the project footprint. There is currently a private sluice gate along the TWP 560 ditch that is used to divert water periodically from the ditch to the private property. This is currently being controlled by the landowner of NE 34-55-22-W4M.

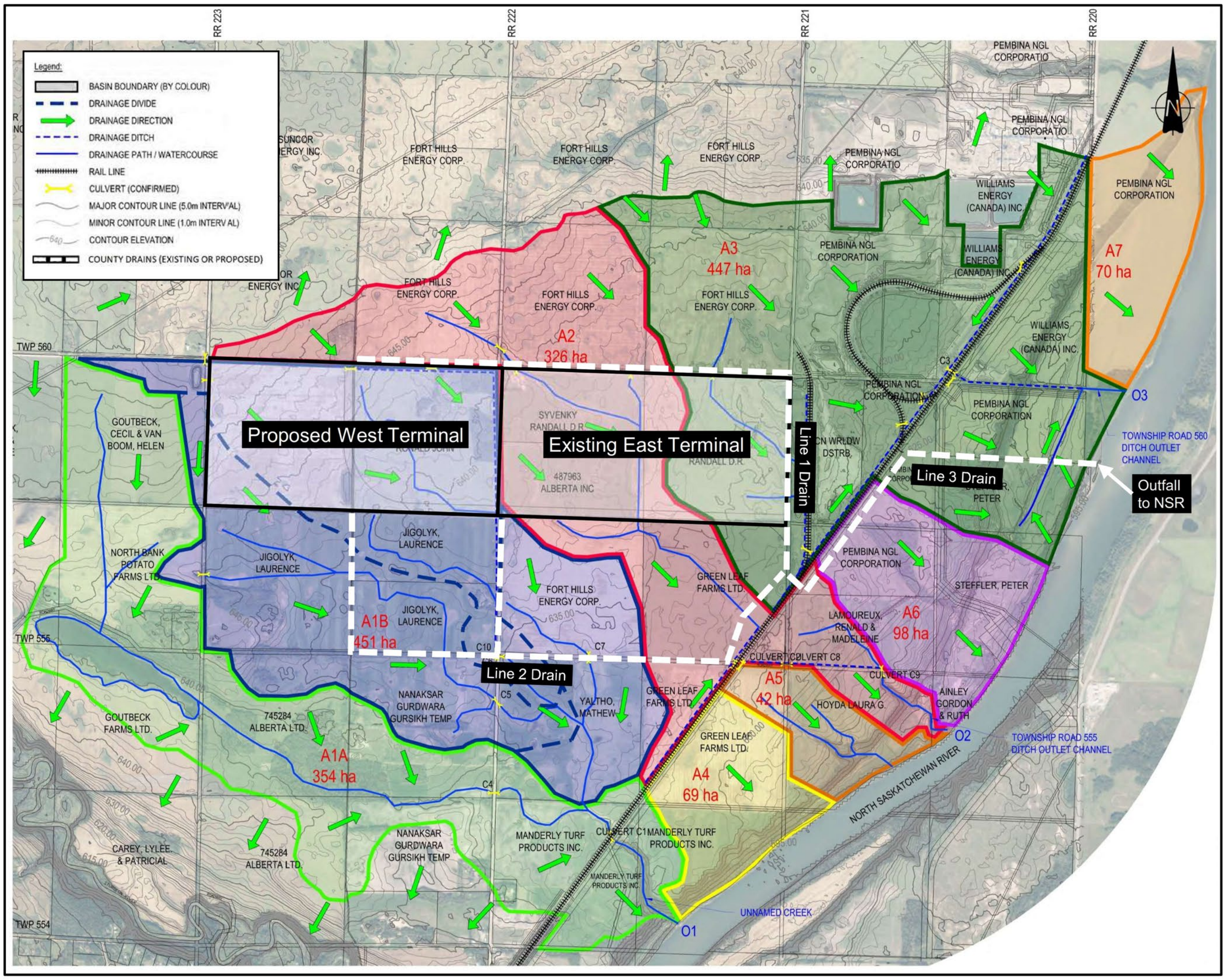

Figure 3-1 – Pre-Development Project Site Drainage within Basin 7

4.0 Hydrology

Hydrology information is defined in the following sections for the local vicinity of the property, including natural runoff characteristics as a baseline reference plus stormwater characteristics for the Project.

4.1 Precipitation

Annual precipitation characteristics for the Project were estimated from combined precipitation records at Edmonton Blatchford climate station (Climate ID: 3012209, 1999-2023) and the inactive station Edmonton

City Center Airport (Climate ID: 3012208,1937-2005) at the same location. The Edmonton climate stations are located 35 km southwest of the Project, with similar elevation (671 m station elevation compared to 650 m project elevation).

The average annual precipitation for the combined data record 1937-2023 is 444 mm with over 70% of this recorded as rainfall (328 mm). Historical monthly precipitation is presented in Table 4.1.

Table 4.1 – Monthly Precipitation (mm)

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Precipitation	22.6	16.8	18.2	24.4	43.6	76.2	85.8	63.9	35.4	19.2	18.5	19.6	444
Average Rainfall	1.2	0.5	1.5	11.0	39.1	74.5	83.7	65.9	36.0	11.0	2.3	1.0	328
Extreme Daily Rainfall	38.6	15.0	18.5	43.4	41.6	66.3	114	69.5	60.5	30.4	14.2	16.2	n/a

4.2 Design Storm

The 1:100-year return period 24-hour duration design storm for the Project is 113.6 mm total rainfall. This is comparable to the highest historical daily rainfall of 114 mm on 31 July 1953 and the most recent large storm of 85.4 mm on 04 July 1990. The design storm is based on rainfall intensity-duration-frequency (IDF) statistics provided in Table 4.2 at Edmonton Blatchford and Edmonton City Center Airport. The rainfall IDF is based on existing climate conditions. The IDF_CC Tool climate change prediction, endorsed by Environment and Climate Change Canada, estimates about 10% increase in the design storm by the end of the century.

Table 4.2 – Rainfall IDF

Duration	Rainfall (mm)					
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
5 min	5.6	8.1	9.8	11.9	13.5	15.1
10 min	8.6	12.5	15.1	18.4	20.8	23.3
15 min	10.4	15.3	18.5	22.6	25.7	28.7
30 min	13.2	20.2	24.7	30.5	34.8	39.1
1 h	15.9	24	29.4	36.2	41.2	46.2
2 h	19.7	28.6	34.5	41.9	47.4	52.9
6 h	28.2	40.8	49.1	59.7	67.5	75.3
12 h	34.6	49.7	59.8	72.4	81.8	91.1
24 h	43	61.9	74.4	90.2	101.9	113.6

4.3 Stormwater

The stormwater characteristics for the integrated Project and performance assessments were based on PCSWMM modelling. The assumed hydrology characteristics were equivalent to the assumptions used for the existing Sturgeon East Yard, as prepared by others and approved by Sturgeon County and the Province. A key assumption is the relative imperviousness of the rail yard. A standard assumption of 40% imperviousness for the rail yards was assumed based on Alberta stormwater management guidelines (AEP 1999).

5.0 Stormwater Management Plan

5.1 Approach

The SWMP has been developed as an integrated plan for both the West Yard and East Yard. The integrated plan will use the existing outlet at the SWMF in the East Yard as the single release point, plus perimeter drainage to prevent off-site drainage from entering the yards. The integrated plan results in operating simplicity and reliability for Cando, simplicity of regulatory compliance reporting, and benefits for the County master drainage plan by potentially avoiding additional drainage investments related to multiple stormwater release locations.

The integrated SWMP general arrangement is illustrated on Figure 5.1. In the West Yard, the West Pond will attenuate the stormwater peak flow. Stormwater will then be conveyed from the West Yard to the East Yard along the West-East Ditch, and stormwater releases will occur at the existing SWMF in the East Yard where releases will discharge to the Line 1 drain. Additional perimeter ditches are intended to prevent off-site drainage from entering the rail yards.

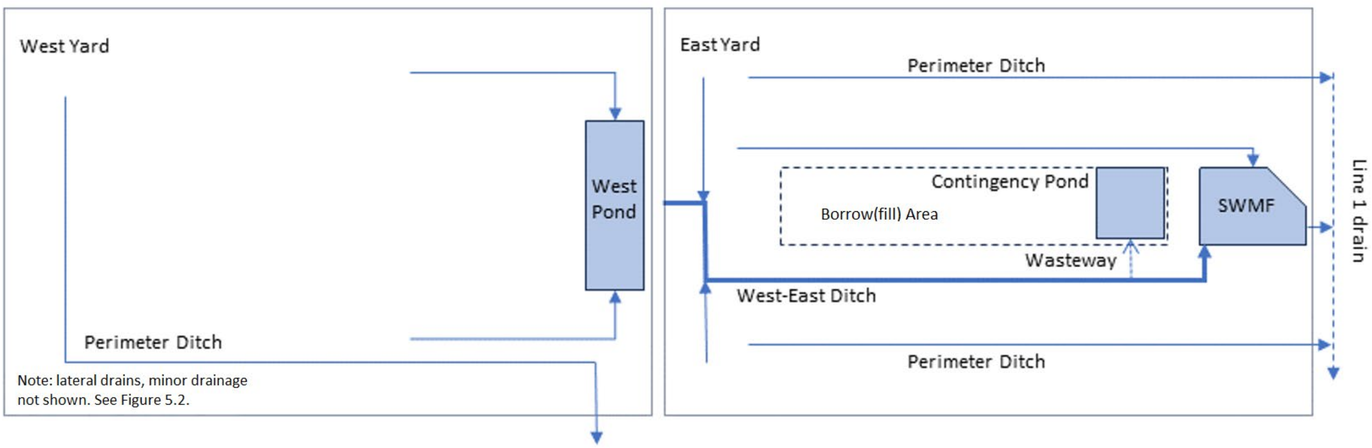

Figure 5.1 – Conceptual Stormwater Management Plan

A key component of the integrated SWMP is the Contingency Pond, an existing below-ground location that was the borrow source for construction of the East Yard. This location is a deep hole that is expected to be partially filled during construction of the West Yard. The integrated SWMP will use this location for stormwater containment during large storms. Due to the below-ground location of the Contingency Pond, the pond may need to be pumped out periodically. The SWMP therefore uses the topographic advantage of an excavated area for in the East Yard for partial stormwater control.

Inflow to the Contingency Pond will be optimized during detailed engineering so that stormwater along the West-East Ditch will be diverted to the Contingency Pond only during large events via spillway or 'wasteway'. The wasteway will be activated in a passive manner after the ditch flow depth exceeds the wasteway bottom invert. In this way, the Contingency Pond will remain relatively dry during normal storm events when it will only receive inflow and store drainage from the local borrow area.

Other aspects of the SWMP include:

- Subsurface lateral drains within the Yard that report to the stormwater facilities.
- Reconfiguration of the existing East Yard perimeter ditches that report directly to the Line 1 drain. New rail connections between the East and West yards will cross the perimeter ditches near RR 222. This necessitates a small change in the ditch alignment so that the perimeter ditches are only conveying drainage from outside of the Yard. The change will result in less water for the perimeter ditches and more water for the stormwater management system.
- Proposed West Perimeter Ditch around the West Yard to the RR 222 ditch south of the Yard.

Altogether, the combined property of 260 ha will have onsite stormwater management controls for 228 ha and perimeter ditches for the remaining 32 ha along the fringe areas outside of the rail loop. The various drainage areas are listed in Table 5.1. Collectively, the West Pond, SWMF and Contingency Pond will have an available storage capacity equivalent to the design storm volume, as summarized in Table 5.2. The SWMP general arrangement and design details are provided in Appendix A, as illustrated on Figure 5.2.

Cando proposes to release stormwater at the existing approved rate of 0.76 m^3/s from the SWMF to the Line 1 drain. This is equivalent to a release rate of 3.3 L/s/ha for the integrated Sturgeon Rail Terminal. The storage capacity of the ponds will allow Cando to exceed the County expectations by releasing a lower peak flow during the design storm.

Stormwater management performance details are provided in Appendix B based on PCSWMM modelling for stormwater hydrographs, pond storage, ditch conveyance, and releases. The model results in Appendix B includes two PCSWMM scenarios. The first scenario simulates the design storm with the outlet gate closed to determine whether any of the stormwater ponds would be overtopped if releases were delayed. The second scenario simulated the design storm with the gate open to determine whether the releases would comply with the County approved rate. All model results and input files are included in Appendix B.

To summarize, the SWMP is expected to comply with the requirement to operate within an approved release limit during large storms up to a 1:100-year 24-hour design storm as per Stormwater Management Guidelines (Alberta Government, 2009) and the General Municipal Servicing Standards (Sturgeon County, 2009). Additional SWMP details are described in the following sections for specific aspects of the integrated plan.

Table 5.1 – Drainage Areas		
Area	Description	Drainage Area (ha)
East Yard	Rail Yards (North & South)	91.5
	SWMF Pond	3.8
	Borrow (Fill) Area	14.6
	Contingency Pond	2.4
	East Yard North Perimeter Ditch	8
	East Yard South Perimeter Ditch	10
	East Yard Total	**130**
West Yard	Rail Yards (North & South)	75
	Undeveloped Area	39.2
	West Pond	1.8
	West Perimeter Ditch	14
	West Yard Total	**130**
Total		**260**

Table 5.2 – Stormwater Volumes			
Stormwater Ponds	Contributing Area (ha)	Design Storm Volume (m^3)	Storage Capacity (m^3)
West Pond (Section 5.2)	116	70,500	43,000
SWMF (Section 5.3)	95	66,300	74,000
Contingency Pond (Section 5.4)	17	9,400	86,000*
Total	228	146,200	203,000

* To be confirmed during detailed engineering.

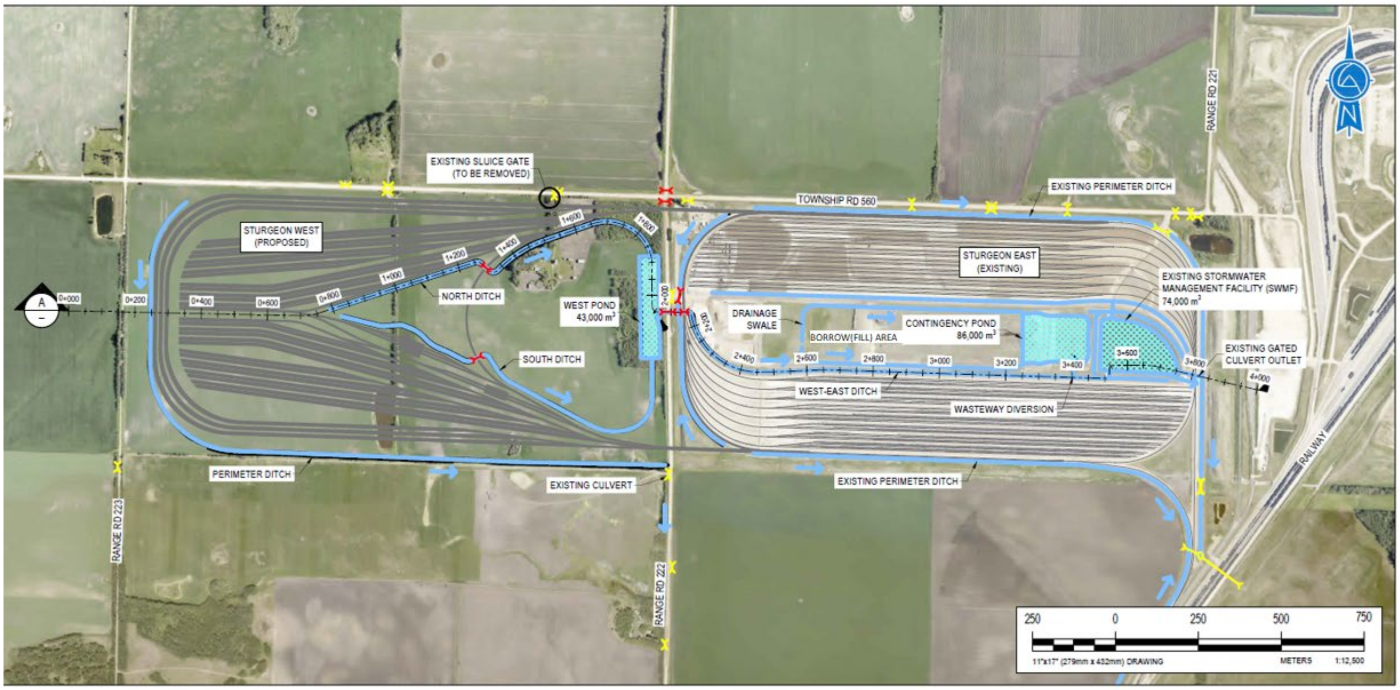

Figure 5.2 – Cando Stormwater Management Plan General Arrangement

5.2 West Pond

The West Yard stormwater pond (West Pond) will attenuate stormwater runoff from the West Yard. The pond will be excavated below existing ground with a culvert outlet across RR 222 to the East Yard.

West Pond information is listed below and illustrated on Figure 5.3:

- 637 m pond bottom; 639.5 m high water level (HWL).
- 1.4 m diameter ungated outlet culvert with a bottom invert of 638.1 m.
- 1.8 ha surface area with 2.2 m average depth below the high-water level.
- 116 ha drainage area within the West Yard rail loop.
- 70,500 m³ design storm inflow volume during a 1:100-year 24-hour storm.
- 43,000 m³ West Pond storage capacity as measured from the top of pipe (obvert) of the culvert outlet.

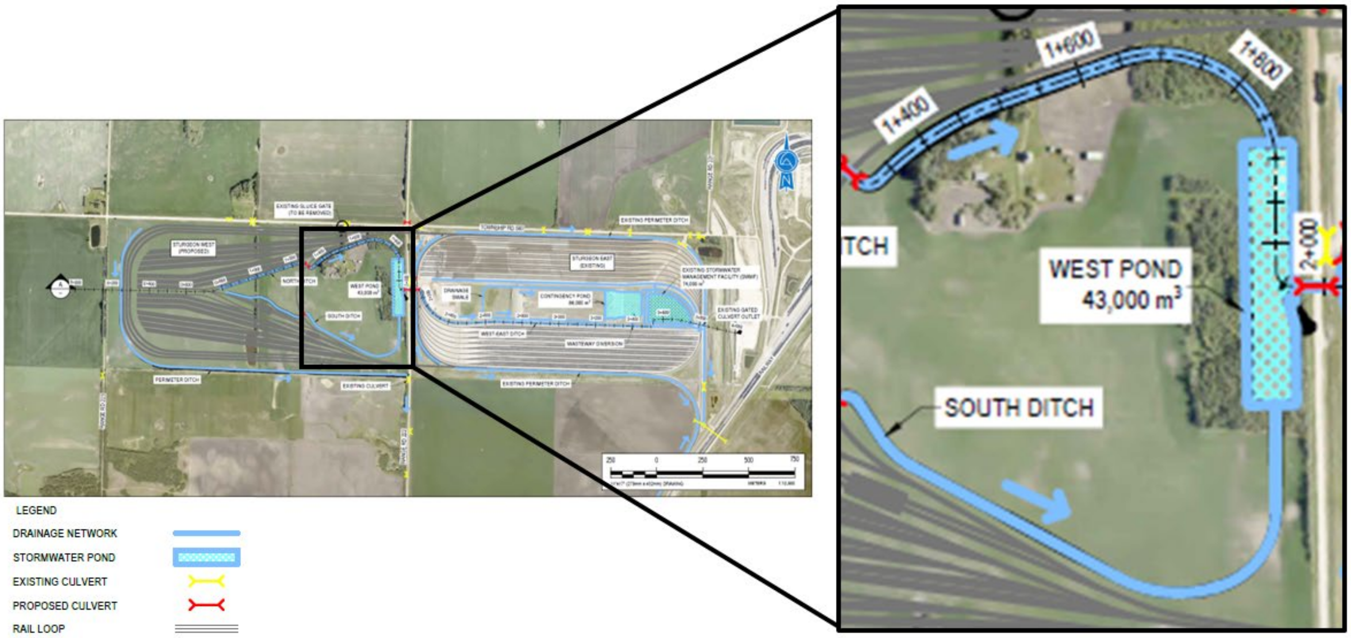

Figure 5.3 – West Pond Details

5.3 East Pond (SWMF)

The existing East Yard SWMF stormwater pond attenuates stormwater runoff from the East Yard and is the controlled outlet location for both the West Yard and East Yard. The SWMF was designed with a permanent pool (i.e. dead storage) to allow for some sediment to accumulate in the bottom of pond (WSP, 2019). Inflow consists of local ditch drains within the East Yard, plus the West-East Ditch from the West Yard. Stormwater peak inflow to the SWMF is limited by the wasteway diversion to the Contingency Pond. The SWMF outlet is a 900 mm gated culvert to the RR 221 road ditch with an orifice that controls the release rate when the gate is open. The SWMF was approved and constructed as part of Sturgeon Rail Terminal or East Yard.

East Pond (SWMF) information is listed below and illustrated on Figure 5.4:

- 633 m normal water level (NWL); 635 m HWL.
- 3.8 ha SWMF surface area, 2 m average depth below the high-water level.
- 95 ha drainage area within the East Yard plus 17 ha area draining to the Contingency Pond within the East Yard (i.e. not contributing to the SWMF).
- 66,300 m³ design storm volume for the 1:100-year 24-hour flood.
- 74,000 m³ active or live storage capacity between NWL and HWL.

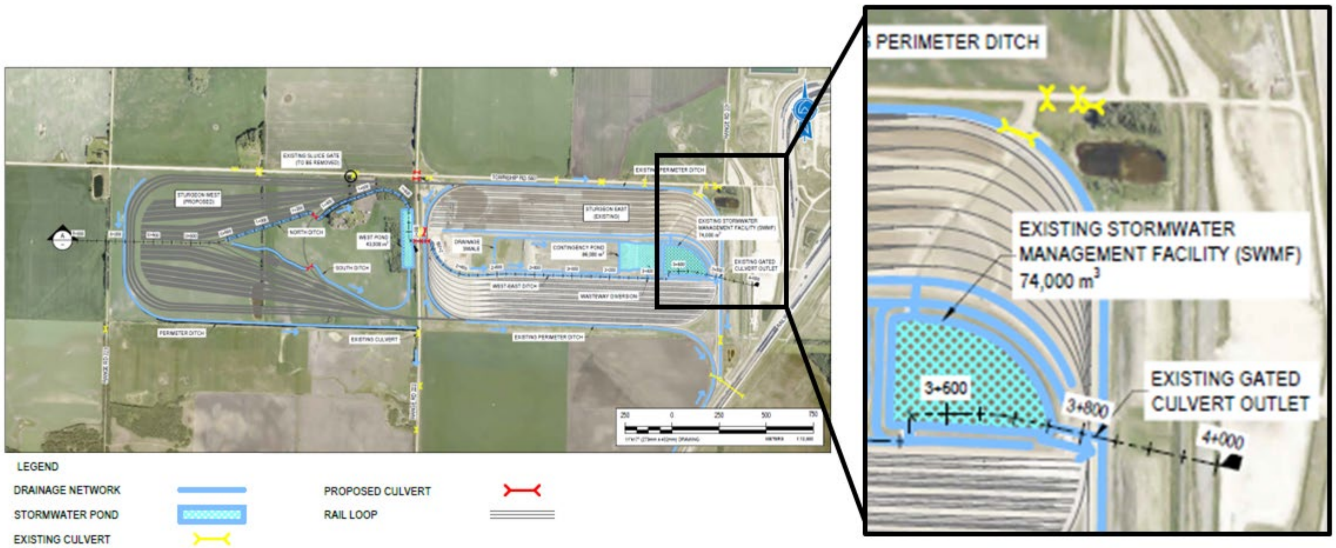

Figure 5.4 – East Pond (SWMF) Details

5.4 Contingency Pond

The Contingency Pond is intended as a dry pond to store surplus water during large storms. The location is an excavated borrow source in the East Yard as seen on Figure 5.5. This pond is not intended for frequent use. It is expected to be used only during large storms with a return period of about once in 2 years (i.e. 1:2-year return period rainfall storm event). The Contingency Pond local drainage area is about 17 ha including the 2.4 ha pond surface area. The Contingency Pond will provide water storage below ground. The borrow area is currently about 6 m deep with a pond bottom at 628 m. Final grading will be determined as part of detailed engineering for the West Yard.

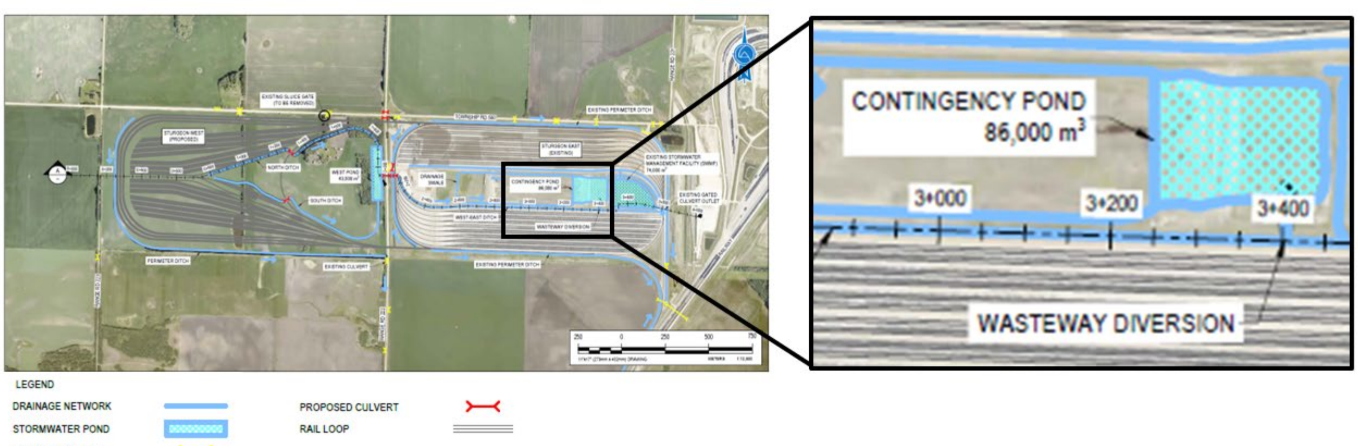

Figure 5.5 – Contingency Pond Details

5.5 Pond Releases

Releases to the environment will be from the SWMF to the Line 1 drain as illustrated on Figure 5.6. The releases will be controlled as needed at the gated culvert to comply with the release limit and EPEA approval conditions related to water quality. The SWMF is currently approved to release 0.76 m³/s peak flow from the Sturgeon Rail Terminal (East Yard) based on the County standard of 7 L/s/ha. The approved release limit of 0.76 m^3/s will be equivalent to 3.3 L/s/ha for the proposed integrated Sturgeon Rail Terminal after completion of the proposed West Yard. Cando proposes to accept the existing approved release rate for the larger integrated rail terminal.

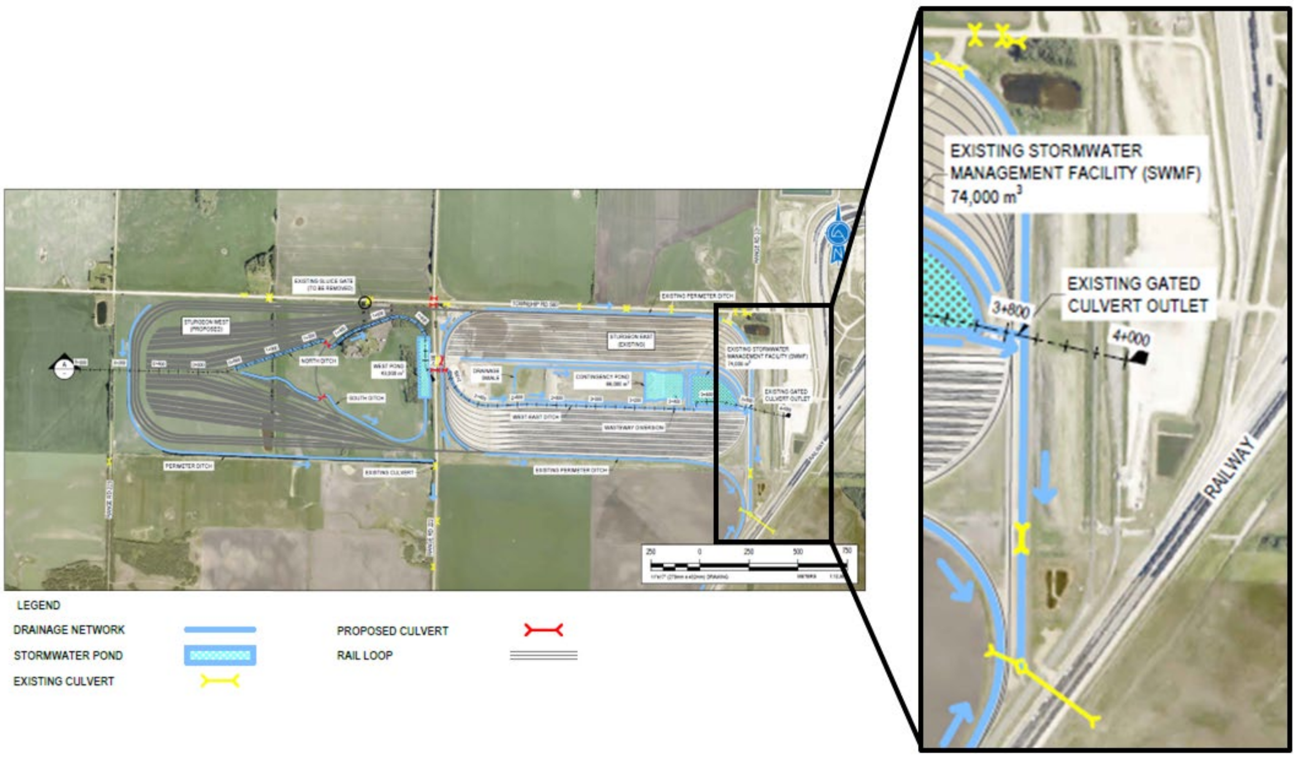

Figure 5.6 – Pond Release Details

5.6 East Yard Perimeter Ditches

The existing perimeter ditches around the East Yard are the North Perimeter Ditch and the South Perimeter Ditch. The alignment of these ditches will be altered near RR 222 where there will be a new rail connection to the West Yard. A portion of the ditches will be re-directed to the West-East Ditch through the East Yard, and the remaining perimeter ditches will be situated only along the perimeter of the property where they will continue to convey natural drainage from offsite areas. The change in alignments is illustrated on Figure 5.7. This change results in about 5 ha area that will be re-graded to direct the drainage to the onsite stormwater management system. The amount of water along the perimeter ditches will be reduced by an equivalent amount.

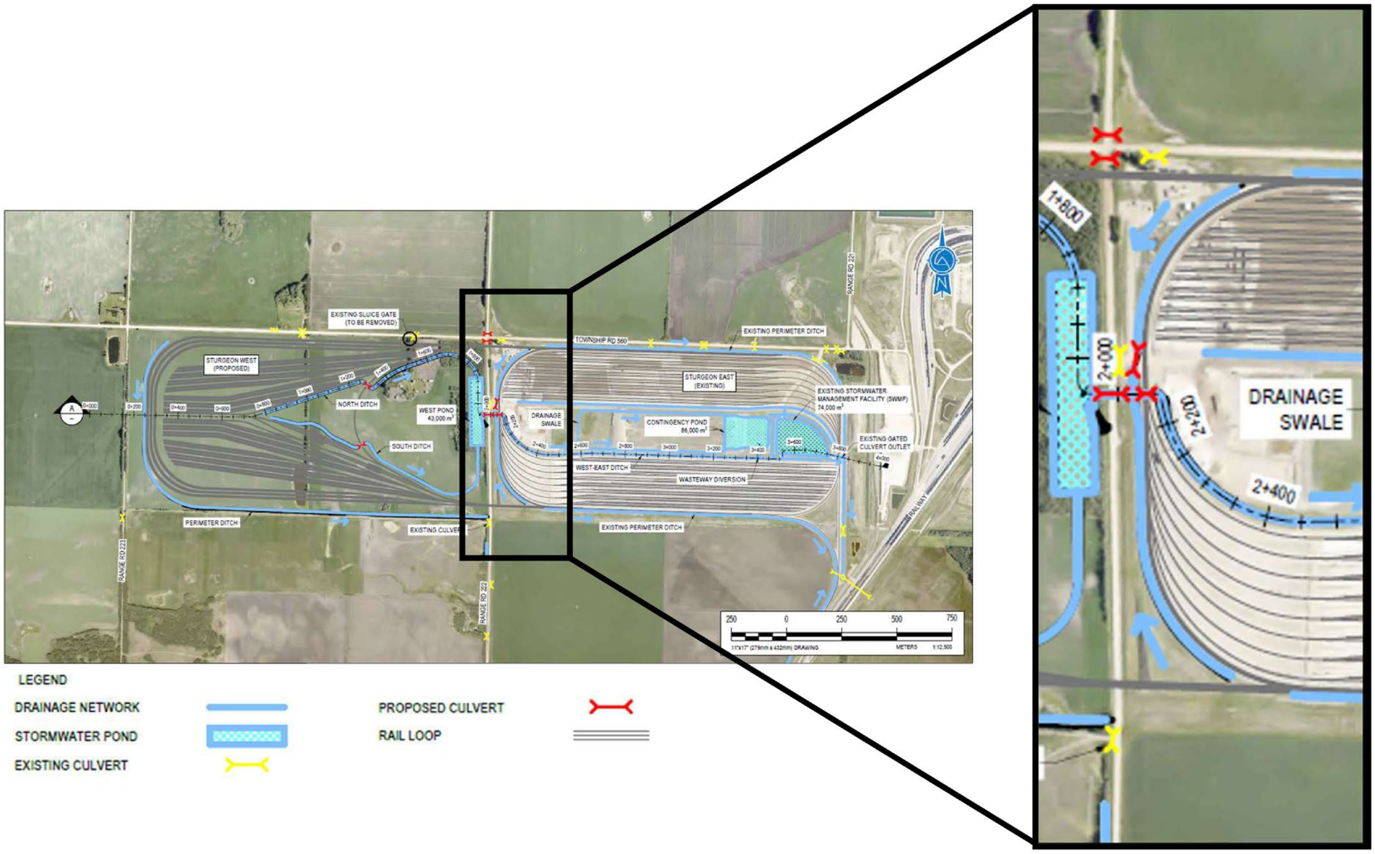

Figure 5.7 – East Yard Perimeter Ditches

5.7 West Yard Perimeter Ditch

The proposed perimeter ditch around the West Yard rail loop will have variable slope of at least 0.3% and a nominal depth of 0.5 m to 1.0 m. Some overland inundation may occur during large floods because the ditch is configured to maintain the small existing wetlands along the ditch alignment by tying into the wetland elevation with no excavation through the wetland. Containment will be provided at key locations along the south side where the local topography naturally results in drainage towards the adjacent property to the south. The perimeter ditch will tie-in at the downstream end to the existing RR 222 at an existing 900 mm diameter driveway culvert along the west side of the road as shown on Figure 5.8.

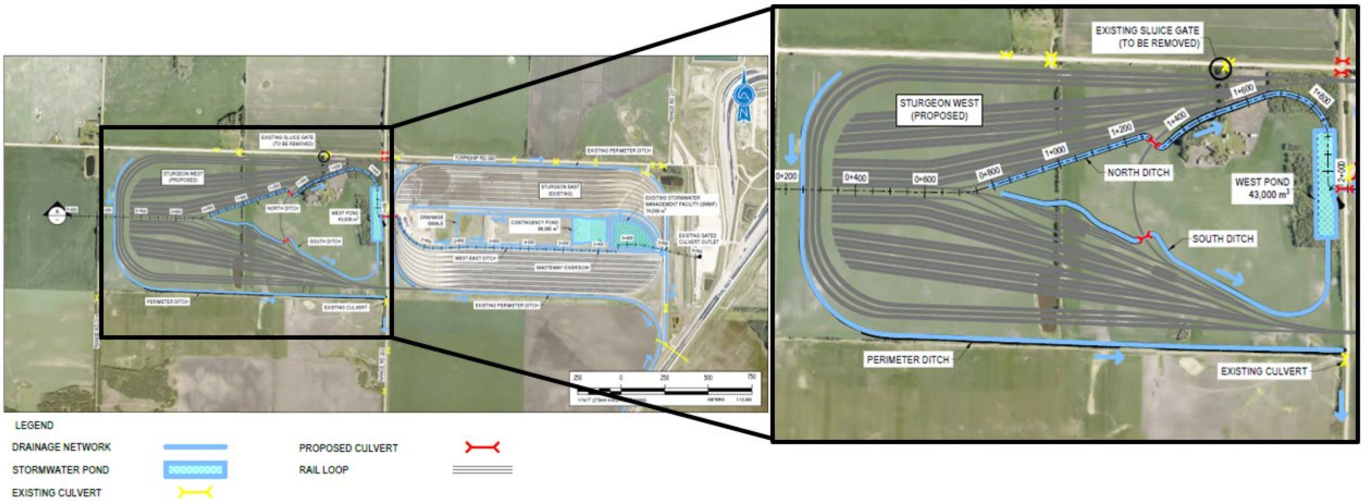

Figure 5.8 – West Yard Perimeter Ditch Details

5.8 TWP 560 Ditch Improvements

The development of the West Yard requires removal of a private sluice gate structure that is currently used by the local landowner (Ron Holmes) to divert water across TWP 560 to his property within the proposed rail terminal.

To facilitate drainage after removing the sluice gate, additional culverts have been proposed along the north side and south side of TWP 560 across RR 222 as shown on Figure 5.9. These culverts will drain to the existing Line 1 drain on the east side of the Yard.

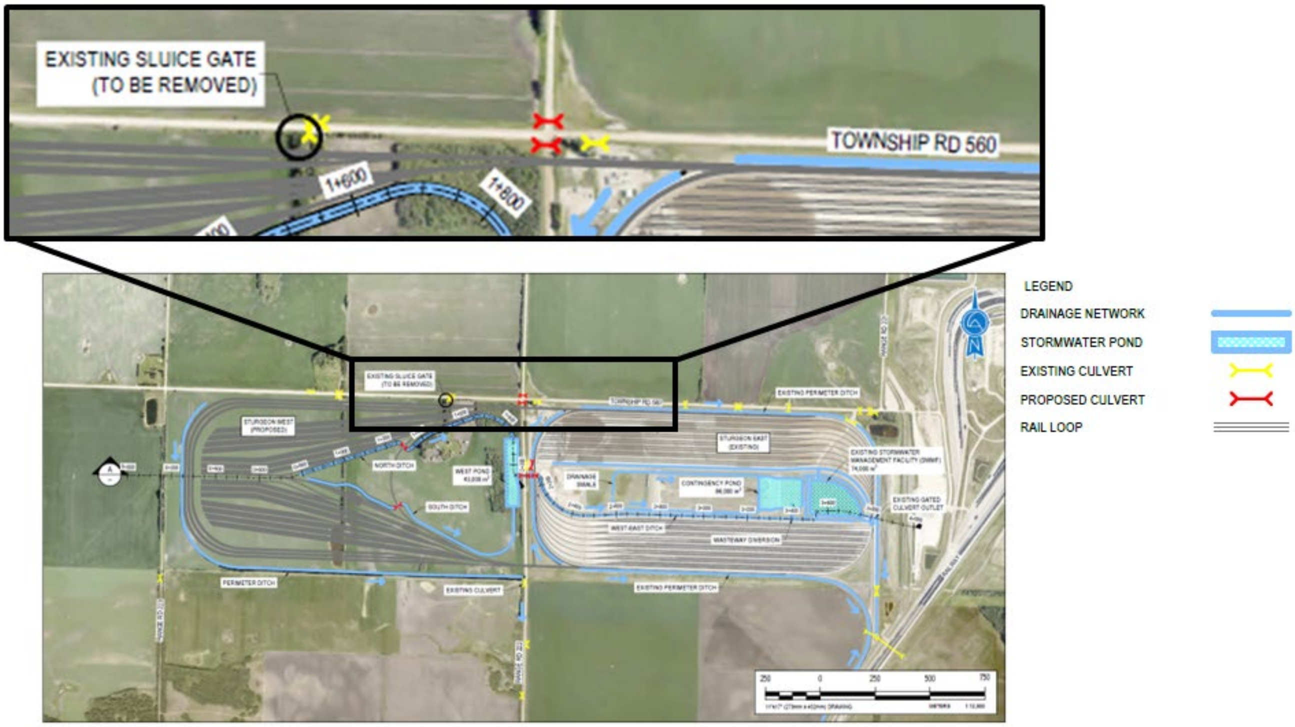

Figure 5.9 – TWP 560 Ditch Improvement Details

5.9 Wetlands

Wetlands were assessed and impacts to the wetlands were reported separately (EDI, 2024). In summary, all wetlands within the property are assumed to be impacted and compensated. Additional wetlands outside of the property on the south side are not expected to be impacted by Cando because the property is a sod farm where any natural wetlands have already been impacted.

5.10 Impacts on Regional Drainage

By accepting the existing approved release limit of 0.76 m^3/s, the effective release rate for the combined project will be about 3.3 L/s/ha or about half of the County's 7 L/s/ha allowable release rate. The County stormwater release policy normally allows for a maximum release rate of 223 ha x 7 L/s/ha = 1.56 m^3/s.

The integrated SWMP will only release stormwater at the existing SWMF to the Line 1 drain, which then flows to the Line 3 drain that discharges to the North Saskatchewan River. The downstream Line 3 drain in the Sturgeon County Stormwater Management Plan for Drainage Basin 7 (SamEng, 2016) is the receiving drain for stormwater plus natural drainage near the Project.

The Line 3 stormwater peak flow is expected to be reduced compared to the existing drainage configuration because the stormwater releases for both the West and East Yard of the Sturgeon Rail

Terminal will be managed at the SWMF and controlled to the existing peak rate as approved by Sturgeon County. The duration of releases at the approved peak rate may be up to 1 day, depending on whether Cando chooses to release water at the peak rate or at a lower rate.

Stormwater runoff from offsite areas will be diverted via existing road ditches and perimeter ditches. Along the north side of the property, the TWP 560 ditch will drain east to the Line 1 drain. The existing East Yard perimeter ditches also divert drainage to the east side of the property. Other offsite drainage along the west side of the Yard will be diverted by a new perimeter ditch to the RR 222 road ditch south of the Yard (see Figure 5.2). The net difference to RR 222 drainage will be a reduction in flow of about 15% of the natural flow as seen on Figure 5.10. The perimeter ditches will convey drainage from a small portion of the Cando property and will result in a net zero change to the regional drainage.

In summary, there will be no adverse impacts on regional drainage because the regional drainage during the design storm will either remain unchanged or will be reduced, which could potentially result in fewer drainage infrastructure investments by the County by eliminating the Line 2 drain along TWP 555 and reducing the requirements for the Line 3 drain as compared to the County planned basis.

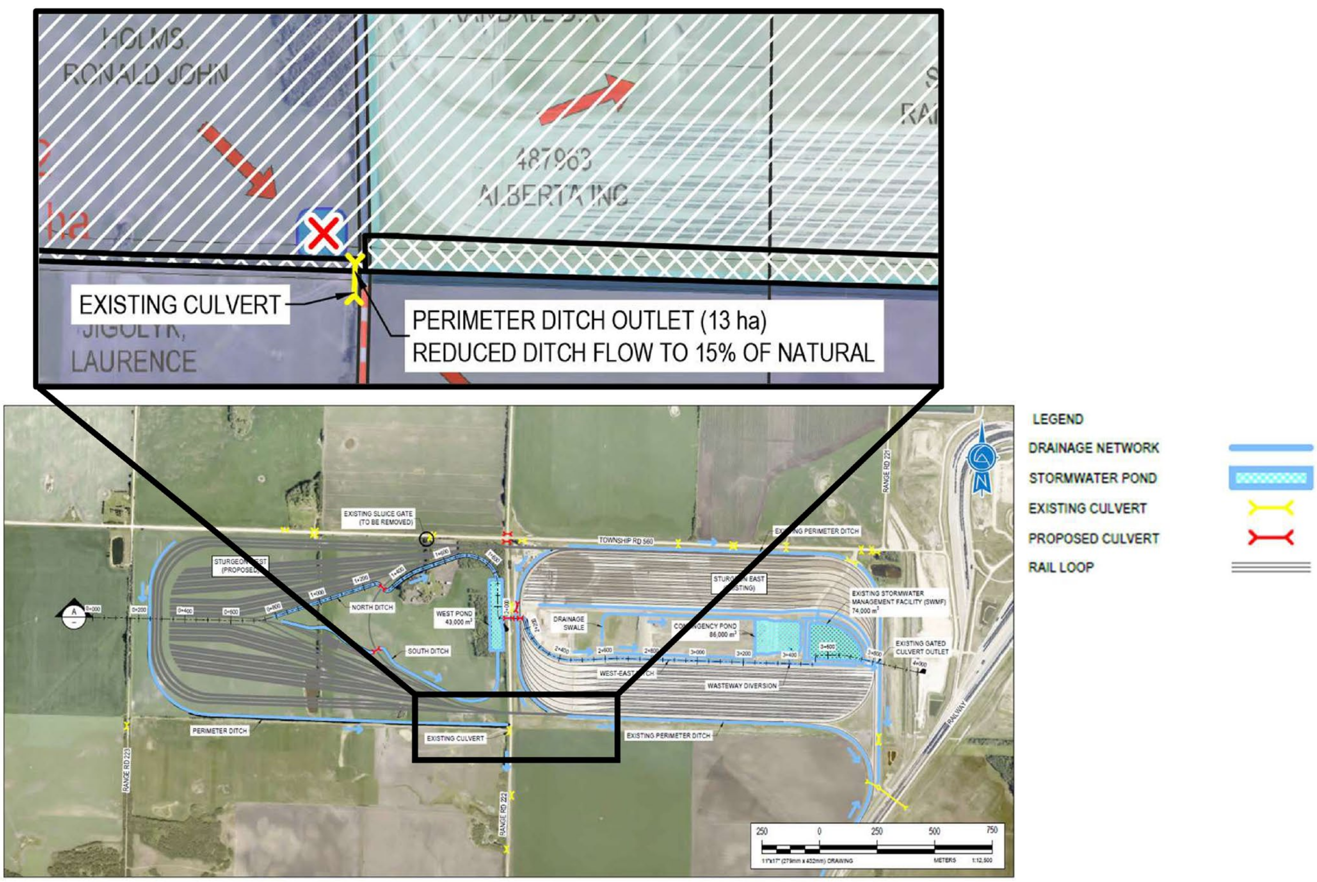

Figure 5.10 – RR 222 Drainage Details

6.0 Operation and Maintenance

The stormwater management system will be operated in accordance with Stormwater Management Guidelines (Alberta Government, 1999) and the (pending) EPEA approval conditions including pond water levels and release rates as necessary. Additional testing may be required for unusual conditions. Periodic maintenance may also be required to manage sediment in the ponds.

SWMF operations will be:

- Gate closed during normal operations.
- Gate open after a storm, after testing to ensure acceptable water quality.
- Regular water quality testing and documentation will meet EPEA approval conditions.

West Pond operations will be:

- Culvert outlet is open and uncontrolled during normal operations.
- Pond will be pumped dry as needed.
- Water quality testing will occur as needed.

Contingency Pond operations will be:

- No inflow during small storms, with local rainfall accumulation only.
- Diverted flow into the pond at the wasteway during large storms.
- Pond will be pumped dry as needed.

Temporary pump systems will be deployed as needed to drain the dead storage areas of the ponds as needed for maintenance purposes or to restore the stormwater capacity.

The ponds may require maintenance, including periodic sediment removal during their operational life. This will likely occur in the fall by drawing the pond(s) down and using an excavator to remove the accumulated sediment.

Culverts will be maintained by removing sediment after the conveyance capacity has been reduced by 30%.

Ditches may also need maintenance each year to remove sediment, debris, and vegetation as needed to maintain the conveyance capacity of the ditch.

The perimeter ditch containment berm along the south side of the West Yard rail loop will be maintained as needed based on periodic inspections.

7.0 Water Quality Monitoring Plan

Water quality will be monitored as per approval conditions at the SWMF, based on planned sampling for water quality. The preferred mitigation or combination of mitigations for dealing with high turbidity will be developed based on ongoing operating experience. The preference will be to hold the water until water quality is acceptable.

Water quality testing results will be kept on site and documented as per EPEA approval conditions. Data will be managed in a consistent manner to allow for effective analysis and comparisons over time. Water quality monitoring reports will be issued to the government as per EPEA approval conditions.

8.0 Closure

This report was prepared by Clifton Engineering Group Inc. for the use of Cando Rail & Terminals Ltd. for specific application to the Cando Sturgeon West and East Rail Terminal.

This report has been prepared in accordance with generally accepted engineering practice common to the local area. No other warranty, express or implied is made. The discussion and recommendations within this report were prepared in accordance with the standard care of stormwater management practice at the time of the report preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Clifton Engineering Group Inc. accepts no responsibility for damages, if any, suffered by any third party because of decisions made or actions based on this report.

Site information was obtained from the sources listed in the report and from interviews with individuals. Clifton Engineering Group Inc. accepts no responsibility for any deficiencies or inaccuracies in the information provided in this report that are the direct result of intentional or unintentional misrepresentations, errors or omissions of the persons interviewed or information reviewed.

9.0 References

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WSP. September 2019.Cando Sturgeon County Yard Stormwater Management Plan (second submission).

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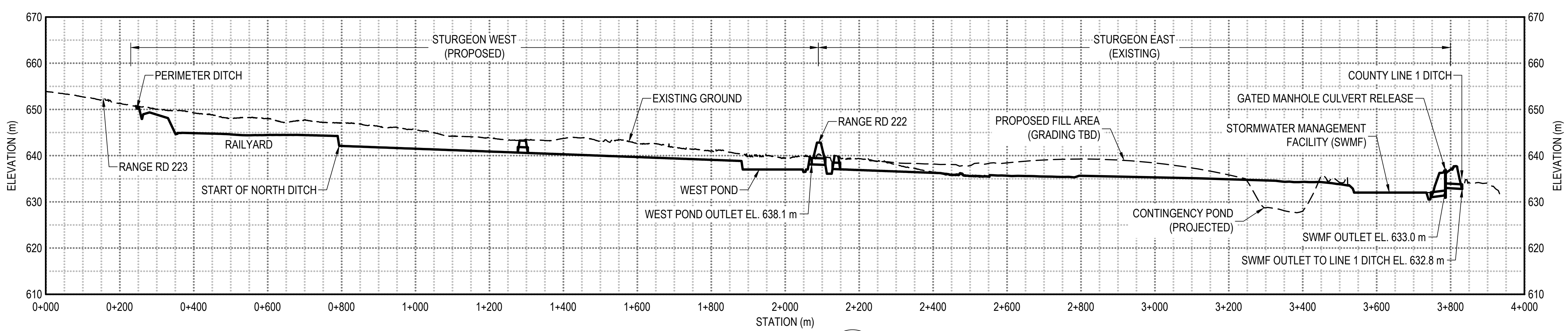
Appendix A
Drawings

Clifton



DRAINAGE PROFILE A --
H 1:12,500
V 1:1,000

LEGEND

DRAINAGE NETWORK	
STORMWATER POND	
EXISTING CULVERT	
PROPOSED CULVERT	
RAIL LOOP	

NOTES:

1. STURGEON WEST STORMWATER MANAGEMENT TO BE INTEGRATED WITH THE EXISTING STURGEON EAST RAIL TERMINAL STORMWATER MANAGEMENT PLAN, RESULTING IN A SINGLE OUTLET AT THE EXISTING SWMF FOR BOTH THE WEST AND EAST RAIL TERMINALS.
2. SUBSURFACE DRAINS FOR TRACK DRAINAGE NOT SHOWN.

REFERENCE(S):

- ESRI WORLD IMAGERY DATED JUNE 20, 2021.
- WSP "CANDO STURGEON TERMINAL" PROJECT NO 17M01224-12, REV 1.

DRAWING REVISIONS

REV	DESCRIPTION	BY	DATE
0	30% DESIGN	MB	2024-04-22

Clifton

CLIENT: CANDO RAIL & TERMINALS

PROJECT: STURGEON WEST STORMWATER MANAGEMENT PLAN

DRAWING NAME: GENERAL ARRANGEMENT

DSGN. BY	MB	SCALE	AS SHOWN	DATE	2024-04-22
DWN. BY	ZS	PROJECT NO.	CG3821	DWG. NO.	CG3821.001
REV. BY	MB	FILE NO.	W-CG3821-DA	SHEET NO.	1 OF 7

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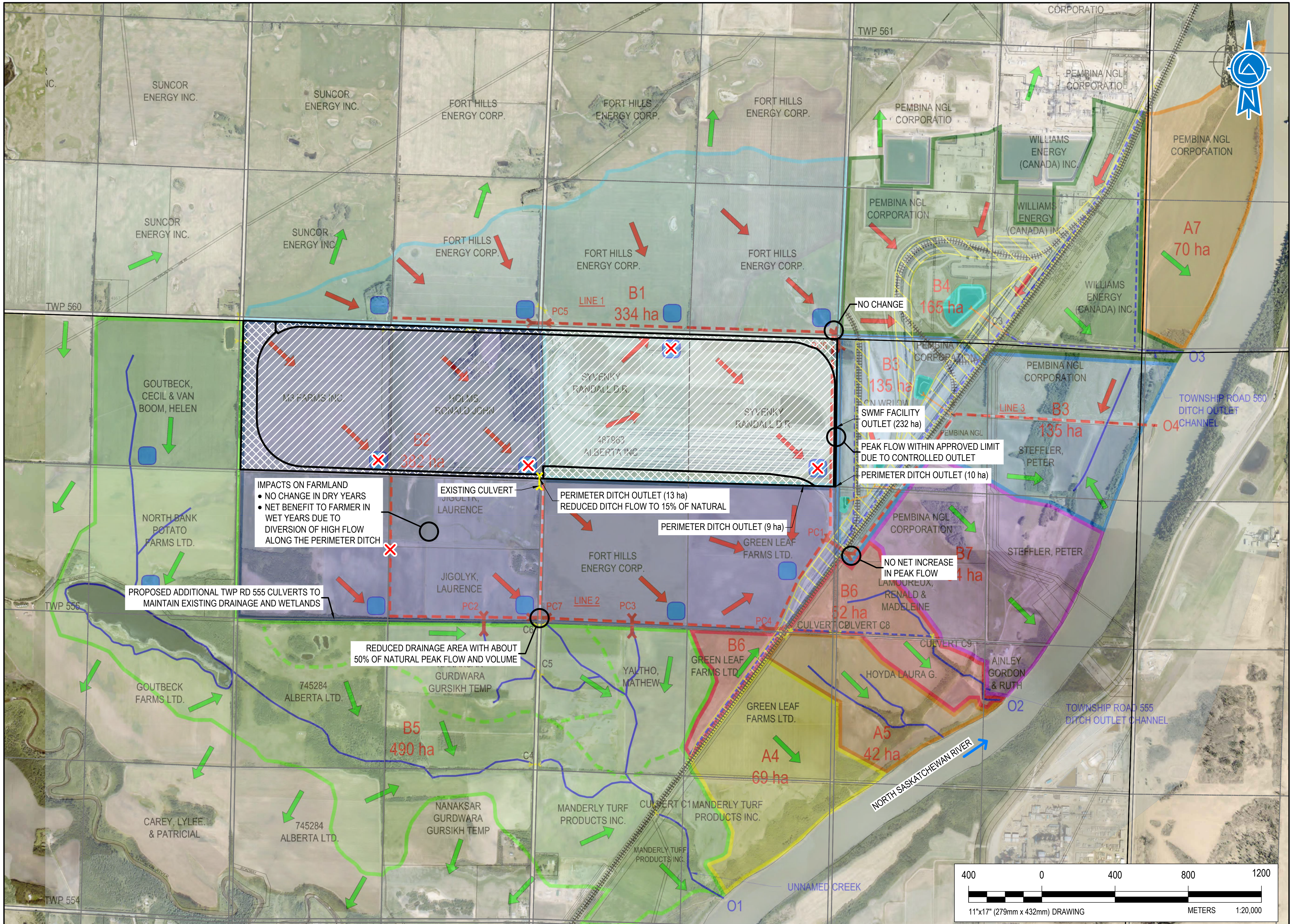

EXISTING COUNTY REGIONAL DRAINAGE PLAN

- PROPOSED BASIN BOUNDARY (BY COLOUR)
- PROPOSED REDWATER SOUTH RAIL YARD EXPANSION
- PROPOSED DRAINAGE DIRECTION
- PROPOSED PEMBINA STORMWATER POND
- COUNTY RECOMMENDED STORMWATER POND
- PROPOSED DRAINAGE DITCH
- PROPOSED CULVERT
- PROPOSED PEMBINA SITE CULVERT
- EXISTING DRAINAGE DIRECTION
- EXISTING DRAINAGE DITCH
- EXISTING DRAINAGE PATH
- EXISTING RAIL LINE
- EXISTING CULVERT

IMPACTS ON THE EXISTING PLAN

- NO LONGER REQUIRED
- STURGEON WEST AND EAST RAIL YARD AREA
- STURGEON WEST PERIMETER DITCH AREA

REFERENCE(S):
- ESRI WORLD IMAGERY DATED JUNE 20, 2021.
- SAMENG INC. "STORMWATER MANAGEMENT PLAN FOR DRAINAGE BASIN 7 OF STURGEON INDUSTRIAL HEARTLAND" DATED APRIL 12, 2016. FIGURE 4-1 PROPOSED POST-DEVELOPMENT DRAINAGE MANAGEMENT PLAN.

DRAWING REVISIONS

REV	DESCRIPTION	BY	DATE
0	30% DESIGN	MB	2024-04-22

Clifton

CLIENT: CANDO RAIL & TERMINALS

PROJECT: STURGEON WEST STORMWATER MANAGEMENT PLAN

DRAWING NAME: IMPACTS ON REGIONAL DRAINAGE

DSGN. BY: MB	SCALE: 1:20,000	DATE: 2024-04-22	
DWN. BY: ZS	PROJECT NO.: CG3821	DWG. NO.: CG3821.002	
REV. BY: MB	FILE NO.: W-CG3821-DA	SHEET NO.: 2 OF 7	

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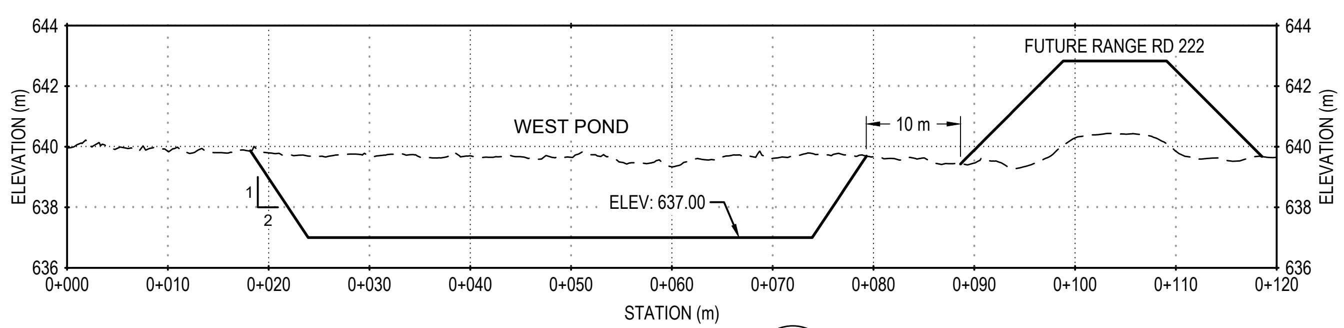


WEST POND SECTION E --
H 1:750
V 1:250

LEGEND

EXISTING GROUND
(1 m MINOR, 5 m MAJOR)

DESIGN GRADE
(1 m MINOR, 5 m MAJOR)

RAIL LOOP

DRAINAGE FEATURE

REFERENCE(S):

- ESRI WORLD IMAGERY DATED JUNE 20, 2021.
- EXISTING GROUND TOPOGRAPHY DATED 2023.

DRAWING REVISIONS

REV	DESCRIPTION	BY	DATE
0	30% DESIGN	MB	2024-04-22

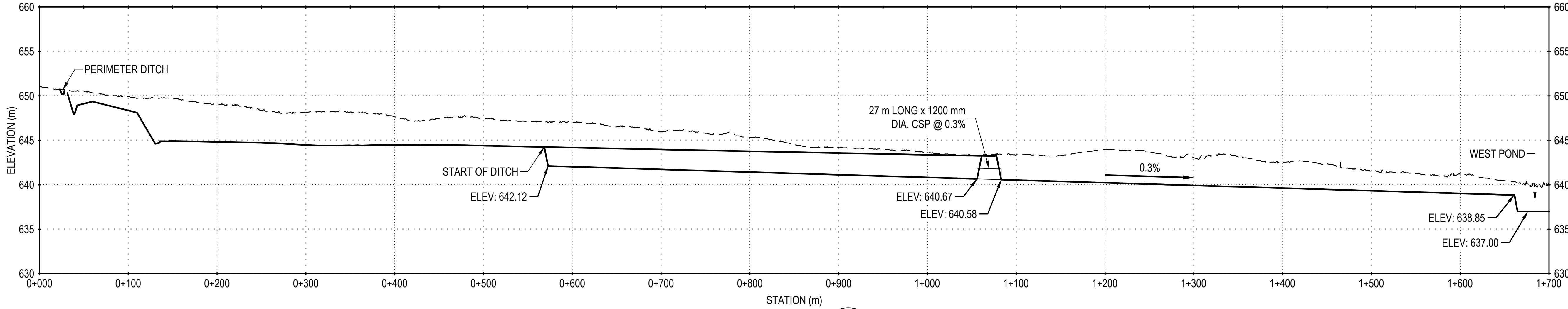
Clifton

CLIENT: CANDO RAIL & TERMINALS

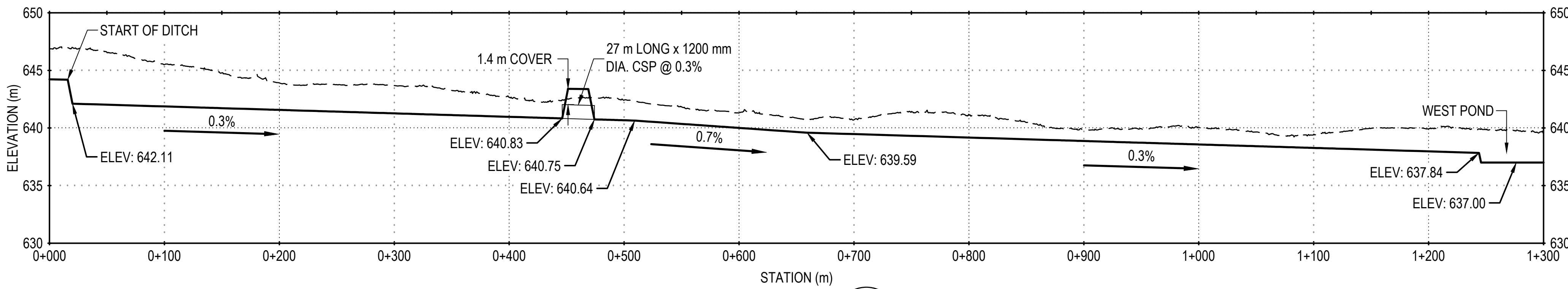
PROJECT: STURGEON WEST STORMWATER MANAGEMENT PLAN

DRAWING NAME: WEST YARD GENERAL ARRANGEMENT

DSGN. BY: MB	SCALE: 1:5000	DATE: 2024-04-22	
DWN. BY: ZS	PROJECT NO.: CG3821	DWG. NO.: CG3821.003	
REV. BY: MB	FILE NO.: W-CG3821-GA	SHEET NO.: 3 OF 7	

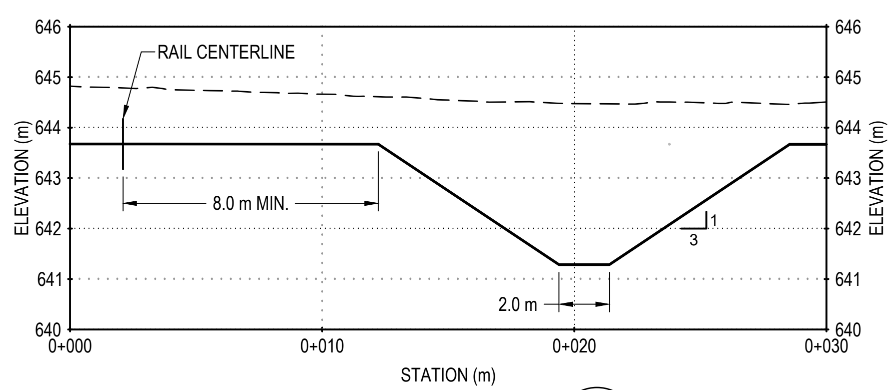


NORTH DITCH (B / 3)
H 1:5000
V 1:500

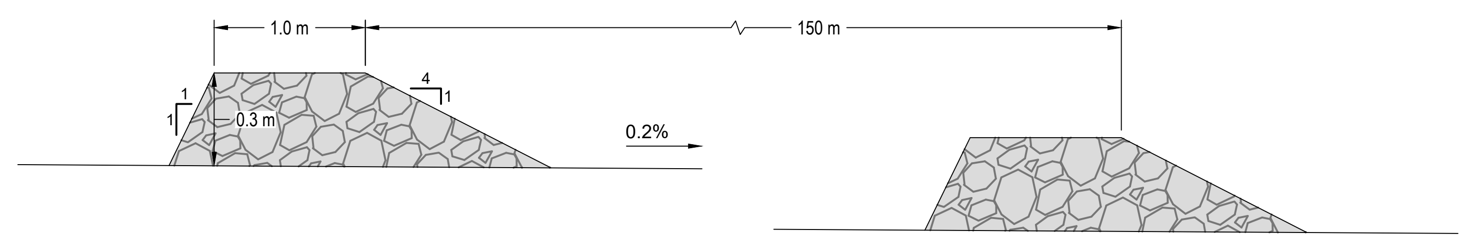


SOUTH DITCH (C / 3)
H 1:5000
V 1:500

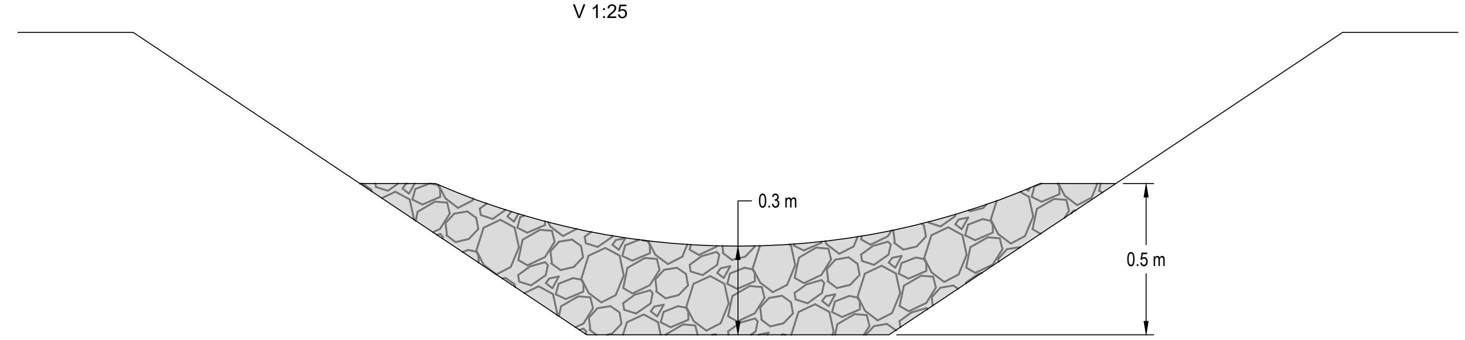
GRADATION		HEAVY ROCK RIPRAP CLASS
REQUIRED PROPERTIES	UNITS	1M
NOMINAL MASS	KG	7
NOMINAL DIAMETER	mm	175
NONE GREATER THAN	KG	40
	mm	300
20% TO 50%	KG	10
	mm	200
50% TO 80%	KG	7
	mm	175
100% GREATER THAN	KG	3
	mm	125



TYPICAL DITCH SECTION (D / 3)
H 1:300
V 1:150



TYPICAL ROCK CHECK PROFILE
H 1:50
V 1:25



TYPICAL ROCK CHECK SECTION
H 1:50
V 1:25

LEGEND

EXISTING GROUND

DESIGN GRADE

RIPRAP

DEFINITIONS

RIPRAP = CLASS 1M RIPRAP AS PER ALBERTA TRANSPORTATION.

NOTE:

INSTALL ROCK CHECKS IN NORTH DITCH, SOUTH DITCH, WEST-EAST DITCH AND EXISTING WEST-EAST DITCH

REFERENCE(S):
- EXISTING GROUND TOPOGRAPHY DATED 2023.
- ALBERTA TRANSPORTATION SPECIFICATIONS FOR BRIDGE CONSTRUCTION, SECTION 10, HEAVY ROCK RIPRAP.

DRAWING REVISIONS

REV	DESCRIPTION	BY	DATE
0	30% DESIGN	MB	2024-04-22

Clifton

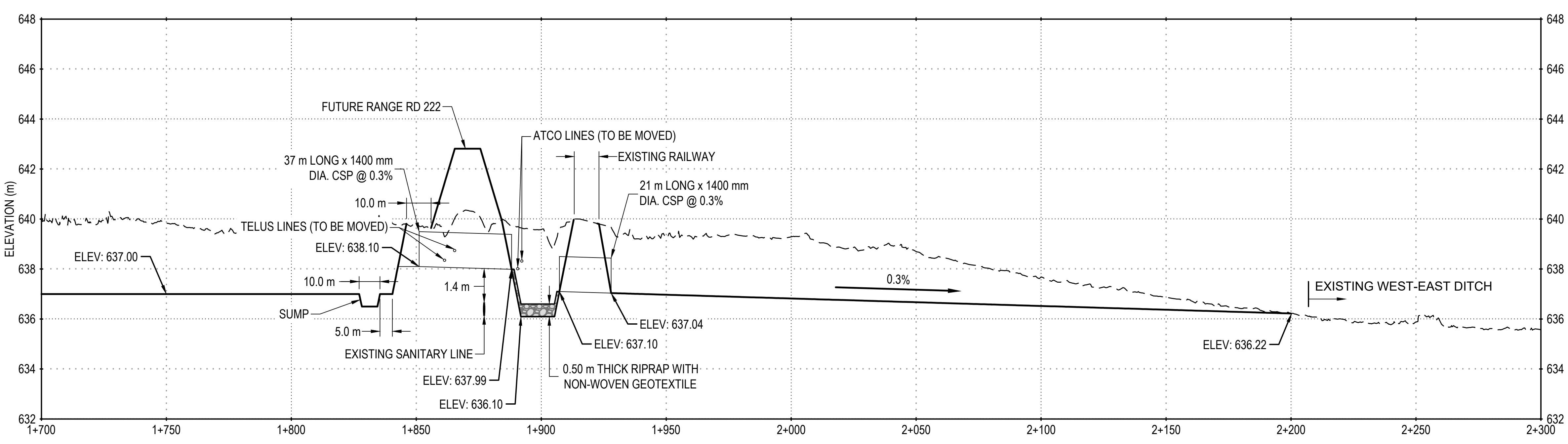
CLIENT: CANDO RAIL & TERMINALS

PROJECT: STURGEON WEST STORMWATER MANAGEMENT PLAN

DRAWING NAME: STURGEON WEST DITCH PROFILES AND SECTION

DSGN. BY: MB	SCALE: AS SHOWN	DATE: 2024-04-22	
DWN. BY: ZS	PROJECT NO.: CG3821	DWG. NO.: CG3821.004	
REV. BY: MB	FILE NO.: W-CG3821-GA	SHEET NO.: 4 OF 7	

GRADATION		HEAVY ROCK RIPRAP CLASS
REQUIRED PROPERTIES	UNITS	1M
NOMINAL MASS	kg	7
NOMINAL DIAMETER	mm	175
NONE GREATER THAN	kg	40
	mm	300
20% TO 50%	kg	10
	mm	200
50% TO 80%	kg	7
	mm	175
100% GREATER THAN	kg	3
	mm	125



NORTH DITCH B/--
H 1:2000
V 1:200

LEGEND

- EXISTING GROUND (1 m MINOR, 5 m MAJOR)
- DESIGN GRADE (1 m MINOR, 5 m MAJOR)
- RAIL LOOP
- DRAINAGE FEATURE
- RIPRAP
- EXISTING SUBDRAIN
- EXISTING GROUND
- DESIGN GRADE

DEFINITIONS

RIPRAP = CLASS 1M RIPRAP AS PER ALBERTA TRANSPORTATION.

REFERENCE(S):

- ESRI WORLD IMAGERY DATED JUNE 20, 2021.
- STURGEON WEST EXISTING GROUND TOPOGRAPHY DATED 2023.
- STURGEON EAST EXISTING GROUND TOPOGRAPHY DATED 2022.
- ALBERTA TRANSPORTATION SPECIFICATIONS FOR BRIDGE CONSTRUCTION, SECTION 10, HEAVY ROCK RIPRAP.

DRAWING REVISIONS

REV	DESCRIPTION	BY	DATE
0	30% DESIGN	MB	2024-04-22

Clifton

CLIENT: CANDO RAIL & TERMINALS

PROJECT: STURGEON WEST STORMWATER MANAGEMENT PLAN

DRAWING NAME: RANGE RD 222 CROSSING

DSGN. BY	MB	SCALE	AS SHOWN	DATE	2024-04-22
DWN. BY	ZS	PROJECT NO.	CG3821	DWG. NO.	CG3821.005
REV. BY	MB	FILE NO.	W-CG3821-GA	SHEET NO.	5 OF 7

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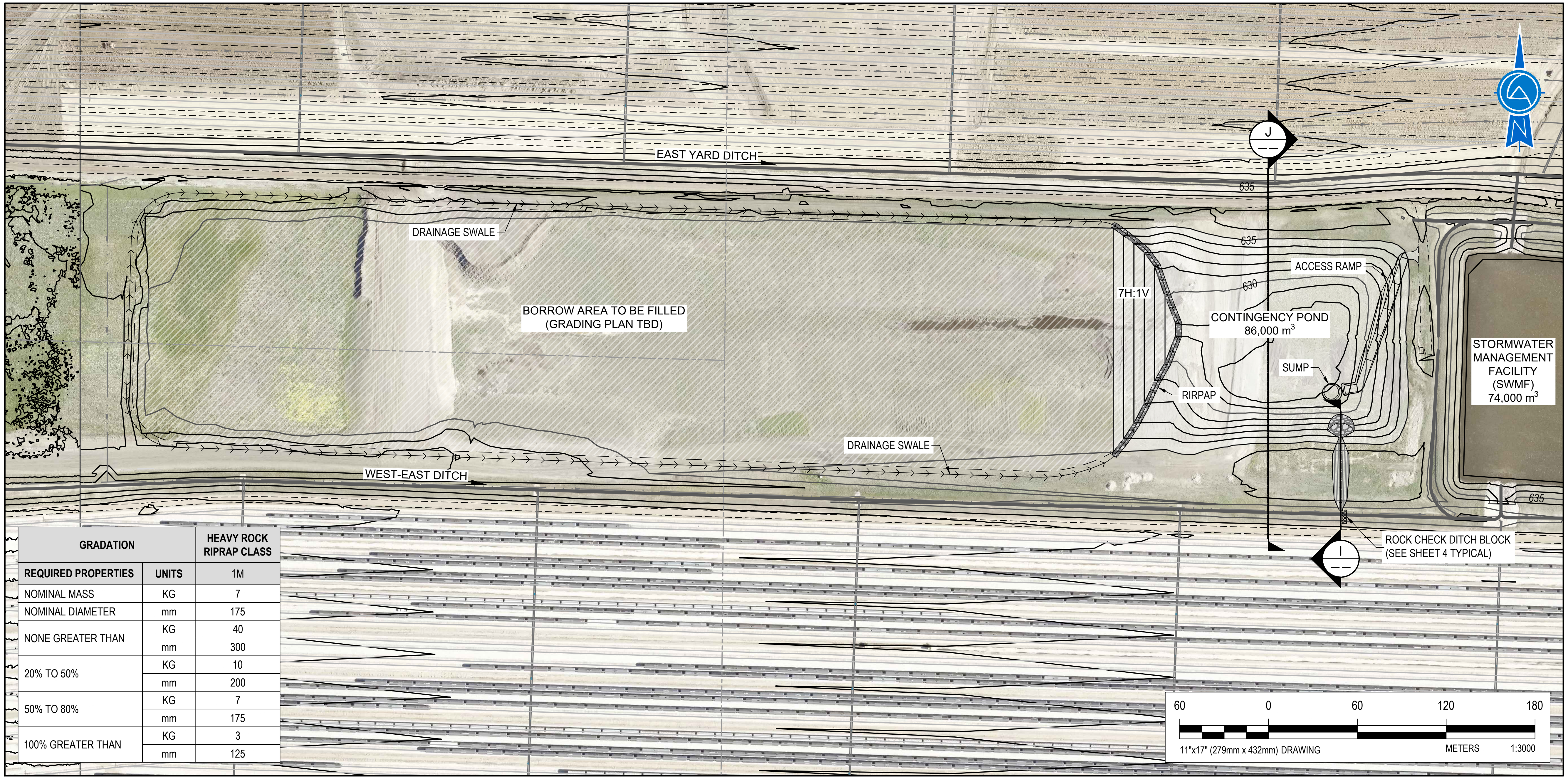


GRADATION		HEAVY ROCK RIPRAP CLASS
REQUIRED PROPERTIES	UNITS	1M
NOMINAL MASS	KG	7
NOMINAL DIAMETER	mm	175
NONE GREATER THAN	KG	40
	mm	300
20% TO 50%	KG	10
	mm	200
50% TO 80%	KG	7
	mm	175
100% GREATER THAN	KG	3
	mm	125

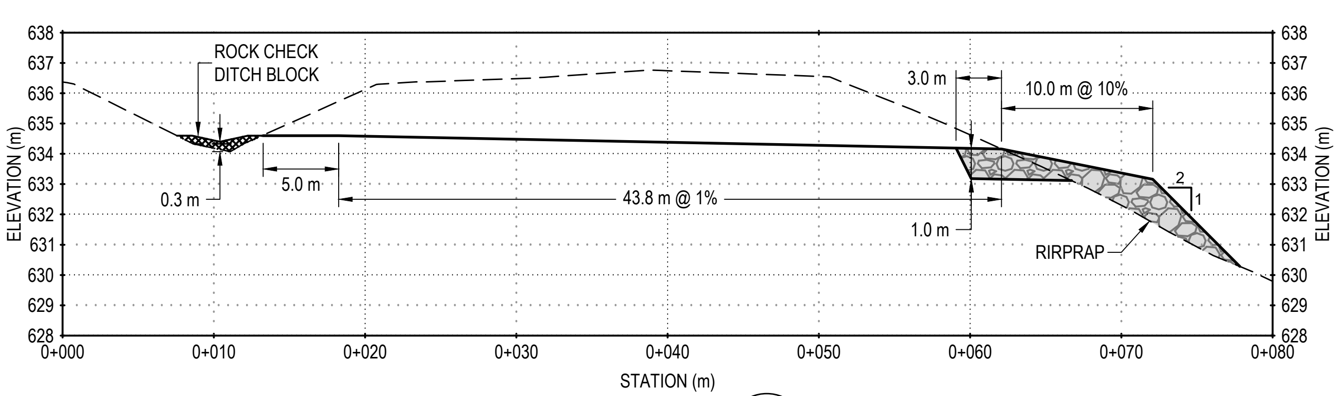
LEGEND

- EXISTING GROUND (1 m MINOR, 5 m MAJOR)
- RIPRAP
- EXISTING SUBDRAIN
- EXISTING ACCESS ROAD
- EXISTING GROUND
- DESIGN GRADE

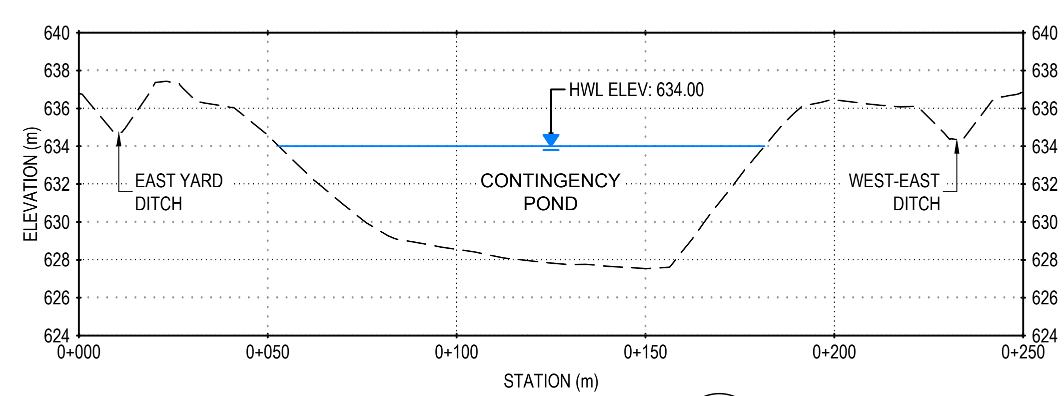
DEFINITIONS

RIPRAP = CLASS 1M RIPRAP AS PER ALBERTA TRANSPORTATION.

REFERENCE(S):
- ESRI WORLD IMAGERY DATED JUNE 20, 2021.
- EXISTING GROUND TOPOGRAPHY DATED 2022.
- ALBERTA TRANSPORTATION SPECIFICATIONS FOR BRIDGE CONSTRUCTION, SECTION 10, HEAVY ROCK RIPRAP.



EAST WASTEWAY I / --
H 1:500
V 1:250



CONTINGENCY POND SECTION J / --
H 1:2000
V 1:400

DRAWING REVISIONS

REV	DESCRIPTION	BY	DATE
0	30% DESIGN	MB	2024-04-22

Clifton

CLIENT: CANDO RAIL & TERMINALS

PROJECT: STURGEON WEST STORMWATER MANAGEMENT PLAN

DRAWING NAME: CONTINGENCY POND DETAILS

DSGN. BY	MB	SCALE	AS SHOWN	DATE	2024-04-22
DWN. BY	ZS	PROJECT NO.	CG3821	DWG. NO.	CG3821.006
REV. BY	MB	FILE NO.	W-CG3821-GA	SHEET NO.	6 OF 7

Z:\Shared\Civil Design and Drafting\Projects\Calgary\CG3821 Sturgeon West\!CURRENT DRAWINGS\SWM\W-CG3821-GA.dwg, 04/22/2024 10:20:11 AM

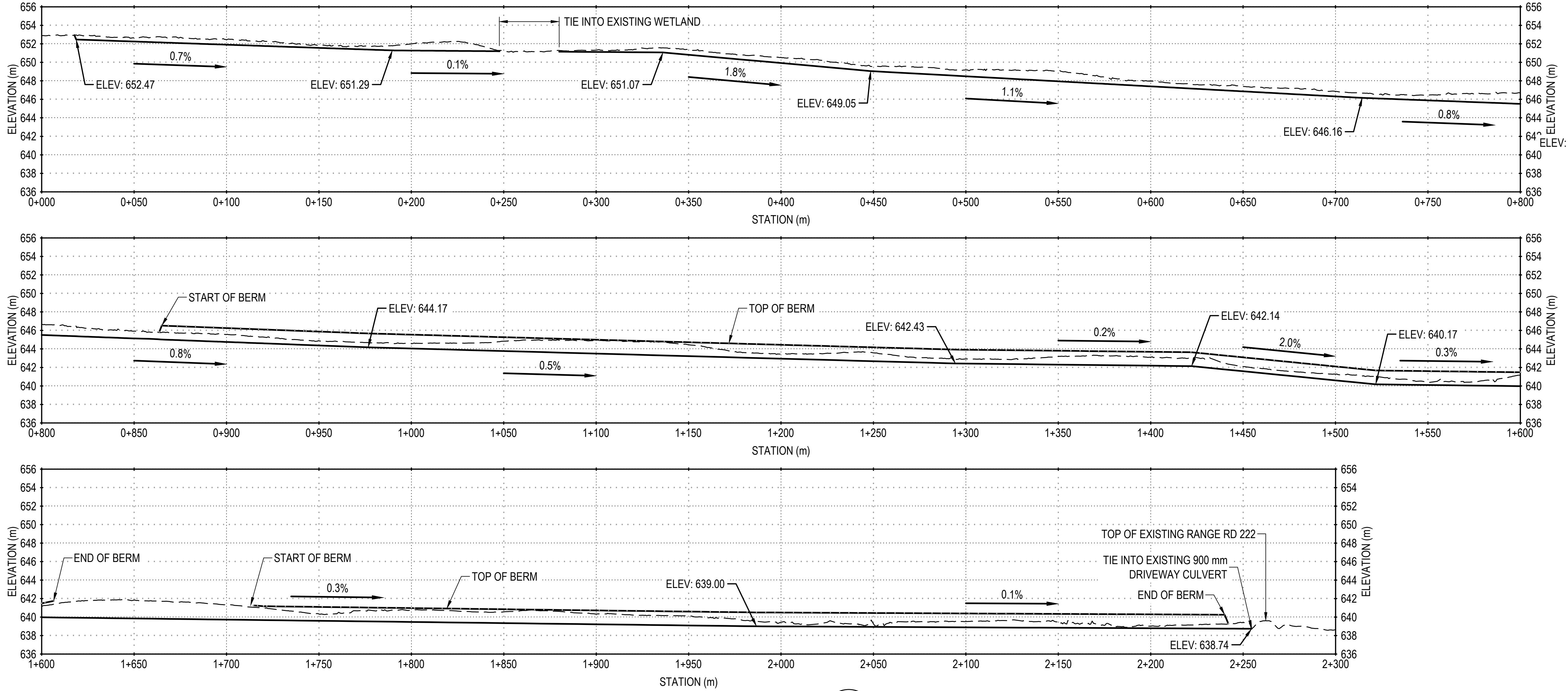
LEGEND

EXISTING GROUND (1 m MINOR, 5 m MAJOR)

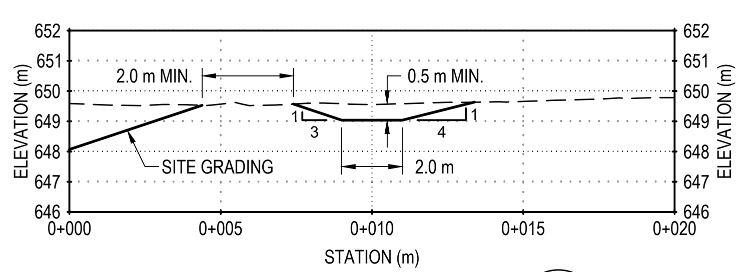
DESIGN GRADE (1 m MINOR, 5 m MAJOR)

EXISTING GROUND

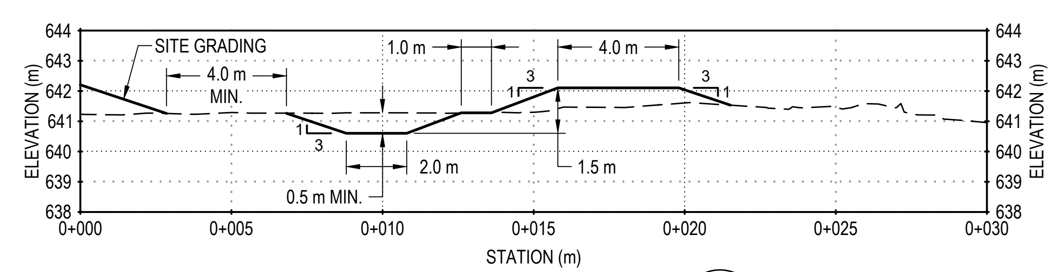
DESIGN GRADE



PERIMETER DITCH F/3
H 1:2500
V 1:250



WEST PERIMETER DITCH SECTION G/3
1:250



SOUTH PERIMETER DITCH SECTION H/3
1:250

REFERENCE(S):
- STURGEON WEST EXISTING GROUND TOPOGRAPHY DATED 2023.

DRAWING REVISIONS

REV	DESCRIPTION	BY	DATE
0	30% DESIGN	MB	2024-04-22

Clifton

CLIENT: CANDO RAIL & TERMINALS

PROJECT: STURGEON WEST STORMWATER MANAGEMENT PLAN

DRAWING NAME: PERIMETER DITCH PROFILE AND SECTION

DSGN. BY	MB	SCALE	AS SHOWN	DATE	2024-04-22
DWN. BY	ZS	PROJECT NO.	CG3821	DWG. NO.	CG3821.007
REV. BY	MB	FILE NO.	W-CG3821-GA	SHEET NO.	7 OF 7

Appendix B
PCSWMM Stormwater Model

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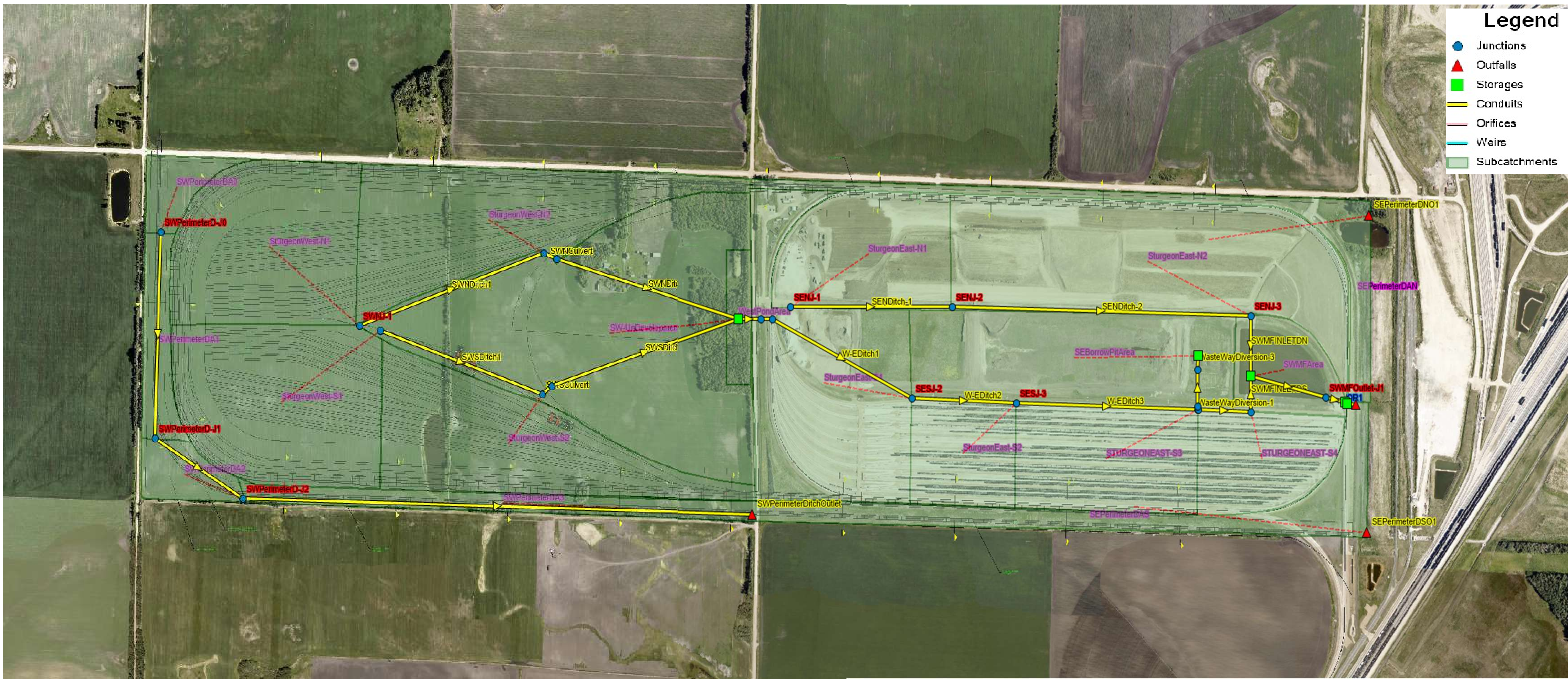
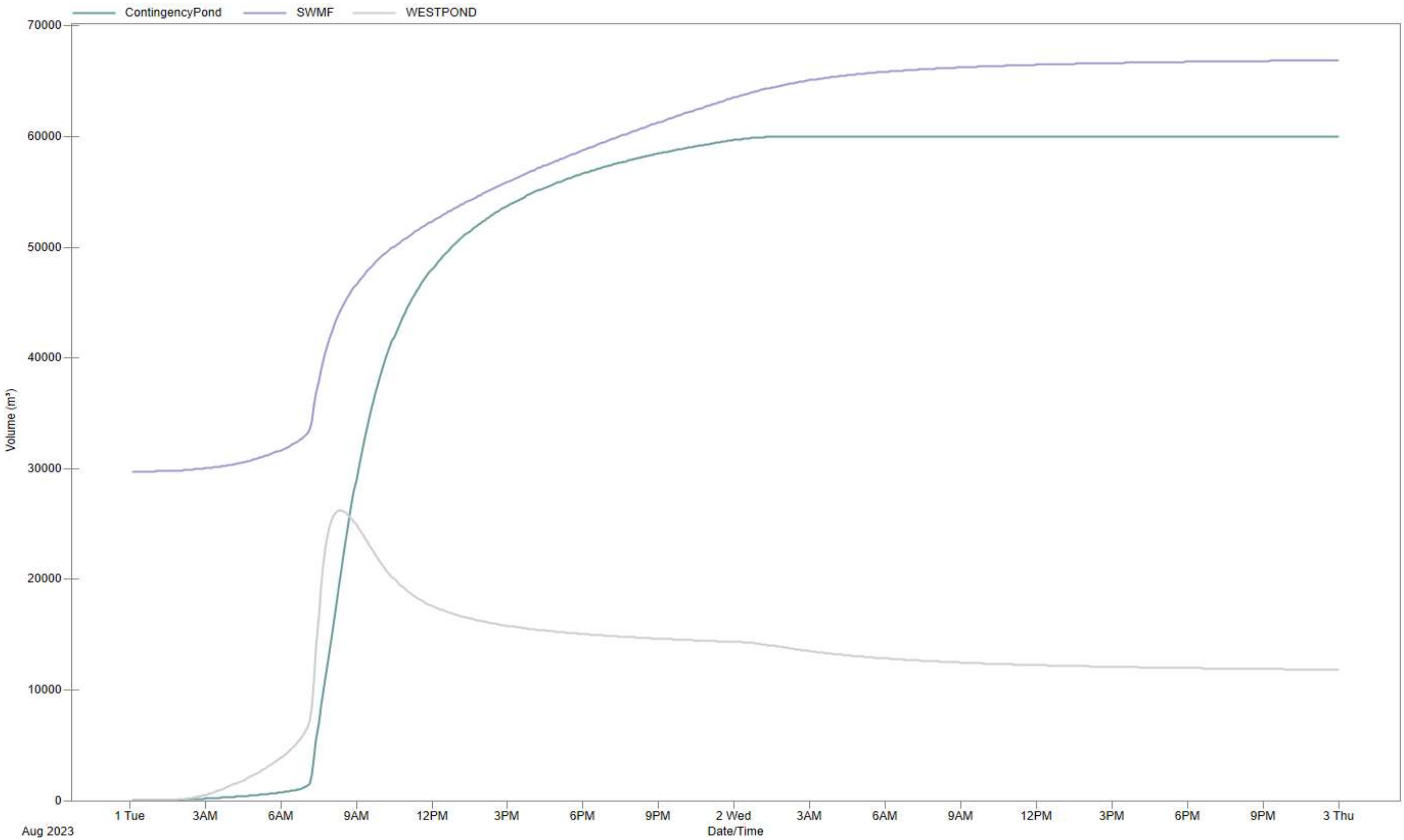
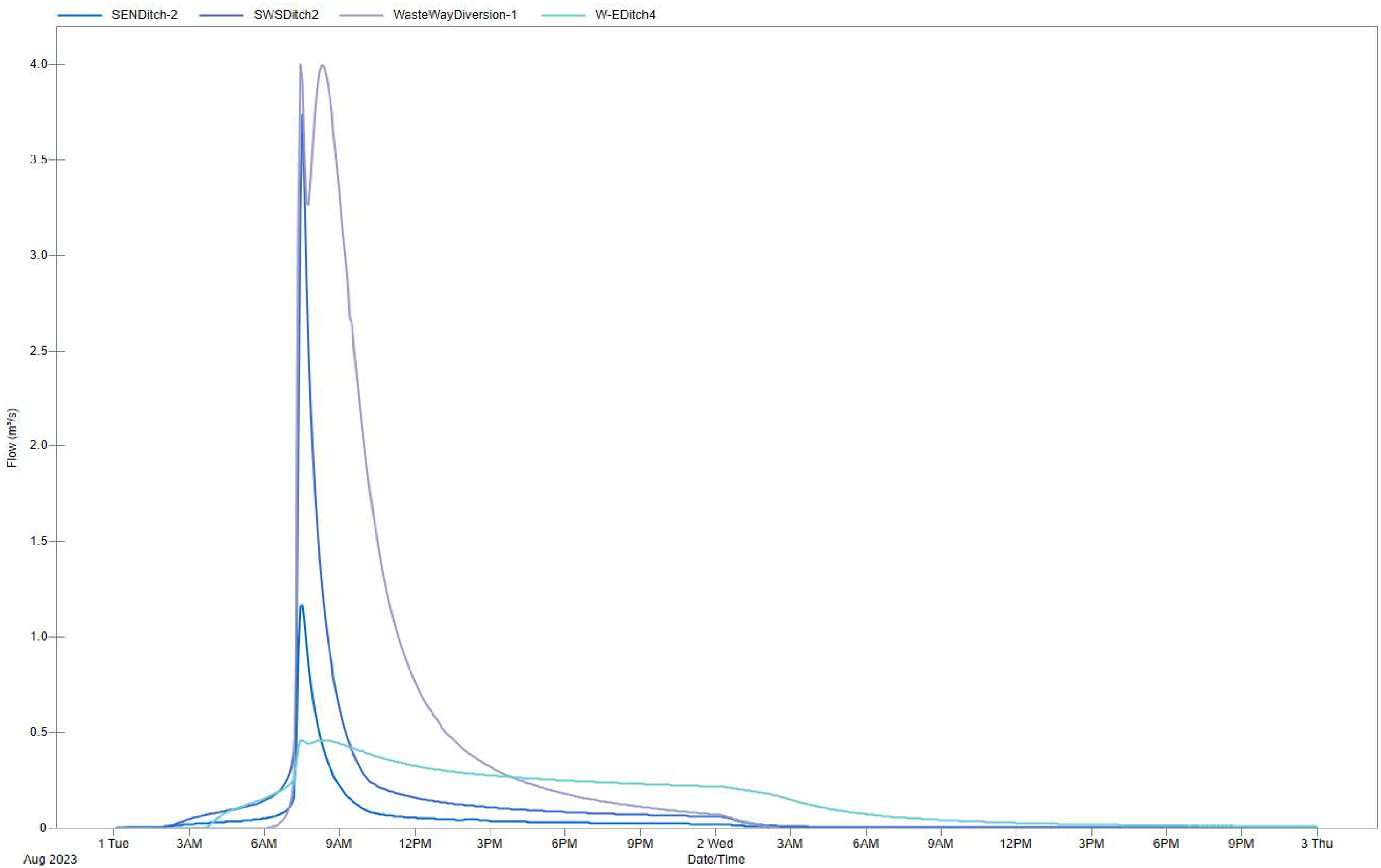
PCSWMM Model Drainage System
Sturgeon West-East Yard - Post Development Condition



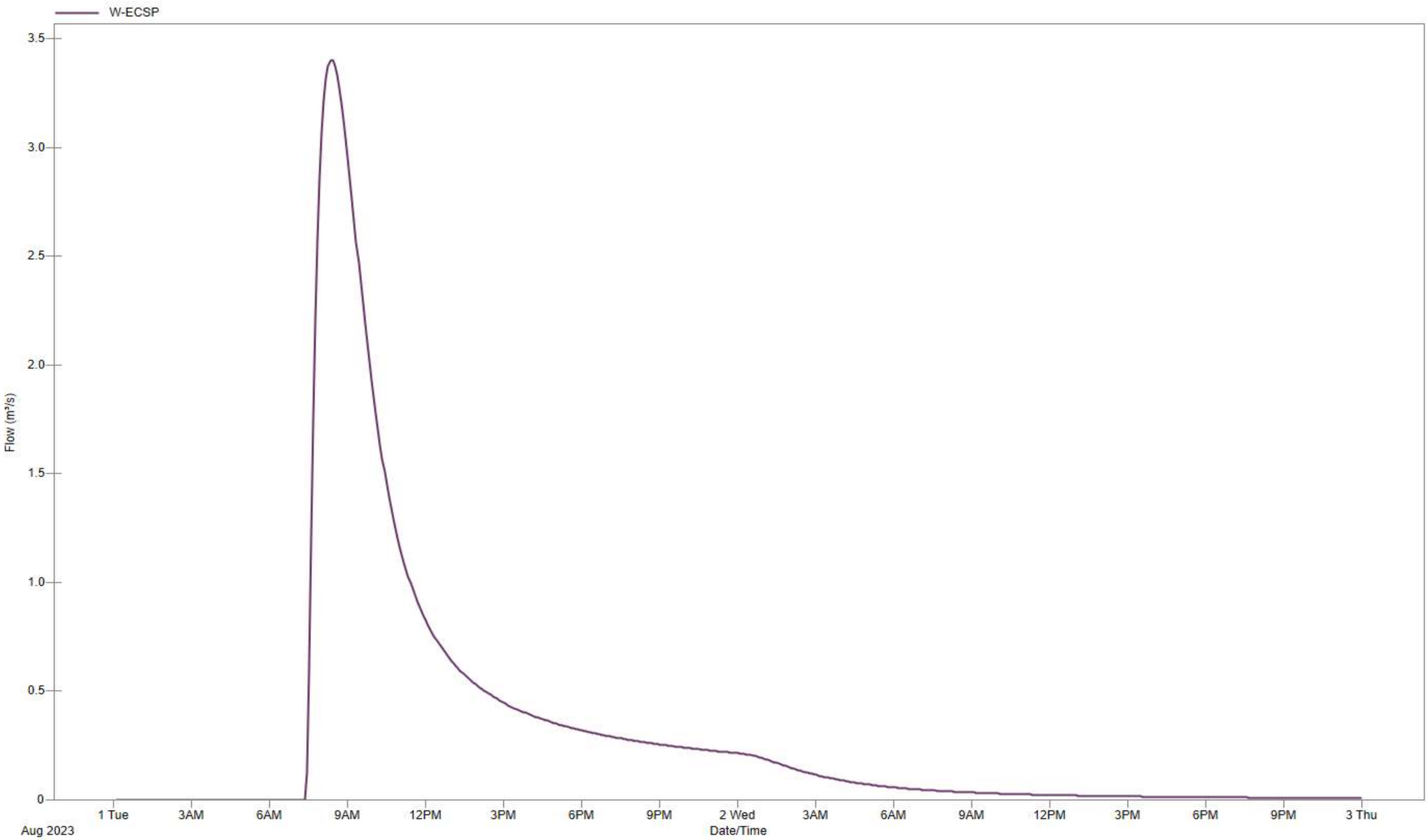
SWMF Outlet Closed - Pond Volumes during a 1:100 Year Storm



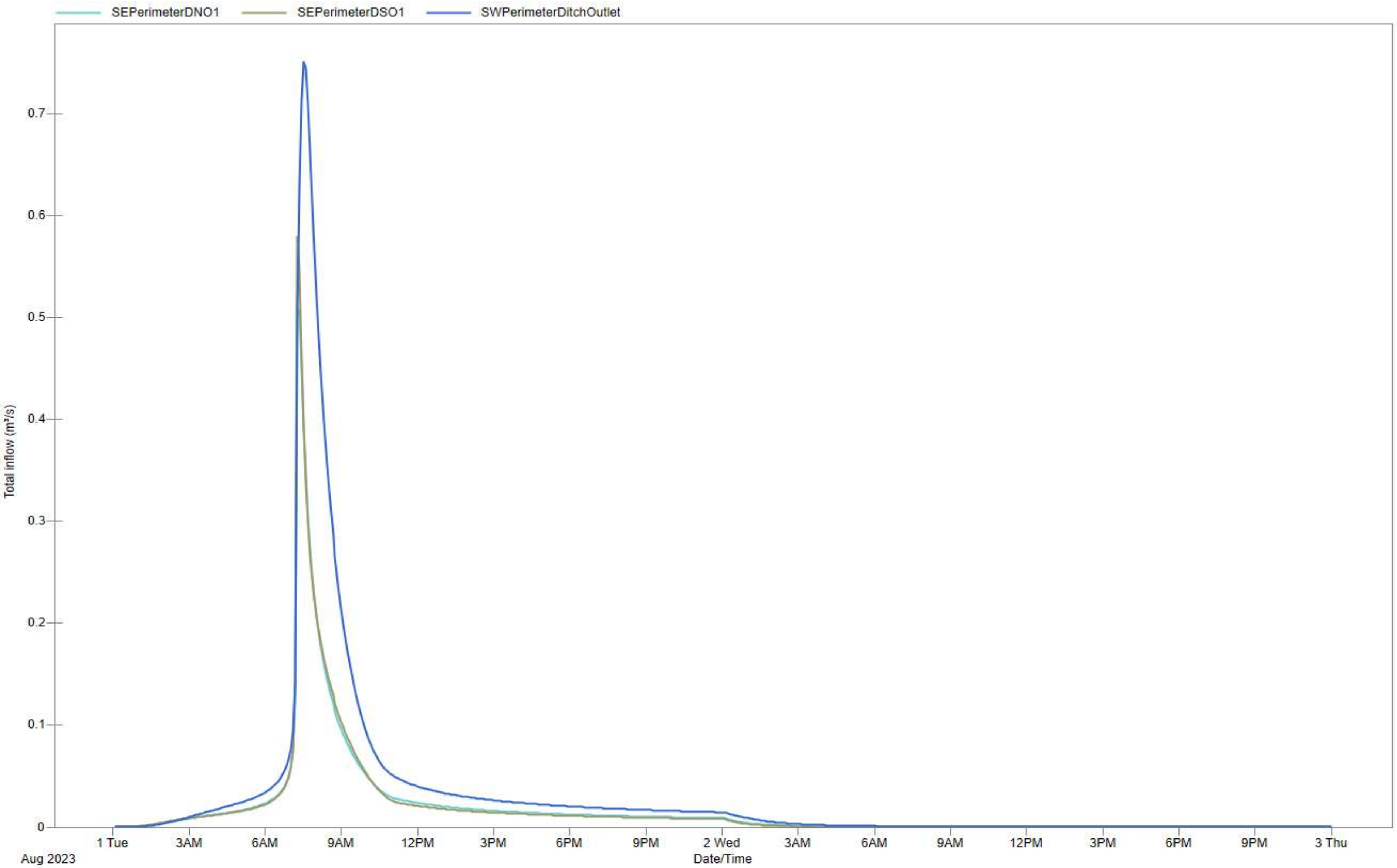
SWMF Outlet Closed - Ditch Flows during a 1:100 Year Storm



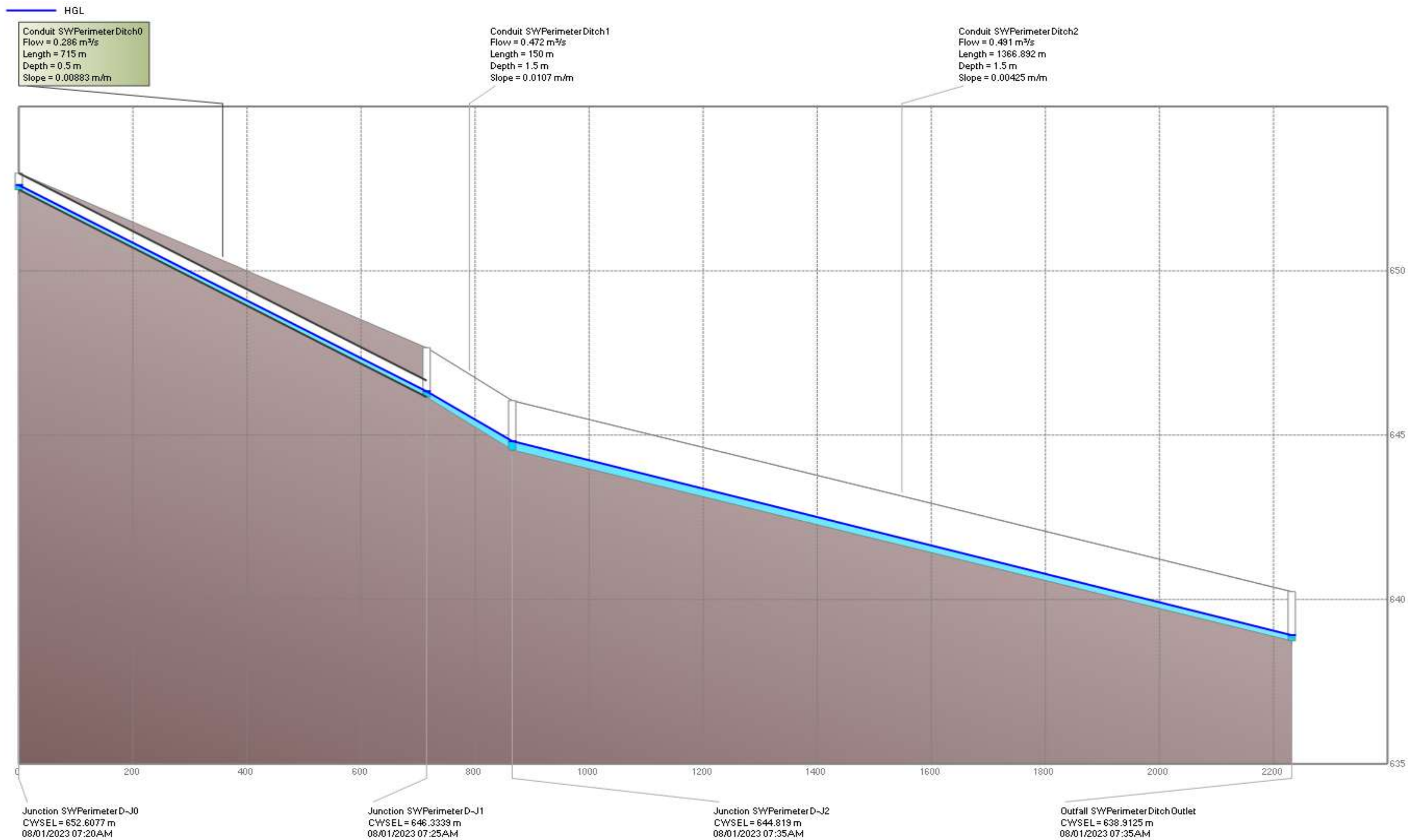
SWMF Outlet Closed - West Pond Outlet Flow during a 1:100 Year Storm



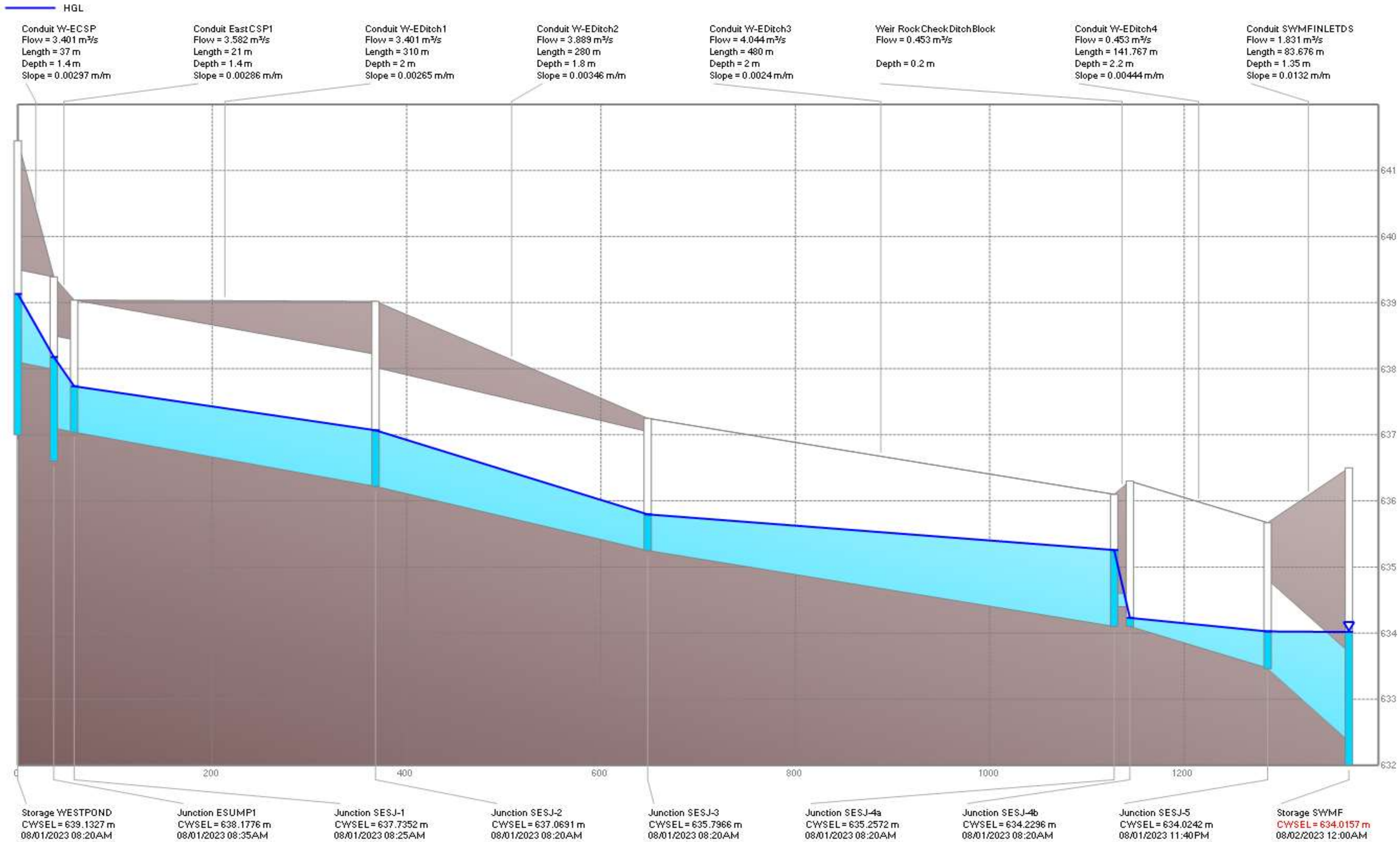
SWMF Outlet Closed - 1:100 Year Storm Perimeter Ditch Outlet Flows



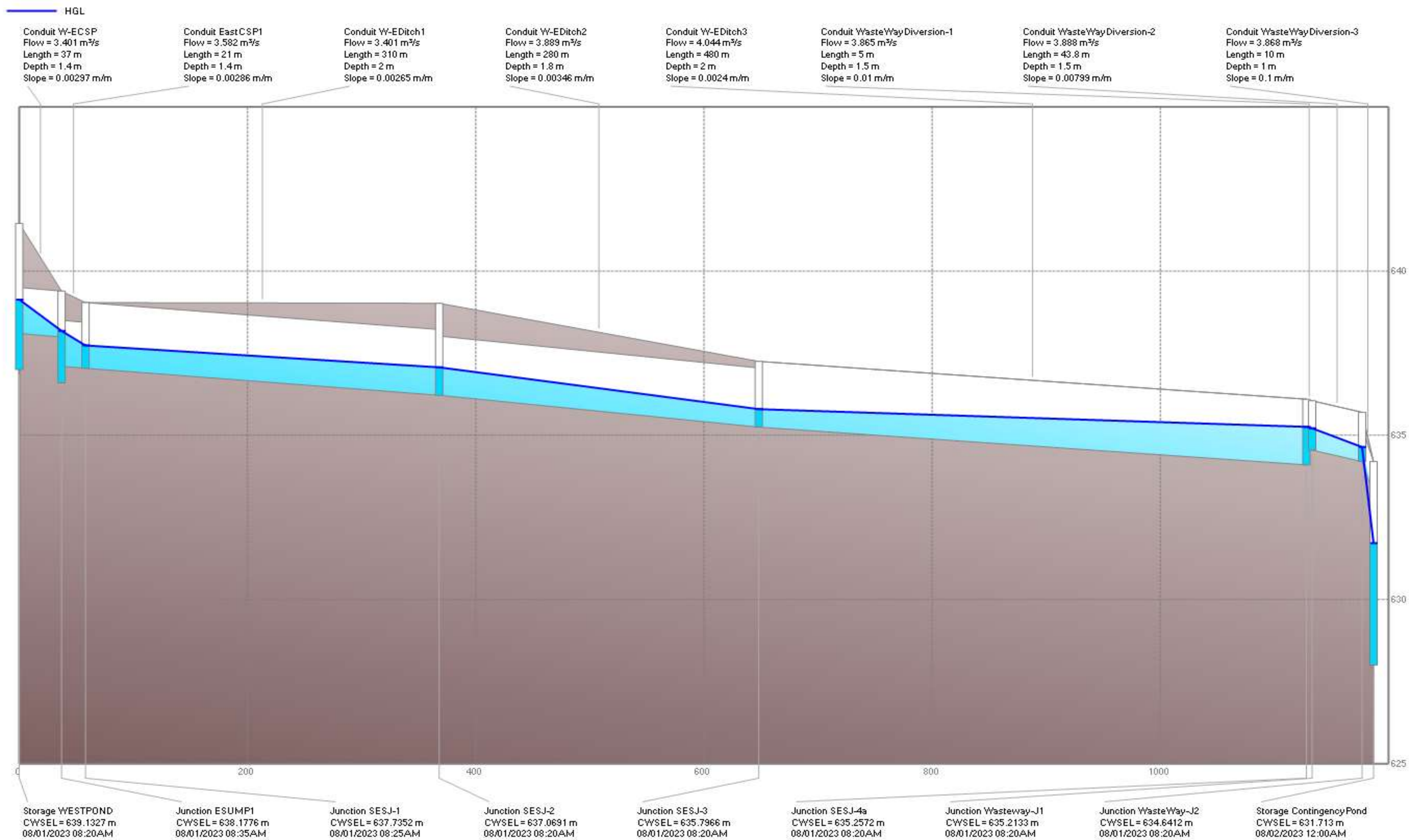
SWMF Outlet Closed - 1:100 Year Water Level Profile
Sturgeon West Perimeter Ditch



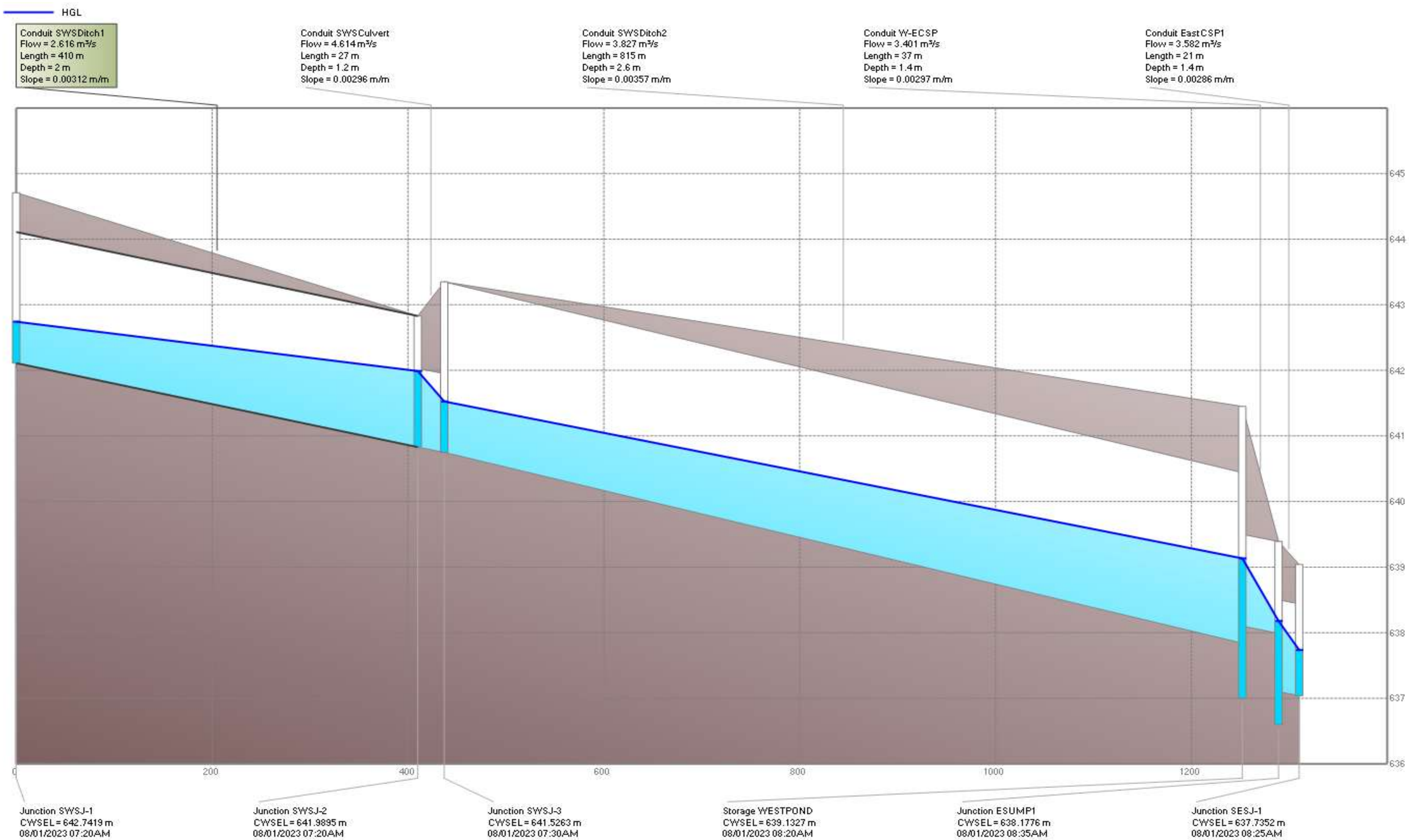
SWMF Outlet Closed - 1:100 Year Water Level Profile
West Pond to SWMF



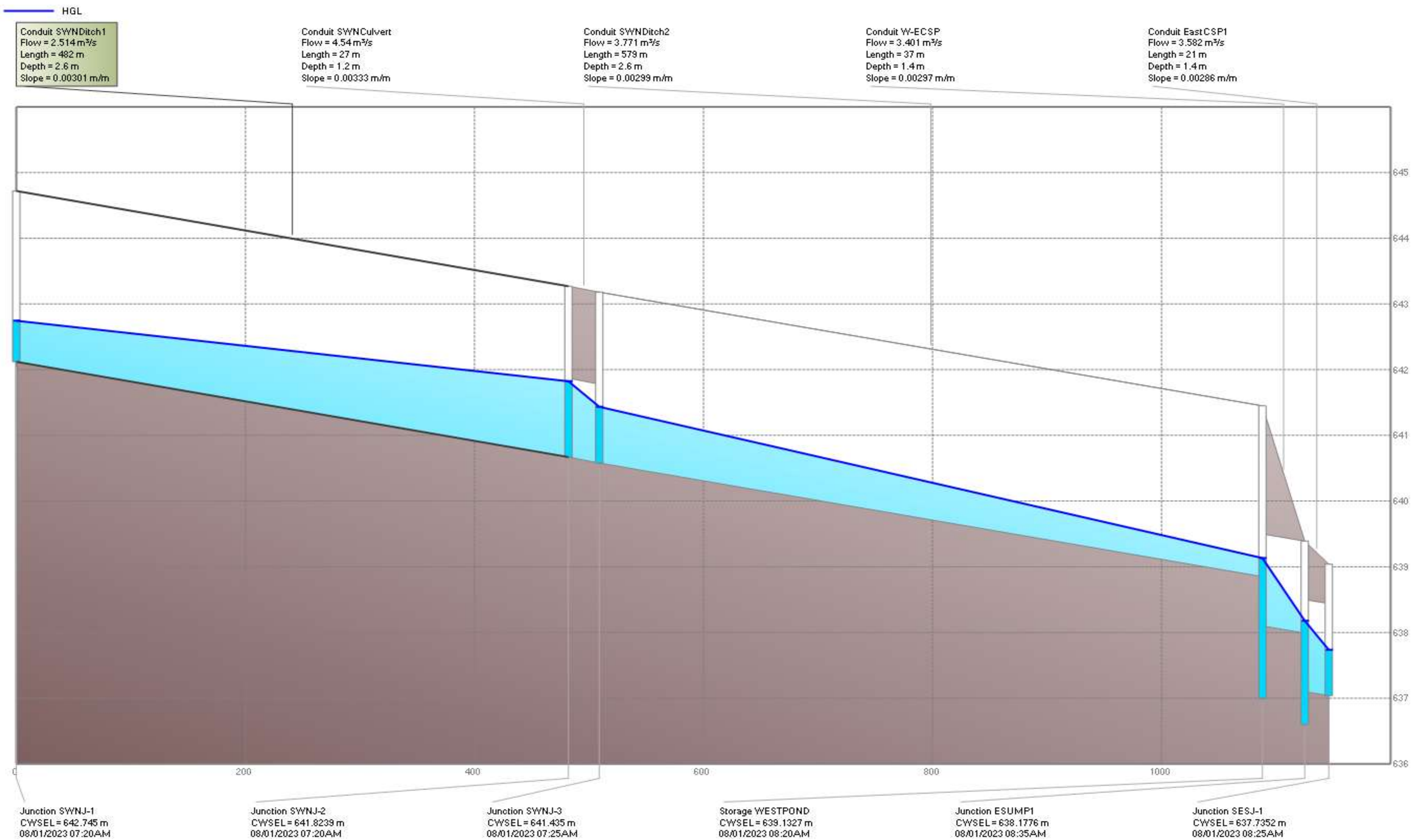
SWMF Outlet Closed - 1:100 Year Water Level Profile
West Pond to Contingency Pond



SWMF Outlet Closed - 1:100 Year Water Level Profile
Proposed Sturgeon West South Ditch



SWMF Outlet Closed - 1:100 Year Water Level Profile
Proposed Sturgeon West North Ditch



```
[TITLE]
;;Project Title/Notes
Sturgeon West Outlet Closed Post Development-1:100yr Event

[OPTIONS]
;;Option             Value
FLOW_UNITS           CMS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         DYNWAVE
LINK_OFFSETS         ELEVATION
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    YES

START_DATE           08/01/2023
START_TIME           00:00:00
REPORT_START_DATE    08/01/2023
REPORT_START_TIME    00:00:00
END_DATE             08/03/2023
END_TIME             00:00:00
SWEEP_START          05/15
SWEEP_END            06/15
DRY_DAYS             0
REPORT_STEP          00:05:00
WET_STEP             00:05:00
DRY_STEP             00:05:00
ROUTING_STEP         3
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           8
HEAD_TOLERANCE       0.0015
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         1
THREADS              8

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
CONSTANT         0.0
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- -------- -------- ----------
;mm/hr
Chicago_Edmonton_24hr_100Yr INTENSITY 0:05     1.0      TIMESERIES Chicago-Edmonton_24hr_100yr
Chicago_Edmonton_24hr_10Yr INTENSITY 0:05     1.0      TIMESERIES Chicago_Edmonton_24hr_10Yr
Chicago_Edmonton_24hr_25Yr INTENSITY 0:05     1.0      TIMESERIES Chicago_Edmonton_24hr_25Yr
Chicago_Edmonton_24hr_2Yr INTENSITY 0:05     1.0      TIMESERIES Chicago_Edmonton_24hr_2Yr
Chicago_Edmonton_24hr_50Yr INTENSITY 0:05     1.0      TIMESERIES Chicago_Edmonton_24hr_50Yr
Chicago_Edmonton_24hr_5Yr INTENSITY 0:05     1.0      TIMESERIES Chicago_Edmonton_24hr_5Yr

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
SEBorrowPitArea  Chicago_Edmonton_24hr_100Yr ContingencyPond 17 40   200      5        0
SEPerimeterDAN   Chicago_Edmonton_24hr_100Yr SEPerimeterDNO1 7.5 30  50       0.4      0
SEPerimeterDAS   Chicago_Edmonton_24hr_100Yr SEPerimeterDSO1 10.2 20 68       0.4      0
SturgeonEast-N1  Chicago_Edmonton_24hr_100Yr SENJ-1 12.5     40       403.226  0.2      0
SturgeonEast-N2  Chicago_Edmonton_24hr_100Yr SENJ-3 28       40       329.412  0.2      0
SturgeonEast-S1  Chicago_Edmonton_24hr_100Yr SESJ-2 24.3     40       347.143  0.5      0
SturgeonEast-S2  Chicago_Edmonton_24hr_100Yr SESJ-3 7.1      40       394.444  0.5      0
```

```
STURGEONEAST-S3  Chicago_Edmonton_24hr_100Yr SESJ-4a 11.5   40       500      0.5      0
STURGEONEAST-S4  Chicago_Edmonton_24hr_100Yr SESJ-5 8.1     40       399.015  0.5      0
SturgeonWest-N1  Chicago_Edmonton_24hr_100Yr SWNJ-1 18.1    40       452.5    0.5      0
;Sturgeon West North Yard
SturgeonWest-N2  Chicago_Edmonton_24hr_100Yr SWNJ-2 19.4    40       400      0.4      0
SturgeonWest-S1  Chicago_Edmonton_24hr_100Yr SWSJ-1 20      40       400      0.4      0
SturgeonWest-S2  Chicago_Edmonton_24hr_100Yr SWSJ-2 17.5    40       397.727  0.5      0
SWMFArea         Chicago_Edmonton_24hr_100Yr SWMF  3.8      100      304      5        0
SWPerimeterDA0   Chicago_Edmonton_24hr_100Yr SWPerimeterD-J0 2.6 30  80       0.5      0
SWPerimeterDA1   Chicago_Edmonton_24hr_100Yr SWPerimeterD-J1 3.5 20  60.345   0.4      0
SWPerimeterDA2   Chicago_Edmonton_24hr_100Yr SWPerimeterD-J2 2.6 20  60.465   0.8      0
SWPerimeterDA3   Chicago_Edmonton_24hr_100Yr SWPerimeterDitchOutlet 5.3 30 50 0.3      0
SW-UnDevelopment Chicago_Edmonton_24hr_100Yr WESTPOND 39.2  40       500      0.4      0
WestPondArea     Chicago_Edmonton_24hr_100Yr WESTPOND 1.8   100      100      5        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
SEBorrowPitArea  0.015      0.1        1.6        3.2        25         OUTLET
SEPerimeterDAN   0.015      0.1        1.6        3.2        25         OUTLET
SEPerimeterDAS   0.015      0.1        1.6        3.2        25         OUTLET
SturgeonEast-N1  0.015      0.1        1.6        3.2        25         OUTLET
SturgeonEast-N2  0.015      0.1        1.6        3.2        25         OUTLET
SturgeonEast-S1  0.015      0.1        1.6        3.2        25         OUTLET
SturgeonEast-S2  0.015      0.1        1.6        3.2        25         OUTLET
STURGEONEAST-S3  0.015      0.1        1.6        3.2        25         OUTLET
STURGEONEAST-S4  0.015      0.1        1.6        3.2        25         OUTLET
SturgeonWest-N1  0.015      0.1        1.6        3.2        25         OUTLET
SturgeonWest-N2  0.015      0.1        1.6        3.2        25         OUTLET
SturgeonWest-S1  0.015      0.1        1.6        3.2        25         OUTLET
SturgeonWest-S2  0.015      0.1        1.6        3.2        25         OUTLET
SWMFArea         0.015      0.1        1.6        3.2        25         OUTLET
SWPerimeterDA0   0.015      0.1        1.6        3.2        25         OUTLET
SWPerimeterDA1   0.015      0.1        1.6        3.2        25         OUTLET
SWPerimeterDA2   0.015      0.1        1.6        3.2        25         OUTLET
SWPerimeterDA3   0.015      0.1        1.6        3.2        25         OUTLET
SW-UnDevelopment 0.015      0.1        1.6        3.2        25         OUTLET
WestPondArea     0.015      0.1        1.6        3.2        25         OUTLET

[INFILTRATION]
;;Subcatchment   Param1     Param2     Param3     Param4     Param5
;;-------------- ---------- ---------- ---------- ---------- ----------
SEBorrowPitArea  89         12.7       0.25       0          0
SEPerimeterDAN   89         12.7       0.25       0          0
SEPerimeterDAS   89         12.7       0.25       0          0
SturgeonEast-N1  89         12.5       0.25       0          0
SturgeonEast-N2  89         12.7       0.25       0          0
SturgeonEast-S1  89         12.7       0.25       0          0
SturgeonEast-S2  89         12.7       0.25       0          0
STURGEONEAST-S3  89         12.7       0.25       0          0
STURGEONEAST-S4  89         12.7       0.25       0          0
SturgeonWest-N1  89         12.7       0.25       0          0
SturgeonWest-N2  89         12.7       0.25       0          0
SturgeonWest-S1  89         12.7       0.25       0          0
SturgeonWest-S2  89         12.7       0.25       0          0
SWMFArea         89         12.7       0.25       0          0
SWPerimeterDA0   89         12.7       0.25       0          0
SWPerimeterDA1   89         12.7       0.25       0          0
SWPerimeterDA2   89         12.7       0.25       0          0
SWPerimeterDA3   89         12.7       0.25       0          0
SW-UnDevelopment 89         12.7       0.25       0          0
WestPondArea     89         12.7       0.25       0          0

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
;Sump betwwen 2 CSPs
ESUMP1           636.6      2.5        0          0          100
;SturgeonEast North Ditch Start
```

```
SENJ-1           638       2          0          0          0
;SturgeonEast North Ditch Middle
SENJ-2           637.49    0          0          0          0
SENJ-3           633.7     2          0          0          0
SESJ-1           637.04    1          0          0          0
SESJ-2           636.22    2.8        0          0          0
;West Waste Way
SESJ-3           635.25    2          0          0          0
;East WasteWay
SESJ-4a          634.1     2          0          0          0
SESJ-4b          634.1     2          0          0          0
SESJ-5           633.46    2          0          0          0
;SWMF Outlet Culvert Gate Closed
SWMFOutlet-J1    635.5     1          0          0          0
;Start of Norrth Ditch
SWNJ-1           642.12    2.6        0          0          0
;West North Ditch to Culvet1
SWNJ-2           640.67    2.4        0          0          0
SWNJ-3           640.58    2.4        0          0          0
;Start of Perimeter Ditch
SWPerimeterD-J0  652.47    0.5        0          0          0
SWPerimeterD-J1  646.16    1          0          0          0
SWPerimeterD-J2  644.55    1.5        0          0          0
;Start of South Ditch
SWSJ-1           642.11    2.6        0          0          0
SWSJ-2           640.83    0          0          0          0
SWSJ-3           640.75    0          0          0          0
Wasteway-J1      634.55    0          0          0          0
WasteWay-J2      634.2     1.5        0          0          0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
;Sturgeon East North Perimeter Ditch Outlet
SEPerimeterDNO1  633.9      FREE                        NO
;Sturgeon East South Perimeter Ditch Outlet
SEPerimeterDSO1  635.2      FREE                        NO
SWMFOutlet       632.786    FREE                        NO
SWPerimeterDitchOutlet 638.74 FREE                      NO

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            SurDepth Fevap    Psi
Ksat     IMD
;;-------------- -------- ---------- ----------- ---------- ---------------------------- -------- -------- --------
-------- --------
ContingencyPond  628      5.2        0          TABULAR    ContingencyPondCurve             0    0
;400 mm Sump in Manhole
MH-SUMP1         631      5          0.2        TABULAR    MH-SUMP1Curve                0        0
;Manhole Sump2
MH-SUMP2         631      5          0.2        TABULAR    NH-SUMP2Curve                0        0
;East Pond
SWMF             632      3.7        1          TABULAR    SWMFCurve                    0        0
;West Pond-Proposed
WESTPOND         637      2.2        0          TABULAR    WestPondCurve                0        0

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- ----------
EastCSP1         ESUMP1           SESJ-1           21         0.013      637.1      637.04     0          0
;Sturgeon East Ditch1
SENDitch-1       SENJ-1           SENJ-2           410        0.01       638        637.49     0          0
SENDitch-2       SENJ-2           SENJ-3           820        0.025      637.49     633.7      0          0
;SWMF North Inlet Ditch
SWMFINLETDN      SENJ-3           SWMF             40         0.025      633.7      632.46     0          0
;SWMF South Inlet Ditch
SWMFINLETDS      SESJ-5           SWMF             83.676     0.025      633.46     632.36     0          0
SWMFO_C          SWMF             SWMFOutlet-J1    240        0.013      632        632        0          0
;SWMF Outlet Culvert
SWMFOutlet-C1    SWMFOutlet-J1    MH-SUMP1         38.84      0.013      631        631.3      0          0
```

```
;Outlet Culvert2
SWMFOutlet-C2    MH-SUMP2         SWMFOutlet       23.66      0.013      633        632.786    0          0
SWNCulvert       SWNJ-2           SWNJ-3           27         0.013      640.67     640.58     0          0
;From WN area End to Culvert1
SWNDitch1        SWNJ-1           SWNJ-2           482        0.025      642.12     640.67     0          0
SWNDitch2        SWNJ-3           WESTPOND         579        0.025      640.58     638.85     0          0
SWPerimeterDitch0 SWPerimeterD-J0 SWPerimeterD-J1  715        0.025      652.47     646.16     0          0
SWPerimeterDitch1 SWPerimeterD-J1 SWPerimeterD-J2  150        0.025      646.16     644.55     0          0
SWPerimeterDitch2 SWPerimeterD-J2 SWPerimeterDitchOutlet 1366.892 0.025  644.55     638.74     0          0
SWSCulvert       SWSJ-2           SWSJ-3           27         0.013      640.83     640.75     0          0
;SW-South Ditch1
SWSDitch1        SWSJ-1           SWSJ-2           410        0.025      642.11     640.83     0          0
;SW-South Ditch2
SWSDitch2        SWSJ-3           WESTPOND         815        0.025      640.75     637.84     0          0
WasteWayDiversion-1 SESJ-4a       Wasteway-J1      6.245      0.025      634.6      634.55     0          0
WasteWayDiversion-2 Wasteway-J1   WasteWay-J2      43.8       0.025      634.55     634.2      0          0
WasteWayDiversion-3 WasteWay-J2   ContingencyPond  10         0.035      634.2      633.2      0          0
W-ECSP           WESTPOND         ESUMP1           37         0.013      638.1      637.99     0          0
W-EDitch1        SESJ-1           SESJ-2           310        0.025      637.04     636.22     0          0
W-EDitch2        SESJ-2           SESJ-3           280        0.025      636.22     635.25     0          0
W-EDitch3        SESJ-3           SESJ-4a          480        0.025      635.25     634.1      0          0
W-EDitch4        SESJ-4b          SESJ-5           141.767    0.025      634.1      633.47     0          0

[ORIFICES]
;;Name           From Node        To Node          Type         Offset     Qcoeff     Gated    CloseTime
;;-------------- ---------------- ---------------- ------------ ---------- ---------- -------- ----------
OR1              MH-SUMP2         MH-SUMP1         SIDE         631.4      0.65       NO       0

[WEIRS]
;;Name           From Node        To Node          Type         CrestHt    Qcoeff     Gated    EndCon   EndCoeff
Surcharge  RoadWidth  RoadSurf   Coeff. Curve
;;-------------- ---------------- ---------------- ------------ ---------- ---------- -------- -------- ----------
---------- ---------- ---------- ----------------
RockCheckDitchBlock SESJ-4a       SESJ-4b          TRAPEZOIDAL  634.4      1.84       NO       0        0
YES

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ----------
EastCSP1         CIRCULAR     1.4              0          0          0          1
SENDitch-1       TRAPEZOIDAL  2.1              1          4          4          1
SENDitch-2       TRAPEZOIDAL  2.1              1          4          4          1
SWMFINLETDN      TRAPEZOIDAL  2                2          4          4          1
SWMFINLETDS      TRAPEZOIDAL  1.35             3          4          4          1
SWMFO_C          TRAPEZOIDAL  4.5              100        8          8          1
SWMFOutlet-C1    CIRCULAR     1.05             0          0          0          1          6
SWMFOutlet-C2    CIRCULAR     1                0          0          0          1
SWNCulvert       CIRCULAR     1.2              0          0          0          1
SWNDitch1        TRAPEZOIDAL  2.6              2          2          2          1
SWNDitch2        TRAPEZOIDAL  2.6              2          2          2          1
SWPerimeterDitch0 TRAPEZOIDAL 0.5              2          2          2          1
SWPerimeterDitch1 TRAPEZOIDAL 1.5              2          2          2          1
SWPerimeterDitch2 TRAPEZOIDAL 1.5              2          2          2          1
SWSCulvert       CIRCULAR     1.2              0          0          0          1
SWSDitch1        TRAPEZOIDAL  2                2          2          2          1
SWSDitch2        TRAPEZOIDAL  2.6              2          2          2          1
WasteWayDiversion-1 TRAPEZOIDAL 1.5            1.5        2          2          1
WasteWayDiversion-2 TRAPEZOIDAL 1.5            1.5        2          2          1
WasteWayDiversion-3 TRAPEZOIDAL 1              1          3          3          1
W-ECSP           CIRCULAR     1.4              0          0          0          1
W-EDitch1        TRAPEZOIDAL  2                2          3          3          1
W-EDitch2        TRAPEZOIDAL  1.8              1          3          3          1
W-EDitch3        TRAPEZOIDAL  2                5          3          3          1
W-EDitch4        TRAPEZOIDAL  2.2              5          3          3          1
OR1              CIRCULAR     0.7              0          0          0
RockCheckDitchBlock TRAPEZOIDAL 0.2            1          5          5

[LOSSES]
;;Link           Kentry     Kexit      Kavg       Flap Gate  Seepage
```

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;;-------------- ---------- ---------- ---------- ---------- ----------
SWMFOutlet-C1    0          0          0          YES        0

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
ContingencyPondCurve Storage    0          787
ContingencyPondCurve            0.5        3136
ContingencyPondCurve            1          6372
ContingencyPondCurve            1.5        10486
ContingencyPondCurve            2          15521
ContingencyPondCurve            2.5        21440
ContingencyPondCurve            3          28178
ContingencyPondCurve            3.5        35758
ContingencyPondCurve            4          44150
ContingencyPondCurve            4.5        53360
ContingencyPondCurve            5          63394
ContingencyPondCurve            5.5        74276
ContingencyPondCurve            6          85999

ESUMP1Curve      Storage    0          150
ESUMP1Curve                 1.5        1000
ESUMP1Curve                 2.4        2000

MH-SUMP1Curve    Storage    0          1
MH-SUMP1Curve               4          1
MH-SUMP1Curve               4.01       2
MH-SUMP1Curve               5          2

NH-SUMP2Curve    Storage    0          1
NH-SUMP2Curve               4          1
NH-SUMP2Curve               4.01       2

SWMFCurve        Storage    0          28000
SWMFCurve                   1          31500
SWMFCurve                   2          35000
SWMFCurve                   3          37800
SWMFCurve                   3.5        38000

WestPondCurve    Storage    0          8000
WestPondCurve               1          12000
WestPondCurve               1.5        14100
WestPondCurve               2          16100
WestPondCurve               2.5        18000

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;Total = 74.4 mm, unit mm/hr
Chicago_Edmonton_24hr_10Yr            0:00       0.92
Chicago_Edmonton_24hr_10Yr            0:05       0.92
Chicago_Edmonton_24hr_10Yr            0:10       0.92
Chicago_Edmonton_24hr_10Yr            0:15       0.92
Chicago_Edmonton_24hr_10Yr            0:20       0.93
Chicago_Edmonton_24hr_10Yr            0:25       0.94
Chicago_Edmonton_24hr_10Yr            0:30       0.95
Chicago_Edmonton_24hr_10Yr            0:35       0.96
Chicago_Edmonton_24hr_10Yr            0:40       0.96
Chicago_Edmonton_24hr_10Yr            0:45       0.97
Chicago_Edmonton_24hr_10Yr            0:50       0.98
Chicago_Edmonton_24hr_10Yr            0:55       0.99
Chicago_Edmonton_24hr_10Yr            1:00       1.00
Chicago_Edmonton_24hr_10Yr            1:05       1.01
Chicago_Edmonton_24hr_10Yr            1:10       1.02
Chicago_Edmonton_24hr_10Yr            1:15       1.03
Chicago_Edmonton_24hr_10Yr            1:20       1.04
Chicago_Edmonton_24hr_10Yr            1:25       1.05
Chicago_Edmonton_24hr_10Yr            1:30       1.07
Chicago_Edmonton_24hr_10Yr            1:35       1.08
```

Chicago_Edmonton_24hr_10Yr	1:40	1.09
Chicago_Edmonton_24hr_10Yr	1:45	1.10
Chicago_Edmonton_24hr_10Yr	1:50	1.11
Chicago_Edmonton_24hr_10Yr	1:55	1.13
Chicago_Edmonton_24hr_10Yr	2:00	1.14
Chicago_Edmonton_24hr_10Yr	2:05	1.15
Chicago_Edmonton_24hr_10Yr	2:10	1.16
Chicago_Edmonton_24hr_10Yr	2:15	1.18
Chicago_Edmonton_24hr_10Yr	2:20	1.19
Chicago_Edmonton_24hr_10Yr	2:25	1.21
Chicago_Edmonton_24hr_10Yr	2:30	1.22
Chicago_Edmonton_24hr_10Yr	2:35	1.24
Chicago_Edmonton_24hr_10Yr	2:40	1.26
Chicago_Edmonton_24hr_10Yr	2:45	1.27
Chicago_Edmonton_24hr_10Yr	2:50	1.29
Chicago_Edmonton_24hr_10Yr	2:55	1.31
Chicago_Edmonton_24hr_10Yr	3:00	1.33
Chicago_Edmonton_24hr_10Yr	3:05	1.35
Chicago_Edmonton_24hr_10Yr	3:10	1.37
Chicago_Edmonton_24hr_10Yr	3:15	1.39
Chicago_Edmonton_24hr_10Yr	3:20	1.41
Chicago_Edmonton_24hr_10Yr	3:25	1.43
Chicago_Edmonton_24hr_10Yr	3:30	1.46
Chicago_Edmonton_24hr_10Yr	3:35	1.48
Chicago_Edmonton_24hr_10Yr	3:40	1.51
Chicago_Edmonton_24hr_10Yr	3:45	1.53
Chicago_Edmonton_24hr_10Yr	3:50	1.56
Chicago_Edmonton_24hr_10Yr	3:55	1.59
Chicago_Edmonton_24hr_10Yr	4:00	1.62
Chicago_Edmonton_24hr_10Yr	4:05	1.65
Chicago_Edmonton_24hr_10Yr	4:10	1.68
Chicago_Edmonton_24hr_10Yr	4:15	1.72
Chicago_Edmonton_24hr_10Yr	4:20	1.75
Chicago_Edmonton_24hr_10Yr	4:25	1.79
Chicago_Edmonton_24hr_10Yr	4:30	1.83
Chicago_Edmonton_24hr_10Yr	4:35	1.87
Chicago_Edmonton_24hr_10Yr	4:40	1.92
Chicago_Edmonton_24hr_10Yr	4:45	1.97
Chicago_Edmonton_24hr_10Yr	4:50	2.02
Chicago_Edmonton_24hr_10Yr	4:55	2.07
Chicago_Edmonton_24hr_10Yr	5:00	2.13
Chicago_Edmonton_24hr_10Yr	5:05	2.19
Chicago_Edmonton_24hr_10Yr	5:10	2.26
Chicago_Edmonton_24hr_10Yr	5:15	2.33
Chicago_Edmonton_24hr_10Yr	5:20	2.40
Chicago_Edmonton_24hr_10Yr	5:25	2.49
Chicago_Edmonton_24hr_10Yr	5:30	2.58
Chicago_Edmonton_24hr_10Yr	5:35	2.68
Chicago_Edmonton_24hr_10Yr	5:40	2.78
Chicago_Edmonton_24hr_10Yr	5:45	2.90
Chicago_Edmonton_24hr_10Yr	5:50	3.03
Chicago_Edmonton_24hr_10Yr	5:55	3.18
Chicago_Edmonton_24hr_10Yr	6:00	3.35
Chicago_Edmonton_24hr_10Yr	6:05	3.53
Chicago_Edmonton_24hr_10Yr	6:10	3.75
Chicago_Edmonton_24hr_10Yr	6:15	4.00
Chicago_Edmonton_24hr_10Yr	6:20	4.29
Chicago_Edmonton_24hr_10Yr	6:25	4.65
Chicago_Edmonton_24hr_10Yr	6:30	5.08
Chicago_Edmonton_24hr_10Yr	6:35	5.62
Chicago_Edmonton_24hr_10Yr	6:40	6.33
Chicago_Edmonton_24hr_10Yr	6:45	7.29
Chicago_Edmonton_24hr_10Yr	6:50	8.70
Chicago_Edmonton_24hr_10Yr	6:55	11.02
Chicago_Edmonton_24hr_10Yr	7:00	15.73
Chicago_Edmonton_24hr_10Yr	7:05	33.62
Chicago_Edmonton_24hr_10Yr	7:10	139.52
Chicago_Edmonton_24hr_10Yr	7:15	45.12
Chicago_Edmonton_24hr_10Yr	7:20	26.34

Chicago_Edmonton_24hr_10Yr	7:25	19.28
Chicago_Edmonton_24hr_10Yr	7:30	15.48
Chicago_Edmonton_24hr_10Yr	7:35	13.08
Chicago_Edmonton_24hr_10Yr	7:40	11.41
Chicago_Edmonton_24hr_10Yr	7:45	10.17
Chicago_Edmonton_24hr_10Yr	7:50	9.20
Chicago_Edmonton_24hr_10Yr	7:55	8.44
Chicago_Edmonton_24hr_10Yr	8:00	7.80
Chicago_Edmonton_24hr_10Yr	8:05	7.28
Chicago_Edmonton_24hr_10Yr	8:10	6.82
Chicago_Edmonton_24hr_10Yr	8:15	6.44
Chicago_Edmonton_24hr_10Yr	8:20	6.10
Chicago_Edmonton_24hr_10Yr	8:25	5.80
Chicago_Edmonton_24hr_10Yr	8:30	5.53
Chicago_Edmonton_24hr_10Yr	8:35	5.29
Chicago_Edmonton_24hr_10Yr	8:40	5.07
Chicago_Edmonton_24hr_10Yr	8:45	4.88
Chicago_Edmonton_24hr_10Yr	8:50	4.70
Chicago_Edmonton_24hr_10Yr	8:55	4.54
Chicago_Edmonton_24hr_10Yr	9:00	4.35
Chicago_Edmonton_24hr_10Yr	9:05	4.25
Chicago_Edmonton_24hr_10Yr	9:10	4.12
Chicago_Edmonton_24hr_10Yr	9:15	4.00
Chicago_Edmonton_24hr_10Yr	9:20	3.90
Chicago_Edmonton_24hr_10Yr	9:25	3.78
Chicago_Edmonton_24hr_10Yr	9:30	3.68
Chicago_Edmonton_24hr_10Yr	9:35	3.59
Chicago_Edmonton_24hr_10Yr	9:40	3.51
Chicago_Edmonton_24hr_10Yr	9:45	3.42
Chicago_Edmonton_24hr_10Yr	9:50	3.35
Chicago_Edmonton_24hr_10Yr	9:55	3.27
Chicago_Edmonton_24hr_10Yr	10:00	3.20
Chicago_Edmonton_24hr_10Yr	10:05	3.14
Chicago_Edmonton_24hr_10Yr	10:10	3.07
Chicago_Edmonton_24hr_10Yr	10:15	3.01
Chicago_Edmonton_24hr_10Yr	10:20	2.96
Chicago_Edmonton_24hr_10Yr	10:25	2.90
Chicago_Edmonton_24hr_10Yr	10:30	2.85
Chicago_Edmonton_24hr_10Yr	10:35	2.80
Chicago_Edmonton_24hr_10Yr	10:40	2.75
Chicago_Edmonton_24hr_10Yr	10:45	2.70
Chicago_Edmonton_24hr_10Yr	10:50	2.66
Chicago_Edmonton_24hr_10Yr	10:55	2.62
Chicago_Edmonton_24hr_10Yr	11:00	2.58
Chicago_Edmonton_24hr_10Yr	11:05	2.54
Chicago_Edmonton_24hr_10Yr	11:10	2.50
Chicago_Edmonton_24hr_10Yr	11:15	2.46
Chicago_Edmonton_24hr_10Yr	11:20	2.43
Chicago_Edmonton_24hr_10Yr	11:25	2.39
Chicago_Edmonton_24hr_10Yr	11:30	2.36
Chicago_Edmonton_24hr_10Yr	11:35	2.33
Chicago_Edmonton_24hr_10Yr	11:40	2.30
Chicago_Edmonton_24hr_10Yr	11:45	2.27
Chicago_Edmonton_24hr_10Yr	11:50	2.24
Chicago_Edmonton_24hr_10Yr	11:55	2.21
Chicago_Edmonton_24hr_10Yr	12:00	2.18
Chicago_Edmonton_24hr_10Yr	12:05	2.15
Chicago_Edmonton_24hr_10Yr	12:10	2.13
Chicago_Edmonton_24hr_10Yr	12:15	2.10
Chicago_Edmonton_24hr_10Yr	12:20	2.08
Chicago_Edmonton_24hr_10Yr	12:25	2.06
Chicago_Edmonton_24hr_10Yr	12:30	2.03
Chicago_Edmonton_24hr_10Yr	12:35	2.01
Chicago_Edmonton_24hr_10Yr	12:40	1.99
Chicago_Edmonton_24hr_10Yr	12:45	1.97
Chicago_Edmonton_24hr_10Yr	12:50	1.95
Chicago_Edmonton_24hr_10Yr	12:55	1.93
Chicago_Edmonton_24hr_10Yr	13:00	1.91
Chicago_Edmonton_24hr_10Yr	13:05	1.89

Chicago_Edmonton_24hr_10Yr	13:10	1.87
Chicago_Edmonton_24hr_10Yr	13:15	1.85
Chicago_Edmonton_24hr_10Yr	13:20	1.83
Chicago_Edmonton_24hr_10Yr	13:25	1.81
Chicago_Edmonton_24hr_10Yr	13:30	1.80
Chicago_Edmonton_24hr_10Yr	13:35	1.78
Chicago_Edmonton_24hr_10Yr	13:40	1.76
Chicago_Edmonton_24hr_10Yr	13:45	1.75
Chicago_Edmonton_24hr_10Yr	13:50	1.73
Chicago_Edmonton_24hr_10Yr	13:55	1.72
Chicago_Edmonton_24hr_10Yr	14:00	1.70
Chicago_Edmonton_24hr_10Yr	14:05	1.69
Chicago_Edmonton_24hr_10Yr	14:10	1.67
Chicago_Edmonton_24hr_10Yr	14:15	1.66
Chicago_Edmonton_24hr_10Yr	14:20	1.65
Chicago_Edmonton_24hr_10Yr	14:25	1.63
Chicago_Edmonton_24hr_10Yr	14:30	1.62
Chicago_Edmonton_24hr_10Yr	14:35	1.61
Chicago_Edmonton_24hr_10Yr	14:40	1.59
Chicago_Edmonton_24hr_10Yr	14:45	1.58
Chicago_Edmonton_24hr_10Yr	14:50	1.57
Chicago_Edmonton_24hr_10Yr	14:55	1.56
Chicago_Edmonton_24hr_10Yr	15:00	1.54
Chicago_Edmonton_24hr_10Yr	15:05	1.53
Chicago_Edmonton_24hr_10Yr	15:10	1.52
Chicago_Edmonton_24hr_10Yr	15:15	1.51
Chicago_Edmonton_24hr_10Yr	15:20	1.50
Chicago_Edmonton_24hr_10Yr	15:25	1.49
Chicago_Edmonton_24hr_10Yr	15:30	1.48
Chicago_Edmonton_24hr_10Yr	15:35	1.47
Chicago_Edmonton_24hr_10Yr	15:40	1.46
Chicago_Edmonton_24hr_10Yr	15:45	1.45
Chicago_Edmonton_24hr_10Yr	15:50	1.44
Chicago_Edmonton_24hr_10Yr	15:55	1.43
Chicago_Edmonton_24hr_10Yr	16:00	1.42
Chicago_Edmonton_24hr_10Yr	16:05	1.41
Chicago_Edmonton_24hr_10Yr	16:10	1.40
Chicago_Edmonton_24hr_10Yr	16:15	1.39
Chicago_Edmonton_24hr_10Yr	16:20	1.38
Chicago_Edmonton_24hr_10Yr	16:25	1.37
Chicago_Edmonton_24hr_10Yr	16:30	1.36
Chicago_Edmonton_24hr_10Yr	16:35	1.35
Chicago_Edmonton_24hr_10Yr	16:40	1.34
Chicago_Edmonton_24hr_10Yr	16:45	1.34
Chicago_Edmonton_24hr_10Yr	16:50	1.33
Chicago_Edmonton_24hr_10Yr	16:55	1.32
Chicago_Edmonton_24hr_10Yr	17:00	1.31
Chicago_Edmonton_24hr_10Yr	17:05	1.30
Chicago_Edmonton_24hr_10Yr	17:10	1.30
Chicago_Edmonton_24hr_10Yr	17:15	1.29
Chicago_Edmonton_24hr_10Yr	17:20	1.28
Chicago_Edmonton_24hr_10Yr	17:25	1.27
Chicago_Edmonton_24hr_10Yr	17:30	1.27
Chicago_Edmonton_24hr_10Yr	17:35	1.26
Chicago_Edmonton_24hr_10Yr	17:40	1.25
Chicago_Edmonton_24hr_10Yr	17:45	1.24
Chicago_Edmonton_24hr_10Yr	17:50	1.24
Chicago_Edmonton_24hr_10Yr	17:55	1.23
Chicago_Edmonton_24hr_10Yr	18:00	1.22
Chicago_Edmonton_24hr_10Yr	18:05	1.22
Chicago_Edmonton_24hr_10Yr	18:10	1.21
Chicago_Edmonton_24hr_10Yr	18:15	1.20
Chicago_Edmonton_24hr_10Yr	18:20	1.20
Chicago_Edmonton_24hr_10Yr	18:25	1.19
Chicago_Edmonton_24hr_10Yr	18:30	1.19
Chicago_Edmonton_24hr_10Yr	18:35	1.18
Chicago_Edmonton_24hr_10Yr	18:40	1.17
Chicago_Edmonton_24hr_10Yr	18:45	1.17
Chicago_Edmonton_24hr_10Yr	18:50	1.16

Chicago_Edmonton_24hr_10Yr	18:55	1.16
Chicago_Edmonton_24hr_10Yr	19:00	1.15
Chicago_Edmonton_24hr_10Yr	19:05	1.14
Chicago_Edmonton_24hr_10Yr	19:10	1.14
Chicago_Edmonton_24hr_10Yr	19:15	1.13
Chicago_Edmonton_24hr_10Yr	19:20	1.13
Chicago_Edmonton_24hr_10Yr	19:25	1.12
Chicago_Edmonton_24hr_10Yr	19:30	1.12
Chicago_Edmonton_24hr_10Yr	19:35	1.11
Chicago_Edmonton_24hr_10Yr	19:40	1.11
Chicago_Edmonton_24hr_10Yr	19:45	1.10
Chicago_Edmonton_24hr_10Yr	19:50	1.10
Chicago_Edmonton_24hr_10Yr	19:55	1.09
Chicago_Edmonton_24hr_10Yr	20:00	1.08
Chicago_Edmonton_24hr_10Yr	20:05	1.08
Chicago_Edmonton_24hr_10Yr	20:10	1.07
Chicago_Edmonton_24hr_10Yr	20:15	1.07
Chicago_Edmonton_24hr_10Yr	20:20	1.07
Chicago_Edmonton_24hr_10Yr	20:25	1.06
Chicago_Edmonton_24hr_10Yr	20:30	1.06
Chicago_Edmonton_24hr_10Yr	20:35	1.05
Chicago_Edmonton_24hr_10Yr	20:40	1.05
Chicago_Edmonton_24hr_10Yr	20:45	1.04
Chicago_Edmonton_24hr_10Yr	20:50	1.04
Chicago_Edmonton_24hr_10Yr	20:55	1.03
Chicago_Edmonton_24hr_10Yr	21:00	1.03
Chicago_Edmonton_24hr_10Yr	21:05	1.02
Chicago_Edmonton_24hr_10Yr	21:10	1.02
Chicago_Edmonton_24hr_10Yr	21:15	1.01
Chicago_Edmonton_24hr_10Yr	21:20	1.01
Chicago_Edmonton_24hr_10Yr	21:25	1.01
Chicago_Edmonton_24hr_10Yr	21:30	1.00
Chicago_Edmonton_24hr_10Yr	21:35	1.00
Chicago_Edmonton_24hr_10Yr	21:40	0.99
Chicago_Edmonton_24hr_10Yr	21:45	0.99
Chicago_Edmonton_24hr_10Yr	21:50	0.99
Chicago_Edmonton_24hr_10Yr	21:55	0.98
Chicago_Edmonton_24hr_10Yr	22:00	0.98
Chicago_Edmonton_24hr_10Yr	22:05	0.97
Chicago_Edmonton_24hr_10Yr	22:10	0.97
Chicago_Edmonton_24hr_10Yr	22:15	0.97
Chicago_Edmonton_24hr_10Yr	22:20	0.96
Chicago_Edmonton_24hr_10Yr	22:25	0.96
Chicago_Edmonton_24hr_10Yr	22:30	0.96
Chicago_Edmonton_24hr_10Yr	22:35	0.95
Chicago_Edmonton_24hr_10Yr	22:40	0.95
Chicago_Edmonton_24hr_10Yr	22:45	0.94
Chicago_Edmonton_24hr_10Yr	22:50	0.94
Chicago_Edmonton_24hr_10Yr	22:55	0.94
Chicago_Edmonton_24hr_10Yr	23:00	0.93
Chicago_Edmonton_24hr_10Yr	23:05	0.93
Chicago_Edmonton_24hr_10Yr	23:10	0.93
Chicago_Edmonton_24hr_10Yr	23:15	0.92
Chicago_Edmonton_24hr_10Yr	23:20	0.92
Chicago_Edmonton_24hr_10Yr	23:25	0.92
Chicago_Edmonton_24hr_10Yr	23:30	0.91
Chicago_Edmonton_24hr_10Yr	23:35	0.91
Chicago_Edmonton_24hr_10Yr	23:40	0.91
Chicago_Edmonton_24hr_10Yr	23:45	0.90
Chicago_Edmonton_24hr_10Yr	23:50	0.90
Chicago_Edmonton_24hr_10Yr	23:55	0.90
Chicago_Edmonton_24hr_10Yr	24:00	0.89

;Total = 90.2 mm,unit mm/hr

Chicago_Edmonton_24hr_25Yr	0:00	1.11
Chicago_Edmonton_24hr_25Yr	0:05	1.11
Chicago_Edmonton_24hr_25Yr	0:10	1.11
Chicago_Edmonton_24hr_25Yr	0:15	1.12
Chicago_Edmonton_24hr_25Yr	0:20	1.13

Chicago_Edmonton_24hr_25Yr	0:25	1.14
Chicago_Edmonton_24hr_25Yr	0:30	1.15
Chicago_Edmonton_24hr_25Yr	0:35	1.16
Chicago_Edmonton_24hr_25Yr	0:40	1.17
Chicago_Edmonton_24hr_25Yr	0:45	1.18
Chicago_Edmonton_24hr_25Yr	0:50	1.19
Chicago_Edmonton_24hr_25Yr	0:55	1.20
Chicago_Edmonton_24hr_25Yr	1:00	1.22
Chicago_Edmonton_24hr_25Yr	1:05	1.23
Chicago_Edmonton_24hr_25Yr	1:10	1.24
Chicago_Edmonton_24hr_25Yr	1:15	1.25
Chicago_Edmonton_24hr_25Yr	1:20	1.26
Chicago_Edmonton_24hr_25Yr	1:25	1.28
Chicago_Edmonton_24hr_25Yr	1:30	1.29
Chicago_Edmonton_24hr_25Yr	1:35	1.30
Chicago_Edmonton_24hr_25Yr	1:40	1.32
Chicago_Edmonton_24hr_25Yr	1:45	1.33
Chicago_Edmonton_24hr_25Yr	1:50	1.35
Chicago_Edmonton_24hr_25Yr	1:55	1.36
Chicago_Edmonton_24hr_25Yr	2:00	1.38
Chicago_Edmonton_24hr_25Yr	2:05	1.40
Chicago_Edmonton_24hr_25Yr	2:10	1.41
Chicago_Edmonton_24hr_25Yr	2:15	1.43
Chicago_Edmonton_24hr_25Yr	2:20	1.45
Chicago_Edmonton_24hr_25Yr	2:25	1.47
Chicago_Edmonton_24hr_25Yr	2:30	1.48
Chicago_Edmonton_24hr_25Yr	2:35	1.50
Chicago_Edmonton_24hr_25Yr	2:40	1.52
Chicago_Edmonton_24hr_25Yr	2:45	1.54
Chicago_Edmonton_24hr_25Yr	2:50	1.56
Chicago_Edmonton_24hr_25Yr	2:55	1.59
Chicago_Edmonton_24hr_25Yr	3:00	1.61
Chicago_Edmonton_24hr_25Yr	3:05	1.63
Chicago_Edmonton_24hr_25Yr	3:10	1.66
Chicago_Edmonton_24hr_25Yr	3:15	1.68
Chicago_Edmonton_24hr_25Yr	3:20	1.71
Chicago_Edmonton_24hr_25Yr	3:25	1.74
Chicago_Edmonton_24hr_25Yr	3:30	1.77
Chicago_Edmonton_24hr_25Yr	3:35	1.79
Chicago_Edmonton_24hr_25Yr	3:40	1.83
Chicago_Edmonton_24hr_25Yr	3:45	1.86
Chicago_Edmonton_24hr_25Yr	3:50	1.89
Chicago_Edmonton_24hr_25Yr	3:55	1.93
Chicago_Edmonton_24hr_25Yr	4:00	1.96
Chicago_Edmonton_24hr_25Yr	4:05	2.00
Chicago_Edmonton_24hr_25Yr	4:10	2.04
Chicago_Edmonton_24hr_25Yr	4:15	2.08
Chicago_Edmonton_24hr_25Yr	4:20	2.13
Chicago_Edmonton_24hr_25Yr	4:25	2.17
Chicago_Edmonton_24hr_25Yr	4:30	2.22
Chicago_Edmonton_24hr_25Yr	4:35	2.27
Chicago_Edmonton_24hr_25Yr	4:40	2.33
Chicago_Edmonton_24hr_25Yr	4:45	2.39
Chicago_Edmonton_24hr_25Yr	4:50	2.45
Chicago_Edmonton_24hr_25Yr	4:55	2.51
Chicago_Edmonton_24hr_25Yr	5:00	2.58
Chicago_Edmonton_24hr_25Yr	5:05	2.66
Chicago_Edmonton_24hr_25Yr	5:10	2.74
Chicago_Edmonton_24hr_25Yr	5:15	2.82
Chicago_Edmonton_24hr_25Yr	5:20	2.91
Chicago_Edmonton_24hr_25Yr	5:25	3.02
Chicago_Edmonton_24hr_25Yr	5:30	3.12
Chicago_Edmonton_24hr_25Yr	5:35	3.24
Chicago_Edmonton_24hr_25Yr	5:40	3.37
Chicago_Edmonton_24hr_25Yr	5:45	3.52
Chicago_Edmonton_24hr_25Yr	5:50	3.68
Chicago_Edmonton_24hr_25Yr	5:55	3.86
Chicago_Edmonton_24hr_25Yr	6:00	4.06
Chicago_Edmonton_24hr_25Yr	6:05	4.28

Chicago_Edmonton_24hr_25Yr	6:10	4.55
Chicago_Edmonton_24hr_25Yr	6:15	4.85
Chicago_Edmonton_24hr_25Yr	6:20	5.21
Chicago_Edmonton_24hr_25Yr	6:25	5.63
Chicago_Edmonton_24hr_25Yr	6:30	6.16
Chicago_Edmonton_24hr_25Yr	6:35	6.81
Chicago_Edmonton_24hr_25Yr	6:40	7.67
Chicago_Edmonton_24hr_25Yr	6:45	8.84
Chicago_Edmonton_24hr_25Yr	6:50	10.55
Chicago_Edmonton_24hr_25Yr	6:55	13.36
Chicago_Edmonton_24hr_25Yr	7:00	19.07
Chicago_Edmonton_24hr_25Yr	7:05	40.76
Chicago_Edmonton_24hr_25Yr	7:10	169.14
Chicago_Edmonton_24hr_25Yr	7:15	54.70
Chicago_Edmonton_24hr_25Yr	7:20	31.94
Chicago_Edmonton_24hr_25Yr	7:25	23.38
Chicago_Edmonton_24hr_25Yr	7:30	18.77
Chicago_Edmonton_24hr_25Yr	7:35	15.86
Chicago_Edmonton_24hr_25Yr	7:40	13.83
Chicago_Edmonton_24hr_25Yr	7:45	12.32
Chicago_Edmonton_24hr_25Yr	7:50	11.16
Chicago_Edmonton_24hr_25Yr	7:55	10.23
Chicago_Edmonton_24hr_25Yr	8:00	9.46
Chicago_Edmonton_24hr_25Yr	8:05	8.82
Chicago_Edmonton_24hr_25Yr	8:10	8.27
Chicago_Edmonton_24hr_25Yr	8:15	7.80
Chicago_Edmonton_24hr_25Yr	8:20	7.39
Chicago_Edmonton_24hr_25Yr	8:25	7.03
Chicago_Edmonton_24hr_25Yr	8:30	6.70
Chicago_Edmonton_24hr_25Yr	8:35	6.41
Chicago_Edmonton_24hr_25Yr	8:40	6.15
Chicago_Edmonton_24hr_25Yr	8:45	5.92
Chicago_Edmonton_24hr_25Yr	8:50	5.70
Chicago_Edmonton_24hr_25Yr	8:55	5.50
Chicago_Edmonton_24hr_25Yr	9:00	5.27
Chicago_Edmonton_24hr_25Yr	9:05	5.15
Chicago_Edmonton_24hr_25Yr	9:10	4.99
Chicago_Edmonton_24hr_25Yr	9:15	4.85
Chicago_Edmonton_24hr_25Yr	9:20	4.72
Chicago_Edmonton_24hr_25Yr	9:25	4.59
Chicago_Edmonton_24hr_25Yr	9:30	4.47
Chicago_Edmonton_24hr_25Yr	9:35	4.36
Chicago_Edmonton_24hr_25Yr	9:40	4.25
Chicago_Edmonton_24hr_25Yr	9:45	4.15
Chicago_Edmonton_24hr_25Yr	9:50	4.06
Chicago_Edmonton_24hr_25Yr	9:55	3.97
Chicago_Edmonton_24hr_25Yr	10:00	3.88
Chicago_Edmonton_24hr_25Yr	10:05	3.80
Chicago_Edmonton_24hr_25Yr	10:10	3.73
Chicago_Edmonton_24hr_25Yr	10:15	3.65
Chicago_Edmonton_24hr_25Yr	10:20	3.58
Chicago_Edmonton_24hr_25Yr	10:25	3.52
Chicago_Edmonton_24hr_25Yr	10:30	3.45
Chicago_Edmonton_24hr_25Yr	10:35	3.39
Chicago_Edmonton_24hr_25Yr	10:40	3.33
Chicago_Edmonton_24hr_25Yr	10:45	3.28
Chicago_Edmonton_24hr_25Yr	10:50	3.22
Chicago_Edmonton_24hr_25Yr	10:55	3.17
Chicago_Edmonton_24hr_25Yr	11:00	3.12
Chicago_Edmonton_24hr_25Yr	11:05	3.08
Chicago_Edmonton_24hr_25Yr	11:10	3.03
Chicago_Edmonton_24hr_25Yr	11:15	2.99
Chicago_Edmonton_24hr_25Yr	11:20	2.94
Chicago_Edmonton_24hr_25Yr	11:25	2.90
Chicago_Edmonton_24hr_25Yr	11:30	2.86
Chicago_Edmonton_24hr_25Yr	11:35	2.82
Chicago_Edmonton_24hr_25Yr	11:40	2.78
Chicago_Edmonton_24hr_25Yr	11:45	2.75
Chicago_Edmonton_24hr_25Yr	11:50	2.71

Chicago_Edmonton_24hr_25Yr	11:55	2.68
Chicago_Edmonton_24hr_25Yr	12:00	2.64
Chicago_Edmonton_24hr_25Yr	12:05	2.61
Chicago_Edmonton_24hr_25Yr	12:10	2.58
Chicago_Edmonton_24hr_25Yr	12:15	2.55
Chicago_Edmonton_24hr_25Yr	12:20	2.52
Chicago_Edmonton_24hr_25Yr	12:25	2.49
Chicago_Edmonton_24hr_25Yr	12:30	2.46
Chicago_Edmonton_24hr_25Yr	12:35	2.44
Chicago_Edmonton_24hr_25Yr	12:40	2.41
Chicago_Edmonton_24hr_25Yr	12:45	2.39
Chicago_Edmonton_24hr_25Yr	12:50	2.36
Chicago_Edmonton_24hr_25Yr	12:55	2.34
Chicago_Edmonton_24hr_25Yr	13:00	2.31
Chicago_Edmonton_24hr_25Yr	13:05	2.29
Chicago_Edmonton_24hr_25Yr	13:10	2.27
Chicago_Edmonton_24hr_25Yr	13:15	2.24
Chicago_Edmonton_24hr_25Yr	13:20	2.22
Chicago_Edmonton_24hr_25Yr	13:25	2.20
Chicago_Edmonton_24hr_25Yr	13:30	2.18
Chicago_Edmonton_24hr_25Yr	13:35	2.16
Chicago_Edmonton_24hr_25Yr	13:40	2.14
Chicago_Edmonton_24hr_25Yr	13:45	2.12
Chicago_Edmonton_24hr_25Yr	13:50	2.10
Chicago_Edmonton_24hr_25Yr	13:55	2.08
Chicago_Edmonton_24hr_25Yr	14:00	2.06
Chicago_Edmonton_24hr_25Yr	14:05	2.05
Chicago_Edmonton_24hr_25Yr	14:10	2.03
Chicago_Edmonton_24hr_25Yr	14:15	2.01
Chicago_Edmonton_24hr_25Yr	14:20	1.99
Chicago_Edmonton_24hr_25Yr	14:25	1.98
Chicago_Edmonton_24hr_25Yr	14:30	1.96
Chicago_Edmonton_24hr_25Yr	14:35	1.95
Chicago_Edmonton_24hr_25Yr	14:40	1.93
Chicago_Edmonton_24hr_25Yr	14:45	1.92
Chicago_Edmonton_24hr_25Yr	14:50	1.90
Chicago_Edmonton_24hr_25Yr	14:55	1.89
Chicago_Edmonton_24hr_25Yr	15:00	1.87
Chicago_Edmonton_24hr_25Yr	15:05	1.86
Chicago_Edmonton_24hr_25Yr	15:10	1.84
Chicago_Edmonton_24hr_25Yr	15:15	1.83
Chicago_Edmonton_24hr_25Yr	15:20	1.82
Chicago_Edmonton_24hr_25Yr	15:25	1.80
Chicago_Edmonton_24hr_25Yr	15:30	1.79
Chicago_Edmonton_24hr_25Yr	15:35	1.78
Chicago_Edmonton_24hr_25Yr	15:40	1.77
Chicago_Edmonton_24hr_25Yr	15:45	1.75
Chicago_Edmonton_24hr_25Yr	15:50	1.74
Chicago_Edmonton_24hr_25Yr	15:55	1.73
Chicago_Edmonton_24hr_25Yr	16:00	1.72
Chicago_Edmonton_24hr_25Yr	16:05	1.71
Chicago_Edmonton_24hr_25Yr	16:10	1.70
Chicago_Edmonton_24hr_25Yr	16:15	1.68
Chicago_Edmonton_24hr_25Yr	16:20	1.67
Chicago_Edmonton_24hr_25Yr	16:25	1.66
Chicago_Edmonton_24hr_25Yr	16:30	1.65
Chicago_Edmonton_24hr_25Yr	16:35	1.64
Chicago_Edmonton_24hr_25Yr	16:40	1.63
Chicago_Edmonton_24hr_25Yr	16:45	1.62
Chicago_Edmonton_24hr_25Yr	16:50	1.61
Chicago_Edmonton_24hr_25Yr	16:55	1.60
Chicago_Edmonton_24hr_25Yr	17:00	1.59
Chicago_Edmonton_24hr_25Yr	17:05	1.58
Chicago_Edmonton_24hr_25Yr	17:10	1.57
Chicago_Edmonton_24hr_25Yr	17:15	1.56
Chicago_Edmonton_24hr_25Yr	17:20	1.55
Chicago_Edmonton_24hr_25Yr	17:25	1.54
Chicago_Edmonton_24hr_25Yr	17:30	1.54
Chicago_Edmonton_24hr_25Yr	17:35	1.53

Chicago_Edmonton_24hr_25Yr	17:40	1.52
Chicago_Edmonton_24hr_25Yr	17:45	1.51
Chicago_Edmonton_24hr_25Yr	17:50	1.50
Chicago_Edmonton_24hr_25Yr	17:55	1.49
Chicago_Edmonton_24hr_25Yr	18:00	1.48
Chicago_Edmonton_24hr_25Yr	18:05	1.48
Chicago_Edmonton_24hr_25Yr	18:10	1.47
Chicago_Edmonton_24hr_25Yr	18:15	1.46
Chicago_Edmonton_24hr_25Yr	18:20	1.45
Chicago_Edmonton_24hr_25Yr	18:25	1.44
Chicago_Edmonton_24hr_25Yr	18:30	1.44
Chicago_Edmonton_24hr_25Yr	18:35	1.43
Chicago_Edmonton_24hr_25Yr	18:40	1.42
Chicago_Edmonton_24hr_25Yr	18:45	1.42
Chicago_Edmonton_24hr_25Yr	18:50	1.41
Chicago_Edmonton_24hr_25Yr	18:55	1.40
Chicago_Edmonton_24hr_25Yr	19:00	1.39
Chicago_Edmonton_24hr_25Yr	19:05	1.39
Chicago_Edmonton_24hr_25Yr	19:10	1.38
Chicago_Edmonton_24hr_25Yr	19:15	1.37
Chicago_Edmonton_24hr_25Yr	19:20	1.37
Chicago_Edmonton_24hr_25Yr	19:25	1.36
Chicago_Edmonton_24hr_25Yr	19:30	1.35
Chicago_Edmonton_24hr_25Yr	19:35	1.35
Chicago_Edmonton_24hr_25Yr	19:40	1.34
Chicago_Edmonton_24hr_25Yr	19:45	1.33
Chicago_Edmonton_24hr_25Yr	19:50	1.33
Chicago_Edmonton_24hr_25Yr	19:55	1.32
Chicago_Edmonton_24hr_25Yr	20:00	1.31
Chicago_Edmonton_24hr_25Yr	20:05	1.31
Chicago_Edmonton_24hr_25Yr	20:10	1.30
Chicago_Edmonton_24hr_25Yr	20:15	1.30
Chicago_Edmonton_24hr_25Yr	20:20	1.29
Chicago_Edmonton_24hr_25Yr	20:25	1.29
Chicago_Edmonton_24hr_25Yr	20:30	1.28
Chicago_Edmonton_24hr_25Yr	20:35	1.27
Chicago_Edmonton_24hr_25Yr	20:40	1.27
Chicago_Edmonton_24hr_25Yr	20:45	1.26
Chicago_Edmonton_24hr_25Yr	20:50	1.26
Chicago_Edmonton_24hr_25Yr	20:55	1.25
Chicago_Edmonton_24hr_25Yr	21:00	1.25
Chicago_Edmonton_24hr_25Yr	21:05	1.24
Chicago_Edmonton_24hr_25Yr	21:10	1.24
Chicago_Edmonton_24hr_25Yr	21:15	1.23
Chicago_Edmonton_24hr_25Yr	21:20	1.23
Chicago_Edmonton_24hr_25Yr	21:25	1.22
Chicago_Edmonton_24hr_25Yr	21:30	1.22
Chicago_Edmonton_24hr_25Yr	21:35	1.21
Chicago_Edmonton_24hr_25Yr	21:40	1.20
Chicago_Edmonton_24hr_25Yr	21:45	1.20
Chicago_Edmonton_24hr_25Yr	21:50	1.20
Chicago_Edmonton_24hr_25Yr	21:55	1.19
Chicago_Edmonton_24hr_25Yr	22:00	1.19
Chicago_Edmonton_24hr_25Yr	22:05	1.18
Chicago_Edmonton_24hr_25Yr	22:10	1.18
Chicago_Edmonton_24hr_25Yr	22:15	1.17
Chicago_Edmonton_24hr_25Yr	22:20	1.17
Chicago_Edmonton_24hr_25Yr	22:25	1.16
Chicago_Edmonton_24hr_25Yr	22:30	1.16
Chicago_Edmonton_24hr_25Yr	22:35	1.15
Chicago_Edmonton_24hr_25Yr	22:40	1.15
Chicago_Edmonton_24hr_25Yr	22:45	1.15
Chicago_Edmonton_24hr_25Yr	22:50	1.14
Chicago_Edmonton_24hr_25Yr	22:55	1.14
Chicago_Edmonton_24hr_25Yr	23:00	1.13
Chicago_Edmonton_24hr_25Yr	23:05	1.13
Chicago_Edmonton_24hr_25Yr	23:10	1.12
Chicago_Edmonton_24hr_25Yr	23:15	1.12
Chicago_Edmonton_24hr_25Yr	23:20	1.12

Chicago_Edmonton_24hr_25Yr	23:25	1.11
Chicago_Edmonton_24hr_25Yr	23:30	1.11
Chicago_Edmonton_24hr_25Yr	23:35	1.10
Chicago_Edmonton_24hr_25Yr	23:40	1.10
Chicago_Edmonton_24hr_25Yr	23:45	1.10
Chicago_Edmonton_24hr_25Yr	23:50	1.09
Chicago_Edmonton_24hr_25Yr	23:55	1.09
Chicago_Edmonton_24hr_25Yr	24:00	1.08

;Total = 43 mm,unit mm/hr

Chicago_Edmonton_24hr_2Yr	0:00	0.53
Chicago_Edmonton_24hr_2Yr	0:05	0.53
Chicago_Edmonton_24hr_2Yr	0:10	0.53
Chicago_Edmonton_24hr_2Yr	0:15	0.53
Chicago_Edmonton_24hr_2Yr	0:20	0.54
Chicago_Edmonton_24hr_2Yr	0:25	0.54
Chicago_Edmonton_24hr_2Yr	0:30	0.55
Chicago_Edmonton_24hr_2Yr	0:35	0.55
Chicago_Edmonton_24hr_2Yr	0:40	0.56
Chicago_Edmonton_24hr_2Yr	0:45	0.56
Chicago_Edmonton_24hr_2Yr	0:50	0.57
Chicago_Edmonton_24hr_2Yr	0:55	0.57
Chicago_Edmonton_24hr_2Yr	1:00	0.58
Chicago_Edmonton_24hr_2Yr	1:05	0.59
Chicago_Edmonton_24hr_2Yr	1:10	0.59
Chicago_Edmonton_24hr_2Yr	1:15	0.60
Chicago_Edmonton_24hr_2Yr	1:20	0.60
Chicago_Edmonton_24hr_2Yr	1:25	0.61
Chicago_Edmonton_24hr_2Yr	1:30	0.62
Chicago_Edmonton_24hr_2Yr	1:35	0.62
Chicago_Edmonton_24hr_2Yr	1:40	0.63
Chicago_Edmonton_24hr_2Yr	1:45	0.64
Chicago_Edmonton_24hr_2Yr	1:50	0.64
Chicago_Edmonton_24hr_2Yr	1:55	0.65
Chicago_Edmonton_24hr_2Yr	2:00	0.66
Chicago_Edmonton_24hr_2Yr	2:05	0.67
Chicago_Edmonton_24hr_2Yr	2:10	0.67
Chicago_Edmonton_24hr_2Yr	2:15	0.68
Chicago_Edmonton_24hr_2Yr	2:20	0.69
Chicago_Edmonton_24hr_2Yr	2:25	0.70
Chicago_Edmonton_24hr_2Yr	2:30	0.71
Chicago_Edmonton_24hr_2Yr	2:35	0.72
Chicago_Edmonton_24hr_2Yr	2:40	0.73
Chicago_Edmonton_24hr_2Yr	2:45	0.74
Chicago_Edmonton_24hr_2Yr	2:50	0.75
Chicago_Edmonton_24hr_2Yr	2:55	0.76
Chicago_Edmonton_24hr_2Yr	3:00	0.77
Chicago_Edmonton_24hr_2Yr	3:05	0.78
Chicago_Edmonton_24hr_2Yr	3:10	0.79
Chicago_Edmonton_24hr_2Yr	3:15	0.80
Chicago_Edmonton_24hr_2Yr	3:20	0.82
Chicago_Edmonton_24hr_2Yr	3:25	0.83
Chicago_Edmonton_24hr_2Yr	3:30	0.84
Chicago_Edmonton_24hr_2Yr	3:35	0.86
Chicago_Edmonton_24hr_2Yr	3:40	0.87
Chicago_Edmonton_24hr_2Yr	3:45	0.89
Chicago_Edmonton_24hr_2Yr	3:50	0.90
Chicago_Edmonton_24hr_2Yr	3:55	0.92
Chicago_Edmonton_24hr_2Yr	4:00	0.94
Chicago_Edmonton_24hr_2Yr	4:05	0.95
Chicago_Edmonton_24hr_2Yr	4:10	0.97
Chicago_Edmonton_24hr_2Yr	4:15	0.99
Chicago_Edmonton_24hr_2Yr	4:20	1.01
Chicago_Edmonton_24hr_2Yr	4:25	1.04
Chicago_Edmonton_24hr_2Yr	4:30	1.06
Chicago_Edmonton_24hr_2Yr	4:35	1.08
Chicago_Edmonton_24hr_2Yr	4:40	1.11
Chicago_Edmonton_24hr_2Yr	4:45	1.14
Chicago_Edmonton_24hr_2Yr	4:50	1.17

Chicago_Edmonton_24hr_2Yr	4:55	1.20
Chicago_Edmonton_24hr_2Yr	5:00	1.23
Chicago_Edmonton_24hr_2Yr	5:05	1.27
Chicago_Edmonton_24hr_2Yr	5:10	1.30
Chicago_Edmonton_24hr_2Yr	5:15	1.35
Chicago_Edmonton_24hr_2Yr	5:20	1.39
Chicago_Edmonton_24hr_2Yr	5:25	1.44
Chicago_Edmonton_24hr_2Yr	5:30	1.49
Chicago_Edmonton_24hr_2Yr	5:35	1.55
Chicago_Edmonton_24hr_2Yr	5:40	1.61
Chicago_Edmonton_24hr_2Yr	5:45	1.68
Chicago_Edmonton_24hr_2Yr	5:50	1.75
Chicago_Edmonton_24hr_2Yr	5:55	1.84
Chicago_Edmonton_24hr_2Yr	6:00	1.93
Chicago_Edmonton_24hr_2Yr	6:05	2.04
Chicago_Edmonton_24hr_2Yr	6:10	2.17
Chicago_Edmonton_24hr_2Yr	6:15	2.31
Chicago_Edmonton_24hr_2Yr	6:20	2.48
Chicago_Edmonton_24hr_2Yr	6:25	2.69
Chicago_Edmonton_24hr_2Yr	6:30	2.94
Chicago_Edmonton_24hr_2Yr	6:35	3.25
Chicago_Edmonton_24hr_2Yr	6:40	3.66
Chicago_Edmonton_24hr_2Yr	6:45	4.21
Chicago_Edmonton_24hr_2Yr	6:50	5.03
Chicago_Edmonton_24hr_2Yr	6:55	6.37
Chicago_Edmonton_24hr_2Yr	7:00	9.09
Chicago_Edmonton_24hr_2Yr	7:05	19.43
Chicago_Edmonton_24hr_2Yr	7:10	80.63
Chicago_Edmonton_24hr_2Yr	7:15	26.08
Chicago_Edmonton_24hr_2Yr	7:20	15.23
Chicago_Edmonton_24hr_2Yr	7:25	11.14
Chicago_Edmonton_24hr_2Yr	7:30	8.95
Chicago_Edmonton_24hr_2Yr	7:35	7.56
Chicago_Edmonton_24hr_2Yr	7:40	6.59
Chicago_Edmonton_24hr_2Yr	7:45	5.88
Chicago_Edmonton_24hr_2Yr	7:50	5.32
Chicago_Edmonton_24hr_2Yr	7:55	4.88
Chicago_Edmonton_24hr_2Yr	8:00	4.51
Chicago_Edmonton_24hr_2Yr	8:05	4.20
Chicago_Edmonton_24hr_2Yr	8:10	3.94
Chicago_Edmonton_24hr_2Yr	8:15	3.72
Chicago_Edmonton_24hr_2Yr	8:20	3.52
Chicago_Edmonton_24hr_2Yr	8:25	3.35
Chicago_Edmonton_24hr_2Yr	8:30	3.20
Chicago_Edmonton_24hr_2Yr	8:35	3.06
Chicago_Edmonton_24hr_2Yr	8:40	2.93
Chicago_Edmonton_24hr_2Yr	8:45	2.82
Chicago_Edmonton_24hr_2Yr	8:50	2.72
Chicago_Edmonton_24hr_2Yr	8:55	2.62
Chicago_Edmonton_24hr_2Yr	9:00	2.51
Chicago_Edmonton_24hr_2Yr	9:05	2.46
Chicago_Edmonton_24hr_2Yr	9:10	2.38
Chicago_Edmonton_24hr_2Yr	9:15	2.31
Chicago_Edmonton_24hr_2Yr	9:20	2.25
Chicago_Edmonton_24hr_2Yr	9:25	2.19
Chicago_Edmonton_24hr_2Yr	9:30	2.13
Chicago_Edmonton_24hr_2Yr	9:35	2.08
Chicago_Edmonton_24hr_2Yr	9:40	2.03
Chicago_Edmonton_24hr_2Yr	9:45	1.98
Chicago_Edmonton_24hr_2Yr	9:50	1.93
Chicago_Edmonton_24hr_2Yr	9:55	1.89
Chicago_Edmonton_24hr_2Yr	10:00	1.85
Chicago_Edmonton_24hr_2Yr	10:05	1.81
Chicago_Edmonton_24hr_2Yr	10:10	1.78
Chicago_Edmonton_24hr_2Yr	10:15	1.74
Chicago_Edmonton_24hr_2Yr	10:20	1.71
Chicago_Edmonton_24hr_2Yr	10:25	1.68
Chicago_Edmonton_24hr_2Yr	10:30	1.65
Chicago_Edmonton_24hr_2Yr	10:35	1.62

Chicago_Edmonton_24hr_2Yr	10:40	1.59
Chicago_Edmonton_24hr_2Yr	10:45	1.56
Chicago_Edmonton_24hr_2Yr	10:50	1.54
Chicago_Edmonton_24hr_2Yr	10:55	1.51
Chicago_Edmonton_24hr_2Yr	11:00	1.49
Chicago_Edmonton_24hr_2Yr	11:05	1.47
Chicago_Edmonton_24hr_2Yr	11:10	1.44
Chicago_Edmonton_24hr_2Yr	11:15	1.42
Chicago_Edmonton_24hr_2Yr	11:20	1.40
Chicago_Edmonton_24hr_2Yr	11:25	1.38
Chicago_Edmonton_24hr_2Yr	11:30	1.36
Chicago_Edmonton_24hr_2Yr	11:35	1.35
Chicago_Edmonton_24hr_2Yr	11:40	1.33
Chicago_Edmonton_24hr_2Yr	11:45	1.31
Chicago_Edmonton_24hr_2Yr	11:50	1.29
Chicago_Edmonton_24hr_2Yr	11:55	1.28
Chicago_Edmonton_24hr_2Yr	12:00	1.26
Chicago_Edmonton_24hr_2Yr	12:05	1.25
Chicago_Edmonton_24hr_2Yr	12:10	1.23
Chicago_Edmonton_24hr_2Yr	12:15	1.22
Chicago_Edmonton_24hr_2Yr	12:20	1.20
Chicago_Edmonton_24hr_2Yr	12:25	1.19
Chicago_Edmonton_24hr_2Yr	12:30	1.17
Chicago_Edmonton_24hr_2Yr	12:35	1.16
Chicago_Edmonton_24hr_2Yr	12:40	1.15
Chicago_Edmonton_24hr_2Yr	12:45	1.14
Chicago_Edmonton_24hr_2Yr	12:50	1.12
Chicago_Edmonton_24hr_2Yr	12:55	1.11
Chicago_Edmonton_24hr_2Yr	13:00	1.10
Chicago_Edmonton_24hr_2Yr	13:05	1.09
Chicago_Edmonton_24hr_2Yr	13:10	1.08
Chicago_Edmonton_24hr_2Yr	13:15	1.07
Chicago_Edmonton_24hr_2Yr	13:20	1.06
Chicago_Edmonton_24hr_2Yr	13:25	1.05
Chicago_Edmonton_24hr_2Yr	13:30	1.04
Chicago_Edmonton_24hr_2Yr	13:35	1.03
Chicago_Edmonton_24hr_2Yr	13:40	1.02
Chicago_Edmonton_24hr_2Yr	13:45	1.01
Chicago_Edmonton_24hr_2Yr	13:50	1.00
Chicago_Edmonton_24hr_2Yr	13:55	0.99
Chicago_Edmonton_24hr_2Yr	14:00	0.98
Chicago_Edmonton_24hr_2Yr	14:05	0.98
Chicago_Edmonton_24hr_2Yr	14:10	0.97
Chicago_Edmonton_24hr_2Yr	14:15	0.96
Chicago_Edmonton_24hr_2Yr	14:20	0.95
Chicago_Edmonton_24hr_2Yr	14:25	0.94
Chicago_Edmonton_24hr_2Yr	14:30	0.94
Chicago_Edmonton_24hr_2Yr	14:35	0.93
Chicago_Edmonton_24hr_2Yr	14:40	0.92
Chicago_Edmonton_24hr_2Yr	14:45	0.91
Chicago_Edmonton_24hr_2Yr	14:50	0.91
Chicago_Edmonton_24hr_2Yr	14:55	0.90
Chicago_Edmonton_24hr_2Yr	15:00	0.89
Chicago_Edmonton_24hr_2Yr	15:05	0.89
Chicago_Edmonton_24hr_2Yr	15:10	0.88
Chicago_Edmonton_24hr_2Yr	15:15	0.87
Chicago_Edmonton_24hr_2Yr	15:20	0.87
Chicago_Edmonton_24hr_2Yr	15:25	0.86
Chicago_Edmonton_24hr_2Yr	15:30	0.85
Chicago_Edmonton_24hr_2Yr	15:35	0.85
Chicago_Edmonton_24hr_2Yr	15:40	0.84
Chicago_Edmonton_24hr_2Yr	15:45	0.84
Chicago_Edmonton_24hr_2Yr	15:50	0.83
Chicago_Edmonton_24hr_2Yr	15:55	0.82
Chicago_Edmonton_24hr_2Yr	16:00	0.82
Chicago_Edmonton_24hr_2Yr	16:05	0.81
Chicago_Edmonton_24hr_2Yr	16:10	0.81
Chicago_Edmonton_24hr_2Yr	16:15	0.80
Chicago_Edmonton_24hr_2Yr	16:20	0.80

Chicago_Edmonton_24hr_2Yr	16:25	0.79
Chicago_Edmonton_24hr_2Yr	16:30	0.79
Chicago_Edmonton_24hr_2Yr	16:35	0.78
Chicago_Edmonton_24hr_2Yr	16:40	0.78
Chicago_Edmonton_24hr_2Yr	16:45	0.77
Chicago_Edmonton_24hr_2Yr	16:50	0.77
Chicago_Edmonton_24hr_2Yr	16:55	0.76
Chicago_Edmonton_24hr_2Yr	17:00	0.76
Chicago_Edmonton_24hr_2Yr	17:05	0.75
Chicago_Edmonton_24hr_2Yr	17:10	0.75
Chicago_Edmonton_24hr_2Yr	17:15	0.74
Chicago_Edmonton_24hr_2Yr	17:20	0.74
Chicago_Edmonton_24hr_2Yr	17:25	0.74
Chicago_Edmonton_24hr_2Yr	17:30	0.73
Chicago_Edmonton_24hr_2Yr	17:35	0.73
Chicago_Edmonton_24hr_2Yr	17:40	0.72
Chicago_Edmonton_24hr_2Yr	17:45	0.72
Chicago_Edmonton_24hr_2Yr	17:50	0.72
Chicago_Edmonton_24hr_2Yr	17:55	0.71
Chicago_Edmonton_24hr_2Yr	18:00	0.71
Chicago_Edmonton_24hr_2Yr	18:05	0.70
Chicago_Edmonton_24hr_2Yr	18:10	0.70
Chicago_Edmonton_24hr_2Yr	18:15	0.70
Chicago_Edmonton_24hr_2Yr	18:20	0.69
Chicago_Edmonton_24hr_2Yr	18:25	0.69
Chicago_Edmonton_24hr_2Yr	18:30	0.69
Chicago_Edmonton_24hr_2Yr	18:35	0.68
Chicago_Edmonton_24hr_2Yr	18:40	0.68
Chicago_Edmonton_24hr_2Yr	18:45	0.67
Chicago_Edmonton_24hr_2Yr	18:50	0.67
Chicago_Edmonton_24hr_2Yr	18:55	0.67
Chicago_Edmonton_24hr_2Yr	19:00	0.66
Chicago_Edmonton_24hr_2Yr	19:05	0.66
Chicago_Edmonton_24hr_2Yr	19:10	0.66
Chicago_Edmonton_24hr_2Yr	19:15	0.65
Chicago_Edmonton_24hr_2Yr	19:20	0.65
Chicago_Edmonton_24hr_2Yr	19:25	0.65
Chicago_Edmonton_24hr_2Yr	19:30	0.64
Chicago_Edmonton_24hr_2Yr	19:35	0.64
Chicago_Edmonton_24hr_2Yr	19:40	0.64
Chicago_Edmonton_24hr_2Yr	19:45	0.64
Chicago_Edmonton_24hr_2Yr	19:50	0.63
Chicago_Edmonton_24hr_2Yr	19:55	0.63
Chicago_Edmonton_24hr_2Yr	20:00	0.63
Chicago_Edmonton_24hr_2Yr	20:05	0.62
Chicago_Edmonton_24hr_2Yr	20:10	0.62
Chicago_Edmonton_24hr_2Yr	20:15	0.62
Chicago_Edmonton_24hr_2Yr	20:20	0.62
Chicago_Edmonton_24hr_2Yr	20:25	0.61
Chicago_Edmonton_24hr_2Yr	20:30	0.61
Chicago_Edmonton_24hr_2Yr	20:35	0.61
Chicago_Edmonton_24hr_2Yr	20:40	0.60
Chicago_Edmonton_24hr_2Yr	20:45	0.60
Chicago_Edmonton_24hr_2Yr	20:50	0.60
Chicago_Edmonton_24hr_2Yr	20:55	0.60
Chicago_Edmonton_24hr_2Yr	21:00	0.59
Chicago_Edmonton_24hr_2Yr	21:05	0.59
Chicago_Edmonton_24hr_2Yr	21:10	0.59
Chicago_Edmonton_24hr_2Yr	21:15	0.59
Chicago_Edmonton_24hr_2Yr	21:20	0.58
Chicago_Edmonton_24hr_2Yr	21:25	0.58
Chicago_Edmonton_24hr_2Yr	21:30	0.58
Chicago_Edmonton_24hr_2Yr	21:35	0.58
Chicago_Edmonton_24hr_2Yr	21:40	0.57
Chicago_Edmonton_24hr_2Yr	21:45	0.57
Chicago_Edmonton_24hr_2Yr	21:50	0.57
Chicago_Edmonton_24hr_2Yr	21:55	0.57
Chicago_Edmonton_24hr_2Yr	22:00	0.57
Chicago_Edmonton_24hr_2Yr	22:05	0.56

Chicago_Edmonton_24hr_2Yr	22:10	0.56
Chicago_Edmonton_24hr_2Yr	22:15	0.56
Chicago_Edmonton_24hr_2Yr	22:20	0.56
Chicago_Edmonton_24hr_2Yr	22:25	0.55
Chicago_Edmonton_24hr_2Yr	22:30	0.55
Chicago_Edmonton_24hr_2Yr	22:35	0.55
Chicago_Edmonton_24hr_2Yr	22:40	0.55
Chicago_Edmonton_24hr_2Yr	22:45	0.55
Chicago_Edmonton_24hr_2Yr	22:50	0.54
Chicago_Edmonton_24hr_2Yr	22:55	0.54
Chicago_Edmonton_24hr_2Yr	23:00	0.54
Chicago_Edmonton_24hr_2Yr	23:05	0.54
Chicago_Edmonton_24hr_2Yr	23:10	0.54
Chicago_Edmonton_24hr_2Yr	23:15	0.53
Chicago_Edmonton_24hr_2Yr	23:20	0.53
Chicago_Edmonton_24hr_2Yr	23:25	0.53
Chicago_Edmonton_24hr_2Yr	23:30	0.53
Chicago_Edmonton_24hr_2Yr	23:35	0.53
Chicago_Edmonton_24hr_2Yr	23:40	0.52
Chicago_Edmonton_24hr_2Yr	23:45	0.52
Chicago_Edmonton_24hr_2Yr	23:50	0.52
Chicago_Edmonton_24hr_2Yr	23:55	0.52
Chicago_Edmonton_24hr_2Yr	24:00	0.52

;Totral =101.9 mm, unit mm/hr

Chicago_Edmonton_24hr_50Yr	0:00	1.26
Chicago_Edmonton_24hr_50Yr	0:05	1.26
Chicago_Edmonton_24hr_50Yr	0:10	1.25
Chicago_Edmonton_24hr_50Yr	0:15	1.26
Chicago_Edmonton_24hr_50Yr	0:20	1.27
Chicago_Edmonton_24hr_50Yr	0:25	1.29
Chicago_Edmonton_24hr_50Yr	0:30	1.30
Chicago_Edmonton_24hr_50Yr	0:35	1.31
Chicago_Edmonton_24hr_50Yr	0:40	1.32
Chicago_Edmonton_24hr_50Yr	0:45	1.33
Chicago_Edmonton_24hr_50Yr	0:50	1.35
Chicago_Edmonton_24hr_50Yr	0:55	1.36
Chicago_Edmonton_24hr_50Yr	1:00	1.37
Chicago_Edmonton_24hr_50Yr	1:05	1.39
Chicago_Edmonton_24hr_50Yr	1:10	1.40
Chicago_Edmonton_24hr_50Yr	1:15	1.42
Chicago_Edmonton_24hr_50Yr	1:20	1.43
Chicago_Edmonton_24hr_50Yr	1:25	1.44
Chicago_Edmonton_24hr_50Yr	1:30	1.46
Chicago_Edmonton_24hr_50Yr	1:35	1.47
Chicago_Edmonton_24hr_50Yr	1:40	1.49
Chicago_Edmonton_24hr_50Yr	1:45	1.51
Chicago_Edmonton_24hr_50Yr	1:50	1.52
Chicago_Edmonton_24hr_50Yr	1:55	1.54
Chicago_Edmonton_24hr_50Yr	2:00	1.56
Chicago_Edmonton_24hr_50Yr	2:05	1.58
Chicago_Edmonton_24hr_50Yr	2:10	1.60
Chicago_Edmonton_24hr_50Yr	2:15	1.62
Chicago_Edmonton_24hr_50Yr	2:20	1.64
Chicago_Edmonton_24hr_50Yr	2:25	1.66
Chicago_Edmonton_24hr_50Yr	2:30	1.68
Chicago_Edmonton_24hr_50Yr	2:35	1.70
Chicago_Edmonton_24hr_50Yr	2:40	1.72
Chicago_Edmonton_24hr_50Yr	2:45	1.74
Chicago_Edmonton_24hr_50Yr	2:50	1.77
Chicago_Edmonton_24hr_50Yr	2:55	1.79
Chicago_Edmonton_24hr_50Yr	3:00	1.82
Chicago_Edmonton_24hr_50Yr	3:05	1.85
Chicago_Edmonton_24hr_50Yr	3:10	1.87
Chicago_Edmonton_24hr_50Yr	3:15	1.90
Chicago_Edmonton_24hr_50Yr	3:20	1.93
Chicago_Edmonton_24hr_50Yr	3:25	1.96
Chicago_Edmonton_24hr_50Yr	3:30	1.99
Chicago_Edmonton_24hr_50Yr	3:35	2.03

Chicago_Edmonton_24hr_50Yr	3:40	2.06
Chicago_Edmonton_24hr_50Yr	3:45	2.10
Chicago_Edmonton_24hr_50Yr	3:50	2.14
Chicago_Edmonton_24hr_50Yr	3:55	2.17
Chicago_Edmonton_24hr_50Yr	4:00	2.22
Chicago_Edmonton_24hr_50Yr	4:05	2.26
Chicago_Edmonton_24hr_50Yr	4:10	2.31
Chicago_Edmonton_24hr_50Yr	4:15	2.35
Chicago_Edmonton_24hr_50Yr	4:20	2.40
Chicago_Edmonton_24hr_50Yr	4:25	2.45
Chicago_Edmonton_24hr_50Yr	4:30	2.51
Chicago_Edmonton_24hr_50Yr	4:35	2.57
Chicago_Edmonton_24hr_50Yr	4:40	2.63
Chicago_Edmonton_24hr_50Yr	4:45	2.69
Chicago_Edmonton_24hr_50Yr	4:50	2.76
Chicago_Edmonton_24hr_50Yr	4:55	2.84
Chicago_Edmonton_24hr_50Yr	5:00	2.92
Chicago_Edmonton_24hr_50Yr	5:05	3.00
Chicago_Edmonton_24hr_50Yr	5:10	3.09
Chicago_Edmonton_24hr_50Yr	5:15	3.19
Chicago_Edmonton_24hr_50Yr	5:20	3.29
Chicago_Edmonton_24hr_50Yr	5:25	3.41
Chicago_Edmonton_24hr_50Yr	5:30	3.53
Chicago_Edmonton_24hr_50Yr	5:35	3.66
Chicago_Edmonton_24hr_50Yr	5:40	3.81
Chicago_Edmonton_24hr_50Yr	5:45	3.97
Chicago_Edmonton_24hr_50Yr	5:50	4.16
Chicago_Edmonton_24hr_50Yr	5:55	4.36
Chicago_Edmonton_24hr_50Yr	6:00	4.58
Chicago_Edmonton_24hr_50Yr	6:05	4.84
Chicago_Edmonton_24hr_50Yr	6:10	5.14
Chicago_Edmonton_24hr_50Yr	6:15	5.48
Chicago_Edmonton_24hr_50Yr	6:20	5.88
Chicago_Edmonton_24hr_50Yr	6:25	6.37
Chicago_Edmonton_24hr_50Yr	6:30	6.96
Chicago_Edmonton_24hr_50Yr	6:35	7.70
Chicago_Edmonton_24hr_50Yr	6:40	8.66
Chicago_Edmonton_24hr_50Yr	6:45	9.98
Chicago_Edmonton_24hr_50Yr	6:50	11.92
Chicago_Edmonton_24hr_50Yr	6:55	15.10
Chicago_Edmonton_24hr_50Yr	7:00	21.55
Chicago_Edmonton_24hr_50Yr	7:05	46.05
Chicago_Edmonton_24hr_50Yr	7:10	191.08
Chicago_Edmonton_24hr_50Yr	7:15	61.79
Chicago_Edmonton_24hr_50Yr	7:20	36.08
Chicago_Edmonton_24hr_50Yr	7:25	26.41
Chicago_Edmonton_24hr_50Yr	7:30	21.21
Chicago_Edmonton_24hr_50Yr	7:35	17.91
Chicago_Edmonton_24hr_50Yr	7:40	15.62
Chicago_Edmonton_24hr_50Yr	7:45	13.92
Chicago_Edmonton_24hr_50Yr	7:50	12.61
Chicago_Edmonton_24hr_50Yr	7:55	11.55
Chicago_Edmonton_24hr_50Yr	8:00	10.69
Chicago_Edmonton_24hr_50Yr	8:05	9.96
Chicago_Edmonton_24hr_50Yr	8:10	9.35
Chicago_Edmonton_24hr_50Yr	8:15	8.81
Chicago_Edmonton_24hr_50Yr	8:20	8.35
Chicago_Edmonton_24hr_50Yr	8:25	7.94
Chicago_Edmonton_24hr_50Yr	8:30	7.57
Chicago_Edmonton_24hr_50Yr	8:35	7.25
Chicago_Edmonton_24hr_50Yr	8:40	6.95
Chicago_Edmonton_24hr_50Yr	8:45	6.68
Chicago_Edmonton_24hr_50Yr	8:50	6.44
Chicago_Edmonton_24hr_50Yr	8:55	6.21
Chicago_Edmonton_24hr_50Yr	9:00	5.95
Chicago_Edmonton_24hr_50Yr	9:05	5.82
Chicago_Edmonton_24hr_50Yr	9:10	5.64
Chicago_Edmonton_24hr_50Yr	9:15	5.48
Chicago_Edmonton_24hr_50Yr	9:20	5.33

Chicago_Edmonton_24hr_50Yr	9:25	5.18
Chicago_Edmonton_24hr_50Yr	9:30	5.05
Chicago_Edmonton_24hr_50Yr	9:35	4.92
Chicago_Edmonton_24hr_50Yr	9:40	4.80
Chicago_Edmonton_24hr_50Yr	9:45	4.69
Chicago_Edmonton_24hr_50Yr	9:50	4.58
Chicago_Edmonton_24hr_50Yr	9:55	4.48
Chicago_Edmonton_24hr_50Yr	10:00	4.39
Chicago_Edmonton_24hr_50Yr	10:05	4.30
Chicago_Edmonton_24hr_50Yr	10:10	4.21
Chicago_Edmonton_24hr_50Yr	10:15	4.13
Chicago_Edmonton_24hr_50Yr	10:20	4.05
Chicago_Edmonton_24hr_50Yr	10:25	3.97
Chicago_Edmonton_24hr_50Yr	10:30	3.90
Chicago_Edmonton_24hr_50Yr	10:35	3.83
Chicago_Edmonton_24hr_50Yr	10:40	3.77
Chicago_Edmonton_24hr_50Yr	10:45	3.70
Chicago_Edmonton_24hr_50Yr	10:50	3.64
Chicago_Edmonton_24hr_50Yr	10:55	3.58
Chicago_Edmonton_24hr_50Yr	11:00	3.53
Chicago_Edmonton_24hr_50Yr	11:05	3.47
Chicago_Edmonton_24hr_50Yr	11:10	3.42
Chicago_Edmonton_24hr_50Yr	11:15	3.37
Chicago_Edmonton_24hr_50Yr	11:20	3.32
Chicago_Edmonton_24hr_50Yr	11:25	3.28
Chicago_Edmonton_24hr_50Yr	11:30	3.23
Chicago_Edmonton_24hr_50Yr	11:35	3.19
Chicago_Edmonton_24hr_50Yr	11:40	3.14
Chicago_Edmonton_24hr_50Yr	11:45	3.10
Chicago_Edmonton_24hr_50Yr	11:50	3.06
Chicago_Edmonton_24hr_50Yr	11:55	3.03
Chicago_Edmonton_24hr_50Yr	12:00	2.99
Chicago_Edmonton_24hr_50Yr	12:05	2.95
Chicago_Edmonton_24hr_50Yr	12:10	2.92
Chicago_Edmonton_24hr_50Yr	12:15	2.88
Chicago_Edmonton_24hr_50Yr	12:20	2.85
Chicago_Edmonton_24hr_50Yr	12:25	2.82
Chicago_Edmonton_24hr_50Yr	12:30	2.78
Chicago_Edmonton_24hr_50Yr	12:35	2.75
Chicago_Edmonton_24hr_50Yr	12:40	2.72
Chicago_Edmonton_24hr_50Yr	12:45	2.69
Chicago_Edmonton_24hr_50Yr	12:50	2.67
Chicago_Edmonton_24hr_50Yr	12:55	2.64
Chicago_Edmonton_24hr_50Yr	13:00	2.61
Chicago_Edmonton_24hr_50Yr	13:05	2.58
Chicago_Edmonton_24hr_50Yr	13:10	2.56
Chicago_Edmonton_24hr_50Yr	13:15	2.53
Chicago_Edmonton_24hr_50Yr	13:20	2.51
Chicago_Edmonton_24hr_50Yr	13:25	2.49
Chicago_Edmonton_24hr_50Yr	13:30	2.46
Chicago_Edmonton_24hr_50Yr	13:35	2.44
Chicago_Edmonton_24hr_50Yr	13:40	2.42
Chicago_Edmonton_24hr_50Yr	13:45	2.39
Chicago_Edmonton_24hr_50Yr	13:50	2.37
Chicago_Edmonton_24hr_50Yr	13:55	2.35
Chicago_Edmonton_24hr_50Yr	14:00	2.33
Chicago_Edmonton_24hr_50Yr	14:05	2.31
Chicago_Edmonton_24hr_50Yr	14:10	2.29
Chicago_Edmonton_24hr_50Yr	14:15	2.27
Chicago_Edmonton_24hr_50Yr	14:20	2.25
Chicago_Edmonton_24hr_50Yr	14:25	2.23
Chicago_Edmonton_24hr_50Yr	14:30	2.22
Chicago_Edmonton_24hr_50Yr	14:35	2.20
Chicago_Edmonton_24hr_50Yr	14:40	2.18
Chicago_Edmonton_24hr_50Yr	14:45	2.16
Chicago_Edmonton_24hr_50Yr	14:50	2.15
Chicago_Edmonton_24hr_50Yr	14:55	2.13
Chicago_Edmonton_24hr_50Yr	15:00	2.11
Chicago_Edmonton_24hr_50Yr	15:05	2.10

Chicago_Edmonton_24hr_50Yr	15:10	2.08
Chicago_Edmonton_24hr_50Yr	15:15	2.07
Chicago_Edmonton_24hr_50Yr	15:20	2.05
Chicago_Edmonton_24hr_50Yr	15:25	2.04
Chicago_Edmonton_24hr_50Yr	15:30	2.02
Chicago_Edmonton_24hr_50Yr	15:35	2.01
Chicago_Edmonton_24hr_50Yr	15:40	1.99
Chicago_Edmonton_24hr_50Yr	15:45	1.98
Chicago_Edmonton_24hr_50Yr	15:50	1.97
Chicago_Edmonton_24hr_50Yr	15:55	1.95
Chicago_Edmonton_24hr_50Yr	16:00	1.94
Chicago_Edmonton_24hr_50Yr	16:05	1.93
Chicago_Edmonton_24hr_50Yr	16:10	1.91
Chicago_Edmonton_24hr_50Yr	16:15	1.90
Chicago_Edmonton_24hr_50Yr	16:20	1.89
Chicago_Edmonton_24hr_50Yr	16:25	1.88
Chicago_Edmonton_24hr_50Yr	16:30	1.87
Chicago_Edmonton_24hr_50Yr	16:35	1.85
Chicago_Edmonton_24hr_50Yr	16:40	1.84
Chicago_Edmonton_24hr_50Yr	16:45	1.83
Chicago_Edmonton_24hr_50Yr	16:50	1.82
Chicago_Edmonton_24hr_50Yr	16:55	1.81
Chicago_Edmonton_24hr_50Yr	17:00	1.80
Chicago_Edmonton_24hr_50Yr	17:05	1.79
Chicago_Edmonton_24hr_50Yr	17:10	1.78
Chicago_Edmonton_24hr_50Yr	17:15	1.76
Chicago_Edmonton_24hr_50Yr	17:20	1.75
Chicago_Edmonton_24hr_50Yr	17:25	1.74
Chicago_Edmonton_24hr_50Yr	17:30	1.73
Chicago_Edmonton_24hr_50Yr	17:35	1.72
Chicago_Edmonton_24hr_50Yr	17:40	1.71
Chicago_Edmonton_24hr_50Yr	17:45	1.70
Chicago_Edmonton_24hr_50Yr	17:50	1.70
Chicago_Edmonton_24hr_50Yr	17:55	1.69
Chicago_Edmonton_24hr_50Yr	18:00	1.68
Chicago_Edmonton_24hr_50Yr	18:05	1.67
Chicago_Edmonton_24hr_50Yr	18:10	1.66
Chicago_Edmonton_24hr_50Yr	18:15	1.65
Chicago_Edmonton_24hr_50Yr	18:20	1.64
Chicago_Edmonton_24hr_50Yr	18:25	1.63
Chicago_Edmonton_24hr_50Yr	18:30	1.62
Chicago_Edmonton_24hr_50Yr	18:35	1.62
Chicago_Edmonton_24hr_50Yr	18:40	1.61
Chicago_Edmonton_24hr_50Yr	18:45	1.60
Chicago_Edmonton_24hr_50Yr	18:50	1.59
Chicago_Edmonton_24hr_50Yr	18:55	1.58
Chicago_Edmonton_24hr_50Yr	19:00	1.57
Chicago_Edmonton_24hr_50Yr	19:05	1.57
Chicago_Edmonton_24hr_50Yr	19:10	1.56
Chicago_Edmonton_24hr_50Yr	19:15	1.55
Chicago_Edmonton_24hr_50Yr	19:20	1.54
Chicago_Edmonton_24hr_50Yr	19:25	1.54
Chicago_Edmonton_24hr_50Yr	19:30	1.53
Chicago_Edmonton_24hr_50Yr	19:35	1.52
Chicago_Edmonton_24hr_50Yr	19:40	1.51
Chicago_Edmonton_24hr_50Yr	19:45	1.51
Chicago_Edmonton_24hr_50Yr	19:50	1.50
Chicago_Edmonton_24hr_50Yr	19:55	1.49
Chicago_Edmonton_24hr_50Yr	20:00	1.48
Chicago_Edmonton_24hr_50Yr	20:05	1.48
Chicago_Edmonton_24hr_50Yr	20:10	1.47
Chicago_Edmonton_24hr_50Yr	20:15	1.46
Chicago_Edmonton_24hr_50Yr	20:20	1.46
Chicago_Edmonton_24hr_50Yr	20:25	1.45
Chicago_Edmonton_24hr_50Yr	20:30	1.45
Chicago_Edmonton_24hr_50Yr	20:35	1.44
Chicago_Edmonton_24hr_50Yr	20:40	1.43
Chicago_Edmonton_24hr_50Yr	20:45	1.43
Chicago_Edmonton_24hr_50Yr	20:50	1.42

Chicago_Edmonton_24hr_50Yr	20:55	1.41
Chicago_Edmonton_24hr_50Yr	21:00	1.41
Chicago_Edmonton_24hr_50Yr	21:05	1.40
Chicago_Edmonton_24hr_50Yr	21:10	1.40
Chicago_Edmonton_24hr_50Yr	21:15	1.39
Chicago_Edmonton_24hr_50Yr	21:20	1.38
Chicago_Edmonton_24hr_50Yr	21:25	1.38
Chicago_Edmonton_24hr_50Yr	21:30	1.37
Chicago_Edmonton_24hr_50Yr	21:35	1.37
Chicago_Edmonton_24hr_50Yr	21:40	1.36
Chicago_Edmonton_24hr_50Yr	21:45	1.36
Chicago_Edmonton_24hr_50Yr	21:50	1.35
Chicago_Edmonton_24hr_50Yr	21:55	1.35
Chicago_Edmonton_24hr_50Yr	22:00	1.34
Chicago_Edmonton_24hr_50Yr	22:05	1.33
Chicago_Edmonton_24hr_50Yr	22:10	1.33
Chicago_Edmonton_24hr_50Yr	22:15	1.32
Chicago_Edmonton_24hr_50Yr	22:20	1.32
Chicago_Edmonton_24hr_50Yr	22:25	1.31
Chicago_Edmonton_24hr_50Yr	22:30	1.31
Chicago_Edmonton_24hr_50Yr	22:35	1.30
Chicago_Edmonton_24hr_50Yr	22:40	1.30
Chicago_Edmonton_24hr_50Yr	22:45	1.29
Chicago_Edmonton_24hr_50Yr	22:50	1.29
Chicago_Edmonton_24hr_50Yr	22:55	1.28
Chicago_Edmonton_24hr_50Yr	23:00	1.28
Chicago_Edmonton_24hr_50Yr	23:05	1.27
Chicago_Edmonton_24hr_50Yr	23:10	1.27
Chicago_Edmonton_24hr_50Yr	23:15	1.26
Chicago_Edmonton_24hr_50Yr	23:20	1.26
Chicago_Edmonton_24hr_50Yr	23:25	1.26
Chicago_Edmonton_24hr_50Yr	23:30	1.25
Chicago_Edmonton_24hr_50Yr	23:35	1.25
Chicago_Edmonton_24hr_50Yr	23:40	1.24
Chicago_Edmonton_24hr_50Yr	23:45	1.24
Chicago_Edmonton_24hr_50Yr	23:50	1.23
Chicago_Edmonton_24hr_50Yr	23:55	1.23
Chicago_Edmonton_24hr_50Yr	24:00	1.22

;Total = 61.9 mm,unit mm/hr

Chicago_Edmonton_24hr_5Yr	0:00	0.76
Chicago_Edmonton_24hr_5Yr	0:05	0.76
Chicago_Edmonton_24hr_5Yr	0:10	0.76
Chicago_Edmonton_24hr_5Yr	0:15	0.77
Chicago_Edmonton_24hr_5Yr	0:20	0.77
Chicago_Edmonton_24hr_5Yr	0:25	0.78
Chicago_Edmonton_24hr_5Yr	0:30	0.79
Chicago_Edmonton_24hr_5Yr	0:35	0.80
Chicago_Edmonton_24hr_5Yr	0:40	0.80
Chicago_Edmonton_24hr_5Yr	0:45	0.81
Chicago_Edmonton_24hr_5Yr	0:50	0.82
Chicago_Edmonton_24hr_5Yr	0:55	0.83
Chicago_Edmonton_24hr_5Yr	1:00	0.83
Chicago_Edmonton_24hr_5Yr	1:05	0.84
Chicago_Edmonton_24hr_5Yr	1:10	0.85
Chicago_Edmonton_24hr_5Yr	1:15	0.86
Chicago_Edmonton_24hr_5Yr	1:20	0.87
Chicago_Edmonton_24hr_5Yr	1:25	0.88
Chicago_Edmonton_24hr_5Yr	1:30	0.89
Chicago_Edmonton_24hr_5Yr	1:35	0.90
Chicago_Edmonton_24hr_5Yr	1:40	0.91
Chicago_Edmonton_24hr_5Yr	1:45	0.92
Chicago_Edmonton_24hr_5Yr	1:50	0.93
Chicago_Edmonton_24hr_5Yr	1:55	0.94
Chicago_Edmonton_24hr_5Yr	2:00	0.95
Chicago_Edmonton_24hr_5Yr	2:05	0.96
Chicago_Edmonton_24hr_5Yr	2:10	0.97
Chicago_Edmonton_24hr_5Yr	2:15	0.98
Chicago_Edmonton_24hr_5Yr	2:20	0.99

Chicago_Edmonton_24hr_5Yr	2:25	1.01
Chicago_Edmonton_24hr_5Yr	2:30	1.02
Chicago_Edmonton_24hr_5Yr	2:35	1.03
Chicago_Edmonton_24hr_5Yr	2:40	1.05
Chicago_Edmonton_24hr_5Yr	2:45	1.06
Chicago_Edmonton_24hr_5Yr	2:50	1.07
Chicago_Edmonton_24hr_5Yr	2:55	1.09
Chicago_Edmonton_24hr_5Yr	3:00	1.11
Chicago_Edmonton_24hr_5Yr	3:05	1.12
Chicago_Edmonton_24hr_5Yr	3:10	1.14
Chicago_Edmonton_24hr_5Yr	3:15	1.16
Chicago_Edmonton_24hr_5Yr	3:20	1.17
Chicago_Edmonton_24hr_5Yr	3:25	1.19
Chicago_Edmonton_24hr_5Yr	3:30	1.21
Chicago_Edmonton_24hr_5Yr	3:35	1.23
Chicago_Edmonton_24hr_5Yr	3:40	1.25
Chicago_Edmonton_24hr_5Yr	3:45	1.27
Chicago_Edmonton_24hr_5Yr	3:50	1.30
Chicago_Edmonton_24hr_5Yr	3:55	1.32
Chicago_Edmonton_24hr_5Yr	4:00	1.35
Chicago_Edmonton_24hr_5Yr	4:05	1.37
Chicago_Edmonton_24hr_5Yr	4:10	1.40
Chicago_Edmonton_24hr_5Yr	4:15	1.43
Chicago_Edmonton_24hr_5Yr	4:20	1.46
Chicago_Edmonton_24hr_5Yr	4:25	1.49
Chicago_Edmonton_24hr_5Yr	4:30	1.52
Chicago_Edmonton_24hr_5Yr	4:35	1.56
Chicago_Edmonton_24hr_5Yr	4:40	1.60
Chicago_Edmonton_24hr_5Yr	4:45	1.64
Chicago_Edmonton_24hr_5Yr	4:50	1.68
Chicago_Edmonton_24hr_5Yr	4:55	1.72
Chicago_Edmonton_24hr_5Yr	5:00	1.77
Chicago_Edmonton_24hr_5Yr	5:05	1.82
Chicago_Edmonton_24hr_5Yr	5:10	1.88
Chicago_Edmonton_24hr_5Yr	5:15	1.94
Chicago_Edmonton_24hr_5Yr	5:20	2.00
Chicago_Edmonton_24hr_5Yr	5:25	2.07
Chicago_Edmonton_24hr_5Yr	5:30	2.14
Chicago_Edmonton_24hr_5Yr	5:35	2.23
Chicago_Edmonton_24hr_5Yr	5:40	2.32
Chicago_Edmonton_24hr_5Yr	5:45	2.41
Chicago_Edmonton_24hr_5Yr	5:50	2.52
Chicago_Edmonton_24hr_5Yr	5:55	2.65
Chicago_Edmonton_24hr_5Yr	6:00	2.78
Chicago_Edmonton_24hr_5Yr	6:05	2.94
Chicago_Edmonton_24hr_5Yr	6:10	3.12
Chicago_Edmonton_24hr_5Yr	6:15	3.33
Chicago_Edmonton_24hr_5Yr	6:20	3.57
Chicago_Edmonton_24hr_5Yr	6:25	3.87
Chicago_Edmonton_24hr_5Yr	6:30	4.23
Chicago_Edmonton_24hr_5Yr	6:35	4.68
Chicago_Edmonton_24hr_5Yr	6:40	5.26
Chicago_Edmonton_24hr_5Yr	6:45	6.06
Chicago_Edmonton_24hr_5Yr	6:50	7.24
Chicago_Edmonton_24hr_5Yr	6:55	9.17
Chicago_Edmonton_24hr_5Yr	7:00	13.09
Chicago_Edmonton_24hr_5Yr	7:05	27.97
Chicago_Edmonton_24hr_5Yr	7:10	116.08
Chicago_Edmonton_24hr_5Yr	7:15	37.54
Chicago_Edmonton_24hr_5Yr	7:20	21.92
Chicago_Edmonton_24hr_5Yr	7:25	16.04
Chicago_Edmonton_24hr_5Yr	7:30	12.88
Chicago_Edmonton_24hr_5Yr	7:35	10.88
Chicago_Edmonton_24hr_5Yr	7:40	9.49
Chicago_Edmonton_24hr_5Yr	7:45	8.46
Chicago_Edmonton_24hr_5Yr	7:50	7.66
Chicago_Edmonton_24hr_5Yr	7:55	7.02
Chicago_Edmonton_24hr_5Yr	8:00	6.49
Chicago_Edmonton_24hr_5Yr	8:05	6.05

Chicago_Edmonton_24hr_5Yr	8:10	5.68
Chicago_Edmonton_24hr_5Yr	8:15	5.35
Chicago_Edmonton_24hr_5Yr	8:20	5.07
Chicago_Edmonton_24hr_5Yr	8:25	4.82
Chicago_Edmonton_24hr_5Yr	8:30	4.60
Chicago_Edmonton_24hr_5Yr	8:35	4.40
Chicago_Edmonton_24hr_5Yr	8:40	4.22
Chicago_Edmonton_24hr_5Yr	8:45	4.06
Chicago_Edmonton_24hr_5Yr	8:50	3.91
Chicago_Edmonton_24hr_5Yr	8:55	3.77
Chicago_Edmonton_24hr_5Yr	9:00	3.62
Chicago_Edmonton_24hr_5Yr	9:05	3.53
Chicago_Edmonton_24hr_5Yr	9:10	3.43
Chicago_Edmonton_24hr_5Yr	9:15	3.33
Chicago_Edmonton_24hr_5Yr	9:20	3.24
Chicago_Edmonton_24hr_5Yr	9:25	3.15
Chicago_Edmonton_24hr_5Yr	9:30	3.07
Chicago_Edmonton_24hr_5Yr	9:35	2.99
Chicago_Edmonton_24hr_5Yr	9:40	2.92
Chicago_Edmonton_24hr_5Yr	9:45	2.85
Chicago_Edmonton_24hr_5Yr	9:50	2.78
Chicago_Edmonton_24hr_5Yr	9:55	2.72
Chicago_Edmonton_24hr_5Yr	10:00	2.66
Chicago_Edmonton_24hr_5Yr	10:05	2.61
Chicago_Edmonton_24hr_5Yr	10:10	2.56
Chicago_Edmonton_24hr_5Yr	10:15	2.51
Chicago_Edmonton_24hr_5Yr	10:20	2.46
Chicago_Edmonton_24hr_5Yr	10:25	2.41
Chicago_Edmonton_24hr_5Yr	10:30	2.37
Chicago_Edmonton_24hr_5Yr	10:35	2.33
Chicago_Edmonton_24hr_5Yr	10:40	2.29
Chicago_Edmonton_24hr_5Yr	10:45	2.25
Chicago_Edmonton_24hr_5Yr	10:50	2.21
Chicago_Edmonton_24hr_5Yr	10:55	2.18
Chicago_Edmonton_24hr_5Yr	11:00	2.14
Chicago_Edmonton_24hr_5Yr	11:05	2.11
Chicago_Edmonton_24hr_5Yr	11:10	2.08
Chicago_Edmonton_24hr_5Yr	11:15	2.05
Chicago_Edmonton_24hr_5Yr	11:20	2.02
Chicago_Edmonton_24hr_5Yr	11:25	1.99
Chicago_Edmonton_24hr_5Yr	11:30	1.96
Chicago_Edmonton_24hr_5Yr	11:35	1.94
Chicago_Edmonton_24hr_5Yr	11:40	1.91
Chicago_Edmonton_24hr_5Yr	11:45	1.89
Chicago_Edmonton_24hr_5Yr	11:50	1.86
Chicago_Edmonton_24hr_5Yr	11:55	1.84
Chicago_Edmonton_24hr_5Yr	12:00	1.81
Chicago_Edmonton_24hr_5Yr	12:05	1.79
Chicago_Edmonton_24hr_5Yr	12:10	1.77
Chicago_Edmonton_24hr_5Yr	12:15	1.75
Chicago_Edmonton_24hr_5Yr	12:20	1.73
Chicago_Edmonton_24hr_5Yr	12:25	1.71
Chicago_Edmonton_24hr_5Yr	12:30	1.69
Chicago_Edmonton_24hr_5Yr	12:35	1.67
Chicago_Edmonton_24hr_5Yr	12:40	1.65
Chicago_Edmonton_24hr_5Yr	12:45	1.64
Chicago_Edmonton_24hr_5Yr	12:50	1.62
Chicago_Edmonton_24hr_5Yr	12:55	1.60
Chicago_Edmonton_24hr_5Yr	13:00	1.59
Chicago_Edmonton_24hr_5Yr	13:05	1.57
Chicago_Edmonton_24hr_5Yr	13:10	1.55
Chicago_Edmonton_24hr_5Yr	13:15	1.54
Chicago_Edmonton_24hr_5Yr	13:20	1.52
Chicago_Edmonton_24hr_5Yr	13:25	1.51
Chicago_Edmonton_24hr_5Yr	13:30	1.50
Chicago_Edmonton_24hr_5Yr	13:35	1.48
Chicago_Edmonton_24hr_5Yr	13:40	1.47
Chicago_Edmonton_24hr_5Yr	13:45	1.45
Chicago_Edmonton_24hr_5Yr	13:50	1.44

Chicago_Edmonton_24hr_5Yr	13:55	1.43
Chicago_Edmonton_24hr_5Yr	14:00	1.42
Chicago_Edmonton_24hr_5Yr	14:05	1.40
Chicago_Edmonton_24hr_5Yr	14:10	1.39
Chicago_Edmonton_24hr_5Yr	14:15	1.38
Chicago_Edmonton_24hr_5Yr	14:20	1.37
Chicago_Edmonton_24hr_5Yr	14:25	1.36
Chicago_Edmonton_24hr_5Yr	14:30	1.35
Chicago_Edmonton_24hr_5Yr	14:35	1.34
Chicago_Edmonton_24hr_5Yr	14:40	1.32
Chicago_Edmonton_24hr_5Yr	14:45	1.31
Chicago_Edmonton_24hr_5Yr	14:50	1.30
Chicago_Edmonton_24hr_5Yr	14:55	1.29
Chicago_Edmonton_24hr_5Yr	15:00	1.28
Chicago_Edmonton_24hr_5Yr	15:05	1.27
Chicago_Edmonton_24hr_5Yr	15:10	1.27
Chicago_Edmonton_24hr_5Yr	15:15	1.26
Chicago_Edmonton_24hr_5Yr	15:20	1.25
Chicago_Edmonton_24hr_5Yr	15:25	1.24
Chicago_Edmonton_24hr_5Yr	15:30	1.23
Chicago_Edmonton_24hr_5Yr	15:35	1.22
Chicago_Edmonton_24hr_5Yr	15:40	1.21
Chicago_Edmonton_24hr_5Yr	15:45	1.20
Chicago_Edmonton_24hr_5Yr	15:50	1.19
Chicago_Edmonton_24hr_5Yr	15:55	1.19
Chicago_Edmonton_24hr_5Yr	16:00	1.18
Chicago_Edmonton_24hr_5Yr	16:05	1.17
Chicago_Edmonton_24hr_5Yr	16:10	1.16
Chicago_Edmonton_24hr_5Yr	16:15	1.16
Chicago_Edmonton_24hr_5Yr	16:20	1.15
Chicago_Edmonton_24hr_5Yr	16:25	1.14
Chicago_Edmonton_24hr_5Yr	16:30	1.13
Chicago_Edmonton_24hr_5Yr	16:35	1.13
Chicago_Edmonton_24hr_5Yr	16:40	1.12
Chicago_Edmonton_24hr_5Yr	16:45	1.11
Chicago_Edmonton_24hr_5Yr	16:50	1.11
Chicago_Edmonton_24hr_5Yr	16:55	1.10
Chicago_Edmonton_24hr_5Yr	17:00	1.09
Chicago_Edmonton_24hr_5Yr	17:05	1.09
Chicago_Edmonton_24hr_5Yr	17:10	1.08
Chicago_Edmonton_24hr_5Yr	17:15	1.07
Chicago_Edmonton_24hr_5Yr	17:20	1.07
Chicago_Edmonton_24hr_5Yr	17:25	1.06
Chicago_Edmonton_24hr_5Yr	17:30	1.05
Chicago_Edmonton_24hr_5Yr	17:35	1.05
Chicago_Edmonton_24hr_5Yr	17:40	1.04
Chicago_Edmonton_24hr_5Yr	17:45	1.04
Chicago_Edmonton_24hr_5Yr	17:50	1.03
Chicago_Edmonton_24hr_5Yr	17:55	1.02
Chicago_Edmonton_24hr_5Yr	18:00	1.02
Chicago_Edmonton_24hr_5Yr	18:05	1.01
Chicago_Edmonton_24hr_5Yr	18:10	1.01
Chicago_Edmonton_24hr_5Yr	18:15	1.00
Chicago_Edmonton_24hr_5Yr	18:20	1.00
Chicago_Edmonton_24hr_5Yr	18:25	0.99
Chicago_Edmonton_24hr_5Yr	18:30	0.99
Chicago_Edmonton_24hr_5Yr	18:35	0.98
Chicago_Edmonton_24hr_5Yr	18:40	0.98
Chicago_Edmonton_24hr_5Yr	18:45	0.97
Chicago_Edmonton_24hr_5Yr	18:50	0.97
Chicago_Edmonton_24hr_5Yr	18:55	0.96
Chicago_Edmonton_24hr_5Yr	19:00	0.96
Chicago_Edmonton_24hr_5Yr	19:05	0.95
Chicago_Edmonton_24hr_5Yr	19:10	0.95
Chicago_Edmonton_24hr_5Yr	19:15	0.94
Chicago_Edmonton_24hr_5Yr	19:20	0.94
Chicago_Edmonton_24hr_5Yr	19:25	0.93
Chicago_Edmonton_24hr_5Yr	19:30	0.93
Chicago_Edmonton_24hr_5Yr	19:35	0.92

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Chicago_Edmonton_24hr_5Yr           19:40      0.92
Chicago_Edmonton_24hr_5Yr           19:45      0.92
Chicago_Edmonton_24hr_5Yr           19:50      0.91
Chicago_Edmonton_24hr_5Yr           19:55      0.91
Chicago_Edmonton_24hr_5Yr           20:00      0.90
Chicago_Edmonton_24hr_5Yr           20:05      0.90
Chicago_Edmonton_24hr_5Yr           20:10      0.89
Chicago_Edmonton_24hr_5Yr           20:15      0.89
Chicago_Edmonton_24hr_5Yr           20:20      0.89
Chicago_Edmonton_24hr_5Yr           20:25      0.88
Chicago_Edmonton_24hr_5Yr           20:30      0.88
Chicago_Edmonton_24hr_5Yr           20:35      0.87
Chicago_Edmonton_24hr_5Yr           20:40      0.87
Chicago_Edmonton_24hr_5Yr           20:45      0.87
Chicago_Edmonton_24hr_5Yr           20:50      0.86
Chicago_Edmonton_24hr_5Yr           20:55      0.86
Chicago_Edmonton_24hr_5Yr           21:00      0.86
Chicago_Edmonton_24hr_5Yr           21:05      0.85
Chicago_Edmonton_24hr_5Yr           21:10      0.85
Chicago_Edmonton_24hr_5Yr           21:15      0.84
Chicago_Edmonton_24hr_5Yr           21:20      0.84
Chicago_Edmonton_24hr_5Yr           21:25      0.84
Chicago_Edmonton_24hr_5Yr           21:30      0.83
Chicago_Edmonton_24hr_5Yr           21:35      0.83
Chicago_Edmonton_24hr_5Yr           21:40      0.83
Chicago_Edmonton_24hr_5Yr           21:45      0.82
Chicago_Edmonton_24hr_5Yr           21:50      0.82
Chicago_Edmonton_24hr_5Yr           21:55      0.82
Chicago_Edmonton_24hr_5Yr           22:00      0.81
Chicago_Edmonton_24hr_5Yr           22:05      0.81
Chicago_Edmonton_24hr_5Yr           22:10      0.81
Chicago_Edmonton_24hr_5Yr           22:15      0.80
Chicago_Edmonton_24hr_5Yr           22:20      0.80
Chicago_Edmonton_24hr_5Yr           22:25      0.80
Chicago_Edmonton_24hr_5Yr           22:30      0.79
Chicago_Edmonton_24hr_5Yr           22:35      0.79
Chicago_Edmonton_24hr_5Yr           22:40      0.79
Chicago_Edmonton_24hr_5Yr           22:45      0.79
Chicago_Edmonton_24hr_5Yr           22:50      0.78
Chicago_Edmonton_24hr_5Yr           22:55      0.78
Chicago_Edmonton_24hr_5Yr           23:00      0.78
Chicago_Edmonton_24hr_5Yr           23:05      0.77
Chicago_Edmonton_24hr_5Yr           23:10      0.77
Chicago_Edmonton_24hr_5Yr           23:15      0.77
Chicago_Edmonton_24hr_5Yr           23:20      0.77
Chicago_Edmonton_24hr_5Yr           23:25      0.76
Chicago_Edmonton_24hr_5Yr           23:30      0.76
Chicago_Edmonton_24hr_5Yr           23:35      0.76
Chicago_Edmonton_24hr_5Yr           23:40      0.75
Chicago_Edmonton_24hr_5Yr           23:45      0.75
Chicago_Edmonton_24hr_5Yr           23:50      0.75
Chicago_Edmonton_24hr_5Yr           23:55      0.75
Chicago_Edmonton_24hr_5Yr           24:00      0.74

;24 hr  Precipitation(IDF)+24 Hr "0"
Chicago_Edmonton_48hr 08/01/23   0:00       1.40
Chicago_Edmonton_48hr 08/01/23   0:05       1.40
Chicago_Edmonton_48hr 08/01/23   0:10       1.40
Chicago_Edmonton_48hr 08/01/23   0:15       1.41
Chicago_Edmonton_48hr 08/01/23   0:20       1.42
Chicago_Edmonton_48hr 08/01/23   0:25       1.43
Chicago_Edmonton_48hr 08/01/23   0:30       1.45
Chicago_Edmonton_48hr 08/01/23   0:35       1.46
Chicago_Edmonton_48hr 08/01/23   0:40       1.47
Chicago_Edmonton_48hr 08/01/23   0:45       1.49
Chicago_Edmonton_48hr 08/01/23   0:50       1.50
......
Too many data points (577 in total).
```

;Total=113.6 mm. unit mm/hr

Chicago-Edmonton_24hr_100yr	0:00	1.40
Chicago-Edmonton_24hr_100yr	0:05	1.39
Chicago-Edmonton_24hr_100yr	0:10	1.40
Chicago-Edmonton_24hr_100yr	0:15	1.41
Chicago-Edmonton_24hr_100yr	0:20	1.42
Chicago-Edmonton_24hr_100yr	0:25	1.43
Chicago-Edmonton_24hr_100yr	0:30	1.45
Chicago-Edmonton_24hr_100yr	0:35	1.46
Chicago-Edmonton_24hr_100yr	0:40	1.47
Chicago-Edmonton_24hr_100yr	0:45	1.49
Chicago-Edmonton_24hr_100yr	0:50	1.50
Chicago-Edmonton_24hr_100yr	0:55	1.52
Chicago-Edmonton_24hr_100yr	1:00	1.53
Chicago-Edmonton_24hr_100yr	1:05	1.55
Chicago-Edmonton_24hr_100yr	1:10	1.56
Chicago-Edmonton_24hr_100yr	1:15	1.58
Chicago-Edmonton_24hr_100yr	1:20	1.59
Chicago-Edmonton_24hr_100yr	1:25	1.61
Chicago-Edmonton_24hr_100yr	1:30	1.63
Chicago-Edmonton_24hr_100yr	1:35	1.64
Chicago-Edmonton_24hr_100yr	1:40	1.66
Chicago-Edmonton_24hr_100yr	1:45	1.68
Chicago-Edmonton_24hr_100yr	1:50	1.70
Chicago-Edmonton_24hr_100yr	1:55	1.72
Chicago-Edmonton_24hr_100yr	2:00	1.74
Chicago-Edmonton_24hr_100yr	2:05	1.76
Chicago-Edmonton_24hr_100yr	2:10	1.78
Chicago-Edmonton_24hr_100yr	2:15	1.80
Chicago-Edmonton_24hr_100yr	2:20	1.82
Chicago-Edmonton_24hr_100yr	2:25	1.85
Chicago-Edmonton_24hr_100yr	2:30	1.87
Chicago-Edmonton_24hr_100yr	2:35	1.89
Chicago-Edmonton_24hr_100yr	2:40	1.92
Chicago-Edmonton_24hr_100yr	2:45	1.95
Chicago-Edmonton_24hr_100yr	2:50	1.97
Chicago-Edmonton_24hr_100yr	2:55	2.00
Chicago-Edmonton_24hr_100yr	3:00	2.03
Chicago-Edmonton_24hr_100yr	3:05	2.06
Chicago-Edmonton_24hr_100yr	3:10	2.09
Chicago-Edmonton_24hr_100yr	3:15	2.12
Chicago-Edmonton_24hr_100yr	3:20	2.15
Chicago-Edmonton_24hr_100yr	3:25	2.19
Chicago-Edmonton_24hr_100yr	3:30	2.22
Chicago-Edmonton_24hr_100yr	3:35	2.26
Chicago-Edmonton_24hr_100yr	3:40	2.30
Chicago-Edmonton_24hr_100yr	3:45	2.34
Chicago-Edmonton_24hr_100yr	3:50	2.38
Chicago-Edmonton_24hr_100yr	3:55	2.42
Chicago-Edmonton_24hr_100yr	4:00	2.47
Chicago-Edmonton_24hr_100yr	4:05	2.52
Chicago-Edmonton_24hr_100yr	4:10	2.57
Chicago-Edmonton_24hr_100yr	4:15	2.62
Chicago-Edmonton_24hr_100yr	4:20	2.68
Chicago-Edmonton_24hr_100yr	4:25	2.74
Chicago-Edmonton_24hr_100yr	4:30	2.80
Chicago-Edmonton_24hr_100yr	4:35	2.86
Chicago-Edmonton_24hr_100yr	4:40	2.93
Chicago-Edmonton_24hr_100yr	4:45	3.00
Chicago-Edmonton_24hr_100yr	4:50	3.08
Chicago-Edmonton_24hr_100yr	4:55	3.16
Chicago-Edmonton_24hr_100yr	5:00	3.25
Chicago-Edmonton_24hr_100yr	5:05	3.35
Chicago-Edmonton_24hr_100yr	5:10	3.45
Chicago-Edmonton_24hr_100yr	5:15	3.55
Chicago-Edmonton_24hr_100yr	5:20	3.67
Chicago-Edmonton_24hr_100yr	5:25	3.80
Chicago-Edmonton_24hr_100yr	5:30	3.93
Chicago-Edmonton_24hr_100yr	5:35	4.08

Chicago-Edmonton_24hr_100yr	5:40	4.25
Chicago-Edmonton_24hr_100yr	5:45	4.43
Chicago-Edmonton_24hr_100yr	5:50	4.63
Chicago-Edmonton_24hr_100yr	5:55	4.86
Chicago-Edmonton_24hr_100yr	6:00	5.11
Chicago-Edmonton_24hr_100yr	6:05	5.40
Chicago-Edmonton_24hr_100yr	6:10	5.73
Chicago-Edmonton_24hr_100yr	6:15	6.11
Chicago-Edmonton_24hr_100yr	6:20	6.56
Chicago-Edmonton_24hr_100yr	6:25	7.10
Chicago-Edmonton_24hr_100yr	6:30	7.75
Chicago-Edmonton_24hr_100yr	6:35	8.58
Chicago-Edmonton_24hr_100yr	6:40	9.66
Chicago-Edmonton_24hr_100yr	6:45	11.13
Chicago-Edmonton_24hr_100yr	6:50	13.29
Chicago-Edmonton_24hr_100yr	6:55	16.83
Chicago-Edmonton_24hr_100yr	7:00	24.02
Chicago-Edmonton_24hr_100yr	7:05	51.33
Chicago-Edmonton_24hr_100yr	7:10	213.02
Chicago-Edmonton_24hr_100yr	7:15	68.89
Chicago-Edmonton_24hr_100yr	7:20	40.22
Chicago-Edmonton_24hr_100yr	7:25	29.44
Chicago-Edmonton_24hr_100yr	7:30	23.64
Chicago-Edmonton_24hr_100yr	7:35	19.97
Chicago-Edmonton_24hr_100yr	7:40	17.42
Chicago-Edmonton_24hr_100yr	7:45	15.52
Chicago-Edmonton_24hr_100yr	7:50	14.05
Chicago-Edmonton_24hr_100yr	7:55	12.88
Chicago-Edmonton_24hr_100yr	8:00	11.92
Chicago-Edmonton_24hr_100yr	8:05	11.11
Chicago-Edmonton_24hr_100yr	8:10	10.42
Chicago-Edmonton_24hr_100yr	8:15	9.83
Chicago-Edmonton_24hr_100yr	8:20	9.31
Chicago-Edmonton_24hr_100yr	8:25	8.85
Chicago-Edmonton_24hr_100yr	8:30	8.44
Chicago-Edmonton_24hr_100yr	8:35	8.08
Chicago-Edmonton_24hr_100yr	8:40	7.75
Chicago-Edmonton_24hr_100yr	8:45	7.45
Chicago-Edmonton_24hr_100yr	8:50	7.18
Chicago-Edmonton_24hr_100yr	8:55	6.93
Chicago-Edmonton_24hr_100yr	9:00	6.64
Chicago-Edmonton_24hr_100yr	9:05	6.49
Chicago-Edmonton_24hr_100yr	9:10	6.29
Chicago-Edmonton_24hr_100yr	9:15	6.11
Chicago-Edmonton_24hr_100yr	9:20	5.95
Chicago-Edmonton_24hr_100yr	9:25	5.77
Chicago-Edmonton_24hr_100yr	9:30	5.63
Chicago-Edmonton_24hr_100yr	9:35	5.49
Chicago-Edmonton_24hr_100yr	9:40	5.35
Chicago-Edmonton_24hr_100yr	9:45	5.23
Chicago-Edmonton_24hr_100yr	9:50	5.11
Chicago-Edmonton_24hr_100yr	9:55	5.00
Chicago-Edmonton_24hr_100yr	10:00	4.89
Chicago-Edmonton_24hr_100yr	10:05	4.79
Chicago-Edmonton_24hr_100yr	10:10	4.69
Chicago-Edmonton_24hr_100yr	10:15	4.60
Chicago-Edmonton_24hr_100yr	10:20	4.51
Chicago-Edmonton_24hr_100yr	10:25	4.43
Chicago-Edmonton_24hr_100yr	10:30	4.35
Chicago-Edmonton_24hr_100yr	10:35	4.27
Chicago-Edmonton_24hr_100yr	10:40	4.20
Chicago-Edmonton_24hr_100yr	10:45	4.13
Chicago-Edmonton_24hr_100yr	10:50	4.06
Chicago-Edmonton_24hr_100yr	10:55	4.00
Chicago-Edmonton_24hr_100yr	11:00	3.93
Chicago-Edmonton_24hr_100yr	11:05	3.87
Chicago-Edmonton_24hr_100yr	11:10	3.81
Chicago-Edmonton_24hr_100yr	11:15	3.76
Chicago-Edmonton_24hr_100yr	11:20	3.70

Chicago-Edmonton_24hr_100yr	11:25	3.65
Chicago-Edmonton_24hr_100yr	11:30	3.60
Chicago-Edmonton_24hr_100yr	11:35	3.55
Chicago-Edmonton_24hr_100yr	11:40	3.51
Chicago-Edmonton_24hr_100yr	11:45	3.46
Chicago-Edmonton_24hr_100yr	11:50	3.42
Chicago-Edmonton_24hr_100yr	11:55	3.37
Chicago-Edmonton_24hr_100yr	12:00	3.33
Chicago-Edmonton_24hr_100yr	12:05	3.29
Chicago-Edmonton_24hr_100yr	12:10	3.25
Chicago-Edmonton_24hr_100yr	12:15	3.21
Chicago-Edmonton_24hr_100yr	12:20	3.18
Chicago-Edmonton_24hr_100yr	12:25	3.14
Chicago-Edmonton_24hr_100yr	12:30	3.10
Chicago-Edmonton_24hr_100yr	12:35	3.07
Chicago-Edmonton_24hr_100yr	12:40	3.04
Chicago-Edmonton_24hr_100yr	12:45	3.00
Chicago-Edmonton_24hr_100yr	12:50	2.97
Chicago-Edmonton_24hr_100yr	12:55	2.94
Chicago-Edmonton_24hr_100yr	13:00	2.91
Chicago-Edmonton_24hr_100yr	13:05	2.88
Chicago-Edmonton_24hr_100yr	13:10	2.85
Chicago-Edmonton_24hr_100yr	13:15	2.82
Chicago-Edmonton_24hr_100yr	13:20	2.80
Chicago-Edmonton_24hr_100yr	13:25	2.77
Chicago-Edmonton_24hr_100yr	13:30	2.74
Chicago-Edmonton_24hr_100yr	13:35	2.72
Chicago-Edmonton_24hr_100yr	13:40	2.69
Chicago-Edmonton_24hr_100yr	13:45	2.67
Chicago-Edmonton_24hr_100yr	13:50	2.65
Chicago-Edmonton_24hr_100yr	13:55	2.62
Chicago-Edmonton_24hr_100yr	14:00	2.60
Chicago-Edmonton_24hr_100yr	14:05	2.58
Chicago-Edmonton_24hr_100yr	14:10	2.55
Chicago-Edmonton_24hr_100yr	14:15	2.53
Chicago-Edmonton_24hr_100yr	14:20	2.51
Chicago-Edmonton_24hr_100yr	14:25	2.49
Chicago-Edmonton_24hr_100yr	14:30	2.47
Chicago-Edmonton_24hr_100yr	14:35	2.45
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Chicago-Edmonton_24hr_100yr	14:45	2.41
Chicago-Edmonton_24hr_100yr	14:50	2.39
Chicago-Edmonton_24hr_100yr	14:55	2.38
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Chicago-Edmonton_24hr_100yr	15:25	2.27
Chicago-Edmonton_24hr_100yr	15:30	2.26
Chicago-Edmonton_24hr_100yr	15:35	2.24
Chicago-Edmonton_24hr_100yr	15:40	2.22
Chicago-Edmonton_24hr_100yr	15:45	2.21
Chicago-Edmonton_24hr_100yr	15:50	2.19
Chicago-Edmonton_24hr_100yr	15:55	2.18
Chicago-Edmonton_24hr_100yr	16:00	2.16
Chicago-Edmonton_24hr_100yr	16:05	2.15
Chicago-Edmonton_24hr_100yr	16:10	2.13
Chicago-Edmonton_24hr_100yr	16:15	2.12
Chicago-Edmonton_24hr_100yr	16:20	2.11
Chicago-Edmonton_24hr_100yr	16:25	2.09
Chicago-Edmonton_24hr_100yr	16:30	2.08
Chicago-Edmonton_24hr_100yr	16:35	2.07
Chicago-Edmonton_24hr_100yr	16:40	2.05
Chicago-Edmonton_24hr_100yr	16:45	2.04
Chicago-Edmonton_24hr_100yr	16:50	2.03
Chicago-Edmonton_24hr_100yr	16:55	2.02
Chicago-Edmonton_24hr_100yr	17:00	2.00
Chicago-Edmonton_24hr_100yr	17:05	1.99

Chicago-Edmonton_24hr_100yr	17:10	1.98
Chicago-Edmonton_24hr_100yr	17:15	1.97
Chicago-Edmonton_24hr_100yr	17:20	1.96
Chicago-Edmonton_24hr_100yr	17:25	1.95
Chicago-Edmonton_24hr_100yr	17:30	1.93
Chicago-Edmonton_24hr_100yr	17:35	1.92
Chicago-Edmonton_24hr_100yr	17:40	1.91
Chicago-Edmonton_24hr_100yr	17:45	1.90
Chicago-Edmonton_24hr_100yr	17:50	1.89
Chicago-Edmonton_24hr_100yr	17:55	1.88
Chicago-Edmonton_24hr_100yr	18:00	1.87
Chicago-Edmonton_24hr_100yr	18:05	1.86
Chicago-Edmonton_24hr_100yr	18:10	1.85
Chicago-Edmonton_24hr_100yr	18:15	1.84
Chicago-Edmonton_24hr_100yr	18:20	1.83
Chicago-Edmonton_24hr_100yr	18:25	1.82
Chicago-Edmonton_24hr_100yr	18:30	1.81
Chicago-Edmonton_24hr_100yr	18:35	1.80
Chicago-Edmonton_24hr_100yr	18:40	1.79
Chicago-Edmonton_24hr_100yr	18:45	1.78
Chicago-Edmonton_24hr_100yr	18:50	1.77
Chicago-Edmonton_24hr_100yr	18:55	1.76
Chicago-Edmonton_24hr_100yr	19:00	1.76
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Chicago-Edmonton_24hr_100yr	19:10	1.74
Chicago-Edmonton_24hr_100yr	19:15	1.73
Chicago-Edmonton_24hr_100yr	19:20	1.72
Chicago-Edmonton_24hr_100yr	19:25	1.71
Chicago-Edmonton_24hr_100yr	19:30	1.70
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Chicago-Edmonton_24hr_100yr	20:00	1.66
Chicago-Edmonton_24hr_100yr	20:05	1.65
Chicago-Edmonton_24hr_100yr	20:10	1.64
Chicago-Edmonton_24hr_100yr	20:15	1.63
Chicago-Edmonton_24hr_100yr	20:20	1.63
Chicago-Edmonton_24hr_100yr	20:25	1.62
Chicago-Edmonton_24hr_100yr	20:30	1.61
Chicago-Edmonton_24hr_100yr	20:35	1.60
Chicago-Edmonton_24hr_100yr	20:40	1.60
Chicago-Edmonton_24hr_100yr	20:45	1.59
Chicago-Edmonton_24hr_100yr	20:50	1.58
Chicago-Edmonton_24hr_100yr	20:55	1.58
Chicago-Edmonton_24hr_100yr	21:00	1.57
Chicago-Edmonton_24hr_100yr	21:05	1.56
Chicago-Edmonton_24hr_100yr	21:10	1.56
Chicago-Edmonton_24hr_100yr	21:15	1.55
Chicago-Edmonton_24hr_100yr	21:20	1.54
Chicago-Edmonton_24hr_100yr	21:25	1.54
Chicago-Edmonton_24hr_100yr	21:30	1.53
Chicago-Edmonton_24hr_100yr	21:35	1.52
Chicago-Edmonton_24hr_100yr	21:40	1.52
Chicago-Edmonton_24hr_100yr	21:45	1.51
Chicago-Edmonton_24hr_100yr	21:50	1.51
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Chicago-Edmonton_24hr_100yr	22:25	1.46
Chicago-Edmonton_24hr_100yr	22:30	1.46
Chicago-Edmonton_24hr_100yr	22:35	1.45
Chicago-Edmonton_24hr_100yr	22:40	1.45
Chicago-Edmonton_24hr_100yr	22:45	1.44
Chicago-Edmonton_24hr_100yr	22:50	1.44

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Chicago-Edmonton_24hr_100yr            22:55      1.43
Chicago-Edmonton_24hr_100yr            23:00      1.42
Chicago-Edmonton_24hr_100yr            23:05      1.42
Chicago-Edmonton_24hr_100yr            23:10      1.42
Chicago-Edmonton_24hr_100yr            23:15      1.41
Chicago-Edmonton_24hr_100yr            23:20      1.41
Chicago-Edmonton_24hr_100yr            23:25      1.40
Chicago-Edmonton_24hr_100yr            23:30      1.40
Chicago-Edmonton_24hr_100yr            23:35      1.39
Chicago-Edmonton_24hr_100yr            23:40      1.38
Chicago-Edmonton_24hr_100yr            23:45      1.38
Chicago-Edmonton_24hr_100yr            23:50      1.37
Chicago-Edmonton_24hr_100yr            23:55      1.37
Chicago-Edmonton_24hr_100yr            24:00      1.36

[REPORT]
;;Reporting Options
INPUT      YES
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS       355007.487       5962940.02425    358637.421       5963936.64075
UNITS            Meters

[COORDINATES]
;;Node           X-Coord            Y-Coord           
;;-------------- ------------------ ------------------
ESUMP1           356836.58          5963503.679       
SENJ-1           356915.544         5963533.325       
SENJ-2           357350.005         5963531.605       
SENJ-3           358152.515         5963511.27        
SESJ-1           356866.387         5963502.537       
SESJ-2           357242.542         5963315.342       
SESJ-3           357522.77          5963304.885       
SESJ-4a          358008.743         5963289.56        
SESJ-4b          358011.035         5963289.622       
SESJ-5           358152.672         5963283.787       
SWMFOutlet-J1    358352.884         5963318.507       
SWNJ-1           355757.585         5963486.007       
SWNJ-2           356253.247         5963657.479       
SWNJ-3           356288.077         5963644.082       
SWPerimeterD-J0  355225.337         5963708.101       
SWPerimeterD-J1  355208.762         5963219.038       
SWPerimeterD-J2  355445.865         5963077.145       
SWSJ-1           355814.742         5963475.29        
SWSJ-2           356248.781         5963323.465       
SWSJ-3           356273.787         5963342.518       
Wasteway-J1      358008.756         5963295.805       
WasteWay-J2      358009.657         5963383.883       
SEPerimeterDNO1  358469.441         5963748.081       
SEPerimeterDSO1  358462.266         5962996.364       
SWMFOutlet       358434.607         5963300.011       
SWPerimeterDitchOutlet 356812.133         5963039.412       
ContingencyPond  358010.404         5963416.28        
MH-SUMP1         358405.99          5963305.441       
MH-SUMP2         358411.108         5963302.753       
SWMF             358151.627         5963367.451       
WESTPOND         356776.179         5963503.429       

[VERTICES]
;;Link           X-Coord            Y-Coord           
;;-------------- ------------------ ------------------

[POLYGONS]
```

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;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
SEBorrowPitArea  358112.019         5963513.91
SEBorrowPitArea  358103.412         5963287.815
SEBorrowPitArea  357423.454         5963312.575
SEBorrowPitArea  357240.066         5963319.253
SEBorrowPitArea  357233.414         5963526.019
SEBorrowPitArea  358112.019         5963513.91
SEPerimeterDAN   356811.576         5963835.653
SEPerimeterDAN   356961.721         5963832.673
SEPerimeterDAN   357503.045         5963815.687
SEPerimeterDAN   358206.051         5963791.067
SEPerimeterDAN   358303.201         5963792.145
SEPerimeterDAN   358325.74          5963790.475
SEPerimeterDAN   358472.424         5963784.357
SEPerimeterDAN   358471.844         5963305.989
SEPerimeterDAN   358413.257         5963312.445
SEPerimeterDAN   358417.978         5963478.127
SEPerimeterDAN   358418.652         5963502.743
SEPerimeterDAN   358418.517         5963586.017
SEPerimeterDAN   358415.089         5963606.588
SEPerimeterDAN   358404.17          5963635.856
SEPerimeterDAN   358389.375         5963661.445
SEPerimeterDAN   358371.208         5963683.565
SEPerimeterDAN   358294.232         5963745.445
SEPerimeterDAN   358269.553         5963756.022
SEPerimeterDAN   358252.232         5963763.445
SEPerimeterDAN   358168.748         5963773.049
SEPerimeterDAN   357990.279         5963779.875
SEPerimeterDAN   357683.539         5963790.933
SEPerimeterDAN   357132.809         5963807.697
SEPerimeterDAN   357061.431         5963808.623
SEPerimeterDAN   356980.494         5963809.511
SEPerimeterDAN   356868.238         5963811.476
SEPerimeterDAN   356812.046         5963812.104
SEPerimeterDAN   356811.576         5963835.653
SEPerimeterDAS   357036.289         5963071.761
SEPerimeterDAS   357450.553         5963057.311
SEPerimeterDAS   358102.43          5963039.919
SEPerimeterDAS   358154.492         5963045.305
SEPerimeterDAS   358228.495         5963054.375
SEPerimeterDAS   358298.797         5963082.1
SEPerimeterDAS   358356.121         5963131.862
SEPerimeterDAS   358382.33          5963174.025
SEPerimeterDAS   358398.284         5963217.326
SEPerimeterDAS   358409.685         5963304.352
SEPerimeterDAS   358466.773         5963305.989
SEPerimeterDAS   358466.773         5963288.315
SEPerimeterDAS   358462.986         5962985.325
SEPerimeterDAS   358369.564         5962989.113
SEPerimeterDAS   358296.342         5962989.113
SEPerimeterDAS   358237.007         5962991.638
SEPerimeterDAS   358167.571         5962994.794
SEPerimeterDAS   356823.529         5963023.492
SEPerimeterDAS   356822.895         5963071.772
SEPerimeterDAS   357036.289         5963071.761
SturgeonEast-N1  357059.533         5963808.582
SturgeonEast-N1  357056.361         5963808.623
SturgeonEast-N1  357076.922         5963809.358
SturgeonEast-N1  357343.585         5963800.643
SturgeonEast-N1  357346.632         5963539.878
SturgeonEast-N1  357347.046         5963537.802
SturgeonEast-N1  357346.938         5963524.406
SturgeonEast-N1  356865.767         5963531.244
SturgeonEast-N1  356865.64          5963544.111
SturgeonEast-N1  356865.059         5963602.763
SturgeonEast-N1  356874.672         5963645.901
SturgeonEast-N1  356882.371         5963664.231
SturgeonEast-N1  356900.335         5963697.226
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SturgeonEast-N1	356913.166	5963712.99
SturgeonEast-N1	356934.796	5963736.454
SturgeonEast-N1	356961.925	5963760.65
SturgeonEast-N1	357019.526	5963793.744
SturgeonEast-N1	357035.593	5963802.686
SturgeonEast-N1	357059.533	5963808.582
SturgeonEast-N2	357346.938	5963524.406
SturgeonEast-N2	357343.585	5963800.643
SturgeonEast-N2	357761.535	5963788.525
SturgeonEast-N2	357817.051	5963785.922
SturgeonEast-N2	358096.923	5963775.858
SturgeonEast-N2	358208.591	5963771.159
SturgeonEast-N2	358247.162	5963763.445
SturgeonEast-N2	358289.162	5963745.445
SturgeonEast-N2	358333.733	5963715.445
SturgeonEast-N2	358366.138	5963683.565
SturgeonEast-N2	358384.305	5963661.445
SturgeonEast-N2	358399.1	5963635.856
SturgeonEast-N2	358410.019	5963606.588
SturgeonEast-N2	358413.447	5963586.017
SturgeonEast-N2	358413.582	5963502.743
SturgeonEast-N2	358412.908	5963478.127
SturgeonEast-N2	358408.187	5963312.445
SturgeonEast-N2	358401.733	5963326.017
SturgeonEast-N2	358394.304	5963341.446
SturgeonEast-N2	358385.27	5963365.508
SturgeonEast-N2	358360.019	5963411.731
SturgeonEast-N2	358340.166	5963438.897
SturgeonEast-N2	358327.934	5963454.187
SturgeonEast-N2	358310.351	5963472.534
SturgeonEast-N2	358277.479	5963491.646
SturgeonEast-N2	358253.78	5963503.878
SturgeonEast-N2	358230.845	5963509.229
SturgeonEast-N2	358160.514	5963516.874
SturgeonEast-N2	357346.938	5963524.406
SturgeonEast-S1	356810.225	5963480.055
SturgeonEast-S1	356810.314	5963497.583
SturgeonEast-S1	356810.5	5963534.099
SturgeonEast-S1	356806.975	5963812.104
SturgeonEast-S1	356937.836	5963810.169
SturgeonEast-S1	356975.423	5963809.511
SturgeonEast-S1	357056.361	5963808.623
SturgeonEast-S1	357035.593	5963802.686
SturgeonEast-S1	357001.419	5963783.34
SturgeonEast-S1	356961.925	5963760.65
SturgeonEast-S1	356934.796	5963736.454
SturgeonEast-S1	356905.781	5963703.917
SturgeonEast-S1	356888.669	5963675.799
SturgeonEast-S1	356879.407	5963657.174
SturgeonEast-S1	356870.145	5963625.587
SturgeonEast-S1	356865.059	5963602.763
SturgeonEast-S1	356865.767	5963531.244
SturgeonEast-S1	356946.239	5963530.1
SturgeonEast-S1	357109.907	5963527.774
SturgeonEast-S1	357172.687	5963526.882
SturgeonEast-S1	357233.414	5963526.019
SturgeonEast-S1	357240.066	5963319.253
SturgeonEast-S1	357236.532	5963066.257
SturgeonEast-S1	357197.782	5963067.841
SturgeonEast-S1	357155.981	5963068.229
SturgeonEast-S1	357093.286	5963068.951
SturgeonEast-S1	357036.289	5963071.761
SturgeonEast-S1	357002.784	5963071.763
SturgeonEast-S1	356822.895	5963071.772
SturgeonEast-S1	356810.034	5963442.633
SturgeonEast-S1	356810.225	5963480.055
;Part2: SturgeonEast-S1		
SturgeonEast-S1	357233.414	5963526.019
SturgeonEast-S1	357235.601	5963525.988

SturgeonEast-S1	357233.414	5963526.019
SturgeonEast-S1	357233.414	5963526.019
SturgeonEast-S2	357240.066	5963319.253
SturgeonEast-S2	357423.454	5963312.575
SturgeonEast-S2	357519.471	5963309.078
SturgeonEast-S2	357520.768	5963309.031
SturgeonEast-S2	357519.542	5963269.41
SturgeonEast-S2	357518.682	5963054.463
SturgeonEast-S2	357236.532	5963066.257
SturgeonEast-S2	357240.066	5963319.253
STURGEONEAST-S3	357520.768	5963309.031
STURGEONEAST-S3	358009.776	5963291.225
STURGEONEAST-S3	358007.153	5963040.641
STURGEONEAST-S3	357518.682	5963054.463
STURGEONEAST-S3	357520.768	5963309.031
STURGEONEAST-S4	358009.776	5963291.225
STURGEONEAST-S4	358402.842	5963272.023
STURGEONEAST-S4	358398.284	5963217.326
STURGEONEAST-S4	358382.33	5963174.025
STURGEONEAST-S4	358356.121	5963131.862
STURGEONEAST-S4	358298.797	5963082.1
STURGEONEAST-S4	358228.495	5963054.375
STURGEONEAST-S4	358176.077	5963047.538
STURGEONEAST-S4	358102.43	5963039.919
STURGEONEAST-S4	358007.153	5963040.641
STURGEONEAST-S4	358009.776	5963291.225
SturgeonWest-N1	355313.605	5963797.368
SturgeonWest-N1	355380.242	5963851.64
SturgeonWest-N1	355444.908	5963875.091
SturgeonWest-N1	355481.75	5963880.329
SturgeonWest-N1	355765.48	5963869.626
SturgeonWest-N1	355747.58	5963488.663
SturgeonWest-N1	355250.583	5963488.176
SturgeonWest-N1	355248.602	5963564.241
SturgeonWest-N1	355249.366	5963630.621
SturgeonWest-N1	355251.491	5963664.96
SturgeonWest-N1	355263.919	5963705.022
SturgeonWest-N1	355313.605	5963797.368
SturgeonWest-N2	355747.58	5963488.663
SturgeonWest-N2	355752.215	5963679.499
SturgeonWest-N2	355764.375	5963868.521
SturgeonWest-N2	355963.393	5963864.089
SturgeonWest-N2	356303.6	5963852.881
SturgeonWest-N2	356585.13	5963848.824
SturgeonWest-N2	356806.506	5963835.653
SturgeonWest-N2	356807.143	5963803.7
SturgeonWest-N2	356678.026	5963805.012
SturgeonWest-N2	356563.224	5963779.05
SturgeonWest-N2	356489.863	5963749.845
SturgeonWest-N2	356443.789	5963731.475
SturgeonWest-N2	356401.63	5963714.311
SturgeonWest-N2	356362.488	5963689.862
SturgeonWest-N2	356333.922	5963671.232
SturgeonWest-N2	356310.324	5963656.328
SturgeonWest-N2	356284.242	5963635.214
SturgeonWest-N2	356268.096	5963658.812
SturgeonWest-N2	356249.466	5963663.78
SturgeonWest-N2	356228.352	5963660.054
SturgeonWest-N2	356191.092	5963650.118
SturgeonWest-N2	356106.734	5963621.756
SturgeonWest-N2	355993.459	5963583.305
SturgeonWest-N2	355875.623	5963543.305
SturgeonWest-N2	355747.58	5963488.663
SturgeonWest-S1	355813.192	5963098.45
SturgeonWest-S1	355735.932	5963100.761
SturgeonWest-S1	355650.002	5963103.332
SturgeonWest-S1	355479.866	5963109.614
SturgeonWest-S1	355448.69	5963121.466
SturgeonWest-S1	355432.122	5963126.827

SturgeonWest-S1	355425.3	5963129.263
SturgeonWest-S1	355405.321	5963137.547
SturgeonWest-S1	355386.805	5963144.369
SturgeonWest-S1	355360.004	5963158.013
SturgeonWest-S1	355325.894	5963185.301
SturgeonWest-S1	355297.388	5963220.385
SturgeonWest-S1	355276.191	5963257.663
SturgeonWest-S1	355258.649	5963316.137
SturgeonWest-S1	355252.801	5963395.077
SturgeonWest-S1	355251.133	5963488.181
SturgeonWest-S1	355387.291	5963489.595
SturgeonWest-S1	355747.58	5963488.663
SturgeonWest-S1	355780.207	5963472.48
SturgeonWest-S1	355817.122	5963454.17
SturgeonWest-S1	355811.721	5963098.494
SturgeonWest-S1	355813.192	5963098.45
SturgeonWest-S2	355819.923	5963452.78
SturgeonWest-S2	356156.48	5963332.281
SturgeonWest-S2	356257.625	5963300.369
SturgeonWest-S2	356334.228	5963268.414
SturgeonWest-S2	356404.289	5963228.38
SturgeonWest-S2	356420.384	5963220.098
SturgeonWest-S2	356536.783	5963169.297
SturgeonWest-S2	356624.573	5963140.393
SturgeonWest-S2	356686.526	5963129.185
SturgeonWest-S2	356725.616	5963120.961
SturgeonWest-S2	356822.403	5963109.171
SturgeonWest-S2	356822.895	5963071.772
SturgeonWest-S2	355813.192	5963098.45
SturgeonWest-S2	355819.923	5963452.78
SWMFArea	358112.019	5963513.91
SWMFArea	358194.324	5963513.199
SWMFArea	358253.78	5963503.878
SWMFArea	358277.479	5963491.646
SWMFArea	358310.351	5963472.534
SWMFArea	358327.934	5963454.187
SWMFArea	358360.019	5963411.731
SWMFArea	358385.27	5963365.508
SWMFArea	358401.733	5963326.017
SWMFArea	358408.187	5963312.445
SWMFArea	358409.685	5963304.352
SWMFArea	358409.086	5963272.879
SWMFArea	358152.804	5963284.238
SWMFArea	358103.412	5963287.815
SWMFArea	358112.019	5963513.91
SWPerimeterDA0	355185.709	5963891.34
SWPerimeterDA0	355448.574	5963882.948
SWPerimeterDA0	355481.75	5963880.329
SWPerimeterDA0	355444.908	5963875.091
SWPerimeterDA0	355380.242	5963851.64
SWPerimeterDA0	355313.605	5963797.368
SWPerimeterDA0	355263.919	5963705.022
SWPerimeterDA0	355182.162	5963707.166
SWPerimeterDA0	355185.709	5963891.34
SWPerimeterDA1	355182.162	5963707.166
SWPerimeterDA1	355263.919	5963705.022
SWPerimeterDA1	355251.491	5963664.96
SWPerimeterDA1	355249.366	5963630.621
SWPerimeterDA1	355248.602	5963564.241
SWPerimeterDA1	355250.583	5963488.176
SWPerimeterDA1	355252.801	5963395.077
SWPerimeterDA1	355258.649	5963316.137
SWPerimeterDA1	355276.191	5963257.663
SWPerimeterDA1	355306.204	5963209.534
SWPerimeterDA1	355172.484	5963218.578
SWPerimeterDA1	355182.162	5963707.166
SWPerimeterDA2	355306.204	5963209.534
SWPerimeterDA2	355307.25	5963208.247
SWPerimeterDA2	355325.894	5963185.301

SWPerimeterDA2	355360.004	5963158.013
SWPerimeterDA2	355386.805	5963144.369
SWPerimeterDA2	355405.321	5963137.547
SWPerimeterDA2	355425.3	5963129.263
SWPerimeterDA2	355448.69	5963121.466
SWPerimeterDA2	355444.562	5963098.319
SWPerimeterDA2	355445.938	5963068.989
SWPerimeterDA2	355185.561	5963075.48
SWPerimeterDA2	355173.403	5963079.771
SWPerimeterDA2	355172.688	5963111.955
SWPerimeterDA2	355172.484	5963218.578
SWPerimeterDA2	355239.105	5963216.028
SWPerimeterDA2	355270.58	5963214.823
SWPerimeterDA2	355306.204	5963209.534
SWPerimeterDA3	355538.081	5963107.54
SWPerimeterDA3	355595.5	5963104.962
SWPerimeterDA3	356417.7	5963080.367
SWPerimeterDA3	356634.006	5963074.549
SWPerimeterDA3	356822.895	5963071.772
SWPerimeterDA3	356823.229	5963046.307
SWPerimeterDA3	356823.529	5963023.492
SWPerimeterDA3	355445.938	5963068.989
SWPerimeterDA3	355446.001	5963074.486
SWPerimeterDA3	355446.064	5963079.976
SWPerimeterDA3	355432.122	5963126.827
SWPerimeterDA3	355479.866	5963109.614
SWPerimeterDA3	355538.081	5963107.54
SW-UnDevelopment	356285.484	5963632.73
SW-UnDevelopment	356362.488	5963689.862
SW-UnDevelopment	356401.63	5963714.311
SW-UnDevelopment	356443.789	5963731.475
SW-UnDevelopment	356489.863	5963749.845
SW-UnDevelopment	356563.224	5963779.05
SW-UnDevelopment	356678.026	5963805.012
SW-UnDevelopment	356807.143	5963803.7
SW-UnDevelopment	356807.845	5963768.471
SW-UnDevelopment	356808.364	5963742.43
SW-UnDevelopment	356809.859	5963667.461
SW-UnDevelopment	356743.07	5963667.841
SW-UnDevelopment	356743.055	5963638.968
SW-UnDevelopment	356742.982	5963498.327
SW-UnDevelopment	356742.905	5963349.373
SW-UnDevelopment	356809.559	5963349.441
SW-UnDevelopment	356820.369	5963260.329
SW-UnDevelopment	356820.72	5963237.281
SW-UnDevelopment	356821.182	5963202.153
SW-UnDevelopment	356821.691	5963163.417
SW-UnDevelopment	356822.403	5963109.171
SW-UnDevelopment	356725.616	5963120.961
SW-UnDevelopment	356686.526	5963129.185
SW-UnDevelopment	356624.573	5963140.393
SW-UnDevelopment	356536.783	5963169.297
SW-UnDevelopment	356420.384	5963220.098
SW-UnDevelopment	356404.289	5963228.38
SW-UnDevelopment	356361.305	5963250.498
SW-UnDevelopment	356347.615	5963259.556
SW-UnDevelopment	356334.228	5963268.414
SW-UnDevelopment	356281.424	5963291.174
SW-UnDevelopment	356257.625	5963300.369
SW-UnDevelopment	356212.191	5963316.595
SW-UnDevelopment	356156.48	5963332.281
SW-UnDevelopment	355851.848	5963436.945
SW-UnDevelopment	355747.58	5963488.663
SW-UnDevelopment	355875.623	5963543.305
SW-UnDevelopment	356146.38	5963635.214
SW-UnDevelopment	356243.256	5963665.022
SW-UnDevelopment	356268.096	5963657.57
SW-UnDevelopment	356285.484	5963632.73
WestPondArea	356809.859	5963667.461

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WestPondArea     356810.911         5963614.679
WestPondArea     356809.559         5963349.441
WestPondArea     356742.905         5963349.373
WestPondArea     356743.07          5963667.841
WestPondArea     356809.859         5963667.461

;;Storage Node   X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Chicago_Edmonton_24hr_100Yr 356445           5963470
```

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EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.3)
------------------------------------------------------------

Sturgeon West Outlet Closed Post Development-1:100yr Event
WARNING 03: negative offset ignored for Link SWMFO_C
WARNING 03: negative offset ignored for Link SWMFOutlet-C1
WARNING 02: maximum depth increased for Node ESUMP1
WARNING 02: maximum depth increased for Node SENJ-1
WARNING 02: maximum depth increased for Node SENJ-3
WARNING 02: maximum depth increased for Node SESJ-1
WARNING 02: maximum depth increased for Node SESJ-4b
WARNING 02: maximum depth increased for Node SESJ-5
WARNING 02: maximum depth increased for Node SWMFOutlet-J1
WARNING 02: maximum depth increased for Node SWNJ-2
WARNING 02: maximum depth increased for Node SWNJ-3
WARNING 02: maximum depth increased for Node SWPerimeterD-J1

*************
Element Count
*************
Number of rain gages ...... 6
Number of subcatchments ... 20
Number of nodes ........... 31
Number of links ........... 27
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                    Data       Recording
Name                 Data Source                    Type       Interval
---------------------------------------------------------------------
Chicago_Edmonton_24hr_100Yr Chicago-Edmonton_24hr_100yr    INTENSITY    5 min.
Chicago_Edmonton_24hr_10Yr Chicago_Edmonton_24hr_10Yr     INTENSITY    5 min.
Chicago_Edmonton_24hr_25Yr Chicago_Edmonton_24hr_25Yr     INTENSITY    5 min.
Chicago_Edmonton_24hr_2Yr Chicago_Edmonton_24hr_2Yr      INTENSITY    5 min.
Chicago_Edmonton_24hr_50Yr Chicago_Edmonton_24hr_50Yr     INTENSITY    5 min.
Chicago_Edmonton_24hr_5Yr Chicago_Edmonton_24hr_5Yr      INTENSITY    5 min.


********************
Subcatchment Summary
********************
Name                       Area     Width   %Imperv    %Slope Rain Gage            Outlet
-----------------------------------------------------------------------------------------------------------
SEBorrowPitArea           17.00    200.00     40.00    5.0000 Chicago_Edmonton_24hr_100Yr ContingencyPond
SEPerimeterDAN             7.50     50.00     30.00    0.4000 Chicago_Edmonton_24hr_100Yr SEPerimeterDNO1
SEPerimeterDAS            10.20     68.00     20.00    0.4000 Chicago_Edmonton_24hr_100Yr SEPerimeterDSO1
SturgeonEast-N1           12.50    403.23     40.00    0.2000 Chicago_Edmonton_24hr_100Yr SENJ-1
SturgeonEast-N2           28.00    329.41     40.00    0.2000 Chicago_Edmonton_24hr_100Yr SENJ-3
SturgeonEast-S1           24.30    347.14     40.00    0.5000 Chicago_Edmonton_24hr_100Yr SESJ-2
SturgeonEast-S2            7.10    394.44     40.00    0.5000 Chicago_Edmonton_24hr_100Yr SESJ-3
STURGEONEAST-S3           11.50    500.00     40.00    0.5000 Chicago_Edmonton_24hr_100Yr SESJ-4a
STURGEONEAST-S4            8.10    399.01     40.00    0.5000 Chicago_Edmonton_24hr_100Yr SESJ-5
SturgeonWest-N1           18.10    452.50     40.00    0.5000 Chicago_Edmonton_24hr_100Yr SWNJ-1
SturgeonWest-N2           19.40    400.00     40.00    0.4000 Chicago_Edmonton_24hr_100Yr SWNJ-2
SturgeonWest-S1           20.00    400.00     40.00    0.4000 Chicago_Edmonton_24hr_100Yr SWSJ-1
SturgeonWest-S2           17.50    397.73     40.00    0.5000 Chicago_Edmonton_24hr_100Yr SWSJ-2
SWMFArea                   3.80    304.00    100.00    5.0000 Chicago_Edmonton_24hr_100Yr SWMF
SWPerimeterDA0             2.60     80.00     30.00    0.5000 Chicago_Edmonton_24hr_100Yr SWPerimeterD-J0
SWPerimeterDA1             3.50     60.34     20.00    0.4000 Chicago_Edmonton_24hr_100Yr SWPerimeterD-J1
SWPerimeterDA2             2.60     60.47     20.00    0.8000 Chicago_Edmonton_24hr_100Yr SWPerimeterD-J2
SWPerimeterDA3             5.30     50.00     30.00    0.3000 Chicago_Edmonton_24hr_100Yr SWPerimeterDitchOutlet
SW-UnDevelopment          39.20    500.00     40.00    0.4000 Chicago_Edmonton_24hr_100Yr WESTPOND
WestPondArea               1.80    100.00    100.00    5.0000 Chicago_Edmonton_24hr_100Yr WESTPOND
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****
Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
ESUMP1	JUNCTION	636.60	2.79	100.0	
SENJ-1	JUNCTION	638.00	2.10	0.0	
SENJ-2	JUNCTION	637.49	2.10	0.0	
SENJ-3	JUNCTION	633.70	2.10	0.0	
SESJ-1	JUNCTION	637.04	2.00	0.0	
SESJ-2	JUNCTION	636.22	2.80	0.0	
SESJ-3	JUNCTION	635.25	2.00	0.0	
SESJ-4a	JUNCTION	634.10	2.00	0.0	
SESJ-4b	JUNCTION	634.10	2.20	0.0	
SESJ-5	JUNCTION	633.46	2.21	0.0	
SWMFOutlet-J1	JUNCTION	635.50	4.50	0.0	
SWNJ-1	JUNCTION	642.12	2.60	0.0	
SWNJ-2	JUNCTION	640.67	2.60	0.0	
SWNJ-3	JUNCTION	640.58	2.60	0.0	
SWPerimeterD-J0	JUNCTION	652.47	0.50	0.0	
SWPerimeterD-J1	JUNCTION	646.16	1.50	0.0	
SWPerimeterD-J2	JUNCTION	644.55	1.50	0.0	
SWSJ-1	JUNCTION	642.11	2.60	0.0	
SWSJ-2	JUNCTION	640.83	2.00	0.0	
SWSJ-3	JUNCTION	640.75	2.60	0.0	
Wasteway-J1	JUNCTION	634.55	1.50	0.0	
WasteWay-J2	JUNCTION	634.20	1.50	0.0	
SEPerimeterDNO1	OUTFALL	633.90	0.00	0.0	
SEPerimeterDSO1	OUTFALL	635.20	0.00	0.0	
SWMFOutlet	OUTFALL	632.79	1.00	0.0	
SWPerimeterDitchOutlet	OUTFALL	638.74	1.50	0.0	
ContingencyPond	STORAGE	628.00	5.20	0.0	
MH-SUMP1	STORAGE	631.00	5.00	0.0	
MH-SUMP2	STORAGE	631.00	5.00	0.0	
SWMF	STORAGE	632.00	3.70	0.0	
WESTPOND	STORAGE	637.00	2.20	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
EastCSP1	ESUMP1	SESJ-1	CONDUIT	21.0	0.2857	0.0130
SENDitch-1	SENJ-1	SENJ-2	CONDUIT	410.0	0.1244	0.0100
SENDitch-2	SENJ-2	SENJ-3	CONDUIT	820.0	0.4622	0.0250
SWMFINLETDN	SENJ-3	SWMF	CONDUIT	40.0	3.1015	0.0250
SWMFINLETDS	SESJ-5	SWMF	CONDUIT	83.7	1.3147	0.0250
SWMFO_C	SWMF	SWMFOutlet-J1	CONDUIT	240.0	-1.4585	0.0130
SWMFOutlet-C1	SWMFOutlet-J1	MH-SUMP1	CONDUIT	38.8	10.8774	0.0130
SWMFOutlet-C2	MH-SUMP2	SWMFOutlet	CONDUIT	23.7	0.9045	0.0130
SWNCulvert	SWNJ-2	SWNJ-3	CONDUIT	27.0	0.3333	0.0130
SWNDitch1	SWNJ-1	SWNJ-2	CONDUIT	482.0	0.3008	0.0250
SWNDitch2	SWNJ-3	WESTPOND	CONDUIT	579.0	0.2988	0.0250
SWPerimeterDitch0	SWPerimeterD-J0	SWPerimeterD-J1	CONDUIT	715.0	0.8826	0.0250
SWPerimeterDitch1	SWPerimeterD-J1	SWPerimeterD-J2	CONDUIT	150.0	1.0734	0.0250
SWPerimeterDitch2	SWPerimeterD-J2	SWPerimeterDitchOutlet	CONDUIT	1366.9	0.4251	0.0250
SWSCulvert	SWSJ-2	SWSJ-3	CONDUIT	27.0	0.2963	0.0130
SWSDitch1	SWSJ-1	SWSJ-2	CONDUIT	410.0	0.3122	0.0250
SWSDitch2	SWSJ-3	WESTPOND	CONDUIT	815.0	0.3571	0.0250
WasteWayDiversion-1	SESJ-4a	Wasteway-J1	CONDUIT	6.2	0.8007	0.0250
WasteWayDiversion-2	Wasteway-J1	WasteWay-J2	CONDUIT	43.8	0.7991	0.0250
WasteWayDiversion-3	WasteWay-J2	ContingencyPond	CONDUIT	10.0	10.0504	0.0350
W-ECSP	WESTPOND	ESUMP1	CONDUIT	37.0	0.2973	0.0130
W-EDitch1	SESJ-1	SESJ-2	CONDUIT	310.0	0.2645	0.0250
W-EDitch2	SESJ-2	SESJ-3	CONDUIT	280.0	0.3464	0.0250
W-EDitch3	SESJ-3	SESJ-4a	CONDUIT	480.0	0.2396	0.0250

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W-EDitch4        SESJ-4b          SESJ-5           CONDUIT          141.8    0.4444    0.0250
OR1              MH-SUMP2         MH-SUMP1         ORIFICE
RockCheckDitchBlock SESJ-4a          SESJ-4b          WEIR


*********************
Cross Section Summary
*********************
                                        Full     Full     Hyd.     Max.   No. of     Full
Conduit          Shape                 Depth     Area     Rad.    Width  Barrels     Flow
---------------------------------------------------------------------------------------
EastCSP1         CIRCULAR               1.40     1.54     0.35     1.40        1     3.14
SENDitch-1       TRAPEZOIDAL            2.10    19.74     1.08    17.80        1    73.19
SENDitch-2       TRAPEZOIDAL            2.10    19.74     1.08    17.80        1    56.44
SWMFINLETDN      TRAPEZOIDAL            2.00    20.00     1.08    18.00        1   148.47
SWMFINLETDS      TRAPEZOIDAL            1.35    11.34     0.80    13.80        1    44.92
SWMFO_C          TRAPEZOIDAL            4.50   612.00     3.55   172.00        1 13224.28
SWMFOutlet-C1    CIRCULAR               1.05     0.87     0.26     1.05        1     9.01
SWMFOutlet-C2    CIRCULAR               1.00     0.79     0.25     1.00        1     2.28
SWNCulvert       CIRCULAR               1.20     1.13     0.30     1.20        1     2.25
SWNDitch1        TRAPEZOIDAL            2.60    18.72     1.37    12.40        1    50.76
SWNDitch2        TRAPEZOIDAL            2.60    18.72     1.37    12.40        1    50.59
SWPerimeterDitch0 TRAPEZOIDAL            0.50     1.50     0.35     4.00        1     2.82
SWPerimeterDitch1 TRAPEZOIDAL            1.50     7.50     0.86     8.00        1    28.14
SWPerimeterDitch2 TRAPEZOIDAL            1.50     7.50     0.86     8.00        1    17.71
SWSCulvert       CIRCULAR               1.20     1.13     0.30     1.20        1     2.12
SWSDitch1        TRAPEZOIDAL            2.00    12.00     1.10    10.00        1    28.52
SWSDitch2        TRAPEZOIDAL            2.60    18.72     1.37    12.40        1    55.30
WasteWayDiversion-1 TRAPEZOIDAL            1.50     6.75     0.82     7.50        1    21.21
WasteWayDiversion-2 TRAPEZOIDAL            1.50     6.75     0.82     7.50        1    21.19
WasteWayDiversion-3 TRAPEZOIDAL            1.00     4.00     0.55     7.00        1    24.21
W-ECSP           CIRCULAR               1.40     1.54     0.35     1.40        1     3.21
W-EDitch1        TRAPEZOIDAL            2.00    16.00     1.09    14.00        1    34.92
W-EDitch2        TRAPEZOIDAL            1.80    11.52     0.93    11.80        1    25.85
W-EDitch3        TRAPEZOIDAL            2.00    22.00     1.25    17.00        1    49.90
W-EDitch4        TRAPEZOIDAL            2.20    25.52     1.35    18.20        1    83.11


****************
Analysis Options
****************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 08/01/2023 00:00:00
Ending Date .............. 08/03/2023 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:05:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 3.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 1
Head Tolerance ........... 0.001500 m


**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
```

```
Total Precipitation ......        29.567       113.718
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........        15.352        59.047
Surface Runoff ...........        14.149        54.418
Final Storage ............         0.126         0.484
Continuity Error (%) .....        -0.204


**************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......        14.145       141.456
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         1.160        11.601
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         4.238        42.376
Final Stored Volume ......        17.334       173.342
Continuity Error (%) .....        -0.605


*************************
Highest Continuity Errors
*************************
Node SWMF (17.35%)
Node SWSJ-3 (3.97%)
Node SENJ-3 (1.54%)
Node SESJ-5 (1.44%)


***************************
Time-Step Critical Elements
***************************
Link WasteWayDiversion-1 (41.27%)


********************************
Highest Flow Instability Indexes
********************************
All links are stable.


*********************************
Most Frequent Nonconverging Nodes
*********************************
Convergence obtained at all time steps.


*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     0.74 sec
Average Time Step           :     2.52 sec
Maximum Time Step           :     3.00 sec
% of Time in Steady State   :     0.00
Average Iterations per Step :     2.02
% of Steps Not Converging   :     0.16
Time Step Frequencies       :
    3.000 -  2.408 sec      :    67.75 %
    2.408 -  1.933 sec      :     8.51 %
    1.933 -  1.552 sec      :     6.96 %
    1.552 -  1.246 sec      :     6.19 %
    1.246 -  1.000 sec      :    10.60 %
```

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
SEBorrowPitArea	113.72	0.00	0.00	55.47	45.25	12.86	58.12	9.88	3.46	0.511
SEPerimeterDAN	113.72	0.00	0.00	73.13	33.80	6.49	40.29	3.02	0.51	0.354
SEPerimeterDAS	113.72	0.00	0.00	84.19	22.56	6.80	29.36	3.00	0.58	0.258
SturgeonEast-N1	113.72	0.00	0.00	57.29	45.18	11.01	56.19	7.02	1.92	0.494
SturgeonEast-N2	113.72	0.00	0.00	61.32	45.06	6.93	52.00	14.56	2.45	0.457
SturgeonEast-S1	113.72	0.00	0.00	58.81	45.14	9.47	54.61	13.27	3.07	0.480
SturgeonEast-S2	113.72	0.00	0.00	54.37	45.28	14.01	59.30	4.21	1.70	0.521
STURGEONEAST-S3	113.72	0.00	0.00	55.02	45.27	13.33	58.60	6.74	2.50	0.515
STURGEONEAST-S4	113.72	0.00	0.00	54.68	45.28	13.69	58.97	4.78	1.85	0.519
SturgeonWest-N1	113.72	0.00	0.00	56.76	45.21	11.55	56.76	10.27	3.07	0.499
SturgeonWest-N2	113.72	0.00	0.00	57.84	45.17	10.44	55.61	10.79	2.82	0.489
SturgeonWest-S1	113.72	0.00	0.00	57.96	45.17	10.33	55.50	11.10	2.86	0.488
SturgeonWest-S2	113.72	0.00	0.00	57.09	45.20	11.21	56.41	9.87	2.83	0.496
SWMFArea	113.72	0.00	0.00	0.00	113.19	0.00	113.19	4.30	2.08	0.995
SWPerimeterDA0	113.72	0.00	0.00	66.00	33.95	13.69	47.64	1.24	0.42	0.419
SWPerimeterDA1	113.72	0.00	0.00	79.50	22.62	11.52	34.14	1.19	0.33	0.300
SWPerimeterDA2	113.72	0.00	0.00	76.26	22.64	14.80	37.45	0.97	0.32	0.329
SWPerimeterDA3	113.72	0.00	0.00	72.29	33.82	7.34	41.16	2.18	0.40	0.362
SW-UnDevelopment	113.72	0.00	0.00	59.68	45.11	8.59	53.70	21.05	4.35	0.472
WestPondArea	113.72	0.00	0.00	0.00	113.22	0.00	113.22	2.04	0.93	0.996

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
ESUMP1	JUNCTION	0.71	1.60	638.20	0 08:22	1.59
SENJ-1	JUNCTION	0.05	0.46	638.46	0 07:16	0.43

SENJ-2	JUNCTION	0.07	0.45	637.94	0 07:28	0.44
SENJ-3	JUNCTION	0.24	0.42	634.12	1 23:58	0.42
SESJ-1	JUNCTION	0.18	0.69	637.73	0 08:24	0.69
SESJ-2	JUNCTION	0.29	0.86	637.08	0 08:17	0.86
SESJ-3	JUNCTION	0.15	0.56	635.81	0 08:18	0.56
SESJ-4a	JUNCTION	0.57	1.18	635.28	0 07:26	1.18
SESJ-4b	JUNCTION	0.07	0.13	634.23	0 07:28	0.13
SESJ-5	JUNCTION	0.41	0.66	634.12	1 23:59	0.66
SWMFOutlet-J1	JUNCTION	0.00	0.00	635.50	0 00:00	0.00
SWNJ-1	JUNCTION	0.07	0.63	642.75	0 07:19	0.63
SWNJ-2	JUNCTION	0.16	1.16	641.83	0 07:19	1.16
SWNJ-3	JUNCTION	0.13	0.87	641.45	0 07:27	0.85
SWPerimeterD-J0	JUNCTION	0.01	0.14	652.61	0 07:20	0.14
SWPerimeterD-J1	JUNCTION	0.02	0.17	646.33	0 07:24	0.17
SWPerimeterD-J2	JUNCTION	0.04	0.27	644.82	0 07:36	0.27
SWSJ-1	JUNCTION	0.07	0.62	642.73	0 07:19	0.62
SWSJ-2	JUNCTION	0.16	1.18	642.01	0 07:18	1.17
SWSJ-3	JUNCTION	0.10	0.78	641.53	0 07:27	0.77
Wasteway-J1	JUNCTION	0.14	0.68	635.23	0 07:26	0.68
WasteWay-J2	JUNCTION	0.10	0.45	634.65	0 07:26	0.45
SEPerimeterDNO1	OUTFALL	0.00	0.00	633.90	0 00:00	0.00
SEPerimeterDSO1	OUTFALL	0.00	0.00	635.20	0 00:00	0.00
SWMFOutlet	OUTFALL	0.00	0.00	632.79	0 00:00	0.00
SWPerimeterDitchOutlet	OUTFALL	0.02	0.17	638.91	0 07:36	0.17
ContingencyPond	STORAGE	3.09	3.77	631.77	2 00:00	3.77
MH-SUMP1	STORAGE	0.20	0.20	631.20	0 00:00	0.20
MH-SUMP2	STORAGE	0.20	0.20	631.20	0 00:00	0.20
SWMF	STORAGE	1.79	2.12	634.12	2 00:00	2.12
WESTPOND	STORAGE	1.25	2.13	639.13	0 08:22	2.13

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Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
ESUMP1	JUNCTION	0.000	3.386	0 08:22	0	52.8	0.021
SENJ-1	JUNCTION	1.915	1.915	0 07:15	7.02	7.02	-0.318
SENJ-2	JUNCTION	0.000	1.866	0 07:17	0	7.04	0.334
SENJ-3	JUNCTION	2.450	3.408	0 07:21	14.6	28.2	1.566
SESJ-1	JUNCTION	0.000	3.849	0 08:22	0	52.7	0.071
SESJ-2	JUNCTION	3.068	4.021	0 08:15	13.3	66	-0.032
SESJ-3	JUNCTION	1.703	4.184	0 08:14	4.21	70.2	0.024
SESJ-4a	JUNCTION	2.503	4.890	0 07:21	6.74	76.9	0.592
SESJ-4b	JUNCTION	0.000	0.460	0 07:26	0	24.3	0.009
SESJ-5	JUNCTION	1.854	2.179	0 07:15	4.77	34.4	1.456
SWMFOutlet-J1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
SWNJ-1	JUNCTION	3.070	3.070	0 07:15	10.3	10.3	-0.195
SWNJ-2	JUNCTION	2.817	5.074	0 07:17	10.8	21.1	0.134
SWNJ-3	JUNCTION	0.000	5.505	0 07:19	0	21	0.545
SWPerimeterD-J0	JUNCTION	0.416	0.416	0 07:15	1.24	1.24	-0.094
SWPerimeterD-J1	JUNCTION	0.329	0.550	0 07:18	1.19	2.43	0.020
SWPerimeterD-J2	JUNCTION	0.322	0.662	0 07:22	0.973	3.41	0.088
SWSJ-1	JUNCTION	2.857	2.857	0 07:15	11.1	11.1	-0.111
SWSJ-2	JUNCTION	2.831	4.997	0 07:17	9.87	21	0.109
SWSJ-3	JUNCTION	0.000	5.755	0 07:19	0	21	4.136
Wasteway-J1	JUNCTION	0.000	4.054	0 07:26	0	52.2	0.009
WasteWay-J2	JUNCTION	0.000	4.133	0 07:26	0	52.2	-0.009
SEPerimeterDNO1	OUTFALL	0.508	0.508	0 07:20	3.02	3.02	0.000
SEPerimeterDSO1	OUTFALL	0.581	0.581	0 07:15	2.99	2.99	0.000
SWMFOutlet	OUTFALL	0.000	0.000	0 00:00	0	0	0.000 ltr
SWPerimeterDitchOutlet	OUTFALL	0.401	0.754	0 07:31	2.18	5.59	0.000
ContingencyPond	STORAGE	3.465	5.860	0 07:23	9.88	62.1	0.011
MH-SUMP1	STORAGE	0.000	0.000	0 00:00	0	0.0002	0.000

MH-SUMP2	STORAGE	0.000	0.000	0 00:00	0	0.0002	0.000
SWMF	STORAGE	2.084	6.326	0 07:16	4.3	95.7	20.986
WESTPOND	STORAGE	5.275	10.791	0 07:26	23.1	64.1	-0.674

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
ContingencyPond	47.001	34.0	0.0	0.0	62.087	44.9	2 00:00	0.000
MH-SUMP1	0.000	3.3	0.0	0.0	0.000	3.3	0 00:00	0.000
MH-SUMP2	0.000	0.4	0.0	0.0	0.000	0.4	0 00:00	0.000
SWMF	55.830	44.3	0.0	0.0	67.140	53.3	2 00:00	0.956
WESTPOND	13.659	49.9	0.0	0.0	26.198	95.7	0 08:22	3.386

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
SEPerimeterDNO1	97.13	0.031	0.508	3.021
SEPerimeterDSO1	87.38	0.035	0.581	2.995
SWMFOutlet	0.00	0.000	0.000	0.000
SWPerimeterDitchOutlet	99.77	0.058	0.754	5.585
System	71.07	0.124	1.683	11.601

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
EastCSP1	CONDUIT	3.849	0 08:22	3.79	1.22	0.64
SENDitch-1	CONDUIT	1.866	0 07:17	1.88	0.03	0.20
SENDitch-2	CONDUIT	1.183	0 07:27	1.15	0.02	0.19
SWMFINLETDN	CONDUIT	3.381	0 07:24	1.46	0.02	0.52
SWMFINLETDS	CONDUIT	2.037	0 07:16	0.73	0.05	0.74
SWMFO_C	CONDUIT	0.000	0 00:00	0.00	0.00	0.24
SWMFOutlet-C1	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
SWMFOutlet-C2	CONDUIT	0.000	0 00:00	0.00	0.00	0.00

SWNCulvert	CONDUIT	5.505	0	07:19	6.11	2.45	0.82
SWNDitch1	CONDUIT	2.542	0	07:19	0.80	0.05	0.34
SWNDitch2	CONDUIT	3.881	0	07:27	1.54	0.08	0.28
SWPerimeterDitch0	CONDUIT	0.287	0	07:20	0.84	0.10	0.31
SWPerimeterDitch1	CONDUIT	0.474	0	07:24	1.04	0.02	0.14
SWPerimeterDitch2	CONDUIT	0.494	0	07:36	0.91	0.03	0.15
SWSCulvert	CONDUIT	5.755	0	07:19	6.76	2.71	0.79
SWSDitch1	CONDUIT	2.510	0	07:19	0.76	0.09	0.45
SWSDitch2	CONDUIT	3.849	0	07:31	1.56	0.07	0.33
WasteWayDiversion-1	CONDUIT	4.054	0	07:26	2.08	0.19	0.45
WasteWayDiversion-2	CONDUIT	4.133	0	07:26	2.78	0.20	0.38
WasteWayDiversion-3	CONDUIT	4.058	0	07:26	3.83	0.17	0.45
W-ECSP	CONDUIT	3.386	0	08:22	2.87	1.06	0.72
W-EDitch1	CONDUIT	3.387	0	08:24	1.01	0.10	0.39
W-EDitch2	CONDUIT	4.015	0	08:17	1.81	0.16	0.39
W-EDitch3	CONDUIT	4.176	0	08:18	0.63	0.08	0.43
W-EDitch4	CONDUIT	0.460	0	07:28	0.65	0.01	0.15
OR1	ORIFICE	0.000	0	00:00			0.00
RockCheckDitchBlock	WEIR	0.460	0	07:26			1.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
		---------- Fraction of Time in Flow Class ----------								
EastCSP1	1.00	0.15	0.00	0.00	0.00	0.85	0.00	0.00	0.19	0.00
SENDitch-1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.94	0.00
SENDitch-2	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.73	0.00
SWMFINLETDN	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.30	0.00
SWMFINLETDS	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.21	0.00
SWMFO_C	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SWMFOutlet-C1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SWMFOutlet-C2	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SWNCulvert	1.00	0.00	0.00	0.00	0.51	0.49	0.00	0.00	0.04	0.00
SWNDitch1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.99	0.00
SWNDitch2	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
SWPerimeterDitch0	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.96	0.00
SWPerimeterDitch1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.95	0.00
SWPerimeterDitch2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.00
SWSCulvert	1.00	0.00	0.00	0.00	0.33	0.67	0.00	0.00	0.04	0.00
SWSDitch1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
SWSDitch2	1.00	0.00	0.00	0.00	0.84	0.00	0.00	0.15	0.84	0.00
WasteWayDiversion-1	1.00	0.51	0.06	0.00	0.43	0.00	0.00	0.00	0.55	0.00
WasteWayDiversion-2	1.00	0.51	0.00	0.00	0.29	0.20	0.00	0.00	0.04	0.00
WasteWayDiversion-3	1.00	0.54	0.00	0.00	0.00	0.00	0.00	0.46	0.00	0.00
W-ECSP	1.00	0.15	0.00	0.00	0.00	0.00	0.00	0.85	0.00	0.00
W-EDitch1	1.00	0.00	0.15	0.00	0.85	0.00	0.00	0.00	0.85	0.00
W-EDitch2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
W-EDitch3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
W-EDitch4	1.00	0.03	0.04	0.00	0.93	0.00	0.00	0.00	0.74	0.00

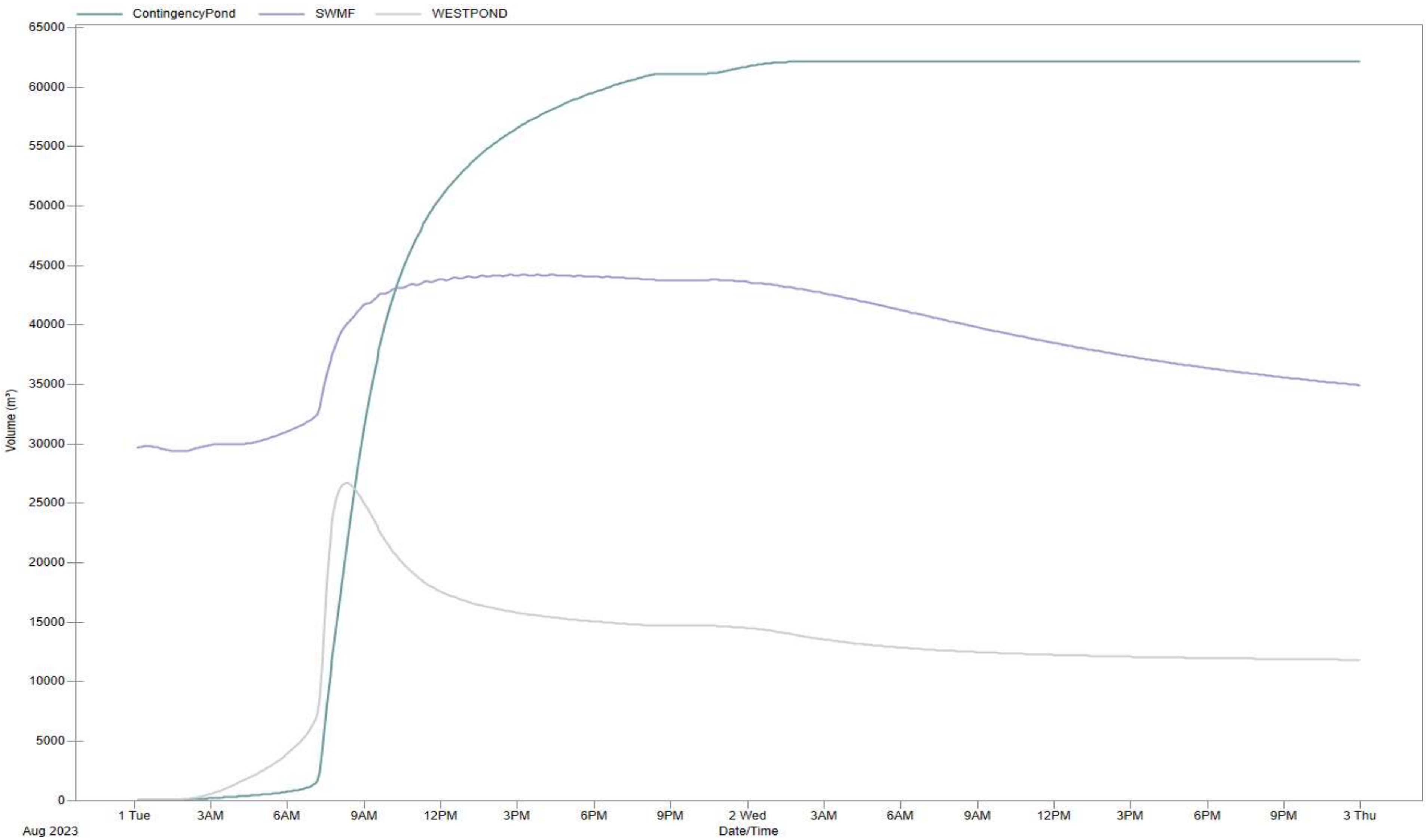
****
Conduit Surcharge Summary
****

Conduit	--------- Hours Full -------- Both Ends	Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
EastCSP1	0.01	0.01	0.01	0.58	0.01
SWMFINLETDS	0.01	0.01	35.52	0.01	0.01
SWNCulvert	0.01	0.01	0.01	0.49	0.01

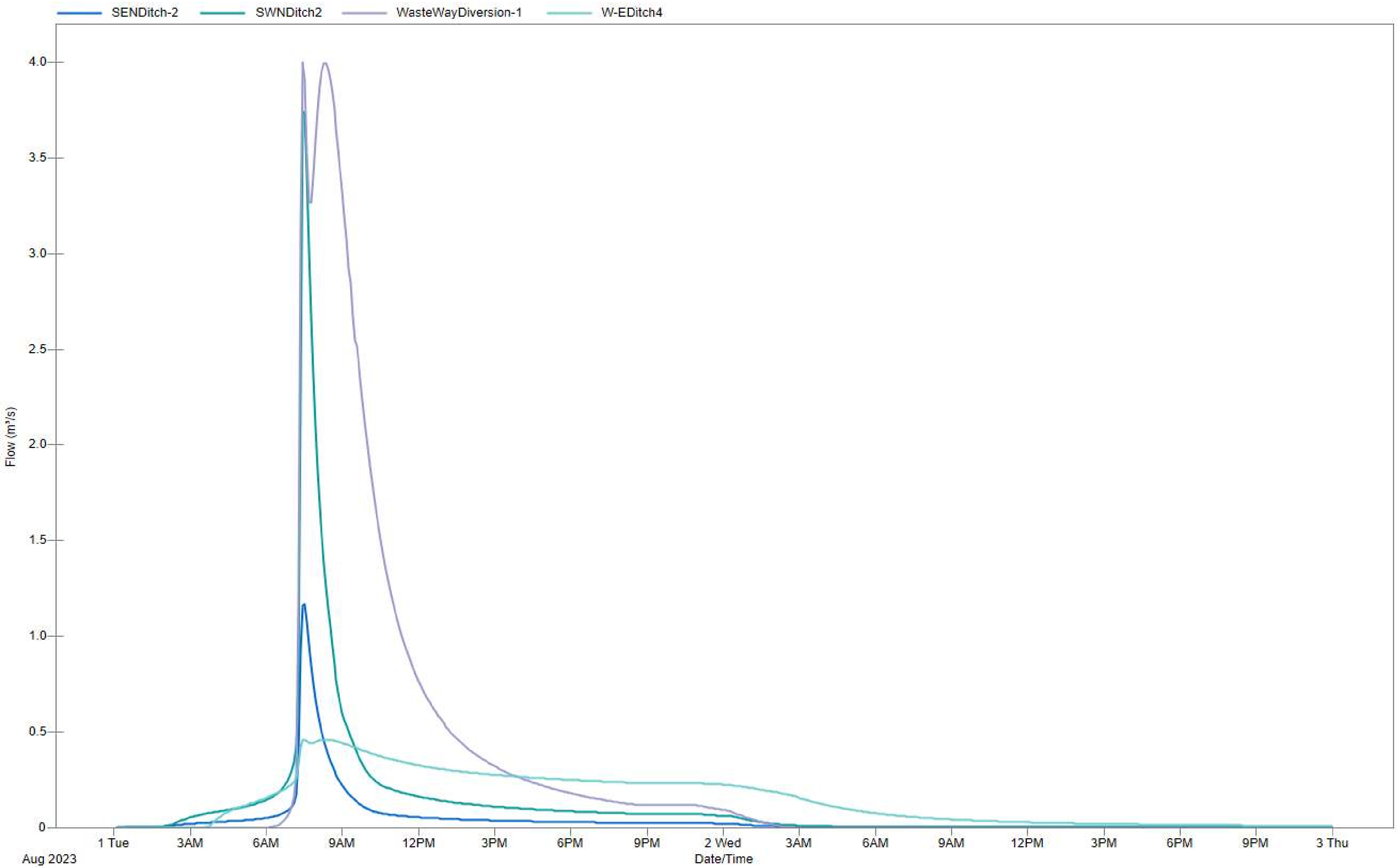
SWSCulvert	0.01	0.01	0.01	0.52	0.01
W-ECSP	0.01	0.01	0.01	0.64	0.01

Analysis begun on: Tue Apr 23 09:06:09 2024
Analysis ended on: Tue Apr 23 09:06:11 2024
Total elapsed time: 00:00:02

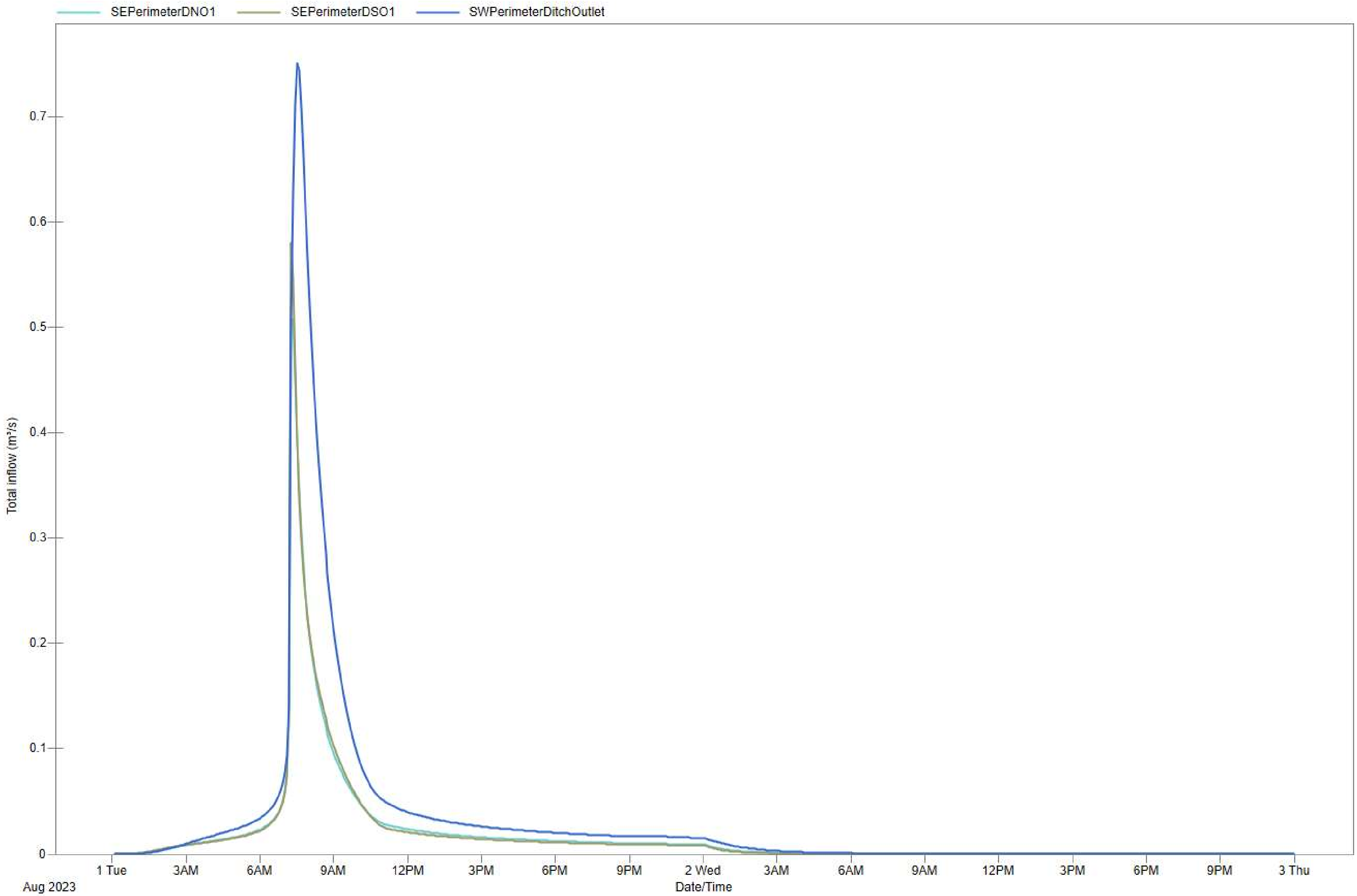
SWMF Outlet Open - Pond Volumes during a 1:100 Year Storm



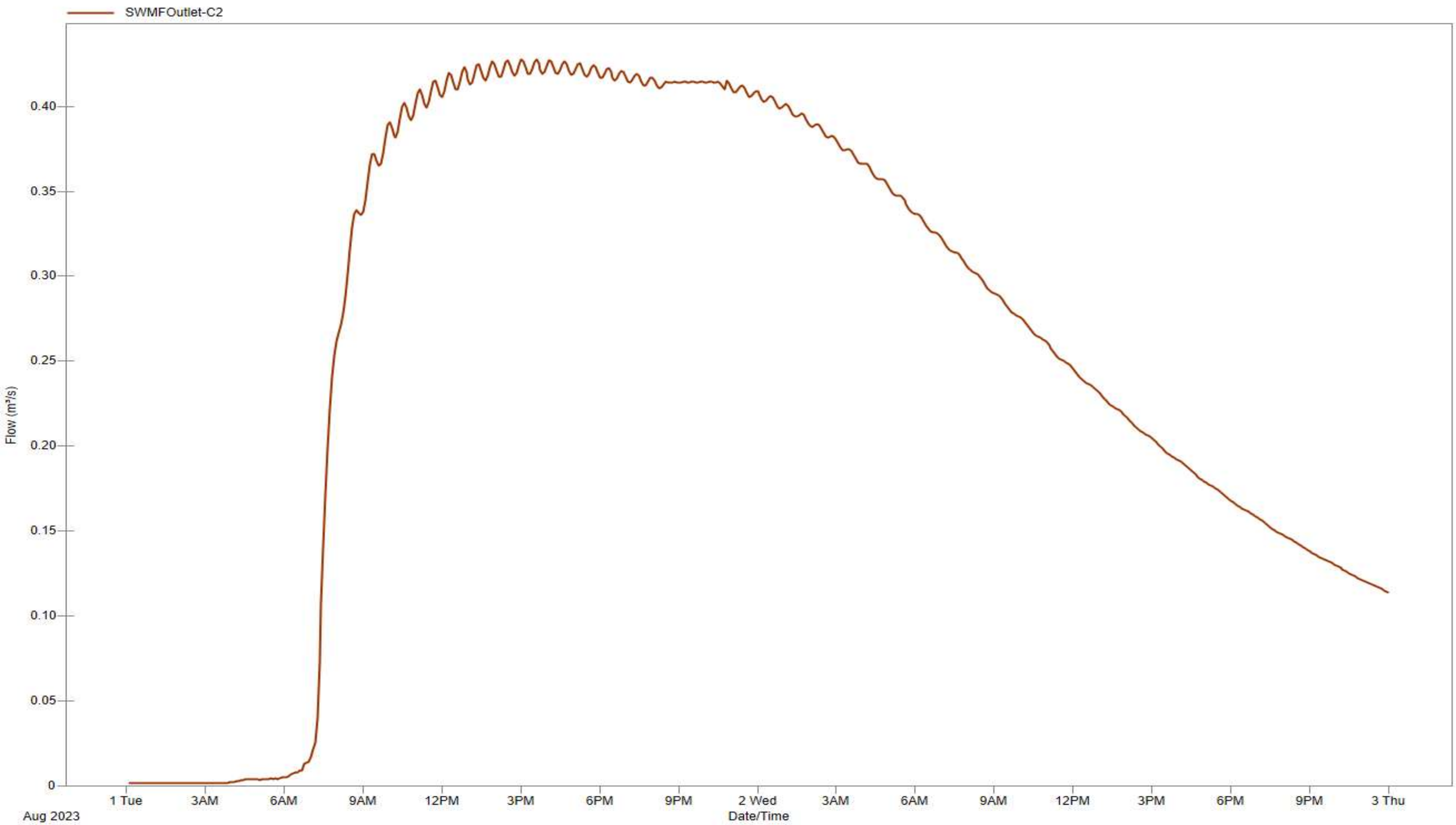
SWMF Outlet Open - Ditch Flows during a 1:100 Year Storm



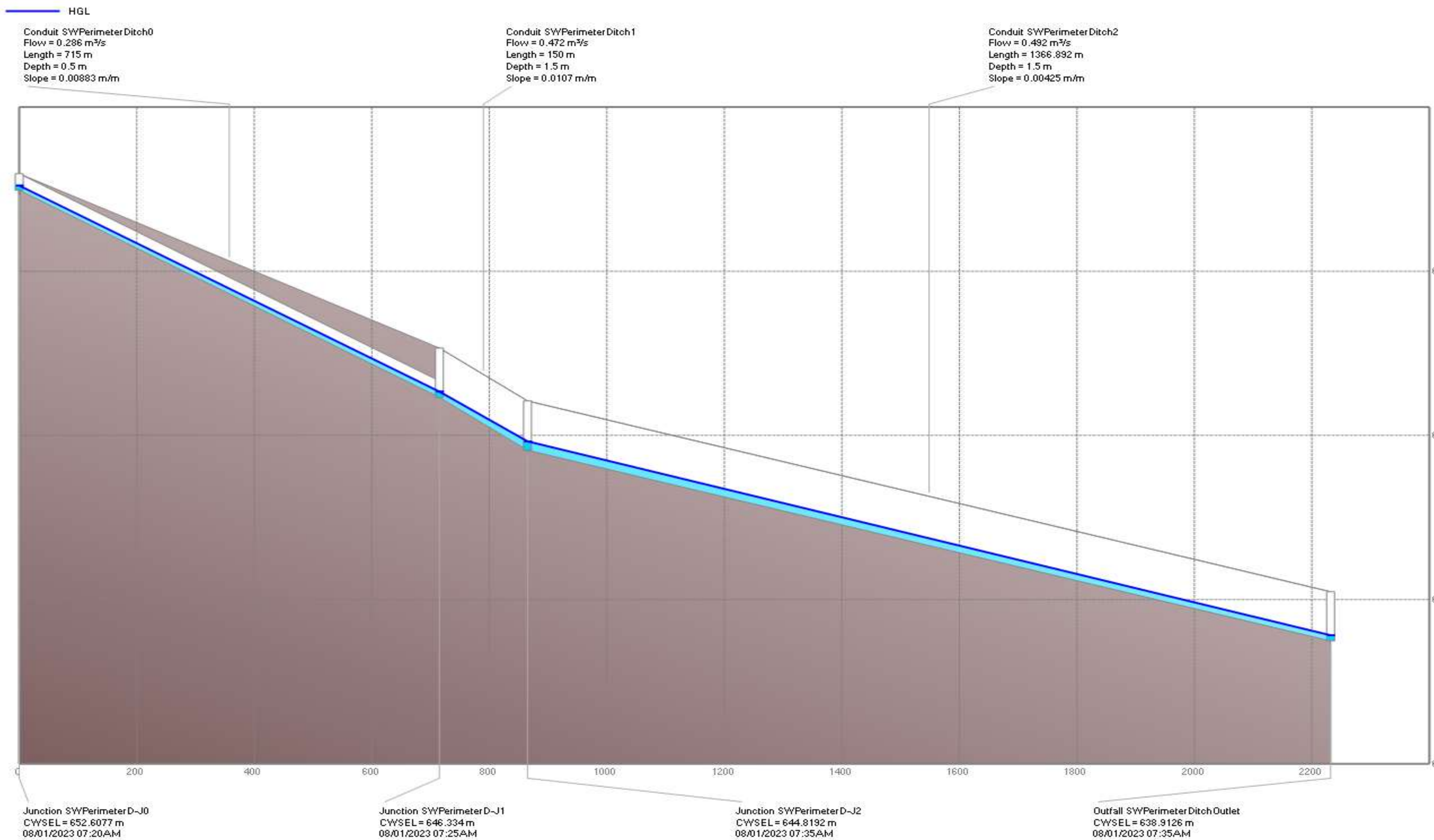
SWMF Outlet Open - Perimeter Ditch Outlet Flows during a 1:100 Year Storm



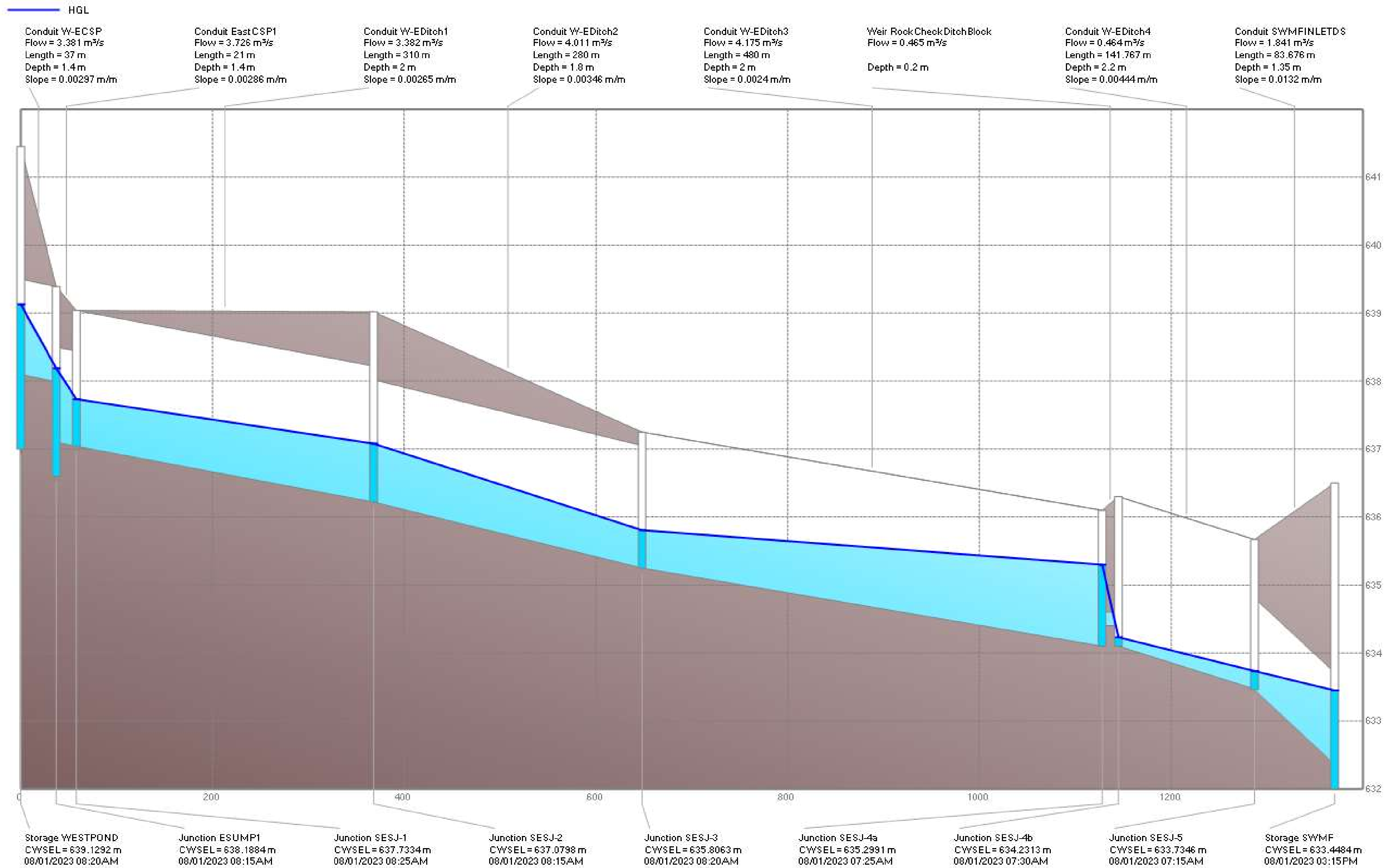
SWMF Outlet Open - SWMF Outlet Flow during a 1:100 Year Storm



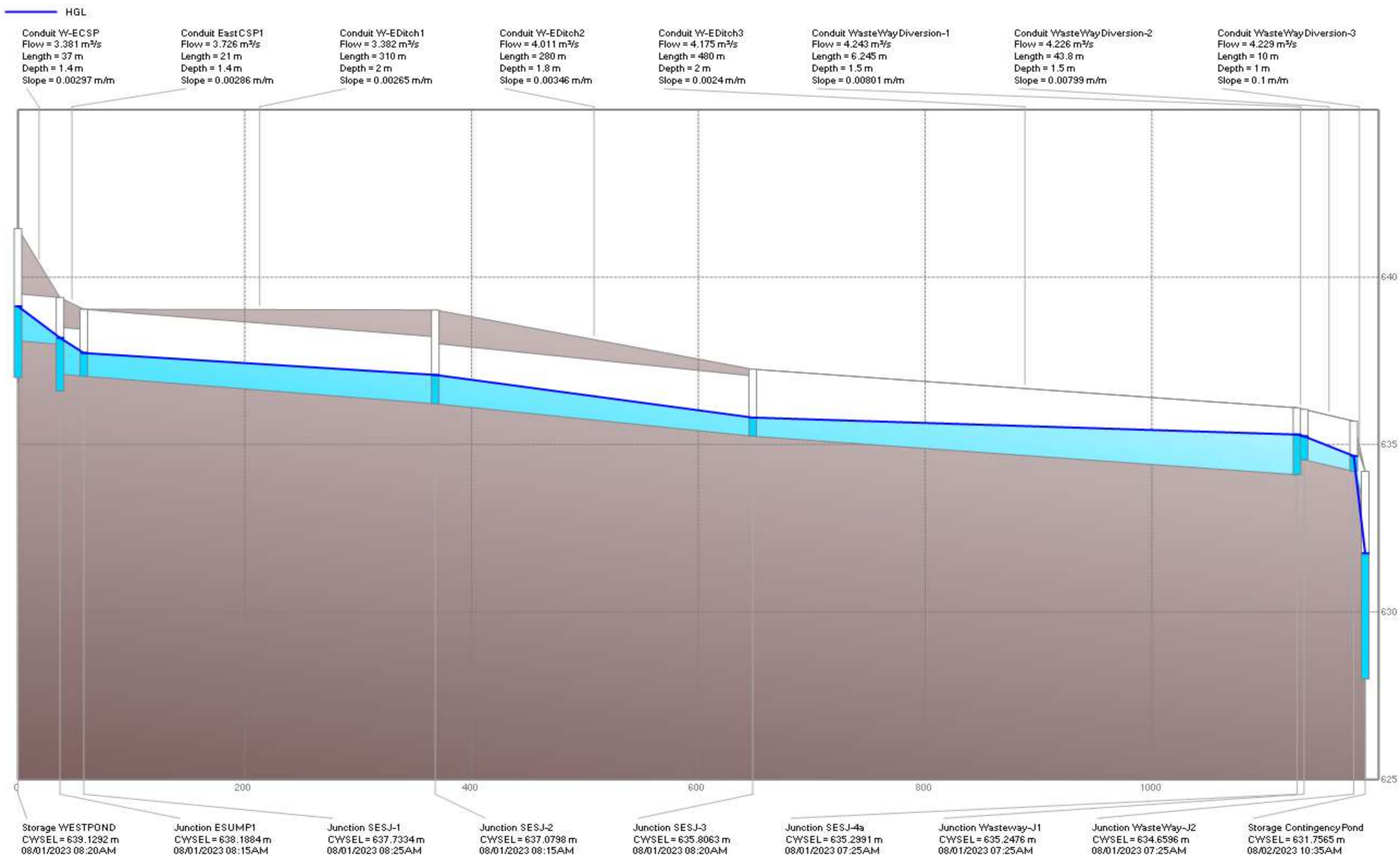
SWMF Outlet Open - 1:100 Year Water Level Profile
Sturgeon West Perimeter Ditch



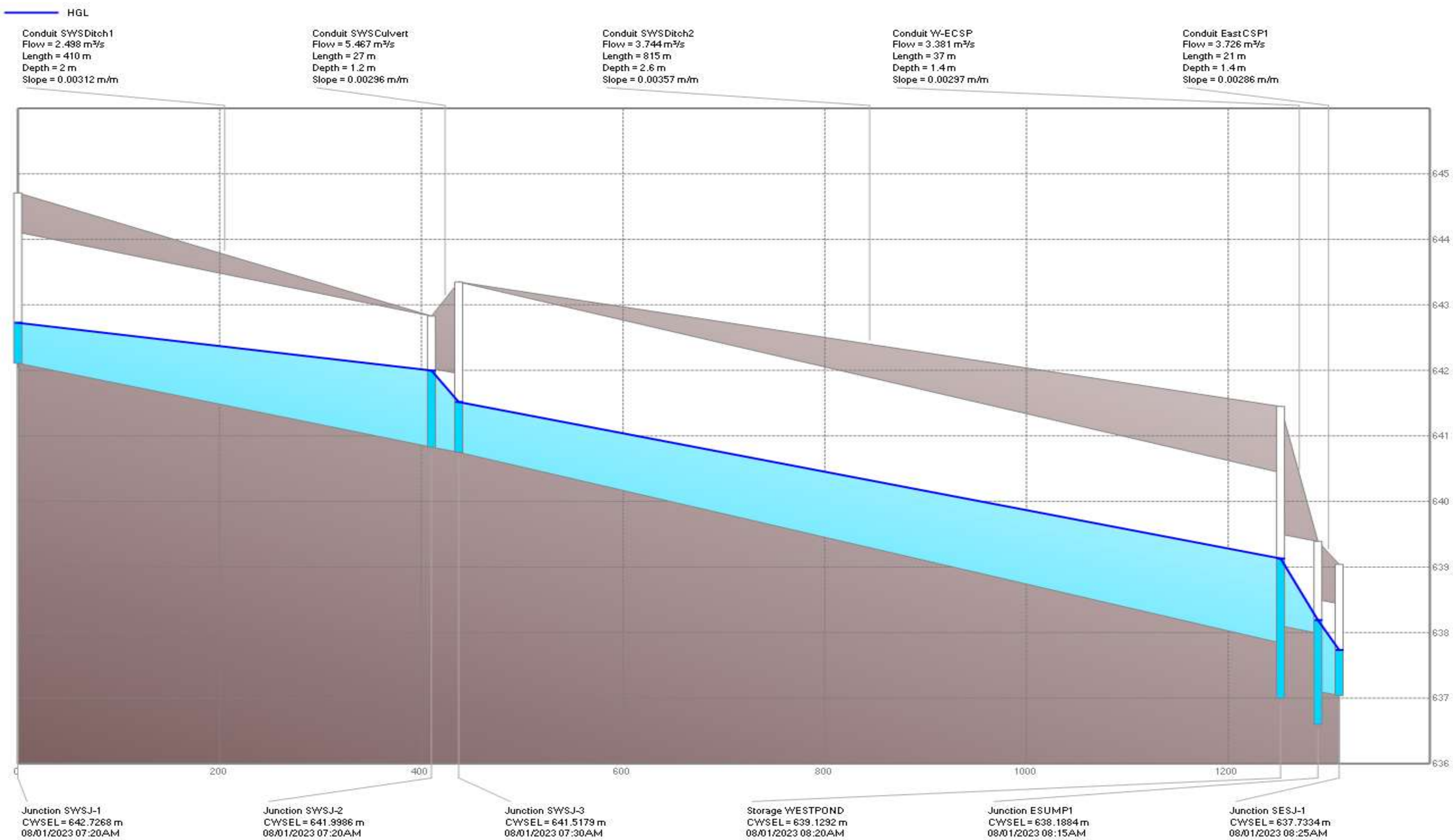
SWMF Outlet Open - 1:100 Year Water Level Profile



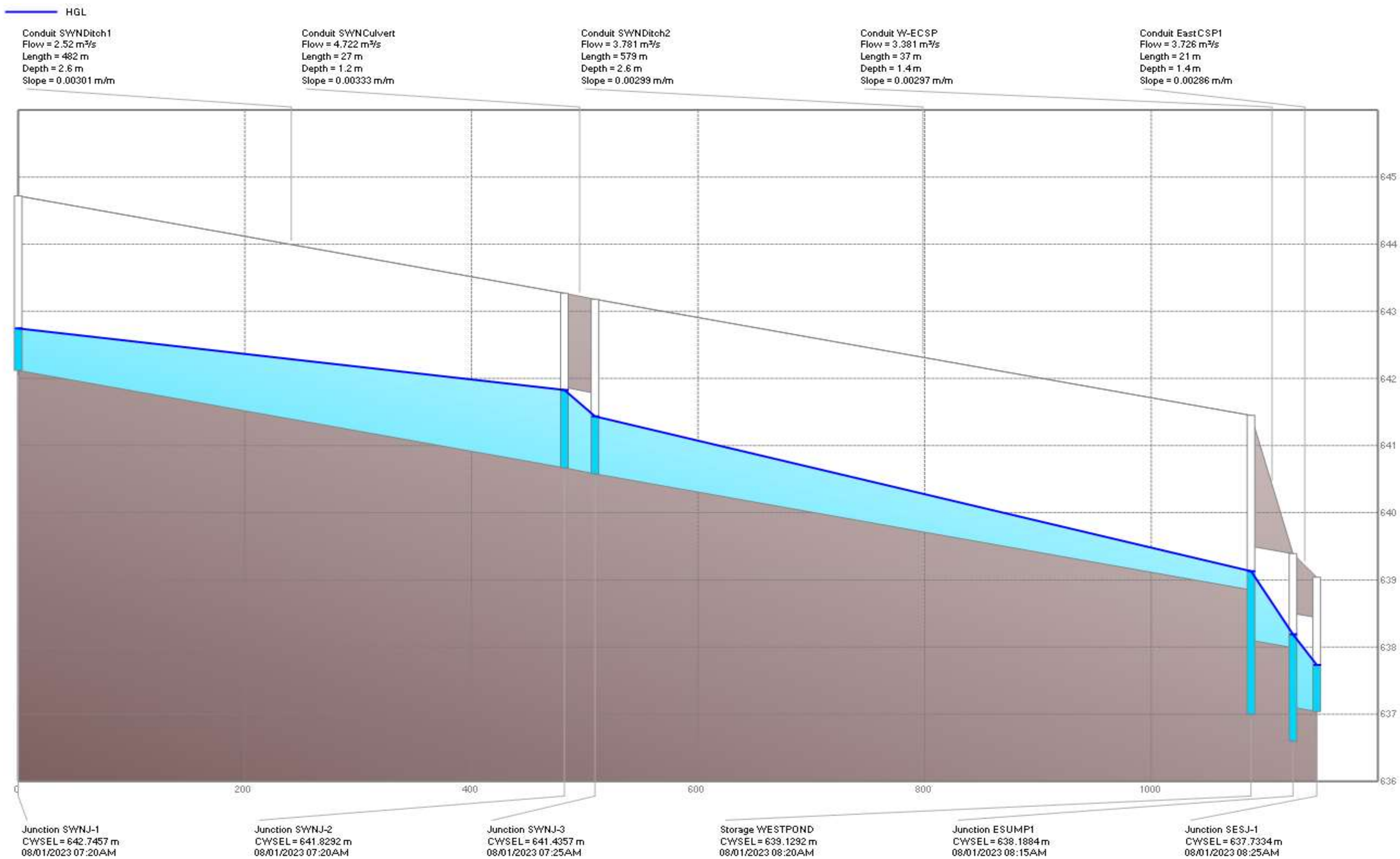
SWMF Outlet Open - 1:100 Year Water Level Profile
West Pond to Contingency Pond



SWMF Outlet Open - 1:100 Year Water Level Profile
Sturgeon West South Ditch



SWMF Outlet Open - 1:100 Year Water Level Profile
Sturgeon West North Ditch



```
[TITLE]
;;Project Title/Notes
Sturgeon West Outlet Open Post Development-1:100yr Event

[OPTIONS]
;;Option             Value
FLOW_UNITS           CMS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         DYNWAVE
LINK_OFFSETS         ELEVATION
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    YES

START_DATE           08/01/2023
START_TIME           00:00:00
REPORT_START_DATE    08/01/2023
REPORT_START_TIME    00:00:00
END_DATE             08/03/2023
END_TIME             00:00:00
SWEEP_START          05/15
SWEEP_END            06/15
DRY_DAYS             0
REPORT_STEP          00:05:00
WET_STEP             00:05:00
DRY_STEP             00:05:00
ROUTING_STEP         3
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           8
HEAD_TOLERANCE       0.0015
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         1
THREADS              8

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
CONSTANT         0.0
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- -------- -------- ----------
;mm/hr
Chicago_Edmonton_24hr_100Yr INTENSITY 0:05     1.0      TIMESERIES Chicago-Edmonton_24hr_100yr
Chicago_Edmonton_24hr_10Yr INTENSITY 0:05     1.0      TIMESERIES Chicago_Edmonton_24hr_10Yr
Chicago_Edmonton_24hr_25Yr INTENSITY 0:05     1.0      TIMESERIES Chicago_Edmonton_24hr_25Yr
Chicago_Edmonton_24hr_2Yr INTENSITY 0:05     1.0      TIMESERIES Chicago_Edmonton_24hr_2Yr
Chicago_Edmonton_24hr_50Yr INTENSITY 0:05     1.0      TIMESERIES Chicago_Edmonton_24hr_50Yr
Chicago_Edmonton_24hr_5Yr INTENSITY 0:05     1.0      TIMESERIES Chicago_Edmonton_24hr_5Yr

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
SEBorrowPitArea  Chicago_Edmonton_24hr_100Yr ContingencyPond 17 40   200      5        0
SEPerimeterDAN   Chicago_Edmonton_24hr_100Yr SEPerimeterDNO1 7.5 30  50       0.4      0
SEPerimeterDAS   Chicago_Edmonton_24hr_100Yr SEPerimeterDSO1 10.2 20 68       0.4      0
SturgeonEast-N1  Chicago_Edmonton_24hr_100Yr SENJ-1 12.5    40       403.226  0.2      0
SturgeonEast-N2  Chicago_Edmonton_24hr_100Yr SENJ-3 28      40       329.412  0.2      0
SturgeonEast-S1  Chicago_Edmonton_24hr_100Yr SESJ-2 24.3    40       347.143  0.5      0
SturgeonEast-S2  Chicago_Edmonton_24hr_100Yr SESJ-3 7.1     40       394.444  0.5      0
```

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STURGEONEAST-S3  Chicago_Edmonton_24hr_100Yr SESJ-4a 11.5   40       500      0.5      0
STURGEONEAST-S4  Chicago_Edmonton_24hr_100Yr SESJ-5 8.1     40       399.015  0.5      0
SturgeonWest-N1  Chicago_Edmonton_24hr_100Yr SWNJ-1 18.1    40       452.5    0.5      0
;Sturgeon West North Yard
SturgeonWest-N2  Chicago_Edmonton_24hr_100Yr SWNJ-2 19.4    40       400      0.4      0
SturgeonWest-S1  Chicago_Edmonton_24hr_100Yr SWSJ-1 20      40       400      0.4      0
SturgeonWest-S2  Chicago_Edmonton_24hr_100Yr SWSJ-2 17.5    40       397.727  0.5      0
SWMFArea         Chicago_Edmonton_24hr_100Yr SWMF  3.8      100      304      5        0
SWPerimeterDA0   Chicago_Edmonton_24hr_100Yr SWPerimeterD-J0 2.6 30  80       0.5      0
SWPerimeterDA1   Chicago_Edmonton_24hr_100Yr SWPerimeterD-J1 3.5 20  60.345   0.4      0
SWPerimeterDA2   Chicago_Edmonton_24hr_100Yr SWPerimeterD-J2 2.6 20  60.465   0.8      0
SWPerimeterDA3   Chicago_Edmonton_24hr_100Yr SWPerimeterDitchOutlet 5.3 30 50 0.3      0
SW-UnDevelopment Chicago_Edmonton_24hr_100Yr WESTPOND 39.2  40       500      0.4      0
WestPondArea     Chicago_Edmonton_24hr_100Yr WESTPOND 1.8   100      100      5        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
SEBorrowPitArea  0.015      0.1        1.6        3.2        25         OUTLET
SEPerimeterDAN   0.015      0.1        1.6        3.2        25         OUTLET
SEPerimeterDAS   0.015      0.1        1.6        3.2        25         OUTLET
SturgeonEast-N1  0.015      0.1        1.6        3.2        25         OUTLET
SturgeonEast-N2  0.015      0.1        1.6        3.2        25         OUTLET
SturgeonEast-S1  0.015      0.1        1.6        3.2        25         OUTLET
SturgeonEast-S2  0.015      0.1        1.6        3.2        25         OUTLET
STURGEONEAST-S3  0.015      0.1        1.6        3.2        25         OUTLET
STURGEONEAST-S4  0.015      0.1        1.6        3.2        25         OUTLET
SturgeonWest-N1  0.015      0.1        1.6        3.2        25         OUTLET
SturgeonWest-N2  0.015      0.1        1.6        3.2        25         OUTLET
SturgeonWest-S1  0.015      0.1        1.6        3.2        25         OUTLET
SturgeonWest-S2  0.015      0.1        1.6        3.2        25         OUTLET
SWMFArea         0.015      0.1        1.6        3.2        25         OUTLET
SWPerimeterDA0   0.015      0.1        1.6        3.2        25         OUTLET
SWPerimeterDA1   0.015      0.1        1.6        3.2        25         OUTLET
SWPerimeterDA2   0.015      0.1        1.6        3.2        25         OUTLET
SWPerimeterDA3   0.015      0.1        1.6        3.2        25         OUTLET
SW-UnDevelopment 0.015      0.1        1.6        3.2        25         OUTLET
WestPondArea     0.015      0.1        1.6        3.2        25         OUTLET

[INFILTRATION]
;;Subcatchment   Param1     Param2     Param3     Param4     Param5
;;-------------- ---------- ---------- ---------- ---------- ----------
SEBorrowPitArea  89         12.7       0.25       0          0
SEPerimeterDAN   89         12.7       0.25       0          0
SEPerimeterDAS   89         12.7       0.25       0          0
SturgeonEast-N1  89         12.5       0.25       0          0
SturgeonEast-N2  89         12.7       0.25       0          0
SturgeonEast-S1  89         12.7       0.25       0          0
SturgeonEast-S2  89         12.7       0.25       0          0
STURGEONEAST-S3  89         12.7       0.25       0          0
STURGEONEAST-S4  89         12.7       0.25       0          0
SturgeonWest-N1  89         12.7       0.25       0          0
SturgeonWest-N2  89         12.7       0.25       0          0
SturgeonWest-S1  89         12.7       0.25       0          0
SturgeonWest-S2  89         12.7       0.25       0          0
SWMFArea         89         12.7       0.25       0          0
SWPerimeterDA0   89         12.7       0.25       0          0
SWPerimeterDA1   89         12.7       0.25       0          0
SWPerimeterDA2   89         12.7       0.25       0          0
SWPerimeterDA3   89         12.7       0.25       0          0
SW-UnDevelopment 89         12.7       0.25       0          0
WestPondArea     89         12.7       0.25       0          0

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
;Sump betwwen 2 CSPs
ESUMP1           636.6      2.5        0          0          100
;SturgeonEast North Ditch Start
```

```
SENJ-1           638       2          0          0          0
;SturgeonEast North Ditch Middle
SENJ-2           637.49    0          0          0          0
SENJ-3           633.7     2          0          0          0
SESJ-1           637.04    1          0          0          0
SESJ-2           636.22    2.8        0          0          0
;West Waste Way
SESJ-3           635.25    2          0          0          0
;East WasteWay
SESJ-4a          634.1     2          0          0          0
SESJ-4b          634.1     2          0          0          0
SESJ-5           633.46    2          0          0          0
;Culvert Gate Open
SWMFOutlet-J1    630.5     1          0          0          0
;Start of Norrth Ditch
SWNJ-1           642.12    2.6        0          0          0
;West North Ditch to Culvet1
SWNJ-2           640.67    2.4        0          0          0
SWNJ-3           640.58    2.4        0          0          0
;Start of Perimeter Ditch
SWPerimeterD-J0  652.47    0.5        0          0          0
SWPerimeterD-J1  646.16    1          0          0          0
SWPerimeterD-J2  644.55    1.5        0          0          0
;Start of South Ditch
SWSJ-1           642.11    2.6        0          0          0
SWSJ-2           640.83    0          0          0          0
SWSJ-3           640.75    0          0          0          0
Wasteway-J1      634.55    0          0          0          0
WasteWay-J2      634.2     1.5        0          0          0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
;Sturgeon East North Perimeter Ditch Outlet
SEPerimeterDNO1  633.9      FREE                        NO
;Sturgeon East South Perimeter Ditch Outlet
SEPerimeterDSO1  635.2      FREE                        NO
SWMFOutlet       632.786    FREE                        NO
SWPerimeterDitchOutlet 638.74 FREE                      NO

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            SurDepth Fevap    Psi
Ksat     IMD
;;-------------- -------- ---------- ----------- ---------- ---------------------------- -------- -------- --------
-------- --------
ContingencyPond  628      5.2        0          TABULAR    ContingencyPondCurve             0    0
;400 mm Sump in Manhole
MH-SUMP1         631      5          0.2        TABULAR    MH-SUMP1Curve                0        0
;Manhole Sump2
MH-SUMP2         631      5          0.2        TABULAR    NH-SUMP2Curve                0        0
;East Pond
SWMF             632      3.7        1          TABULAR    SWMFCurve                    0        0
;West Pond-Proposed
WESTPOND         637      2.2        0          TABULAR    WestPondCurve                0        0

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- ----------
EastCSP1         ESUMP1           SESJ-1           21         0.013      637.1      637.04     0          0
;Sturgeon East Ditch1
SENDitch-1       SENJ-1           SENJ-2           410        0.01       638        637.49     0          0
SENDitch-2       SENJ-2           SENJ-3           820        0.025      637.49     633.7      0          0
;SWMF North Inlet Ditch
SWMFINLETDN      SENJ-3           SWMF             40         0.025      633.7      632.46     0          0
;SWMF South Inlet Ditch
SWMFINLETDS      SESJ-5           SWMF             83.676     0.025      633.46     632.36     0          0
SWMFO_C          SWMF             SWMFOutlet-J1    240        0.013      632        632        0          0
;East Pond Outlet Culvert
SWMFOutlet-C1    SWMFOutlet-J1    MH-SUMP1         38.84      0.013      631        631.3      0          0
```

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;Outlet Culvert2
SWMFOutlet-C2    MH-SUMP2         SWMFOutlet       23.66      0.013      633        632.786    0          0
SWNCulvert       SWNJ-2           SWNJ-3           27         0.013      640.67     640.58     0          0
;From WN area End to Culvert1
SWNDitch1        SWNJ-1           SWNJ-2           482        0.025      642.12     640.67     0          0
SWNDitch2        SWNJ-3           WESTPOND         579        0.025      640.58     638.85     0          0
SWPerimeterDitch0 SWPerimeterD-J0 SWPerimeterD-J1  715        0.025      652.47     646.16     0          0
SWPerimeterDitch1 SWPerimeterD-J1 SWPerimeterD-J2  150        0.025      646.16     644.55     0          0
SWPerimeterDitch2 SWPerimeterD-J2 SWPerimeterDitchOutlet 1366.892 0.025  644.55     638.74     0          0
SWSCulvert       SWSJ-2           SWSJ-3           27         0.013      640.83     640.75     0          0
;SW-South Ditch1
SWSDitch1        SWSJ-1           SWSJ-2           410        0.025      642.11     640.83     0          0
;SW-South Ditch2
SWSDitch2        SWSJ-3           WESTPOND         815        0.025      640.75     637.84     0          0
WasteWayDiversion-1 SESJ-4a       Wasteway-J1      6.245      0.025      634.6      634.55     0          0
WasteWayDiversion-2 Wasteway-J1   WasteWay-J2      43.8       0.025      634.55     634.2      0          0
WasteWayDiversion-3 WasteWay-J2   ContingencyPond  10         0.035      634.2      633.2      0          0
W-ECSP           WESTPOND         ESUMP1           37         0.013      638.1      637.99     0          0
W-EDitch1        SESJ-1           SESJ-2           310        0.025      637.04     636.22     0          0
W-EDitch2        SESJ-2           SESJ-3           280        0.025      636.22     635.25     0          0
W-EDitch3        SESJ-3           SESJ-4a          480        0.025      635.25     634.1      0          0
W-EDitch4        SESJ-4b          SESJ-5           141.767    0.025      634.1      633.47     0          0

[ORIFICES]
;;Name           From Node        To Node          Type         Offset     Qcoeff     Gated    CloseTime
;;-------------- ---------------- ---------------- ------------ ---------- ---------- -------- ----------
OR1              MH-SUMP2         MH-SUMP1         SIDE         631.4      0.65       NO       0

[WEIRS]
;;Name           From Node        To Node          Type         CrestHt    Qcoeff     Gated    EndCon   EndCoeff
Surcharge  RoadWidth  RoadSurf   Coeff. Curve
;;-------------- ---------------- ---------------- ------------ ---------- ---------- -------- -------- ----------
---------- ---------- ---------- ----------------
RockCheckDitchBlock SESJ-4a       SESJ-4b          TRAPEZOIDAL  634.4      1.84       NO       0        0
YES

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ----------
EastCSP1         CIRCULAR     1.4              0          0          0          1
SENDitch-1       TRAPEZOIDAL  2.1              1          4          4          1
SENDitch-2       TRAPEZOIDAL  2.1              1          4          4          1
SWMFINLETDN      TRAPEZOIDAL  2                2          4          4          1
SWMFINLETDS      TRAPEZOIDAL  1.35             3          4          4          1
SWMFO_C          TRAPEZOIDAL  4.5              100        8          8          1
SWMFOutlet-C1    CIRCULAR     1.05             0          0          0          1          6
SWMFOutlet-C2    CIRCULAR     1                0          0          0          1
SWNCulvert       CIRCULAR     1.2              0          0          0          1
SWNDitch1        TRAPEZOIDAL  2.6              2          2          2          1
SWNDitch2        TRAPEZOIDAL  2.6              2          2          2          1
SWPerimeterDitch0 TRAPEZOIDAL 0.5              2          2          2          1
SWPerimeterDitch1 TRAPEZOIDAL 1.5              2          2          2          1
SWPerimeterDitch2 TRAPEZOIDAL 1.5              2          2          2          1
SWSCulvert       CIRCULAR     1.2              0          0          0          1
SWSDitch1        TRAPEZOIDAL  2                2          2          2          1
SWSDitch2        TRAPEZOIDAL  2.6              2          2          2          1
WasteWayDiversion-1 TRAPEZOIDAL 1.5            1.5        2          2          1
WasteWayDiversion-2 TRAPEZOIDAL 1.5            1.5        2          2          1
WasteWayDiversion-3 TRAPEZOIDAL 1              1          3          3          1
W-ECSP           CIRCULAR     1.4              0          0          0          1
W-EDitch1        TRAPEZOIDAL  2                2          3          3          1
W-EDitch2        TRAPEZOIDAL  1.8              1          3          3          1
W-EDitch3        TRAPEZOIDAL  2                5          3          3          1
W-EDitch4        TRAPEZOIDAL  2.2              5          3          3          1
OR1              CIRCULAR     0.7              0          0          0
RockCheckDitchBlock TRAPEZOIDAL 0.2            1          5          5

[LOSSES]
;;Link           Kentry     Kexit      Kavg       Flap Gate  Seepage
```

```
;;-------------- ---------- ---------- ---------- ---------- ----------
SWMFOutlet-C1    0          0          0          YES        0

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
ContingencyPondCurve Storage    0          787
ContingencyPondCurve            0.5        3136
ContingencyPondCurve            1          6372
ContingencyPondCurve            1.5        10486
ContingencyPondCurve            2          15521
ContingencyPondCurve            2.5        21440
ContingencyPondCurve            3          28178
ContingencyPondCurve            3.5        35758
ContingencyPondCurve            4          44150
ContingencyPondCurve            4.5        53360
ContingencyPondCurve            5          63394
ContingencyPondCurve            5.5        74276
ContingencyPondCurve            6          85999

ESUMP1Curve      Storage    0          150
ESUMP1Curve                 1.5        1000
ESUMP1Curve                 2.4        2000

MH-SUMP1Curve    Storage    0          1
MH-SUMP1Curve               4          1
MH-SUMP1Curve               4.01       2
MH-SUMP1Curve               5          2

NH-SUMP2Curve    Storage    0          1
NH-SUMP2Curve               4          1
NH-SUMP2Curve               4.01       2

SWMFCurve        Storage    0          28000
SWMFCurve                   1          31500
SWMFCurve                   2          35000
SWMFCurve                   3          37800
SWMFCurve                   3.5        38000

WestPondCurve    Storage    0          8000
WestPondCurve               1          12000
WestPondCurve               1.5        14100
WestPondCurve               2          16100
WestPondCurve               2.5        18000

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;Total = 74.4 mm, unit mm/hr
Chicago_Edmonton_24hr_10Yr            0:00       0.92
Chicago_Edmonton_24hr_10Yr            0:05       0.92
Chicago_Edmonton_24hr_10Yr            0:10       0.92
Chicago_Edmonton_24hr_10Yr            0:15       0.92
Chicago_Edmonton_24hr_10Yr            0:20       0.93
Chicago_Edmonton_24hr_10Yr            0:25       0.94
Chicago_Edmonton_24hr_10Yr            0:30       0.95
Chicago_Edmonton_24hr_10Yr            0:35       0.96
Chicago_Edmonton_24hr_10Yr            0:40       0.96
Chicago_Edmonton_24hr_10Yr            0:45       0.97
Chicago_Edmonton_24hr_10Yr            0:50       0.98
Chicago_Edmonton_24hr_10Yr            0:55       0.99
Chicago_Edmonton_24hr_10Yr            1:00       1.00
Chicago_Edmonton_24hr_10Yr            1:05       1.01
Chicago_Edmonton_24hr_10Yr            1:10       1.02
Chicago_Edmonton_24hr_10Yr            1:15       1.03
Chicago_Edmonton_24hr_10Yr            1:20       1.04
Chicago_Edmonton_24hr_10Yr            1:25       1.05
Chicago_Edmonton_24hr_10Yr            1:30       1.07
Chicago_Edmonton_24hr_10Yr            1:35       1.08
```

Chicago_Edmonton_24hr_10Yr	1:40	1.09
Chicago_Edmonton_24hr_10Yr	1:45	1.10
Chicago_Edmonton_24hr_10Yr	1:50	1.11
Chicago_Edmonton_24hr_10Yr	1:55	1.13
Chicago_Edmonton_24hr_10Yr	2:00	1.14
Chicago_Edmonton_24hr_10Yr	2:05	1.15
Chicago_Edmonton_24hr_10Yr	2:10	1.16
Chicago_Edmonton_24hr_10Yr	2:15	1.18
Chicago_Edmonton_24hr_10Yr	2:20	1.19
Chicago_Edmonton_24hr_10Yr	2:25	1.21
Chicago_Edmonton_24hr_10Yr	2:30	1.22
Chicago_Edmonton_24hr_10Yr	2:35	1.24
Chicago_Edmonton_24hr_10Yr	2:40	1.26
Chicago_Edmonton_24hr_10Yr	2:45	1.27
Chicago_Edmonton_24hr_10Yr	2:50	1.29
Chicago_Edmonton_24hr_10Yr	2:55	1.31
Chicago_Edmonton_24hr_10Yr	3:00	1.33
Chicago_Edmonton_24hr_10Yr	3:05	1.35
Chicago_Edmonton_24hr_10Yr	3:10	1.37
Chicago_Edmonton_24hr_10Yr	3:15	1.39
Chicago_Edmonton_24hr_10Yr	3:20	1.41
Chicago_Edmonton_24hr_10Yr	3:25	1.43
Chicago_Edmonton_24hr_10Yr	3:30	1.46
Chicago_Edmonton_24hr_10Yr	3:35	1.48
Chicago_Edmonton_24hr_10Yr	3:40	1.51
Chicago_Edmonton_24hr_10Yr	3:45	1.53
Chicago_Edmonton_24hr_10Yr	3:50	1.56
Chicago_Edmonton_24hr_10Yr	3:55	1.59
Chicago_Edmonton_24hr_10Yr	4:00	1.62
Chicago_Edmonton_24hr_10Yr	4:05	1.65
Chicago_Edmonton_24hr_10Yr	4:10	1.68
Chicago_Edmonton_24hr_10Yr	4:15	1.72
Chicago_Edmonton_24hr_10Yr	4:20	1.75
Chicago_Edmonton_24hr_10Yr	4:25	1.79
Chicago_Edmonton_24hr_10Yr	4:30	1.83
Chicago_Edmonton_24hr_10Yr	4:35	1.87
Chicago_Edmonton_24hr_10Yr	4:40	1.92
Chicago_Edmonton_24hr_10Yr	4:45	1.97
Chicago_Edmonton_24hr_10Yr	4:50	2.02
Chicago_Edmonton_24hr_10Yr	4:55	2.07
Chicago_Edmonton_24hr_10Yr	5:00	2.13
Chicago_Edmonton_24hr_10Yr	5:05	2.19
Chicago_Edmonton_24hr_10Yr	5:10	2.26
Chicago_Edmonton_24hr_10Yr	5:15	2.33
Chicago_Edmonton_24hr_10Yr	5:20	2.40
Chicago_Edmonton_24hr_10Yr	5:25	2.49
Chicago_Edmonton_24hr_10Yr	5:30	2.58
Chicago_Edmonton_24hr_10Yr	5:35	2.68
Chicago_Edmonton_24hr_10Yr	5:40	2.78
Chicago_Edmonton_24hr_10Yr	5:45	2.90
Chicago_Edmonton_24hr_10Yr	5:50	3.03
Chicago_Edmonton_24hr_10Yr	5:55	3.18
Chicago_Edmonton_24hr_10Yr	6:00	3.35
Chicago_Edmonton_24hr_10Yr	6:05	3.53
Chicago_Edmonton_24hr_10Yr	6:10	3.75
Chicago_Edmonton_24hr_10Yr	6:15	4.00
Chicago_Edmonton_24hr_10Yr	6:20	4.29
Chicago_Edmonton_24hr_10Yr	6:25	4.65
Chicago_Edmonton_24hr_10Yr	6:30	5.08
Chicago_Edmonton_24hr_10Yr	6:35	5.62
Chicago_Edmonton_24hr_10Yr	6:40	6.33
Chicago_Edmonton_24hr_10Yr	6:45	7.29
Chicago_Edmonton_24hr_10Yr	6:50	8.70
Chicago_Edmonton_24hr_10Yr	6:55	11.02
Chicago_Edmonton_24hr_10Yr	7:00	15.73
Chicago_Edmonton_24hr_10Yr	7:05	33.62
Chicago_Edmonton_24hr_10Yr	7:10	139.52
Chicago_Edmonton_24hr_10Yr	7:15	45.12
Chicago_Edmonton_24hr_10Yr	7:20	26.34

Chicago_Edmonton_24hr_10Yr	7:25	19.28
Chicago_Edmonton_24hr_10Yr	7:30	15.48
Chicago_Edmonton_24hr_10Yr	7:35	13.08
Chicago_Edmonton_24hr_10Yr	7:40	11.41
Chicago_Edmonton_24hr_10Yr	7:45	10.17
Chicago_Edmonton_24hr_10Yr	7:50	9.20
Chicago_Edmonton_24hr_10Yr	7:55	8.44
Chicago_Edmonton_24hr_10Yr	8:00	7.80
Chicago_Edmonton_24hr_10Yr	8:05	7.28
Chicago_Edmonton_24hr_10Yr	8:10	6.82
Chicago_Edmonton_24hr_10Yr	8:15	6.44
Chicago_Edmonton_24hr_10Yr	8:20	6.10
Chicago_Edmonton_24hr_10Yr	8:25	5.80
Chicago_Edmonton_24hr_10Yr	8:30	5.53
Chicago_Edmonton_24hr_10Yr	8:35	5.29
Chicago_Edmonton_24hr_10Yr	8:40	5.07
Chicago_Edmonton_24hr_10Yr	8:45	4.88
Chicago_Edmonton_24hr_10Yr	8:50	4.70
Chicago_Edmonton_24hr_10Yr	8:55	4.54
Chicago_Edmonton_24hr_10Yr	9:00	4.35
Chicago_Edmonton_24hr_10Yr	9:05	4.25
Chicago_Edmonton_24hr_10Yr	9:10	4.12
Chicago_Edmonton_24hr_10Yr	9:15	4.00
Chicago_Edmonton_24hr_10Yr	9:20	3.90
Chicago_Edmonton_24hr_10Yr	9:25	3.78
Chicago_Edmonton_24hr_10Yr	9:30	3.68
Chicago_Edmonton_24hr_10Yr	9:35	3.59
Chicago_Edmonton_24hr_10Yr	9:40	3.51
Chicago_Edmonton_24hr_10Yr	9:45	3.42
Chicago_Edmonton_24hr_10Yr	9:50	3.35
Chicago_Edmonton_24hr_10Yr	9:55	3.27
Chicago_Edmonton_24hr_10Yr	10:00	3.20
Chicago_Edmonton_24hr_10Yr	10:05	3.14
Chicago_Edmonton_24hr_10Yr	10:10	3.07
Chicago_Edmonton_24hr_10Yr	10:15	3.01
Chicago_Edmonton_24hr_10Yr	10:20	2.96
Chicago_Edmonton_24hr_10Yr	10:25	2.90
Chicago_Edmonton_24hr_10Yr	10:30	2.85
Chicago_Edmonton_24hr_10Yr	10:35	2.80
Chicago_Edmonton_24hr_10Yr	10:40	2.75
Chicago_Edmonton_24hr_10Yr	10:45	2.70
Chicago_Edmonton_24hr_10Yr	10:50	2.66
Chicago_Edmonton_24hr_10Yr	10:55	2.62
Chicago_Edmonton_24hr_10Yr	11:00	2.58
Chicago_Edmonton_24hr_10Yr	11:05	2.54
Chicago_Edmonton_24hr_10Yr	11:10	2.50
Chicago_Edmonton_24hr_10Yr	11:15	2.46
Chicago_Edmonton_24hr_10Yr	11:20	2.43
Chicago_Edmonton_24hr_10Yr	11:25	2.39
Chicago_Edmonton_24hr_10Yr	11:30	2.36
Chicago_Edmonton_24hr_10Yr	11:35	2.33
Chicago_Edmonton_24hr_10Yr	11:40	2.30
Chicago_Edmonton_24hr_10Yr	11:45	2.27
Chicago_Edmonton_24hr_10Yr	11:50	2.24
Chicago_Edmonton_24hr_10Yr	11:55	2.21
Chicago_Edmonton_24hr_10Yr	12:00	2.18
Chicago_Edmonton_24hr_10Yr	12:05	2.15
Chicago_Edmonton_24hr_10Yr	12:10	2.13
Chicago_Edmonton_24hr_10Yr	12:15	2.10
Chicago_Edmonton_24hr_10Yr	12:20	2.08
Chicago_Edmonton_24hr_10Yr	12:25	2.06
Chicago_Edmonton_24hr_10Yr	12:30	2.03
Chicago_Edmonton_24hr_10Yr	12:35	2.01
Chicago_Edmonton_24hr_10Yr	12:40	1.99
Chicago_Edmonton_24hr_10Yr	12:45	1.97
Chicago_Edmonton_24hr_10Yr	12:50	1.95
Chicago_Edmonton_24hr_10Yr	12:55	1.93
Chicago_Edmonton_24hr_10Yr	13:00	1.91
Chicago_Edmonton_24hr_10Yr	13:05	1.89

Chicago_Edmonton_24hr_10Yr	13:10	1.87
Chicago_Edmonton_24hr_10Yr	13:15	1.85
Chicago_Edmonton_24hr_10Yr	13:20	1.83
Chicago_Edmonton_24hr_10Yr	13:25	1.81
Chicago_Edmonton_24hr_10Yr	13:30	1.80
Chicago_Edmonton_24hr_10Yr	13:35	1.78
Chicago_Edmonton_24hr_10Yr	13:40	1.76
Chicago_Edmonton_24hr_10Yr	13:45	1.75
Chicago_Edmonton_24hr_10Yr	13:50	1.73
Chicago_Edmonton_24hr_10Yr	13:55	1.72
Chicago_Edmonton_24hr_10Yr	14:00	1.70
Chicago_Edmonton_24hr_10Yr	14:05	1.69
Chicago_Edmonton_24hr_10Yr	14:10	1.67
Chicago_Edmonton_24hr_10Yr	14:15	1.66
Chicago_Edmonton_24hr_10Yr	14:20	1.65
Chicago_Edmonton_24hr_10Yr	14:25	1.63
Chicago_Edmonton_24hr_10Yr	14:30	1.62
Chicago_Edmonton_24hr_10Yr	14:35	1.61
Chicago_Edmonton_24hr_10Yr	14:40	1.59
Chicago_Edmonton_24hr_10Yr	14:45	1.58
Chicago_Edmonton_24hr_10Yr	14:50	1.57
Chicago_Edmonton_24hr_10Yr	14:55	1.56
Chicago_Edmonton_24hr_10Yr	15:00	1.54
Chicago_Edmonton_24hr_10Yr	15:05	1.53
Chicago_Edmonton_24hr_10Yr	15:10	1.52
Chicago_Edmonton_24hr_10Yr	15:15	1.51
Chicago_Edmonton_24hr_10Yr	15:20	1.50
Chicago_Edmonton_24hr_10Yr	15:25	1.49
Chicago_Edmonton_24hr_10Yr	15:30	1.48
Chicago_Edmonton_24hr_10Yr	15:35	1.47
Chicago_Edmonton_24hr_10Yr	15:40	1.46
Chicago_Edmonton_24hr_10Yr	15:45	1.45
Chicago_Edmonton_24hr_10Yr	15:50	1.44
Chicago_Edmonton_24hr_10Yr	15:55	1.43
Chicago_Edmonton_24hr_10Yr	16:00	1.42
Chicago_Edmonton_24hr_10Yr	16:05	1.41
Chicago_Edmonton_24hr_10Yr	16:10	1.40
Chicago_Edmonton_24hr_10Yr	16:15	1.39
Chicago_Edmonton_24hr_10Yr	16:20	1.38
Chicago_Edmonton_24hr_10Yr	16:25	1.37
Chicago_Edmonton_24hr_10Yr	16:30	1.36
Chicago_Edmonton_24hr_10Yr	16:35	1.35
Chicago_Edmonton_24hr_10Yr	16:40	1.34
Chicago_Edmonton_24hr_10Yr	16:45	1.34
Chicago_Edmonton_24hr_10Yr	16:50	1.33
Chicago_Edmonton_24hr_10Yr	16:55	1.32
Chicago_Edmonton_24hr_10Yr	17:00	1.31
Chicago_Edmonton_24hr_10Yr	17:05	1.30
Chicago_Edmonton_24hr_10Yr	17:10	1.30
Chicago_Edmonton_24hr_10Yr	17:15	1.29
Chicago_Edmonton_24hr_10Yr	17:20	1.28
Chicago_Edmonton_24hr_10Yr	17:25	1.27
Chicago_Edmonton_24hr_10Yr	17:30	1.27
Chicago_Edmonton_24hr_10Yr	17:35	1.26
Chicago_Edmonton_24hr_10Yr	17:40	1.25
Chicago_Edmonton_24hr_10Yr	17:45	1.24
Chicago_Edmonton_24hr_10Yr	17:50	1.24
Chicago_Edmonton_24hr_10Yr	17:55	1.23
Chicago_Edmonton_24hr_10Yr	18:00	1.22
Chicago_Edmonton_24hr_10Yr	18:05	1.22
Chicago_Edmonton_24hr_10Yr	18:10	1.21
Chicago_Edmonton_24hr_10Yr	18:15	1.20
Chicago_Edmonton_24hr_10Yr	18:20	1.20
Chicago_Edmonton_24hr_10Yr	18:25	1.19
Chicago_Edmonton_24hr_10Yr	18:30	1.19
Chicago_Edmonton_24hr_10Yr	18:35	1.18
Chicago_Edmonton_24hr_10Yr	18:40	1.17
Chicago_Edmonton_24hr_10Yr	18:45	1.17
Chicago_Edmonton_24hr_10Yr	18:50	1.16

Chicago_Edmonton_24hr_10Yr	18:55	1.16
Chicago_Edmonton_24hr_10Yr	19:00	1.15
Chicago_Edmonton_24hr_10Yr	19:05	1.14
Chicago_Edmonton_24hr_10Yr	19:10	1.14
Chicago_Edmonton_24hr_10Yr	19:15	1.13
Chicago_Edmonton_24hr_10Yr	19:20	1.13
Chicago_Edmonton_24hr_10Yr	19:25	1.12
Chicago_Edmonton_24hr_10Yr	19:30	1.12
Chicago_Edmonton_24hr_10Yr	19:35	1.11
Chicago_Edmonton_24hr_10Yr	19:40	1.11
Chicago_Edmonton_24hr_10Yr	19:45	1.10
Chicago_Edmonton_24hr_10Yr	19:50	1.10
Chicago_Edmonton_24hr_10Yr	19:55	1.09
Chicago_Edmonton_24hr_10Yr	20:00	1.08
Chicago_Edmonton_24hr_10Yr	20:05	1.08
Chicago_Edmonton_24hr_10Yr	20:10	1.07
Chicago_Edmonton_24hr_10Yr	20:15	1.07
Chicago_Edmonton_24hr_10Yr	20:20	1.07
Chicago_Edmonton_24hr_10Yr	20:25	1.06
Chicago_Edmonton_24hr_10Yr	20:30	1.06
Chicago_Edmonton_24hr_10Yr	20:35	1.05
Chicago_Edmonton_24hr_10Yr	20:40	1.05
Chicago_Edmonton_24hr_10Yr	20:45	1.04
Chicago_Edmonton_24hr_10Yr	20:50	1.04
Chicago_Edmonton_24hr_10Yr	20:55	1.03
Chicago_Edmonton_24hr_10Yr	21:00	1.03
Chicago_Edmonton_24hr_10Yr	21:05	1.02
Chicago_Edmonton_24hr_10Yr	21:10	1.02
Chicago_Edmonton_24hr_10Yr	21:15	1.01
Chicago_Edmonton_24hr_10Yr	21:20	1.01
Chicago_Edmonton_24hr_10Yr	21:25	1.01
Chicago_Edmonton_24hr_10Yr	21:30	1.00
Chicago_Edmonton_24hr_10Yr	21:35	1.00
Chicago_Edmonton_24hr_10Yr	21:40	0.99
Chicago_Edmonton_24hr_10Yr	21:45	0.99
Chicago_Edmonton_24hr_10Yr	21:50	0.99
Chicago_Edmonton_24hr_10Yr	21:55	0.98
Chicago_Edmonton_24hr_10Yr	22:00	0.98
Chicago_Edmonton_24hr_10Yr	22:05	0.97
Chicago_Edmonton_24hr_10Yr	22:10	0.97
Chicago_Edmonton_24hr_10Yr	22:15	0.97
Chicago_Edmonton_24hr_10Yr	22:20	0.96
Chicago_Edmonton_24hr_10Yr	22:25	0.96
Chicago_Edmonton_24hr_10Yr	22:30	0.96
Chicago_Edmonton_24hr_10Yr	22:35	0.95
Chicago_Edmonton_24hr_10Yr	22:40	0.95
Chicago_Edmonton_24hr_10Yr	22:45	0.94
Chicago_Edmonton_24hr_10Yr	22:50	0.94
Chicago_Edmonton_24hr_10Yr	22:55	0.94
Chicago_Edmonton_24hr_10Yr	23:00	0.93
Chicago_Edmonton_24hr_10Yr	23:05	0.93
Chicago_Edmonton_24hr_10Yr	23:10	0.93
Chicago_Edmonton_24hr_10Yr	23:15	0.92
Chicago_Edmonton_24hr_10Yr	23:20	0.92
Chicago_Edmonton_24hr_10Yr	23:25	0.92
Chicago_Edmonton_24hr_10Yr	23:30	0.91
Chicago_Edmonton_24hr_10Yr	23:35	0.91
Chicago_Edmonton_24hr_10Yr	23:40	0.91
Chicago_Edmonton_24hr_10Yr	23:45	0.90
Chicago_Edmonton_24hr_10Yr	23:50	0.90
Chicago_Edmonton_24hr_10Yr	23:55	0.90
Chicago_Edmonton_24hr_10Yr	24:00	0.89

;Total = 90.2 mm,unit mm/hr

Chicago_Edmonton_24hr_25Yr	0:00	1.11
Chicago_Edmonton_24hr_25Yr	0:05	1.11
Chicago_Edmonton_24hr_25Yr	0:10	1.11
Chicago_Edmonton_24hr_25Yr	0:15	1.12
Chicago_Edmonton_24hr_25Yr	0:20	1.13

Chicago_Edmonton_24hr_25Yr	0:25	1.14
Chicago_Edmonton_24hr_25Yr	0:30	1.15
Chicago_Edmonton_24hr_25Yr	0:35	1.16
Chicago_Edmonton_24hr_25Yr	0:40	1.17
Chicago_Edmonton_24hr_25Yr	0:45	1.18
Chicago_Edmonton_24hr_25Yr	0:50	1.19
Chicago_Edmonton_24hr_25Yr	0:55	1.20
Chicago_Edmonton_24hr_25Yr	1:00	1.22
Chicago_Edmonton_24hr_25Yr	1:05	1.23
Chicago_Edmonton_24hr_25Yr	1:10	1.24
Chicago_Edmonton_24hr_25Yr	1:15	1.25
Chicago_Edmonton_24hr_25Yr	1:20	1.26
Chicago_Edmonton_24hr_25Yr	1:25	1.28
Chicago_Edmonton_24hr_25Yr	1:30	1.29
Chicago_Edmonton_24hr_25Yr	1:35	1.30
Chicago_Edmonton_24hr_25Yr	1:40	1.32
Chicago_Edmonton_24hr_25Yr	1:45	1.33
Chicago_Edmonton_24hr_25Yr	1:50	1.35
Chicago_Edmonton_24hr_25Yr	1:55	1.36
Chicago_Edmonton_24hr_25Yr	2:00	1.38
Chicago_Edmonton_24hr_25Yr	2:05	1.40
Chicago_Edmonton_24hr_25Yr	2:10	1.41
Chicago_Edmonton_24hr_25Yr	2:15	1.43
Chicago_Edmonton_24hr_25Yr	2:20	1.45
Chicago_Edmonton_24hr_25Yr	2:25	1.47
Chicago_Edmonton_24hr_25Yr	2:30	1.48
Chicago_Edmonton_24hr_25Yr	2:35	1.50
Chicago_Edmonton_24hr_25Yr	2:40	1.52
Chicago_Edmonton_24hr_25Yr	2:45	1.54
Chicago_Edmonton_24hr_25Yr	2:50	1.56
Chicago_Edmonton_24hr_25Yr	2:55	1.59
Chicago_Edmonton_24hr_25Yr	3:00	1.61
Chicago_Edmonton_24hr_25Yr	3:05	1.63
Chicago_Edmonton_24hr_25Yr	3:10	1.66
Chicago_Edmonton_24hr_25Yr	3:15	1.68
Chicago_Edmonton_24hr_25Yr	3:20	1.71
Chicago_Edmonton_24hr_25Yr	3:25	1.74
Chicago_Edmonton_24hr_25Yr	3:30	1.77
Chicago_Edmonton_24hr_25Yr	3:35	1.79
Chicago_Edmonton_24hr_25Yr	3:40	1.83
Chicago_Edmonton_24hr_25Yr	3:45	1.86
Chicago_Edmonton_24hr_25Yr	3:50	1.89
Chicago_Edmonton_24hr_25Yr	3:55	1.93
Chicago_Edmonton_24hr_25Yr	4:00	1.96
Chicago_Edmonton_24hr_25Yr	4:05	2.00
Chicago_Edmonton_24hr_25Yr	4:10	2.04
Chicago_Edmonton_24hr_25Yr	4:15	2.08
Chicago_Edmonton_24hr_25Yr	4:20	2.13
Chicago_Edmonton_24hr_25Yr	4:25	2.17
Chicago_Edmonton_24hr_25Yr	4:30	2.22
Chicago_Edmonton_24hr_25Yr	4:35	2.27
Chicago_Edmonton_24hr_25Yr	4:40	2.33
Chicago_Edmonton_24hr_25Yr	4:45	2.39
Chicago_Edmonton_24hr_25Yr	4:50	2.45
Chicago_Edmonton_24hr_25Yr	4:55	2.51
Chicago_Edmonton_24hr_25Yr	5:00	2.58
Chicago_Edmonton_24hr_25Yr	5:05	2.66
Chicago_Edmonton_24hr_25Yr	5:10	2.74
Chicago_Edmonton_24hr_25Yr	5:15	2.82
Chicago_Edmonton_24hr_25Yr	5:20	2.91
Chicago_Edmonton_24hr_25Yr	5:25	3.02
Chicago_Edmonton_24hr_25Yr	5:30	3.12
Chicago_Edmonton_24hr_25Yr	5:35	3.24
Chicago_Edmonton_24hr_25Yr	5:40	3.37
Chicago_Edmonton_24hr_25Yr	5:45	3.52
Chicago_Edmonton_24hr_25Yr	5:50	3.68
Chicago_Edmonton_24hr_25Yr	5:55	3.86
Chicago_Edmonton_24hr_25Yr	6:00	4.06
Chicago_Edmonton_24hr_25Yr	6:05	4.28

Chicago_Edmonton_24hr_25Yr	6:10	4.55
Chicago_Edmonton_24hr_25Yr	6:15	4.85
Chicago_Edmonton_24hr_25Yr	6:20	5.21
Chicago_Edmonton_24hr_25Yr	6:25	5.63
Chicago_Edmonton_24hr_25Yr	6:30	6.16
Chicago_Edmonton_24hr_25Yr	6:35	6.81
Chicago_Edmonton_24hr_25Yr	6:40	7.67
Chicago_Edmonton_24hr_25Yr	6:45	8.84
Chicago_Edmonton_24hr_25Yr	6:50	10.55
Chicago_Edmonton_24hr_25Yr	6:55	13.36
Chicago_Edmonton_24hr_25Yr	7:00	19.07
Chicago_Edmonton_24hr_25Yr	7:05	40.76
Chicago_Edmonton_24hr_25Yr	7:10	169.14
Chicago_Edmonton_24hr_25Yr	7:15	54.70
Chicago_Edmonton_24hr_25Yr	7:20	31.94
Chicago_Edmonton_24hr_25Yr	7:25	23.38
Chicago_Edmonton_24hr_25Yr	7:30	18.77
Chicago_Edmonton_24hr_25Yr	7:35	15.86
Chicago_Edmonton_24hr_25Yr	7:40	13.83
Chicago_Edmonton_24hr_25Yr	7:45	12.32
Chicago_Edmonton_24hr_25Yr	7:50	11.16
Chicago_Edmonton_24hr_25Yr	7:55	10.23
Chicago_Edmonton_24hr_25Yr	8:00	9.46
Chicago_Edmonton_24hr_25Yr	8:05	8.82
Chicago_Edmonton_24hr_25Yr	8:10	8.27
Chicago_Edmonton_24hr_25Yr	8:15	7.80
Chicago_Edmonton_24hr_25Yr	8:20	7.39
Chicago_Edmonton_24hr_25Yr	8:25	7.03
Chicago_Edmonton_24hr_25Yr	8:30	6.70
Chicago_Edmonton_24hr_25Yr	8:35	6.41
Chicago_Edmonton_24hr_25Yr	8:40	6.15
Chicago_Edmonton_24hr_25Yr	8:45	5.92
Chicago_Edmonton_24hr_25Yr	8:50	5.70
Chicago_Edmonton_24hr_25Yr	8:55	5.50
Chicago_Edmonton_24hr_25Yr	9:00	5.27
Chicago_Edmonton_24hr_25Yr	9:05	5.15
Chicago_Edmonton_24hr_25Yr	9:10	4.99
Chicago_Edmonton_24hr_25Yr	9:15	4.85
Chicago_Edmonton_24hr_25Yr	9:20	4.72
Chicago_Edmonton_24hr_25Yr	9:25	4.59
Chicago_Edmonton_24hr_25Yr	9:30	4.47
Chicago_Edmonton_24hr_25Yr	9:35	4.36
Chicago_Edmonton_24hr_25Yr	9:40	4.25
Chicago_Edmonton_24hr_25Yr	9:45	4.15
Chicago_Edmonton_24hr_25Yr	9:50	4.06
Chicago_Edmonton_24hr_25Yr	9:55	3.97
Chicago_Edmonton_24hr_25Yr	10:00	3.88
Chicago_Edmonton_24hr_25Yr	10:05	3.80
Chicago_Edmonton_24hr_25Yr	10:10	3.73
Chicago_Edmonton_24hr_25Yr	10:15	3.65
Chicago_Edmonton_24hr_25Yr	10:20	3.58
Chicago_Edmonton_24hr_25Yr	10:25	3.52
Chicago_Edmonton_24hr_25Yr	10:30	3.45
Chicago_Edmonton_24hr_25Yr	10:35	3.39
Chicago_Edmonton_24hr_25Yr	10:40	3.33
Chicago_Edmonton_24hr_25Yr	10:45	3.28
Chicago_Edmonton_24hr_25Yr	10:50	3.22
Chicago_Edmonton_24hr_25Yr	10:55	3.17
Chicago_Edmonton_24hr_25Yr	11:00	3.12
Chicago_Edmonton_24hr_25Yr	11:05	3.08
Chicago_Edmonton_24hr_25Yr	11:10	3.03
Chicago_Edmonton_24hr_25Yr	11:15	2.99
Chicago_Edmonton_24hr_25Yr	11:20	2.94
Chicago_Edmonton_24hr_25Yr	11:25	2.90
Chicago_Edmonton_24hr_25Yr	11:30	2.86
Chicago_Edmonton_24hr_25Yr	11:35	2.82
Chicago_Edmonton_24hr_25Yr	11:40	2.78
Chicago_Edmonton_24hr_25Yr	11:45	2.75
Chicago_Edmonton_24hr_25Yr	11:50	2.71

Chicago_Edmonton_24hr_25Yr	11:55	2.68
Chicago_Edmonton_24hr_25Yr	12:00	2.64
Chicago_Edmonton_24hr_25Yr	12:05	2.61
Chicago_Edmonton_24hr_25Yr	12:10	2.58
Chicago_Edmonton_24hr_25Yr	12:15	2.55
Chicago_Edmonton_24hr_25Yr	12:20	2.52
Chicago_Edmonton_24hr_25Yr	12:25	2.49
Chicago_Edmonton_24hr_25Yr	12:30	2.46
Chicago_Edmonton_24hr_25Yr	12:35	2.44
Chicago_Edmonton_24hr_25Yr	12:40	2.41
Chicago_Edmonton_24hr_25Yr	12:45	2.39
Chicago_Edmonton_24hr_25Yr	12:50	2.36
Chicago_Edmonton_24hr_25Yr	12:55	2.34
Chicago_Edmonton_24hr_25Yr	13:00	2.31
Chicago_Edmonton_24hr_25Yr	13:05	2.29
Chicago_Edmonton_24hr_25Yr	13:10	2.27
Chicago_Edmonton_24hr_25Yr	13:15	2.24
Chicago_Edmonton_24hr_25Yr	13:20	2.22
Chicago_Edmonton_24hr_25Yr	13:25	2.20
Chicago_Edmonton_24hr_25Yr	13:30	2.18
Chicago_Edmonton_24hr_25Yr	13:35	2.16
Chicago_Edmonton_24hr_25Yr	13:40	2.14
Chicago_Edmonton_24hr_25Yr	13:45	2.12
Chicago_Edmonton_24hr_25Yr	13:50	2.10
Chicago_Edmonton_24hr_25Yr	13:55	2.08
Chicago_Edmonton_24hr_25Yr	14:00	2.06
Chicago_Edmonton_24hr_25Yr	14:05	2.05
Chicago_Edmonton_24hr_25Yr	14:10	2.03
Chicago_Edmonton_24hr_25Yr	14:15	2.01
Chicago_Edmonton_24hr_25Yr	14:20	1.99
Chicago_Edmonton_24hr_25Yr	14:25	1.98
Chicago_Edmonton_24hr_25Yr	14:30	1.96
Chicago_Edmonton_24hr_25Yr	14:35	1.95
Chicago_Edmonton_24hr_25Yr	14:40	1.93
Chicago_Edmonton_24hr_25Yr	14:45	1.92
Chicago_Edmonton_24hr_25Yr	14:50	1.90
Chicago_Edmonton_24hr_25Yr	14:55	1.89
Chicago_Edmonton_24hr_25Yr	15:00	1.87
Chicago_Edmonton_24hr_25Yr	15:05	1.86
Chicago_Edmonton_24hr_25Yr	15:10	1.84
Chicago_Edmonton_24hr_25Yr	15:15	1.83
Chicago_Edmonton_24hr_25Yr	15:20	1.82
Chicago_Edmonton_24hr_25Yr	15:25	1.80
Chicago_Edmonton_24hr_25Yr	15:30	1.79
Chicago_Edmonton_24hr_25Yr	15:35	1.78
Chicago_Edmonton_24hr_25Yr	15:40	1.77
Chicago_Edmonton_24hr_25Yr	15:45	1.75
Chicago_Edmonton_24hr_25Yr	15:50	1.74
Chicago_Edmonton_24hr_25Yr	15:55	1.73
Chicago_Edmonton_24hr_25Yr	16:00	1.72
Chicago_Edmonton_24hr_25Yr	16:05	1.71
Chicago_Edmonton_24hr_25Yr	16:10	1.70
Chicago_Edmonton_24hr_25Yr	16:15	1.68
Chicago_Edmonton_24hr_25Yr	16:20	1.67
Chicago_Edmonton_24hr_25Yr	16:25	1.66
Chicago_Edmonton_24hr_25Yr	16:30	1.65
Chicago_Edmonton_24hr_25Yr	16:35	1.64
Chicago_Edmonton_24hr_25Yr	16:40	1.63
Chicago_Edmonton_24hr_25Yr	16:45	1.62
Chicago_Edmonton_24hr_25Yr	16:50	1.61
Chicago_Edmonton_24hr_25Yr	16:55	1.60
Chicago_Edmonton_24hr_25Yr	17:00	1.59
Chicago_Edmonton_24hr_25Yr	17:05	1.58
Chicago_Edmonton_24hr_25Yr	17:10	1.57
Chicago_Edmonton_24hr_25Yr	17:15	1.56
Chicago_Edmonton_24hr_25Yr	17:20	1.55
Chicago_Edmonton_24hr_25Yr	17:25	1.54
Chicago_Edmonton_24hr_25Yr	17:30	1.54
Chicago_Edmonton_24hr_25Yr	17:35	1.53

Chicago_Edmonton_24hr_25Yr	17:40	1.52
Chicago_Edmonton_24hr_25Yr	17:45	1.51
Chicago_Edmonton_24hr_25Yr	17:50	1.50
Chicago_Edmonton_24hr_25Yr	17:55	1.49
Chicago_Edmonton_24hr_25Yr	18:00	1.48
Chicago_Edmonton_24hr_25Yr	18:05	1.48
Chicago_Edmonton_24hr_25Yr	18:10	1.47
Chicago_Edmonton_24hr_25Yr	18:15	1.46
Chicago_Edmonton_24hr_25Yr	18:20	1.45
Chicago_Edmonton_24hr_25Yr	18:25	1.44
Chicago_Edmonton_24hr_25Yr	18:30	1.44
Chicago_Edmonton_24hr_25Yr	18:35	1.43
Chicago_Edmonton_24hr_25Yr	18:40	1.42
Chicago_Edmonton_24hr_25Yr	18:45	1.42
Chicago_Edmonton_24hr_25Yr	18:50	1.41
Chicago_Edmonton_24hr_25Yr	18:55	1.40
Chicago_Edmonton_24hr_25Yr	19:00	1.39
Chicago_Edmonton_24hr_25Yr	19:05	1.39
Chicago_Edmonton_24hr_25Yr	19:10	1.38
Chicago_Edmonton_24hr_25Yr	19:15	1.37
Chicago_Edmonton_24hr_25Yr	19:20	1.37
Chicago_Edmonton_24hr_25Yr	19:25	1.36
Chicago_Edmonton_24hr_25Yr	19:30	1.35
Chicago_Edmonton_24hr_25Yr	19:35	1.35
Chicago_Edmonton_24hr_25Yr	19:40	1.34
Chicago_Edmonton_24hr_25Yr	19:45	1.33
Chicago_Edmonton_24hr_25Yr	19:50	1.33
Chicago_Edmonton_24hr_25Yr	19:55	1.32
Chicago_Edmonton_24hr_25Yr	20:00	1.31
Chicago_Edmonton_24hr_25Yr	20:05	1.31
Chicago_Edmonton_24hr_25Yr	20:10	1.30
Chicago_Edmonton_24hr_25Yr	20:15	1.30
Chicago_Edmonton_24hr_25Yr	20:20	1.29
Chicago_Edmonton_24hr_25Yr	20:25	1.29
Chicago_Edmonton_24hr_25Yr	20:30	1.28
Chicago_Edmonton_24hr_25Yr	20:35	1.27
Chicago_Edmonton_24hr_25Yr	20:40	1.27
Chicago_Edmonton_24hr_25Yr	20:45	1.26
Chicago_Edmonton_24hr_25Yr	20:50	1.26
Chicago_Edmonton_24hr_25Yr	20:55	1.25
Chicago_Edmonton_24hr_25Yr	21:00	1.25
Chicago_Edmonton_24hr_25Yr	21:05	1.24
Chicago_Edmonton_24hr_25Yr	21:10	1.24
Chicago_Edmonton_24hr_25Yr	21:15	1.23
Chicago_Edmonton_24hr_25Yr	21:20	1.23
Chicago_Edmonton_24hr_25Yr	21:25	1.22
Chicago_Edmonton_24hr_25Yr	21:30	1.22
Chicago_Edmonton_24hr_25Yr	21:35	1.21
Chicago_Edmonton_24hr_25Yr	21:40	1.20
Chicago_Edmonton_24hr_25Yr	21:45	1.20
Chicago_Edmonton_24hr_25Yr	21:50	1.20
Chicago_Edmonton_24hr_25Yr	21:55	1.19
Chicago_Edmonton_24hr_25Yr	22:00	1.19
Chicago_Edmonton_24hr_25Yr	22:05	1.18
Chicago_Edmonton_24hr_25Yr	22:10	1.18
Chicago_Edmonton_24hr_25Yr	22:15	1.17
Chicago_Edmonton_24hr_25Yr	22:20	1.17
Chicago_Edmonton_24hr_25Yr	22:25	1.16
Chicago_Edmonton_24hr_25Yr	22:30	1.16
Chicago_Edmonton_24hr_25Yr	22:35	1.15
Chicago_Edmonton_24hr_25Yr	22:40	1.15
Chicago_Edmonton_24hr_25Yr	22:45	1.15
Chicago_Edmonton_24hr_25Yr	22:50	1.14
Chicago_Edmonton_24hr_25Yr	22:55	1.14
Chicago_Edmonton_24hr_25Yr	23:00	1.13
Chicago_Edmonton_24hr_25Yr	23:05	1.13
Chicago_Edmonton_24hr_25Yr	23:10	1.12
Chicago_Edmonton_24hr_25Yr	23:15	1.12
Chicago_Edmonton_24hr_25Yr	23:20	1.12

Chicago_Edmonton_24hr_25Yr	23:25	1.11
Chicago_Edmonton_24hr_25Yr	23:30	1.11
Chicago_Edmonton_24hr_25Yr	23:35	1.10
Chicago_Edmonton_24hr_25Yr	23:40	1.10
Chicago_Edmonton_24hr_25Yr	23:45	1.10
Chicago_Edmonton_24hr_25Yr	23:50	1.09
Chicago_Edmonton_24hr_25Yr	23:55	1.09
Chicago_Edmonton_24hr_25Yr	24:00	1.08

;Total = 43 mm,unit mm/hr

Chicago_Edmonton_24hr_2Yr	0:00	0.53
Chicago_Edmonton_24hr_2Yr	0:05	0.53
Chicago_Edmonton_24hr_2Yr	0:10	0.53
Chicago_Edmonton_24hr_2Yr	0:15	0.53
Chicago_Edmonton_24hr_2Yr	0:20	0.54
Chicago_Edmonton_24hr_2Yr	0:25	0.54
Chicago_Edmonton_24hr_2Yr	0:30	0.55
Chicago_Edmonton_24hr_2Yr	0:35	0.55
Chicago_Edmonton_24hr_2Yr	0:40	0.56
Chicago_Edmonton_24hr_2Yr	0:45	0.56
Chicago_Edmonton_24hr_2Yr	0:50	0.57
Chicago_Edmonton_24hr_2Yr	0:55	0.57
Chicago_Edmonton_24hr_2Yr	1:00	0.58
Chicago_Edmonton_24hr_2Yr	1:05	0.59
Chicago_Edmonton_24hr_2Yr	1:10	0.59
Chicago_Edmonton_24hr_2Yr	1:15	0.60
Chicago_Edmonton_24hr_2Yr	1:20	0.60
Chicago_Edmonton_24hr_2Yr	1:25	0.61
Chicago_Edmonton_24hr_2Yr	1:30	0.62
Chicago_Edmonton_24hr_2Yr	1:35	0.62
Chicago_Edmonton_24hr_2Yr	1:40	0.63
Chicago_Edmonton_24hr_2Yr	1:45	0.64
Chicago_Edmonton_24hr_2Yr	1:50	0.64
Chicago_Edmonton_24hr_2Yr	1:55	0.65
Chicago_Edmonton_24hr_2Yr	2:00	0.66
Chicago_Edmonton_24hr_2Yr	2:05	0.67
Chicago_Edmonton_24hr_2Yr	2:10	0.67
Chicago_Edmonton_24hr_2Yr	2:15	0.68
Chicago_Edmonton_24hr_2Yr	2:20	0.69
Chicago_Edmonton_24hr_2Yr	2:25	0.70
Chicago_Edmonton_24hr_2Yr	2:30	0.71
Chicago_Edmonton_24hr_2Yr	2:35	0.72
Chicago_Edmonton_24hr_2Yr	2:40	0.73
Chicago_Edmonton_24hr_2Yr	2:45	0.74
Chicago_Edmonton_24hr_2Yr	2:50	0.75
Chicago_Edmonton_24hr_2Yr	2:55	0.76
Chicago_Edmonton_24hr_2Yr	3:00	0.77
Chicago_Edmonton_24hr_2Yr	3:05	0.78
Chicago_Edmonton_24hr_2Yr	3:10	0.79
Chicago_Edmonton_24hr_2Yr	3:15	0.80
Chicago_Edmonton_24hr_2Yr	3:20	0.82
Chicago_Edmonton_24hr_2Yr	3:25	0.83
Chicago_Edmonton_24hr_2Yr	3:30	0.84
Chicago_Edmonton_24hr_2Yr	3:35	0.86
Chicago_Edmonton_24hr_2Yr	3:40	0.87
Chicago_Edmonton_24hr_2Yr	3:45	0.89
Chicago_Edmonton_24hr_2Yr	3:50	0.90
Chicago_Edmonton_24hr_2Yr	3:55	0.92
Chicago_Edmonton_24hr_2Yr	4:00	0.94
Chicago_Edmonton_24hr_2Yr	4:05	0.95
Chicago_Edmonton_24hr_2Yr	4:10	0.97
Chicago_Edmonton_24hr_2Yr	4:15	0.99
Chicago_Edmonton_24hr_2Yr	4:20	1.01
Chicago_Edmonton_24hr_2Yr	4:25	1.04
Chicago_Edmonton_24hr_2Yr	4:30	1.06
Chicago_Edmonton_24hr_2Yr	4:35	1.08
Chicago_Edmonton_24hr_2Yr	4:40	1.11
Chicago_Edmonton_24hr_2Yr	4:45	1.14
Chicago_Edmonton_24hr_2Yr	4:50	1.17

Chicago_Edmonton_24hr_2Yr	4:55	1.20
Chicago_Edmonton_24hr_2Yr	5:00	1.23
Chicago_Edmonton_24hr_2Yr	5:05	1.27
Chicago_Edmonton_24hr_2Yr	5:10	1.30
Chicago_Edmonton_24hr_2Yr	5:15	1.35
Chicago_Edmonton_24hr_2Yr	5:20	1.39
Chicago_Edmonton_24hr_2Yr	5:25	1.44
Chicago_Edmonton_24hr_2Yr	5:30	1.49
Chicago_Edmonton_24hr_2Yr	5:35	1.55
Chicago_Edmonton_24hr_2Yr	5:40	1.61
Chicago_Edmonton_24hr_2Yr	5:45	1.68
Chicago_Edmonton_24hr_2Yr	5:50	1.75
Chicago_Edmonton_24hr_2Yr	5:55	1.84
Chicago_Edmonton_24hr_2Yr	6:00	1.93
Chicago_Edmonton_24hr_2Yr	6:05	2.04
Chicago_Edmonton_24hr_2Yr	6:10	2.17
Chicago_Edmonton_24hr_2Yr	6:15	2.31
Chicago_Edmonton_24hr_2Yr	6:20	2.48
Chicago_Edmonton_24hr_2Yr	6:25	2.69
Chicago_Edmonton_24hr_2Yr	6:30	2.94
Chicago_Edmonton_24hr_2Yr	6:35	3.25
Chicago_Edmonton_24hr_2Yr	6:40	3.66
Chicago_Edmonton_24hr_2Yr	6:45	4.21
Chicago_Edmonton_24hr_2Yr	6:50	5.03
Chicago_Edmonton_24hr_2Yr	6:55	6.37
Chicago_Edmonton_24hr_2Yr	7:00	9.09
Chicago_Edmonton_24hr_2Yr	7:05	19.43
Chicago_Edmonton_24hr_2Yr	7:10	80.63
Chicago_Edmonton_24hr_2Yr	7:15	26.08
Chicago_Edmonton_24hr_2Yr	7:20	15.23
Chicago_Edmonton_24hr_2Yr	7:25	11.14
Chicago_Edmonton_24hr_2Yr	7:30	8.95
Chicago_Edmonton_24hr_2Yr	7:35	7.56
Chicago_Edmonton_24hr_2Yr	7:40	6.59
Chicago_Edmonton_24hr_2Yr	7:45	5.88
Chicago_Edmonton_24hr_2Yr	7:50	5.32
Chicago_Edmonton_24hr_2Yr	7:55	4.88
Chicago_Edmonton_24hr_2Yr	8:00	4.51
Chicago_Edmonton_24hr_2Yr	8:05	4.20
Chicago_Edmonton_24hr_2Yr	8:10	3.94
Chicago_Edmonton_24hr_2Yr	8:15	3.72
Chicago_Edmonton_24hr_2Yr	8:20	3.52
Chicago_Edmonton_24hr_2Yr	8:25	3.35
Chicago_Edmonton_24hr_2Yr	8:30	3.20
Chicago_Edmonton_24hr_2Yr	8:35	3.06
Chicago_Edmonton_24hr_2Yr	8:40	2.93
Chicago_Edmonton_24hr_2Yr	8:45	2.82
Chicago_Edmonton_24hr_2Yr	8:50	2.72
Chicago_Edmonton_24hr_2Yr	8:55	2.62
Chicago_Edmonton_24hr_2Yr	9:00	2.51
Chicago_Edmonton_24hr_2Yr	9:05	2.46
Chicago_Edmonton_24hr_2Yr	9:10	2.38
Chicago_Edmonton_24hr_2Yr	9:15	2.31
Chicago_Edmonton_24hr_2Yr	9:20	2.25
Chicago_Edmonton_24hr_2Yr	9:25	2.19
Chicago_Edmonton_24hr_2Yr	9:30	2.13
Chicago_Edmonton_24hr_2Yr	9:35	2.08
Chicago_Edmonton_24hr_2Yr	9:40	2.03
Chicago_Edmonton_24hr_2Yr	9:45	1.98
Chicago_Edmonton_24hr_2Yr	9:50	1.93
Chicago_Edmonton_24hr_2Yr	9:55	1.89
Chicago_Edmonton_24hr_2Yr	10:00	1.85
Chicago_Edmonton_24hr_2Yr	10:05	1.81
Chicago_Edmonton_24hr_2Yr	10:10	1.78
Chicago_Edmonton_24hr_2Yr	10:15	1.74
Chicago_Edmonton_24hr_2Yr	10:20	1.71
Chicago_Edmonton_24hr_2Yr	10:25	1.68
Chicago_Edmonton_24hr_2Yr	10:30	1.65
Chicago_Edmonton_24hr_2Yr	10:35	1.62

Chicago_Edmonton_24hr_2Yr	10:40	1.59
Chicago_Edmonton_24hr_2Yr	10:45	1.56
Chicago_Edmonton_24hr_2Yr	10:50	1.54
Chicago_Edmonton_24hr_2Yr	10:55	1.51
Chicago_Edmonton_24hr_2Yr	11:00	1.49
Chicago_Edmonton_24hr_2Yr	11:05	1.47
Chicago_Edmonton_24hr_2Yr	11:10	1.44
Chicago_Edmonton_24hr_2Yr	11:15	1.42
Chicago_Edmonton_24hr_2Yr	11:20	1.40
Chicago_Edmonton_24hr_2Yr	11:25	1.38
Chicago_Edmonton_24hr_2Yr	11:30	1.36
Chicago_Edmonton_24hr_2Yr	11:35	1.35
Chicago_Edmonton_24hr_2Yr	11:40	1.33
Chicago_Edmonton_24hr_2Yr	11:45	1.31
Chicago_Edmonton_24hr_2Yr	11:50	1.29
Chicago_Edmonton_24hr_2Yr	11:55	1.28
Chicago_Edmonton_24hr_2Yr	12:00	1.26
Chicago_Edmonton_24hr_2Yr	12:05	1.25
Chicago_Edmonton_24hr_2Yr	12:10	1.23
Chicago_Edmonton_24hr_2Yr	12:15	1.22
Chicago_Edmonton_24hr_2Yr	12:20	1.20
Chicago_Edmonton_24hr_2Yr	12:25	1.19
Chicago_Edmonton_24hr_2Yr	12:30	1.17
Chicago_Edmonton_24hr_2Yr	12:35	1.16
Chicago_Edmonton_24hr_2Yr	12:40	1.15
Chicago_Edmonton_24hr_2Yr	12:45	1.14
Chicago_Edmonton_24hr_2Yr	12:50	1.12
Chicago_Edmonton_24hr_2Yr	12:55	1.11
Chicago_Edmonton_24hr_2Yr	13:00	1.10
Chicago_Edmonton_24hr_2Yr	13:05	1.09
Chicago_Edmonton_24hr_2Yr	13:10	1.08
Chicago_Edmonton_24hr_2Yr	13:15	1.07
Chicago_Edmonton_24hr_2Yr	13:20	1.06
Chicago_Edmonton_24hr_2Yr	13:25	1.05
Chicago_Edmonton_24hr_2Yr	13:30	1.04
Chicago_Edmonton_24hr_2Yr	13:35	1.03
Chicago_Edmonton_24hr_2Yr	13:40	1.02
Chicago_Edmonton_24hr_2Yr	13:45	1.01
Chicago_Edmonton_24hr_2Yr	13:50	1.00
Chicago_Edmonton_24hr_2Yr	13:55	0.99
Chicago_Edmonton_24hr_2Yr	14:00	0.98
Chicago_Edmonton_24hr_2Yr	14:05	0.98
Chicago_Edmonton_24hr_2Yr	14:10	0.97
Chicago_Edmonton_24hr_2Yr	14:15	0.96
Chicago_Edmonton_24hr_2Yr	14:20	0.95
Chicago_Edmonton_24hr_2Yr	14:25	0.94
Chicago_Edmonton_24hr_2Yr	14:30	0.94
Chicago_Edmonton_24hr_2Yr	14:35	0.93
Chicago_Edmonton_24hr_2Yr	14:40	0.92
Chicago_Edmonton_24hr_2Yr	14:45	0.91
Chicago_Edmonton_24hr_2Yr	14:50	0.91
Chicago_Edmonton_24hr_2Yr	14:55	0.90
Chicago_Edmonton_24hr_2Yr	15:00	0.89
Chicago_Edmonton_24hr_2Yr	15:05	0.89
Chicago_Edmonton_24hr_2Yr	15:10	0.88
Chicago_Edmonton_24hr_2Yr	15:15	0.87
Chicago_Edmonton_24hr_2Yr	15:20	0.87
Chicago_Edmonton_24hr_2Yr	15:25	0.86
Chicago_Edmonton_24hr_2Yr	15:30	0.85
Chicago_Edmonton_24hr_2Yr	15:35	0.85
Chicago_Edmonton_24hr_2Yr	15:40	0.84
Chicago_Edmonton_24hr_2Yr	15:45	0.84
Chicago_Edmonton_24hr_2Yr	15:50	0.83
Chicago_Edmonton_24hr_2Yr	15:55	0.82
Chicago_Edmonton_24hr_2Yr	16:00	0.82
Chicago_Edmonton_24hr_2Yr	16:05	0.81
Chicago_Edmonton_24hr_2Yr	16:10	0.81
Chicago_Edmonton_24hr_2Yr	16:15	0.80
Chicago_Edmonton_24hr_2Yr	16:20	0.80

Chicago_Edmonton_24hr_2Yr	16:25	0.79
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Chicago_Edmonton_24hr_2Yr	16:35	0.78
Chicago_Edmonton_24hr_2Yr	16:40	0.78
Chicago_Edmonton_24hr_2Yr	16:45	0.77
Chicago_Edmonton_24hr_2Yr	16:50	0.77
Chicago_Edmonton_24hr_2Yr	16:55	0.76
Chicago_Edmonton_24hr_2Yr	17:00	0.76
Chicago_Edmonton_24hr_2Yr	17:05	0.75
Chicago_Edmonton_24hr_2Yr	17:10	0.75
Chicago_Edmonton_24hr_2Yr	17:15	0.74
Chicago_Edmonton_24hr_2Yr	17:20	0.74
Chicago_Edmonton_24hr_2Yr	17:25	0.74
Chicago_Edmonton_24hr_2Yr	17:30	0.73
Chicago_Edmonton_24hr_2Yr	17:35	0.73
Chicago_Edmonton_24hr_2Yr	17:40	0.72
Chicago_Edmonton_24hr_2Yr	17:45	0.72
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Chicago_Edmonton_24hr_2Yr	18:00	0.71
Chicago_Edmonton_24hr_2Yr	18:05	0.70
Chicago_Edmonton_24hr_2Yr	18:10	0.70
Chicago_Edmonton_24hr_2Yr	18:15	0.70
Chicago_Edmonton_24hr_2Yr	18:20	0.69
Chicago_Edmonton_24hr_2Yr	18:25	0.69
Chicago_Edmonton_24hr_2Yr	18:30	0.69
Chicago_Edmonton_24hr_2Yr	18:35	0.68
Chicago_Edmonton_24hr_2Yr	18:40	0.68
Chicago_Edmonton_24hr_2Yr	18:45	0.67
Chicago_Edmonton_24hr_2Yr	18:50	0.67
Chicago_Edmonton_24hr_2Yr	18:55	0.67
Chicago_Edmonton_24hr_2Yr	19:00	0.66
Chicago_Edmonton_24hr_2Yr	19:05	0.66
Chicago_Edmonton_24hr_2Yr	19:10	0.66
Chicago_Edmonton_24hr_2Yr	19:15	0.65
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Chicago_Edmonton_24hr_2Yr	19:50	0.63
Chicago_Edmonton_24hr_2Yr	19:55	0.63
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Chicago_Edmonton_24hr_2Yr	20:15	0.62
Chicago_Edmonton_24hr_2Yr	20:20	0.62
Chicago_Edmonton_24hr_2Yr	20:25	0.61
Chicago_Edmonton_24hr_2Yr	20:30	0.61
Chicago_Edmonton_24hr_2Yr	20:35	0.61
Chicago_Edmonton_24hr_2Yr	20:40	0.60
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Chicago_Edmonton_24hr_2Yr	20:55	0.60
Chicago_Edmonton_24hr_2Yr	21:00	0.59
Chicago_Edmonton_24hr_2Yr	21:05	0.59
Chicago_Edmonton_24hr_2Yr	21:10	0.59
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Chicago_Edmonton_24hr_2Yr	21:20	0.58
Chicago_Edmonton_24hr_2Yr	21:25	0.58
Chicago_Edmonton_24hr_2Yr	21:30	0.58
Chicago_Edmonton_24hr_2Yr	21:35	0.58
Chicago_Edmonton_24hr_2Yr	21:40	0.57
Chicago_Edmonton_24hr_2Yr	21:45	0.57
Chicago_Edmonton_24hr_2Yr	21:50	0.57
Chicago_Edmonton_24hr_2Yr	21:55	0.57
Chicago_Edmonton_24hr_2Yr	22:00	0.57
Chicago_Edmonton_24hr_2Yr	22:05	0.56

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Chicago_Edmonton_24hr_2Yr           22:15      0.56
Chicago_Edmonton_24hr_2Yr           22:20      0.56
Chicago_Edmonton_24hr_2Yr           22:25      0.55
Chicago_Edmonton_24hr_2Yr           22:30      0.55
Chicago_Edmonton_24hr_2Yr           22:35      0.55
Chicago_Edmonton_24hr_2Yr           22:40      0.55
Chicago_Edmonton_24hr_2Yr           22:45      0.55
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Chicago_Edmonton_24hr_2Yr           22:55      0.54
Chicago_Edmonton_24hr_2Yr           23:00      0.54
Chicago_Edmonton_24hr_2Yr           23:05      0.54
Chicago_Edmonton_24hr_2Yr           23:10      0.54
Chicago_Edmonton_24hr_2Yr           23:15      0.53
Chicago_Edmonton_24hr_2Yr           23:20      0.53
Chicago_Edmonton_24hr_2Yr           23:25      0.53
Chicago_Edmonton_24hr_2Yr           23:30      0.53
Chicago_Edmonton_24hr_2Yr           23:35      0.53
Chicago_Edmonton_24hr_2Yr           23:40      0.52
Chicago_Edmonton_24hr_2Yr           23:45      0.52
Chicago_Edmonton_24hr_2Yr           23:50      0.52
Chicago_Edmonton_24hr_2Yr           23:55      0.52
Chicago_Edmonton_24hr_2Yr           24:00      0.52

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Chicago_Edmonton_24hr_50Yr           0:15       1.26
Chicago_Edmonton_24hr_50Yr           0:20       1.27
Chicago_Edmonton_24hr_50Yr           0:25       1.29
Chicago_Edmonton_24hr_50Yr           0:30       1.30
Chicago_Edmonton_24hr_50Yr           0:35       1.31
Chicago_Edmonton_24hr_50Yr           0:40       1.32
Chicago_Edmonton_24hr_50Yr           0:45       1.33
Chicago_Edmonton_24hr_50Yr           0:50       1.35
Chicago_Edmonton_24hr_50Yr           0:55       1.36
Chicago_Edmonton_24hr_50Yr           1:00       1.37
Chicago_Edmonton_24hr_50Yr           1:05       1.39
Chicago_Edmonton_24hr_50Yr           1:10       1.40
Chicago_Edmonton_24hr_50Yr           1:15       1.42
Chicago_Edmonton_24hr_50Yr           1:20       1.43
Chicago_Edmonton_24hr_50Yr           1:25       1.44
Chicago_Edmonton_24hr_50Yr           1:30       1.46
Chicago_Edmonton_24hr_50Yr           1:35       1.47
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Chicago_Edmonton_24hr_50Yr           1:50       1.52
Chicago_Edmonton_24hr_50Yr           1:55       1.54
Chicago_Edmonton_24hr_50Yr           2:00       1.56
Chicago_Edmonton_24hr_50Yr           2:05       1.58
Chicago_Edmonton_24hr_50Yr           2:10       1.60
Chicago_Edmonton_24hr_50Yr           2:15       1.62
Chicago_Edmonton_24hr_50Yr           2:20       1.64
Chicago_Edmonton_24hr_50Yr           2:25       1.66
Chicago_Edmonton_24hr_50Yr           2:30       1.68
Chicago_Edmonton_24hr_50Yr           2:35       1.70
Chicago_Edmonton_24hr_50Yr           2:40       1.72
Chicago_Edmonton_24hr_50Yr           2:45       1.74
Chicago_Edmonton_24hr_50Yr           2:50       1.77
Chicago_Edmonton_24hr_50Yr           2:55       1.79
Chicago_Edmonton_24hr_50Yr           3:00       1.82
Chicago_Edmonton_24hr_50Yr           3:05       1.85
Chicago_Edmonton_24hr_50Yr           3:10       1.87
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Chicago_Edmonton_24hr_50Yr           3:20       1.93
Chicago_Edmonton_24hr_50Yr           3:25       1.96
Chicago_Edmonton_24hr_50Yr           3:30       1.99
Chicago_Edmonton_24hr_50Yr           3:35       2.03
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Chicago_Edmonton_24hr_50Yr	3:50	2.14
Chicago_Edmonton_24hr_50Yr	3:55	2.17
Chicago_Edmonton_24hr_50Yr	4:00	2.22
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Chicago_Edmonton_24hr_50Yr	4:30	2.51
Chicago_Edmonton_24hr_50Yr	4:35	2.57
Chicago_Edmonton_24hr_50Yr	4:40	2.63
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Chicago_Edmonton_24hr_50Yr	4:50	2.76
Chicago_Edmonton_24hr_50Yr	4:55	2.84
Chicago_Edmonton_24hr_50Yr	5:00	2.92
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Chicago_Edmonton_24hr_50Yr	5:25	3.41
Chicago_Edmonton_24hr_50Yr	5:30	3.53
Chicago_Edmonton_24hr_50Yr	5:35	3.66
Chicago_Edmonton_24hr_50Yr	5:40	3.81
Chicago_Edmonton_24hr_50Yr	5:45	3.97
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Chicago_Edmonton_24hr_50Yr	6:00	4.58
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Chicago_Edmonton_24hr_50Yr	6:20	5.88
Chicago_Edmonton_24hr_50Yr	6:25	6.37
Chicago_Edmonton_24hr_50Yr	6:30	6.96
Chicago_Edmonton_24hr_50Yr	6:35	7.70
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Chicago_Edmonton_24hr_50Yr	9:10	5.64
Chicago_Edmonton_24hr_50Yr	9:15	5.48
Chicago_Edmonton_24hr_50Yr	9:20	5.33

Chicago_Edmonton_24hr_50Yr	9:25	5.18
Chicago_Edmonton_24hr_50Yr	9:30	5.05
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Chicago_Edmonton_24hr_50Yr	9:40	4.80
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Chicago_Edmonton_24hr_50Yr	11:35	3.19
Chicago_Edmonton_24hr_50Yr	11:40	3.14
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Chicago_Edmonton_24hr_50Yr	11:50	3.06
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Chicago_Edmonton_24hr_50Yr	12:50	2.67
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Chicago_Edmonton_24hr_50Yr	19:55	1.49
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Chicago_Edmonton_24hr_50Yr	23:15	1.26
Chicago_Edmonton_24hr_50Yr	23:20	1.26
Chicago_Edmonton_24hr_50Yr	23:25	1.26
Chicago_Edmonton_24hr_50Yr	23:30	1.25
Chicago_Edmonton_24hr_50Yr	23:35	1.25
Chicago_Edmonton_24hr_50Yr	23:40	1.24
Chicago_Edmonton_24hr_50Yr	23:45	1.24
Chicago_Edmonton_24hr_50Yr	23:50	1.23
Chicago_Edmonton_24hr_50Yr	23:55	1.23
Chicago_Edmonton_24hr_50Yr	24:00	1.22

;Total = 61.9 mm,unit mm/hr

Chicago_Edmonton_24hr_5Yr	0:00	0.76
Chicago_Edmonton_24hr_5Yr	0:05	0.76
Chicago_Edmonton_24hr_5Yr	0:10	0.76
Chicago_Edmonton_24hr_5Yr	0:15	0.77
Chicago_Edmonton_24hr_5Yr	0:20	0.77
Chicago_Edmonton_24hr_5Yr	0:25	0.78
Chicago_Edmonton_24hr_5Yr	0:30	0.79
Chicago_Edmonton_24hr_5Yr	0:35	0.80
Chicago_Edmonton_24hr_5Yr	0:40	0.80
Chicago_Edmonton_24hr_5Yr	0:45	0.81
Chicago_Edmonton_24hr_5Yr	0:50	0.82
Chicago_Edmonton_24hr_5Yr	0:55	0.83
Chicago_Edmonton_24hr_5Yr	1:00	0.83
Chicago_Edmonton_24hr_5Yr	1:05	0.84
Chicago_Edmonton_24hr_5Yr	1:10	0.85
Chicago_Edmonton_24hr_5Yr	1:15	0.86
Chicago_Edmonton_24hr_5Yr	1:20	0.87
Chicago_Edmonton_24hr_5Yr	1:25	0.88
Chicago_Edmonton_24hr_5Yr	1:30	0.89
Chicago_Edmonton_24hr_5Yr	1:35	0.90
Chicago_Edmonton_24hr_5Yr	1:40	0.91
Chicago_Edmonton_24hr_5Yr	1:45	0.92
Chicago_Edmonton_24hr_5Yr	1:50	0.93
Chicago_Edmonton_24hr_5Yr	1:55	0.94
Chicago_Edmonton_24hr_5Yr	2:00	0.95
Chicago_Edmonton_24hr_5Yr	2:05	0.96
Chicago_Edmonton_24hr_5Yr	2:10	0.97
Chicago_Edmonton_24hr_5Yr	2:15	0.98
Chicago_Edmonton_24hr_5Yr	2:20	0.99

Chicago_Edmonton_24hr_5Yr	2:25	1.01
Chicago_Edmonton_24hr_5Yr	2:30	1.02
Chicago_Edmonton_24hr_5Yr	2:35	1.03
Chicago_Edmonton_24hr_5Yr	2:40	1.05
Chicago_Edmonton_24hr_5Yr	2:45	1.06
Chicago_Edmonton_24hr_5Yr	2:50	1.07
Chicago_Edmonton_24hr_5Yr	2:55	1.09
Chicago_Edmonton_24hr_5Yr	3:00	1.11
Chicago_Edmonton_24hr_5Yr	3:05	1.12
Chicago_Edmonton_24hr_5Yr	3:10	1.14
Chicago_Edmonton_24hr_5Yr	3:15	1.16
Chicago_Edmonton_24hr_5Yr	3:20	1.17
Chicago_Edmonton_24hr_5Yr	3:25	1.19
Chicago_Edmonton_24hr_5Yr	3:30	1.21
Chicago_Edmonton_24hr_5Yr	3:35	1.23
Chicago_Edmonton_24hr_5Yr	3:40	1.25
Chicago_Edmonton_24hr_5Yr	3:45	1.27
Chicago_Edmonton_24hr_5Yr	3:50	1.30
Chicago_Edmonton_24hr_5Yr	3:55	1.32
Chicago_Edmonton_24hr_5Yr	4:00	1.35
Chicago_Edmonton_24hr_5Yr	4:05	1.37
Chicago_Edmonton_24hr_5Yr	4:10	1.40
Chicago_Edmonton_24hr_5Yr	4:15	1.43
Chicago_Edmonton_24hr_5Yr	4:20	1.46
Chicago_Edmonton_24hr_5Yr	4:25	1.49
Chicago_Edmonton_24hr_5Yr	4:30	1.52
Chicago_Edmonton_24hr_5Yr	4:35	1.56
Chicago_Edmonton_24hr_5Yr	4:40	1.60
Chicago_Edmonton_24hr_5Yr	4:45	1.64
Chicago_Edmonton_24hr_5Yr	4:50	1.68
Chicago_Edmonton_24hr_5Yr	4:55	1.72
Chicago_Edmonton_24hr_5Yr	5:00	1.77
Chicago_Edmonton_24hr_5Yr	5:05	1.82
Chicago_Edmonton_24hr_5Yr	5:10	1.88
Chicago_Edmonton_24hr_5Yr	5:15	1.94
Chicago_Edmonton_24hr_5Yr	5:20	2.00
Chicago_Edmonton_24hr_5Yr	5:25	2.07
Chicago_Edmonton_24hr_5Yr	5:30	2.14
Chicago_Edmonton_24hr_5Yr	5:35	2.23
Chicago_Edmonton_24hr_5Yr	5:40	2.32
Chicago_Edmonton_24hr_5Yr	5:45	2.41
Chicago_Edmonton_24hr_5Yr	5:50	2.52
Chicago_Edmonton_24hr_5Yr	5:55	2.65
Chicago_Edmonton_24hr_5Yr	6:00	2.78
Chicago_Edmonton_24hr_5Yr	6:05	2.94
Chicago_Edmonton_24hr_5Yr	6:10	3.12
Chicago_Edmonton_24hr_5Yr	6:15	3.33
Chicago_Edmonton_24hr_5Yr	6:20	3.57
Chicago_Edmonton_24hr_5Yr	6:25	3.87
Chicago_Edmonton_24hr_5Yr	6:30	4.23
Chicago_Edmonton_24hr_5Yr	6:35	4.68
Chicago_Edmonton_24hr_5Yr	6:40	5.26
Chicago_Edmonton_24hr_5Yr	6:45	6.06
Chicago_Edmonton_24hr_5Yr	6:50	7.24
Chicago_Edmonton_24hr_5Yr	6:55	9.17
Chicago_Edmonton_24hr_5Yr	7:00	13.09
Chicago_Edmonton_24hr_5Yr	7:05	27.97
Chicago_Edmonton_24hr_5Yr	7:10	116.08
Chicago_Edmonton_24hr_5Yr	7:15	37.54
Chicago_Edmonton_24hr_5Yr	7:20	21.92
Chicago_Edmonton_24hr_5Yr	7:25	16.04
Chicago_Edmonton_24hr_5Yr	7:30	12.88
Chicago_Edmonton_24hr_5Yr	7:35	10.88
Chicago_Edmonton_24hr_5Yr	7:40	9.49
Chicago_Edmonton_24hr_5Yr	7:45	8.46
Chicago_Edmonton_24hr_5Yr	7:50	7.66
Chicago_Edmonton_24hr_5Yr	7:55	7.02
Chicago_Edmonton_24hr_5Yr	8:00	6.49
Chicago_Edmonton_24hr_5Yr	8:05	6.05

Chicago_Edmonton_24hr_5Yr	8:10	5.68
Chicago_Edmonton_24hr_5Yr	8:15	5.35
Chicago_Edmonton_24hr_5Yr	8:20	5.07
Chicago_Edmonton_24hr_5Yr	8:25	4.82
Chicago_Edmonton_24hr_5Yr	8:30	4.60
Chicago_Edmonton_24hr_5Yr	8:35	4.40
Chicago_Edmonton_24hr_5Yr	8:40	4.22
Chicago_Edmonton_24hr_5Yr	8:45	4.06
Chicago_Edmonton_24hr_5Yr	8:50	3.91
Chicago_Edmonton_24hr_5Yr	8:55	3.77
Chicago_Edmonton_24hr_5Yr	9:00	3.62
Chicago_Edmonton_24hr_5Yr	9:05	3.53
Chicago_Edmonton_24hr_5Yr	9:10	3.43
Chicago_Edmonton_24hr_5Yr	9:15	3.33
Chicago_Edmonton_24hr_5Yr	9:20	3.24
Chicago_Edmonton_24hr_5Yr	9:25	3.15
Chicago_Edmonton_24hr_5Yr	9:30	3.07
Chicago_Edmonton_24hr_5Yr	9:35	2.99
Chicago_Edmonton_24hr_5Yr	9:40	2.92
Chicago_Edmonton_24hr_5Yr	9:45	2.85
Chicago_Edmonton_24hr_5Yr	9:50	2.78
Chicago_Edmonton_24hr_5Yr	9:55	2.72
Chicago_Edmonton_24hr_5Yr	10:00	2.66
Chicago_Edmonton_24hr_5Yr	10:05	2.61
Chicago_Edmonton_24hr_5Yr	10:10	2.56
Chicago_Edmonton_24hr_5Yr	10:15	2.51
Chicago_Edmonton_24hr_5Yr	10:20	2.46
Chicago_Edmonton_24hr_5Yr	10:25	2.41
Chicago_Edmonton_24hr_5Yr	10:30	2.37
Chicago_Edmonton_24hr_5Yr	10:35	2.33
Chicago_Edmonton_24hr_5Yr	10:40	2.29
Chicago_Edmonton_24hr_5Yr	10:45	2.25
Chicago_Edmonton_24hr_5Yr	10:50	2.21
Chicago_Edmonton_24hr_5Yr	10:55	2.18
Chicago_Edmonton_24hr_5Yr	11:00	2.14
Chicago_Edmonton_24hr_5Yr	11:05	2.11
Chicago_Edmonton_24hr_5Yr	11:10	2.08
Chicago_Edmonton_24hr_5Yr	11:15	2.05
Chicago_Edmonton_24hr_5Yr	11:20	2.02
Chicago_Edmonton_24hr_5Yr	11:25	1.99
Chicago_Edmonton_24hr_5Yr	11:30	1.96
Chicago_Edmonton_24hr_5Yr	11:35	1.94
Chicago_Edmonton_24hr_5Yr	11:40	1.91
Chicago_Edmonton_24hr_5Yr	11:45	1.89
Chicago_Edmonton_24hr_5Yr	11:50	1.86
Chicago_Edmonton_24hr_5Yr	11:55	1.84
Chicago_Edmonton_24hr_5Yr	12:00	1.81
Chicago_Edmonton_24hr_5Yr	12:05	1.79
Chicago_Edmonton_24hr_5Yr	12:10	1.77
Chicago_Edmonton_24hr_5Yr	12:15	1.75
Chicago_Edmonton_24hr_5Yr	12:20	1.73
Chicago_Edmonton_24hr_5Yr	12:25	1.71
Chicago_Edmonton_24hr_5Yr	12:30	1.69
Chicago_Edmonton_24hr_5Yr	12:35	1.67
Chicago_Edmonton_24hr_5Yr	12:40	1.65
Chicago_Edmonton_24hr_5Yr	12:45	1.64
Chicago_Edmonton_24hr_5Yr	12:50	1.62
Chicago_Edmonton_24hr_5Yr	12:55	1.60
Chicago_Edmonton_24hr_5Yr	13:00	1.59
Chicago_Edmonton_24hr_5Yr	13:05	1.57
Chicago_Edmonton_24hr_5Yr	13:10	1.55
Chicago_Edmonton_24hr_5Yr	13:15	1.54
Chicago_Edmonton_24hr_5Yr	13:20	1.52
Chicago_Edmonton_24hr_5Yr	13:25	1.51
Chicago_Edmonton_24hr_5Yr	13:30	1.50
Chicago_Edmonton_24hr_5Yr	13:35	1.48
Chicago_Edmonton_24hr_5Yr	13:40	1.47
Chicago_Edmonton_24hr_5Yr	13:45	1.45
Chicago_Edmonton_24hr_5Yr	13:50	1.44

Chicago_Edmonton_24hr_5Yr	13:55	1.43
Chicago_Edmonton_24hr_5Yr	14:00	1.42
Chicago_Edmonton_24hr_5Yr	14:05	1.40
Chicago_Edmonton_24hr_5Yr	14:10	1.39
Chicago_Edmonton_24hr_5Yr	14:15	1.38
Chicago_Edmonton_24hr_5Yr	14:20	1.37
Chicago_Edmonton_24hr_5Yr	14:25	1.36
Chicago_Edmonton_24hr_5Yr	14:30	1.35
Chicago_Edmonton_24hr_5Yr	14:35	1.34
Chicago_Edmonton_24hr_5Yr	14:40	1.32
Chicago_Edmonton_24hr_5Yr	14:45	1.31
Chicago_Edmonton_24hr_5Yr	14:50	1.30
Chicago_Edmonton_24hr_5Yr	14:55	1.29
Chicago_Edmonton_24hr_5Yr	15:00	1.28
Chicago_Edmonton_24hr_5Yr	15:05	1.27
Chicago_Edmonton_24hr_5Yr	15:10	1.27
Chicago_Edmonton_24hr_5Yr	15:15	1.26
Chicago_Edmonton_24hr_5Yr	15:20	1.25
Chicago_Edmonton_24hr_5Yr	15:25	1.24
Chicago_Edmonton_24hr_5Yr	15:30	1.23
Chicago_Edmonton_24hr_5Yr	15:35	1.22
Chicago_Edmonton_24hr_5Yr	15:40	1.21
Chicago_Edmonton_24hr_5Yr	15:45	1.20
Chicago_Edmonton_24hr_5Yr	15:50	1.19
Chicago_Edmonton_24hr_5Yr	15:55	1.19
Chicago_Edmonton_24hr_5Yr	16:00	1.18
Chicago_Edmonton_24hr_5Yr	16:05	1.17
Chicago_Edmonton_24hr_5Yr	16:10	1.16
Chicago_Edmonton_24hr_5Yr	16:15	1.16
Chicago_Edmonton_24hr_5Yr	16:20	1.15
Chicago_Edmonton_24hr_5Yr	16:25	1.14
Chicago_Edmonton_24hr_5Yr	16:30	1.13
Chicago_Edmonton_24hr_5Yr	16:35	1.13
Chicago_Edmonton_24hr_5Yr	16:40	1.12
Chicago_Edmonton_24hr_5Yr	16:45	1.11
Chicago_Edmonton_24hr_5Yr	16:50	1.11
Chicago_Edmonton_24hr_5Yr	16:55	1.10
Chicago_Edmonton_24hr_5Yr	17:00	1.09
Chicago_Edmonton_24hr_5Yr	17:05	1.09
Chicago_Edmonton_24hr_5Yr	17:10	1.08
Chicago_Edmonton_24hr_5Yr	17:15	1.07
Chicago_Edmonton_24hr_5Yr	17:20	1.07
Chicago_Edmonton_24hr_5Yr	17:25	1.06
Chicago_Edmonton_24hr_5Yr	17:30	1.05
Chicago_Edmonton_24hr_5Yr	17:35	1.05
Chicago_Edmonton_24hr_5Yr	17:40	1.04
Chicago_Edmonton_24hr_5Yr	17:45	1.04
Chicago_Edmonton_24hr_5Yr	17:50	1.03
Chicago_Edmonton_24hr_5Yr	17:55	1.02
Chicago_Edmonton_24hr_5Yr	18:00	1.02
Chicago_Edmonton_24hr_5Yr	18:05	1.01
Chicago_Edmonton_24hr_5Yr	18:10	1.01
Chicago_Edmonton_24hr_5Yr	18:15	1.00
Chicago_Edmonton_24hr_5Yr	18:20	1.00
Chicago_Edmonton_24hr_5Yr	18:25	0.99
Chicago_Edmonton_24hr_5Yr	18:30	0.99
Chicago_Edmonton_24hr_5Yr	18:35	0.98
Chicago_Edmonton_24hr_5Yr	18:40	0.98
Chicago_Edmonton_24hr_5Yr	18:45	0.97
Chicago_Edmonton_24hr_5Yr	18:50	0.97
Chicago_Edmonton_24hr_5Yr	18:55	0.96
Chicago_Edmonton_24hr_5Yr	19:00	0.96
Chicago_Edmonton_24hr_5Yr	19:05	0.95
Chicago_Edmonton_24hr_5Yr	19:10	0.95
Chicago_Edmonton_24hr_5Yr	19:15	0.94
Chicago_Edmonton_24hr_5Yr	19:20	0.94
Chicago_Edmonton_24hr_5Yr	19:25	0.93
Chicago_Edmonton_24hr_5Yr	19:30	0.93
Chicago_Edmonton_24hr_5Yr	19:35	0.92

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Chicago_Edmonton_24hr_5Yr           19:40      0.92
Chicago_Edmonton_24hr_5Yr           19:45      0.92
Chicago_Edmonton_24hr_5Yr           19:50      0.91
Chicago_Edmonton_24hr_5Yr           19:55      0.91
Chicago_Edmonton_24hr_5Yr           20:00      0.90
Chicago_Edmonton_24hr_5Yr           20:05      0.90
Chicago_Edmonton_24hr_5Yr           20:10      0.89
Chicago_Edmonton_24hr_5Yr           20:15      0.89
Chicago_Edmonton_24hr_5Yr           20:20      0.89
Chicago_Edmonton_24hr_5Yr           20:25      0.88
Chicago_Edmonton_24hr_5Yr           20:30      0.88
Chicago_Edmonton_24hr_5Yr           20:35      0.87
Chicago_Edmonton_24hr_5Yr           20:40      0.87
Chicago_Edmonton_24hr_5Yr           20:45      0.87
Chicago_Edmonton_24hr_5Yr           20:50      0.86
Chicago_Edmonton_24hr_5Yr           20:55      0.86
Chicago_Edmonton_24hr_5Yr           21:00      0.86
Chicago_Edmonton_24hr_5Yr           21:05      0.85
Chicago_Edmonton_24hr_5Yr           21:10      0.85
Chicago_Edmonton_24hr_5Yr           21:15      0.84
Chicago_Edmonton_24hr_5Yr           21:20      0.84
Chicago_Edmonton_24hr_5Yr           21:25      0.84
Chicago_Edmonton_24hr_5Yr           21:30      0.83
Chicago_Edmonton_24hr_5Yr           21:35      0.83
Chicago_Edmonton_24hr_5Yr           21:40      0.83
Chicago_Edmonton_24hr_5Yr           21:45      0.82
Chicago_Edmonton_24hr_5Yr           21:50      0.82
Chicago_Edmonton_24hr_5Yr           21:55      0.82
Chicago_Edmonton_24hr_5Yr           22:00      0.81
Chicago_Edmonton_24hr_5Yr           22:05      0.81
Chicago_Edmonton_24hr_5Yr           22:10      0.81
Chicago_Edmonton_24hr_5Yr           22:15      0.80
Chicago_Edmonton_24hr_5Yr           22:20      0.80
Chicago_Edmonton_24hr_5Yr           22:25      0.80
Chicago_Edmonton_24hr_5Yr           22:30      0.79
Chicago_Edmonton_24hr_5Yr           22:35      0.79
Chicago_Edmonton_24hr_5Yr           22:40      0.79
Chicago_Edmonton_24hr_5Yr           22:45      0.79
Chicago_Edmonton_24hr_5Yr           22:50      0.78
Chicago_Edmonton_24hr_5Yr           22:55      0.78
Chicago_Edmonton_24hr_5Yr           23:00      0.78
Chicago_Edmonton_24hr_5Yr           23:05      0.77
Chicago_Edmonton_24hr_5Yr           23:10      0.77
Chicago_Edmonton_24hr_5Yr           23:15      0.77
Chicago_Edmonton_24hr_5Yr           23:20      0.77
Chicago_Edmonton_24hr_5Yr           23:25      0.76
Chicago_Edmonton_24hr_5Yr           23:30      0.76
Chicago_Edmonton_24hr_5Yr           23:35      0.76
Chicago_Edmonton_24hr_5Yr           23:40      0.75
Chicago_Edmonton_24hr_5Yr           23:45      0.75
Chicago_Edmonton_24hr_5Yr           23:50      0.75
Chicago_Edmonton_24hr_5Yr           23:55      0.75
Chicago_Edmonton_24hr_5Yr           24:00      0.74

;24 hr  Precipitation(IDF)+24 Hr "0"
Chicago_Edmonton_48hr 08/01/23   0:00       1.40
Chicago_Edmonton_48hr 08/01/23   0:05       1.40
Chicago_Edmonton_48hr 08/01/23   0:10       1.40
Chicago_Edmonton_48hr 08/01/23   0:15       1.41
Chicago_Edmonton_48hr 08/01/23   0:20       1.42
Chicago_Edmonton_48hr 08/01/23   0:25       1.43
Chicago_Edmonton_48hr 08/01/23   0:30       1.45
Chicago_Edmonton_48hr 08/01/23   0:35       1.46
Chicago_Edmonton_48hr 08/01/23   0:40       1.47
Chicago_Edmonton_48hr 08/01/23   0:45       1.49
Chicago_Edmonton_48hr 08/01/23   0:50       1.50
......
Too many data points (577 in total).
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;Total=113.6 mm. unit mm/hr
Chicago-Edmonton_24hr_100yr	0:00	1.40
Chicago-Edmonton_24hr_100yr	0:05	1.39
Chicago-Edmonton_24hr_100yr	0:10	1.40
Chicago-Edmonton_24hr_100yr	0:15	1.41
Chicago-Edmonton_24hr_100yr	0:20	1.42
Chicago-Edmonton_24hr_100yr	0:25	1.43
Chicago-Edmonton_24hr_100yr	0:30	1.45
Chicago-Edmonton_24hr_100yr	0:35	1.46
Chicago-Edmonton_24hr_100yr	0:40	1.47
Chicago-Edmonton_24hr_100yr	0:45	1.49
Chicago-Edmonton_24hr_100yr	0:50	1.50
Chicago-Edmonton_24hr_100yr	0:55	1.52
Chicago-Edmonton_24hr_100yr	1:00	1.53
Chicago-Edmonton_24hr_100yr	1:05	1.55
Chicago-Edmonton_24hr_100yr	1:10	1.56
Chicago-Edmonton_24hr_100yr	1:15	1.58
Chicago-Edmonton_24hr_100yr	1:20	1.59
Chicago-Edmonton_24hr_100yr	1:25	1.61
Chicago-Edmonton_24hr_100yr	1:30	1.63
Chicago-Edmonton_24hr_100yr	1:35	1.64
Chicago-Edmonton_24hr_100yr	1:40	1.66
Chicago-Edmonton_24hr_100yr	1:45	1.68
Chicago-Edmonton_24hr_100yr	1:50	1.70
Chicago-Edmonton_24hr_100yr	1:55	1.72
Chicago-Edmonton_24hr_100yr	2:00	1.74
Chicago-Edmonton_24hr_100yr	2:05	1.76
Chicago-Edmonton_24hr_100yr	2:10	1.78
Chicago-Edmonton_24hr_100yr	2:15	1.80
Chicago-Edmonton_24hr_100yr	2:20	1.82
Chicago-Edmonton_24hr_100yr	2:25	1.85
Chicago-Edmonton_24hr_100yr	2:30	1.87
Chicago-Edmonton_24hr_100yr	2:35	1.89
Chicago-Edmonton_24hr_100yr	2:40	1.92
Chicago-Edmonton_24hr_100yr	2:45	1.95
Chicago-Edmonton_24hr_100yr	2:50	1.97
Chicago-Edmonton_24hr_100yr	2:55	2.00
Chicago-Edmonton_24hr_100yr	3:00	2.03
Chicago-Edmonton_24hr_100yr	3:05	2.06
Chicago-Edmonton_24hr_100yr	3:10	2.09
Chicago-Edmonton_24hr_100yr	3:15	2.12
Chicago-Edmonton_24hr_100yr	3:20	2.15
Chicago-Edmonton_24hr_100yr	3:25	2.19
Chicago-Edmonton_24hr_100yr	3:30	2.22
Chicago-Edmonton_24hr_100yr	3:35	2.26
Chicago-Edmonton_24hr_100yr	3:40	2.30
Chicago-Edmonton_24hr_100yr	3:45	2.34
Chicago-Edmonton_24hr_100yr	3:50	2.38
Chicago-Edmonton_24hr_100yr	3:55	2.42
Chicago-Edmonton_24hr_100yr	4:00	2.47
Chicago-Edmonton_24hr_100yr	4:05	2.52
Chicago-Edmonton_24hr_100yr	4:10	2.57
Chicago-Edmonton_24hr_100yr	4:15	2.62
Chicago-Edmonton_24hr_100yr	4:20	2.68
Chicago-Edmonton_24hr_100yr	4:25	2.74
Chicago-Edmonton_24hr_100yr	4:30	2.80
Chicago-Edmonton_24hr_100yr	4:35	2.86
Chicago-Edmonton_24hr_100yr	4:40	2.93
Chicago-Edmonton_24hr_100yr	4:45	3.00
Chicago-Edmonton_24hr_100yr	4:50	3.08
Chicago-Edmonton_24hr_100yr	4:55	3.16
Chicago-Edmonton_24hr_100yr	5:00	3.25
Chicago-Edmonton_24hr_100yr	5:05	3.35
Chicago-Edmonton_24hr_100yr	5:10	3.45
Chicago-Edmonton_24hr_100yr	5:15	3.55
Chicago-Edmonton_24hr_100yr	5:20	3.67
Chicago-Edmonton_24hr_100yr	5:25	3.80
Chicago-Edmonton_24hr_100yr	5:30	3.93
Chicago-Edmonton_24hr_100yr	5:35	4.08
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Chicago-Edmonton_24hr_100yr	5:40	4.25
Chicago-Edmonton_24hr_100yr	5:45	4.43
Chicago-Edmonton_24hr_100yr	5:50	4.63
Chicago-Edmonton_24hr_100yr	5:55	4.86
Chicago-Edmonton_24hr_100yr	6:00	5.11
Chicago-Edmonton_24hr_100yr	6:05	5.40
Chicago-Edmonton_24hr_100yr	6:10	5.73
Chicago-Edmonton_24hr_100yr	6:15	6.11
Chicago-Edmonton_24hr_100yr	6:20	6.56
Chicago-Edmonton_24hr_100yr	6:25	7.10
Chicago-Edmonton_24hr_100yr	6:30	7.75
Chicago-Edmonton_24hr_100yr	6:35	8.58
Chicago-Edmonton_24hr_100yr	6:40	9.66
Chicago-Edmonton_24hr_100yr	6:45	11.13
Chicago-Edmonton_24hr_100yr	6:50	13.29
Chicago-Edmonton_24hr_100yr	6:55	16.83
Chicago-Edmonton_24hr_100yr	7:00	24.02
Chicago-Edmonton_24hr_100yr	7:05	51.33
Chicago-Edmonton_24hr_100yr	7:10	213.02
Chicago-Edmonton_24hr_100yr	7:15	68.89
Chicago-Edmonton_24hr_100yr	7:20	40.22
Chicago-Edmonton_24hr_100yr	7:25	29.44
Chicago-Edmonton_24hr_100yr	7:30	23.64
Chicago-Edmonton_24hr_100yr	7:35	19.97
Chicago-Edmonton_24hr_100yr	7:40	17.42
Chicago-Edmonton_24hr_100yr	7:45	15.52
Chicago-Edmonton_24hr_100yr	7:50	14.05
Chicago-Edmonton_24hr_100yr	7:55	12.88
Chicago-Edmonton_24hr_100yr	8:00	11.92
Chicago-Edmonton_24hr_100yr	8:05	11.11
Chicago-Edmonton_24hr_100yr	8:10	10.42
Chicago-Edmonton_24hr_100yr	8:15	9.83
Chicago-Edmonton_24hr_100yr	8:20	9.31
Chicago-Edmonton_24hr_100yr	8:25	8.85
Chicago-Edmonton_24hr_100yr	8:30	8.44
Chicago-Edmonton_24hr_100yr	8:35	8.08
Chicago-Edmonton_24hr_100yr	8:40	7.75
Chicago-Edmonton_24hr_100yr	8:45	7.45
Chicago-Edmonton_24hr_100yr	8:50	7.18
Chicago-Edmonton_24hr_100yr	8:55	6.93
Chicago-Edmonton_24hr_100yr	9:00	6.64
Chicago-Edmonton_24hr_100yr	9:05	6.49
Chicago-Edmonton_24hr_100yr	9:10	6.29
Chicago-Edmonton_24hr_100yr	9:15	6.11
Chicago-Edmonton_24hr_100yr	9:20	5.95
Chicago-Edmonton_24hr_100yr	9:25	5.77
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Chicago-Edmonton_24hr_100yr	9:35	5.49
Chicago-Edmonton_24hr_100yr	9:40	5.35
Chicago-Edmonton_24hr_100yr	9:45	5.23
Chicago-Edmonton_24hr_100yr	9:50	5.11
Chicago-Edmonton_24hr_100yr	9:55	5.00
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Chicago-Edmonton_24hr_100yr	10:05	4.79
Chicago-Edmonton_24hr_100yr	10:10	4.69
Chicago-Edmonton_24hr_100yr	10:15	4.60
Chicago-Edmonton_24hr_100yr	10:20	4.51
Chicago-Edmonton_24hr_100yr	10:25	4.43
Chicago-Edmonton_24hr_100yr	10:30	4.35
Chicago-Edmonton_24hr_100yr	10:35	4.27
Chicago-Edmonton_24hr_100yr	10:40	4.20
Chicago-Edmonton_24hr_100yr	10:45	4.13
Chicago-Edmonton_24hr_100yr	10:50	4.06
Chicago-Edmonton_24hr_100yr	10:55	4.00
Chicago-Edmonton_24hr_100yr	11:00	3.93
Chicago-Edmonton_24hr_100yr	11:05	3.87
Chicago-Edmonton_24hr_100yr	11:10	3.81
Chicago-Edmonton_24hr_100yr	11:15	3.76
Chicago-Edmonton_24hr_100yr	11:20	3.70

Chicago-Edmonton_24hr_100yr	11:25	3.65
Chicago-Edmonton_24hr_100yr	11:30	3.60
Chicago-Edmonton_24hr_100yr	11:35	3.55
Chicago-Edmonton_24hr_100yr	11:40	3.51
Chicago-Edmonton_24hr_100yr	11:45	3.46
Chicago-Edmonton_24hr_100yr	11:50	3.42
Chicago-Edmonton_24hr_100yr	11:55	3.37
Chicago-Edmonton_24hr_100yr	12:00	3.33
Chicago-Edmonton_24hr_100yr	12:05	3.29
Chicago-Edmonton_24hr_100yr	12:10	3.25
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Chicago-Edmonton_24hr_100yr	12:20	3.18
Chicago-Edmonton_24hr_100yr	12:25	3.14
Chicago-Edmonton_24hr_100yr	12:30	3.10
Chicago-Edmonton_24hr_100yr	12:35	3.07
Chicago-Edmonton_24hr_100yr	12:40	3.04
Chicago-Edmonton_24hr_100yr	12:45	3.00
Chicago-Edmonton_24hr_100yr	12:50	2.97
Chicago-Edmonton_24hr_100yr	12:55	2.94
Chicago-Edmonton_24hr_100yr	13:00	2.91
Chicago-Edmonton_24hr_100yr	13:05	2.88
Chicago-Edmonton_24hr_100yr	13:10	2.85
Chicago-Edmonton_24hr_100yr	13:15	2.82
Chicago-Edmonton_24hr_100yr	13:20	2.80
Chicago-Edmonton_24hr_100yr	13:25	2.77
Chicago-Edmonton_24hr_100yr	13:30	2.74
Chicago-Edmonton_24hr_100yr	13:35	2.72
Chicago-Edmonton_24hr_100yr	13:40	2.69
Chicago-Edmonton_24hr_100yr	13:45	2.67
Chicago-Edmonton_24hr_100yr	13:50	2.65
Chicago-Edmonton_24hr_100yr	13:55	2.62
Chicago-Edmonton_24hr_100yr	14:00	2.60
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Chicago-Edmonton_24hr_100yr	14:25	2.49
Chicago-Edmonton_24hr_100yr	14:30	2.47
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Chicago-Edmonton_24hr_100yr	14:40	2.43
Chicago-Edmonton_24hr_100yr	14:45	2.41
Chicago-Edmonton_24hr_100yr	14:50	2.39
Chicago-Edmonton_24hr_100yr	14:55	2.38
Chicago-Edmonton_24hr_100yr	15:00	2.36
Chicago-Edmonton_24hr_100yr	15:05	2.34
Chicago-Edmonton_24hr_100yr	15:10	2.32
Chicago-Edmonton_24hr_100yr	15:15	2.30
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Chicago-Edmonton_24hr_100yr	15:25	2.27
Chicago-Edmonton_24hr_100yr	15:30	2.26
Chicago-Edmonton_24hr_100yr	15:35	2.24
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Chicago-Edmonton_24hr_100yr	16:00	2.16
Chicago-Edmonton_24hr_100yr	16:05	2.15
Chicago-Edmonton_24hr_100yr	16:10	2.13
Chicago-Edmonton_24hr_100yr	16:15	2.12
Chicago-Edmonton_24hr_100yr	16:20	2.11
Chicago-Edmonton_24hr_100yr	16:25	2.09
Chicago-Edmonton_24hr_100yr	16:30	2.08
Chicago-Edmonton_24hr_100yr	16:35	2.07
Chicago-Edmonton_24hr_100yr	16:40	2.05
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Chicago-Edmonton_24hr_100yr	16:50	2.03
Chicago-Edmonton_24hr_100yr	16:55	2.02
Chicago-Edmonton_24hr_100yr	17:00	2.00
Chicago-Edmonton_24hr_100yr	17:05	1.99

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Chicago-Edmonton_24hr_100yr	17:15	1.97
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Chicago-Edmonton_24hr_100yr	18:15	1.84
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Chicago-Edmonton_24hr_100yr	20:35	1.60
Chicago-Edmonton_24hr_100yr	20:40	1.60
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Chicago-Edmonton_24hr_100yr	20:55	1.58
Chicago-Edmonton_24hr_100yr	21:00	1.57
Chicago-Edmonton_24hr_100yr	21:05	1.56
Chicago-Edmonton_24hr_100yr	21:10	1.56
Chicago-Edmonton_24hr_100yr	21:15	1.55
Chicago-Edmonton_24hr_100yr	21:20	1.54
Chicago-Edmonton_24hr_100yr	21:25	1.54
Chicago-Edmonton_24hr_100yr	21:30	1.53
Chicago-Edmonton_24hr_100yr	21:35	1.52
Chicago-Edmonton_24hr_100yr	21:40	1.52
Chicago-Edmonton_24hr_100yr	21:45	1.51
Chicago-Edmonton_24hr_100yr	21:50	1.51
Chicago-Edmonton_24hr_100yr	21:55	1.50
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Chicago-Edmonton_24hr_100yr	22:35	1.45
Chicago-Edmonton_24hr_100yr	22:40	1.45
Chicago-Edmonton_24hr_100yr	22:45	1.44
Chicago-Edmonton_24hr_100yr	22:50	1.44

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Chicago-Edmonton_24hr_100yr            22:55      1.43
Chicago-Edmonton_24hr_100yr            23:00      1.42
Chicago-Edmonton_24hr_100yr            23:05      1.42
Chicago-Edmonton_24hr_100yr            23:10      1.42
Chicago-Edmonton_24hr_100yr            23:15      1.41
Chicago-Edmonton_24hr_100yr            23:20      1.41
Chicago-Edmonton_24hr_100yr            23:25      1.40
Chicago-Edmonton_24hr_100yr            23:30      1.40
Chicago-Edmonton_24hr_100yr            23:35      1.39
Chicago-Edmonton_24hr_100yr            23:40      1.38
Chicago-Edmonton_24hr_100yr            23:45      1.38
Chicago-Edmonton_24hr_100yr            23:50      1.37
Chicago-Edmonton_24hr_100yr            23:55      1.37
Chicago-Edmonton_24hr_100yr            24:00      1.36

[REPORT]
;;Reporting Options
INPUT      YES
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS       355007.487       5962940.02425    358637.421       5963936.64075
UNITS            Meters

[COORDINATES]
;;Node           X-Coord            Y-Coord
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ESUMP1           356836.58          5963503.679
SENJ-1           356915.544         5963533.325
SENJ-2           357350.005         5963531.605
SENJ-3           358152.515         5963511.27
SESJ-1           356866.387         5963502.537
SESJ-2           357242.542         5963315.342
SESJ-3           357522.77          5963304.885
SESJ-4a          358008.743         5963289.56
SESJ-4b          358011.035         5963289.622
SESJ-5           358152.672         5963283.787
SWMFOutlet-J1    358352.884         5963318.507
SWNJ-1           355757.585         5963486.007
SWNJ-2           356253.247         5963657.479
SWNJ-3           356288.077         5963644.082
SWPerimeterD-J0  355225.337         5963708.101
SWPerimeterD-J1  355208.762         5963219.038
SWPerimeterD-J2  355445.865         5963077.145
SWSJ-1           355814.742         5963475.29
SWSJ-2           356248.781         5963323.465
SWSJ-3           356273.787         5963342.518
Wasteway-J1      358008.756         5963295.805
WasteWay-J2      358009.657         5963383.883
SEPerimeterDNO1  358469.441         5963748.081
SEPerimeterDSO1  358462.266         5962996.364
SWMFOutlet       358434.607         5963300.011
SWPerimeterDitchOutlet 356812.133         5963039.412
ContingencyPond  358010.404         5963416.28
MH-SUMP1         358405.99          5963305.441
MH-SUMP2         358411.108         5963302.753
SWMF             358151.627         5963367.451
WESTPOND         356776.179         5963503.429

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[POLYGONS]
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;;Subcatchment   X-Coord            Y-Coord           
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SEBorrowPitArea  358103.412         5963287.815       
SEBorrowPitArea  357423.454         5963312.575       
SEBorrowPitArea  357240.066         5963319.253       
SEBorrowPitArea  357233.414         5963526.019       
SEBorrowPitArea  358112.019         5963513.91        
SEPerimeterDAN   356811.576         5963835.653       
SEPerimeterDAN   356961.721         5963832.673       
SEPerimeterDAN   357503.045         5963815.687       
SEPerimeterDAN   358206.051         5963791.067       
SEPerimeterDAN   358303.201         5963792.145       
SEPerimeterDAN   358325.74          5963790.475       
SEPerimeterDAN   358472.424         5963784.357       
SEPerimeterDAN   358466.773         5963305.989       
SEPerimeterDAN   358409.685         5963304.352       
SEPerimeterDAN   358412.908         5963478.127       
SEPerimeterDAN   358413.582         5963502.743       
SEPerimeterDAN   358413.447         5963586.017       
SEPerimeterDAN   358410.019         5963606.588       
SEPerimeterDAN   358399.1           5963635.856       
SEPerimeterDAN   358384.305         5963661.445       
SEPerimeterDAN   358366.138         5963683.565       
SEPerimeterDAN   358294.232         5963745.445       
SEPerimeterDAN   358269.553         5963756.022       
SEPerimeterDAN   358252.232         5963763.445       
SEPerimeterDAN   358168.748         5963773.049       
SEPerimeterDAN   357990.279         5963779.875       
SEPerimeterDAN   357683.539         5963790.933       
SEPerimeterDAN   357132.809         5963807.697       
SEPerimeterDAN   357061.431         5963808.623       
SEPerimeterDAN   356980.494         5963809.511       
SEPerimeterDAN   356868.238         5963811.476       
SEPerimeterDAN   356812.046         5963812.104       
SEPerimeterDAN   356811.576         5963835.653       
SEPerimeterDAS   357036.289         5963071.761       
SEPerimeterDAS   357450.553         5963057.311       
SEPerimeterDAS   358102.43          5963039.919       
SEPerimeterDAS   358154.492         5963045.305       
SEPerimeterDAS   358228.495         5963054.375       
SEPerimeterDAS   358298.797         5963082.1         
SEPerimeterDAS   358356.121         5963131.862       
SEPerimeterDAS   358382.33          5963174.025       
SEPerimeterDAS   358398.284         5963217.326       
SEPerimeterDAS   358409.685         5963304.352       
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SEPerimeterDAS   358369.564         5962989.113       
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SEPerimeterDAS   358237.007         5962991.638       
SEPerimeterDAS   358167.571         5962994.794       
SEPerimeterDAS   356823.529         5963023.492       
SEPerimeterDAS   356822.895         5963071.772       
SEPerimeterDAS   357036.289         5963071.761       
SturgeonEast-N1  357059.533         5963808.582       
SturgeonEast-N1  357056.361         5963808.623       
SturgeonEast-N1  357076.922         5963809.358       
SturgeonEast-N1  357343.585         5963800.643       
SturgeonEast-N1  357346.632         5963539.878       
SturgeonEast-N1  357347.046         5963537.802       
SturgeonEast-N1  357346.938         5963524.406       
SturgeonEast-N1  356865.767         5963531.244       
SturgeonEast-N1  356865.64          5963544.111       
SturgeonEast-N1  356865.059         5963602.763       
SturgeonEast-N1  356874.672         5963645.901       
SturgeonEast-N1  356882.371         5963664.231       
SturgeonEast-N1  356900.335         5963697.226       
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SturgeonEast-N1	356913.166	5963712.99
SturgeonEast-N1	356934.796	5963736.454
SturgeonEast-N1	356961.925	5963760.65
SturgeonEast-N1	357019.526	5963793.744
SturgeonEast-N1	357035.593	5963802.686
SturgeonEast-N1	357059.533	5963808.582
SturgeonEast-N2	357346.938	5963524.406
SturgeonEast-N2	357343.585	5963800.643
SturgeonEast-N2	357761.535	5963788.525
SturgeonEast-N2	357817.051	5963785.922
SturgeonEast-N2	358096.923	5963775.858
SturgeonEast-N2	358208.591	5963771.159
SturgeonEast-N2	358247.162	5963763.445
SturgeonEast-N2	358289.162	5963745.445
SturgeonEast-N2	358333.733	5963715.445
SturgeonEast-N2	358366.138	5963683.565
SturgeonEast-N2	358384.305	5963661.445
SturgeonEast-N2	358399.1	5963635.856
SturgeonEast-N2	358410.019	5963606.588
SturgeonEast-N2	358413.447	5963586.017
SturgeonEast-N2	358413.582	5963502.743
SturgeonEast-N2	358412.908	5963478.127
SturgeonEast-N2	358408.187	5963312.445
SturgeonEast-N2	358401.733	5963326.017
SturgeonEast-N2	358394.304	5963341.446
SturgeonEast-N2	358385.27	5963365.508
SturgeonEast-N2	358360.019	5963411.731
SturgeonEast-N2	358340.166	5963438.897
SturgeonEast-N2	358327.934	5963454.187
SturgeonEast-N2	358310.351	5963472.534
SturgeonEast-N2	358277.479	5963491.646
SturgeonEast-N2	358253.78	5963503.878
SturgeonEast-N2	358230.845	5963509.229
SturgeonEast-N2	358160.514	5963516.874
SturgeonEast-N2	357346.938	5963524.406
SturgeonEast-S1	356810.225	5963480.055
SturgeonEast-S1	356810.314	5963497.583
SturgeonEast-S1	356810.5	5963534.099
SturgeonEast-S1	356806.975	5963812.104
SturgeonEast-S1	356937.836	5963810.169
SturgeonEast-S1	356975.423	5963809.511
SturgeonEast-S1	357056.361	5963808.623
SturgeonEast-S1	357035.593	5963802.686
SturgeonEast-S1	357001.419	5963783.34
SturgeonEast-S1	356961.925	5963760.65
SturgeonEast-S1	356934.796	5963736.454
SturgeonEast-S1	356905.781	5963703.917
SturgeonEast-S1	356888.669	5963675.799
SturgeonEast-S1	356879.407	5963657.174
SturgeonEast-S1	356870.145	5963625.587
SturgeonEast-S1	356865.059	5963602.763
SturgeonEast-S1	356865.767	5963531.244
SturgeonEast-S1	356946.239	5963530.1
SturgeonEast-S1	357109.907	5963527.774
SturgeonEast-S1	357172.687	5963526.882
SturgeonEast-S1	357233.414	5963526.019
SturgeonEast-S1	357240.066	5963319.253
SturgeonEast-S1	357236.532	5963066.257
SturgeonEast-S1	357197.782	5963067.841
SturgeonEast-S1	357155.981	5963068.229
SturgeonEast-S1	357093.286	5963068.951
SturgeonEast-S1	357036.289	5963071.761
SturgeonEast-S1	357002.784	5963071.763
SturgeonEast-S1	356822.895	5963071.772
SturgeonEast-S1	356810.034	5963442.633
SturgeonEast-S1	356810.225	5963480.055
;Part2: SturgeonEast-S1		
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SturgeonEast-S1	357235.601	5963525.988

SturgeonEast-S1	357233.414	5963526.019
SturgeonEast-S1	357233.414	5963526.019
SturgeonEast-S2	357240.066	5963319.253
SturgeonEast-S2	357423.454	5963312.575
SturgeonEast-S2	357519.471	5963309.078
SturgeonEast-S2	357520.768	5963309.031
SturgeonEast-S2	357519.542	5963269.41
SturgeonEast-S2	357518.682	5963054.463
SturgeonEast-S2	357236.532	5963066.257
SturgeonEast-S2	357240.066	5963319.253
STURGEONEAST-S3	357520.768	5963309.031
STURGEONEAST-S3	358009.776	5963291.225
STURGEONEAST-S3	358007.153	5963040.641
STURGEONEAST-S3	357518.682	5963054.463
STURGEONEAST-S3	357520.768	5963309.031
STURGEONEAST-S4	358009.776	5963291.225
STURGEONEAST-S4	358402.842	5963272.023
STURGEONEAST-S4	358398.284	5963217.326
STURGEONEAST-S4	358382.33	5963174.025
STURGEONEAST-S4	358356.121	5963131.862
STURGEONEAST-S4	358298.797	5963082.1
STURGEONEAST-S4	358228.495	5963054.375
STURGEONEAST-S4	358176.077	5963047.538
STURGEONEAST-S4	358102.43	5963039.919
STURGEONEAST-S4	358007.153	5963040.641
STURGEONEAST-S4	358009.776	5963291.225
SturgeonWest-N1	355313.605	5963797.368
SturgeonWest-N1	355380.242	5963851.64
SturgeonWest-N1	355444.908	5963875.091
SturgeonWest-N1	355481.75	5963880.329
SturgeonWest-N1	355765.48	5963869.626
SturgeonWest-N1	355747.58	5963488.663
SturgeonWest-N1	355250.583	5963488.176
SturgeonWest-N1	355248.602	5963564.241
SturgeonWest-N1	355249.366	5963630.621
SturgeonWest-N1	355251.491	5963664.96
SturgeonWest-N1	355263.919	5963705.022
SturgeonWest-N1	355313.605	5963797.368
SturgeonWest-N2	355747.58	5963488.663
SturgeonWest-N2	355752.215	5963679.499
SturgeonWest-N2	355764.375	5963868.521
SturgeonWest-N2	355963.393	5963864.089
SturgeonWest-N2	356303.6	5963852.881
SturgeonWest-N2	356585.13	5963848.824
SturgeonWest-N2	356806.506	5963835.653
SturgeonWest-N2	356807.143	5963803.7
SturgeonWest-N2	356678.026	5963805.012
SturgeonWest-N2	356563.224	5963779.05
SturgeonWest-N2	356489.863	5963749.845
SturgeonWest-N2	356443.789	5963731.475
SturgeonWest-N2	356401.63	5963714.311
SturgeonWest-N2	356362.488	5963689.862
SturgeonWest-N2	356333.922	5963671.232
SturgeonWest-N2	356310.324	5963656.328
SturgeonWest-N2	356284.242	5963635.214
SturgeonWest-N2	356268.096	5963658.812
SturgeonWest-N2	356249.466	5963663.78
SturgeonWest-N2	356228.352	5963660.054
SturgeonWest-N2	356191.092	5963650.118
SturgeonWest-N2	356106.734	5963621.756
SturgeonWest-N2	355993.459	5963583.305
SturgeonWest-N2	355875.623	5963543.305
SturgeonWest-N2	355747.58	5963488.663
SturgeonWest-S1	355813.192	5963098.45
SturgeonWest-S1	355735.932	5963100.761
SturgeonWest-S1	355650.002	5963103.332
SturgeonWest-S1	355479.866	5963109.614
SturgeonWest-S1	355448.69	5963121.466
SturgeonWest-S1	355432.122	5963126.827

SturgeonWest-S1	355425.3	5963129.263
SturgeonWest-S1	355405.321	5963137.547
SturgeonWest-S1	355386.805	5963144.369
SturgeonWest-S1	355360.004	5963158.013
SturgeonWest-S1	355325.894	5963185.301
SturgeonWest-S1	355297.388	5963220.385
SturgeonWest-S1	355276.191	5963257.663
SturgeonWest-S1	355258.649	5963316.137
SturgeonWest-S1	355252.801	5963395.077
SturgeonWest-S1	355251.133	5963488.181
SturgeonWest-S1	355387.291	5963489.595
SturgeonWest-S1	355747.58	5963488.663
SturgeonWest-S1	355780.207	5963472.48
SturgeonWest-S1	355817.122	5963454.17
SturgeonWest-S1	355811.721	5963098.494
SturgeonWest-S1	355813.192	5963098.45
SturgeonWest-S2	355819.923	5963452.78
SturgeonWest-S2	356156.48	5963332.281
SturgeonWest-S2	356257.625	5963300.369
SturgeonWest-S2	356334.228	5963268.414
SturgeonWest-S2	356404.289	5963228.38
SturgeonWest-S2	356420.384	5963220.098
SturgeonWest-S2	356536.783	5963169.297
SturgeonWest-S2	356624.573	5963140.393
SturgeonWest-S2	356686.526	5963129.185
SturgeonWest-S2	356725.616	5963120.961
SturgeonWest-S2	356822.403	5963109.171
SturgeonWest-S2	356822.895	5963071.772
SturgeonWest-S2	355813.192	5963098.45
SturgeonWest-S2	355819.923	5963452.78
SWMFArea	358112.019	5963513.91
SWMFArea	358194.324	5963513.199
SWMFArea	358253.78	5963503.878
SWMFArea	358277.479	5963491.646
SWMFArea	358310.351	5963472.534
SWMFArea	358327.934	5963454.187
SWMFArea	358360.019	5963411.731
SWMFArea	358385.27	5963365.508
SWMFArea	358401.733	5963326.017
SWMFArea	358408.187	5963312.445
SWMFArea	358409.685	5963304.352
SWMFArea	358409.086	5963272.879
SWMFArea	358152.804	5963284.238
SWMFArea	358103.412	5963287.815
SWMFArea	358112.019	5963513.91
SWPerimeterDA0	355185.709	5963891.34
SWPerimeterDA0	355448.574	5963882.948
SWPerimeterDA0	355481.75	5963880.329
SWPerimeterDA0	355444.908	5963875.091
SWPerimeterDA0	355380.242	5963851.64
SWPerimeterDA0	355313.605	5963797.368
SWPerimeterDA0	355263.919	5963705.022
SWPerimeterDA0	355182.162	5963707.166
SWPerimeterDA0	355185.709	5963891.34
SWPerimeterDA1	355182.162	5963707.166
SWPerimeterDA1	355263.919	5963705.022
SWPerimeterDA1	355251.491	5963664.96
SWPerimeterDA1	355249.366	5963630.621
SWPerimeterDA1	355248.602	5963564.241
SWPerimeterDA1	355250.583	5963488.176
SWPerimeterDA1	355252.801	5963395.077
SWPerimeterDA1	355258.649	5963316.137
SWPerimeterDA1	355276.191	5963257.663
SWPerimeterDA1	355306.204	5963209.534
SWPerimeterDA1	355172.484	5963218.578
SWPerimeterDA1	355182.162	5963707.166
SWPerimeterDA2	355306.204	5963209.534
SWPerimeterDA2	355307.25	5963208.247
SWPerimeterDA2	355325.894	5963185.301

SWPerimeterDA2	355360.004	5963158.013
SWPerimeterDA2	355386.805	5963144.369
SWPerimeterDA2	355405.321	5963137.547
SWPerimeterDA2	355425.3	5963129.263
SWPerimeterDA2	355448.69	5963121.466
SWPerimeterDA2	355444.562	5963098.319
SWPerimeterDA2	355445.938	5963068.989
SWPerimeterDA2	355185.561	5963075.48
SWPerimeterDA2	355173.403	5963079.771
SWPerimeterDA2	355172.688	5963111.955
SWPerimeterDA2	355172.484	5963218.578
SWPerimeterDA2	355239.105	5963216.028
SWPerimeterDA2	355270.58	5963214.823
SWPerimeterDA2	355306.204	5963209.534
SWPerimeterDA3	355538.081	5963107.54
SWPerimeterDA3	355595.5	5963104.962
SWPerimeterDA3	356417.7	5963080.367
SWPerimeterDA3	356634.006	5963074.549
SWPerimeterDA3	356822.895	5963071.772
SWPerimeterDA3	356823.229	5963046.307
SWPerimeterDA3	356823.529	5963023.492
SWPerimeterDA3	355445.938	5963068.989
SWPerimeterDA3	355446.001	5963074.486
SWPerimeterDA3	355446.064	5963079.976
SWPerimeterDA3	355432.122	5963126.827
SWPerimeterDA3	355479.866	5963109.614
SWPerimeterDA3	355538.081	5963107.54
SW-UnDevelopment	356285.484	5963632.73
SW-UnDevelopment	356362.488	5963689.862
SW-UnDevelopment	356401.63	5963714.311
SW-UnDevelopment	356443.789	5963731.475
SW-UnDevelopment	356489.863	5963749.845
SW-UnDevelopment	356563.224	5963779.05
SW-UnDevelopment	356678.026	5963805.012
SW-UnDevelopment	356807.143	5963803.7
SW-UnDevelopment	356807.845	5963768.471
SW-UnDevelopment	356808.364	5963742.43
SW-UnDevelopment	356809.859	5963667.461
SW-UnDevelopment	356743.07	5963667.841
SW-UnDevelopment	356743.055	5963638.968
SW-UnDevelopment	356742.982	5963498.327
SW-UnDevelopment	356742.905	5963349.373
SW-UnDevelopment	356809.559	5963349.441
SW-UnDevelopment	356820.369	5963260.329
SW-UnDevelopment	356820.72	5963237.281
SW-UnDevelopment	356821.182	5963202.153
SW-UnDevelopment	356821.691	5963163.417
SW-UnDevelopment	356822.403	5963109.171
SW-UnDevelopment	356725.616	5963120.961
SW-UnDevelopment	356686.526	5963129.185
SW-UnDevelopment	356624.573	5963140.393
SW-UnDevelopment	356536.783	5963169.297
SW-UnDevelopment	356420.384	5963220.098
SW-UnDevelopment	356404.289	5963228.38
SW-UnDevelopment	356361.305	5963250.498
SW-UnDevelopment	356347.615	5963259.556
SW-UnDevelopment	356334.228	5963268.414
SW-UnDevelopment	356281.424	5963291.174
SW-UnDevelopment	356257.625	5963300.369
SW-UnDevelopment	356212.191	5963316.595
SW-UnDevelopment	356156.48	5963332.281
SW-UnDevelopment	355851.848	5963436.945
SW-UnDevelopment	355747.58	5963488.663
SW-UnDevelopment	355875.623	5963543.305
SW-UnDevelopment	356146.38	5963635.214
SW-UnDevelopment	356243.256	5963665.022
SW-UnDevelopment	356268.096	5963657.57
SW-UnDevelopment	356285.484	5963632.73
WestPondArea	356809.859	5963667.461

```
WestPondArea     356810.911         5963614.679
WestPondArea     356809.559         5963349.441
WestPondArea     356742.905         5963349.373
WestPondArea     356743.07          5963667.841
WestPondArea     356809.859         5963667.461

;;Storage Node   X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Chicago_Edmonton_24hr_100Yr 356445           5963470
```

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.3)

Sturgeon West Outlet Open Post Development-1:100yr Event
WARNING 04: minimum elevation drop used for Conduit SWMFO_C
WARNING 02: maximum depth increased for Node ESUMP1
WARNING 02: maximum depth increased for Node SENJ-1
WARNING 02: maximum depth increased for Node SENJ-3
WARNING 02: maximum depth increased for Node SESJ-1
WARNING 02: maximum depth increased for Node SESJ-4b
WARNING 02: maximum depth increased for Node SESJ-5
WARNING 02: maximum depth increased for Node SWMFOutlet-J1
WARNING 02: maximum depth increased for Node SWNJ-2
WARNING 02: maximum depth increased for Node SWNJ-3
WARNING 02: maximum depth increased for Node SWPerimeterD-J1

****
Element Count
****
Number of rain gages 6
Number of subcatchments ... 20
Number of nodes 31
Number of links 27
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Chicago_Edmonton_24hr_100Yr	Chicago-Edmonton_24hr_100yr	INTENSITY	5 min.
Chicago_Edmonton_24hr_10Yr	Chicago_Edmonton_24hr_10Yr	INTENSITY	5 min.
Chicago_Edmonton_24hr_25Yr	Chicago_Edmonton_24hr_25Yr	INTENSITY	5 min.
Chicago_Edmonton_24hr_2Yr	Chicago_Edmonton_24hr_2Yr	INTENSITY	5 min.
Chicago_Edmonton_24hr_50Yr	Chicago_Edmonton_24hr_50Yr	INTENSITY	5 min.
Chicago_Edmonton_24hr_5Yr	Chicago_Edmonton_24hr_5Yr	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
SEBorrowPitArea	17.00	200.00	40.00	5.0000	Chicago_Edmonton_24hr_100Yr	ContingencyPond
SEPerimeterDAN	7.50	50.00	30.00	0.4000	Chicago_Edmonton_24hr_100Yr	SEPerimeterDNO1
SEPerimeterDAS	10.20	68.00	20.00	0.4000	Chicago_Edmonton_24hr_100Yr	SEPerimeterDSO1
SturgeonEast-N1	12.50	403.23	40.00	0.2000	Chicago_Edmonton_24hr_100Yr	SENJ-1
SturgeonEast-N2	28.00	329.41	40.00	0.2000	Chicago_Edmonton_24hr_100Yr	SENJ-3
SturgeonEast-S1	24.30	347.14	40.00	0.5000	Chicago_Edmonton_24hr_100Yr	SESJ-2
SturgeonEast-S2	7.10	394.44	40.00	0.5000	Chicago_Edmonton_24hr_100Yr	SESJ-3
STURGEONEAST-S3	11.50	500.00	40.00	0.5000	Chicago_Edmonton_24hr_100Yr	SESJ-4a
STURGEONEAST-S4	8.10	399.01	40.00	0.5000	Chicago_Edmonton_24hr_100Yr	SESJ-5
SturgeonWest-N1	18.10	452.50	40.00	0.5000	Chicago_Edmonton_24hr_100Yr	SWNJ-1
SturgeonWest-N2	19.40	400.00	40.00	0.4000	Chicago_Edmonton_24hr_100Yr	SWNJ-2
SturgeonWest-S1	20.00	400.00	40.00	0.4000	Chicago_Edmonton_24hr_100Yr	SWSJ-1
SturgeonWest-S2	17.50	397.73	40.00	0.5000	Chicago_Edmonton_24hr_100Yr	SWSJ-2
SWMFArea	3.80	304.00	100.00	5.0000	Chicago_Edmonton_24hr_100Yr	SWMF
SWPerimeterDA0	2.60	80.00	30.00	0.5000	Chicago_Edmonton_24hr_100Yr	SWPerimeterD-J0
SWPerimeterDA1	3.50	60.34	20.00	0.4000	Chicago_Edmonton_24hr_100Yr	SWPerimeterD-J1
SWPerimeterDA2	2.60	60.47	20.00	0.8000	Chicago_Edmonton_24hr_100Yr	SWPerimeterD-J2
SWPerimeterDA3	5.30	50.00	30.00	0.3000	Chicago_Edmonton_24hr_100Yr	SWPerimeterDitchOutlet
SW-UnDevelopment	39.20	500.00	40.00	0.4000	Chicago_Edmonton_24hr_100Yr	WESTPOND
WestPondArea	1.80	100.00	100.00	5.0000	Chicago_Edmonton_24hr_100Yr	WESTPOND

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
ESUMP1	JUNCTION	636.60	2.79	100.0	
SENJ-1	JUNCTION	638.00	2.10	0.0	
SENJ-2	JUNCTION	637.49	2.10	0.0	
SENJ-3	JUNCTION	633.70	2.10	0.0	
SESJ-1	JUNCTION	637.04	2.00	0.0	
SESJ-2	JUNCTION	636.22	2.80	0.0	
SESJ-3	JUNCTION	635.25	2.00	0.0	
SESJ-4a	JUNCTION	634.10	2.00	0.0	
SESJ-4b	JUNCTION	634.10	2.20	0.0	
SESJ-5	JUNCTION	633.46	2.21	0.0	
SWMFOutlet-J1	JUNCTION	630.50	6.00	0.0	
SWNJ-1	JUNCTION	642.12	2.60	0.0	
SWNJ-2	JUNCTION	640.67	2.60	0.0	
SWNJ-3	JUNCTION	640.58	2.60	0.0	
SWPerimeterD-J0	JUNCTION	652.47	0.50	0.0	
SWPerimeterD-J1	JUNCTION	646.16	1.50	0.0	
SWPerimeterD-J2	JUNCTION	644.55	1.50	0.0	
SWSJ-1	JUNCTION	642.11	2.60	0.0	
SWSJ-2	JUNCTION	640.83	2.00	0.0	
SWSJ-3	JUNCTION	640.75	2.60	0.0	
Wasteway-J1	JUNCTION	634.55	1.50	0.0	
WasteWay-J2	JUNCTION	634.20	1.50	0.0	
SEPerimeterDNO1	OUTFALL	633.90	0.00	0.0	
SEPerimeterDSO1	OUTFALL	635.20	0.00	0.0	
SWMFOutlet	OUTFALL	632.79	1.00	0.0	
SWPerimeterDitchOutlet	OUTFALL	638.74	1.50	0.0	
ContingencyPond	STORAGE	628.00	5.20	0.0	
MH-SUMP1	STORAGE	631.00	5.00	0.0	
MH-SUMP2	STORAGE	631.00	5.00	0.0	
SWMF	STORAGE	632.00	3.70	0.0	
WESTPOND	STORAGE	637.00	2.20	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
EastCSP1	ESUMP1	SESJ-1	CONDUIT	21.0	0.2857	0.0130
SENDitch-1	SENJ-1	SENJ-2	CONDUIT	410.0	0.1244	0.0100
SENDitch-2	SENJ-2	SENJ-3	CONDUIT	820.0	0.4622	0.0250
SWMFINLETDN	SENJ-3	SWMF	CONDUIT	40.0	3.1015	0.0250
SWMFINLETDS	SESJ-5	SWMF	CONDUIT	83.7	1.3147	0.0250
SWMFO_C	SWMF	SWMFOutlet-J1	CONDUIT	240.0	0.0001	0.0130
SWMFOutlet-C1	SWMFOutlet-J1	MH-SUMP1	CONDUIT	38.8	-0.7724	0.0130
SWMFOutlet-C2	MH-SUMP2	SWMFOutlet	CONDUIT	23.7	0.9045	0.0130
SWNCulvert	SWNJ-2	SWNJ-3	CONDUIT	27.0	0.3333	0.0130
SWNDitch1	SWNJ-1	SWNJ-2	CONDUIT	482.0	0.3008	0.0250
SWNDitch2	SWNJ-3	WESTPOND	CONDUIT	579.0	0.2988	0.0250
SWPerimeterDitch0	SWPerimeterD-J0	SWPerimeterD-J1	CONDUIT	715.0	0.8826	0.0250
SWPerimeterDitch1	SWPerimeterD-J1	SWPerimeterD-J2	CONDUIT	150.0	1.0734	0.0250
SWPerimeterDitch2	SWPerimeterD-J2	SWPerimeterDitchOutlet	CONDUIT	1366.9	0.4251	0.0250
SWSCulvert	SWSJ-2	SWSJ-3	CONDUIT	27.0	0.2963	0.0130
SWSDitch1	SWSJ-1	SWSJ-2	CONDUIT	410.0	0.3122	0.0250
SWSDitch2	SWSJ-3	WESTPOND	CONDUIT	815.0	0.3571	0.0250
WasteWayDiversion-1	SESJ-4a	Wasteway-J1	CONDUIT	6.2	0.8007	0.0250
WasteWayDiversion-2	Wasteway-J1	WasteWay-J2	CONDUIT	43.8	0.7991	0.0250
WasteWayDiversion-3	WasteWay-J2	ContingencyPond	CONDUIT	10.0	10.0504	0.0350
W-ECSP	WESTPOND	ESUMP1	CONDUIT	37.0	0.2973	0.0130
W-EDitch1	SESJ-1	SESJ-2	CONDUIT	310.0	0.2645	0.0250
W-EDitch2	SESJ-2	SESJ-3	CONDUIT	280.0	0.3464	0.0250
W-EDitch3	SESJ-3	SESJ-4a	CONDUIT	480.0	0.2396	0.0250
W-EDitch4	SESJ-4b	SESJ-5	CONDUIT	141.8	0.4444	0.0250

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OR1              MH-SUMP2         MH-SUMP1         ORIFICE
RockCheckDitchBlock SESJ-4a          SESJ-4b          WEIR
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Cross Section Summary
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                                     Full     Full     Hyd.     Max.   No. of     Full
Conduit          Shape              Depth     Area     Rad.    Width  Barrels     Flow
---------------------------------------------------------------------------------------
EastCSP1         CIRCULAR            1.40     1.54     0.35     1.40        1     3.14
SENDitch-1       TRAPEZOIDAL         2.10    19.74     1.08    17.80        1    73.19
SENDitch-2       TRAPEZOIDAL         2.10    19.74     1.08    17.80        1    56.44
SWMFINLETDN      TRAPEZOIDAL         2.00    20.00     1.08    18.00        1   148.47
SWMFINLETDS      TRAPEZOIDAL         1.35    11.34     0.80    13.80        1    44.92
SWMFO_C          TRAPEZOIDAL         4.50   612.00     3.55   172.00        1   123.40
SWMFOutlet-C1    CIRCULAR            1.05     0.87     0.26     1.05        1     2.40
SWMFOutlet-C2    CIRCULAR            1.00     0.79     0.25     1.00        1     2.28
SWNCulvert       CIRCULAR            1.20     1.13     0.30     1.20        1     2.25
SWNDitch1        TRAPEZOIDAL         2.60    18.72     1.37    12.40        1    50.76
SWNDitch2        TRAPEZOIDAL         2.60    18.72     1.37    12.40        1    50.59
SWPerimeterDitch0 TRAPEZOIDAL         0.50     1.50     0.35     4.00        1     2.82
SWPerimeterDitch1 TRAPEZOIDAL         1.50     7.50     0.86     8.00        1    28.14
SWPerimeterDitch2 TRAPEZOIDAL         1.50     7.50     0.86     8.00        1    17.71
SWSCulvert       CIRCULAR            1.20     1.13     0.30     1.20        1     2.12
SWSDitch1        TRAPEZOIDAL         2.00    12.00     1.10    10.00        1    28.52
SWSDitch2        TRAPEZOIDAL         2.60    18.72     1.37    12.40        1    55.30
WasteWayDiversion-1 TRAPEZOIDAL         1.50     6.75     0.82     7.50        1    21.21
WasteWayDiversion-2 TRAPEZOIDAL         1.50     6.75     0.82     7.50        1    21.19
WasteWayDiversion-3 TRAPEZOIDAL         1.00     4.00     0.55     7.00        1    24.21
W-ECSP           CIRCULAR            1.40     1.54     0.35     1.40        1     3.21
W-EDitch1        TRAPEZOIDAL         2.00    16.00     1.09    14.00        1    34.92
W-EDitch2        TRAPEZOIDAL         1.80    11.52     0.93    11.80        1    25.85
W-EDitch3        TRAPEZOIDAL         2.00    22.00     1.25    17.00        1    49.90
W-EDitch4        TRAPEZOIDAL         2.20    25.52     1.35    18.20        1    83.11
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****************
Analysis Options
****************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 08/01/2023 00:00:00
Ending Date .............. 08/03/2023 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:05:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 3.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 1
Head Tolerance ........... 0.001500 m
```

```
**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......        29.567       113.718
```

```
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........        15.352        59.047
Surface Runoff ...........        14.149        54.418
Final Storage ............         0.126         0.484
Continuity Error (%) .....        -0.204


**************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......        14.145       141.456
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         5.717        57.172
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         4.238        42.376
Final Stored Volume ......        13.963       139.635
Continuity Error (%) .....        -7.058


*************************
Highest Continuity Errors
*************************
Node SWSJ-3 (3.92%)
Node SWMFOutlet-J1 (3.14%)
Node WESTPOND (-1.17%)


***************************
Time-Step Critical Elements
***************************
Link WasteWayDiversion-1 (46.78%)


********************************
Highest Flow Instability Indexes
********************************
All links are stable.


*********************************
Most Frequent Nonconverging Nodes
*********************************
Node SEPerimeterDNO1 (1.76%)
Node SEPerimeterDSO1 (1.76%)
Node SWMFOutlet (1.76%)
Node SWPerimeterDitchOutlet (1.76%)
Node MH-SUMP2 (1.60%)


*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     0.37 sec
Average Time Step           :     2.50 sec
Maximum Time Step           :     3.00 sec
% of Time in Steady State   :     4.82
Average Iterations per Step :     2.71
% of Steps Not Converging   :     1.76
Time Step Frequencies       :
    3.000 -  2.408 sec      :    66.39 %
    2.408 -  1.933 sec      :     8.87 %
    1.933 -  1.552 sec      :     7.25 %
    1.552 -  1.246 sec      :     6.43 %
    1.246 -  1.000 sec      :    11.07 %
```

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
SEBorrowPitArea	113.72	0.00	0.00	55.47	45.25	12.86	58.12	9.88	3.46	0.511
SEPerimeterDAN	113.72	0.00	0.00	73.13	33.80	6.49	40.29	3.02	0.51	0.354
SEPerimeterDAS	113.72	0.00	0.00	84.19	22.56	6.80	29.36	3.00	0.58	0.258
SturgeonEast-N1	113.72	0.00	0.00	57.29	45.18	11.01	56.19	7.02	1.92	0.494
SturgeonEast-N2	113.72	0.00	0.00	61.32	45.06	6.93	52.00	14.56	2.45	0.457
SturgeonEast-S1	113.72	0.00	0.00	58.81	45.14	9.47	54.61	13.27	3.07	0.480
SturgeonEast-S2	113.72	0.00	0.00	54.37	45.28	14.01	59.30	4.21	1.70	0.521
STURGEONEAST-S3	113.72	0.00	0.00	55.02	45.27	13.33	58.60	6.74	2.50	0.515
STURGEONEAST-S4	113.72	0.00	0.00	54.68	45.28	13.69	58.97	4.78	1.85	0.519
SturgeonWest-N1	113.72	0.00	0.00	56.76	45.21	11.55	56.76	10.27	3.07	0.499
SturgeonWest-N2	113.72	0.00	0.00	57.84	45.17	10.44	55.61	10.79	2.82	0.489
SturgeonWest-S1	113.72	0.00	0.00	57.96	45.17	10.33	55.50	11.10	2.86	0.488
SturgeonWest-S2	113.72	0.00	0.00	57.09	45.20	11.21	56.41	9.87	2.83	0.496
SWMFArea	113.72	0.00	0.00	0.00	113.19	0.00	113.19	4.30	2.08	0.995
SWPerimeterDA0	113.72	0.00	0.00	66.00	33.95	13.69	47.64	1.24	0.42	0.419
SWPerimeterDA1	113.72	0.00	0.00	79.50	22.62	11.52	34.14	1.19	0.33	0.300
SWPerimeterDA2	113.72	0.00	0.00	76.26	22.64	14.80	37.45	0.97	0.32	0.329
SWPerimeterDA3	113.72	0.00	0.00	72.29	33.82	7.34	41.16	2.18	0.40	0.362
SW-UnDevelopment	113.72	0.00	0.00	59.68	45.11	8.59	53.70	21.05	4.35	0.472
WestPondArea	113.72	0.00	0.00	0.00	113.22	0.00	113.22	2.04	0.93	0.996

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters

ESUMP1	JUNCTION	0.71	1.60	638.20	0	08:22	1.59
SENJ-1	JUNCTION	0.05	0.46	638.46	0	07:16	0.43
SENJ-2	JUNCTION	0.07	0.45	637.94	0	07:28	0.44
SENJ-3	JUNCTION	0.05	0.36	634.06	0	07:24	0.36
SESJ-1	JUNCTION	0.18	0.69	637.73	0	08:24	0.69
SESJ-2	JUNCTION	0.29	0.86	637.08	0	08:17	0.86
SESJ-3	JUNCTION	0.15	0.56	635.81	0	08:18	0.56
SESJ-4a	JUNCTION	0.57	1.18	635.28	0	07:26	1.18
SESJ-4b	JUNCTION	0.07	0.13	634.23	0	07:28	0.13
SESJ-5	JUNCTION	0.07	0.29	633.75	0	07:16	0.27
SWMFOutlet-J1	JUNCTION	2.80	2.95	633.45	0	15:22	2.95
SWNJ-1	JUNCTION	0.07	0.63	642.75	0	07:19	0.63
SWNJ-2	JUNCTION	0.16	1.17	641.84	0	07:19	1.16
SWNJ-3	JUNCTION	0.13	0.87	641.45	0	07:27	0.86
SWPerimeterD-J0	JUNCTION	0.01	0.14	652.61	0	07:20	0.14
SWPerimeterD-J1	JUNCTION	0.02	0.17	646.33	0	07:24	0.17
SWPerimeterD-J2	JUNCTION	0.04	0.27	644.82	0	07:36	0.27
SWSJ-1	JUNCTION	0.07	0.62	642.73	0	07:19	0.62
SWSJ-2	JUNCTION	0.16	1.17	642.00	0	07:18	1.16
SWSJ-3	JUNCTION	0.10	0.78	641.53	0	07:28	0.77
Wasteway-J1	JUNCTION	0.15	0.68	635.23	0	07:26	0.68
WasteWay-J2	JUNCTION	0.10	0.45	634.65	0	07:26	0.45
SEPerimeterDNO1	OUTFALL	0.00	0.00	633.90	0	00:00	0.00
SEPerimeterDSO1	OUTFALL	0.00	0.00	635.20	0	00:00	0.00
SWMFOutlet	OUTFALL	0.22	0.29	633.08	0	15:22	0.29
SWPerimeterDitchOutlet	OUTFALL	0.02	0.17	638.91	0	07:36	0.17
ContingencyPond	STORAGE	3.08	3.75	631.75	2	00:00	3.75
MH-SUMP1	STORAGE	2.30	2.55	633.55	0	00:00	2.44
MH-SUMP2	STORAGE	2.22	2.34	633.34	0	00:00	2.29
SWMF	STORAGE	1.30	1.45	633.45	0	15:37	1.45
WESTPOND	STORAGE	1.26	2.13	639.13	0	08:22	2.13

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days	Time of Max Occurrence hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
ESUMP1	JUNCTION	0.000	3.385	0	08:22	0	53.2	0.139
SENJ-1	JUNCTION	1.915	1.915	0	07:15	7.02	7.03	-0.369
SENJ-2	JUNCTION	0.000	1.866	0	07:17	0	7.06	0.509
SENJ-3	JUNCTION	2.450	3.408	0	07:21	14.6	21.6	-0.129
SESJ-1	JUNCTION	0.000	3.848	0	08:22	0	53.1	-0.064
SESJ-2	JUNCTION	3.068	4.020	0	08:15	13.3	66.4	-0.067
SESJ-3	JUNCTION	1.703	4.183	0	08:14	4.21	70.7	-0.009
SESJ-4a	JUNCTION	2.503	4.890	0	07:21	6.74	77.4	0.533
SESJ-4b	JUNCTION	0.000	0.460	0	07:26	0	24.5	-0.003
SESJ-5	JUNCTION	1.854	2.178	0	07:15	4.77	29.3	0.017
SWMFOutlet-J1	JUNCTION	0.000	42.509	0	00:00	0	117	3.238
SWNJ-1	JUNCTION	3.070	3.070	0	07:15	10.3	10.3	-0.251
SWNJ-2	JUNCTION	2.817	5.073	0	07:17	10.8	21.1	0.086
SWNJ-3	JUNCTION	0.000	5.539	0	07:19	0	21.1	0.484
SWPerimeterD-J0	JUNCTION	0.416	0.416	0	07:15	1.24	1.24	-0.174
SWPerimeterD-J1	JUNCTION	0.329	0.550	0	07:18	1.19	2.44	-0.038
SWPerimeterD-J2	JUNCTION	0.322	0.662	0	07:22	0.973	3.41	-0.040
SWSJ-1	JUNCTION	2.857	2.857	0	07:15	11.1	11.1	-0.165
SWSJ-2	JUNCTION	2.831	4.997	0	07:17	9.87	21	0.073
SWSJ-3	JUNCTION	0.000	5.713	0	07:19	0	21	4.079
Wasteway-J1	JUNCTION	0.000	4.053	0	07:26	0	52.6	0.007
WasteWay-J2	JUNCTION	0.000	4.133	0	07:26	0	52.6	-0.011
SEPerimeterDNO1	OUTFALL	0.508	0.508	0	07:20	3.02	3.03	0.000
SEPerimeterDSO1	OUTFALL	0.581	0.581	0	07:15	2.99	3	0.000
SWMFOutlet	OUTFALL	0.000	0.425	0	15:22	0	45.6	0.000
SWPerimeterDitchOutlet	OUTFALL	0.401	0.754	0	07:31	2.18	5.6	0.000

ContingencyPond	STORAGE	3.465	5.860	0	07:23	9.88	62.4	2.021
MH-SUMP1	STORAGE	0.000	1.698	0	00:00	0	45.6	0.010
MH-SUMP2	STORAGE	0.000	0.932	0	00:00	0	45.6	-0.051
SWMF	STORAGE	2.084	8.765	0	00:02	4.3	152	0.540
WESTPOND	STORAGE	5.275	10.787	0	07:26	23.1	64.3	-1.152

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
ContingencyPond	46.608	33.7	0.0	0.0	61.214	44.2	2 00:00	0.000
MH-SUMP1	0.002	38.3	0.0	0.0	0.003	42.5	0 00:00	0.932
MH-SUMP2	0.002	4.0	0.0	0.0	0.002	4.2	0 00:00	0.425
SWMF	39.470	31.3	0.0	0.0	44.141	35.0	0 15:37	42.509
WESTPOND	13.678	50.0	0.0	0.0	26.195	95.7	0 08:22	3.385

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
SEPerimeterDNO1	97.14	0.031	0.508	3.025
SEPerimeterDSO1	87.40	0.035	0.581	2.998
SWMFOutlet	99.99	0.277	0.425	45.551
SWPerimeterDitchOutlet	99.77	0.058	0.754	5.598
System	96.07	0.401	1.765	57.172

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
EastCSP1	CONDUIT	3.848	0 08:22	3.79	1.22	0.64
SENDitch-1	CONDUIT	1.866	0 07:17	1.88	0.03	0.20
SENDitch-2	CONDUIT	1.183	0 07:27	1.15	0.02	0.19
SWMFINLETDN	CONDUIT	3.380	0 07:24	1.59	0.02	0.27
SWMFINLETDS	CONDUIT	2.038	0 07:16	0.78	0.05	0.44
SWMFO_C	CONDUIT	42.509	0 00:00	0.40	0.34	0.32

SWMFOutlet-C1	CONDUIT	1.472	0	00:00	2.02	0.61	1.00
SWMFOutlet-C2	CONDUIT	0.425	0	15:22	2.22	0.19	0.29
SWNCulvert	CONDUIT	5.539	0	07:19	6.07	2.46	0.82
SWNDitch1	CONDUIT	2.541	0	07:19	0.80	0.05	0.35
SWNDitch2	CONDUIT	3.878	0	07:27	1.54	0.08	0.28
SWPerimeterDitch0	CONDUIT	0.287	0	07:20	0.84	0.10	0.31
SWPerimeterDitch1	CONDUIT	0.474	0	07:24	1.04	0.02	0.14
SWPerimeterDitch2	CONDUIT	0.493	0	07:36	0.91	0.03	0.15
SWSCulvert	CONDUIT	5.713	0	07:19	6.58	2.69	0.79
SWSDitch1	CONDUIT	2.510	0	07:19	0.76	0.09	0.45
SWSDitch2	CONDUIT	3.836	0	07:31	1.56	0.07	0.33
WasteWayDiversion-1	CONDUIT	4.053	0	07:26	2.08	0.19	0.45
WasteWayDiversion-2	CONDUIT	4.133	0	07:26	2.78	0.20	0.38
WasteWayDiversion-3	CONDUIT	4.058	0	07:27	3.83	0.17	0.45
W-ECSP	CONDUIT	3.385	0	08:22	2.87	1.06	0.72
W-EDitch1	CONDUIT	3.386	0	08:24	1.01	0.10	0.39
W-EDitch2	CONDUIT	4.014	0	08:17	1.81	0.16	0.39
W-EDitch3	CONDUIT	4.175	0	08:18	0.63	0.08	0.43
W-EDitch4	CONDUIT	0.460	0	07:28	0.65	0.01	0.09
OR1	ORIFICE	0.932	0	00:00			1.00
RockCheckDitchBlock	WEIR	0.460	0	07:26			1.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
		---------- Fraction of Time in Flow Class ----------								
EastCSP1	1.00	0.15	0.00	0.00	0.00	0.85	0.00	0.00	0.21	0.00
SENDitch-1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.94	0.00
SENDitch-2	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.32	0.00
SWMFINLETDN	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
SWMFINLETDS	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
SWMFO_C	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
SWMFOutlet-C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
SWMFOutlet-C2	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.26	0.00
SWNCulvert	1.00	0.00	0.00	0.00	0.51	0.49	0.00	0.00	0.04	0.00
SWNDitch1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.99	0.00
SWNDitch2	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
SWPerimeterDitch0	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.96	0.00
SWPerimeterDitch1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.95	0.00
SWPerimeterDitch2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.00
SWSCulvert	1.00	0.00	0.00	0.00	0.33	0.67	0.00	0.00	0.04	0.00
SWSDitch1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
SWSDitch2	1.00	0.00	0.00	0.00	0.84	0.00	0.00	0.15	0.84	0.00
WasteWayDiversion-1	1.00	0.50	0.06	0.00	0.43	0.00	0.00	0.00	0.51	0.00
WasteWayDiversion-2	1.00	0.51	0.00	0.00	0.30	0.20	0.00	0.00	0.04	0.00
WasteWayDiversion-3	1.00	0.53	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.00
W-ECSP	1.00	0.15	0.00	0.00	0.00	0.00	0.00	0.85	0.00	0.00
W-EDitch1	1.00	0.00	0.15	0.00	0.85	0.00	0.00	0.00	0.85	0.00
W-EDitch2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
W-EDitch3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
W-EDitch4	1.00	0.03	0.04	0.00	0.66	0.00	0.00	0.27	0.05	0.00

****
Conduit Surcharge Summary
****

Conduit	Both Ends	Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
	--------- Hours Full --------				
EastCSP1	0.01	0.01	0.01	0.58	0.01

SWMFOutlet-C1	48.00	48.00	48.00	0.01	0.01
SWNCulvert	0.01	0.01	0.01	0.49	0.01
SWSCulvert	0.01	0.01	0.01	0.52	0.01
W-ECSP	0.01	0.01	0.01	0.64	0.01

Analysis begun on: Tue Apr 23 08:47:30 2024
Analysis ended on: Tue Apr 23 08:47:32 2024
Total elapsed time: 00:00:02

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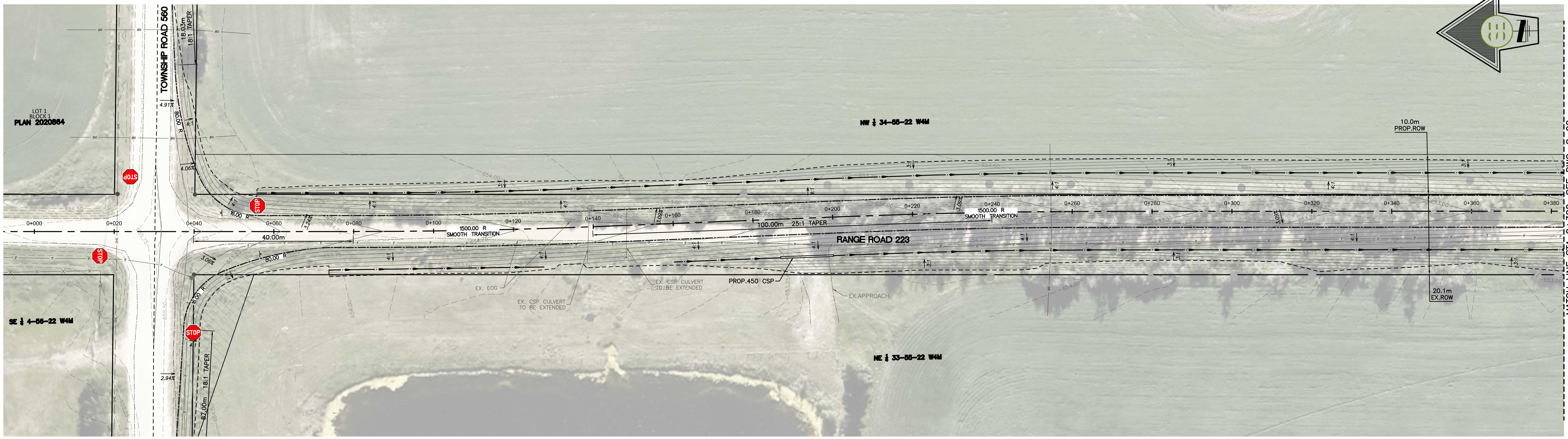
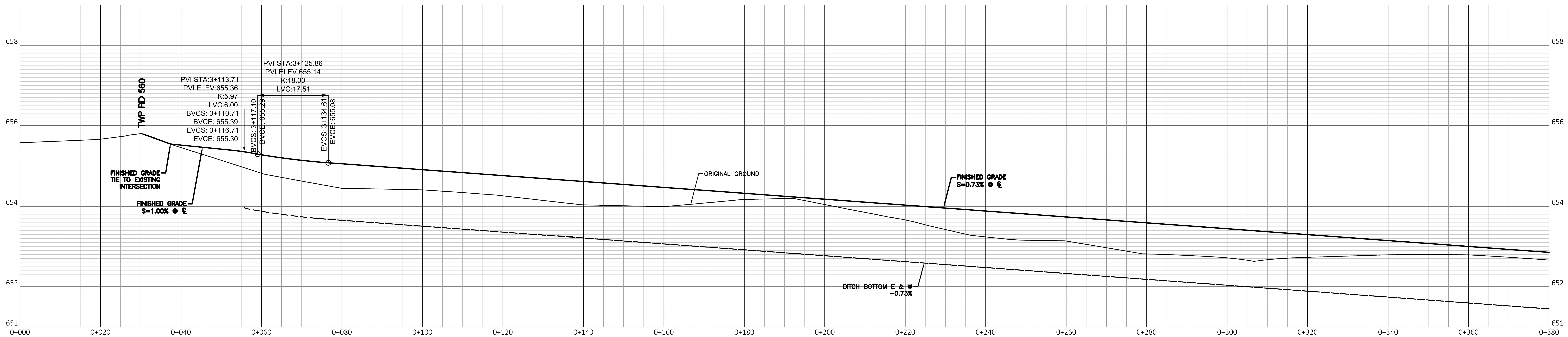
Appendix D
Preliminary Bypass Road Design

Clifton





LEGEND

INDICATES EXISTING PROPERTY LINE
INDICATES EXISTING RIGHT OF WAY
INDICATES EXISTING GROUND CONTOURS & ELEVATION
INDICATES EXISTING EDGE OF GRAVEL
INDICATES EXISTING BARBED WIRE FENCE
INDICATES EXISTING TREE/BUSH LINE
INDICATES EXISTING OVERHEAD POWER LINE
INDICATES EXISTING HIGH PRESSURE GAS LINE
INDICATES EXISTING TELECOMMUNICATION LINE
INDICATES EXISTING CULVERT
INDICATES EXISTING UTILITY BOX
INDICATES EXISTING SIGN
INDICATES EXISTING GUY ANCHOR POLE
INDICATES EXISTING POWER POLE
INDICATES EXISTING FOUND IRON PIN
INDICATES EXISTING TREE
INDICATES PROPOSED RIGHT OF WAY
INDICATES PROPOSED DAYLIGHT LINE
INDICATES PROPOSED EDGE OF GRAVEL
INDICATES PROPOSED DITCH FLOWLINE
INDICATES PROPOSED GROUND CONTOURS & ELEVATION

ISSUED FOR CLIENT REVIEW

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No.	YY/MM/DD	ISSUE/REVISION DESCRIPTION	DRN	DES	CHK	APP'D
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
C	23/12/14	30% DESIGN - RE-ISSUED FOR CLIENT REVIEW	GC	GC	JI	JI
B	23/11/24	30% DESIGN - RE-ISSUED FOR CLIENT REVIEW	GC	GC	JI	JI
A	23/11/16	30% DESIGN - ISSUED FOR CLIENT REVIEW	GC	GC	JI	JI

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Clifton

CANDO RAIL & TERMINALS

CANDO RANGE ROAD 222 BYPASS
STURGEON COUNTY, ALBERTA
PLAN & PROFILE
STATION 0+000 TO 0+380

ISSUE/REVISION: C
DRAWING NO.: C-1
SCALE: H=1:500 V=1:50
PROJECT NO: SEI.23.128
FILE NAME: SEI.23.128 – 30%.dwg
SHEET: 01 OF 11

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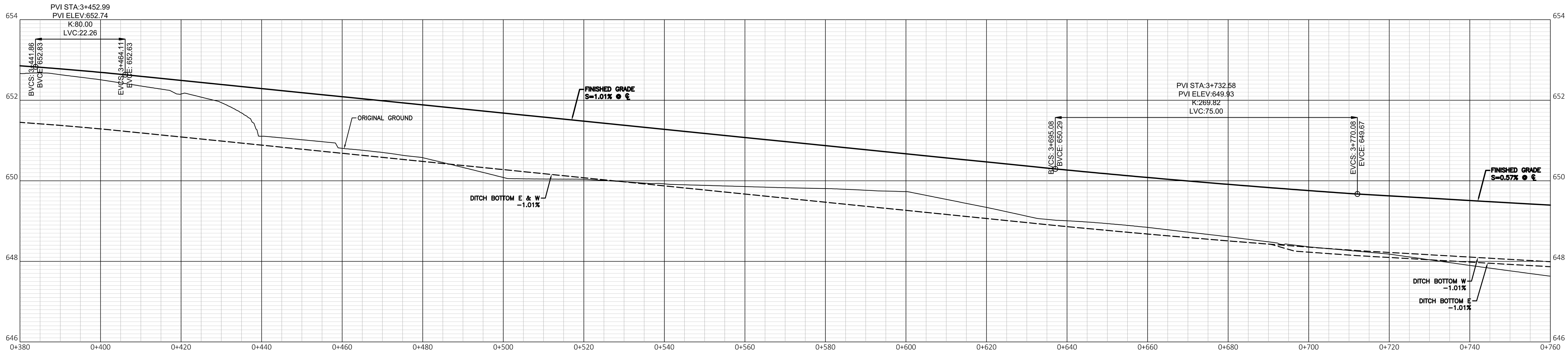

LEGEND

- INDICATES PROPERTY LINE
- INDICATES EXISTING RIGHT OF WAY
- INDICATES EXISTING GROUND CONTOURS & ELEVATION
- INDICATES EXISTING EDGE OF GRAVEL
- INDICATES EXISTING BARBED WIRE FENCE
- INDICATES EXISTING TREE/BUSH LINE
- INDICATES EXISTING OVERHEAD POWER LINE
- INDICATES EXISTING HIGH PRESSURE GAS LINE
- INDICATES EXISTING TELECOMMUNICATION LINE
- INDICATES EXISTING CULVERT
- INDICATES EXISTING UTILITY BOX
- INDICATES EXISTING SIGN
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- INDICATES EXISTING FOUND IRON PIN
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- INDICATES PROPOSED EDGE OF GRAVEL
- INDICATES PROPOSED DITCH FLOWLINE
- INDICATES PROPOSED GROUND CONTOURS & ELEVATION

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ISSUE/REVISION	DRAWING NO.	SCALE:	PROJECT NO:	FILE NAME:	SHEET
C	C-02	H=1:500 V=1:50	SEI.23.128	SEI.23.128 – 30%.dwg	02 OF 11

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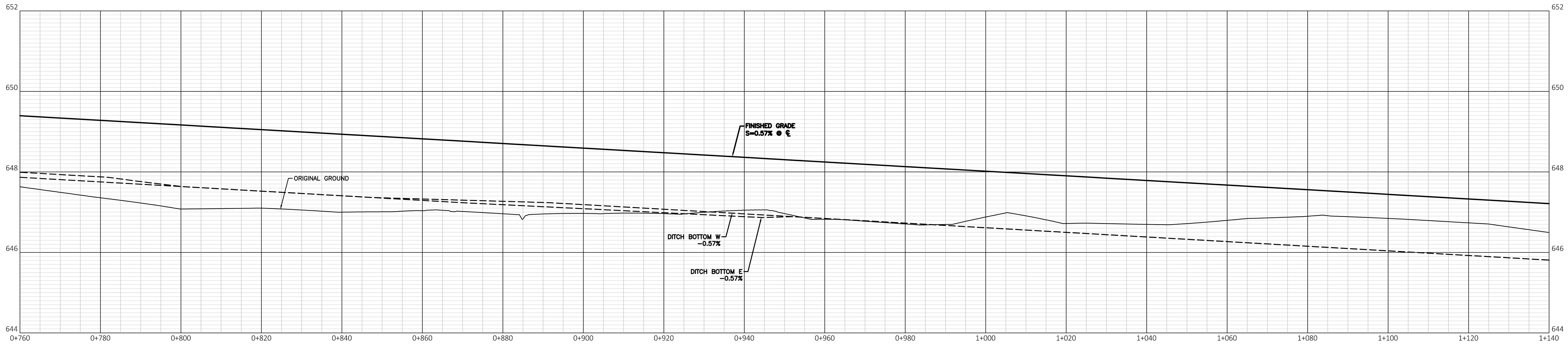

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STATION 0+760 TO 1+140

ISSUE/REVISION: C
DRAWING NO.: C-03
SCALE: H=1:500 V=1:50
PROJECT NO: SEI.23.128
FILE NAME: SEI.23.128 – 30%.dwg
SHEET: 03 OF 11

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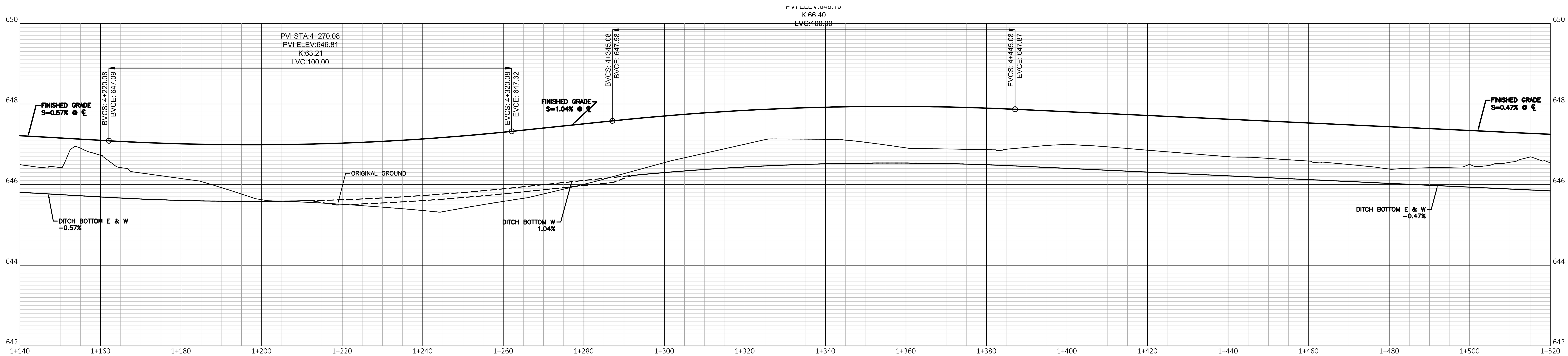

LEGEND

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ISSUE/REVISION: C
DRAWING NO.: C-04

SCALE:	PROJECT NO:	FILE NAME:	SHEET
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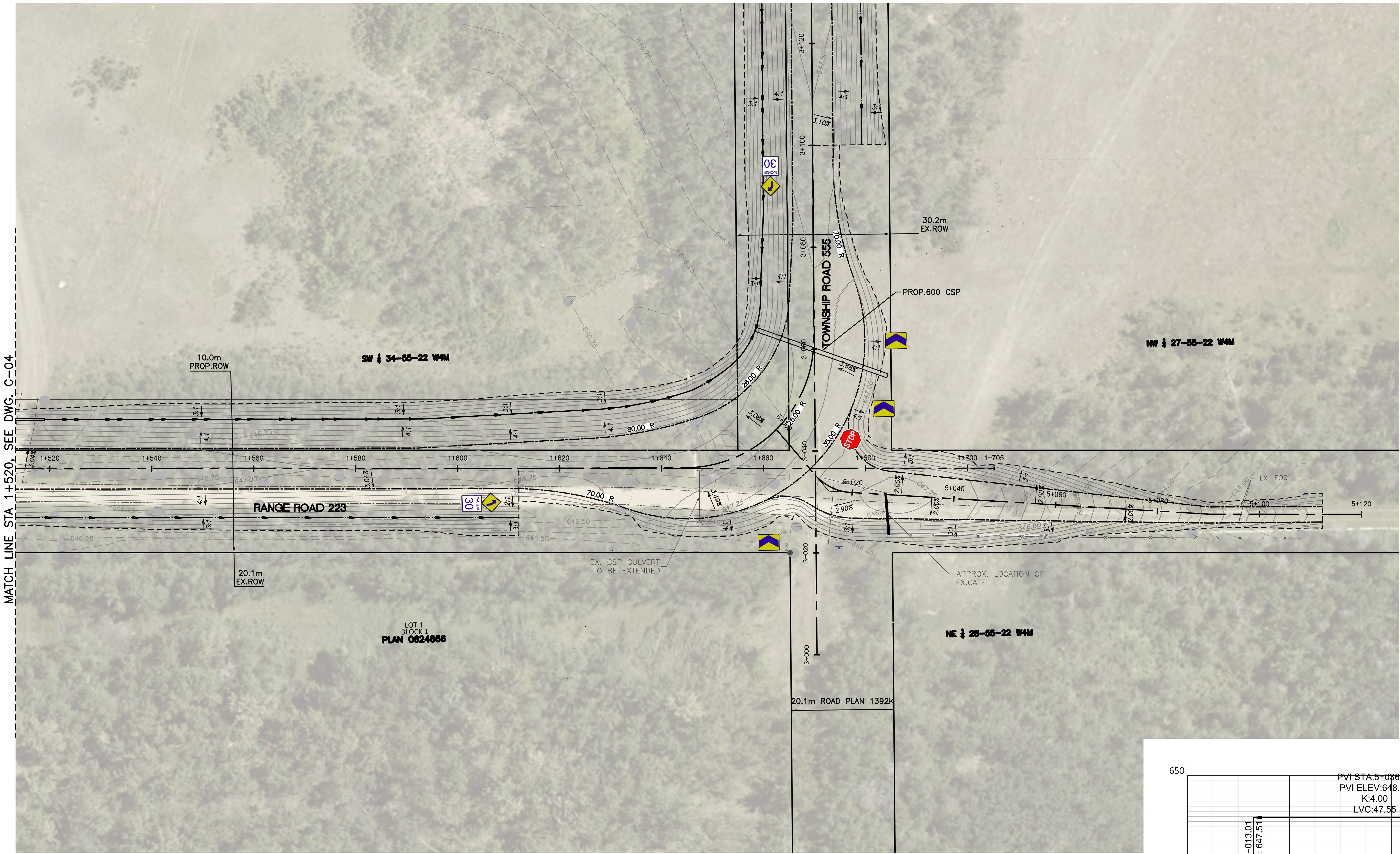

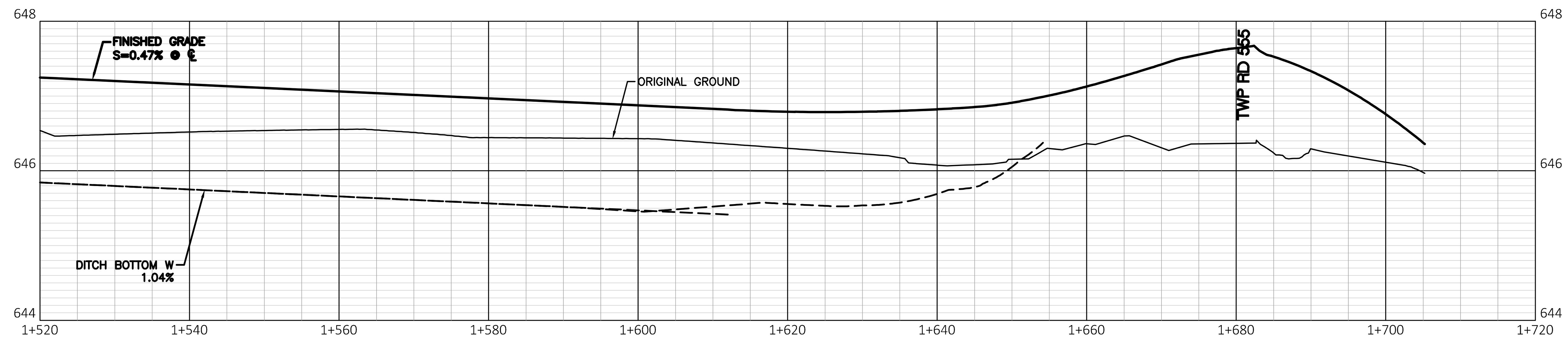

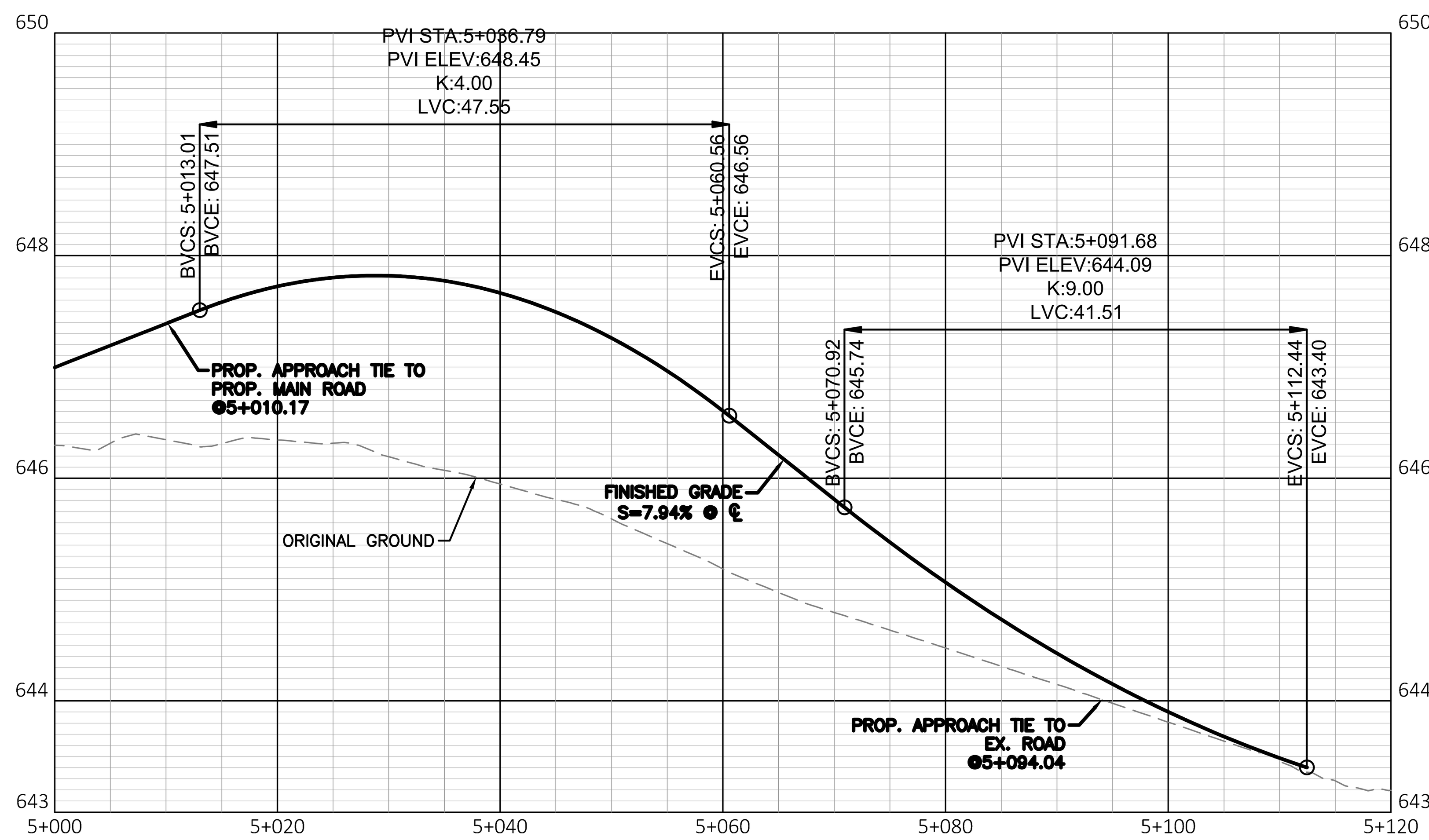

LEGEND

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ISSUE/REVISION: C

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PROJECT NO: SEI.23.128

FILE NAME: SEI.23.128 – 30%.dwg

SHEET: 05 OF 11

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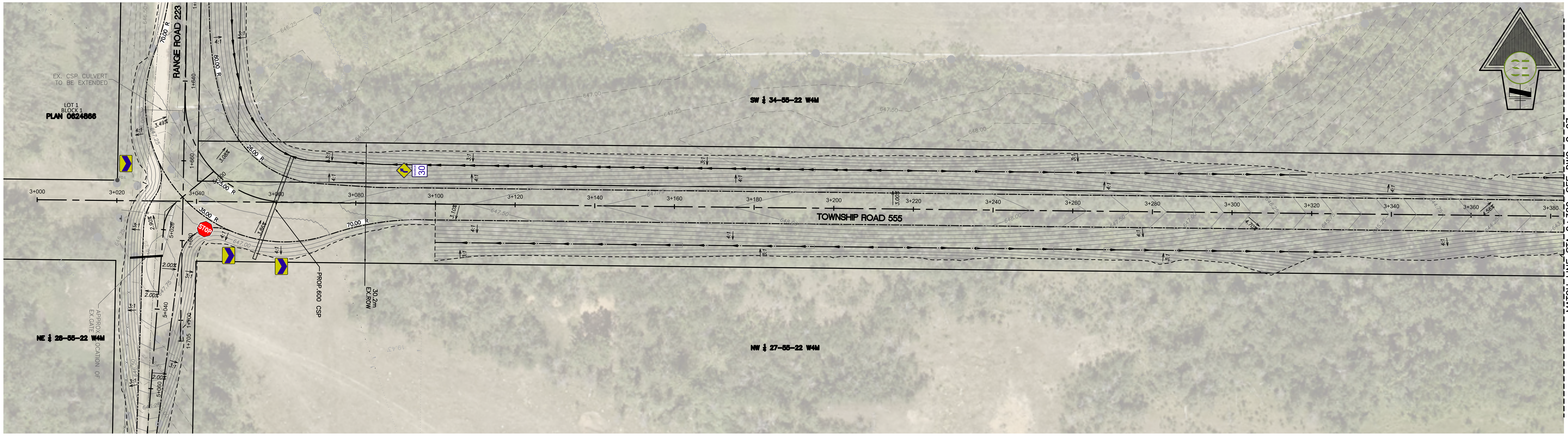

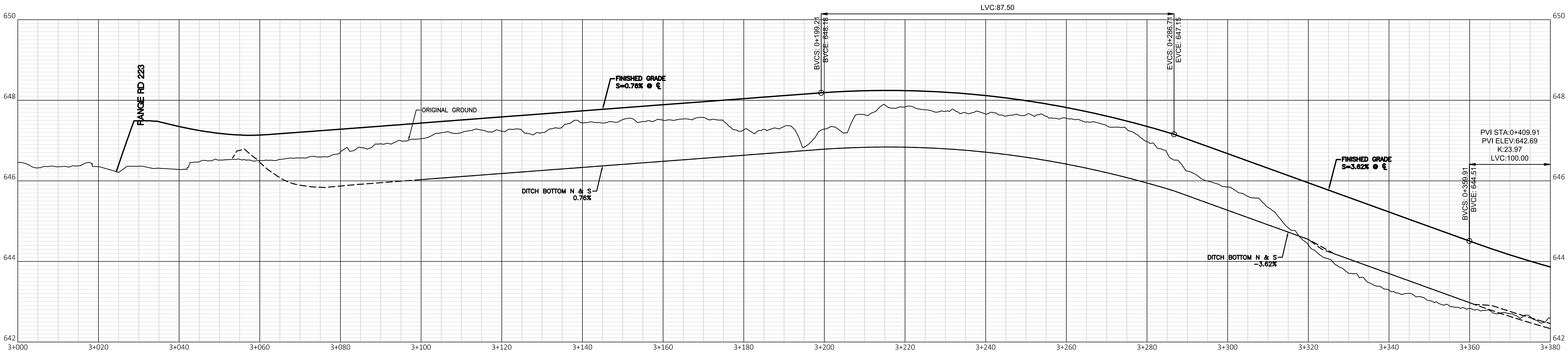

LEGEND

- INDICATES PROPERTY LINE
- INDICATES EXISTING RIGHT OF WAY
- 1036.25 INDICATES EXISTING GROUND CONTOURS & ELEVATION
- INDICATES EXISTING EDGE OF GRAVEL
- INDICATES EXISTING BARBED WIRE FENCE
- INDICATES EXISTING TREE/BUSH LINE
- OHE INDICATES EXISTING OVERHEAD POWER LINE
- HP INDICATES EXISTING HIGH PRESSURE GAS LINE
- T INDICATES EXISTING TELECOMMUNICATION LINE
- INDICATES EXISTING CULVERT
- INDICATES EXISTING UTILITY BOX
- INDICATES EXISTING SIGN
- INDICATES EXISTING GUY ANCHOR POLE
- PP INDICATES EXISTING POWER POLE
- FDI/FDIP INDICATES EXISTING FOUND IRON PIN
- INDICATES EXISTING TREE
- INDICATES PROPOSED RIGHT OF WAY
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- INDICATES PROPOSED EDGE OF GRAVEL
- INDICATES PROPOSED DITCH FLOWLINE
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PROJECT NO: SEI.23.128

FILE NAME: SEI.23.128 – 30%.dwg

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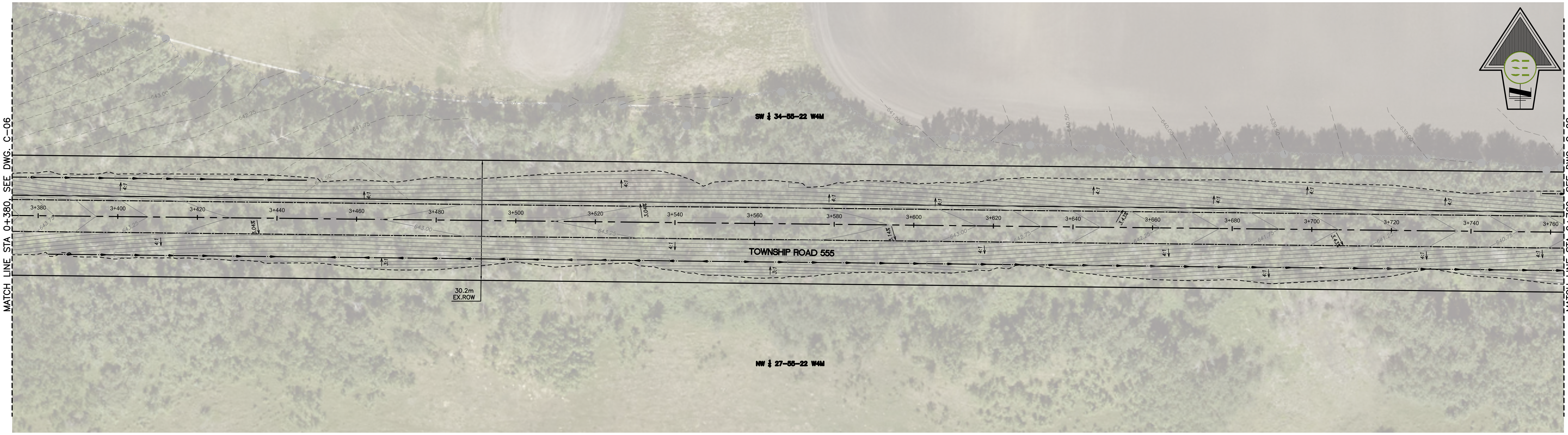

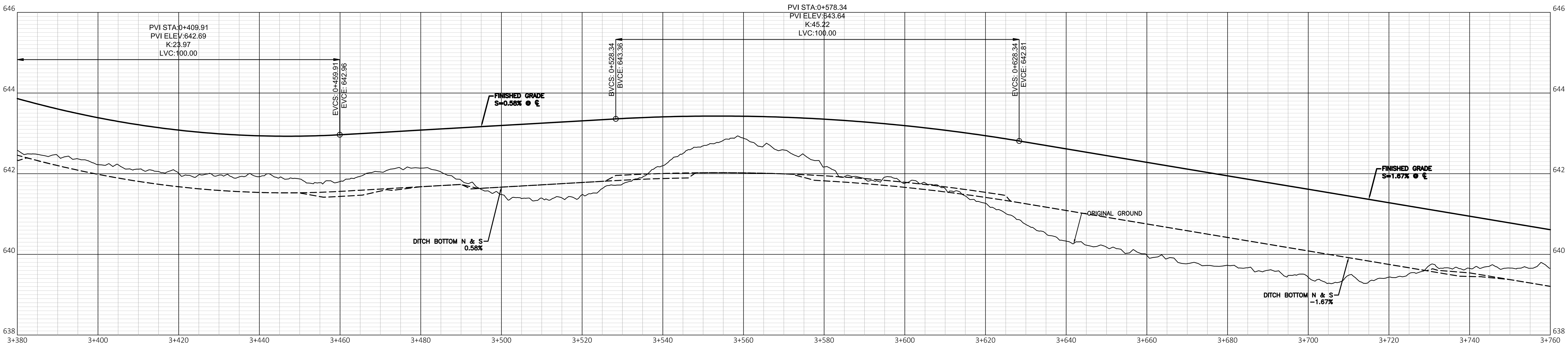

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ISSUE/REVISION: C
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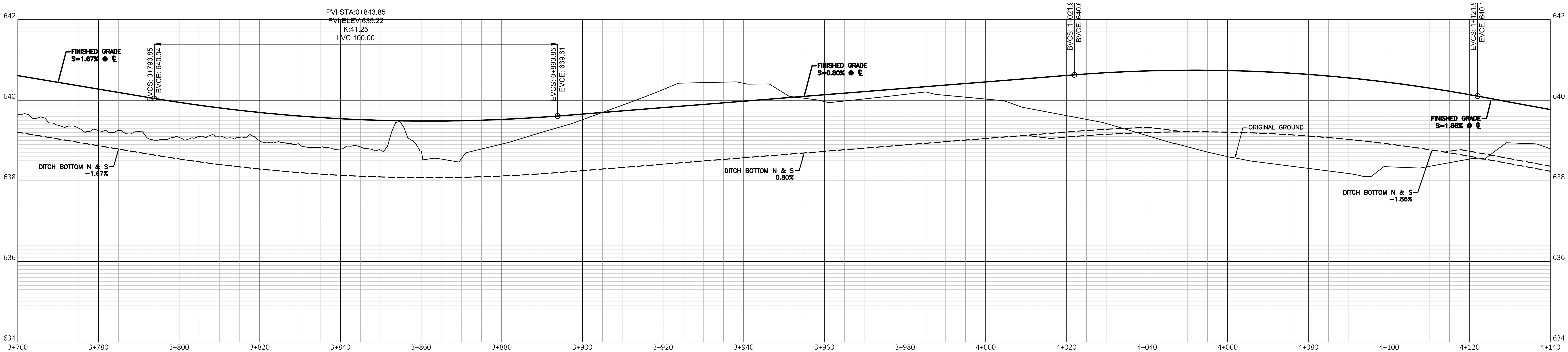

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ISSUE/REVISION: C

DRAWING NO.: C-08

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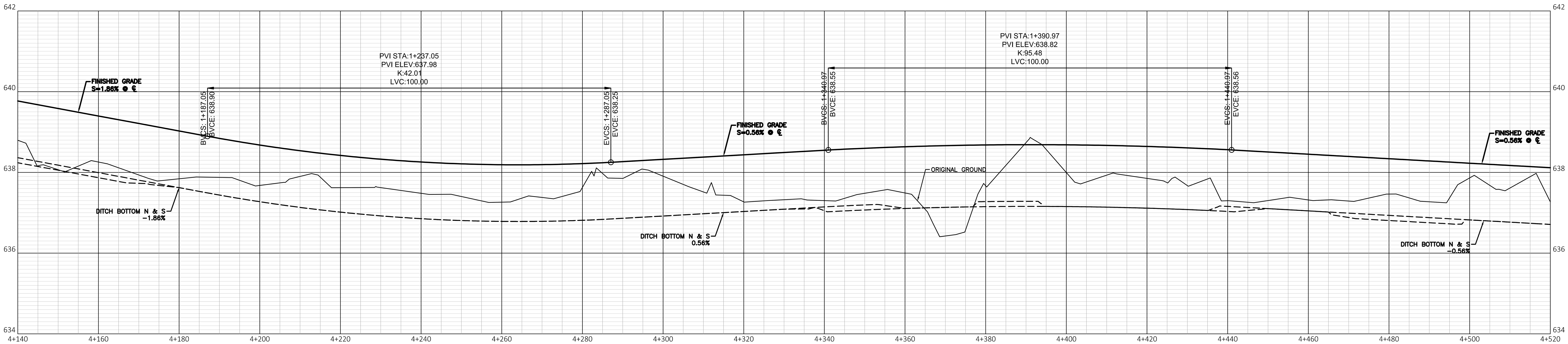

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ISSUE/REVISION: C

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PROJECT NO: SEI.23.128

FILE NAME: SEI.23.128 – 30%.dwg

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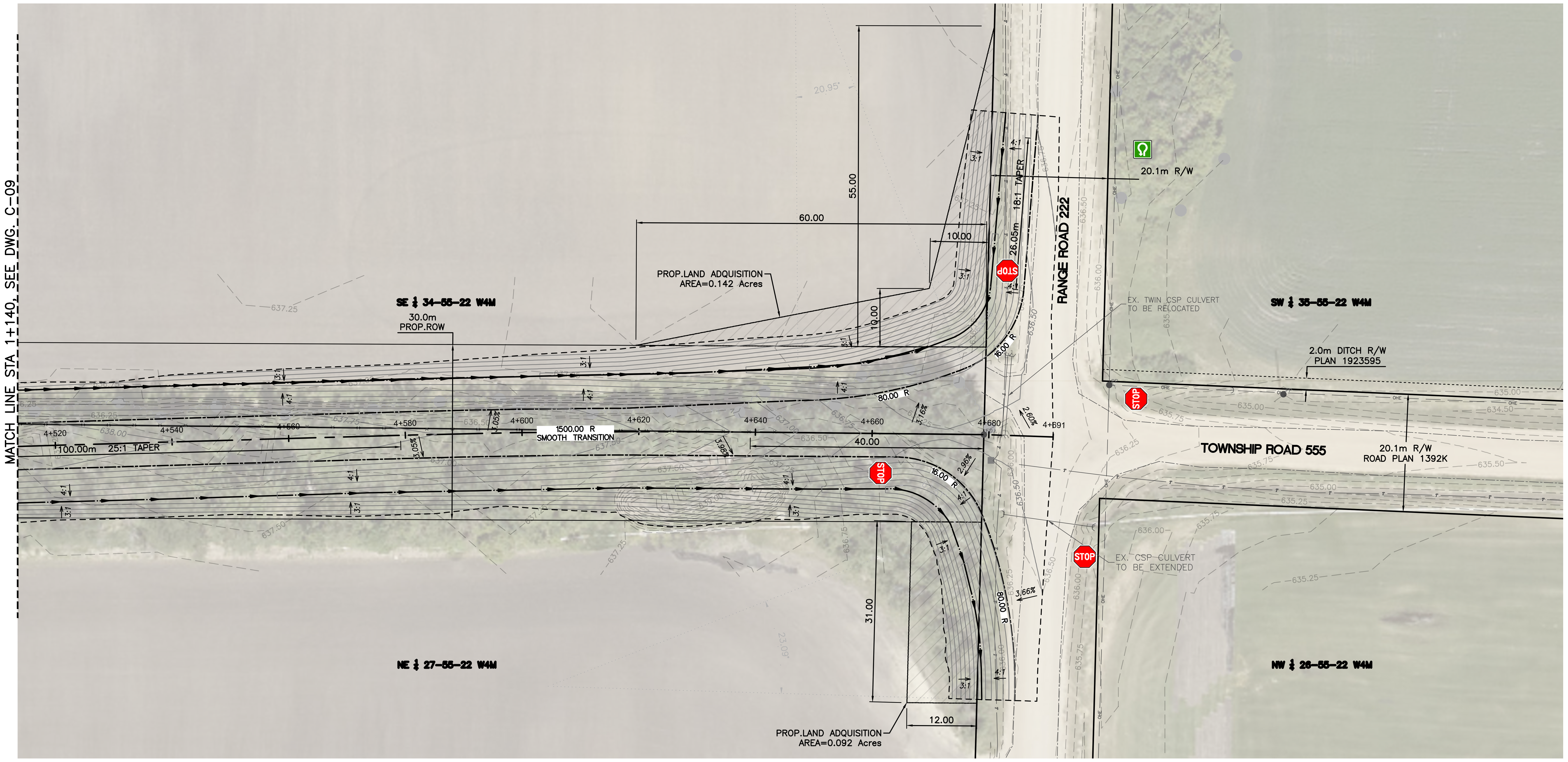

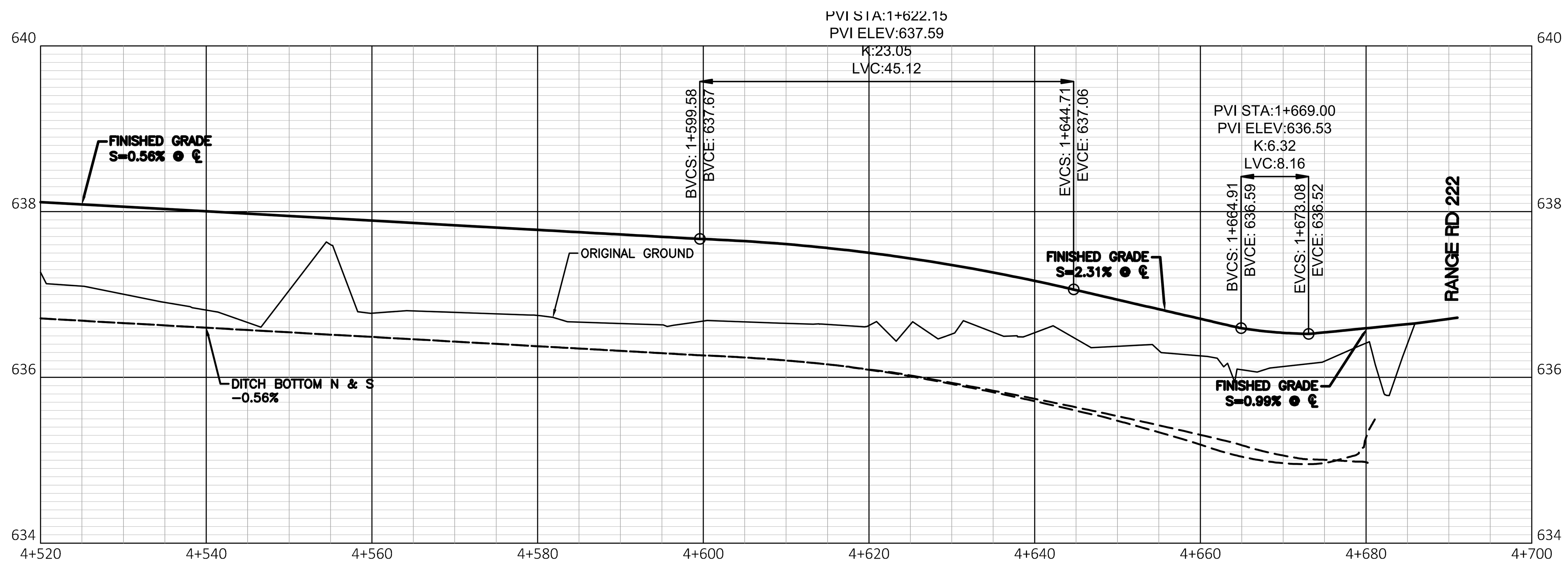

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- INDICATES PROPOSED GROUND CONTOURS & ELEVATION

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CANDO RAIL & TERMINALS

CANDO RANGE ROAD 222 BYPASS
STURGEON COUNTY, ALBERTA
PLAN & PROFILE
STATION 4+520 TO 4+700

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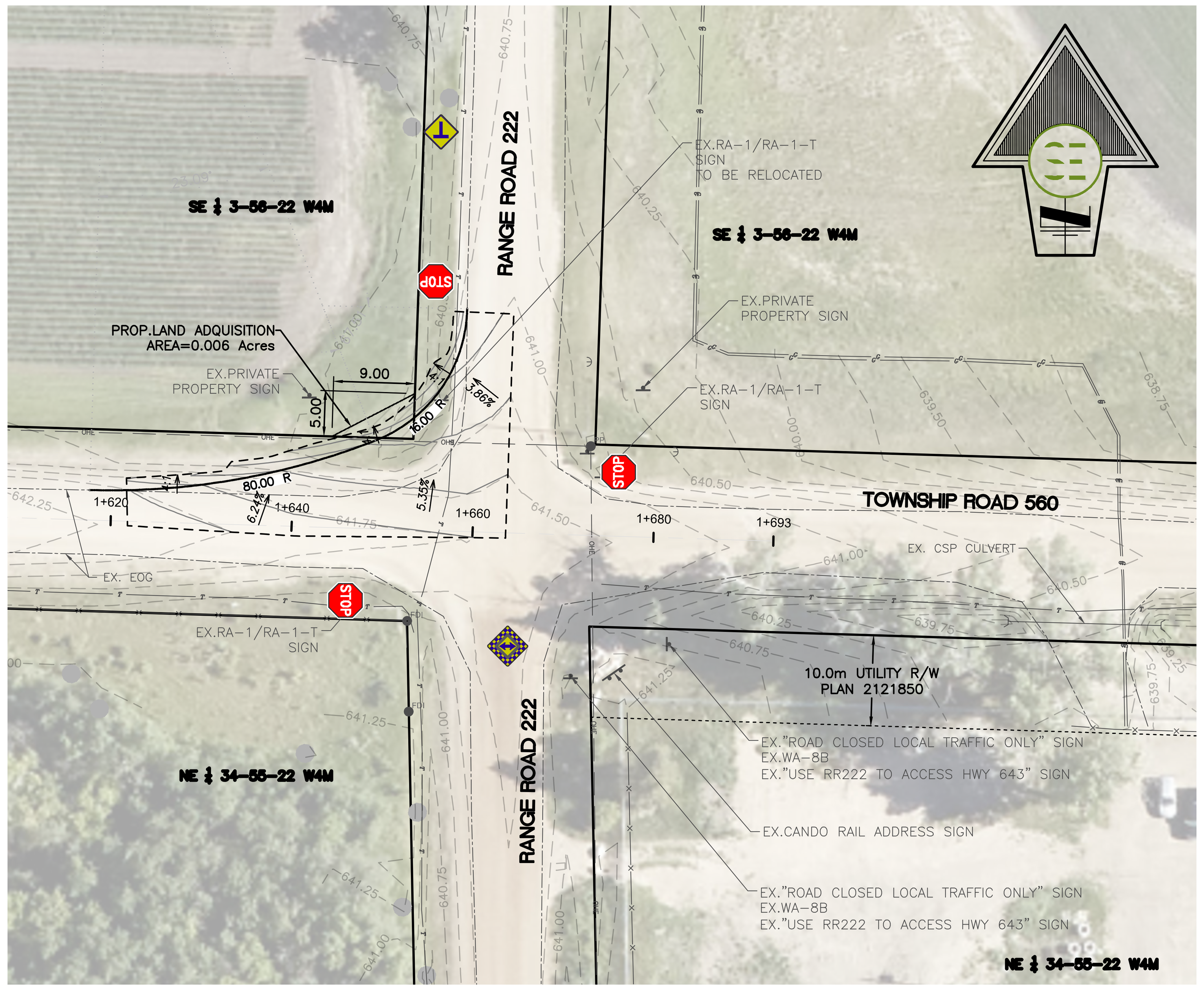

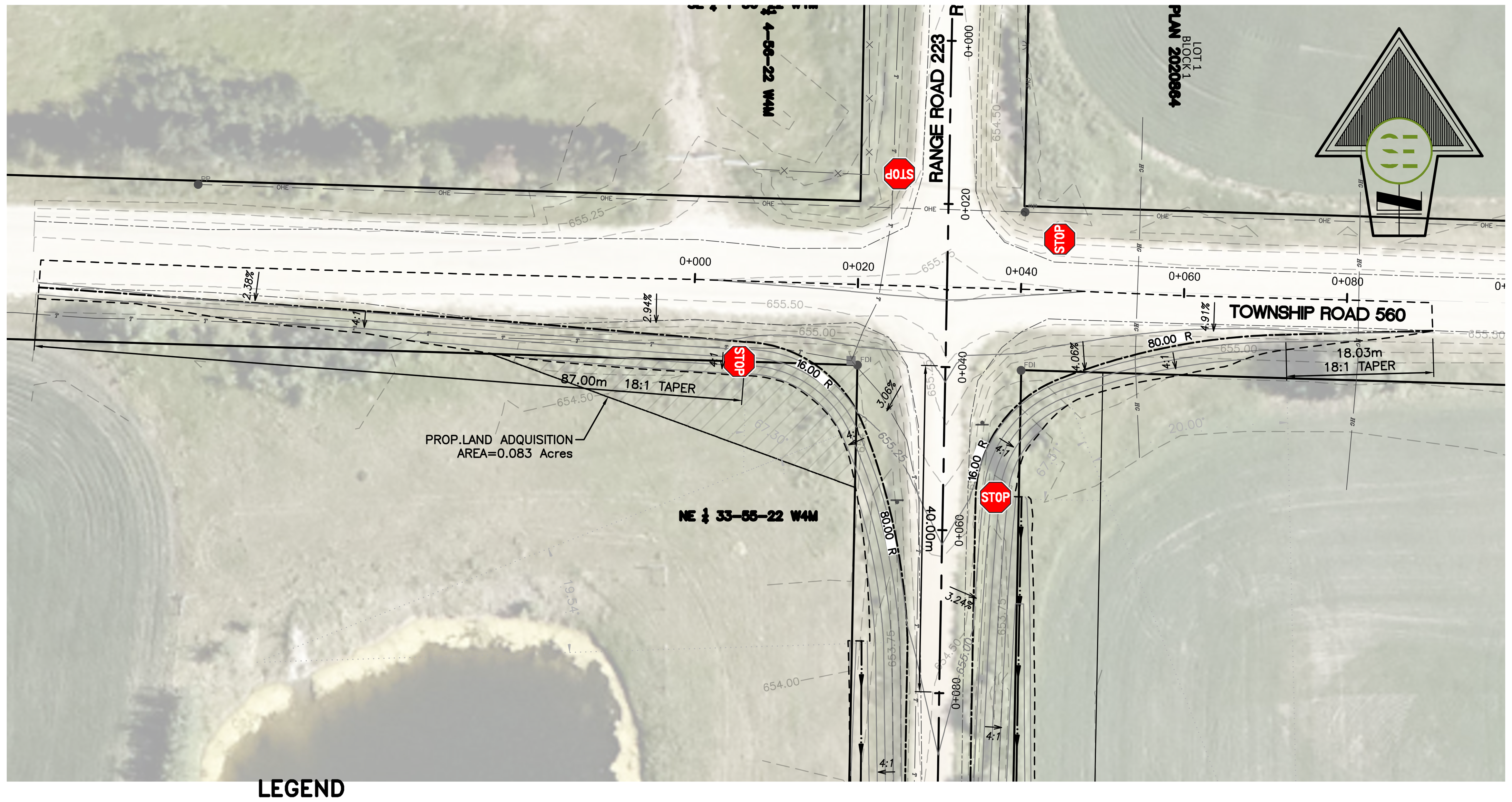

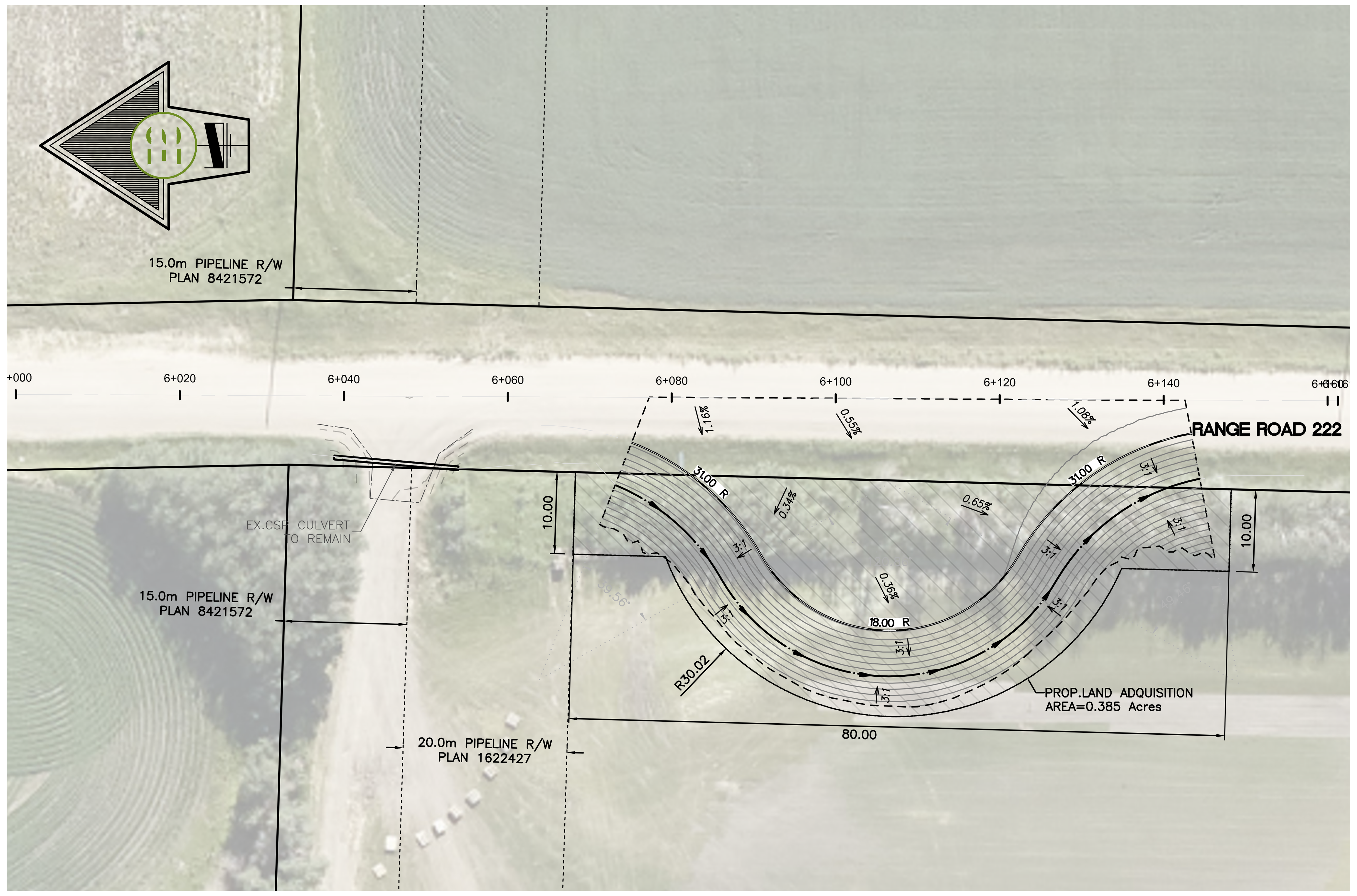

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INDICATES EXISTING BARBED WIRE FENCE	INDICATES EXISTING POWER POLE	INDICATES PROPOSED GROUND CONTOURS & ELEVATION	
INDICATES EXISTING TREE/BUSH LINE	INDICATES EXISTING FOUND IRON PIN		
INDICATES EXISTING OVERHEAD POWER LINE	INDICATES EXISTING TREE		
INDICATES EXISTING HIGH PRESSURE GAS LINE			
INDICATES EXISTING LOW PRESSURE GAS LINE			
INDICATES EXISTING TELECOMMUNICATION LINE			

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CANDO RAIL & TERMINALS

CANDO RANGE ROAD 222 BYPASS
STURGEON COUNTY, ALBERTA
PLAN & PROFILE
TWP 560 INTERSECTIONS & RR222 CUL-DE-SAC

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Appendix E
Biophysical Report

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CANDO STURGEON TERMINAL WEST
Biophysical Baseline Report

Prepared For
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EDI Project
23C0181
Version 2
January 2024

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ENVIRONMENTAL DYNAMICS INC.
Down to Earth Biology

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1 INTRODUCTION

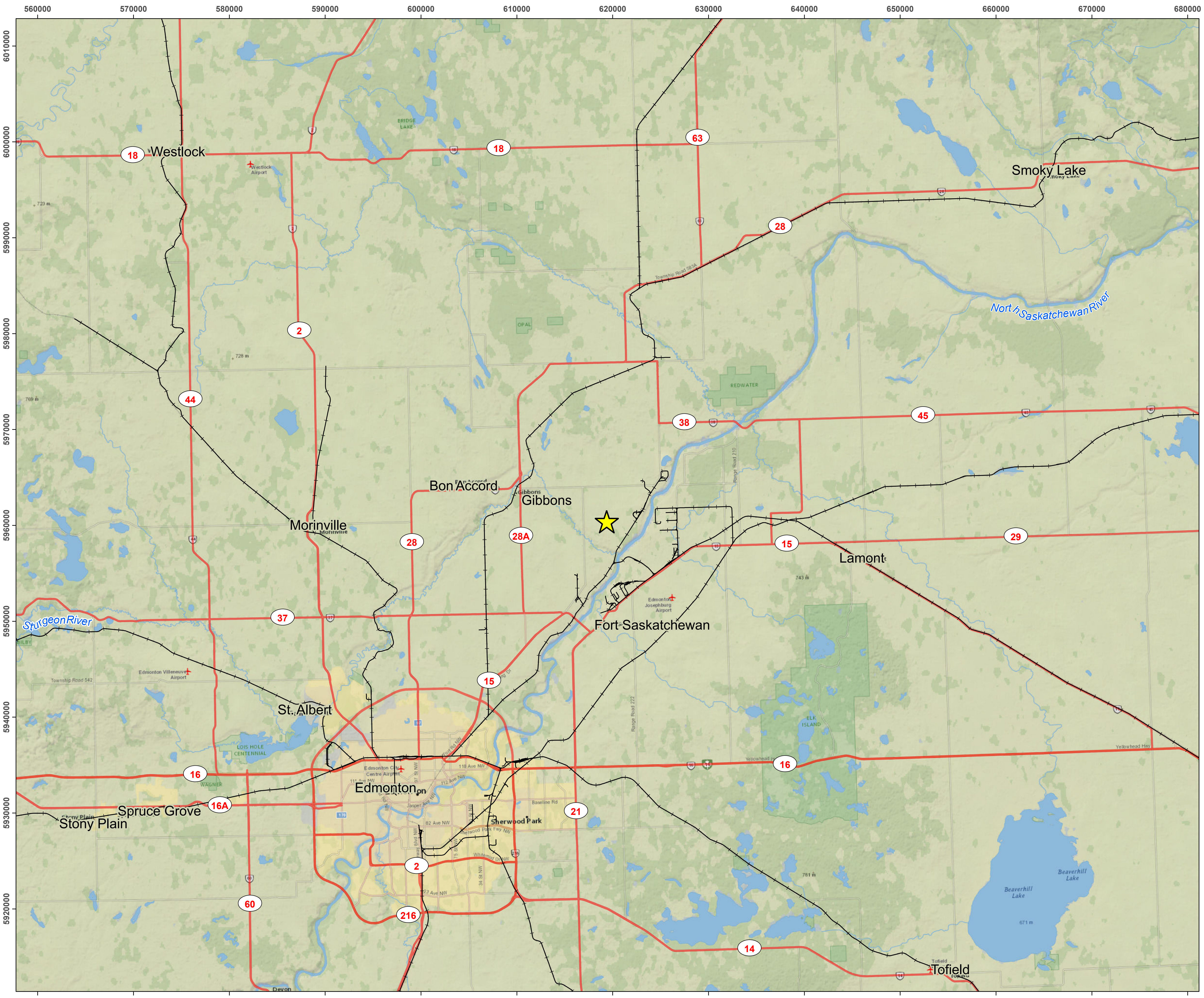
Cando Rail & Terminals (Cando) is planning to develop the Sturgeon Terminal West railyard (the Railyard) located in N½ 34-55-22 W4M, in Sturgeon County near Fort Saskatchewan, Alberta (AB) (Figure 1). The Railyard is located adjacent to the Sturgeon Terminal East railyard located in N½ 35-55-22 W4M, and will be of a similar size and capacity. The Railyard will be connected to the Sturgeon Terminal East, including portions of the existing Range Road 222. As such, a Bypass Road (the Bypass) will also be constructed as part of the Project to facilitate and maintain local traffic around the Railyard. The Railyard and the Bypass are collectively referred to as the Project. Design drawings are provided in Appendix A.

EDI Environmental Dynamics Inc. (EDI) was retained by Clifton Engineering Group Inc. (Clifton) to prepare a biophysical assessment to document baseline conditions including land use, vegetation, wetlands, and surface waterbodies, identify environmental sensitivities, and support the preparation of an Initial Project Description to the Impact Assessment Agency of Canada (IAAC) for the Project. Stormwater management and groundwater are addressed under a separate cover (Clifton Engineering Group Ltd. 2023).

1.1 PROJECT DESCRIPTION

EDI understands that the Railyard will be a full-service, multi-purpose rail terminal, that will facilitate the storage, marshalling, maintenance, and transloading of rail cars from various industries to consolidate rail staging operations in one area. It will be comprised of an arrival/departure yard that includes multiple tracks that will wrap around the entire property, and that have connections to the existing Sturgeon Terminal East. The Railyard will also include a classification yard comprised of four smaller yards for breaking down, sorting, and assembling unit trains to meet local customer needs, as well as a mechanical area to service and repair locomotives and rollingstock. The expansion rail terminal is required to meet the local needs for handling and servicing unit trains and to maintain connections via the Canadian National Railway Company (CN) and rest of the North American market.

A secondary component to the Project consists of the creation of the Bypass (Figure 2). The connection between the existing rail terminal and the expansion rail terminal will cross Range Road 222. These connections may be in use at almost any time of the day for long periods of time with railcar crossings. For the safety and convenience of the surrounding residents, Cando is working with Sturgeon County to permanently close Range Road 222 between the two rail terminals. The bypass will include upgrades to the existing Sturgeon County operated Range Road 223 to the west of the W½ 34-55-22-W4M and the intersection of Range Road 222 and Township Road 560 to the northeast of the property. To complete the bypass, roadways will also be constructed to the south of the S½ 34-55-22-W4M and a cul-de-sac will be constructed to the south of the expansion rail terminal on Range Road 222. Once the road is constructed Sturgeon County will take over ownership and be responsible for the operation and maintenance.



Project location

CLIFTON ENGINEERING GROUP INC.

Legend

Project Location

Highway

Railway

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Kilometres

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Map Projection: NAD 1983 10TM AEP Forest

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Data Sources

• Main map and inset map. National Geographic World Map. National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
• Highway and railway. AltaLIS 20K Base Features

Disclaimer
EDI Environmental Dynamics Inc. has made every effort to verify this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

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Upon commencement of construction, the entire Project footprint is anticipated to be cleared and graded; however, Project components will be developed in multiple stages, with the first stage including construction of the arrival/departure yard, classification yards for sorting railcars, and the mechanical area for locomotive and railcar repairs. Project construction is anticipated to commence in Q4 2024.

1.2 REGULATORY SETTING

It is EDI's understanding that the Project requires a submission of an Initial Project Description to the IAAC, and may trigger an assessment under the federal *Impact Assessment Act* (2019). Additionally, the Project is subject to numerous environmental regulatory considerations, including (but not limited to):

- Alberta *Municipal Government Act;*
- Alberta *Historical Resources Act* (HRA);
- Alberta *Environmental Protection and Enhancement Act* (EPEA);
- Alberta *Water Act* and Alberta Wetland Policy;
- Alberta *Wildlife Act* and Regulations,
- Alberta *Weed Control Act* and Regulation.
- Federal *Species at Risk Act* (SARA);
- Federal *Migratory Birds Convention Act*; and,
- Federal *Fisheries Act*.

2 METHODS

The existing baseline environmental setting was characterized based on an initial desktop review of publicly available data sources followed by field assessments to verify land use, soils, vegetation, and potential for wildlife, wetlands, and surface waterbodies. The Project Footprint is defined as the extent of the Railyard in N½ 34-55-22 W4M and the extent of disturbance anticipated to result from proposed road infrastructure works along Range Road 222, Township Road 560, Range Road 223, and Township Road 555 for the Bypass (both of which are illustrated in the Design Drawings included in Appendix A). The Study Area is defined as a 100 m buffer from the Project Footprint as shown on Figure 2.

2.1 DESKTOP REVIEW

The following datasets and publicly available literature sources were reviewed to gather information within the Study Area:

- Topography (AltaLIS 1:20k contours) (AltaLIS Ltd. 2023);
- Natural Regions and Subregions of Alberta (Natural Regions Committee 2006);
- Alberta Conservation Information Management System (Alberta Environment and Protected Areas 2023a);
- Agricultural Regions of Alberta Soil Inventory Database (AGRASID) (Government of Alberta and Alberta Agriculture and Forestry 2023);
- Alberta Land Suitability Descriptors (Alberta Agriculture and Forestry 2017, Government of Alberta and Alberta Agriculture and Forestry 2023);
- Cumulative Clubroot Infestations (Alberta Government 2021);
- Wildlife Sensitivity Maps (Government of Alberta 2022);
- Fish and Wildlife Management Information System (FWMIS) (Alberta Environment and Protected Areas 2023b);
- General Status of Alberta's Wild Species (Alberta Environment and Parks 2022a);
- Species at Risk Public Registry (Government of Canada 2023);
- Environmentally Significant Areas (Fiera Biological Consulting 2014);
- Parks and Protected Areas (Alberta Environment and Parks 2022b);
- Important Bird Areas (IBAs) (Birds Canada and Nature Canada 2023);
- Migratory Bird Sanctuaries (Environment and Climate Change Canada 2022a); and,
- National Wildlife Areas (Environment and Climate Change Canada 2019).
- Federally designated Critical Habitats (Environment and Climate Change Canada 2022b).
- Critical Habitats for aquatic species at risk (Fisheries and Oceans Canada 2022);
- Historical climate data (Alberta Agriculture and Irrigation 2023);
- Satellite Imagery – ESRI (2021), Google (2010, 2013, 2017, and 2020);
- Aerial Photographic Record System historical aerial photographs (1950, 1967, 1973, 1979, 1987, 1993, 2001, and 2003) (Government of Alberta 2023a);

- Alberta Biodiversity Monitoring Institute (ABMI) Wetland Inventory Data (ABMI 2022) and Predictive Landcover (ABMI 2019);
- Alberta Merged Wetland Inventory (Alberta Environment and Parks 2020a); and,
- Historic Resources Listings (Government of Alberta 2023b).

A wetland assessment with field verification was completed by a qualified wetland practitioner to identify, classify, and delineate wetlands and surface waterbodies potentially affected by the Project; detailed methods are provided under separate cover within the Wetland Assessment and Impact Reports (WAIRs) (EDI Environmental Dynamics Inc. 2023a, b) prepared to support Project *Water Act* applications.

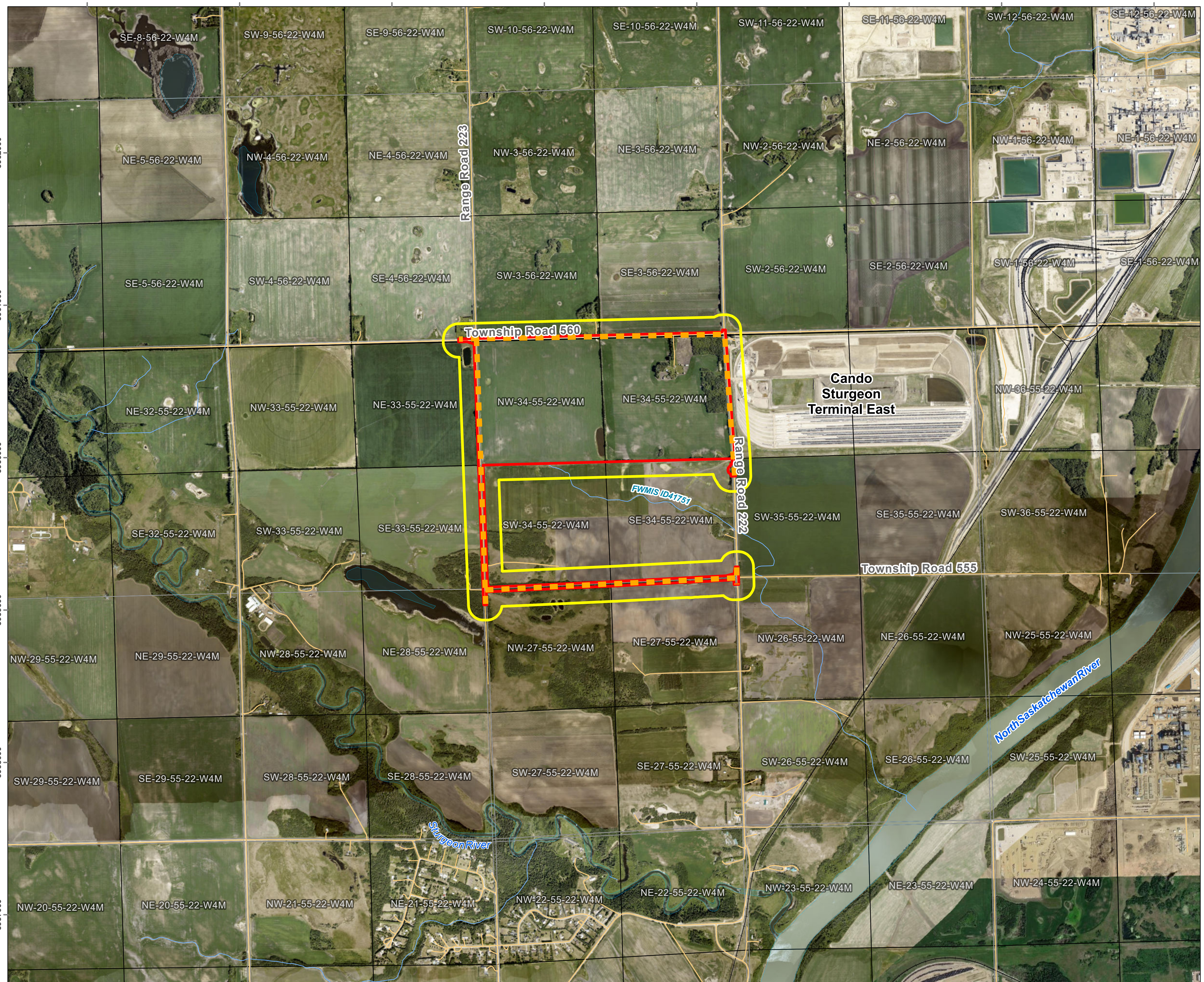
2.2 FIELD PROGRAM

Results of the desktop review were field verified to document pre-disturbance environmental conditions, including land use, vegetation, wetlands, and surface waterbodies, and identify the presence of environmental sensitivities with the potential to be directly affected by the Project (i.e., within or adjacent to the Project Footprint). The field program included the following.

- A wildlife reconnaissance was conducted on July 13, 2023, on foot within the Railyard, as well as from roadways within a 1 km buffer of the Railyard to characterize wildlife habitat and identify any potential wildlife habitat features of concern (e.g., leks, dens, raptor nests).
- A biophysical assessment of land use, soils, vegetation, and wetlands was completed within the Project Footprint between August 9 to 11 for the Railyard, and September 27 to 29 for the Bypass. The biophysical assessment included pedestrian surveys to document the following:
    - land use and plant communities (to characterize vegetation);
    - late season listed plant surveys (conducted as per Alberta Native Plant Council 2012) with a focus on habitats with moderate to high potential for listed plants (e.g., wetlands, uncommon microsites);
    - invasive plants designated by the Alberta Weed Control Regulation;
    - wetland classifications and delineation (verified in accordance with the Alberta Wetland Policy (Government of Alberta 2013) and implementation directives and guidance documents (e.g., Alberta Environment and Sustainable Resource Development 2015, Government of Alberta 2015, Alberta Environment and Parks 2016); and,
    - surface waterbodies, including ephemeral waterbodies, ephemeral drainages and surface water-related anthropogenic features.

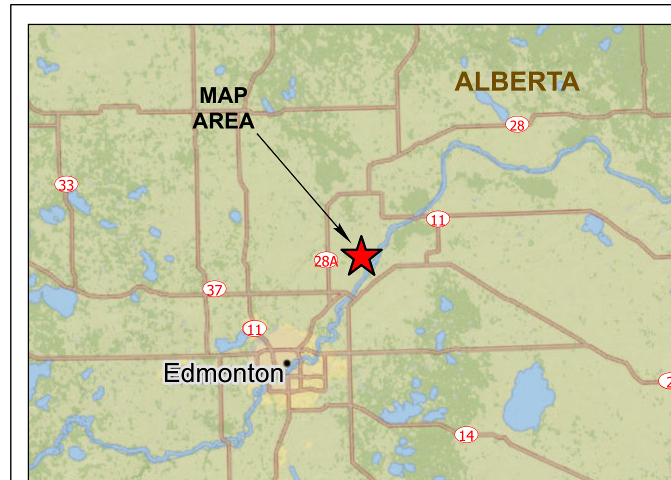
Project overview

Clifton Engineering Group Inc.



Legend

- Road
- Highway
- Railway
- Bypass Modifications
- Project Footprint
- Study Area
- Township
- Section
- Quarter Section



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Map Projection: NAD 1983 10TM AEP Forest

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Data Sources

- Main map. World Imagery. Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
- Inset map. National Geographic. National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
- Roads, rail, and ATS grid. AltaLIS 20K Base Features
- Waterbodies and watercourses. FWMIS. Government of Alberta.

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EDI

3 RESULTS

3.1 SITING, LANDSCAPE, AND LAND USE

The Study Area is located within the Dry Mixedwood Natural Subregion of the Boreal Natural Region (Natural Regions Committee 2006), in Alberta's Industrial Heartland within an area zoned for heavy industry and increasingly dominated by industrial land uses. The Railyard has been sited adjacent to heavy industrial facilities to the east and northeast (CN Rail line, Pembina Redwater Fractionation Facility and Rail Yard, North West Redwater Partnership Sturgeon Refinery) and southeast (Shell Scotford Manufacturing Centre east of the North Saskatchewan River). The Project Footprint does not overlap with any Environmentally Significant Areas in Alberta (Fiera Biological Consulting 2014).

The Project is surrounded by agricultural land on all sides except for its eastern boundary, which is adjacent to Sturgeon Terminal East. Land cover within the Study Area is predominantly comprised of cultivated fields, with small remnant deciduous treed upland along the field margins, and at the northeast portion of the Study Area associated with an existing residence. Representative photos are provided in Appendix D.

3.2 HISTORICAL RESOURCES

Within the Study Area, four land parcels have been assigned a Historic Resource Value (HRV) of 5a (Government of Alberta 2023b). An HRV of 5a is assigned to an area with high potential to contain an archaeological resource (Government of Alberta 2023c). An application for Clearance under the *Historical Resources Act* has been submitted for the Project; results will be provided under a separate cover.

3.3 TERRAIN AND SOILS

Terrain within the southern Dry Mixedwood Natural Subregion is typically characterized by undulating or hummocky surface expression with variable relief, with some level (low-relief) to inclined (high-relief) areas (Natural Regions Committee 2006). Local topography within the Study Area is generally flat with gentle, gradual slopes to the south towards the Sturgeon River and east toward the North Saskatchewan River (Figure 3).

Terrain and soil characteristics identified during desktop review within the Study Area are summarized in Table 1, including the following soil series:

- Hobbema – common on mid-slopes with well-drained Eluviated Black Chernozem with loam, silt loam, and very fine sandy loam till.
- Ponoka – common on mid-slopes with well-drained Eluviated Black Chernozem with loam to silty loam sediments deposited by wind and water;
- Peace Hills – common on mid-slopes with well-drained Orthic Black Chernozem with sandy loam and find sandy loam texture;

- Primula – common on mid-slopes with rapidly-drained Eluviated Eutric Brunisols of sand and loamy sand sediments deposited by wind or water; and,
- Gleyed Peace Hills – common on depressions with imperfectly-drained Gleyed Black Chernozems with sandy loam and fine sandy loam sediments deposited by wind or water (Government of Alberta and Alberta Agriculture and Forestry 2023).

Table 1. Predominant terrain and soil characteristics occurring within the Study Area.

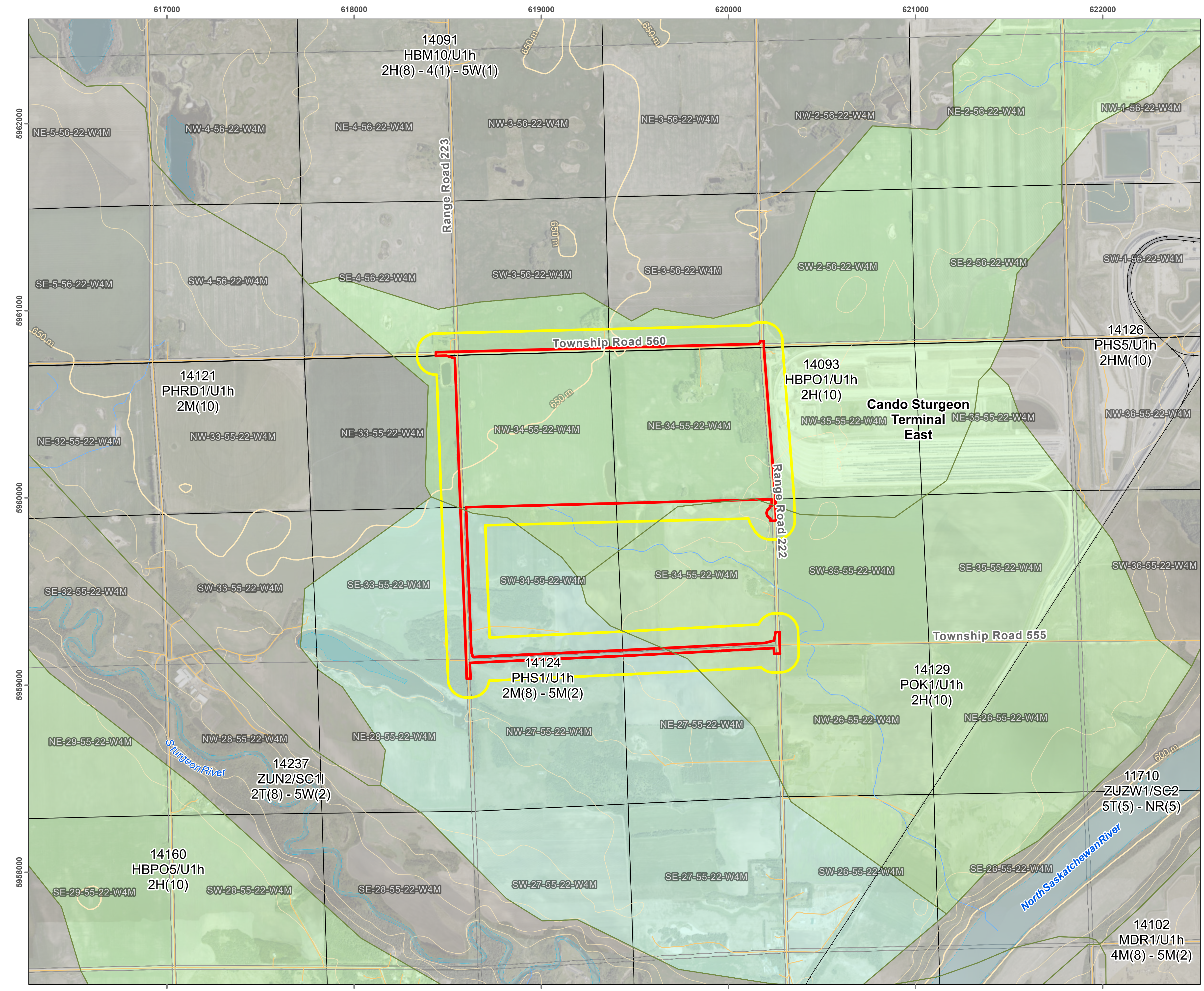
Attribute	**Soils and Land Suitability Results[1]**		
AGRASID Polygon ID	**14093**	**14124**	**14129**
Surface Expression	Undulating, High Relief		
Soil Series (% of polygon)	Hobbema (50%), Ponoka (50%)	Peace Hills (60%), Primula (20%), Peace Hills - Gleyed (20%)	Ponoka (100%)
Land Suitability Ratings[2]	2H (100%)	2M (80%) - 5M (20%)	2H (100%)
Project Footprint Area (ha)	139.755	6.082	3.236

1 Based on AGRASID data (Government of Alberta and Alberta Agriculture and Forestry 2023) and Alberta Land Suitability Descriptors (Alberta Agriculture and Forestry 2017).

2 Land Suitability Descriptors within the Project Study Area:

Class 2: Holds slight limitations to crop growth.
Class 5: Holds very severe limitations to crop growth.
Subclass H (Temperature): Inadequate heat units for the optimal growth.
Subclass M (Soil Drainage): Lack of Water.

Clubroot — a serious soil-borne disease of canola, mustard, and other crops in the cabbage family — is closely monitored and managed in Alberta. Sturgeon County has had more than 50 confirmed cases of clubroot (Alberta Government 2021).

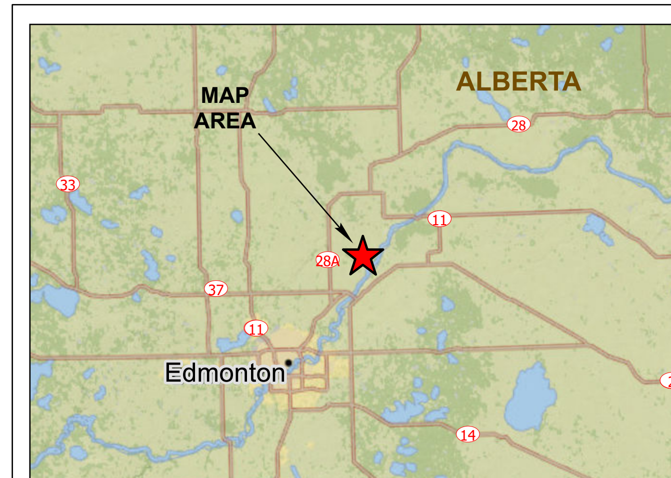


Soil characteristics within the Study Area

Clifton Engineering Group Inc.

Legend

- Road
- Highway
- Railway
- Project Footprint
- Study Area
- Township
- Section
- Quarter Section
- Soil Characteristics
  - 2H(10)
  - 2M(8)
  - Other



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Map Scale = 1:20,000 (printed on 11 x 17)
Map Projection: NAD 1983 10TM AEP Forest

Data Sources

- Main map. World Imagery. Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
- Inset map. National Geographic. National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
- Roads, rail, and ATS grid. AltaLIS 20K Base Features
- Waterbodies and watercourses. FWMIS. Government of Alberta.
- Soil data. Agricultural Regions of Alberta Soil Inventory Database (AGRASID 4.1). of Alberta.

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3.4 VEGETATION

3.4.1 DESKTOP REVIEW

The Dry Mixedwood Natural Subregion is characterized by aspen forests and cultivated lands, with wetlands in low-lying areas (Natural Regions Committee 2006). Agriculture is the primary land use in the southern portion of the Dry Mixedwood Natural Subregion.

Review of the ACIMS database (Alberta Environment and Protected Areas 2023a) indicates that no documented listed vegetation species, listed ecological communities, parks, protected areas, Crown reservations or notations have been historically observed within the Study Area (Appendix B).

3.4.2 FIELD ASSESSMENT

Vegetation field assessments were completed between August 9 to 11 for the Railyard and September 27 to 29 for the Bypass, in conjunction with wetland field assessments. Vegetation within cultivated lands observed to be dominated by crop species (i.e., barley) and tame grass species (e.g., Kentucky bluegrass [*Poa pratensis*], red fescue [*Festuca rubra*]) for the purposes of sod farming). Native vegetation communities were restricted to remnant areas characterized as deciduous treed upland, graminoid marshes, and deciduous swamps.

- **Deciduous Treed Upland** communities were comprised of a canopy of aspen (*Populus tremuloides*) and balsam poplar (*Populus balsamifera*), with a shrub layer dominated by snowberry (*Symphoricarpos albus*), prickly rose (*Rosa acicularis*), wild black currant (*Ribes americanum*), wild red raspberry (*Rubus idaeus*), red-osier dogwood (*Cornus sericea*), Saskatoon (*Amelanchier alnifolia*), pin cherry (*Prunus pensylvanica*), beaked hazelnut (*Corylus cornuta*) and low-bush cranberry (*Viburnum edule*). The understory was characterized by veiny meadow rue (*Thalictrum venulosum*), northern bedstraw (*Galium boreale*), wild vetch (*Vicia americana*), Canada anemone (*Anemonastrum canadense*), sweet-scented bedstraw (*Galium triflorum*), common pink wintergreen (*Pyrola asarifolia*), three-leaved Solomon's-seal (*Maianthemum trifolium*), star-flowered Solomon's-seal (*Maianthemum stellatum*), woodland agrimony (*Agrimonia striata*), rayless aster (*Symphyotrichum ciliatum*), large-leaved yellow avens (*Geum macrophyllum*), cream-colored vetchling (*Lathyrus ochroleucus*), dewberry (*Rubus pubescens*), tall lungwort (*Mertensia paniculata*), common fireweed (*Chamaenerion angustifolium*), prairie sagewort (*Artemisia ludoviciana*), and red and white baneberry (*Actaea rubra*). A representative Deciduous Treed Upland is shown in Appendix Photo D-2.
- **Graminoid Marsh** communities were observed to exhibit shallow wetland plant community zones which were characterized by common cattail (*Typha latifolia*), awned sedge (*Carex atherodes*), small bottle sedge (*Carex utriculata*), slough grass (*Beckmannia syzigachne*), common tall manna grass (*Glyceria grandis*), western dock (*Rumex occidentalis*); and wet meadow plant community zones characterized by fowl bluegrass (*Poa palustris*), needle spike-rush (*Eleocharis acicularis*), foxtail barley (*Hordeum jubatum*), pale persicaria (*Persicaria lapathifolia*), marsh yellow cress (*Rorippa palustris*), and mudwort (*Limosella aquatica*). A representative Graminoid Marsh is shown in Appendix Photo D-6.

- **Deciduous Swamp** communities (i.e., wetlands with >25% woody cover) had deciduous wooded forms dominated by balsam poplar, shrubby forms characterized by red-osier dogwood, shining willow (*Salix lasiandra* var. *lasiandra*), and pussy willow (*Salix discolor*), and herbaceous cover including small bottle sedge, arrow-leaved coltsfoot (*Petasites frigidus* var. *sagittatus*), awned sedge, western dock,), wild mint (*Mentha canadensis*), and common nettle (*Urtica dioica*). A representative Graminoid Marsh is shown in Appendix Photo D-7.

The following are designated noxious invasive plants that were observed within the Project Footprint: creeping (Canada) thistle (*Cirsium arvense*), perennial sow-thistle (*Sonchus arvensis*), scentless chamomile (*Tripleurospermum inodorum*), common (yellow) toadflax (*Linaria vulgaris*), and white cockle (*Silene latifolia* ssp. *alba*). Invasive plants were present primarily along cultivated field margins with fairly uniform presence of creeping thistle and perennial sow thistle, and a few discrete populations of scentless chamomile, common toadflax, and white cockle. Additionally, designated exotic species included absinthe wormwood (*Artemisia absinthium*), biennial sagewort (*Artemisia biennis*), common dandelion (*Taraxacum officinale*), common hempnettle (*Galeopsis tetrahit*), large barnyard grass (*Echinochloa crus-galli*), and smooth brome (*Bromus inermis*).

Two observations of the listed plant clammy hedge-hyssop (*Gratiola neglecta*) were observed within wetlands WL10 and WL146 within the Project Footprint (Figure 4, Appendix Photo D-8). Clammy hedge-hyssop is not listed federally, but is listed provincially on the tracking list as S3 (vulnerable; Alberta Environment and Protected Areas 2023a), occurring in wet sites and along wetland edges in both natural and disturbed sites, including cultivated fields (Fryer et al. 2022). The species appears to be locally abundant, and the occurrence information was reported to the ACIMS on October 19, 2023.

Listed plant locations near the Study Area

Clifton Engineering Group Inc.

Legend

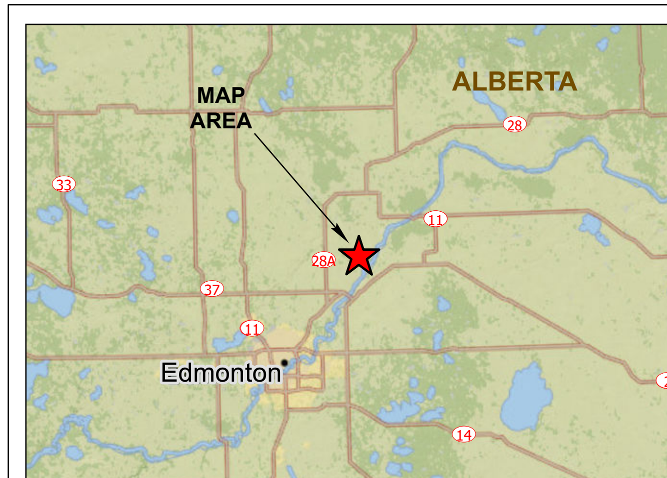
- Road
- Highway
- Railway
- Project Footprint
- Study Area
- Township
- Section
- Quarter Section

Listed Plant Occurrence

- clammy hedge-hyssop (*Gratiola neglecta*)
- flat-topped white aster (*Doellingeria umbellata var. pubens*)

Field Identified Occurrence

- clammy hedge-hyssop (*Gratiola neglecta*)



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Map Scale = 1:20,000 (printed on 11 x 17)
Map Projection: NAD 1983 10TM AEP Forest

Data Sources

• Main map. World Imagery. Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
• Inset map. National Geographic. National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
• Roads, rail, and ATS grid. AltaLIS 20K Base Features
• Waterbodies and watercourses. FWMIS. Government of Alberta.
• Listed Plant Occurrence. Alberta Conservation Information Management System (ACIMS). 2022. Alberta Parks.

Drawn: C. Tennant	Checked: J. Mischkolz	**Figure 4**	Date: 2023-12-18

EDI

3.5 FISH, WILDLIFE AND WILDLIFE HABITAT

3.5.1 DESKTOP REVIEW

Based on the desktop review, the Study Area is not located within any provincially designated wildlife sensitivity zones (Government of Alberta 2022), however, the Project Footprint is located:

- approximately 280 m from a Key Wildlife and Biodiversity Zone associated with the Sturgeon River and North Saskatchewan River valleys;
- approximately 200 m from a Sharp-tailed Grouse Survey Area, and
- approximately 200 m from a Sensitive Raptor Range for Bald Eagle (Government of Alberta 2022).

The Study Area does not overlap with any federally designated critical habitats (Fisheries and Oceans Canada 2022, Environment and Climate Change Canada 2022b), Important Bird Areas, Migratory Bird Sanctuaries, or National Wildlife Areas (Government of Alberta 2022). Wildlife associated with the Dry Mixedwood Natural Subregion is varied and includes ungulates such as mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), moose (*Alces alces*), small mammals such as rodents and rabbits, as well as many bird species. Within 2 km of the Project Footprint, three bird species have historically been reported, and there is documented fish presence within the Sturgeon River and the North Saskatchewan River (Alberta Environment and Protected Areas 2023b), none of which are federally or provincially listed species; the FWMIS report is provided in Appendix C.

Table 2. Fish and wildlife species reported within 2 km of the Project Footprint.

Common Name	Scientific Name	SARA Listing[1]	COSEWIC Status[1]	Alberta General Status[2]	Alberta *Wildlife Act* Listing[3]
Fish Species					
Emerald Shiner	*Notropis atherinoides*	Not Listed	Not Listed	Secure	Not Listed
Goldeye	*Hiodon alosoides*	Not Listed	Not Listed	Secure	Not Listed
Longnose Sucker	*Catostomus catostomus*	Not Listed	Not Listed	Secure	Not Listed
Shorthead Redhorse	*Moxostoma macrolepidotum*	Not Listed	Not Listed	Secure	Not Listed
White Sucker	*Catostomus commersonii*	Not Listed	Not Listed	Secure	Not Listed
Bird Species					
Baltimore Oriole	*Icterus galbula*	Not Listed	Not Listed	Secure	Not Listed
Eastern Phoebe	*Sayornis phoebe*	Not Listed	Not Listed	Sensitive	Not Listed
Least Flycatcher	*Empidonax minimus*	Not Listed	Not Listed	Secure	Not Listed

1 Species at Risk Public Registry (Government of Canada 2023).

2 Alberta Wild Species General Status (Alberta Environment and Parks 2022a).

3 Species at Risk Assessed in Alberta (Government of Alberta 2023e).

3.5.2 FIELD RECONNAISSANCE

A wildlife reconnaissance survey was completed on July 13, 2023. Pedestrian surveys were completed on representative portions of the Railyard, while accessible roadways within 1 km of the Railyard were used to characterize adjacent habitats. Species observed during the field survey are listed in Table 3.

Cultivated fields may provide habitat for deer, small mammals (e.g., rabbits, rodents), and birds, although the remnant deciduous treed uplands provide these species valuable habitat for forage, cover, and breeding. Foraging cavities made by smaller woodpecker species were noted in larger trembling aspen and balsam poplar trees. An unoccupied stick nest was noted within NE-34-55-22 W4M (Figure 5). Trees within the deciduous treed uplands were observed to be large enough to have the potential to support raptor nests and Pileated Woodpecker (*Dryocopus pileatus*) nesting cavities; however, no active nests or nest cavities were noted at the time of the site visit.

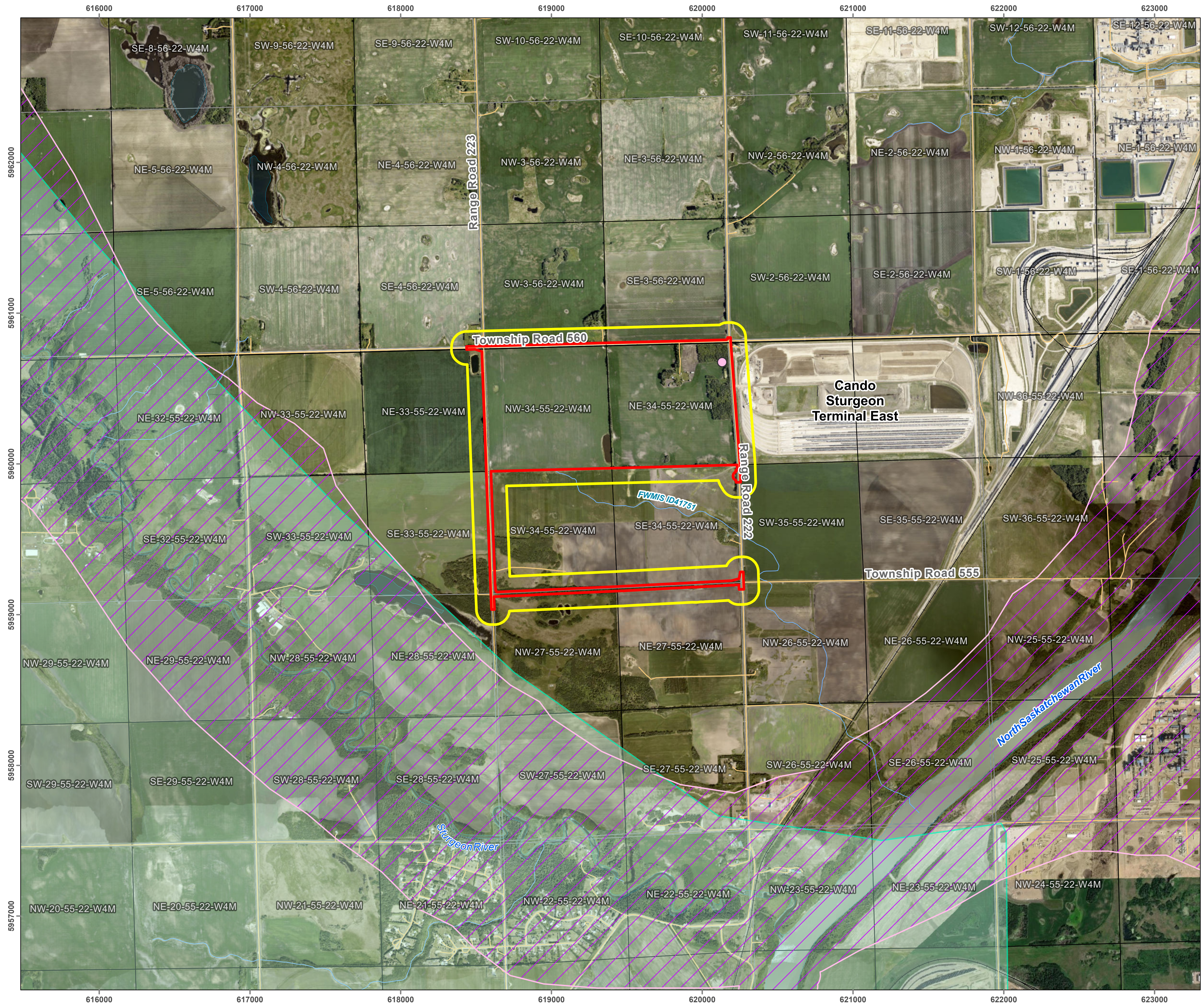
Table 3. Wildlife species observed during field assessment, July 13, 2023.

Common Name	Scientific Name	SARA Listing[1]	COSEWIC Status[1]	Alberta General Status[2]	Alberta Wildlife Act Listing[3]
American Crow	*Corvus brachyrhynchos*	Not Listed	Not Listed	Secure	Not Listed
American Robin	*Turdus migratorius*	Not Listed	Not Listed	Secure	Not Listed
Black-capped Chickadee	*Poecile atricapillus*	Not Listed	Not Listed	Secure	Not Listed
Clay-coloured Sparrow	*Spizella pallida*	Not Listed	Not Listed	Secure	Not Listed
Mule Deer or White-tailed Deer (tracks)	*Odocoileus hemionus* or *Odocoileus virginianus*	Not Listed	Not Listed	Secure	Not Listed
Eastern Kingbird	*Tyrannus tyrannus*	Not Listed	Not Listed	Sensitive	Not Listed
Franklin's Gull	*Leucophaeus pipixcan*	Not Listed	Not Listed	Secure	Not Listed
LeConte's Sparrow	*Ammospiza lecontei*	Not Listed	Not Listed	Secure	Not Listed
Marbled Godwit	*Limosa fedoa*	Not Listed	Not Listed	Secure	Not Listed
Mule Deer	*Odocoileus hemionus*	Not Listed	Not Listed	Secure	Not Listed
Red Squirrel	*Tamiasciurus hudsonicus*	Not Listed	Not Listed	Secure	Not Listed
Red-eyed Vireo	*Vireo olivaceus*	Not Listed	Not Listed	Secure	Not Listed
Red-tailed Hawk	*Buteo jamaicensis*	Not Listed	Not at Risk	Secure	Not Listed
Savannah Sparrow	*Passerculus sandwichensis*	Not Listed	Not Listed	Secure	Not Listed
Song Sparrow	*Melospiza melodia*	Not Listed	Not Listed	Secure	Not Listed
Woodpecker (sp)	*Dryobates sp.*	NA	NA	NA	NA

1 Species at Risk Public Registry (Government of Canada 2023).

2 Alberta General Status (Alberta Environment and Parks 2022a).

3 Species at Risk Assessed in Alberta (Government of Alberta 2023e).

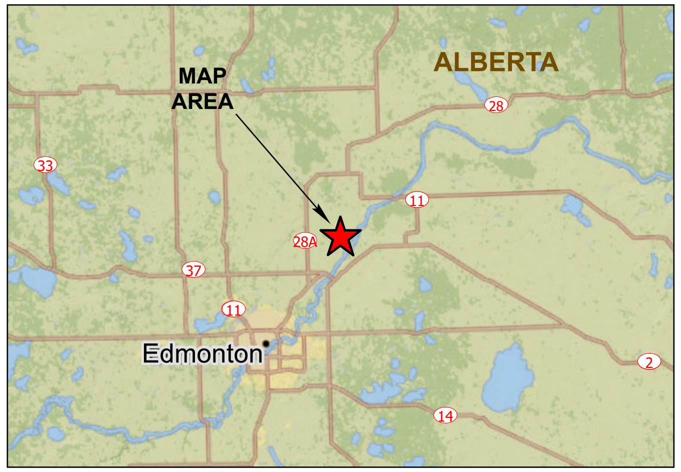


Key wildlife areas near the Study Area

Clifton Engineering Group Inc.

Legend

- Unoccupied Stick Nest
- Road
- Highway
- Railway
- Project Footprint
- Study Area
- Key Wildlife and Biodiversity Zone
- Sharp-tailed Grouse Survey Area and Sensitive Raptor Range for Bald Eagle
- Township
- Section
- Quarter Section



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Data Sources

- Main map. World Imagery. Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
- Inset map. National Geographic. National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
- Roads, rail, and ATS grid. AltaLIS 20K Base Features
- Waterbodies and watercourses. FWMIS. Government of Alberta.
- Wildlife areas. Government of Alberta.

Disclaimer
EDI Environmental Dynamics Inc. has made every effort to verify this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

Drawn: C. Tennant	Checked: J. Mischkolz	**Figure 5**	Date: 2023-12-19

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3.6 SURFACE WATER, HYDROLOGY, AND WETLANDS

3.6.1 SURFACE WATER AND HYDROLOGY

The Project is situated within the North Saskatchewan River watershed (Hydrologic Unit Code 2), and specifically in the North Saskatchewan River Beaverhill Basin (Hydrologic Unit Code 4) and the North Saskatchewan Above Beaverhill Sub-basin (Hydrologic Unit Code 8) (Alberta Environment and Protected Areas 2023b). Generally, the Study Area generally receives surface water from the northwest and water moves downgradient to the south and east. All watercourses, wetlands, ephemeral waterbodies, and ephemeral drainages identified within the Study Area are presented in Figure 6 to Figure 9. Surrounding the Project, surface hydrology and drainage patterns have been historical disturbed by roads, cultivation, irrigation, ditches, and berms.

Two known fish-bearing watercourses are located within 2 km of the Project Footprint (Alberta Environment and Protected Areas 2023b) (Figure 2). The Sturgeon River, located approximately 1 km southwest of the Project Footprint, flows southeast approximately 3 km to its confluence with the North Saskatchewan River, which then flows northeast. The North Saskatchewan River is located approximately 1.7 km southeast of the Project Footprint. The Sturgeon River is a large permanent Class C watercourse with a Restricted Activity Period (RAP) from April 16 to June 30, and the North Saskatchewan River is a large permanent Class C watercourse with a RAP from April 16 to July 31 (Alberta Environment and Sustainable Resource Development 2012). Within the Study Area (but outside the Project Footprint), one potential watercourse is indicated by FWMIS (Waterbody ID 41751) which appears to flow southeast from the southern extent of the Study Area south of the Railyard to the southeast 1.8 km to its confluence with the North Saskatchewan River (Figure 2). However, no evidence of this watercourse (Waterbody ID 41751) was observed within 100 m of the Project Footprint during the field assessments.

3.6.2 WETLANDS

Wetlands are defined as land saturated with water for long enough to promote the formation of water altered soils, growth of water tolerant vegetation, and biological activity adapted to a wet environment (Government of Alberta 2013). Ephemeral waterbodies are low-lying areas where water is briefly ponded in the spring or after heavy precipitation, but not long enough to meet the requirements of a wetland; as such, they are not recognized as wetlands in Alberta (Government of Alberta 2015).

Wetlands identified within the Study Area are presented in Figure 6 to Figure 9. Detailed results of the wetland assessment completed for the Project are included in the Project-specific WAIRs (EDI Environmental Dynamics Inc. 2023a, b). Representative wetland photos are shown in Appendix D. A total of 41 wetlands were identified within the Project Footprint, which will be disturbed by the Project, including the following:

- Within the Railyard, 32 wetlands were identified including: 27 temporary graminoid marshes, four seasonal graminoid marshes, and one wooded deciduous swamp.
- Within the Bypass, nine wetlands were identified including: one seasonal graminoid marsh, four temporary graminoid marshes, and four wooded deciduous swamps.

3.6.3 OTHER WATERBODIES

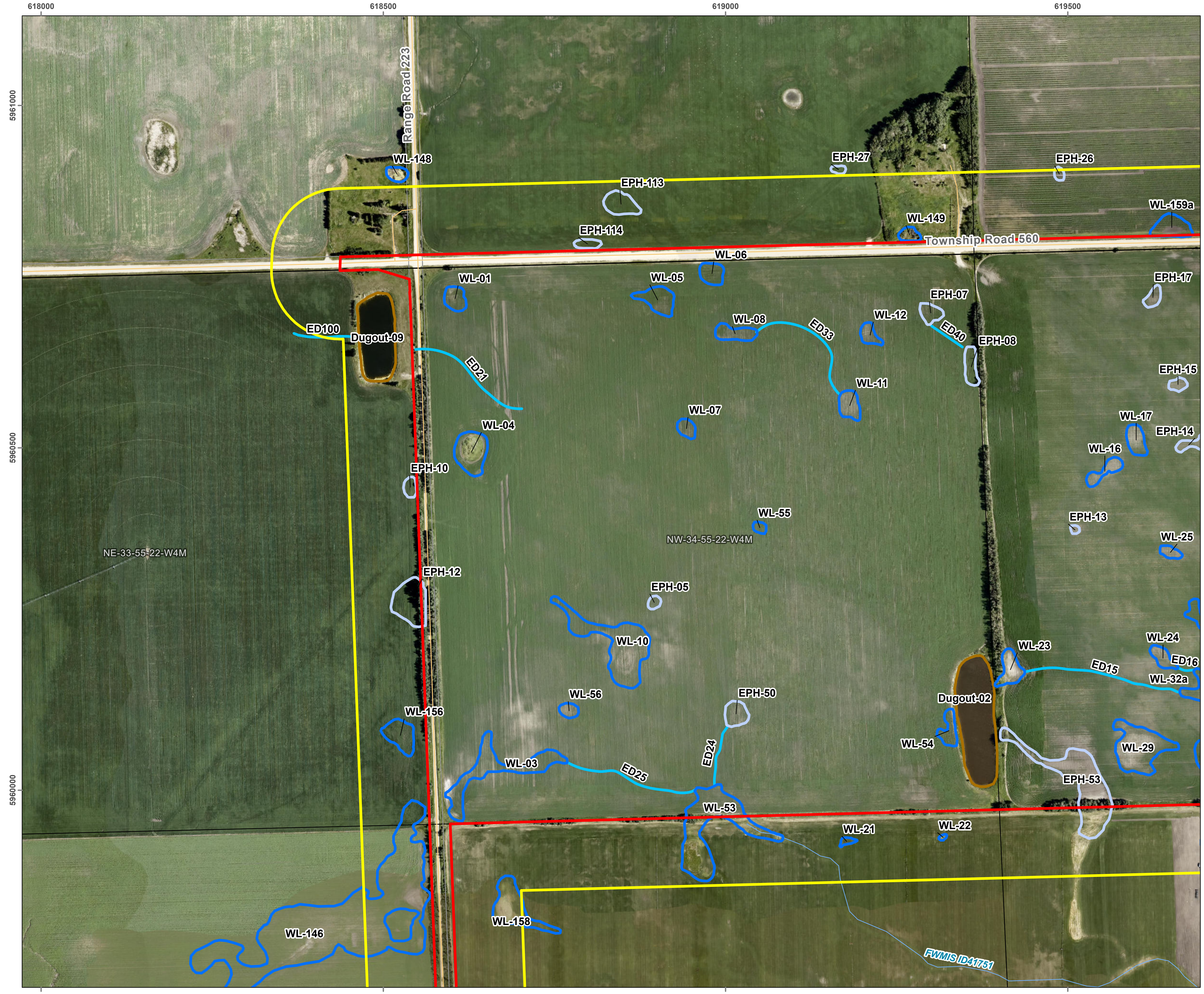
Ephemeral waterbodies, and ephemeral drainages identified within the Study Area are presented in Figure 6 to Figure 9. Of these, 18 ephemeral waterbodies (1.330 ha), and 13 ephemeral drainages (1,962 m in length and 0.196 ha conservatively assuming an average width of 1 m) were identified within the Project Footprint.

Additionally, the following surface water-related anthropogenic features were noted during field assessments:

- A sluice gate is located along the north ditch of Township Road 560, across from the lane entrance to the rural residence in NE 34-55-22 W4M. When the sluice gate is closed to the south, water flows east along the north side of Township Road 560. When the sluice gate is open to the south, water flows south along an ephemeral drainage (EPH-23) adjacent to the entrance lane of the rural residence then east across the Project Footprint towards a dugout (Dugout-03) (Figure 6).
- A 400-m irrigation pipeline running north-south was observed within SE-34-55-22 W4M (Figure 9).
- An 80-m shallow ditch running north-south was observed within SE-34-55-22 W4M (Figure 9).
- An irrigation pipeline with intermittent ditch is located along the Township Road 555 portion of the Bypass (Figure 9).
- Three dugouts (Dugout-09, Dugout-02, and Dugout-03) are located within the Study Area (Figure 6 and Figure 7).

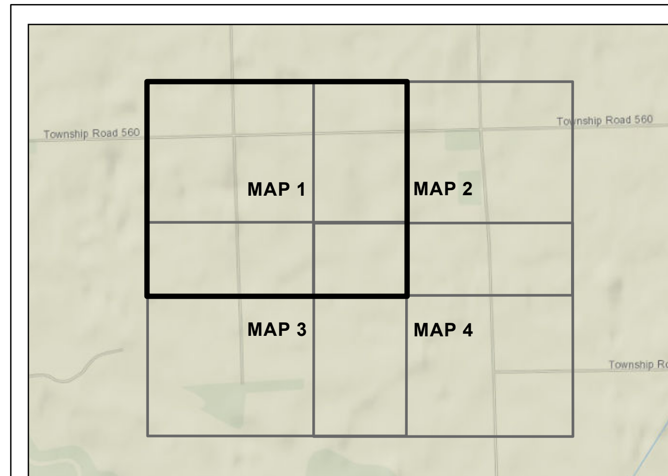
Waterbodies within the Study Area (Map 1 of 4)

Clifton Engineering Group Inc.



Legend

- Road
- Highway
- Railway
- Project Footprint
- Study Area
- Township
- Section
- Quarter Section
- FWMIS Potential Watercourse
- Ditch/Irrigation Pipeline
- Ephemeral Drainage
- Dugout
- Ephemeral Waterbody
- Wetland



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Data Sources

- Main map. World Imagery. Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
- Inset map. National Geographic. National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
- Roads, rail, and ATS grid. AltaLIS 20K Base Features
- Waterbodies and watercourses. FWMIS. Government of Alberta.

Disclaimer

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Drawn: C. Tennant	Checked: J. Mischkolz	**Figure 6**	Date: 2023-12-19

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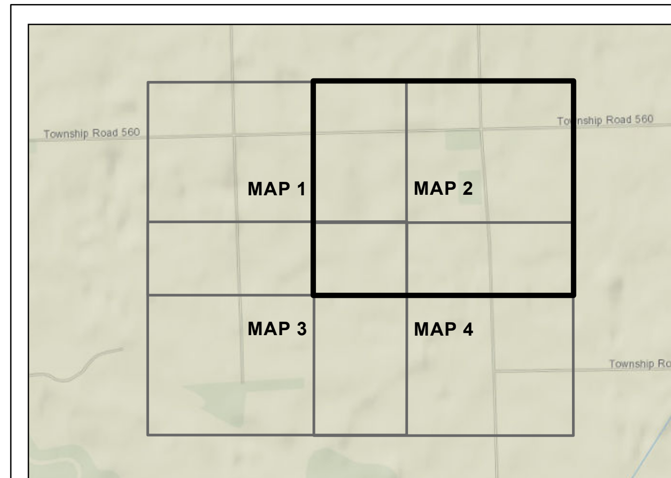
Waterbodies within the Study Area (Map 2 of 4)

Clifton Engineering Group Inc.

Legend

- Road
- Highway
- Railway
- Project Footprint
- Study Area
- Township
- Section
- Quarter Section
- FWMIS Potential Watercourse
- Ditch/Irrigation Pipeline
- Ephemeral Drainage
- Dugout
- Ephemeral Waterbody
- Wetland



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Map Projection: NAD 1983 10TM AEP Forest

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Data Sources

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• Inset map. National Geographic. National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
• Roads, rail, and ATS grid. AltaLIS 20K Base Features
• Waterbodies and watercourses. FWMIS. Government of Alberta.

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Drawn: C. Tennant	Checked: J. Mischkolz	**Figure 7**	Date: 2023-12-19

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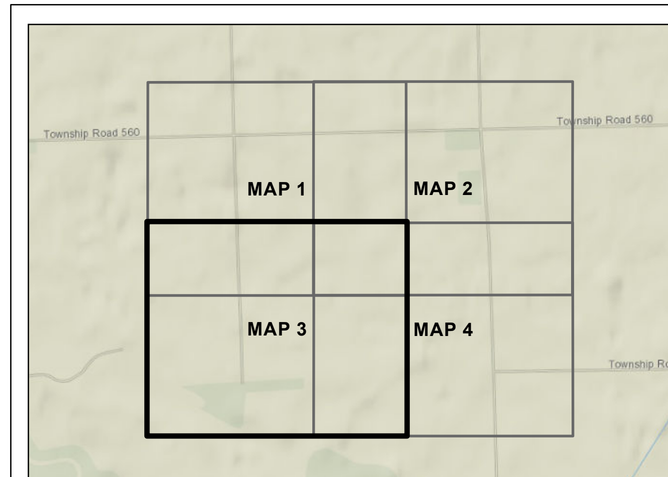
Waterbodies within the Study Area (Map 3 of 4)

Clifton Engineering Group Inc.

Legend

- Road
- Highway
- Railway
- Project Footprint
- Study Area
- Township
- Section
- Quarter Section
- FWMIS Potential Watercourse
- Ditch/Irrigation Pipeline
- Ephemeral Drainage
- Dugout
- Ephemeral Waterbody
- Wetland



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- Roads, rail, and ATS grid. AltaLIS 20K Base Features
- Waterbodies and watercourses. FWMIS. Government of Alberta.

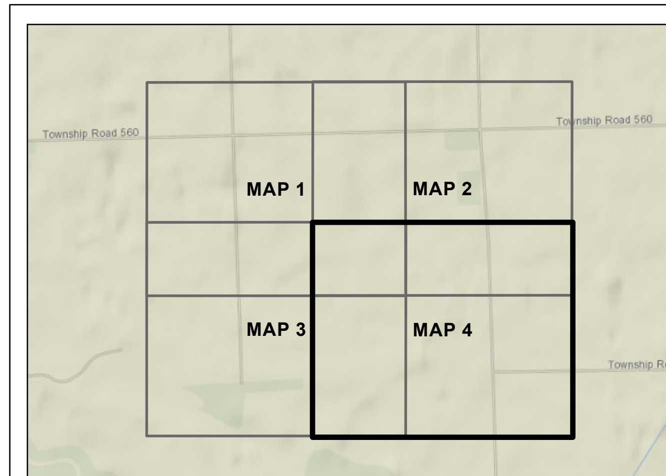
Drawn: C. Tennant	Checked: J. Mischkolz	**Figure 8**	Date: 2023-12-19

Waterbodies within the Study Area (Map 4 of 4)

Clifton Engineering Group Inc.

Legend

- Road
- Highway
- Railway
- Project Footprint
- Study Area
- Township
- Section
- Quarter Section
- FWMIS Potential Watercourse
- Ditch/Irrigation Pipeline
- Ephemeral Drainage
- Dugout
- Ephemeral Waterbody
- Wetland



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Data Sources

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- Waterbodies and watercourses. FWMIS. Government of Alberta.

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Drawn: C. Tennant	Checked: J. Mischkolz	**Figure 9**	Date: 2023-12-19

EDI

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APPENDICES

APPENDIX A DESIGN DRAWINGS

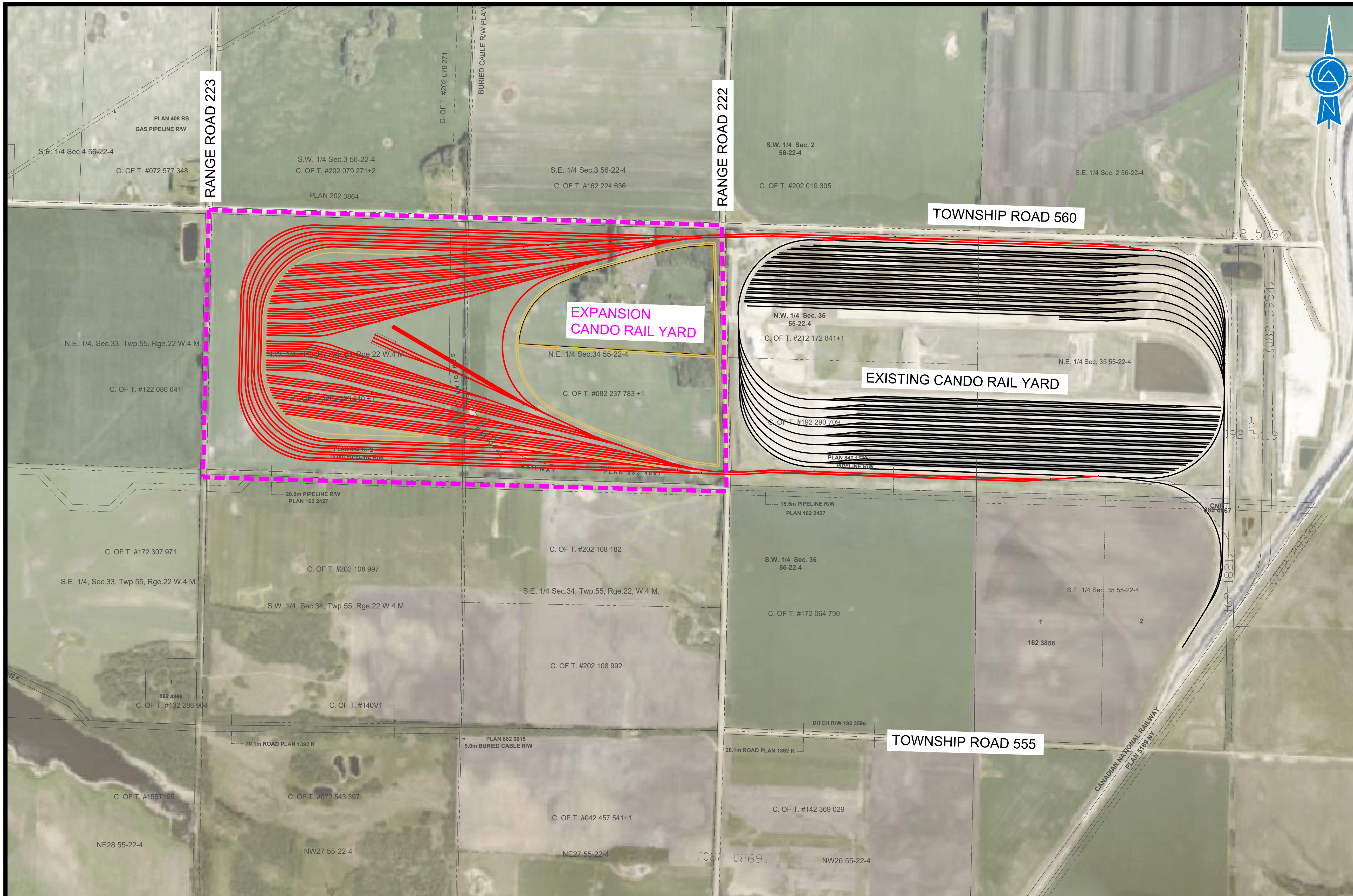

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FIGURE NAME: TRACK LAYOUT

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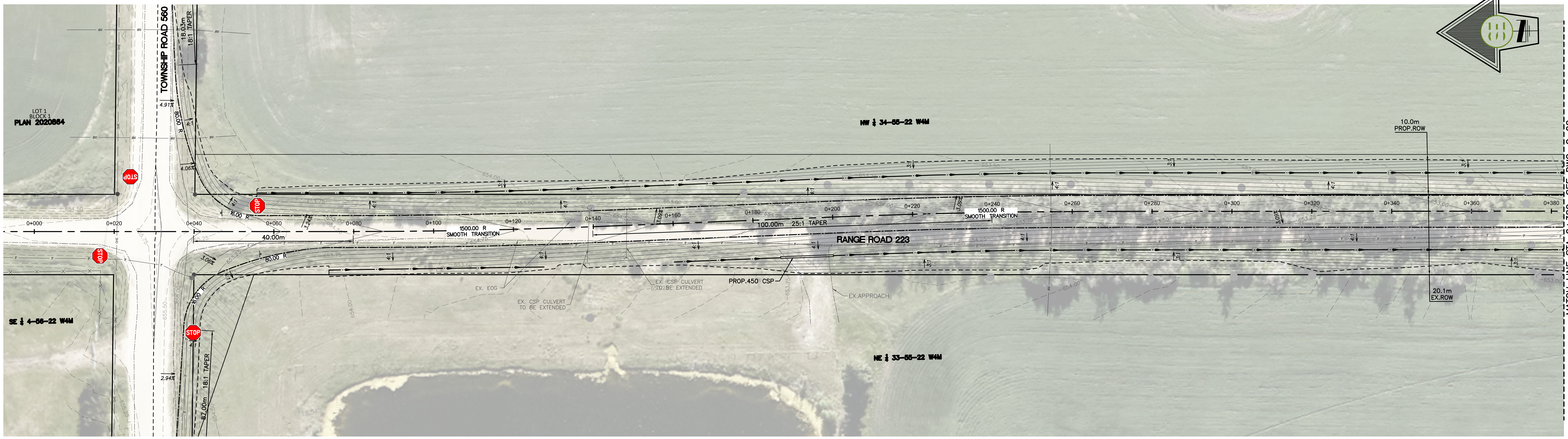

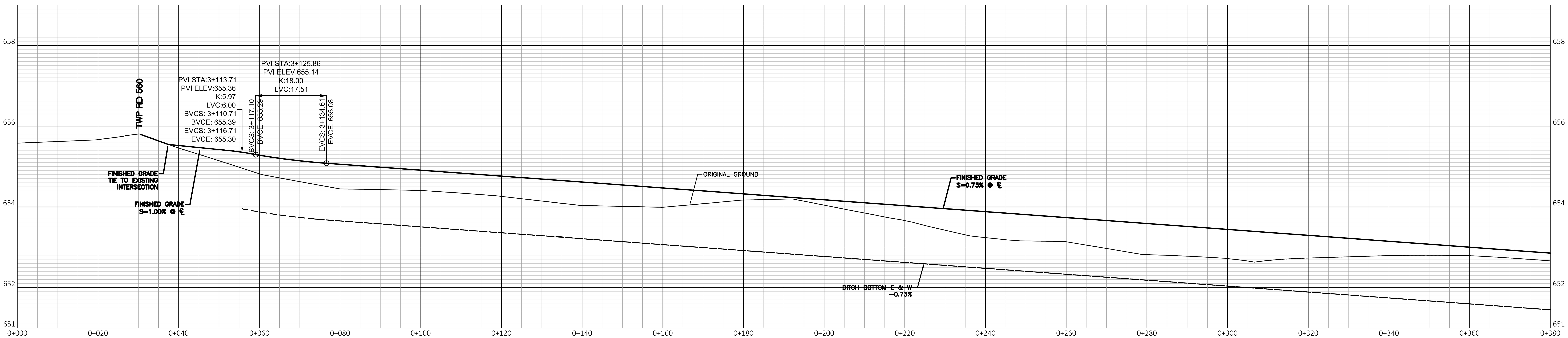

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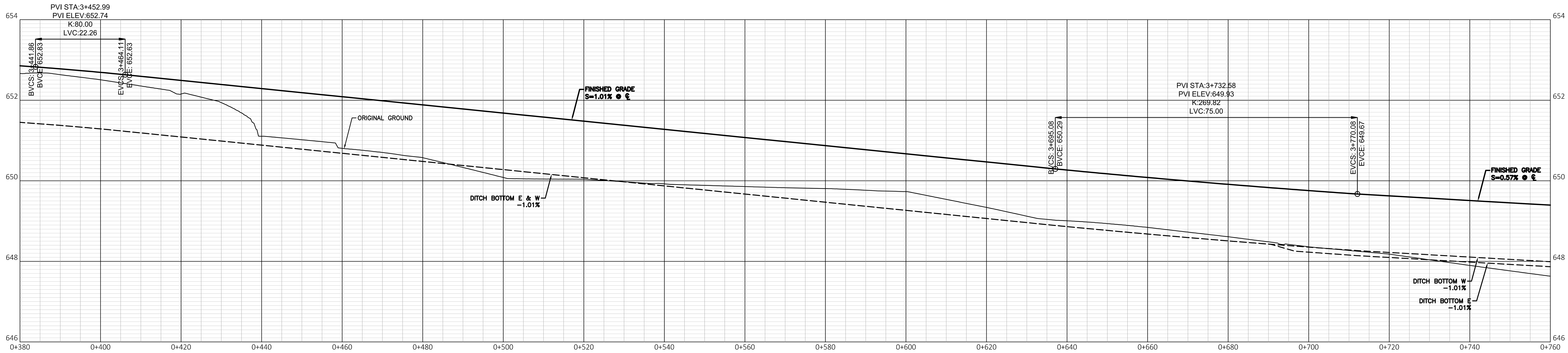

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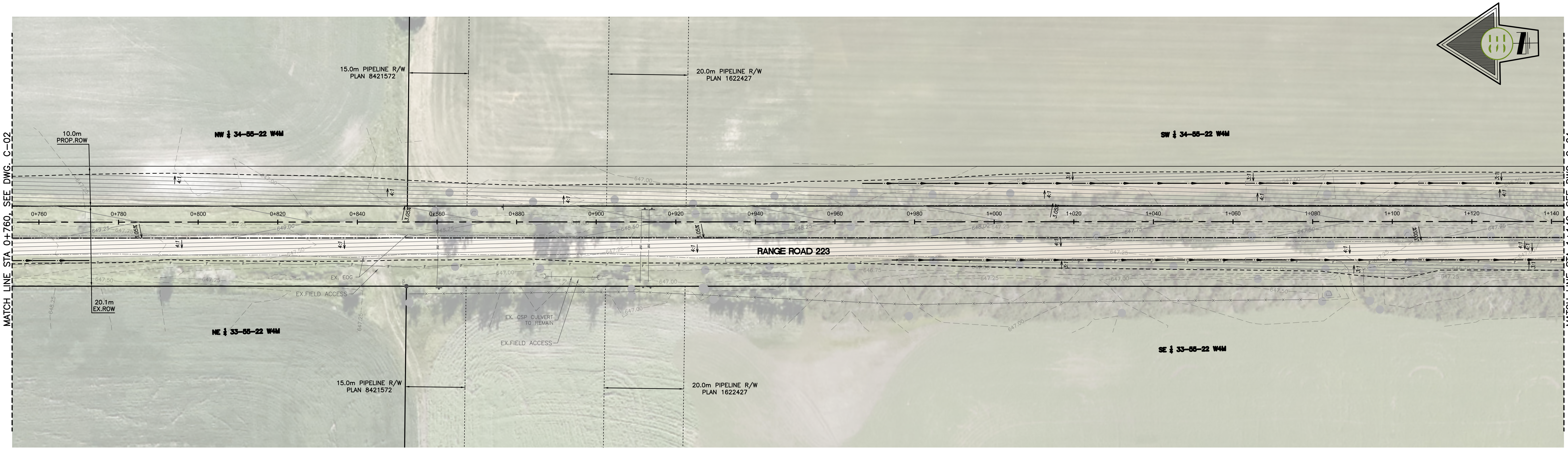

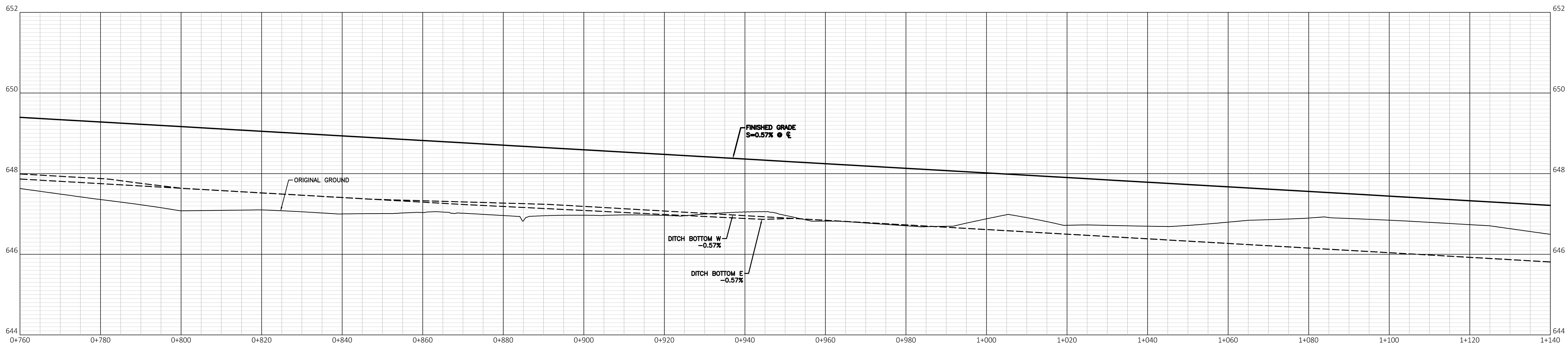

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- FDI/FDIP INDICATES EXISTING FOUND IRON PIN
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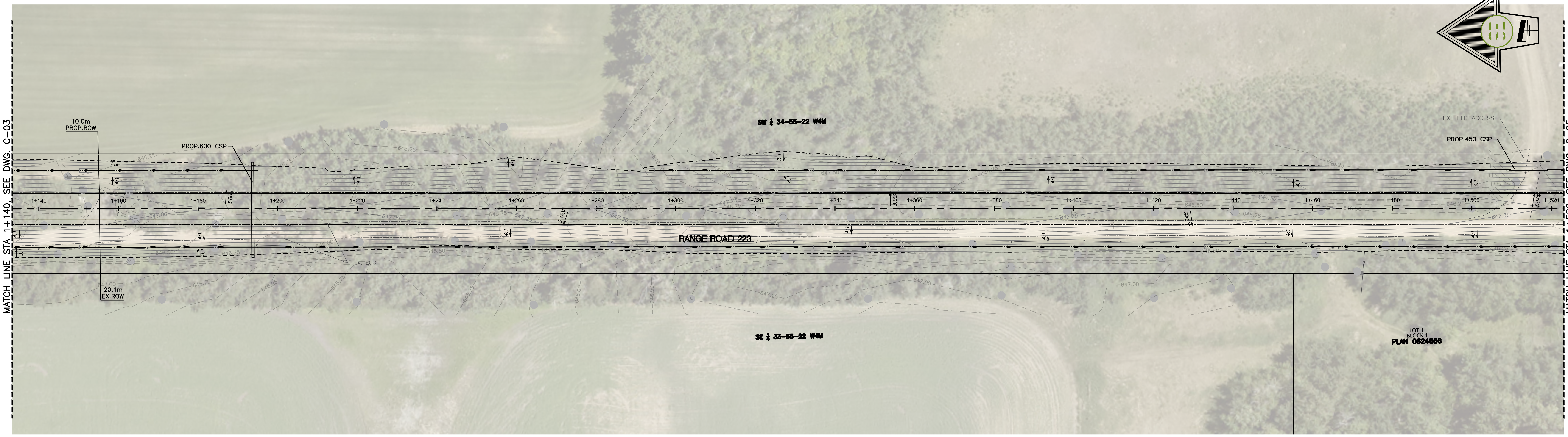

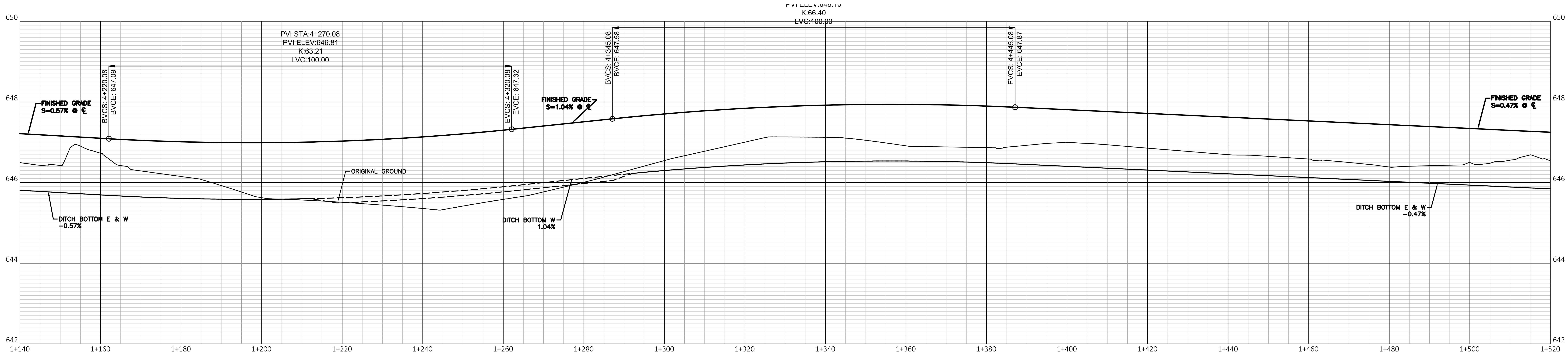

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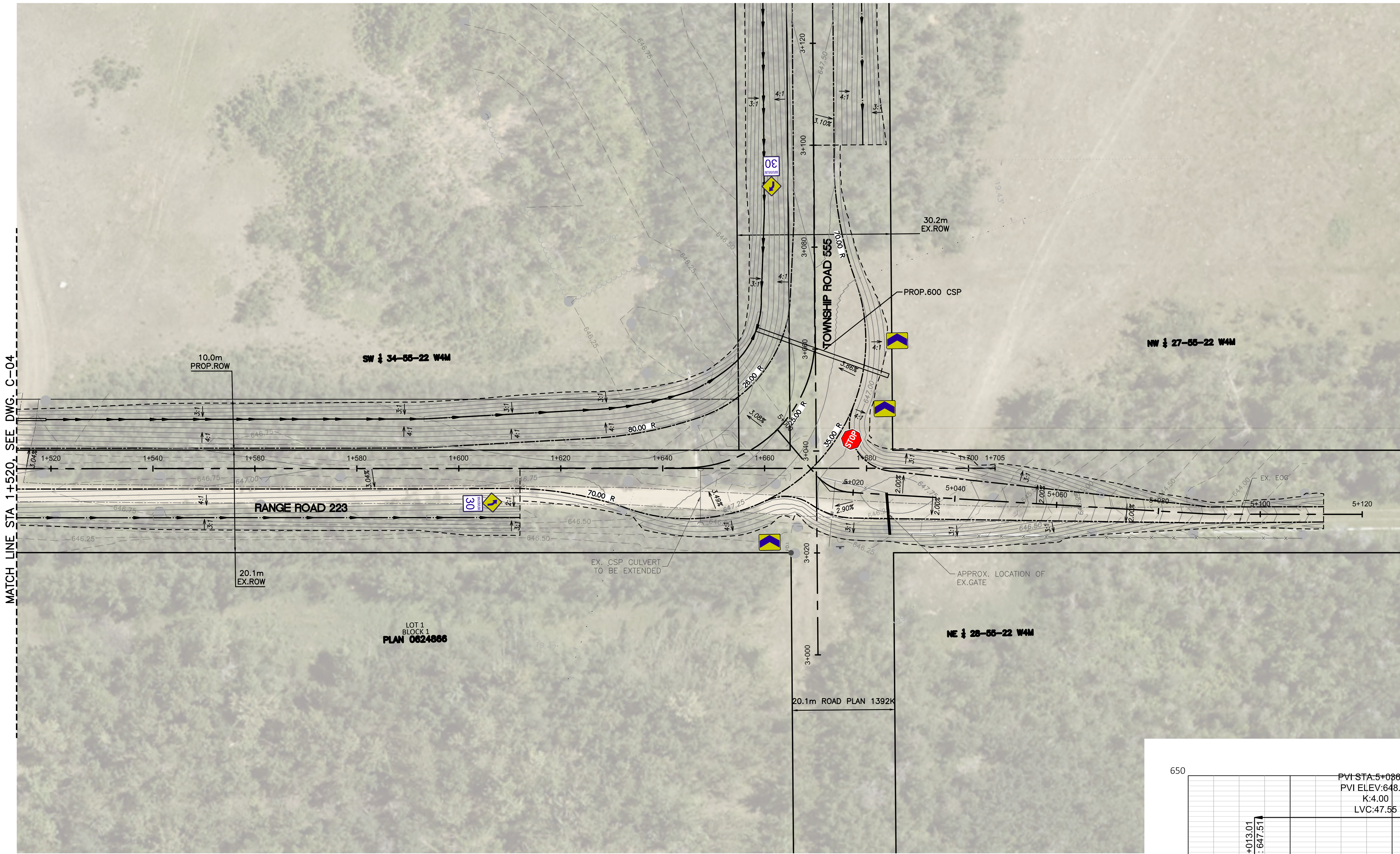

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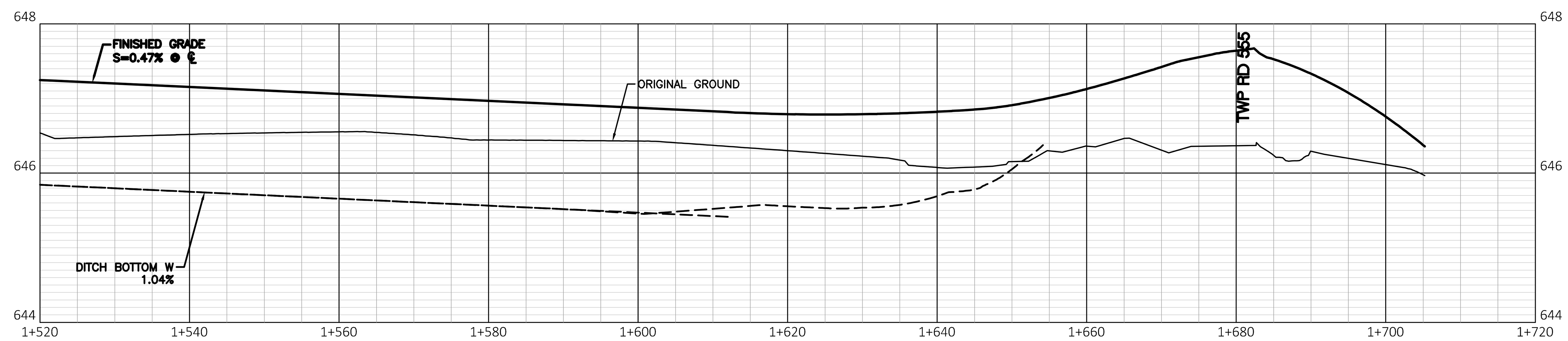

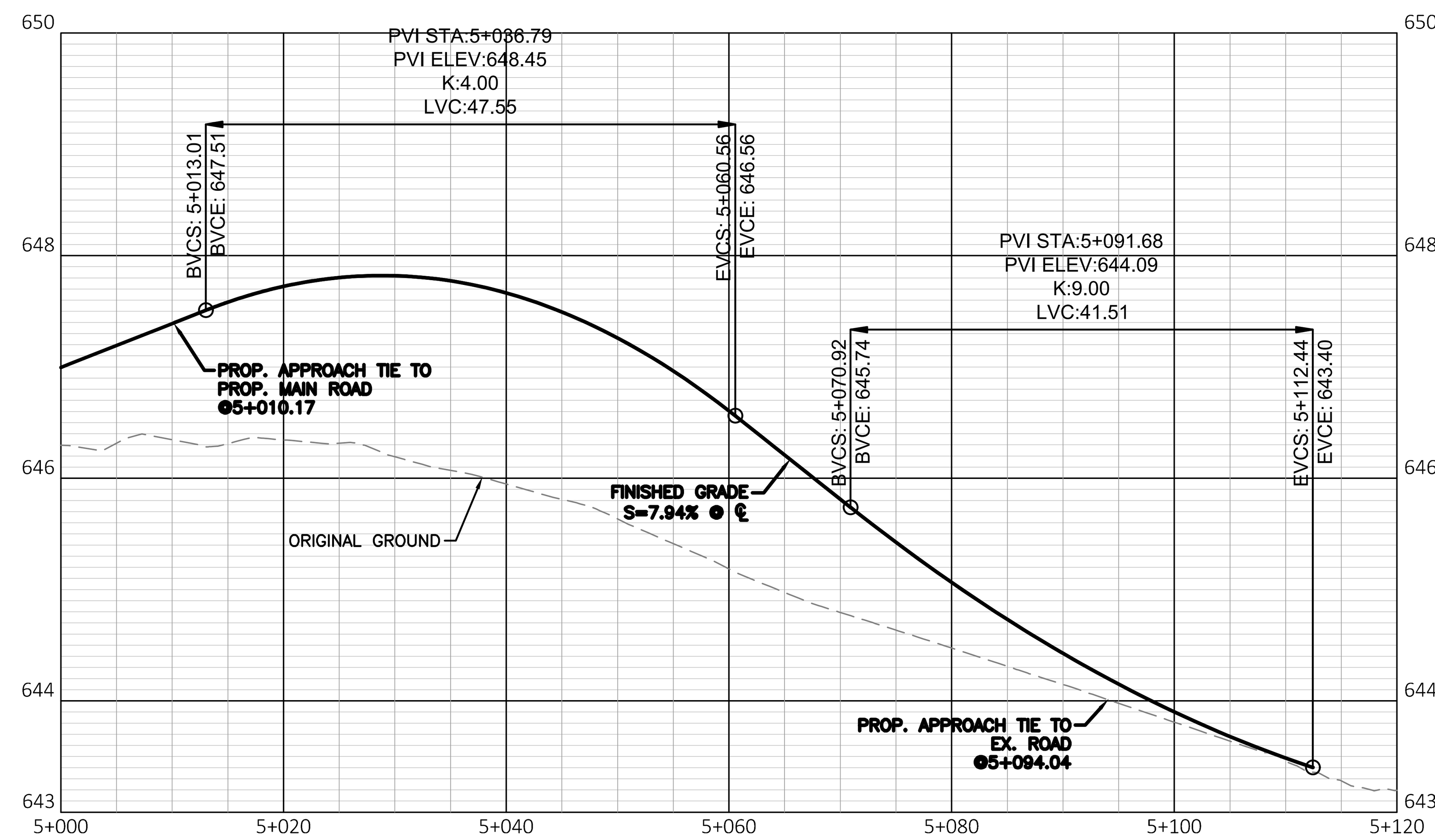

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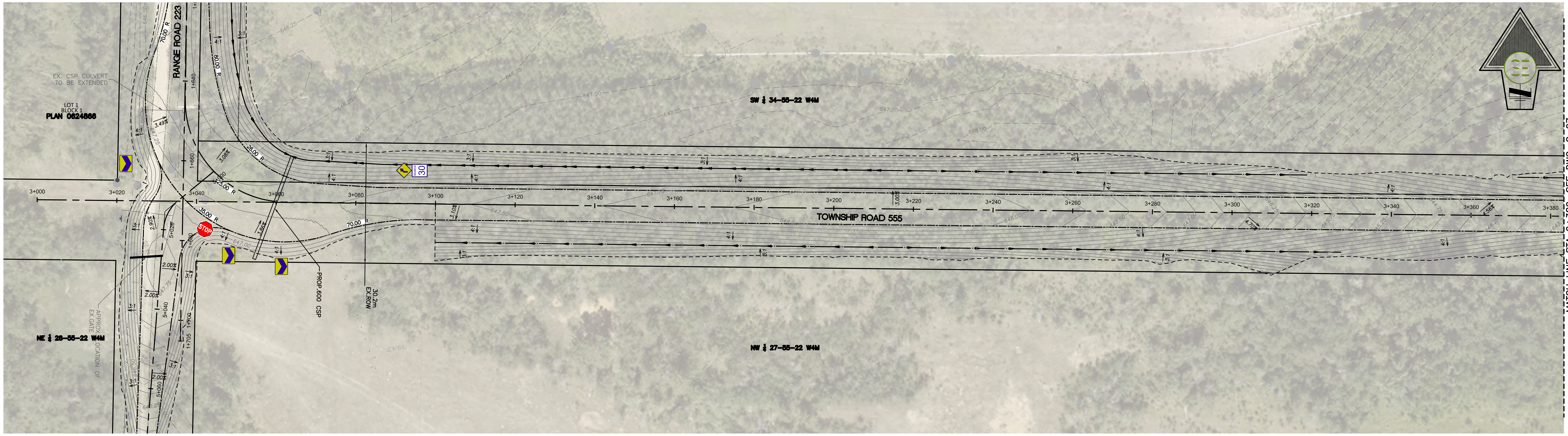

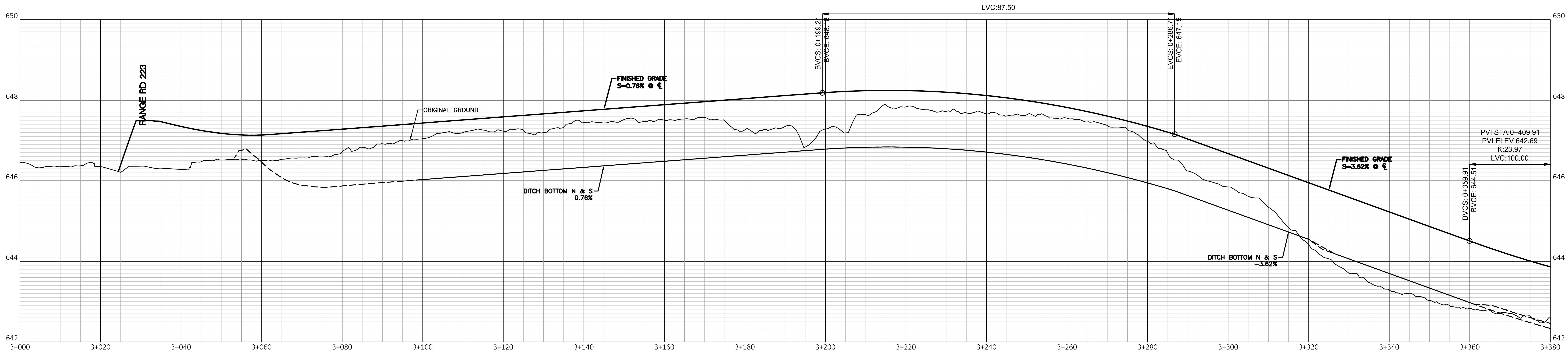

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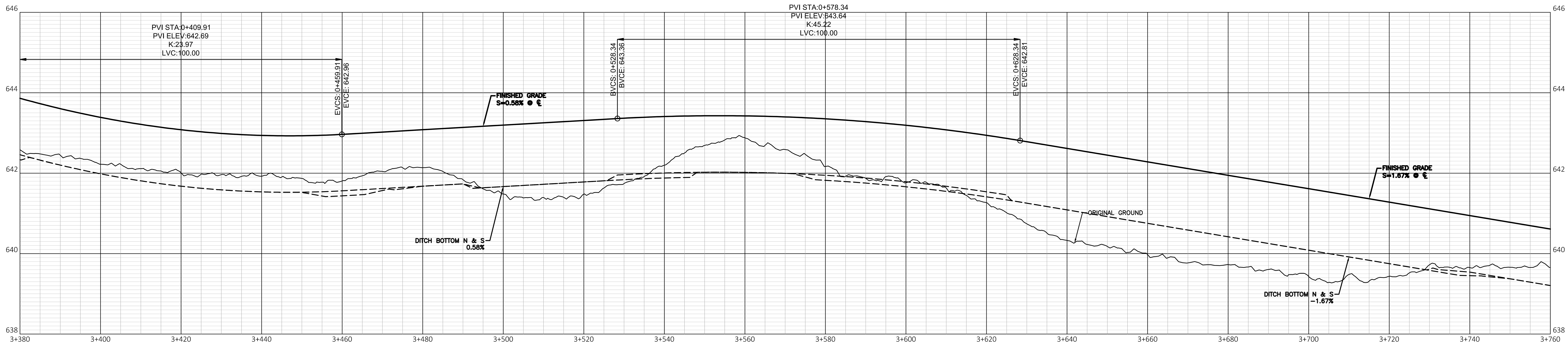

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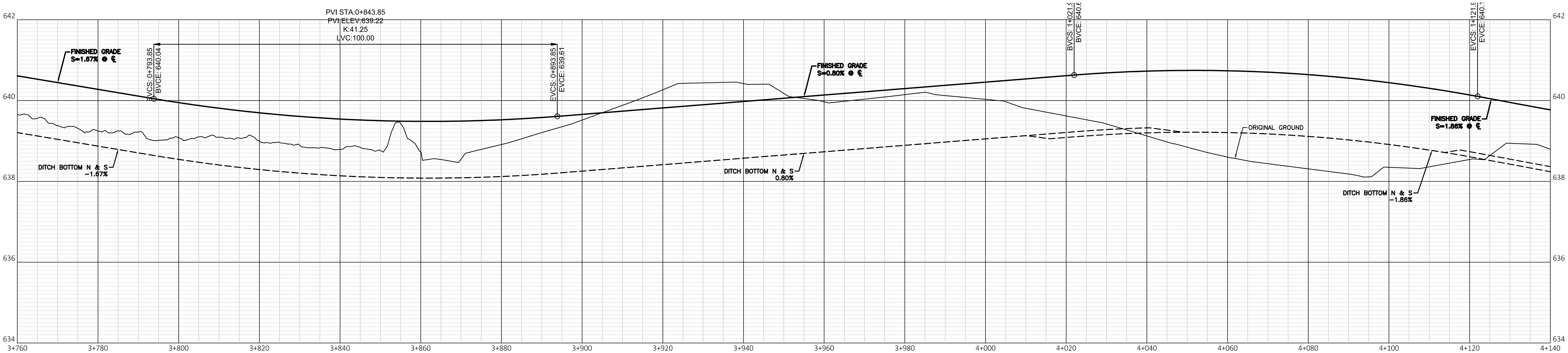

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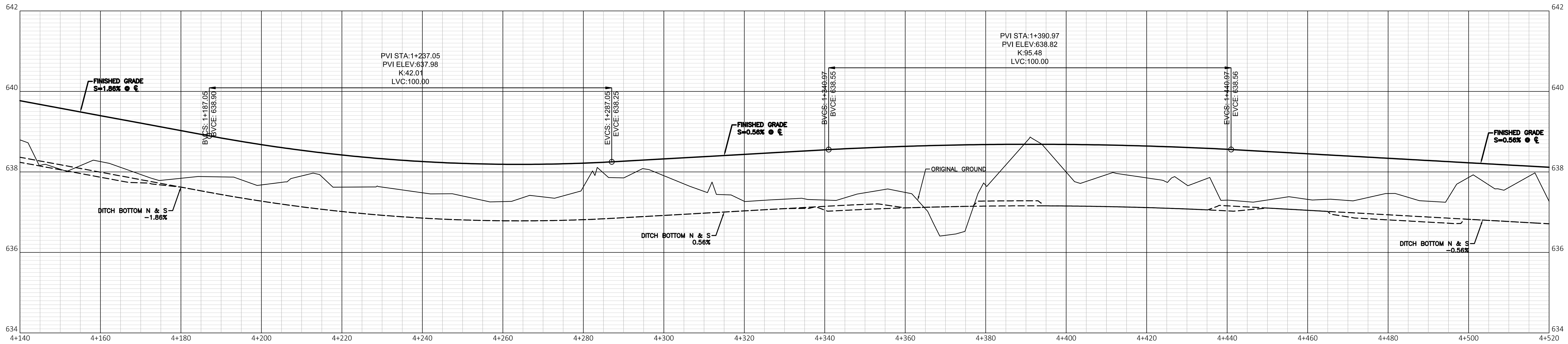

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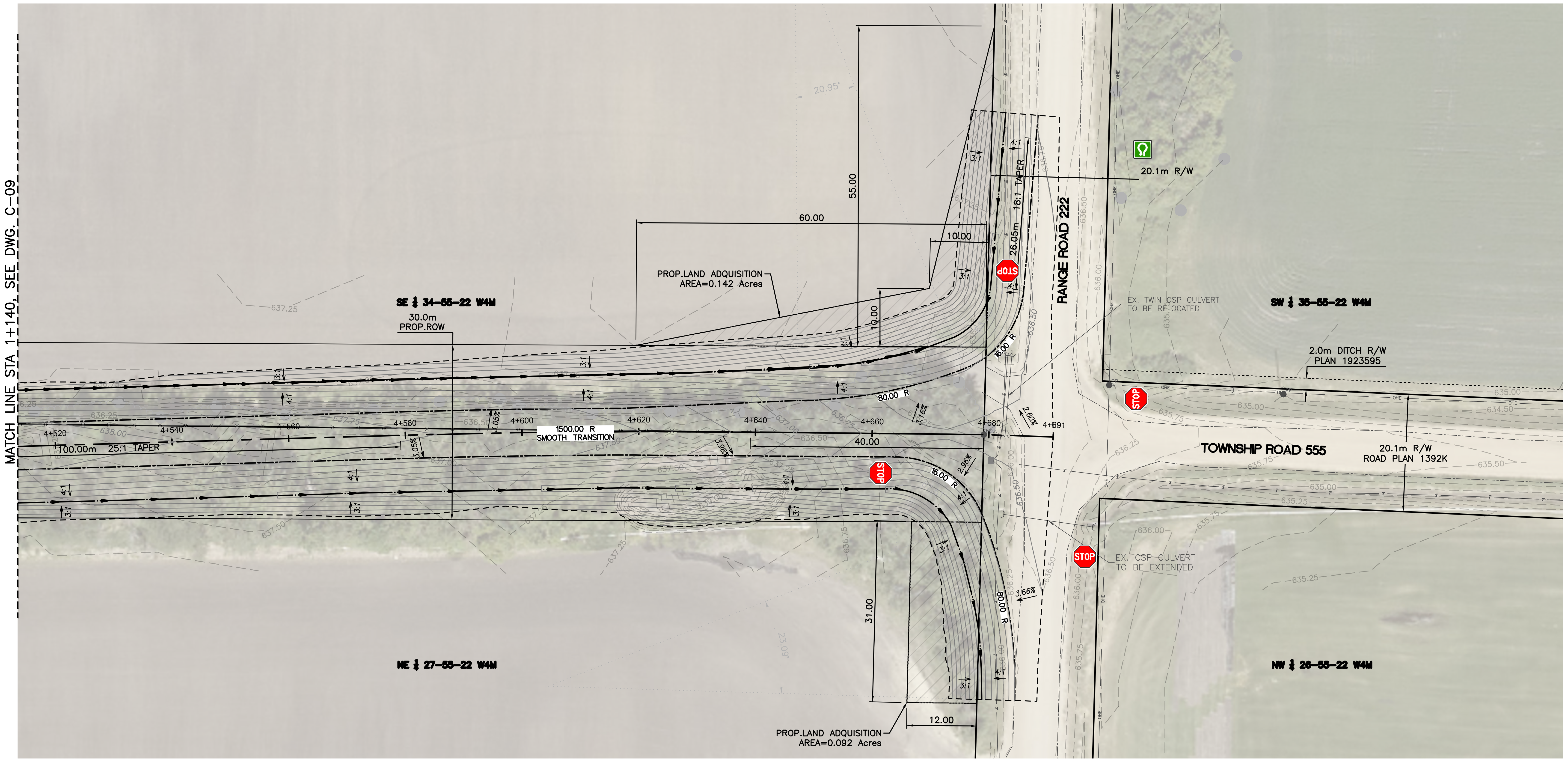

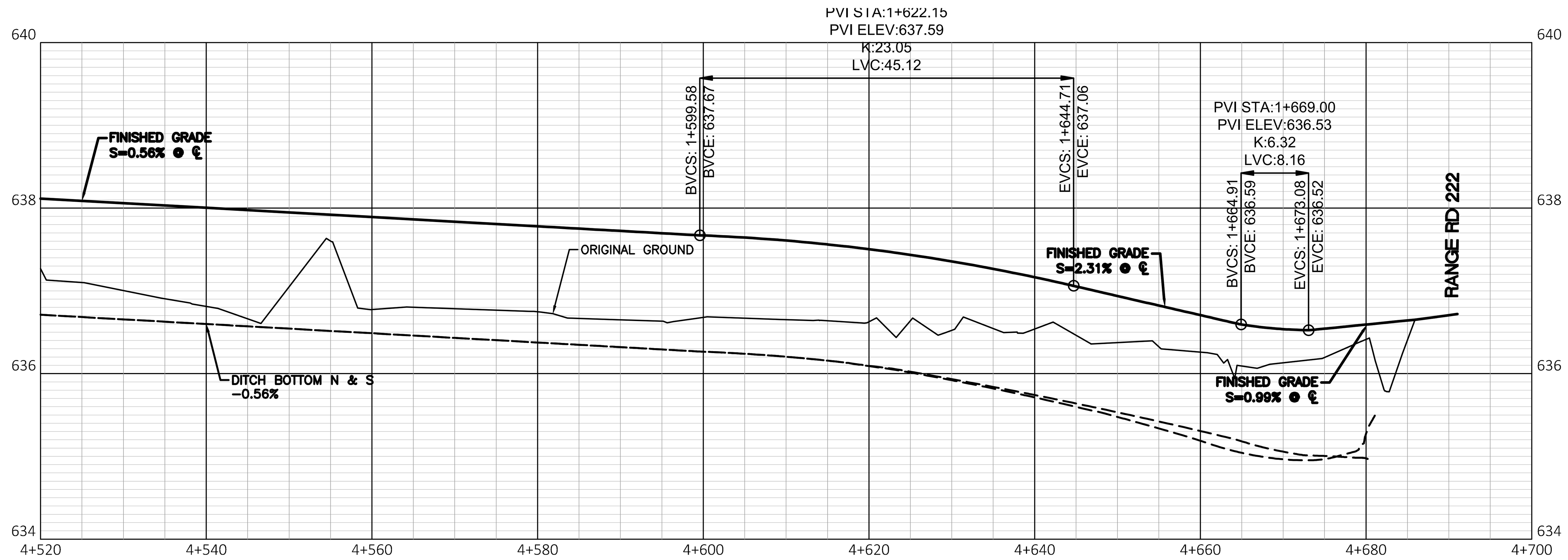

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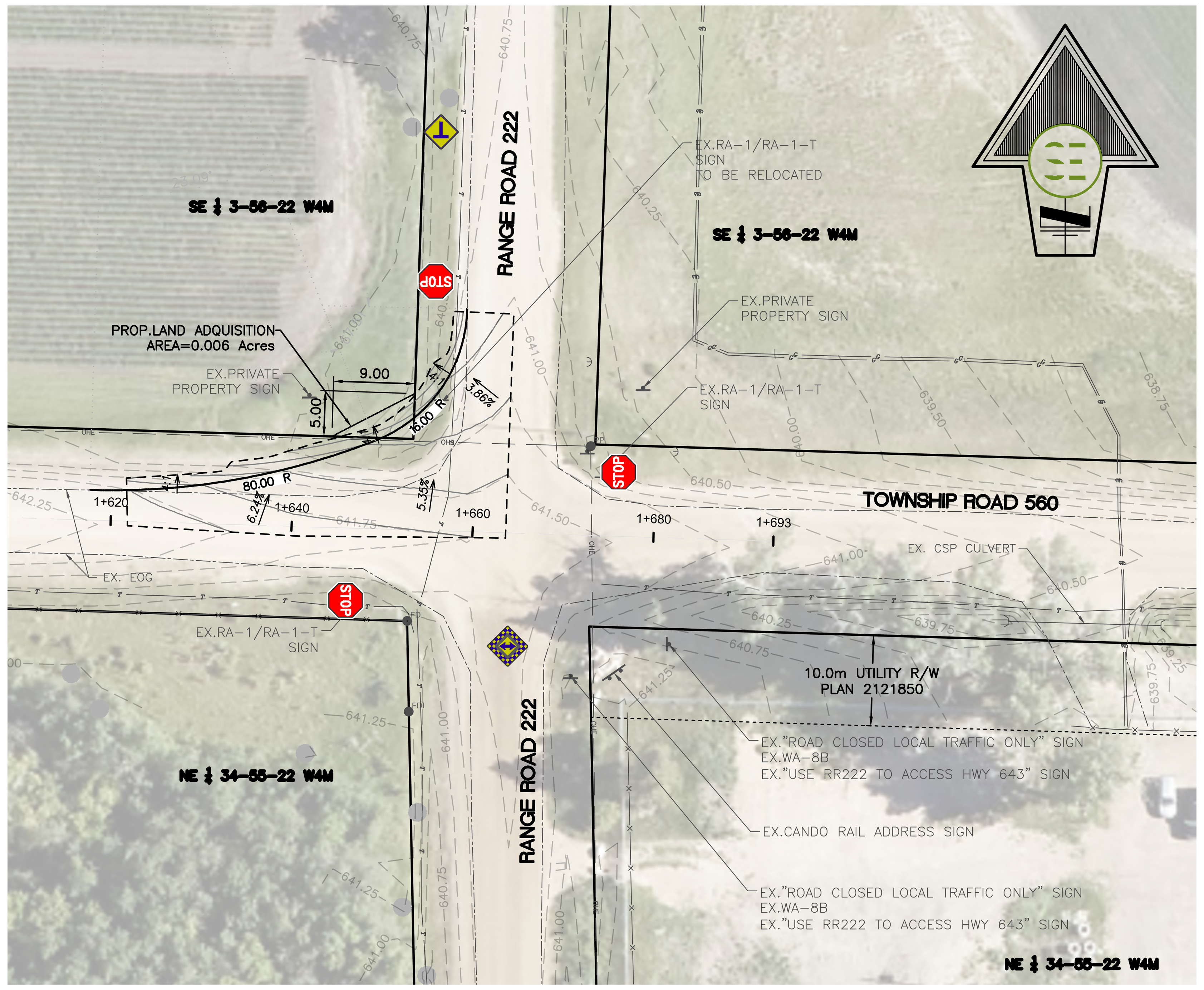

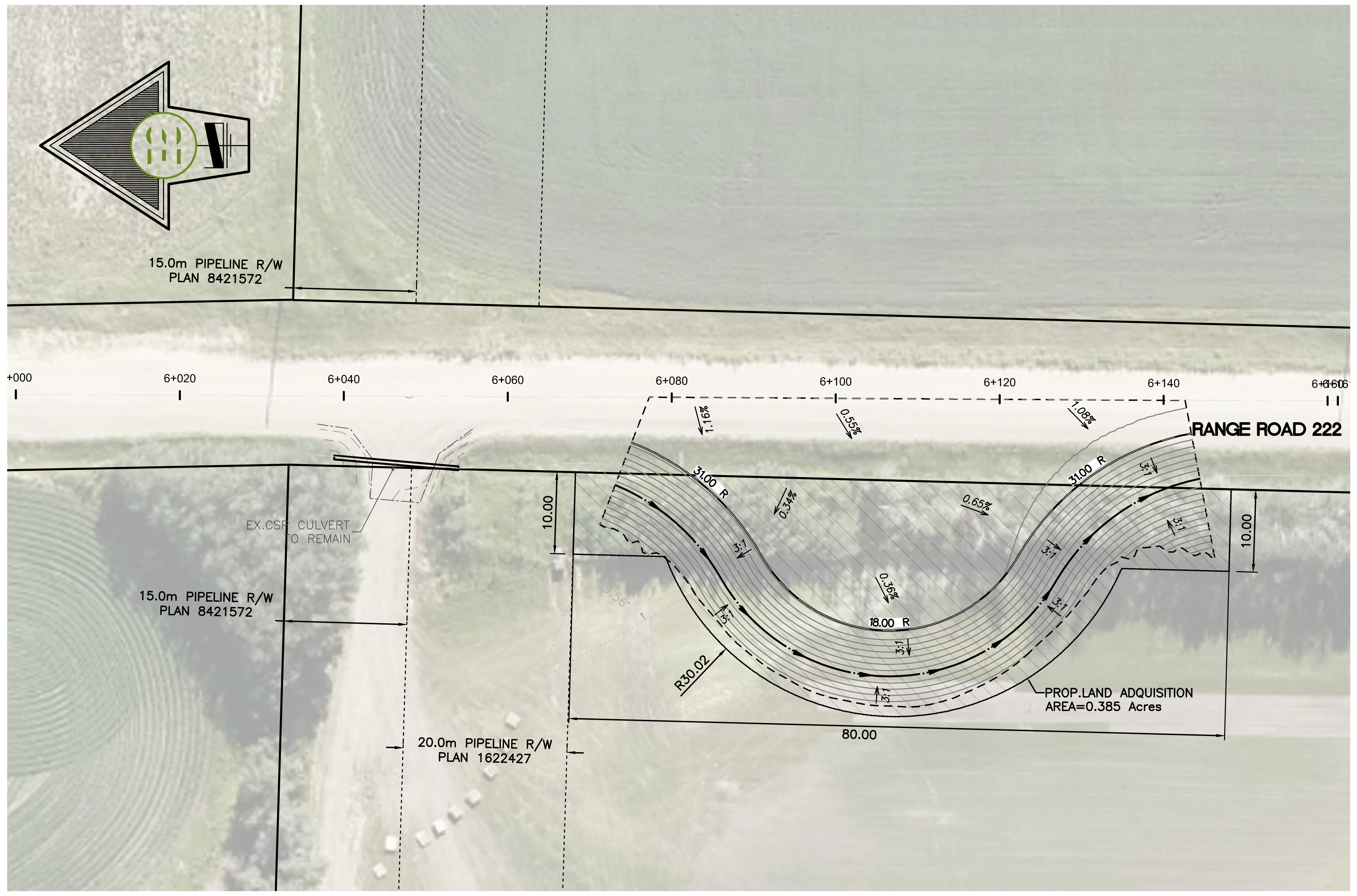

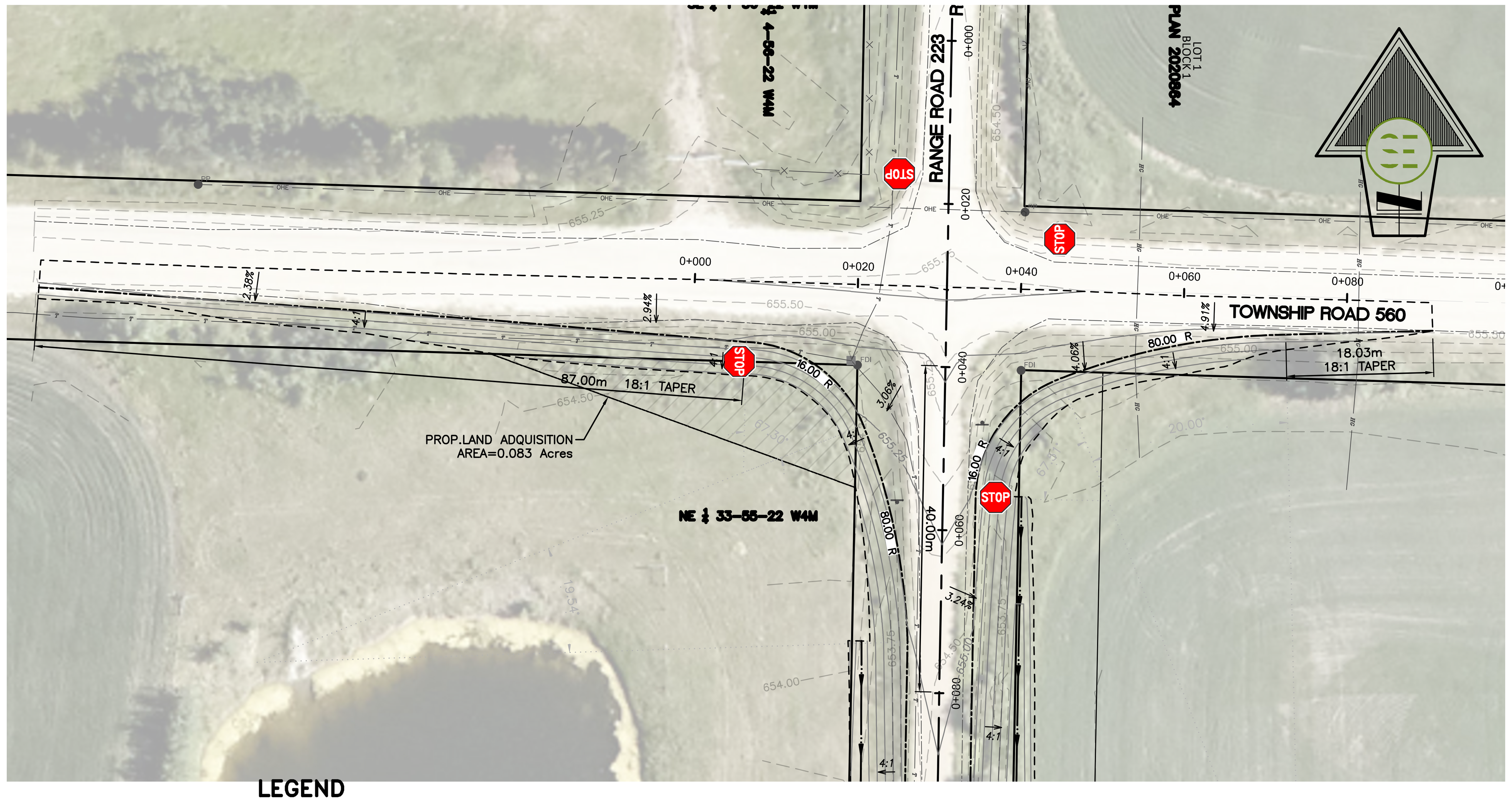

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APPENDIX B ACIMS REPORT

Date: 13/10/2023
Requestor: Consultant
Reason for Request: Environmental Reporting
SEC: 27 **TWP:** 055 **RGE:** 22 **MER:** 4

Non-sensitive EOs (updated: June 2022)

M_RR_TTT_SS	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D
4-22-055-27	7609	PDASTEH022	S3	Doellingeria umbellata var. pubens	flat-topped white aster	1942-07-30
4-22-055-27	7610	PDASTEH022	S3	Doellingeria umbellata var. pubens	flat-topped white aster	1942-08-07

Next Steps: See FAQ (https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/faqs.aspx#2 - Process)

Sensitive EOs (updated: June 2022)

M-RR-TTT	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D

No Sensitive EOs Found: Next Steps - See FAQ (https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/faqs.aspx#2 - Process)

Date: 13/10/2023
Requestor: Consultant
Reason for Request: Environmental Reporting
SEC: 28 **TWP:** 055 **RGE:** 22 **MER:** 4

Non-sensitive EOs (updated: June 2022)

M_RR_TTT_SS	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D

No Non-sensitive EOs Found: Next Steps - See FAQ (https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/faqs.aspx#2 - Process)

Sensitive EOs (updated: June 2022)

M-RR-TTT	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D

No Sensitive EOs Found: Next Steps - See FAQ (https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/faqs.aspx#2 - Process)

Date: 13/10/2023
Requestor: Consultant
Reason for Request: Environmental Reporting
SEC: 03 **TWP:** 056 **RGE:** 22 **MER:** 4

Non-sensitive EOs (updated: June 2022)

M_RR_TTT_SS	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D

No Non-sensitive EOs Found: Next Steps - See FAQ (https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/faqs.aspx#2 - Process)

Sensitive EOs (updated: June 2022)

M-RR-TTT	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D

No Sensitive EOs Found: Next Steps - See FAQ (https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/faqs.aspx#2 - Process)

Updated: Aug 31, 2022

Date: 13/10/2023
Requestor: Consultant
Reason for Request: Environmental Reporting
SEC: 33 **TWP:** 055 **RGE:** 22 **MER:** 4

Non-sensitive EOs (updated: June 2022)

M_RR_TTT_SS	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D

No Non-sensitive EOs Found: Next Steps - See FAQ (https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/faqs.aspx#2 - Process)

Sensitive EOs (updated: June 2022)

M-RR-TTT	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D

No Sensitive EOs Found: Next Steps - See FAQ (https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/faqs.aspx#2 - Process)

Date: 13/10/2023
Requestor: Consultant
Reason for Request: Environmental Reporting
SEC: 34 **TWP:** 055 **RGE:** 22 **MER:** 4

Alberta Parks

Non-sensitive EOs (updated: June 2022)

M_RR_TTT_SS	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D

No Non-sensitive EOs Found: Next Steps - See FAQ (https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/faqs.aspx#2 - Process)

Sensitive EOs (updated: June 2022)

M-RR-TTT	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D

No Sensitive EOs Found: Next Steps - See FAQ (https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/faqs.aspx#2 - Process)

APPENDIX C FWMIS REPORT

Alberta Environment and Parks

Fish and Wildlife Internet Mapping Tool (FWIMT)

(source database: Fish and Wildlife Management Information System (FWMIS))

Species Summary Report

Report Date: 18-Dec-2023 18:36

Species present within the current extent

Fish Inventory

- EMERALD SHINER
- GOLDEYE
- LONGNOSE SUCKER
- SHORTHEAD REDHORSE
- WHITE SUCKER

Wildlife Inventory

- BALTIMORE ORIOLE
- EASTERN PHOEBE
- LEAST FLYCATCHER

Stocked Inventory

No Species Found in Search Extent

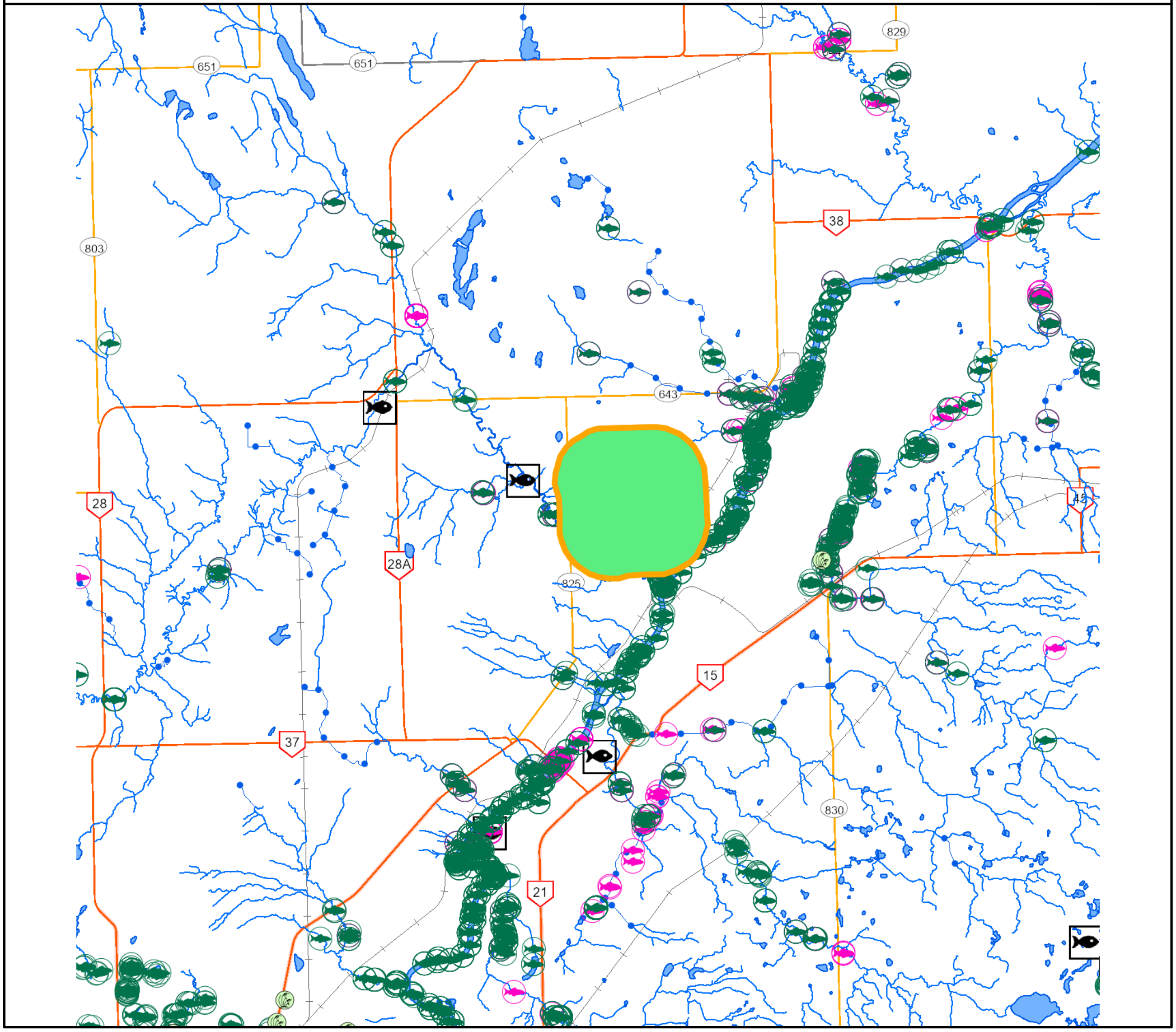
Buffer Extent

Centroid (X,Y)	Projection	Centroid (Qtr Sec Twp Rng Mer)	Radius or Dimensions
619352, 5959933	10-TM AEP Forest	SW 34 55 22 4	5867, 5800 meters

Contact Information

For contact information, please visit:
https://www.alberta.ca/fisheries-and-wildlife-management-contacts.aspx

18-Dec-2023 18:36 **Map Results**



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APPENDIX D REPRESENTATIVE PHOTOGRAPHS

Appendix Photo D-1. View north within the Railyard footprint showing cropland and wetland WL10, August 11, 2023.

Appendix Photo D-2. View north within the Railyard footprint showing deciduous treed upland, August 9, 2023.

Appendix Photo D-3. View south within the Bypass footprint along Range Road 223, September 27, 2023.

Appendix Photo D-4. Representative soil conditions within the Railyard footprint of a temporary graminoid marsh wetland (WL-25), August 9, 2023.

Appendix Photo D-5. View of west showing rutting within the Bypass footprint in a temporary graminoid marsh wetland (WL-28), September 28, 2023.

Appendix Photo D-6. View north showing a seasonal graminoid marsh wetland (WL10) within the Railyard footprint, August 2023.

Appendix Photo D-7. View north within a wooded deciduous swamp (WL125) a wooded deciduous swamp within the Bypass footprint, September 28, 2023.

Appendix Photo D-8. View of listed plant clammy hedge-hyssop (*Gratiola neglecta*) observed within wetlands WL10 and WL146 within the Project Footprint, September 2023.

Appendix Photo D-9. View east along Township Road 555 along the northern boundary of the Bypass footprint showing irrigation pipeline and deciduous treed upland, September 28, 2023.

Appendix Photo D-10. View east along Township Road 555 along the northern boundary of the Bypass footprint showing sod field, ditch, and deciduous treed upland, September 29, 2023.

Appendix F
Ambient Air, Noise & Greenhouse Gas (GHG) Assessment

Clifton

CG3821

Cando Rail & Terminals Ltd. Ambient Air Quality, Noise & Greenhouse Gas (GHG) Assessment

Sturgeon Railyard West Expansion
Sturgeon County, Alberta

Clifton

Calgary Office
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Calgary, Alberta T2C 5C2

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F (403) 234-9033

calgary@clifton.ca
www.clifton.ca

7 February 2024 CG3821

Cando Rail & Terminals Ltd. Ambient Air Quality, Noise & Greenhouse Gas (GHG) Assessment

Sturgeon Railyard West Expansion Sturgeon County, Alberta

Executive Summary

Clifton Engineering Group Inc. (Clifton) was retained by Cando Rail & Terminals Ltd. to complete an Ambient Air Quality, Noise and Greenhouse Gas (GHG) Assessment (Assessment) for the proposed Sturgeon Railyard West Expansion project (Project) located in Sturgeon County, Alberta (Site). The presented Assessment was prepared as a part of the environmental documentation package for the Project required by the approving regulatory authority.

The main objectives of the presented Assessment can be summarized as follows:

- Evaluate potential impacts of the proposed Project on the ambient air quality in the area and outline applicable emissions management measures;
- Evaluate potential impacts of the proposed Project on the noise levels in the area and outline applicable management strategies;
- Establish the GHG emissions inventory for both construction and operation phases of the Project based on the available design information;
- Quantify estimated GHG emissions in all applicable categories;
- Calculate the estimated carbon intensity of the Project; and
- Outline potential GHG mitigation measures and road map towards carbon neutrality applicable to the Project.

Air quality in the region of the Project is monitored by the Fort Air Partnership, which currently operates ten continuous and sixty-three passive air monitoring stations in the Capital Region. Data is compared to provincial AAQOs by the Government of Alberta and used to calculate the Air Quality Health Index. Air contaminant emissions are expected to be negligible, or minimal during all Project phases. Expected emissions during the construction phase will be transient in nature.

Noise receptors are expected to be occupied residences within a 5 km radius of the Project. It is not expected that increased noise levels from the Project will adversely affect these receptors as the overall increase in noise levels over background is expected to be minor. Cando will implement the recommended noise management measures to reduce noise and limit its potential effects on nearby residents and their activities to the extent possible.

GHG emissions were estimated both for the construction and operation phase of the Project in all applicable categories. Net GHG emission summaries are presented in Section 5.0 of this Assessment. Section 6.0 describes carbon sink mitigation measures to be implemented and outlines a long-term carbon neutrality plan for the Project.

Definitions

Acquired Energy GHG Emissions - GHG emissions associated with the generation of electricity, heat, steam or cooling, purchased or acquired from a third party for the project.

Biogenic Carbon - carbon derived from biogenic (plant or animal) sources excluding fossil carbon.

Carbon Sink – the ability of a forest, ocean or other natural environment to absorb carbon dioxide from the atmosphere.

Direct GHG Emissions - GHG emissions generated by activities that are within the defined scope of the project.

Forested Land – includes all areas of trees of 1 ha or more, with a minimum tree crown cover of 25% and trees of 5 m in height— or having the potential to reach this height, as defined by the 2006 Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories (IPCC 2006, Volume 4, Chapter 3).

Greenhouse gases (GHG) – Gases that possess global warming potential, as identified in Schedule 3 of the Greenhouse Gas Pollution Pricing Act (GGPPA).

Industrial processes - processes that involve a chemical or physical reaction, the primary purpose of which is to produce a product.

Project lifetime – the period encompassing all phases of the project, including construction, operation and decommissioning phases.

Significant sources – groups of equipment (or bundle of technologies and practices) or activities that contribute 1% or more of the total direct GHG emissions of the project.

Wetlands – includes areas of peat extraction and land that is covered or saturated by water for all or part of the year and that does not fall into the Forest Land, Cropland, Grassland or Settlements categories as defined by the 2006 Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories (IPCC 2006, Volume 4, Chapter 3).

Acronyms

AEPA: Alberta Environment and Protected Areas
AER: Alberta Energy Regulator
AF: Activity Factor
BAT/BEP: Best Available Technologies / Best Environmental Practices
CH_4: Methane
CF: Conversion Factor
CO: Carbon Monoxide
CO_2: Carbon Dioxide
CO_{2e}: Carbon Dioxide Equivalent
db: decibel
ECCC: Environment and Climate Change Canada
EF: Emission Factor
EIA: The United States Energy Information Agency
GHG: Greenhouse Gas
GWP: Global Warming Potential
ha: Hectare
HC: Hydrocarbons
HP: Horsepower
IPCC: Intergovernmental Panel on Climate Change
km: kilometer
kV: Kilovolt
kWh: Kilowatt hour
LUC: Land Use Change
Mt: Million metric tonnes
MW: Megawatt
MWh: Megawatt hour
NCIA: Northeast Capital Industrial Association
NG: Natural Gas
NO_x: Nitrous oxides
N_2O: Nitrous oxide
$PM_{2.5}$: Fine Particulate Matter
PM_{10}: Particulate Matter
scf: Standard Cubic Feet
SO_2: Sulphur Dioxide
t: metric tonne
U.S. EPA: The United States Environmental Protection Agency

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Table 6.2 – Carbon Sinks Mitigation Measures Summary
Table 6.3 – Uncertainty Ranking

1.0 Introduction

Clifton Engineering Group Inc. (Clifton) was retained by Cando Rail & Terminals Ltd. (Cando) to complete an Ambient Air Quality, Noise and Greenhouse Gas (GHG) Assessment (Assessment) for the proposed Sturgeon Railyard West Expansion (SWRT) project (Project) located in Sturgeon County, Alberta (Site). The presented Assessment was prepared as a part of the environmental documentation package for the Project required by the approving regulatory authority.

The Project intends an expansion of Cando's current railyard with a capacity of approximately 1900 rail car spots to achieve an enhanced capacity of 5000 rail car spots.

The main objectives of the Assessment can be summarized as follows:

- Evaluate potential impacts of the proposed Project on the ambient air quality in the area and outline applicable emissions management measures;
- Evaluate potential impacts of the proposed Project on the noise levels in the area and outline applicable management strategies;
- Establish the GHG emissions inventory for both construction and operation phases of the Project based on the available design information;
- Quantify estimated GHG emissions in all applicable categories;
- Calculate the estimated carbon intensity of the Project; and
- Outline potential GHG mitigation measures and a road map towards carbon neutrality applicable to the Project.

The presented Assessment follows guidance, protocols, scientific rationale and best practices as outlined in the following documents:

- Government of Canada: *Canadian Net-Zero Emissions Accountability Act, S.C. 2021, c-22*; 2021;
- Alberta Environment and Protected Areas (AEPA): *Alberta's Ambient Air Quality Objectives and Guidelines*, 2016;
- AEPA: *The Air Monitoring Directive*, 2016;
- Environment and Climate Change Canada (ECCC): *Technical Guide Related to the Strategic Assessment of Climate Change*, August 2021;
- Intergovernmental Panel on Climate Change: *Guidelines for National Greenhouse Gas Inventories,* 2006;
- ISO 14064-1:2018: *Greenhouse Gas Inventories & Measuring Carbon Footprint*; and
- Alberta Energy Regulator (AER): *Directive 038, Noise Control,* 2023.

2.0 Project Description

2.1 Project Location

The two quarter sections to be used for the Cando Sturgeon Railyard West Expansion are the northeastern and northwestern quarters of section 34, township 55, region 22, west of the 4th meridian (N ½ 34-55-22-W4M). The approximate latitude and longitude of the project are 53°47’59.43"N and 113°11’11.97"W, respectively. The total area to be used for the railyard expansion is approximately 130 ha.

The secondary component to the project consists of the creation of a bypass road. The bypass will include upgrades to the existing Sturgeon County operated Township Road 560 to the north of the Cando Sturgeon Railyard West Expansion and Range Road 223 to the west of the section 34-55-22-W4M. To complete the bypass roadways will be constructed to the south of the S ½ 34-55-22-W4M.

The Project is in the Sturgeon County portion of Alberta’s Industrial Heartland and a Designated Industrial Zone. Alberta’s Industrial Heartland consists of 533 km^2 of land within the City of Fort Saskatchewan and the Counties of Lamont, Strathcona, and Sturgeon as well as 49 km^2 within the City of Edmonton. The entirety of the region is zoned for industrial land use and offers a concentrated location for chemical, petrochemical, and oil and gas facilities. The region offers an attractive location for industrial development and investment as well as provincial regulatory streamlining and cumulative environmental management.

2.2 Project Purpose

The purpose of the proposed Project is to provide an enhanced transportation support facility, providing options and flexibility, for industry directly within Sturgeon County, Strathcona County, and other adjacent municipalities where needed. Due to the growth of industry within Alberta’s Industrial Heartland, additional rail capacity is required for industry to prosper and grow.

A rail yard facility requires connection to existing railway infrastructure to be functional and limited opportunities are available for development of this type of facility. Cando has identified this site within Sturgeon County as a best fit considering industry requirements, railway connections, and Sturgeon County zoning and infrastructure. The Project location is adjacent to an existing Canadian National (CN) Rail line, a spur line providing frequent train service to industry in the area.

2.3 Existing Rail Terminal

The Cando-owned and operated Sturgeon Rail Terminal utilizes a loop-track system to enable storage of up to 1900 railcars. The terminal offers services for railcar staging and storage, including unit-train storage capability, for short or long-term, loaded or empty railcars. Additional value-added services include railcar switching, air testing, railcar repair and cleaning, transloading, material handling, inventory management, car stenciling, placard replacement, inspections and graffiti touch-ups.

Existing terminal includes the following surface infrastructure:

- Rail yards – a loop track and series of parallel storage tracks;

- Rail connection to an existing CN Rail spur southeast of the Site;
- Access roads;
- Internal roads – gravel roads beside the tracks to allow for inspections and light maintenance of rail cars;
- Water management infrastructure – ditches and culverts for the stormwater management;
- Office building;
- Locomotive storage building;
- Storage tanks and containers for potable, liquid waste, propane and solid waste; and
- Perimeter fencing.

The Site is connected to the public electric grid. Propane is used for heating office building and locomotive storage. Produced waste is hauled in regular intervals to an external processing facility.

2.4 Proposed Expansion

The proposed expansion would increase railcars storage and maintenance capacity up to 5000 units. The new facility will link to the existing facility via "C-shaped" arrival/departure tracks that will tie into the northwest and southwest corners of the existing loop track and extend around the perimeter of the new parcel. Yard tracks will branch off from the connection tracks in the east and dead end to the west, inside the arrival/departure tracks.

2.5 Tentative Schedule

The proposed Project construction is tentatively scheduled to start in late 2024, or early 2025. Construction will be phased, lasting 6 to 7 years, depending on the demand for the rail services in the area. As a result, construction should be completed in 2031 or 2032. The expanded terminal is expected to be operated indefinitely, i.e., beyond 2050.

3.0 Potential Ambient Air Quality Impacts

3.1 Regulatory Framework

The air quality in Alberta's Industrial Heartland is managed on a regional basis. The purpose of the Capital Region Air Quality Management Framework is to regulate air emissions on a regional basis, rather than regulating emissions from individual facilities. Four concentration level limits have been established for four contaminants of concern: nitrogen dioxide (NO_2), sulphur dioxide (SO_2), fine particulate matter ($PM_{2.5}$) and ozone (O_3). These limits are based on the Alberta Ambient Air Quality Objectives (AAQO) for NO_2 and SO_2, and Canada Wide Standards for $PM_{2.5}$ and O_3 and are reviewed on an annual basis. Mitigative management actions are to be implemented as needed in response to triggering of limit thresholds.

Air quality in the region of the Project is monitored by the Fort Air Partnership, which currently operates ten continuous and sixty-three passive air monitoring stations in the Capital Region. Data is compared to provincial AAQOs by the Government of Alberta and used to calculate the Air Quality Health Index. The Air Quality Health Index is a publicly accessible report which provides daily risk ratings (on a scale from low to very high risk) related to outdoor activity. The closest continuous monitor to the Project site is located southeast of the Project at the Scotford Shell Refinery. The closest passive monitor lies approximately 65 km east of the Project site. The Air Quality Trend Health Index for 2019-2021 indicates that hourly readings are in the low risk range for 85 to 90 percent of monitoring period.

There are four proactive ambient air quality levels for each contaminant of concern. Triggers at each level lead to management actions that range from baseline monitoring and data gathering to a mandatory plan to reduce the ambient levels below the applicable air quality standard (AEPA 2016).

The interaction between the Project and air quality is discussed in the following Section. Air contaminant emissions are expected to be negligible, or minimal during all Project phases. Expected emissions during the construction phase will be transient in nature.

3.2 Estimated Emissions - Construction Phase

During the Project construction phase, the major sources of atmospheric emissions are expected to be exhausts from the onsite mobile equipment and fugitive dust. The key contaminants from mobile equipment combustion will be sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), hydrocarbons (HC), and particulate matter (PM). The construction phase is planned to extend for a period of up to seven years (12 hours/day, 6 days/week). The presented emissions estimates are for one construction year for the onsite mobile equipment and are presented in Table 3.1. Diesel fuel is assumed to be used in the mobile equipment. The emissions estimation was based on the emission factors available in the U.S. Environmental Protection Agency (U. S. EPA) MOVES database.

Table 3.1 – Estimated Emissions during the Construction Phase

Equipment	Units	Horsepower	Compound in Air				
		(HP)	SO_2 (kg)	NO_x (kg)	CO (kg)	HC (kg)	PM (kg)
Excavator	8	290	21.8	5729	3039	1169	2278
Loader	8	217	16.3	4287	3236	874.3	192
Bulldozer	4	121	3.3	2391	1268	488.6	339.4
Compactor	2	150	2.1	2964	1572	605.1	210.9
Truck 10 ton	2	600	9.4	11854	8950	531.4	972
Spike gauger	2	140	0.7	2765	2088	123.4	72
Track regulator	2	240	1.2	4939	3590	1258	96
Track tamper	2	250	1.2	4939	3730	1271	102.1
Speed swing	2	160	0.9	3161	1676	644.6	241.7
Pickup truck	5	410	7.9	8100	4287	1652	248.6
Estimated Emissions Total			**64.8**	**51129**	**33436**	**8617.4**	**4752.7**

3.3 Estimated Emissions - Operation Phase

During Project operation, the main source of air emissions will be the combustion of diesel fuel in the locomotives. These emissions are expected to be predominately SO_2, NO_x, CO, HC and PM from the locomotive exhaust. A total of eighteen GP-38 locomotives will be in use after the Project expansion.

Air emissions from the locomotives were estimated based on the emission factors published in the Railway Association of Canada: *Locomotive Emissions Monitoring Report*, 2021. Table 3.2 presents the preliminary expected emissions from the Project during the operation over the course of one year:

Table 3.2 – Estimated Emissions during the Operation Phase

Source	Type	Units	Compound in Air (tonnes/year)				
			SO_2	NO_x	CO	PM_{10}	$PM_{2.5}$
Locomotive	GP-38	18	0.0036	55.08	10.02	1.55	1.17
NPRI Reporting Threshold (tonnes/year)			20	20	20	0.5	0.3

Additional sources of emissions during the operations can be summarized as follows:

- Fugitive emissions from the loaded rail cars;
- Fugitive emissions from the fuel storage at the Site; and
- Fugitive dust resulting from the traffic on unpaved internal roads.

The above emissions sources are expected to be negligible compared to the locomotives operation and will be transient in nature.

3.4 Applicable Air Quality Management Measures

Applicable air quality management measures are summarized in the following Table 3.3:

Table 3.3 - Applicable Air Quality Management Measures

Issue	Mitigation Measures
Fugitive Dust	Limit the area of disturbance by earthworks as far as practically possible. Implement reduced vehicle speed limits or other speed control measures on the Project site. Suppress dust as necessary using water trucks. Conduct visual monitoring of dust to determine when suppression is needed.
Air Emissions	Avoiding unnecessary vehicle and equipment idling. Implement the regular maintenance program of vehicles, locomotives and equipment to reduce combustion emissions and maximize fuel efficiency.

4.0 Potential Noise Impacts

4.1 Regional Noise Management

Noise levels in the Project area are managed for member companies under the Northeast Capital Industrial Association (NCIA) Regional Noise Management Plan. The development of the Regional Noise Management Plan was based on a predictive computer noise model (NCIA Regional Noise Model) which incorporated noise models from various facilities in the region, as well as road and rail traffic noise levels. The model is publicly accessible via Google Earth and displays four modelled cases. Case 3D shows 'Existing Facilities plus main Road and Rail Contributions' using 2019 roadway traffic data and estimated rail traffic volume on the main lines over a 24-hour period in 2020. The industrial facilities model assumes all equipment is running at 100% capacity 100% of the time. The regional model is updated every few years and considers significant changes in noise levels at industrial facilities and new data provided by Alberta Transportation and Alberta Infrastructure and Rail Companies (if available). The current model predicts sound levels at the Project site to be 43 to 48 dBA.

The nearest noise monitoring stations to the Project site are located at the southwest fence line of the Pembina Redwater Fractionation facility to the east of the Project, with another located more than 1,500 m from the Project. Measured noise levels at most locations were shown to be generally consistent with model predictions. The field validation annual NCIA report also indicated that noise levels at most locations consisted of low frequency components with occasional mid/high frequency components. Trend analysis indicated no significant increasing or decreasing trends over baseline sound levels. Regarding rail transport activities, noise from train passages through the monitoring regions dominated the noise climate, although there had not been an increase of rail passages over 2019 observations.

During the construction phase of the Project, noise will result from vehicles and equipment conducting activities including earthworks, material deliveries, and rail installation. Construction noise will be transient in nature. The primary noise sources throughout the Project operation will be train shunting, coupling of rail cars and the operation of locomotives. These activities will continue daily over the life of the Project. The Project will result in increased noise levels in the vicinity of the Project; however, the increased noise during either construction or operation is not expected to contribute significantly to increasing trends at a regional level.

Noise receptors are expected to be occupied residences within a 5 km radius of the Project. It is not expected that increased noise levels from the Project will adversely affect these receptors as the overall increase in noise levels over background is expected to be minor. Cando will implement management measures outlined in Table 4.1 to reduce noise and limit its potential effects on nearby residents and their activities to the extent possible.

4.2 Applicable Noise Management Measures

Applicable noise management measures are summarized in the following Table 4.1:

Table 4.1 - Applicable Noise Management Measures

Issue	Mitigation Measures
Potentially Disturbing Noise	Notify nearby residents (landowners and lessees) of the intended Project schedule before the start of construction to prevent or reduce the impact on their operations or activities. Maintain equipment, machinery and locomotives in good working order, including noise abatement equipment, to limit noise. Schedule operations to occur during daytime hours, whenever practical. Reduce the number of switchers used at nighttime if nighttime operations are unavoidable. Reduce the amount of time that switchers are left idling at the yard.

5.0 GHG Emissions Assessment

5.1 General GHG Quantification Approach

If not stated otherwise, a general GHG Emissions quantification equation used in this Assessment is using the following equation:

$$CO_{2e} \text{ (tonnes/year)} = AF * EF * GWP * CF$$

Where:

- CO_{2e} (tonnes/year) – estimated GHG emissions expressed as CO_{2e} equivalent in metric tonnes per year;
- AF – Activity Factor;
- EF – Emission Factor;
- GWP – Global Warming Potential for an evaluated GHG gas; and
- CF – Units Conversion Factor.

Applied GWP conversion factors based on the IPCC 5th Protocol are summarized in the following Table:

Table 5.1 – Applied GWP Conversion Factors

GHG Gas	CO_2	CH_4	N_2O
GWP Factor	1	28	265

5.2 GHG Emission Sources – Construction Phase

Identified significant (i.e., more than 1 % of the overall GHG emissions) GHG emission sources for the construction phase of the proposed Project (excluding any GHG emissions from the existing terminal operation) can be summarized as follows:

- **Direct GHG Emissions**;
  - Mobile Combustion;
    - Mobile Diesel Combustion;
  - Land Use Change;
    - Biomass Oxidation.
- **Indirect GHG Emissions;**
  - Construction Personnel Travel by Road.

5.3 Mobile Combustion – Diesel

Estimated GHG emissions contribution during the construction phase of the Project as a result of the diesel mobile combustion at the Site were quantified using the general equation. Used Emission Factors (EF) for diesel fuel were published in the *ECCC: Emission Factors and Reference Values, Version 1.1*, June 2023, document.

Activity Factors (AF) were calculated using the estimated requirements for the diesel-powered construction and auxiliary vehicles and equipment utilization based on the information provided by Cando and construction subcontractors. An average diesel fuel consumption for the vehicles and equipment was estimated using the data from the U.S. EPA MOVES Database.

Estimated GHG emissions for the category for a construction year are shown in the following Table:

Table 5.2 – Estimated Direct GHG Emissions – Construction, Mobile Diesel Combustion

Equipment	Units	Assumed Horsepower (HP)	CO_{2e} (tonnes/year)
Excavator	8	290	2278
Loader	8	217	1704
Bulldozer	4	121	339.4
Compactor	2	150	210.9
Truck 10 ton	2	600	972
Spike gauger	2	140	72
Track regulator	2	240	125.1
Track tamper	2	250	130.3
Speed swing	2	160	82.3
Pickup truck	5	410	829.7

Estimated GHG Emissions Total	6743.7

5.4 Land Use Change – Biomass Oxidation

Estimated GHG emissions contribution to the overall Project's GHG emission profile as a result of the Land Use Change (LUC) contains two types of the carbon-related impacts:

- Emissions caused by the removal and oxidation of biomass during construction; and
- The carbon not trapped by native vegetation that would have remained at the Site should the Project not have been constructed referred to as the lost carbon sequestration potential.

The presented calculations are based on the general equation published in the *IPCC: Forest Land, Cropland, Grassland, Wetlands and Other Lands*, 2006 and Tier 1 approach:

$$CSI = \sum_{I,\,j} ((NatFlux - PostDFlux)_{i,\,j} * T_{i,\,j} * A_{i,\,j})$$

Where:
CSI – The estimated carbon sink impact
NatFlux – The natural annual carbon accumulation of the land being impacted (t C ha^{-1} y^{-1})
PostDFlux – The post-disturbance carbon flux rate impacted by the project (t C ha^{-1} y^{-1})
T – The time interval (years)
A - The land area (ha)
i – The land use class
j – The disturbance activity for each phase of the project

Calculations assumed a permanent removal of approximately 25 hectares (ha) of the forest and 7.505 ha of the wetlands in the expansion area of the Project during the construction phase. Estimated LUC-related GHG emissions for the construction phase of the Project are summarized in Table 5.3:

Table 5.3 – Estimated Direct GHG Emissions – Construction, Biomass Oxidation

Area Classified As	Estimated Removal Area (ha)	CO_{2e} (tonnes)
Forest	25	7500
Wetlands	7.505	960.64
Estimated GHG Emissions Total		**8460.64**

5.5 Construction Personnel Travel by Road

Estimated GHG emissions released during the construction phase of the Project as a result of the construction personnel travel between the Site and Fort Saskatchewan were quantified using the general equation. Used Emission Factors (EF) for gasoline were published in the *ECCC: Emission Factors and Reference Values, Version 1.1*, June 2023, document.

Activity Factor (AF) was calculated using the estimated average construction personnel count based on the information provided by Cando and construction subcontractors (35), assuming 6 days a week construction schedule and a road distance between the Site and Fort Saskatchewan (about 30 km round trip). An average gasoline fuel consumption for the light pickup truck road travel, 2015 or newer, was estimated using the data from the U.S. EPA MOVES Database.

Estimated GHG emissions for the category for a construction year are shown in the following Table:

Table 5.4 – Estimated Indirect GHG Emissions – Construction Personnel Travel by Road

Average Construction Staff Count	Estimated Number of Personnel Trucks	Estimated Emissions CO_{2e} (tonnes/year)
35	20	**109.29**

5.6 Estimated Net Total GHG Emissions – Construction Phase

Estimated net total GHG emissions throughout the duration of the construction phase are shown in Table 5.5. Estimated total assumes construction phase lifespan six years.

Table 5.5 – Estimated Net Total GHG Emissions – Construction Phase of the Project

Construction Year	Estimated GHG Emissions CO_{2e} (tonnes)	
	Mobile Diesel Combustion	Biomass Oxidation
Y-6	6743.7	8460.64
Y-5	6743.7	
Y-4	6743.7	
Y-3	6743.7	
Y-2	6743.7	
Y-1	6743.7	
Subtotal	40462.2	8460.64
Estimated Net Total GHG Emissions		**48922.84**

5.7 GHG Emission Sources – Operation Phase

Identified significant GHG emission sources for the operation phase of the proposed Project (including GHG emissions from the existing terminal operation) can be summarized as follows:

- **Direct GHG Emissions**;
  - Static Combustion;
    - Propane Combustion.
  - Mobile Combustion;
    - Mobile Diesel Combustion – Locomotives; and
    - Mobile Diesel Combustion – Auxiliary Vehicles and Equipment.

- **Indirect GHG Emissions** (Formerly Scope 2 GHG Emissions);
  Acquired Energy GHG Emissions.
- **Indirect GHG Emissions;**
  - Employees Travel by Road.

5.8 Static Combustion – Propane Combustion

Estimated GHG emissions contribution to the overall Project's GHG emission profile as a result of the propane combustion used for heating at the Site were quantified using the general equation. Used Emission Factors (EF) for propane were published in the *Environment Canada and Climate Change* (*ECCC): Emission Factors and Reference Values, Version 1.1,* June 2022, guidance.

The proposed expansion does not require new propane-burning emission sources, and therefore, Activity Factor is based on the average propane usage at the existing terminal. Estimated GHG emissions for the category are presented in Appendix A, Table 5.6.

Table 5.6 – Estimated Direct GHG Emissions – Operation, Static Propane Combustion

Average Propane Volume (L/year)	Emission Factors (g/L)			CO2e (tonnes/year)
	CO_2	CH_4	N_2O	
7280.5	1515	0.024	0.108	**11.24**

5.9 Mobile Combustion – Diesel Combustion, Locomotives

Estimated GHG emissions contribution during the operation phase of the Project as a result of the diesel mobile combustion by locomotives at the Site were quantified using the general equation. Used Emission Factors (EF) for the locomotives were published in the Railway Association of Canada: *Locomotive Emissions Monitoring Report*, 2021.

Activity Factor (AF) was calculated using the estimated requirements for the diesel-powered locomotives at the Site and utilization based on the information provided by Cando.

Estimated GHG emissions for the category for an operation year are shown in the following Table:

Table 5.7 – Estimated Direct GHG Emissions – Operation, Mobile Diesel Combustion, Locomotives

Combustion Source	Type	Number of Units	CO2e (tonnes/year)
Locomotive	GP-38	18	**4068**

5.10 Mobile Combustion – Diesel Combustion, Auxiliary Vehicles and Equipment

Estimated GHG emissions contribution during the operation phase of the Project as a result of the diesel mobile combustion by auxiliary vehicles and equipment at the Site were quantified using the general equation. Used Emission Factors (EF) for diesel fuel were published in the *ECCC: Emission Factors and Reference Values, Version 1.1*, June 2023, document.

Activity Factors (AF) were calculated using the estimated requirements for the diesel-powered auxiliary vehicles and equipment utilization based on the information provided by Cando. An average diesel fuel consumption for the vehicles and equipment was estimated using the data from the U.S. EPA MOVES Database.

Estimated GHG emissions for the category for a construction year are shown in the following Table:

Table 5.8 – Estimated Direct GHG Emissions – Operation, Mobile Diesel Combustion, Auxiliary Vehicles & Equipment

Equipment	Assumed Horsepower (HP)	Number of Units	CO2e (tonnes/year)
Kubota SBS	121	3	84
Pickup Truck	410	20	3319
Skid Steere	121	1	28
Loader	217	1	213
Backhoe	160	1	41.2
Telehandler	140	1	36
Estimated GHG Emissions Total			**3721.2**

5.11 Acquired Energy GHG Emissions

Estimated GHG emissions contribution during the operation phase of the Project as a result of the acquired energy imports to the Site from the public electric grid were quantified using the general equation. Used Emission Factors (EF) for the electricity consumption intensity applicable for Alberta were published in the ECCC: *Emission Factors and Reference Values, Version 1.1, June 2023*, document.

Activity Factor (AF) was calculated using the estimated requirements for the acquired energy following the terminal expansion provided by Cando. Estimated GHG emissions for the category for a construction year are shown in Table 5.9:

Table 5.9 – Estimated Indirect GHG Emissions – Acquired Energy GHG Emissions

Average Energy Consumption (kWh/year)	Emission Factor for Alberta (g CO_{2e}/kWh)	Estimated Emissions CO_{2e} (tonnes/year)
305397	540	**164.91**

5.12 Employees Travel by Road

Estimated GHG emissions released during the construction phase of the Project as a result of the Site personnel travel between the Site and Fort Saskatchewan were quantified using the general equation. Used Emission Factors (EF) for gasoline were published in the *ECCC: Emission Factors and Reference Values, Version 1.1*, June 2023, document.

Activity Factor (AF) was calculated using the estimated average railyard terminal personnel count based on the information provided by Cando (90), assuming 3 rotating shifts, 7 days a week operations schedule and a road distance between the Site and Fort Saskatchewan (about 30 km round trip). An average gasoline fuel consumption for the light pickup truck road travel, 2015 or newer, was estimated using the data from the U.S. EPA MOVES Database. Estimated GHG emissions for the category for a construction year are shown in Table 5.10:

Table 5.10 – Estimated Indirect GHG Emissions – Employees Travel by Road		
Average Terminal Staff Count	**Estimated Number of Personnel Trucks**	**Estimated Emissions CO_{2e} (tonnes/year)**
90	50	**318.76**

5.13 Estimated Net Total GHG Emissions – Operation Phase

Estimated net total GHG emissions for an average operation year of the proposed Project is summarized in Table 5.11:

Table 5.11 – Estimated Net Total GHG Emissions – Operation Phase of the Project				
Estimated GHG Emissions CO_{2e} (tonnes/year)				**Estimated Net Operation GHG Emissions CO_{2e} (tonnes/year)**
Static Combustion	Mobile Combustion Diesel-Locomotives	Mobile Combustion Diesel-Vehicles	Acquired Energy	
11.24	4068	3721	164.91	**7965**

5.14 Estimated Carbon Intensity of the Project

Estimated carbon intensity of the project per a year of the operation phase is presented as a ratio between calculated net GHG emissions and railcars spots capacity after the terminal expansion as follows:

Table 5.12 – Estimated Carbon Intensity		
Estimated Net Operation GHG Emissions CO_{2e} (tonnes/year)	**Projected Capacity (railcars spots)**	**Estimated Carbon Intensity (t CO2e/railcars spots per a year)**
7965	5000	**1.59**

6.0 Additional Considerations

6.1 Carbon Sinks Impact

Carbon sinks impacts related to the LUC/vegetation removal as a part of the Project Scope of Work were quantified using the methodology described in Section 5.4. Estimated GHG emissions resulting from a loss of carbon sequestration are summarized in Table 6.1:

Table 6.1 – Estimated Carbon Sinks Impact – Loss of Carbon Sequestration		
Area Classified As	**Estimated Removal Area (ha)**	**CO_{2e} (tonnes/year)**
Forest	25	319.5
Wetlands	7.505	23.2
Estimated GHG Emissions Total		**342.7**

6.2 Carbon Sinks Mitigation Measures

Under the Alberta Wetland Mitigation Directive (Government of Alberta 2018b), a Wetland Mitigation Hierarchy outlines the management approach to wetland impacts in Alberta. The primary preferred wetland response is to avoid and, secondarily, to minimize impacts to a wetland. Based on the conceptual Project footprint options, a total area of 7.505 ha of wetlands will be removed entirely during Project development.

In accordance with the Alberta Wetland Policy (Government of Alberta 2013), Cando has submitted an application to AEPA for Water Act approval to provide compensation for loss of wetlands as a result of Project development.

Wetlands will not be disturbed and vegetation clearing in the vicinity of the wetland will not be conducted until Water Act approval for wetland removal has been received. Mitigation will include the applicable compensation for the affected wetlands.

Proposed wetland mitigation is summarized in Table 6.2:

Table 6.2 – Carbon Sinks Mitigation Measures Summary

Area Classified As	Estimated Removal/Restoration Area (ha)	CO_{2e} (tonnes/year)
Forest	25	319.5
Wetlands	7.505	23.2
Estimated GHG Emissions Total (Before Mitigation)		**342.7**
Wetlands	18.617	- 57.5
Estimated GHG Emissions Total (After Mitigation)		**285.2**

6.3 Estimation of Uncertainty

Qualitative estimation of the impact of uncertainties on the accuracy of the presented GHG Assessment is presented in the following Table:

Table 6.3 – Uncertainty Ranking

Propane Combustion	**Low Uncertainty** – Propane consumption is based on the quantity of fuel purchased. Minimal loss is expected from storage or leakages. Propane emission factors are consistent and accurate.
Diesel Combustion	**Medium Uncertainty** – Diesel consumption is based on the utilization rates estimated by Cando and power rating. Minimal loss is expected from storage or leakages. Diesel emission factors are consistent and accurate.
Acquired Energy	**Low Uncertainty** – Electricity consumption is based on the metered electricity data purchased that is calibrated. The emission factor is based on an annual provincial grid average that includes all the province's controllable fuel sources.
Road Travel	**High Uncertainty** – Annual road transport is an estimate based on available information regarding future staffing levels. Gasoline emission factors are consistent and accurate.

6.4 Net-Zero Plan

The presented net-zero plan is based on the Best Applicable Technology/Best Environmental Practices (BAT/BEP) as outlined in the Delphi Group: *Towards Net Zero: Developing a Rail Decarbonization Roadmap for Canada,* December 2022, document. The proposed decarbonization path applicable to the Project consists of the following implementation steps:

Efficiency improvements: Efficiency improvements to existing and new equipment and infrastructure have been the focus of railway decarbonization efforts to date and will continue to be prioritized. All efficiency improvements will serve to reduce the decarbonization burden placed on fuels and propulsion technologies.
Description: There are numerous ways to continue to enhance rail efficiency including further enhancing aerodynamics of locomotives and rail cars, automation and data-driven solutions, among others.
Carbon Reduction Potential: less than 7 %
Implementation Timeframe: Available immediately

Low-carbon fuels: Through low-carbon/renewable fuel regulations, federal and provincial governments have already mandated minimum blending requirements of up to 5% renewable content in diesel, and these will continue to increase. Efficiency improvements may be supplemented by the blending of renewable and low-carbon fuels beyond what is regulated.
Description: Biodiesel is a renewable fuel that can be manufactured from vegetable oils, animal fats, or recycled cooking oil for use in diesel vehicles or any equipment that operates on diesel fuel. Biodiesel's physical properties are like those of petroleum diesel, with some notable exceptions including inferior cold weather properties and reduced energy content. B20 refers to a blend of 20% biodiesel and 80% petroleum diesel.
Carbon Reduction Potential: up to 16 %
Implementation Timeframe: Estimated around 2030

Alternative propulsion: As railways seek to move past the limits of what low-carbon fuels and combustion engines can offer, electrification via battery, or hydrogen fuel cells are likely to prevail in the long-term.
Description: Battery powered trains are electric multiple units and locomotives which carry batteries in order to provide traction power for in-service use. The traction system of a battery powered train is based on that of an electric train but with the addition of on-board battery storage and supporting power converters and temperature management for the battery if required.
Carbon Reduction Potential: up to 100 %
Implementation Timeframe: Estimated around 2035 (provided further technology development and successful testing).

Cando, in cooperation with Emissions Reduction Alberta, is a leading participant in the Li-On battery-powered locomotive initiative.

7.0 Closure

This Assessment has been prepared by Clifton Engineering Group Inc. for the sole benefit of Cando Rail & Terminals Ltd. and the pertinent regulatory authorities. The report may not be relied upon by any other person, entity, other than for its intended purposes, without the express written consent of Clifton Engineering Group Inc. and Cando Rail & Terminals Ltd.

This Assessment was undertaken exclusively for the purpose outlined herein and is limited to the scope and purpose specifically expressed in this Assessment. This Assessment cannot be used or applied under any circumstances to another location or situation or for any other purpose without further evaluation of the data and related limitations. Any use of this Assessment by a third party, or any reliance on decisions made based upon it, are the responsibility of such third parties. Clifton accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this Assessment.

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This report presents the best professional judgment of Clifton personnel available at the time of its preparation. Clifton reserves the right to modify the contents of this report, in whole or in part, to reflect any new information that becomes available. If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that we be notified immediately to reassess the conclusions provided herein.

Yours truly,

Clifton

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