

To: COUNCIL

Meeting Date: 12/02/21

Subject: Riverside Dam Update

Submitted By: Kevin De Leebeeck, Director of Engineering

Prepared By: Scott MacDonald, Project Engineer

Report No.: 21-227(CD)

File No.: C1101

Recommendations

THAT Report 21-227(CD) Riverside Dam Update be received as information;

AND THAT additional funding in the amount of \$375,000 be approved for project A/00024-20 from the Capital Works Reserve Fund for additional archaeological assessments and design work.

OPTIONAL RECOMMENDATION FROM THE CITY MANAGER FOR COUNCIL'S CONSIDERATION:

THAT Report 21-227(CD) Riverside Dam Update be received as information;

AND THAT a passive management approach be initiated for the riverside Dam as outlined in the Report 21-227(CD)Riverside Dam Update, with an increase in future operating budgets of \$30,000 for annual inspections and monitoring;

AND THAT staff promptly inform Council of any substantive change in the condition or short-term risk associated with the Riverside Dam;

AND FURTHER THAT the capital project for Riverside Dam construction, included in the 2022 capital budget, not be approved to proceed and the current capital project A/00024-20 Riverside Dam Detailed Design not continue and the account be closed with the year-end capital forecast report.

Executive Summary

Purpose

- Further to Report 21-111(CD) this report provides an update regarding the status of the Riverside Dam Replacement Project including the most recent cost projections for the dam renewal. Environmental, archaeological, geotechnical, and heritage studies have been completed along with a preliminary design report and drawings. The project team has completed consultation with agencies and Indigenous Communities, and an online Public Information Centre was held in May 2021. The design is now at the 60% design stage.
- The purpose of this report is to provide Council with an update on the design, costs of the project, current schedule, provide information related to a passive management approach, and to secure funding in the amount of \$375,000 for potential future archaeological and design work not included as part of the original design scope.

Key Findings

- The design of Riverside Dam has reached the 60% design level.
- The new dam will be approximately 40 meters upstream from where the existing dam is located.
- The new dam will have four (4) operable vertical lift gates. It is proposed that these will be opened in the fall and closed in the spring.
- A fish ramp will be constructed to allow fish passage when the gates are closed. A natural design of the fish ramp is preferred and is being proposed.
- Additional sediment sampling, wetland assessment and design associated with comments received from the Ministry of the Environment Conservation and Parks (MECP) and GRCA, related to diverting flows through Sulphur Creek are now being required. These requirements are new and were not part of the original design scope.
- A Stage 2 Archaeological Assessment was completed and it was determined that additional Stage 3 Assessments and potentially Stage 4 Assessments are required which were not part of the original design scope.
- In order to proceed with the current project, the recommendation for additional funding is required to complete the detailed design.

- The alternative to naturalize the river can be re-examined and would require additional time to re-open the Class EA and would require additional funding estimated at \$600,000.
- A further option of a passive management approach would cancel the current design project and remove the associated reconstruction project from the 2022 capital budget forecast. This approach would require Council approval for additional operating funds in the amount of \$30,000 to conduct annual inspections and monitoring.

Financial Implications

- A total of \$493,266 was approved for the Riverside Dam detailed design assignment A/00024-20.
- The cost to complete the additional sediment sampling, wetland assessment design, and Archaeological Assessments is estimated to be \$375,000. This additional funding is being requested for existing project A/00024-20.
- Based on 60% design the estimated total construction cost is \$15,200,000 an increase of \$8,957,000 or 143% over the project cost included in the 2021 capital budget forecast.
- The estimated annual operating cost for the new dam is \$35,000.
- The cost of covering the debt principal and interest for the updated project total equates to approximately \$1,205,200 annually. Combined with the operating costs, this represents a tax rate increase of approximately 1.17% based on the 2022 proposed tax levy. The impact of these costs will be incurred over the 2023 to 2024 operating budgets and will require an increase to the tax levy before consideration of inflationary or other budget impacts.
- As the City issues debt over the coming years, it is projected that the City will reach its debt capacity limit of 10% for the tax-supported operating fund. Adding further to the debt funding may potentially limit the City's future financial flexibility, such as using debt financing in the future to fund additional infrastructure projects and may also require the deferral and/or cancellation of other capital projects.

Background

The design and construction of a new Riverside Dam is based on the Municipal Class Environmental Assessment (EA) that was completed in July 2018 after approximately seven years of studies and public consultation. During the public review period, the Minister of Environment, Conservation and Parks received five Part II Order requests asking that the City of Cambridge be required to prepare an individual environmental

assessment. A letter from Minister Rod Phillips was received on May 31, 2019 indicating that an individual environmental assessment was not required and the City could proceed with the preferred alternative to rebuild Riverside Dam. The Minister's decision had conditions that the rebuilt dam must have operable gates, as well as a fish ladder or an alternative fish passage method.

Using the completed Class EA, along with the Minister's review and decision, the City established the requirements for a new dam so that a Request for Proposal (RFP) process could be undertaken to retain a consultant to complete the detailed design of the new dam. The following is a summary of the requirements for the new dam:

- Incorporate a fish ladder, or alternative fish passage measure, to facilitate seasonal movement of aquatic species
- Include operable gates/valves to allow the automated adjustment of headpond water levels to facilitate sediment management and flood impact mitigation
- Safely pass the Inflow Design Flood (IDF)
- Maintain the existing normal water level in the headpond
- Not increase upstream water levels above those associated with the existing dam
- Mitigate public safety risk to the extent reasonably practical
- Incorporate interpretive/educational elements to improve interaction of park patrons with the Speed River while limiting damage caused to riparian habitat
- Explore opportunities to honour and respect the role of the Riverside Dam in the formation of Preston and the surrounding community through various means, and
- Explore opportunities to honour and respect the role that the Speed River has had for Indigenous Communities.

In March 2020 the Riverside Dam Detailed Design project was awarded to Sanchez Engineering Inc., in partnership with B.T. Engineering, and the design was initiated.

In May 2020 due to the COVID-19 pandemic the Riverside Dam Detailed Design project was temporarily suspended, recommencing in September 2020.

Since that time the design has progressed and a number of investigations, studies and reports have been completed; a summary of these are as follows:

- A bathymetric survey of the headpond was completed to determine the bottom of the headpond and to estimate the amount of sediment
- A sediment characterization assessment was completed to determine the characteristics of the sediment
- A structural engineering site investigation was completed to determine the current state of the dam. This investigation concurred with a 2018 Structural Inspection that stated "based on the advancing deterioration of the past decade, it is estimated that within two to ten years the risk of concrete pop-out is high and with a significant local failure the integrity of the dam would be compromised."
- A Heritage Impact Assessment (HIA) was prepared; the HIA was provided to

MHAC for the November 18, 2021 meeting

- Natural heritage field work was completed to verify natural heritage findings from the Class Environmental Assessment
- Stage 1 and Stage 2 Archaeological Assessments were completed and it was determined that additional Stage 3 and potentially Stage 4 Assessments are required.
- A constructability and value engineering review were completed, and
- A design report was prepared.

The design is now at the 60% design stage.

Analysis

Strategic Alignment

PLACE: To take care of, celebrate and share the great features in Cambridge that we love and mean the most to us.

Goal #4 - Environment and Rivers

Objective 4.4 Manage city resources in a responsible and sustainable manner, considering future needs for resiliency and community adaptation.

The Riverside Dam project has involved agency and stakeholder input as well as a number of public engagement opportunities during both the Municipal Class EA and the design phase of the project. This engagement has been completed to ensure that the new Riverside Dam meets agency, stakeholder and community requirements and interests.

Comments

Rebuilding Riverside Dam was the preferred alternative determined through the completion of the Riverside Dam Class Environmental Assessment. The first phase of implementation is detailed design. Input on the proposed design has been received through meetings with approval agencies, stakeholders and Indigenous Communities. A virtual Public Information Center was held in May 2021 to provide an opportunity for the public to review and comment on the proposed design. This report provides an update to Council on the project costs and schedule along with the most current design drawings (**Appendix A**). The following is a summary of the key design elements and study findings.

Key Design Elements and Study Findings:

- The new dam will be constructed upstream (approximately 40 meters) from where the existing dam is located. This is to provide sufficient separation from the railway bridge, as well as to provide a better vista from the King Street bridge

and within the park. This new location will also allow a portage around the dam that is within the park.

- The new dam will have four (4) operable vertical lift gates. It is proposed that these will be opened in the fall and closed in the spring. When the gates are open the river will flow freely allowing sediments to migrate down river and fish will be able to move upstream. When the gates are closed the headpond will provide the recreational opportunities and vista that currently exists.
- A fish ramp will be constructed on the southside of the dam that will allow fish passage when the gates are closed. Passage design will accommodate forage fish with slower swimming speeds. A natural design of the fish ramp is preferred and is being proposed.
- A ramp and work platform will be constructed on the north side of the dam (park side) to allow maintenance equipment to access the dam as required.
- During construction, sections of the park will be used for construction access and staging areas. These sections will be closed to the public.
- It is being proposed that Sulphur Creek will be used to divert river flows during construction. This will involve some work within the park to allow higher flows to pass through and make it safe for the public.
- Elevated concentrations of cadmium, chromium, copper, lead, nickel, silver and zinc were found. The management of sediment in place is the recommended practice where possible. Sediment between the existing dam and new dam will be removed and sediment upstream of the new dam will be relocated to form a channel.
- A detailed sediment management plan is now being prepared. The Ministry of Environment, Conservation and Parks (MECP) informed the design team at an August 24, 2021 meeting that an Environmental Compliance Approval (ECA) may be required for the sediment management plan; this was not identified by MECP at any earlier meetings and this approval can take up to a year. This will impact the proposed schedule and the plan to tender this project in early 2022 will now be delayed to late summer of 2022.
- A natural environment site reconnaissance found that aquatic species at risk (SAR) are unlikely to be found upstream of the existing dam due to sediment accumulation. Some terrestrial species will be protected during construction.
- Stage 1 and Stage 2 Archaeological Assessments were completed. The Stage 2 Assessment identified three archaeological areas of interest with two of the three areas requiring a Stage 3 assessment and potentially a Stage 4 assessment.

The Stage 3 and Stage 4 assessments are outside the original design assignment scope. The cost to complete these assessments could be up to \$284,000. Consultation with the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) and Indigenous Communities is ongoing regarding the scope of these assessments.

- A temporary railway crossing will be required during construction to construct the dam.
- The dam will be constructed in two phases. Phase 1 will involve the construction of the north side of the dam, the Sulphur Creek diversion, sediment management, existing dam demolition, and installation of the gates. Phase 2 will involve the construction of the south side of the dam, construction of the fish ramp, restoration work, and installation of public safety measures.
- Salvaged stone from the control structures will be used in an interpretive landscape feature to commemorate the heritage value of the existing dam.
- The historic Indigenous use of the area will be recognised in a landscape feature.
- Using Sulphur Creek to divert the river during construction provides an opportunity to replace other infrastructure in Riverside Park. The Sulphur Creek control structure needs to be replaced, as identified by Asset Management, and would be replaced as part of the Riverside Dam project. As well a pedestrian bridge would be replaced. These replacements will require additional design effort with a cost of up to \$91,000.

Riverside Area Improvements

The Riverside Dam project provides an opportunity for infrastructure improvements within Riverside Park that are anticipated to be completed as part of the project totaling \$770,000 for items such as:

- New Rogers Drive crossing over Sulphur Creek; \$283,000
- New park pedestrian bridge over Sulphur Creek; \$134,000
- Restoration of Sulphur Creek in area of diversion; \$50,000
- Restore park ring road at inlet to Sulphur Creek; \$38,000
- Reconstruction of park road in area of dam; \$46,000
- North retaining wall between existing dam and King Street bridge; \$67,000
- South retaining wall between existing dam and King Street bridge; \$152,000

The forecasted total capital investment associated with improvements in the Riverside area over the next four years is approximately \$20,000,000 as summarized below.

Year	Description	Estimate Cost
2022	Riverside Dam Roads Design	\$155,000
2022	Riverside Dam Renewal	\$15,200,000
2023	Renovation – Mickler Stadium	\$288,000
2023	Riverside Skateboard Park – Safety Improvements	\$126,200
2024	Riverside Park Roads Construction – Internal Ring Road	\$1,326,000
2024	Playground Replacement – Riverside Front Area	\$155,900
2024	Riverside Pump Station Upgrade - Construction	\$457,200
2025	Riverside Park Roads Construction – Rogers Drive	\$2,205,600
2025	Playground Replacement – Riverside Kin Corners Area	\$84,900

Municipal Class EA:

The Class Environmental Assessment (EA) considered a number of alternatives. Several of the alternatives were screened out of further assessment since they did not address the problem statement of the Class EA or were screened out for other reasons. The Class EA Study came down to a decision between rebuilding a dam or naturalizing the river.

- The alternative of naturalizing the river was investigated in detail during the Class Environmental Assessment, and could be re-examined. This would require additional time to work through the process of reopening the Class Environmental Assessment and then subsequent time to complete a new design for the naturalization alternative. A high-level construction cost estimate to remove the existing dam and naturalize the river is \$8,500,000. The estimated

cost to reopen the Class EA and change the design is \$600,000. This would also result in a substantial schedule delay, increasing the risk of concrete pop-out on the dam and thereby potentially weakening the structure. Council could still opt to reopen the Class EA to revisit the naturalizing option.

- The other alternative of a passive management approach can also be initiated at any time during the detailed design process or prior to the commencement of construction. This alternative was considered as part of the Class EA, but was screened out initially as it did not address the problem statement. The passive management approach would entail regular monitoring of the dam. A recommendation from the 2018 Wood Environmental & Infrastructure Solutions report estimated that within two (2) to ten (10) years, the risk of concrete pop-out (separation of the dam in two) would be high, and that if the extent of concrete pop-out is significant, could lead to local failure, compromising the overall integrity of the dam. A passive management approach would require, at a minimum, annual spring inspections of the dam, to monitor the dam's condition and assess short-term risk. The estimated cost to conduct these annual inspections is estimated to be \$30,000 per year, with inflationary increases added for subsequent years. Another consideration of the passive management approach is that the Class Environmental Assessment is valid for ten years and will expire in 2029 at which point a new Class EA would need to be undertaken should there be a desire to pursue another alternative.

Next Steps:

- Complete any remaining Environmental and Technical Investigations (additional sediment sampling, Archaeological Assessments)
- Finalize Detailed Design
- Obtain Approvals and Permits
- Tender the project in 2022
- Construction, Phase 1 starting in 2022 and Phase 2 in 2023

Existing Policy/By-Law

The study of alternatives for the future of Riverside Dam was carried out in accordance with the Municipal Class EA process and the Environmental Assessment Act. The detailed design project is following the recommendations in the Environmental Study Report completed during the Municipal Class EA and the Minister's decision letter dated May 31, 2019.

Financial Impact

Design Costs:

In March 2020 award of the design RFP in the amount of \$493,266 to commence the detailed design of the Riverside Dam project was provided to Council. The cost of the design work completed to date is approximately \$350,000.

Additional sediment sampling, wetland assessment and design costs will be up to \$91,000.

The costs for the Stage 3 work will be up to \$120,000. It will not be known if the Stage 4 Archaeological Assessments are needed until the Stage 3 Assessments are completed. If the Stage 4 work is required the estimated cost is \$164,000. However the cost of the Stage 4 work could be more and if it not required those funds would be returned.

Estimated Construction Costs:

The Riverside Dam construction budget was previously identified in the 2021 Capital forecast for 2022 and 2023 as follows:

• A/00447-40 Riverside Dam - Sediment Removal	\$2,625,000
• A/00447-41 Riverside Dam - Dam Reconstruction	<u>\$3,618,000</u>
Total	\$6,243,000

These estimates were based on the 2018 Class EA level cost estimates.

With the progression of the design over the last year the current cost estimate for construction is now \$15,200,000. The detailed design estimate includes several key elements that are required as result of the conditions from the Minister, these include:

- operating gates to reduce flooding potential and help pass sediment
- a fish ladder or alternative fish passage method
- health and safety apparatus for safe access and protection of operations staff, and
- fencing, signage and river barriers to prevent recreational use near the dam.

The estimated construction costs in the Final Environmental Study Report did not include these requirements, as they were conditions that came after the completion of the Final Class EA. The changes following the EA account for approximately \$2,800,000 in additional scope of work required following the Minister's decision and associated conditions. The remaining cost estimation difference can primarily be attributed to the preliminary nature of estimates at the Environmental Assessment stage, which are known to generally be +/- 30% level of accuracy. A brief summary of the project cost evolution is provided below:

Item Description	Cost Estimate
2018 EA est.	\$6,243,000
+/- 30% accuracy	+\$1,873,000
5% Inflation (4yrs)	+ \$1,749,000
Minister's Conditions	+ \$2,800,000
60% Design Estimate and Subtotal	\$12,665,000
20% Contingency*	+ \$2,533,000
Total	\$15,200,000
*Contingency increased from 10% to 20% to account for uncertainty of new (August 2021) Ministry of Environment sediment removal ECA request and unknown associated costs from MOE.	

Accordingly, the construction project budget has been updated to \$15,200,000 as part of the 2022 Capital Budget submission. This project is expected to extend over two construction seasons and has been submitted as a multi-year budget to mitigate the impact in a single budget year.

Estimated Operating Costs:

There are no anticipated annual operational costs associated with the naturalization alternative, however the passive management alternative is estimated to have an annual operational cost of \$25,000 to \$30,000 for regular inspection assessments. The annual operating cost for the new dam is estimated to be \$35,000. This estimated cost is for operation, maintenance and inspections.

Additionally, the current capital forecast has identified this project to be debt-funded. The cost of covering the debt principal and interest for the updated project total equates to approximately \$1,205,200 annually based on a 15-year term and estimated interest rate of 2.25%. This represents a tax rate increase of approximately 1.17% based on the proposed 2022 tax levy. The impact of these costs will be incurred over the 2023 to 2024 operating budgets, and will require an increase to the tax levy before consideration of inflationary or other budget impacts.

The 2021 capital budget and forecast had previously included \$109.2 million of debt financing towards growth-funded debt, to be recovered from future DC revenues, as well as \$43.0 million of tax-supported debt over the next 10 years. As the City issues debt over the coming years, it is projected that the City will reach its debt capacity limit of 10% for the tax-supported operating fund. Adding further to the debt funding may potentially limit the City's future financial flexibility, such as using debt financing

strategies in the future to fund additional infrastructure projects and may also require the deferral and/or cancellation of other capital projects.

Public Input

A virtual Public Information Center (PIC) was held online using Engage Cambridge (www.engagewr.ca/riversidedam) from May 17, 2021 to May 31, 2021. The design was presented and an opportunity was provided to ask questions and receive feedback on the design.

The following are highlights from the online PIC.

- The total visits to site were 108
- There were 8 engaged visitors
- There were 30 informed visitors
- Several questions were received and answers were provided by the project team

The questions received were related to the following general themes. Project team responses are also provided:

Why is a new dam being constructed?

The final recommended and endorsed preferred alternative from Class EA was to rebuild a dam.

What are the environmental impacts of the new dam?

Replacement of the existing dam with a new dam will have positive effects by permitting year-round fish passage, re-establishing a more natural sediment transport regime and returning a portion of the river channel to a more natural state.

Why are gates being used in the new dam to drain the headpond for part of the year?

Although the preferred alternative from the Class EA was to rebuild the dam, it is a condition that in order for the City to proceed with this alternative a new dam must have operable gates to allow the natural passing of sediment downstream and lessen the impact of spring flooding in the park.

It should be noted that significant public consultation was completed as part of the Class EA study including four public information centres, four sets of technical and stakeholder advisory committee meetings, two stakeholder group workshops and a variety of individual outreach meetings.

Internal/External Consultation

Consultation with internal and external stakeholders is a key component of the Riverside Dam project. The following summarizes the internal and external stakeholders consulted during the design.

Internal Consultation:

- Parks and Recreation staff
- Manager of Realty Services
- Senior Heritage Planner (presentation to MHAC scheduled for October 21)
- Senior Environmental Planner
- Landscape Architect

External Consultation:

Technical Advisory meetings have taken place during the design. The project team has met with the following agencies.

- Ministry of Natural Resources and Forestry (MNRF)
- Ministry of the Environment, Conservation and Parks (MECP)
- Grand River Conservation Authority (GRCA)
- Transport Canada
- Department of Fisheries and Oceans Canada
- Canadian Pacific Railway

Indigenous Communities:

The project team has consulted with the following Indigenous Communities..

- Six Nations of the Grand River (SNGR); met with SNGR during the Class EA and during the design phase, they also participated in archaeological work in 2021.
- Mississaugas of the Credit First Nation (MCFN); met with MCFN during the Class EA and arranging to meet with them during the design phase, they also participated in archaeological work in 2021.
- Haudenosaunee Confederacy through the Haudenosaunee Development Institute (HDI); met with HDI during the design phase, they also participated in archaeological work in 2021.

Detailed information on Indigenous Community consultation completed during the Class EA is included in the Environmental Study Report (ESR). The ESR can be found on the Riverside Dam project page on the City's website (<https://www.cambridge.ca/en/learn-about/riverside-dam.aspx#>). Section 8 of Appendix A (Part B of ESR) contains a summary of the consultation along with correspondence and meeting minutes in Appendix A10 (Part C of ESR).

Conclusion

The detailed design of the new Riverside Dam has progressed over the past year, and has reached the 60% design level. Details of the new dam and how it will be constructed are now available and have been shared with internal and external agencies, the public, and Indigenous Communities. This report provides Council with an update on the design, costs and schedule.

Additional funding in the amount of up to \$375,000 is being requested to complete Stage 3 and Stage 4 archaeological assessments (\$284,000) and additional design (\$91,000) that was not part of the original scope of work.

The estimated capital construction cost has increased from the original 2018 Class EA estimate of \$6,243,000 in consideration of additional Minister Conditions and inflation is now currently estimated at \$15,200,000.

As an alternative, Council may decide to adopt a passive management approach, featuring regular inspection assessments at an estimated cost of \$30,000 annually.

Signature

Division Approval

Reviewed by the CFO



Reviewed by Legal Services

Name: Kevin De Leebeeck
Title: Director of Engineering

Departmental Approval



Name: Hardy Bromberg
Title: Deputy City Manager, Community Development

City Manager Approval



Name: David Calder
Title: City Manager

Attachments

- Appendix A – Design Drawings

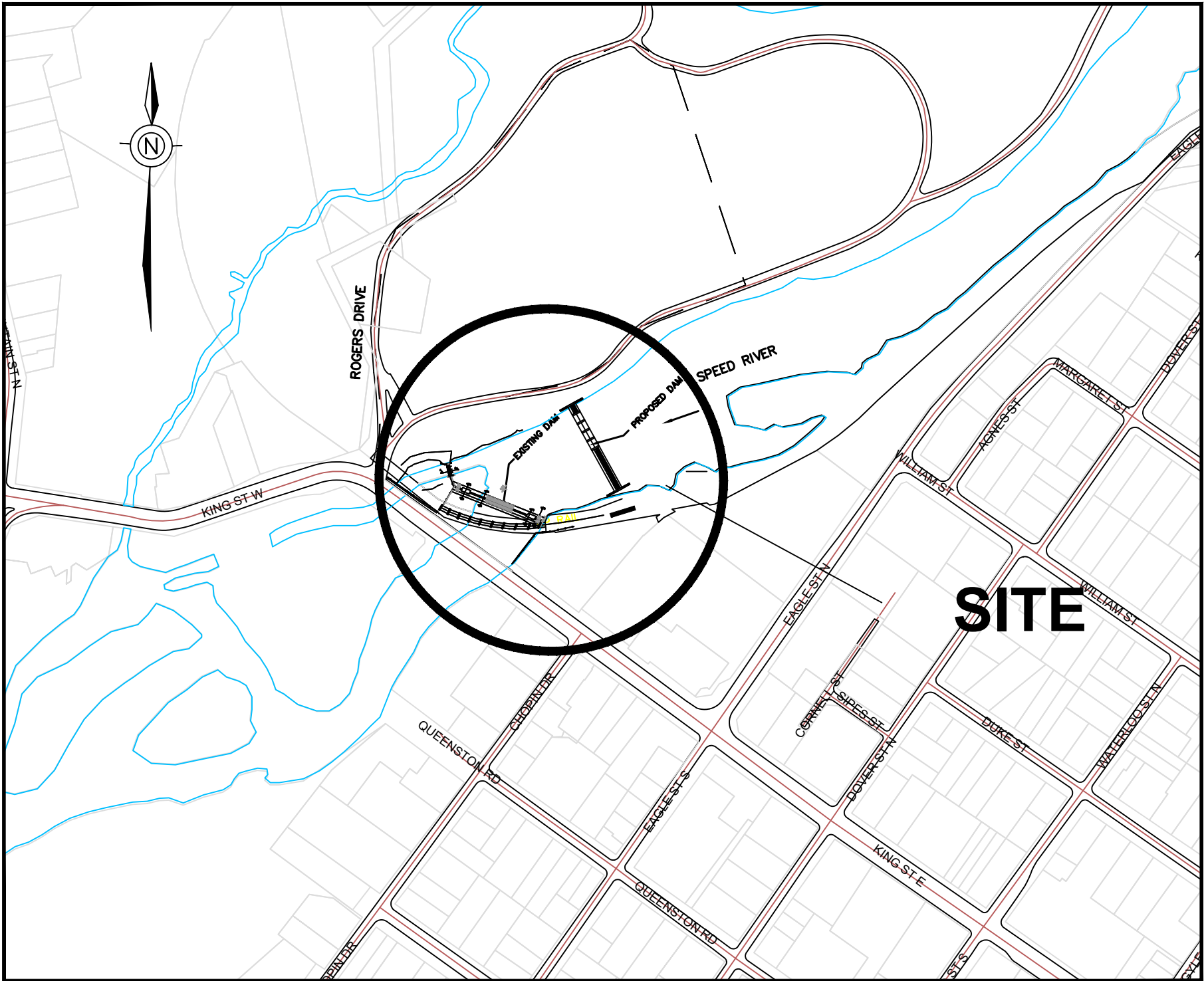
RIVERSIDE DAM REPLACEMENT

SPEED RIVER

CITY OF CAMBRIDGE

LIST OF DRAWINGS

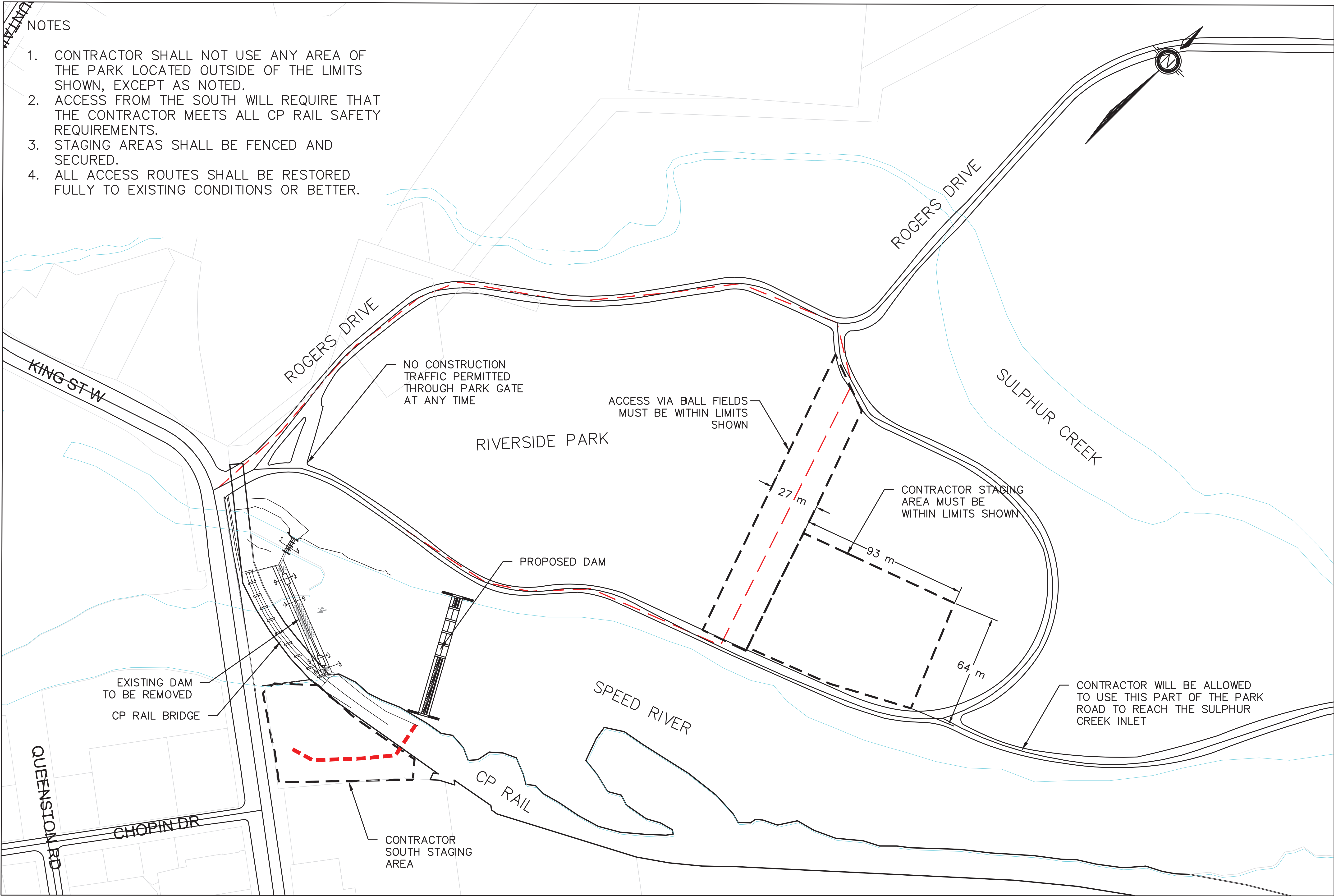
- G01 - CONSTRUCTION ACCESS
- G02 - CONSTRUCTION STAGING
- G03 - EXISTING STRUCTURE DEMOLITION
- G04 - TEMPORARY RIVER ACCESS ROAD
- G05 - DAM SITE PLAN
- G06 - SULPHUR CREEK INLET
- G07 - ROCKY RAMP FOR FISH PASSAGE
- G08 - PROPOSED CHANNEL
- T01 - TREE INVENTORY DAM SITE
- T02 - TREE INVENTORY SULPHUR CREEK INLET
- L-1 - LANDSCAPE PLAN
- L-2 - PLANTING DETAILS
- D01 - DAM GENERAL ARRANGEMENT
- D02 - FOUNDATIONS
- D03 - PIERS AND WEIR
- D04 - ABUTMENTS AND WINGWALLS



CAMBRIDGE, ONTARIO
KEY PLAN
NOT TO SCALE



SANCHEZ ENGINEERING INC.



PLAN
SCALE 1:1,000

LEGEND

- ACCESS
- SOUTH ACCESS
- STAGING AREAS

REVISIONS

SE, Sanchez Engineering Inc.

8440 Danforth Road
Cobourg, Ontario
Tel: 905-372-9594
Fax: 905-372-7812
sei.eng@sanchezengeeneering.ca
www.sanchezengeeneering.ca

CITY OF CAMBRIDGE

SPEED RIVER

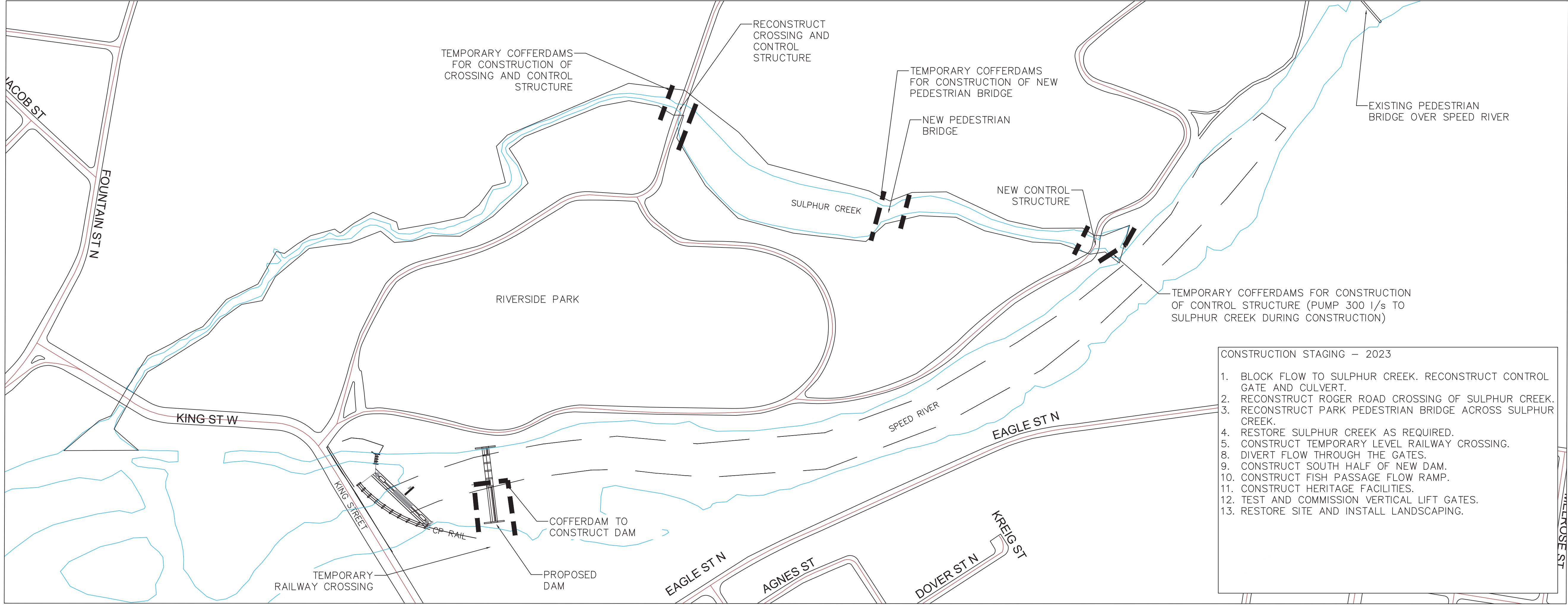
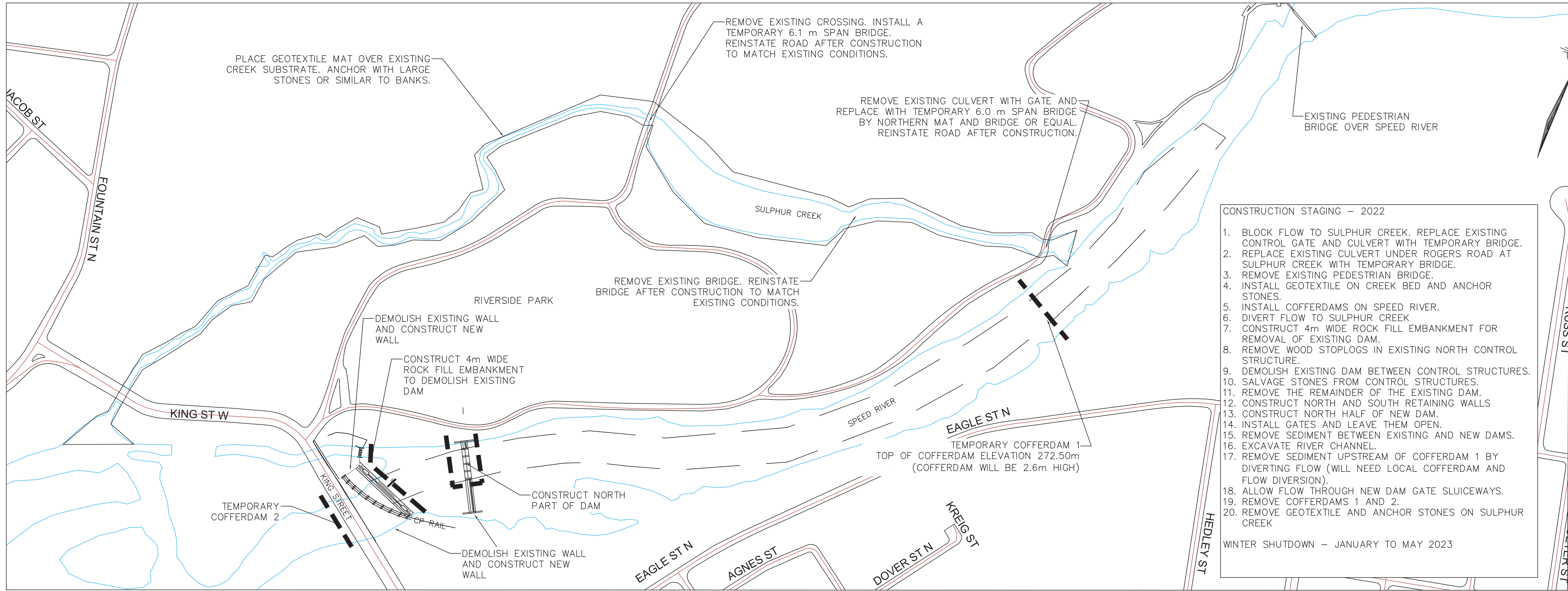
RIVERSIDE DAM
RECONSTRUCTION

DWG. TITLE
CONSTRUCTION ACCESS

PROJECT NO:	SN0426	DRAWN BY:	L.S.C.
		DESIGNED BY:	L.S.
		CHECKED BY:	L.S.

DATE:
AUGUST 2021

SCALE: AS SHOWN	DWG. NO.: G01
--------------------	------------------



REVISIONS

SE **SANCHEZ ENGINEERING INC.**

8440 Danforth Road
Cobourg, Ontario
Tel: 905-372-9594
Fax: 905-372-7812
sei.eng@sanchezengeeneering.ca
www.sanchezengeeneering.ca

CITY OF CAMBRIDGE

SPEED RIVER

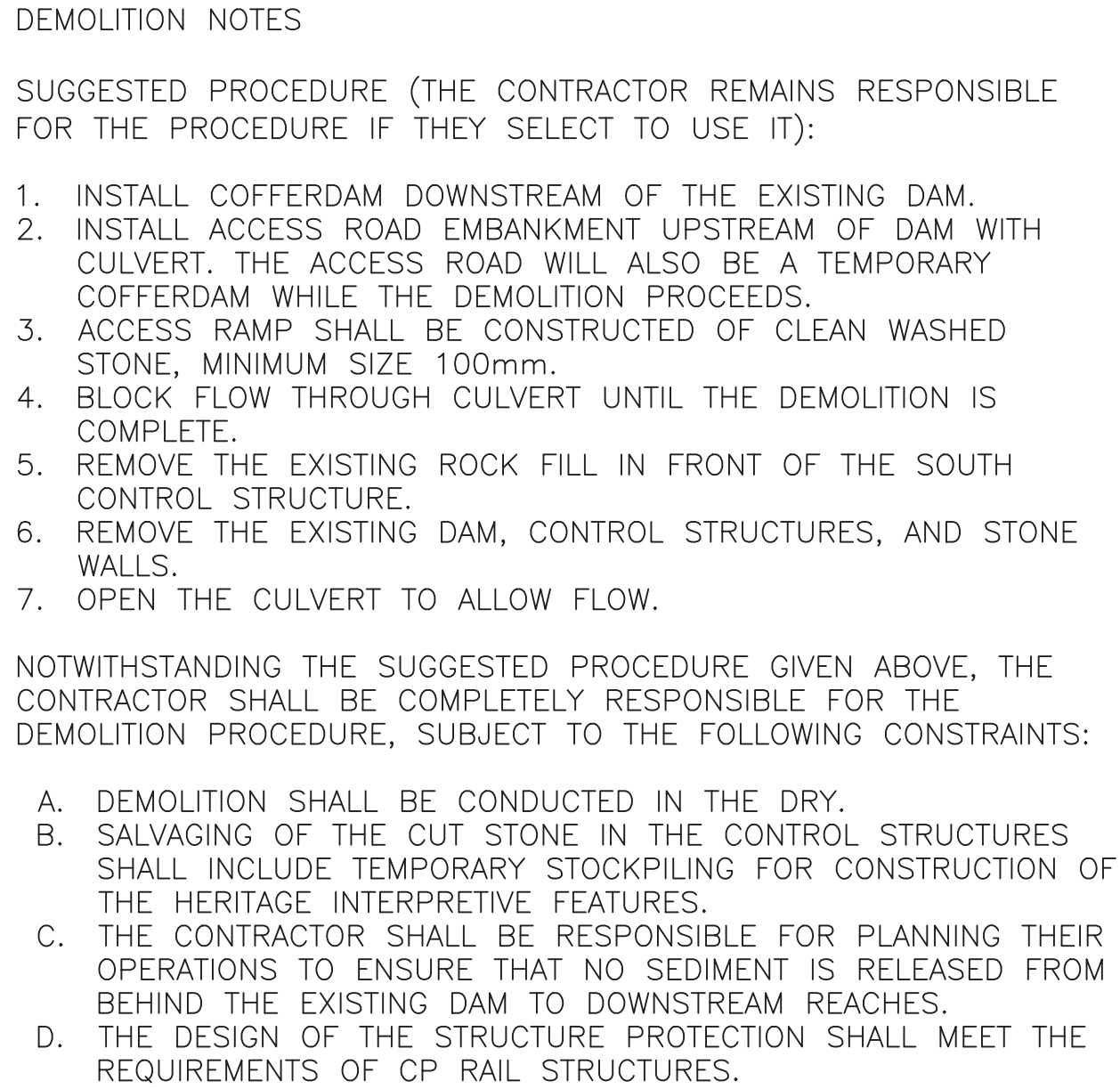
RIVERSIDE DAM
RECONSTRUCTION

DWG. TITLE CONSTRUCTION
STAGING

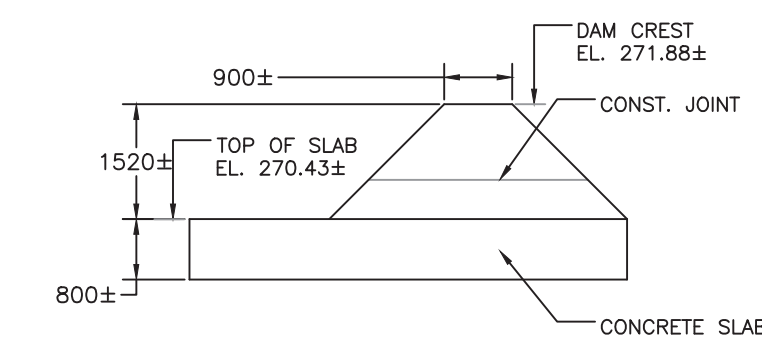
PROJECT NO:	SN0426	DRAWN BY:	L.S.C.
		DESIGNED BY:	L.S.
		CHECKED BY:	L.S.

DATE: OCTOBER 2021

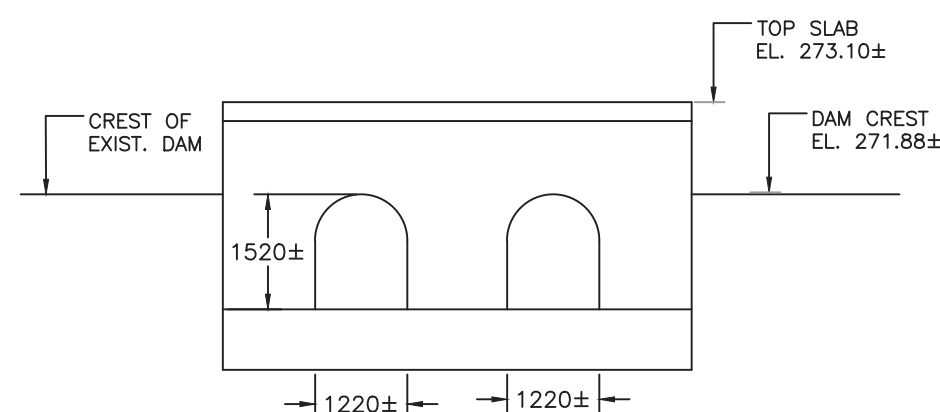
SCALE:	1:1000	DWG. NO.:	G02
--------	--------	-----------	-----



PLAN
SCALE 1:200



TYPICAL WEIR SECTION
SCALE 1:100



NORTH CONTROL STRUCTURE
ELEVATION (SOUTH STRUCTURE
SIMILAR)

DOWNSTREAM ELEVATION
SCALE 1:200

CONTROL STRUCTURE ELEVATION
SCALE 1:100

REVISIONS

C:\Users\lsanchezc\Pictures\Sanchez-Logo 08APR2019.jpg

8440 Danforth Road
Cobourg, Ontario
Tel: 905-372-9594
Fax: 905-372-7812
sei.eng@sanchezengineering.ca
www.sanchezengineering.ca

CITY OF CAMBRIDGE

SPEED RIVER

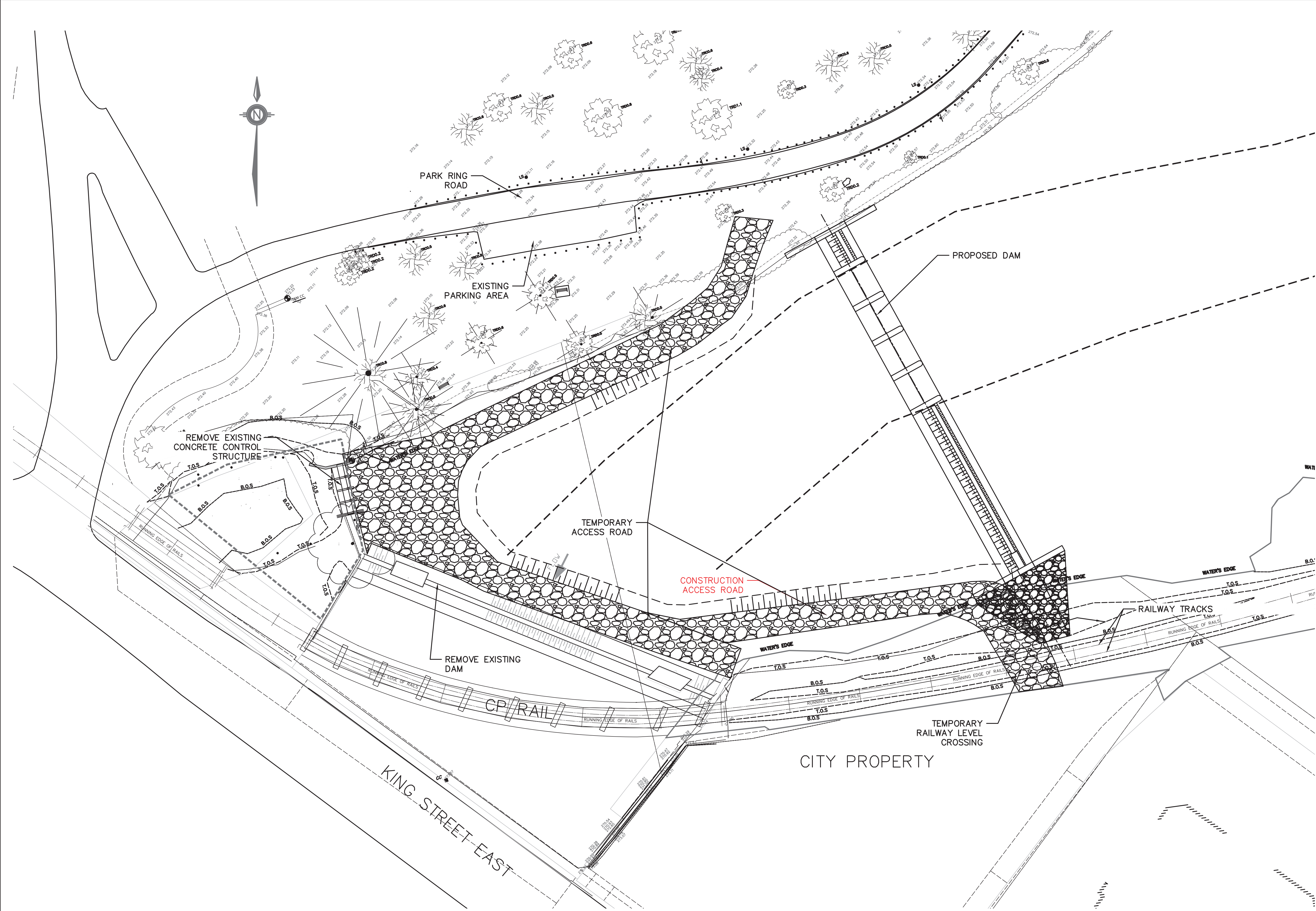
RIVERSIDE DAM RECONSTRUCTION

DWG. TITLE		EXISTING STRUCTURE DEMOLITION	
PROJECT NO:	SN0426	DRAWN BY:	L.S.C.
		DESIGNED BY:	L.S.
		CHECKED BY:	L.S.

DATE: AUGUST 2021

SCALE:
AS SHOWN

DWG. NO.: **G03**



PLAN
SCALE 1:300

TEMPORARY BENCHMARK

TBM
TOP OF NORTH CONCRETE WINGWALL ON BY-PASS
STRUCTURE.
ELEVATION = 273.421 m
NORTHING = 4805455.981
EASTING = 551365.231

REVISIONS

SE SANCHEZ ENGINEERING INC.

8440 Danforth Road
Cobourg, Ontario
Tel: 905-372-9594
Fax: 905-372-7812
sei.eng@sanchezengineering.ca
www.sanchezengineering.ca

CITY OF CAMBRIDGE

SPEED RIVER

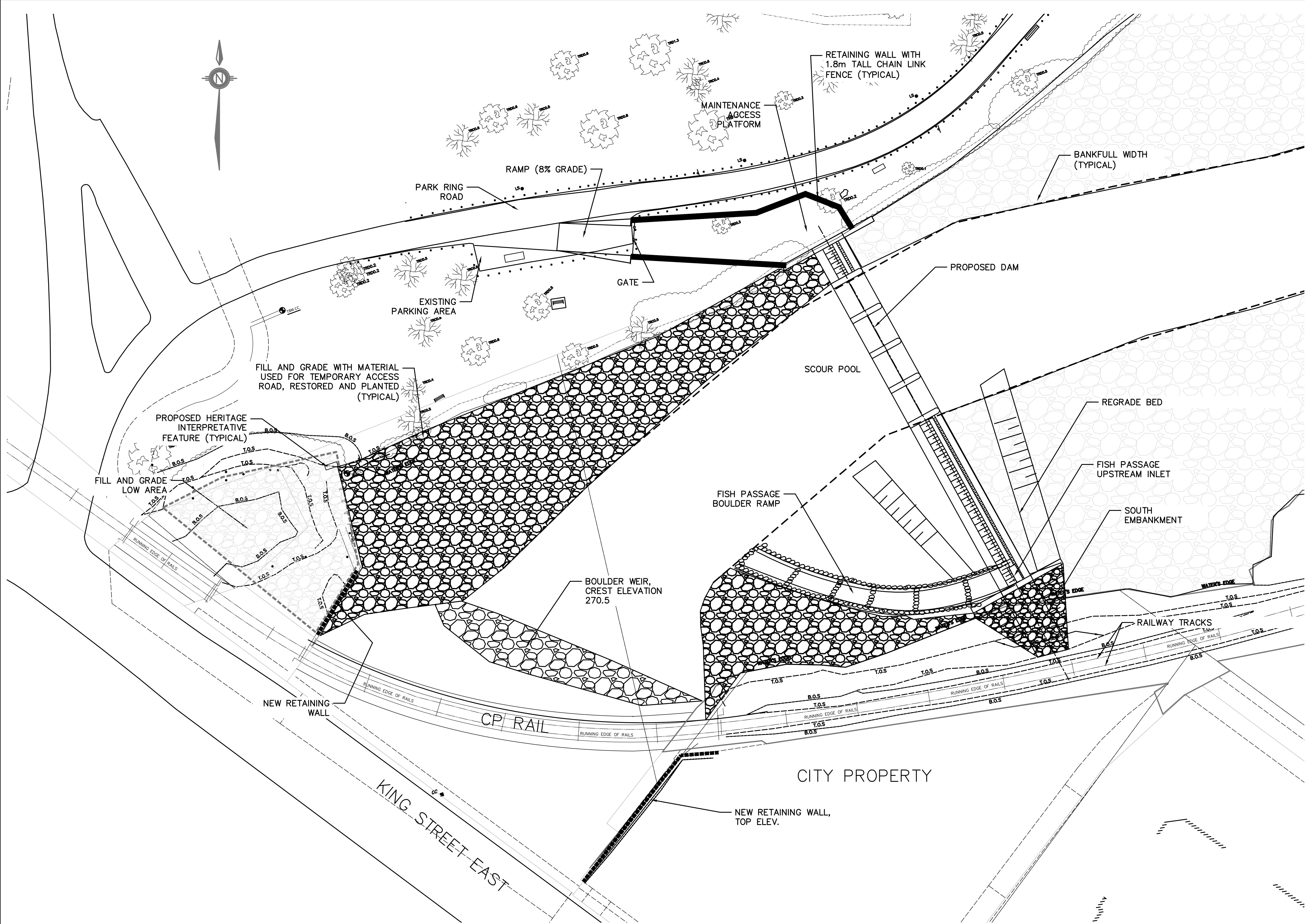
RIVERSIDE DAM
RECONSTRUCTION

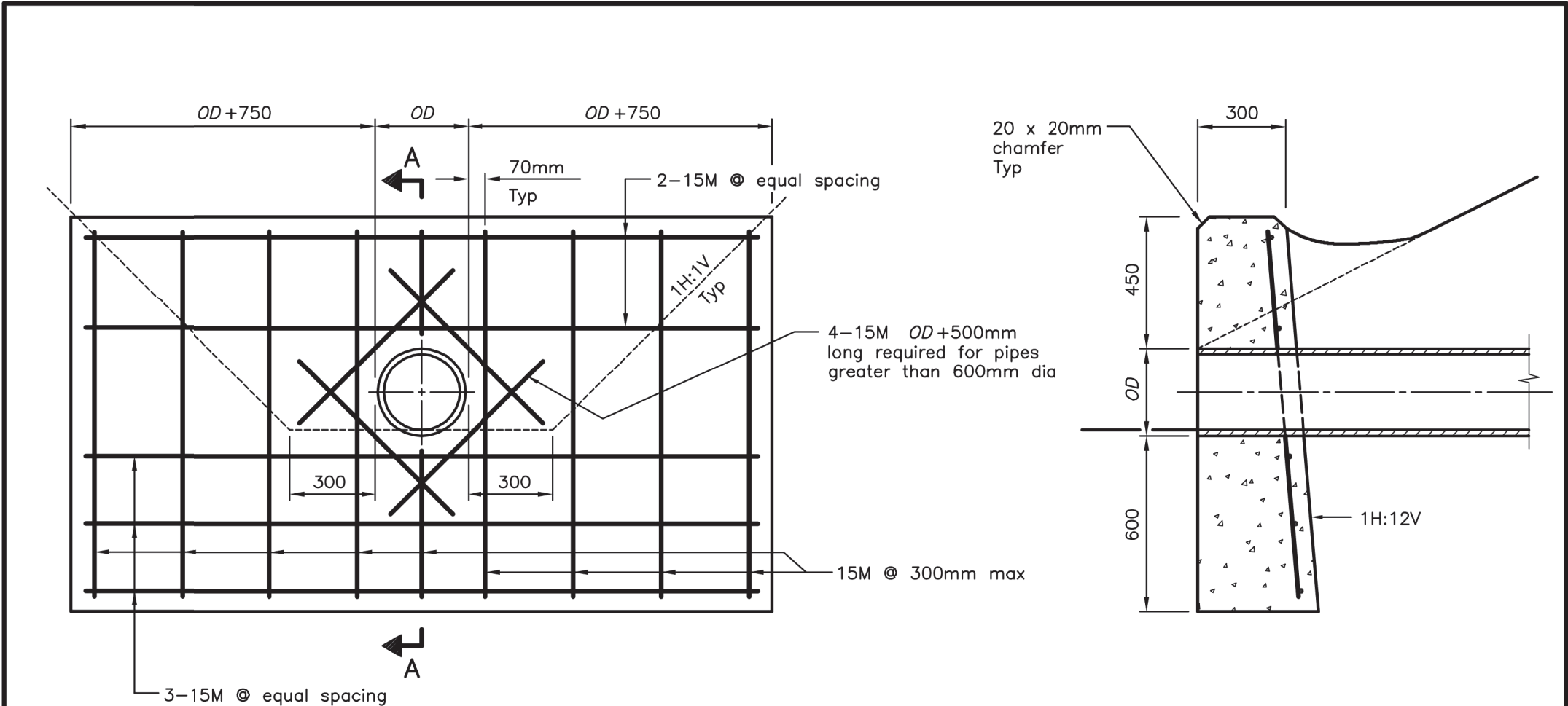
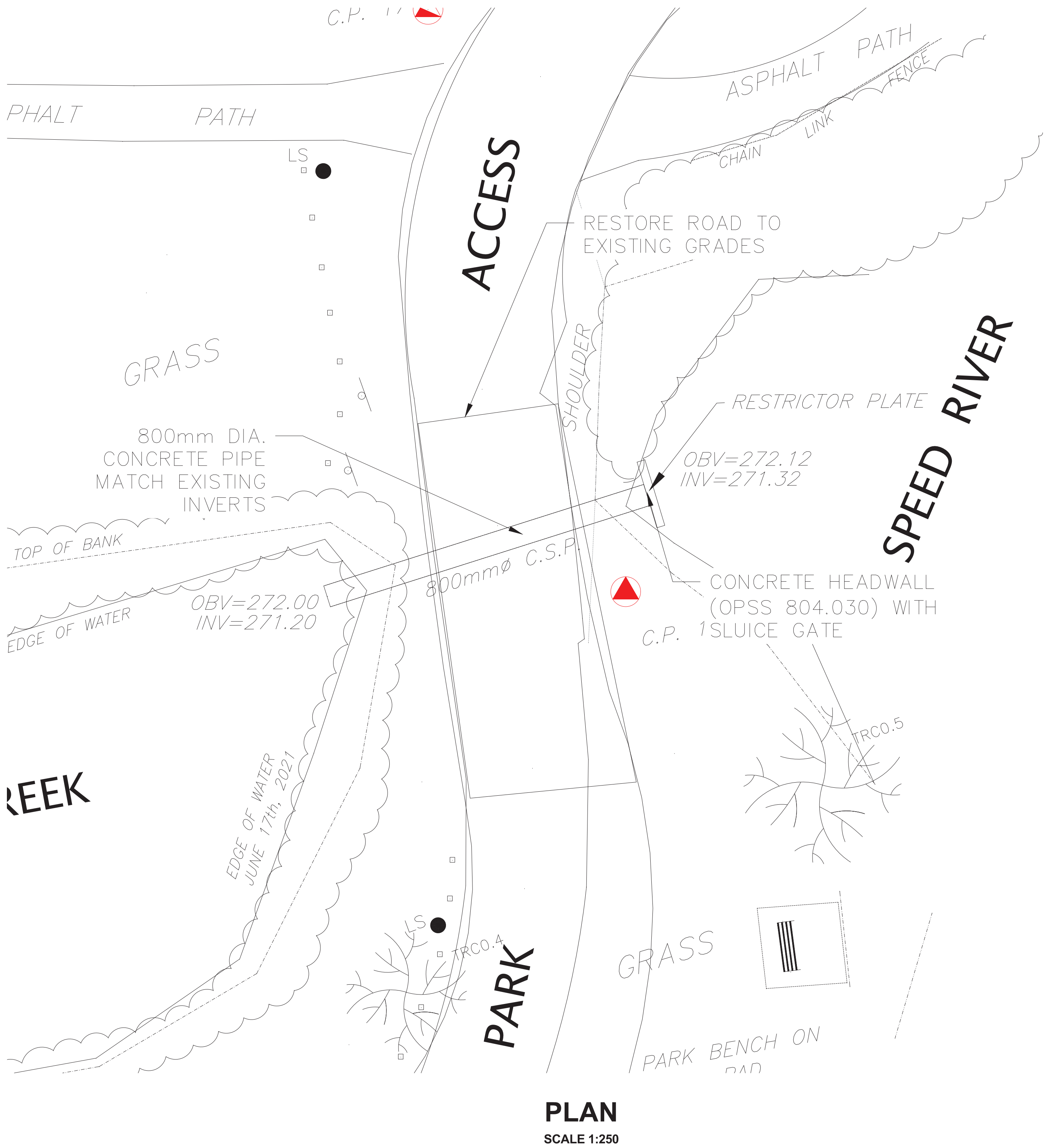
DWG. TITLE TEMPORARY RIVER
ACCESS ROAD

PROJECT NO: SN0426	DRAWN BY:	L.S.C.
	DESIGNED BY:	L.S.
	CHECKED BY:	L.S.

DATE: OCTOBER 2021

SCALE: 1:200	DWG. NO.: G04
--------------	---------------

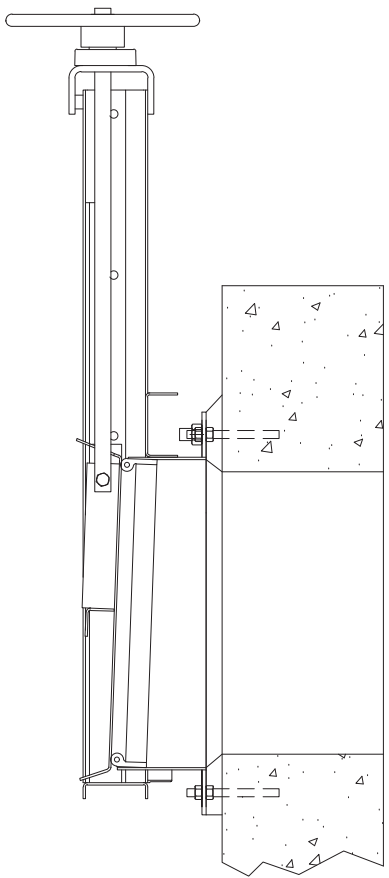




LEGEND:
OD – Outside diameter of pipe

NOTES:
A This OPSD to be read in conjunction with OPSD 3940.150.
B If a steel grate is required, refer to OPSD 804.05.
C Class of concrete: 30MPa.
D Cover to reinforcing bars 70mm ± 20mm.
E All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2017	Rev 2	
CONCRETE HEADWALL			
FOR PIPE LESS THAN 900mm DIAMETER	OPSD 804.030		



WALL MOUNTED GATE BY WESTMAN
OR APPROVED EQUAL

GATE SECTION

SCALE NTS



GATE ELEVATION

SCALE NTS

TEMPORARY BENCHMARK

TBM
TOP OF NORTH CONCRETE WINGWALL ON BY-PASS
STRUCTURE.
ELEVATION = 273.421 m
NORTHING = 4809455.981
EASTING = 551365.231

REVISIONS

SANCHEZ ENGINEERING INC.

8440 Danforth Road
Cobourg, Ontario
Tel: 905-372-9594
Fax: 905-372-7812
sei.eng@sanchezengineering.ca
www.sanchezengineering.ca

CITY OF CAMBRIDGE

SPEED RIVER

**RIVERSIDE DAM
RECONSTRUCTION**

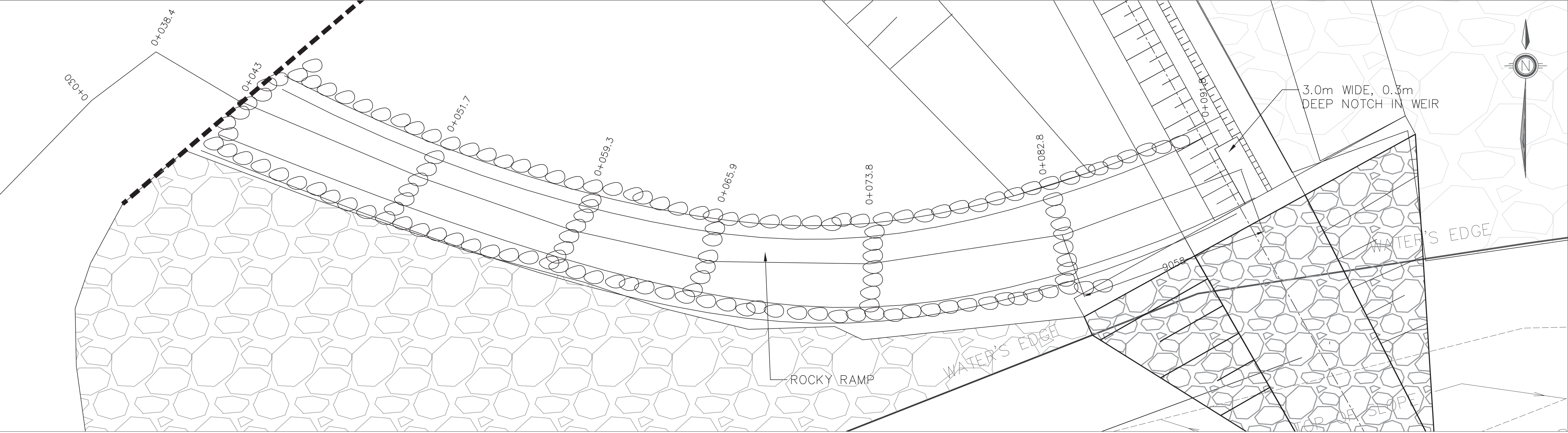
DWG. TITLE
SULPHUR CREEK INLET

PROJECT NO:	SN0426	DRAWN BY:	L.S.C.
DESIGNED BY:	L.S.	CHECKED BY:	L.S.

DATE:
NOVEMBER 2021

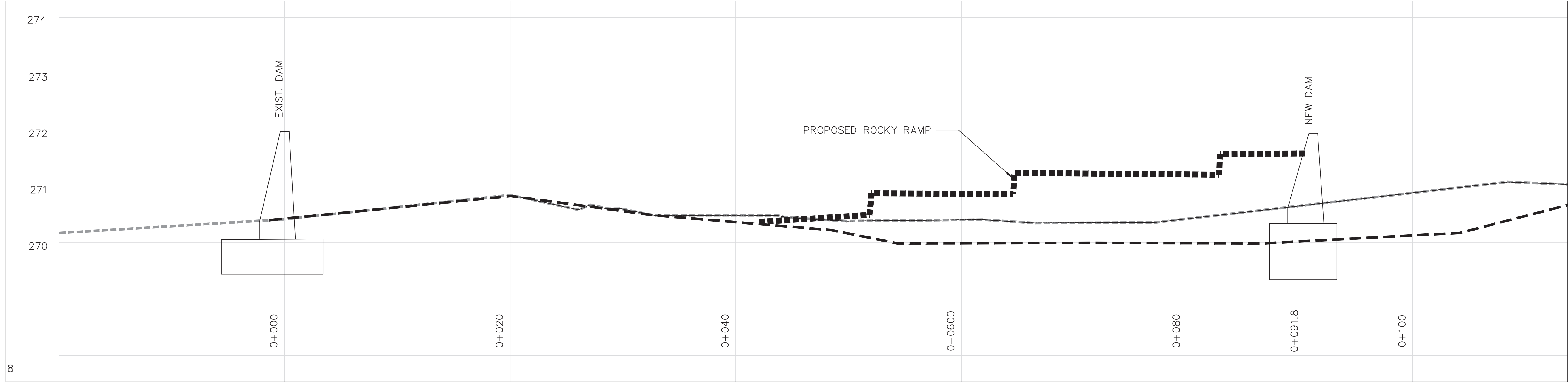
SCALE:
AS NOTED

DWG. NO.:
G06



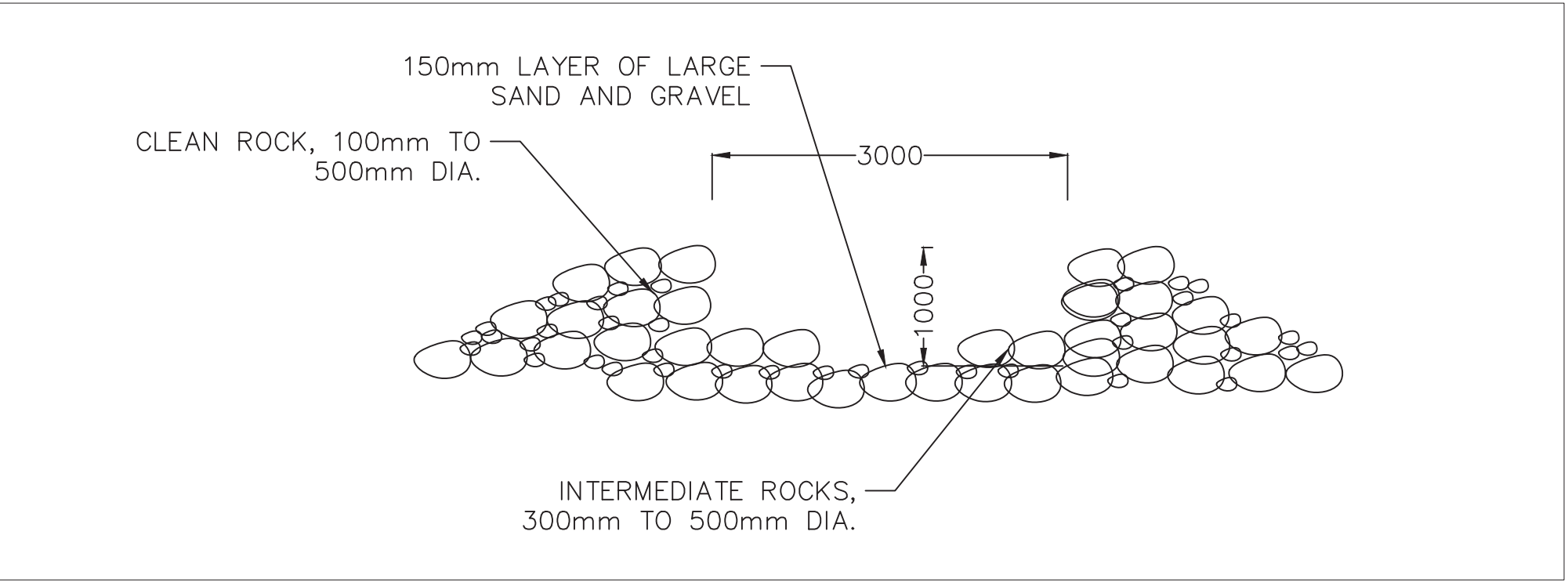
PLAN

SCALE 1:100



PROFILE OF ROCKY RAMP

SCALE HOR. 1:200 VERT. 1:40



SECTION OF ROCKY RAMP

SCALE 1:50

REVISIONS

SEI Sanchez Engineering Inc.

8440 Danforth Road
Cobourg, Ontario
Tel: 905-372-9594
Fax: 905-372-7812
sei.eng@sanchezengineering.ca
www.sanchezengineering.ca

CITY OF CAMBRIDGE

SPEED RIVER

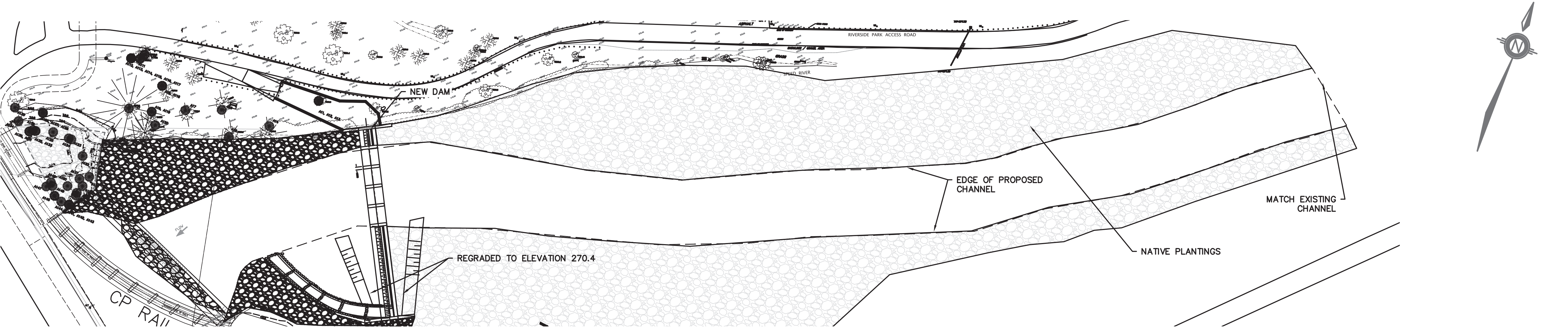
RIVERSIDE DAM
RECONSTRUCTION

DWG. TITLE ROCKY RAMP FOR
FISH PASSAGE

PROJECT NO:	SN0426	DRAWN BY:	L.S.C.
		DESIGNED BY:	L.S.
		CHECKED BY:	L.S.

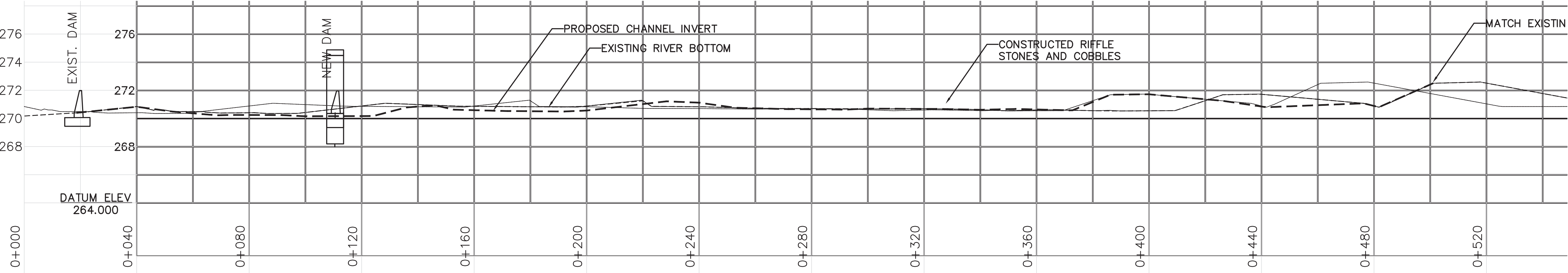
DATE: OCTOBER 2021

SCALE: AS NOTED	DWG. NO.: G07
-----------------	---------------



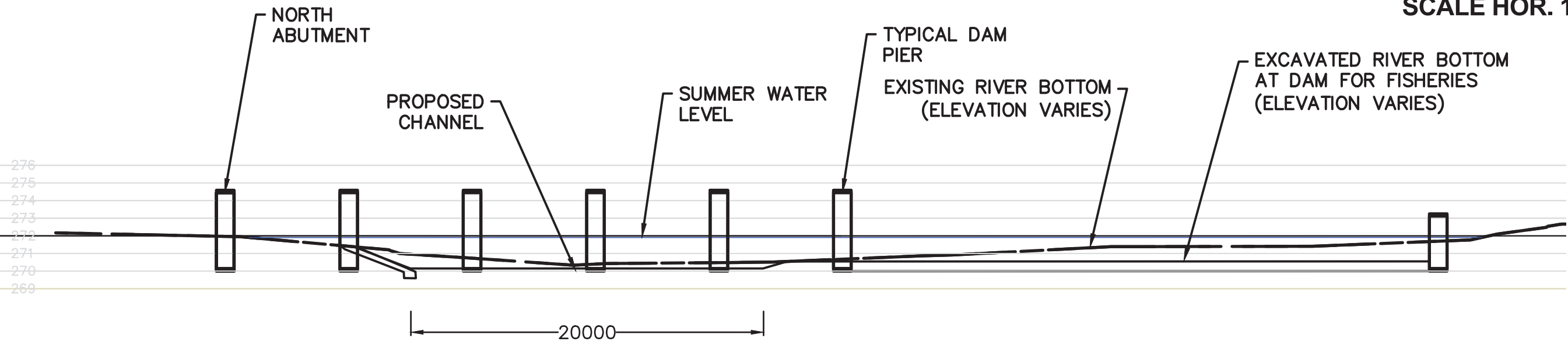
PLAN

SCALE 1:750



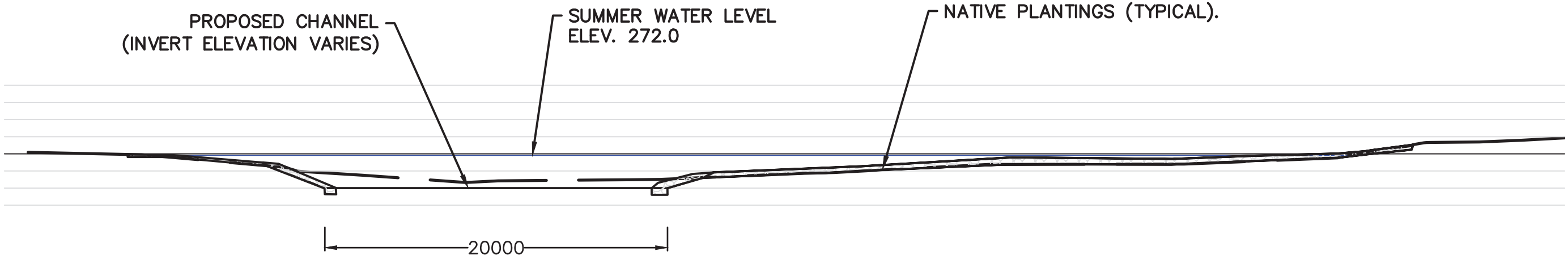
PROFILE OF CHANNEL

SCALE HOR. 1:750 VERT. 1:150



SECTION AT DAM

SCALE 1:250



TYPICAL SECTION

SCALE 1:250



TYPICAL SECTION

SCALE 1:250

REVISIONS

SE SANCHEZ ENGINEERING INC.

8440 Danforth Road
Cobourg, Ontario
Tel: 905-372-9594
Fax: 905-372-7812
sei.eng@sanchezengineering.ca
www.sanchezengineering.ca

CITY OF CAMBRIDGE

SPEED RIVER

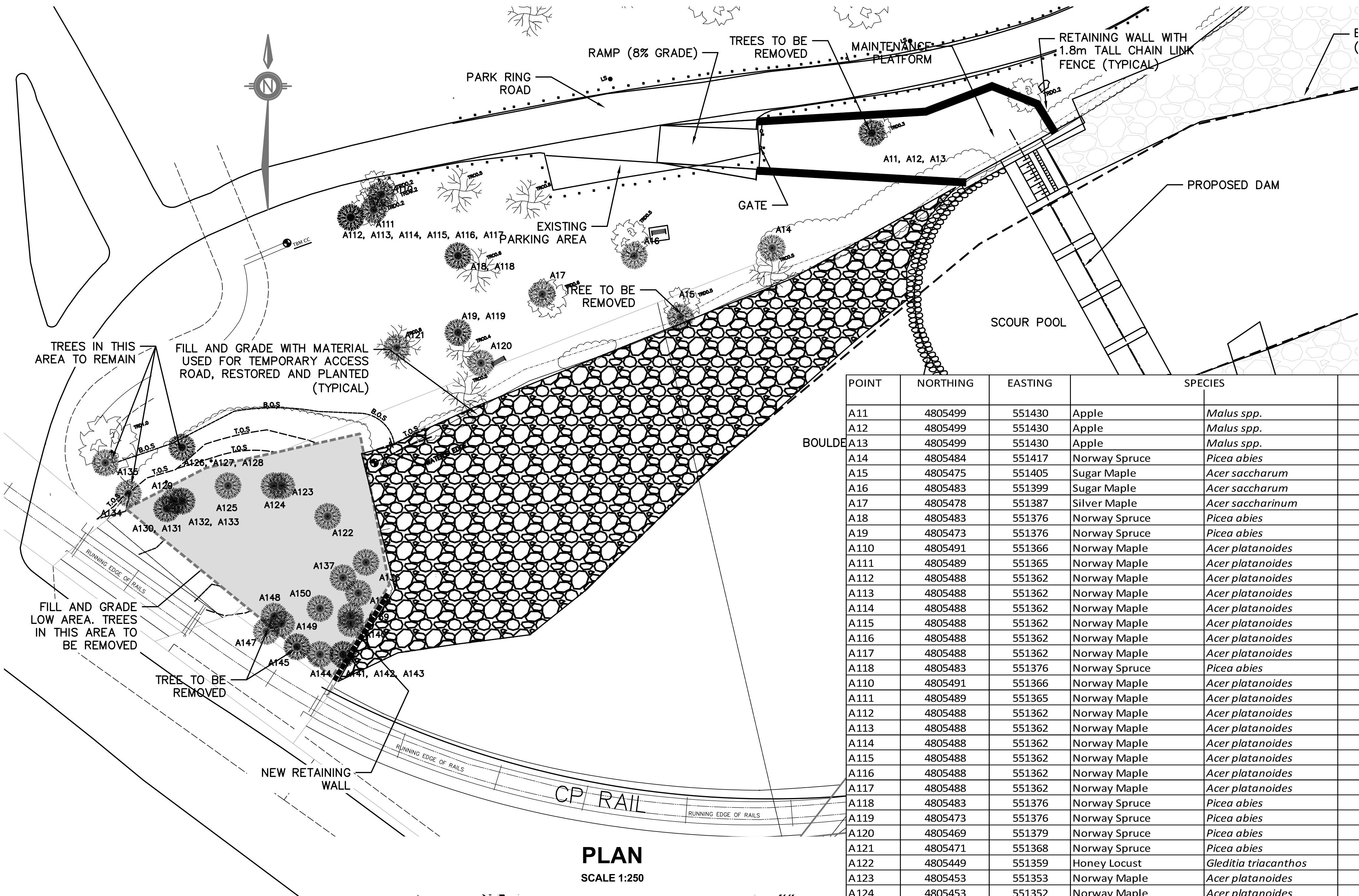
RIVERSIDE DAM RECONSTRUCTION

DWG. TITLE **PROPOSED CHANNEL**

PROJECT NO:	SN0426	DRAWN BY:	L.S.C.
		DESIGNED BY:	L.S.
		CHECKED BY:	L.S.

DATE: **OCTOBER 2021**

SCALE: **AS NOTED** DWG. NO.: **G08**



PLAN
SCALE 1:250

POINT	NORTHING	EASTING	SPECIES		DBH (CM)	CONDITION/COMMENT
A11	4805499	551430	Apple	<i>Malus spp.</i>	16	Poor Condition
A12	4805499	551430	Apple	<i>Malus spp.</i>	21	Poor Condition
A13	4805499	551430	Apple	<i>Malus spp.</i>	22	Poor Condition
A14	4805484	551417	Norway Spruce	<i>Picea abies</i>	90	Fair Condition, Non-Native and Invasive
A15	4805475	551405	Sugar Maple	<i>Acer saccharum</i>	73	Poor Condition, Presence of Dieback
A16	4805483	551399	Sugar Maple	<i>Acer saccharum</i>	71	Good Condition
A17	4805478	551387	Silver Maple	<i>Acer saccharinum</i>	79	Good Condition
A18	4805483	551376	Norway Spruce	<i>Picea abies</i>	96	Good Condition, Non-Native and Invasive
A19	4805473	551376	Norway Spruce	<i>Picea abies</i>	74	Poor Condition, Broken Top, Remove; Non-Native and Invasive
A110	4805491	551366	Norway Maple	<i>Acer platanoides</i>	18	Good Condition, Non-Native and Invasive
A111	4805489	551365	Norway Maple	<i>Acer platanoides</i>	33	Good Condition, Non-Native and Invasive
A112	4805488	551362	Norway Maple	<i>Acer platanoides</i>	19	Good Condition, Non-Native and Invasive
A113	4805488	551362	Norway Maple	<i>Acer platanoides</i>	12	Good Condition, Non-Native and Invasive
A114	4805488	551362	Norway Maple	<i>Acer platanoides</i>	24	Good Condition, Non-Native and Invasive
A115	4805488	551362	Norway Maple	<i>Acer platanoides</i>	12	Good Condition, Non-Native and Invasive
A116	4805488	551362	Norway Maple	<i>Acer platanoides</i>	18	Good Condition, Non-Native and Invasive
A117	4805488	551362	Norway Maple	<i>Acer platanoides</i>	22	Good Condition, Non-Native and Invasive
A118	4805483	551376	Norway Spruce	<i>Picea abies</i>	61	Good Condition, Non-Native
A110	4805491	551366	Norway Maple	<i>Acer platanoides</i>	18	Good Condition, Non-Native and Invasive
A111	4805489	551365	Norway Maple	<i>Acer platanoides</i>	33	Good Condition, Non-Native and Invasive
A112	4805488	551362	Norway Maple	<i>Acer platanoides</i>	19	Good Condition, Non-Native and Invasive
A113	4805488	551362	Norway Maple	<i>Acer platanoides</i>	12	Good Condition, Non-Native and Invasive
A114	4805488	551362	Norway Maple	<i>Acer platanoides</i>	24	Good Condition, Non-Native and Invasive
A115	4805488	551362	Norway Maple	<i>Acer platanoides</i>	12	Good Condition, Non-Native and Invasive
A116	4805488	551362	Norway Maple	<i>Acer platanoides</i>	18	Good Condition, Non-Native and Invasive
A117	4805488	551362	Norway Maple	<i>Acer platanoides</i>	22	Good Condition, Non-Native and Invasive
A118	4805483	551376	Norway Spruce	<i>Picea abies</i>	61	Good Condition, Non-Native
A119	4805473	551376	Norway Spruce	<i>Picea abies</i>	55	Poor Condition, Significant Dieback, Non-native, Remove Tree
A120	4805469	551379	Norway Spruce	<i>Picea abies</i>	64	Poor Condition, Non-native
A121	4805471	551368	Norway Spruce	<i>Picea abies</i>	102	Fair Condition, Non-native
A122	4805449	551359	Honey Locust	<i>Gleditia triacanthos</i>	13	Good Condition
A123	4805453	551353	Norway Maple	<i>Acer platanoides</i>	33	Good Condition, Non-Native and Invasive
A124	4805453	551352	Norway Maple	<i>Acer platanoides</i>	30	Good Condition, Non-Native and Invasive
A125	4805453	551346	Norway Maple	<i>Acer platanoides</i>	38	Good Condition, Non-Native and Invasive
A126	4805458	551340	Norway Maple	<i>Acer platanoides</i>	47	Good Condition, Non-Native and Invasive
A127	4805458	551340	Norway Maple	<i>Acer platanoides</i>	38	Good Condition, Non-Native and Invasive
A128	4805458	551340	Norway Maple	<i>Acer platanoides</i>	12	Good Condition, Non-Native and Invasive
A129	4805451	551339	Willow	<i>Salix spp.</i>	26	Poor Condition, Structural Deficiencies
A130	4805450	551338	Norway Maple	<i>Acer platanoides</i>	43	Good Condition, Non-Native and Invasive
A131	4805450	551338	Norway Maple	<i>Acer platanoides</i>	36	Good Condition, Non-Native and Invasive
A132	4805451	551340	Norway Maple	<i>Acer platanoides</i>	27	Good Condition, Non-Native and Invasive
A133	4805451	551340	Norway Maple	<i>Acer platanoides</i>	24	Good Condition, Non-Native and Invasive
A134	4805452	551333	Mulberry	<i>Morus spp.</i>	22	Poor Condition
A135	4805456	551330	Silver Maple	<i>Acer saccharinum</i>	131	Good Condition
A136	4805443	551364	Norway Maple	<i>Acer platanoides</i>	12	Good Condition, Non-Native and Invasive
A137	4805441	551361	Bur Oak	<i>Quercus macrocarpa</i>	79	Good Condition
A138	4805439	551363	Bur Oak	<i>Quercus macrocarpa</i>	27	Dead, Remove Tree
A139	4805436	551362	Bur Oak	<i>Quercus macrocarpa</i>	21	Dead, Remove Tree
A140	4805435	551362	Bur Oak	<i>Quercus macrocarpa</i>	15	Good Condition
A141	4805431	551361	Red Elm	<i>Ulmus rubra</i>	13	Dead, Remove Tree
A142	4805431	551361	Red Elm	<i>Ulmus rubra</i>	14	Dead, Remove Tree
A143	4805431	551361	Red Elm	<i>Ulmus rubra</i>	14	Dead, Remove Tree
A144	4805431	551358	Red Elm	<i>Ulmus rubra</i>	12	Dead, Remove Tree
A145	4805432	551355	Bur Oak	<i>Quercus macrocarpa</i>	13	Good Condition
A146	4805432	551355	Bur Oak	<i>Quercus macrocarpa</i>	13	Good Condition
A147	4805434	551351	Bur Oak	<i>Quercus macrocarpa</i>	12	Good Condition
A148	4805436	551352	Northern Catalpa	<i>Catalpa speciosa</i>	29	Good Condition
A149	4805435	551353	Red Elm	<i>Ulmus rubra</i>	12	Good Condition
A150	4805437	551358	Norway Maple	<i>Acer platanoides</i>	37	Good Condition

TEMPORARY BENCHMARK

TBM
TOP OF NORTH CONCRETE WINGWALL ON BY-PASS
STRUCTURE.
ELEVATION = 273.421 m
NORTHING = 4805455.981
EASTING = 551365.231

TREE INVENTORY COMPLETED BY:

Charles F. Burgess, ISA Certified Arborist
(ON-2456-A).

REVISIONS



8440 Danforth Road
Cobourg, Ontario
Tel: 905-372-9594
Fax: 905-372-7812
sei.eng@sanchezengineering.ca
www.sanchezengineering.ca

CITY OF CAMBRIDGE

SPEED RIVER

RIVERSIDE DAM
RECONSTRUCTION

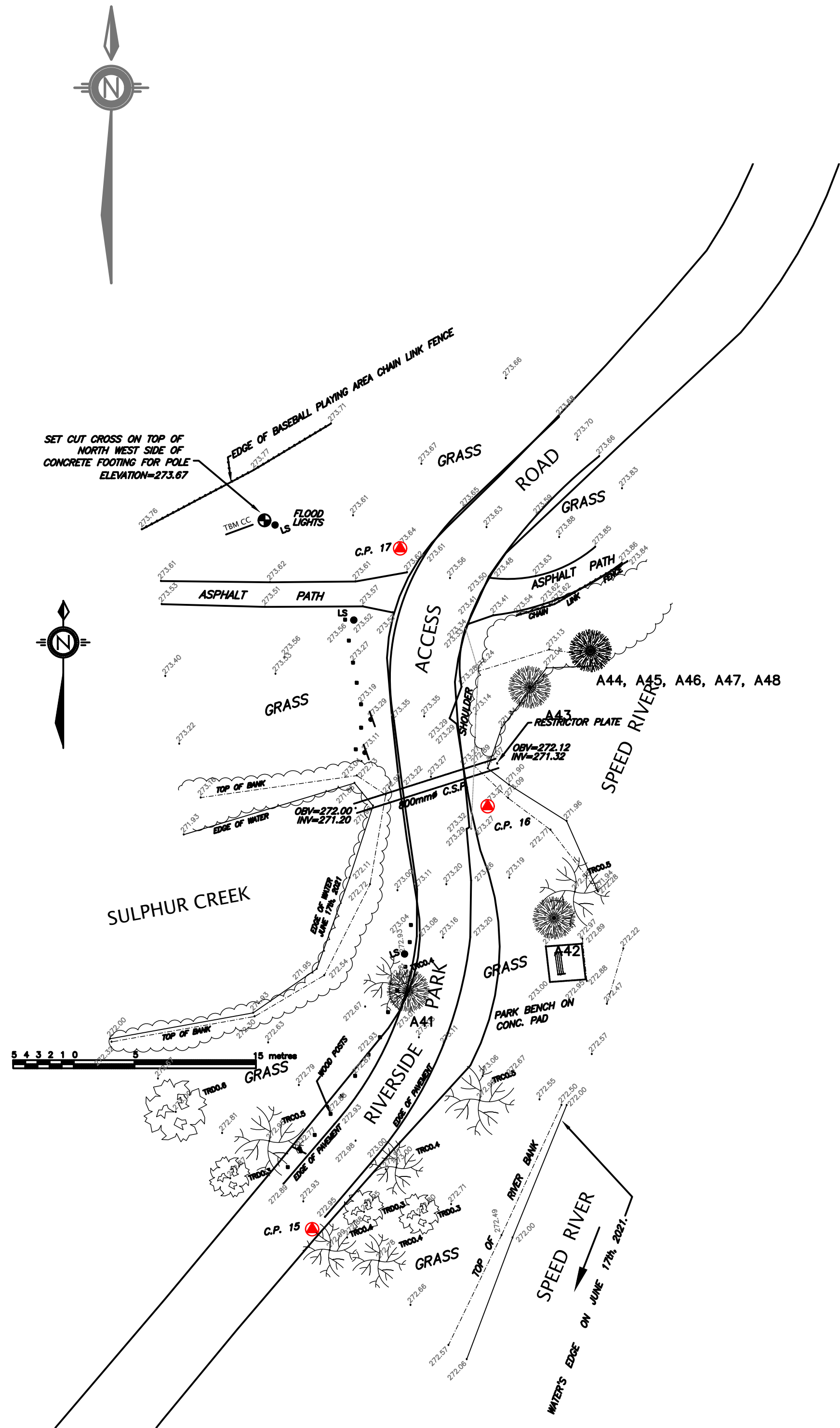
DWG. TITLE TREE INVENTORY
DAM SITE

PROJECT NO: SN0426	DRAWN BY:	L.S.C.
	DESIGNED BY:	L.S.
CHECKED BY:		L.S.

DATE: NOVEMBER 2021

SCALE:
AS NOTED

DWG. NO.:
T01



POINT	NORTHING	EASTING	SPECIES		DBH (cm)	CONDITION/COMMENT
A41	4805859	551883	Scots Pine	<i>Pinus sylvestris</i>	40	Good Condition, Non-native and Invasive
A42	4805865	551895	Scots Pine	<i>Pinus sylvestris</i>	51	Good Condition, Non-native and Invasive
A43	4805884	551893	Norway Maple	<i>Acer platanoides</i>	56	Good Condition, Non-native and Invasive
A44	4805887	551898	Norway Maple	<i>Acer platanoides</i>	42	Good Condition, Non-native and Invasive
A45	4805887	551898	Norway Maple	<i>Acer platanoides</i>	16	Good Condition, Non-native and Invasive
A46	4805887	551898	Norway Maple	<i>Acer platanoides</i>	20	Good Condition, Non-native and Invasive
A47	4805887	551898	Norway Maple	<i>Acer platanoides</i>	41	Good Condition, Non-native and Invasive
A48	4805887	551898	Norway Maple	<i>Acer platanoides</i>	17	Good Condition, Non-native and Invasive

PLAN
SCALE 1:250

TEMPORARY BENCHMARK

TBM
TOP OF NORTH CONCRETE WINGWALL ON BY-PASS STRUCTURE.
ELEVATION = 273.421 m
NORTHING = 4805455.981
EASTING = 551365.231

TREE INVENTORY COMPLETED BY:

Charles F. Burgess, ISA Certified Arborist (ON-2456-A).

REVISIONS



8440 Danforth Road
Cobourg, Ontario
Tel: 905-372-9594
Fax: 905-372-7812
sei.eng@sanchezengineering.ca
www.sanchezengineering.ca

CITY OF CAMBRIDGE

SPEED RIVER

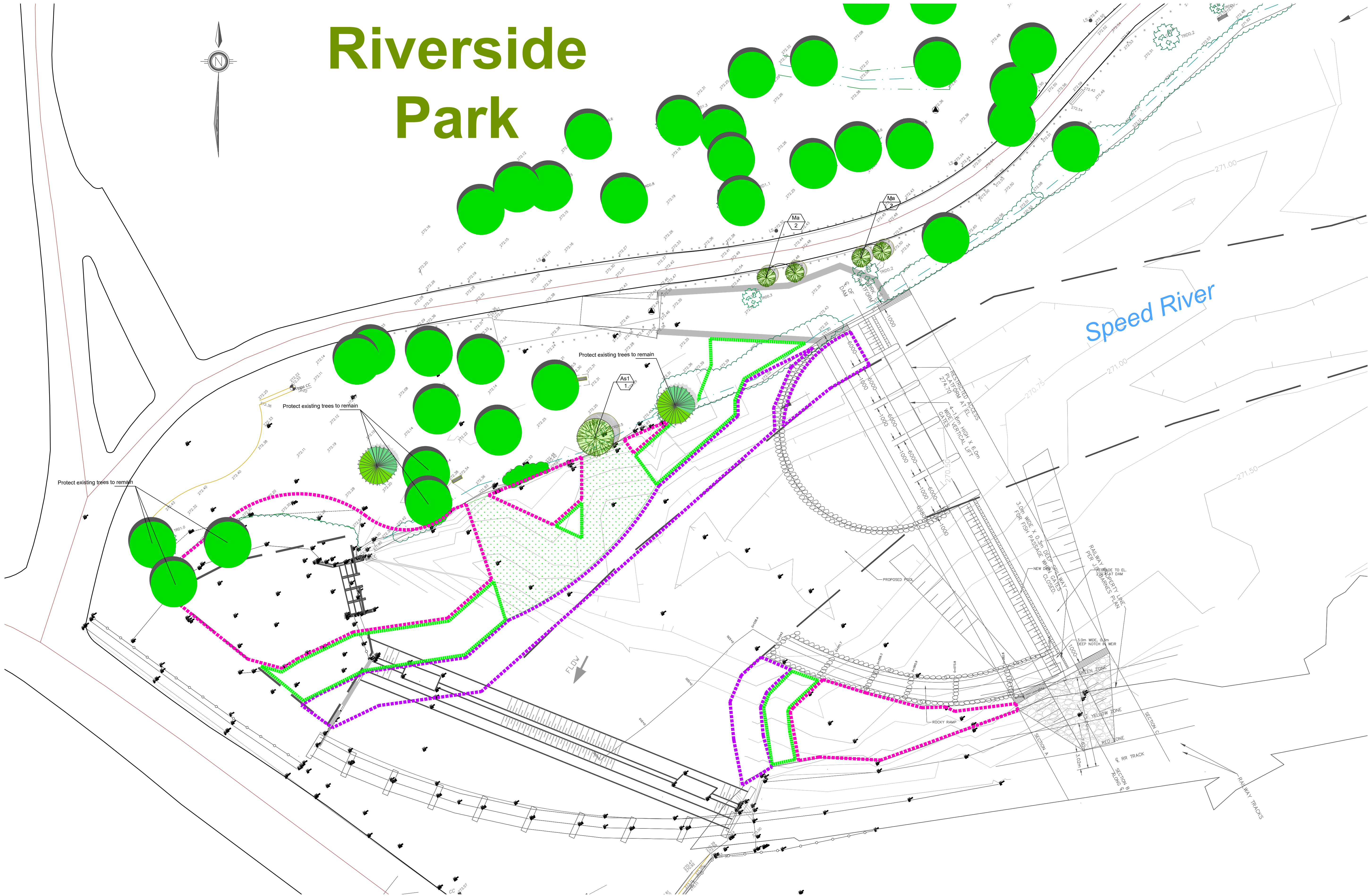
RIVERSIDE DAM
RECONSTRUCTION

DWG. TITLE TREE INVENTORY
SULPHUR CREEK INLET

PROJECT NO:	SN0426	DRAWN BY:	L.S.C.
DESIGNED BY:	L.S.	CHECKED BY:	L.S.

DATE: NOVEMBER 2021

SCALE: AS NOTED
DWG. NO.: T02



Riverside Park

Speed River

LANDSCAPE PLAN
SCALE 1:250

NOTES

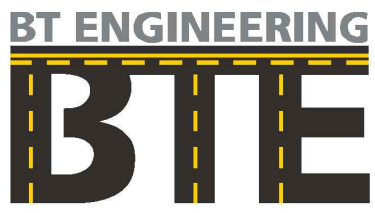
1. ALL SITE INFORMATION SHOWN COMPILED FROM EXISTING MAPS. ALL DIMENSIONS MUST BE VERIFIED ON SITE AND REPORT ALL DISCREPANCIES.
2. CONTRACTOR TO VERIFY LOCATION OF ALL SUBSURFACE SITE SERVICES PRIOR TO ANY EXCAVATION. CONTRACTOR TO REPAIR ALL DAMAGES AT NO COST TO OWNERS(S).
3. REINSTATE ALL AREAS DAMAGED BY CONTRACTOR OUTSIDE DESIGNATED WORK AREAS.
4. ALL GRADED AREAS TO RECEIVE 100 mm TOPSOIL AND HYDROSEED UNLESS OTHERWISE SPECIFIED.
5. ALL EARTH FILL TO BE COMPACTED TO 95% MAX. DRY DENSITY.
6. EXCAVATION FOR TREES/SHRUBS TO BE INCLUDED IN THE UNITY PRICE BID FOR SUPPLY AND INSTALLATION OF TREES/SHRUBS.
7. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.
8. PROTECT EXISTING TREES TO REMAIN.

LEGEND

- EXISTING TREES TO REMAIN
- TOPSOIL 300 mm AND SEED, INCLUDING ALL DISTURBED AREAS.
- WOODLAND PLANTINGS, REFER TO L-2
- SHRUB MASS PLANTINGS REFER TO L-2
- RIPARIAN LANDSCAPING SPEED RIVER SHORE LINE REFER TO L-2

1	ISSUED FOR 60% REVIEW	05/11/21

REVISIONS



SEI **SANCHEZ ENGINEERING INC.**

8440 Danforth Road
Cobourg, Ontario
Tel: 905-372-9594
Fax: 905-372-7812
sei.eng@sanchezengineering.ca
www.sanchezengeenring.ca

CITY OF CAMBRIDGE

SPEED RIVER

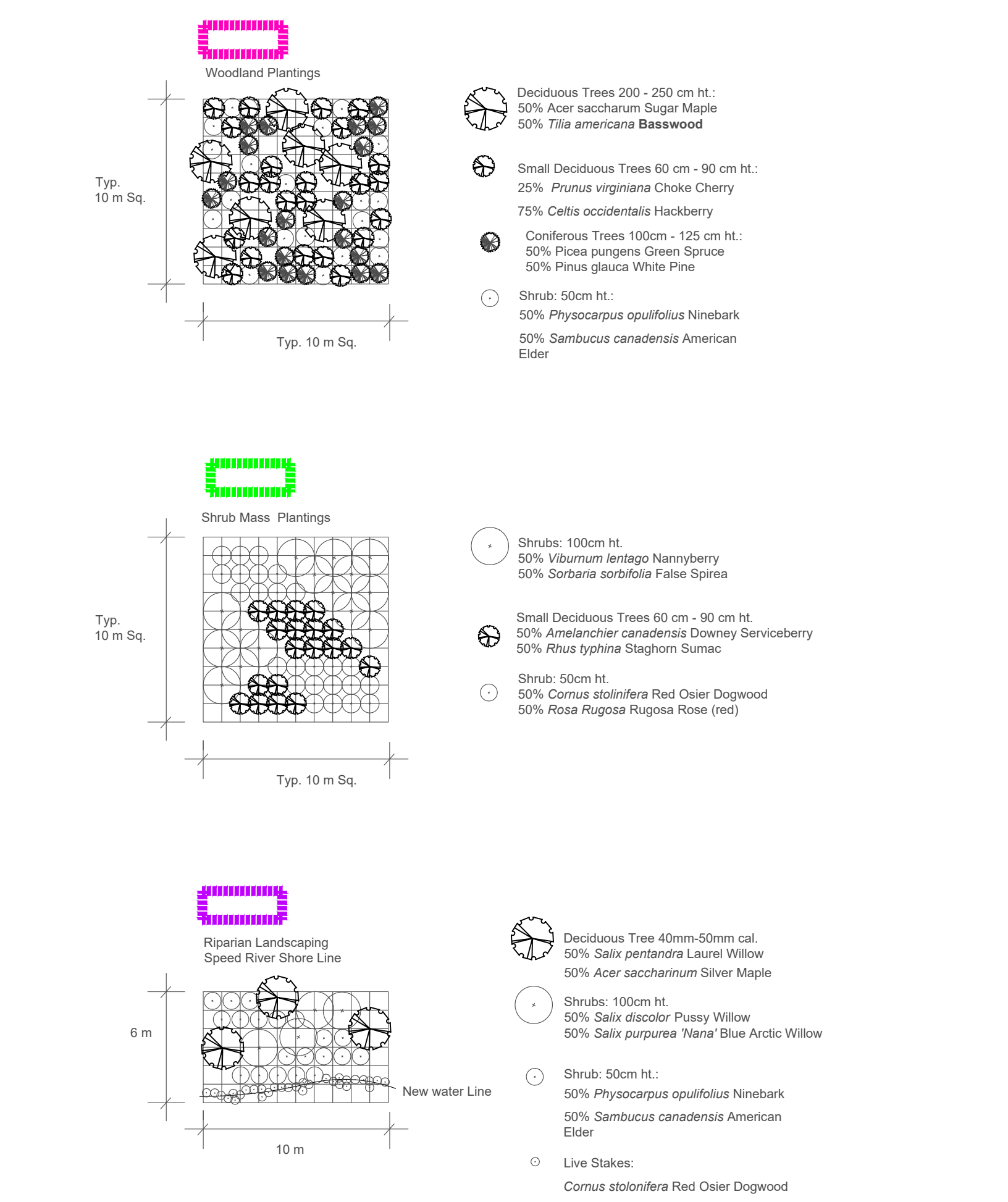
RIVERSIDE DAM
RECONSTRUCTION

DWG. TITLE LANDSCAPE PLAN

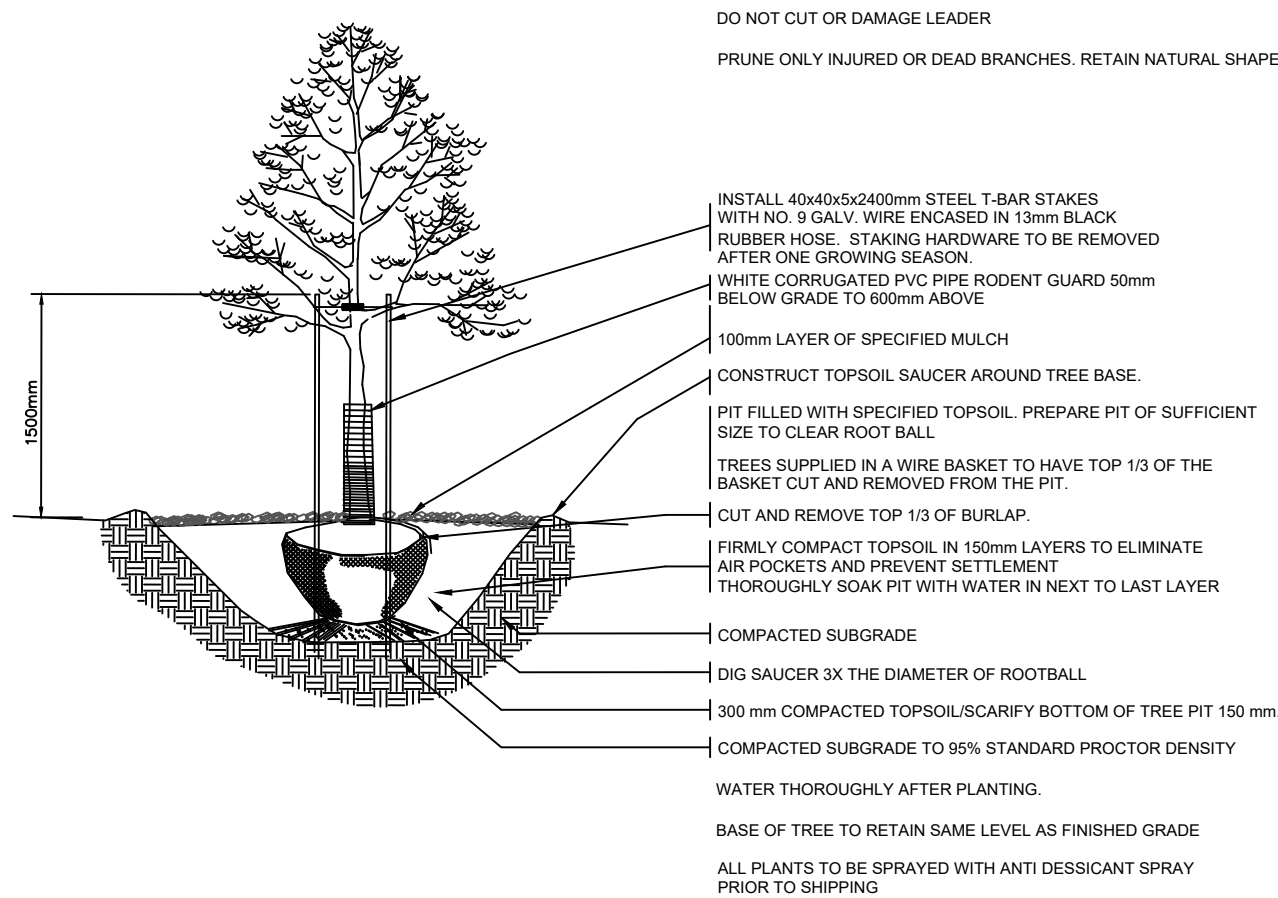
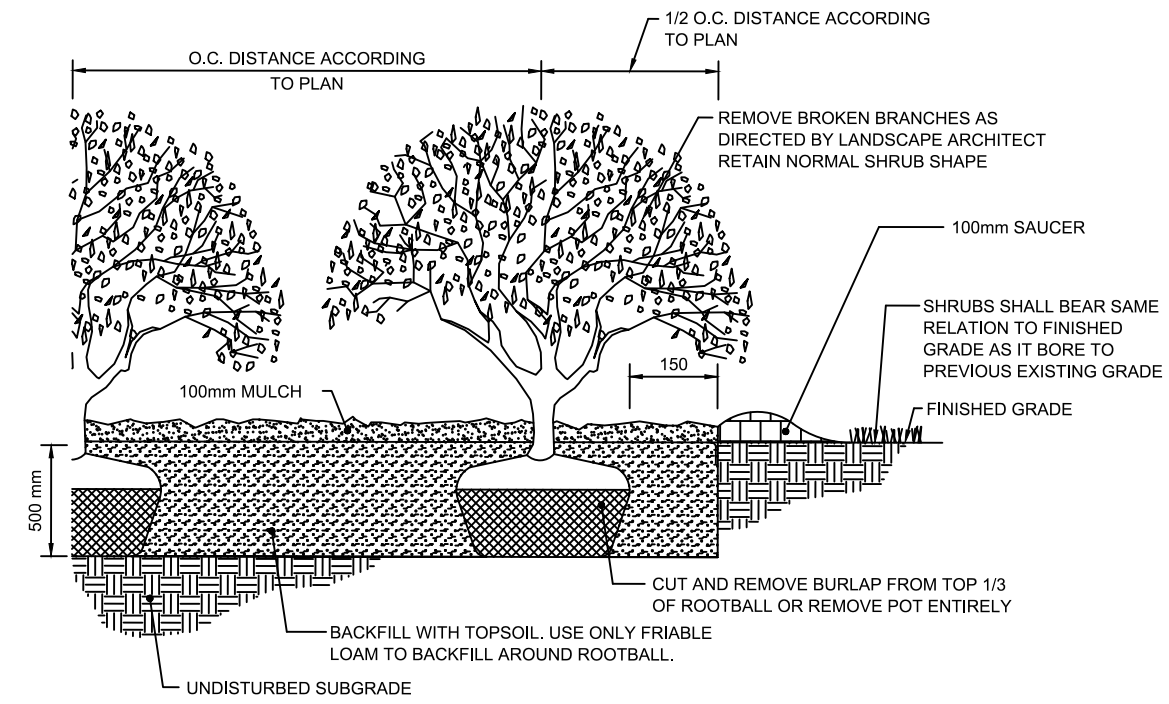
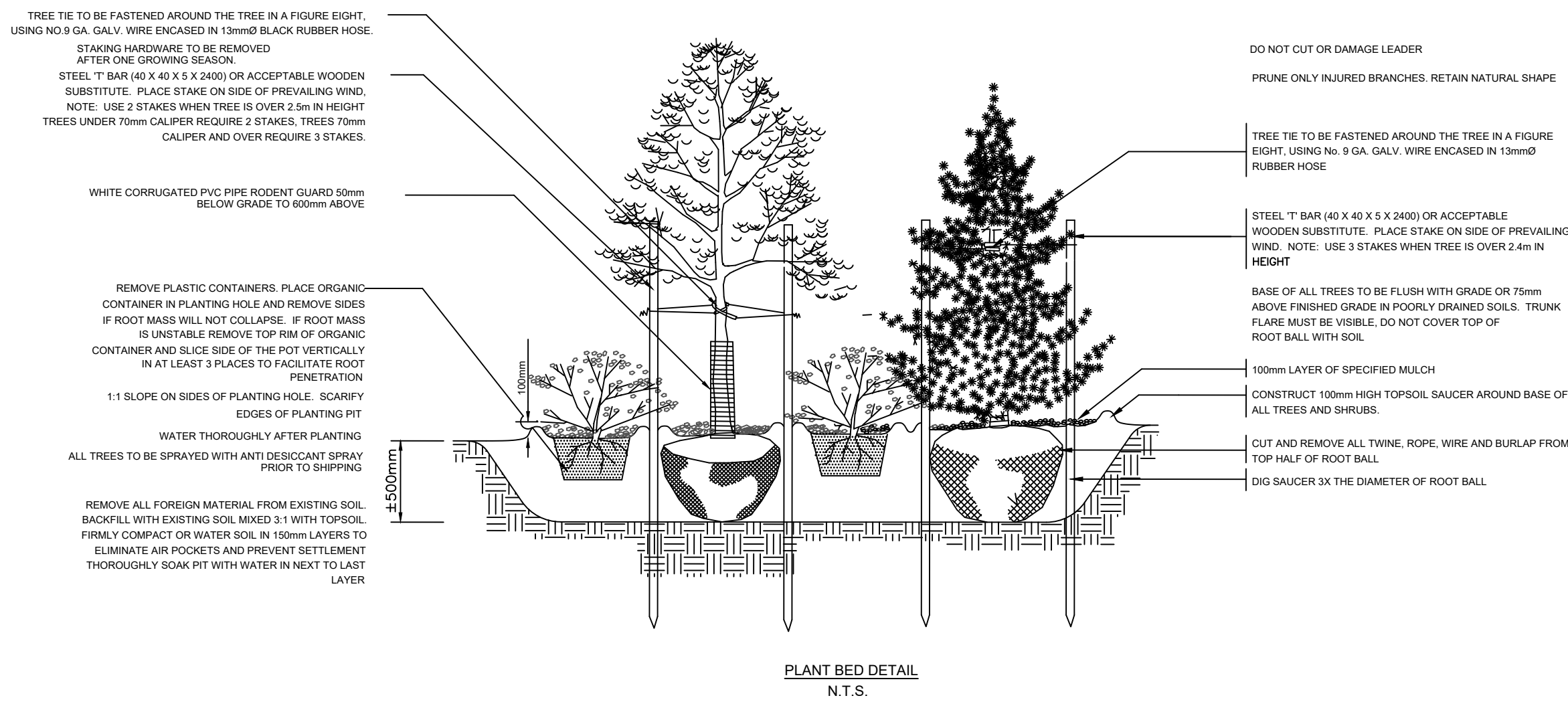
PROJECT NO:	SN0426	DRAWN BY:	L.S.C.
DESIGNED BY:	K.D.	CHECKED BY:	L.S.

DATE: NOVEMBER 2021

SCALE: 1:200 DWG. NO.: L-1



PLANT LIST					
CODE	NO.	LATIN NAME	COMMON NAME	SIZE	REMARKS
Woodland Plantings					
As	57	Acer saccharum	Sugar Maple	200 cm ht.	Potted
Ta	44	Tilia americana	Basswood	200 cm ht.	Potted
Pv	86	Prunus virginiana	Chokecherry	90 cm ht.	Potted
Co	244	Celtis occidentalis	Hackberry Micocoulier Occidental	70 cm ht.	Potted
Pp	143	Picea pungens	Green Spruce	125 cm ht.	Potted
Pg	143	Picea glauca	White Spruce	125 cm ht.	Potted
Po	143	Physocarpus opulifolius	Ninebark	50 cm ht.	Potted
Sc	143	Sambucus canadensis	American Elder	50 cm ht.	Potted
SHRUB MASS PLANTINGS					
Vi	39	Viburnum lentago	Nannyberry	100 cm ht.	Potted
Ss	44	Sorbaria sorbifolia	False Spirea	100 cm ht.	Potted
Ac	49	Amelanchier canadensis	Canadian Service Berry	90 cm ht.	Potted
Rt	51	Rhus typhina	Staghorn Sumac	90 cm ht.	Potted
Cs	72	Cornus stolonifera	Red Osier Dogwood	50 cm ht.	Potted
Rr	66	Rosa rugosa (red)	Rugosa rose	50 cm ht.	Potted
Riparian Plantings					
Sp	24	Salix pentandra	Laurel Willow	50 mm cal.	Balled and Burlapped
Ass	12	Acer saccharinum	Silver Maple	50 mm cal.	Balled and Burlapped
Sd	24	Salix discolor	Pussy Willow	100 cm ht.	Potted
Sp	24	Salix purpurea	Nana Blue Arctic Willow	100 cm ht.	Potted
Po	120	Physocarpus opulifolius	Ninebark	50 cm ht.	Potted
Sc	120	Sambucus canadensis	American Elder	50 cm ht.	Potted
Cs-2	371	Cornus stolonifera	Red Osier Dogwood	50 cm ht.	Live Stakes
Single Specimen Plantings					
As1	1	Acer saccharum	Sugar Maple	75 mm cal.	Balled and Burlapped
Ma	4	Malus spp.	Apple	50 mm cal.	Balled and Burlapped



- NOTES
- ALL SITE INFORMATION SHOWN COMPILED FROM EXISTING MAPS. ALL DIMENSIONS MUST BE VERIFIED ON SITE AND REPORT ALL DISCREPANCIES.
 - CONTRACTOR TO VERIFY LOCATION OF ALL SUBSURFACE SITE SERVICES PRIOR TO ANY EXCAVATION. CONTRACTOR TO REPAIR ALL DAMAGES AT NO COST TO OWNERS(S).
 - REINSTATE ALL AREAS DAMAGED BY CONTRACTOR OUTSIDE DESIGNATED WORK AREAS.
 - ALL GRADED AREAS TO RECEIVE 100 mm TOPSOIL AND HYDROSEED UNLESS OTHERWISE SPECIFIED.
 - ALL EARTH FILL TO BE COMPACTED TO 95% MAX. DRY DENSITY.
 - EXCAVATION FOR TREES/SHRUBS TO BE INCLUDED IN THE UNITY PRICE BID FOR SUPPLY AND INSTALLATION OF TREES/SHRUBS.
 - ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.
 - PROTECT EXISTING TREES TO REMAIN.

1	ISSUED FOR 60% REVIEW	05/11/21

REVISIONS



SEI, Sanchez Engineering Inc.

8440 Danforth Road
Cobourg, Ontario
Tel: 905-372-9594
Fax: 905-372-7812
sei.eng@sanchezengeenring.ca
www.sanchezengeenring.ca

CITY OF CAMBRIDGE

SPEED RIVER

RIVERSIDE DAM
RECONSTRUCTION

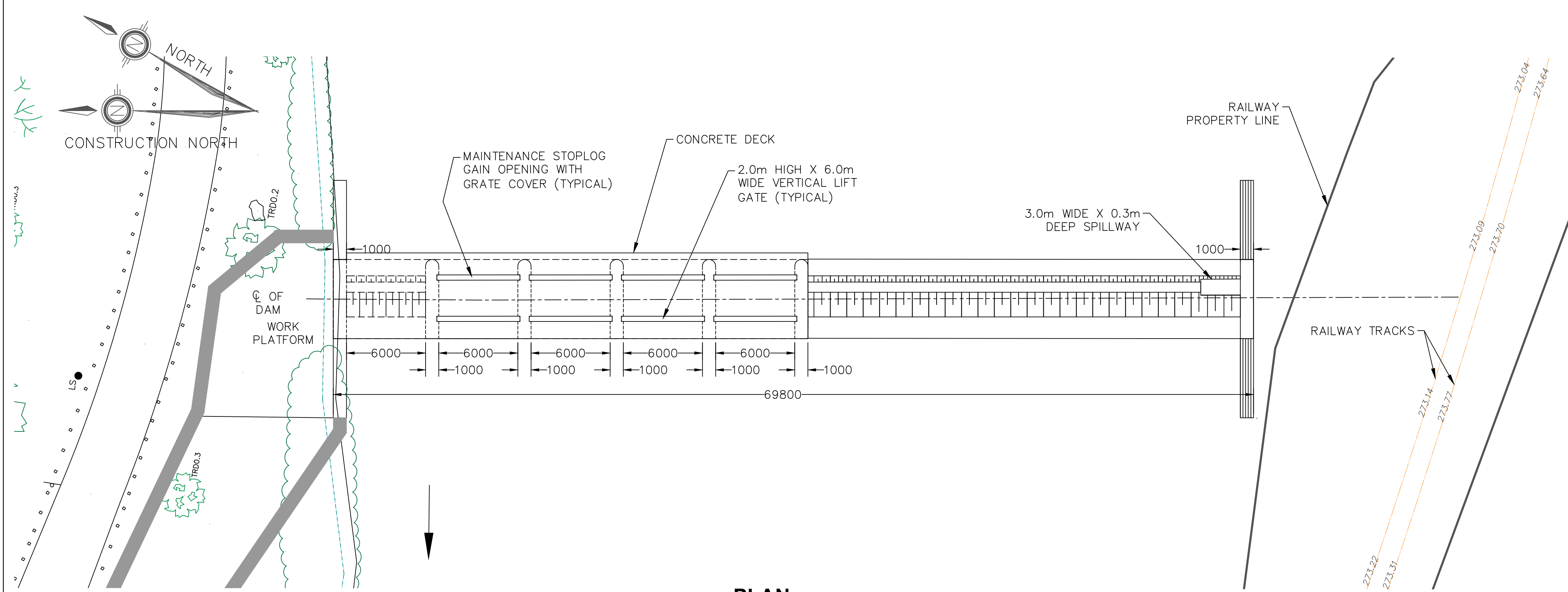
DWG. TITLE
PLANTING DETAILS

PROJECT NO:	SN0426	DRAWN BY:	L.S.C.
		DESIGNED BY:	K.D
		CHECKED BY:	L.S.

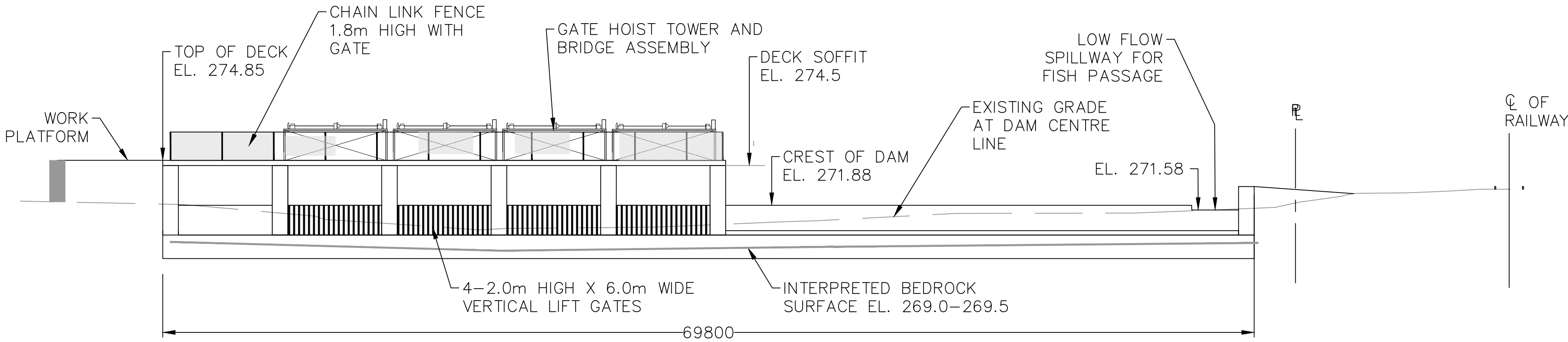
DATE:
NOVEMBER 2021

SCALE:
1:200

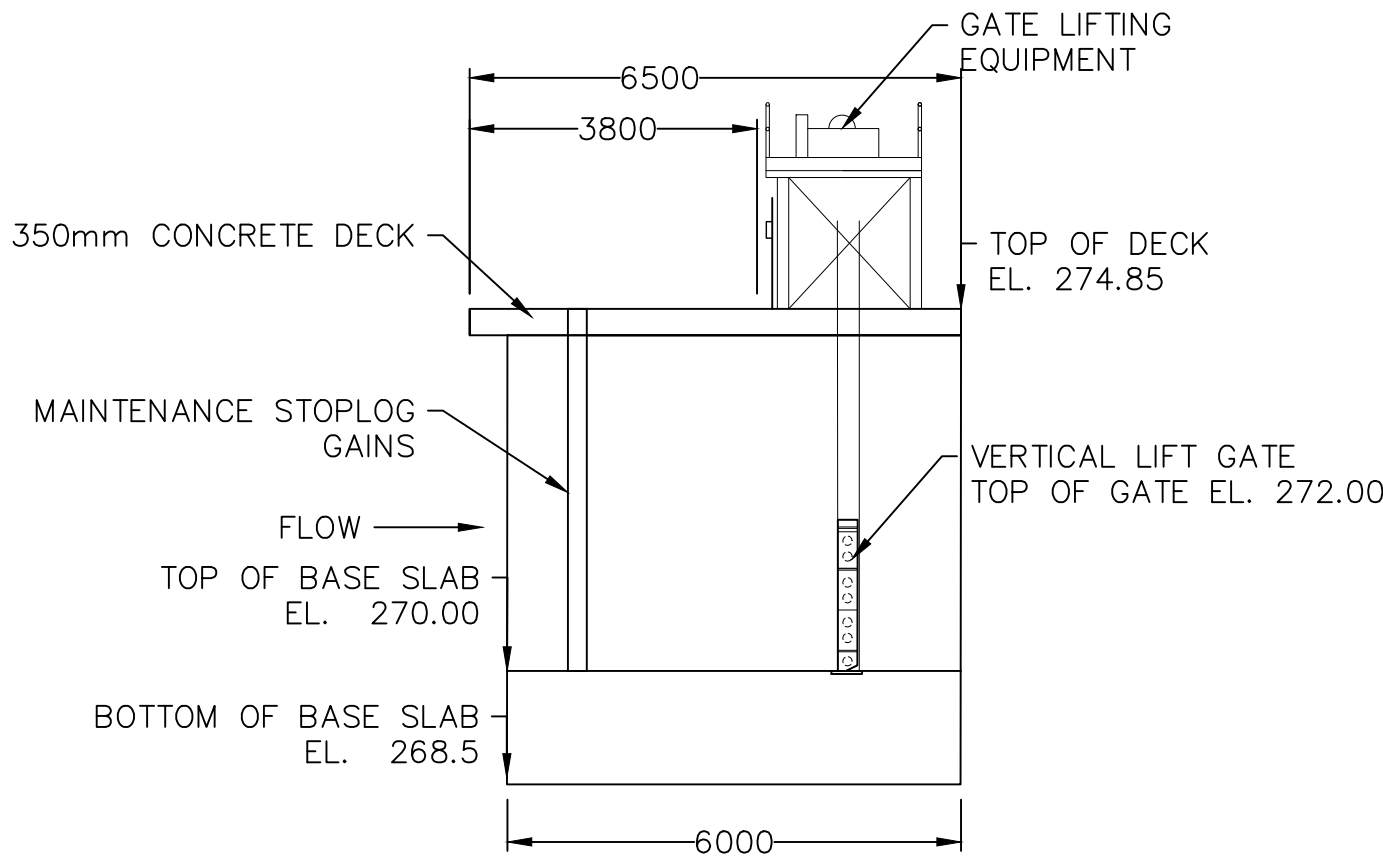
DWG. NO.:
L-2



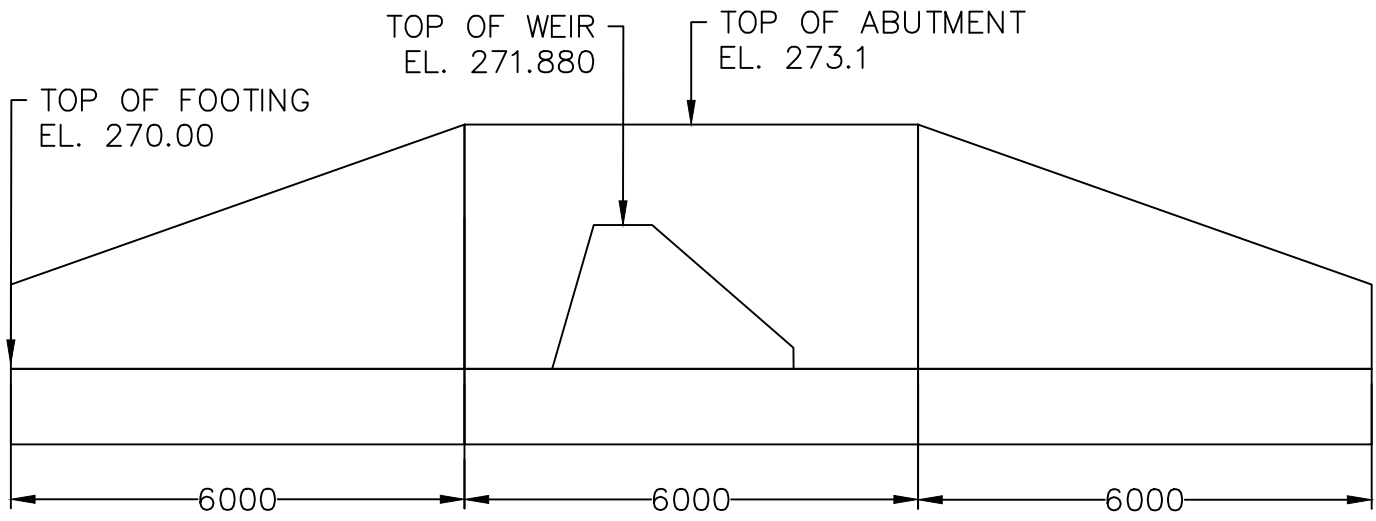
PLAN
SCALE 1:200



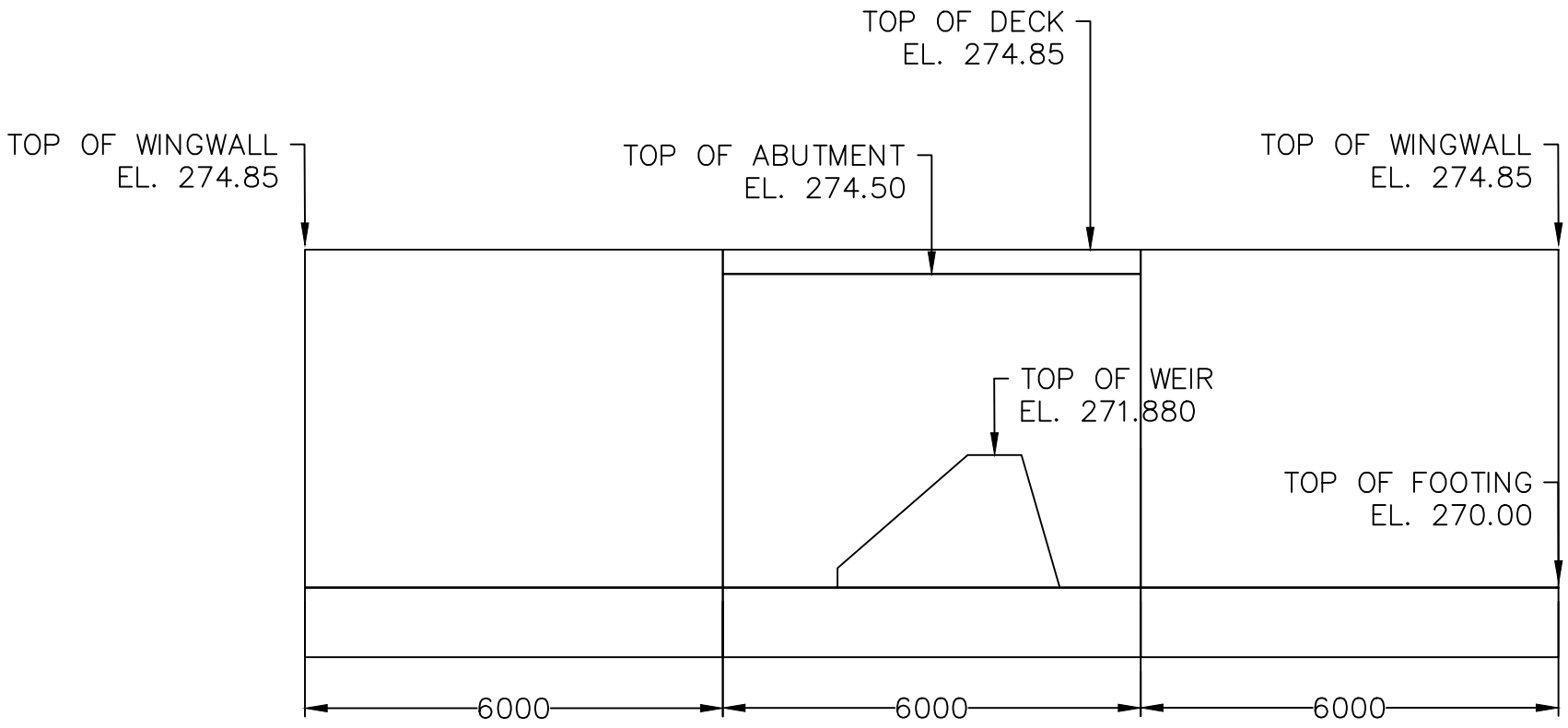
DOWNSTREAM ELEVATION
SCALE 1:200



SECTION THROUGH GATE SLUICE
SCALE 1:100



SOUTH ABUTMENT ELEVATION
SCALE 1:100



NORTH ABUTMENT ELEVATION
SCALE 1:100

GENERAL NOTES:

DIMENSIONS IN MILLIMETRES AND ELEVATIONS IN METRES
CONTRACTOR TO VERIFY ALL DIMENSIONS AND TO ALERT THE
ENGINEER OF ANY DISCREPANCIES.

REFER TO DRAWING G05 – SITE PLAN.

CLASS OF CONCRETE

ALL CONCRETE TO BE EXPOSURE CLASS C-1
COMPRESSIVE STRENGTH 35 MPa

CLEAR COVER TO REINFORCING STEEL

FOOTINGS 100 ± 15
DECK TOP 70 ± 10
DECK BOTTOM 50 ± 10
REMAINDER 70 ± 10 UNLESS OTHERWISE NOTED

REINFORCING STEEL

REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE
SPECIFIED.

UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES FOR BLACK OR
COATED REINFORCING STEEL BARS SHALL BE CLASS B.
STAINLESS REINFORCING STEEL SHALL BE TYPE 316LN, DUPLEX 2205
OR XM-28 AND HAVE A MINIMUM YIELD STRENGTH OF 500 MPa,
UNLESS OTHERWISE SPECIFIED.

BAR MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.

BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING
MINIMUM BEND DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE
MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE
WITH THE STRUCTURAL STANDARD DRAWINGS SS12-1 AND SS12-2,
UNLESS INDICATED OTHERWISE.

CONSTRUCTION NOTES

BACKFILL SHALL NOT BE PLACED BEHIND THE ABUTMENTS UNTIL THE
CONCRETE HAS REACHED 70% OF ITS DESIGN STRENGTH.

NO CONSTRUCTION EQUIPMENT WILL BE PERMITTED ON THE
MAINTENANCE ACCESS RAMP UNTIL THE DECK CONCRETE HAS
ATTAINED 70% OF ITS DESIGN STRENGTH.

TEMPORARY BENCHMARK

TBM

TOP OF NORTH CONCRETE WINGWALL ON BY-PASS
STRUCTURE.
ELEVATION = 273.421 m
NORTHING = 4805455.981
EASTING = 551365.231

REVISIONS

SE, Sanchez Engineering Inc.

8440 Danforth Road
Cobourg, Ontario
Tel: 905-372-9594
Fax: 905-372-7812
sei.eng@sanchezengineering.ca
www.sanchezengineering.ca

CITY OF CAMBRIDGE

SPEED RIVER

RIVERSIDE DAM
RECONSTRUCTION

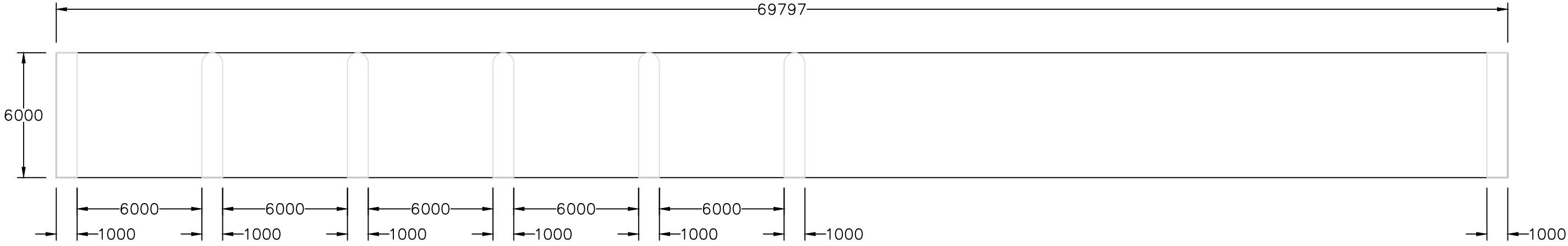
DWG. TITLE GENERAL
ARRANGEMENT

PROJECT NO: SN0426
DRAWN BY: L.S.C.
DESIGNED BY: L.S.
CHECKED BY: L.S.

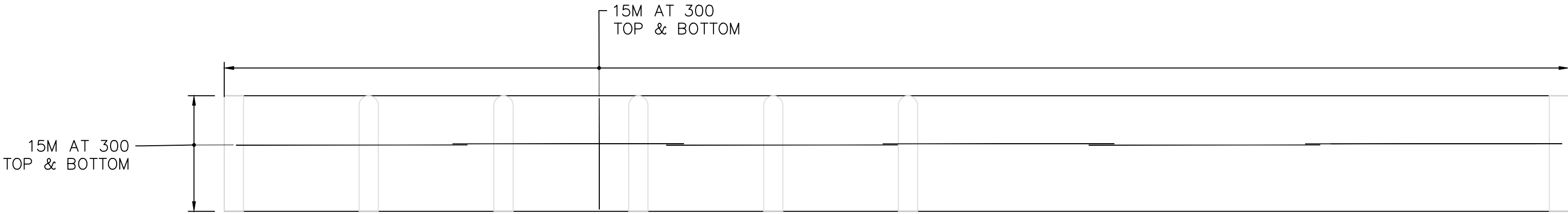
DATE: OCTOBER 2021

SCALE: AS SHOWN

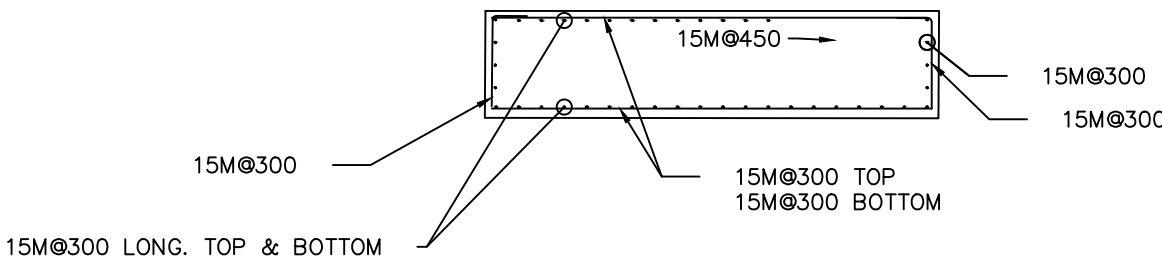
DWG. NO.: D01



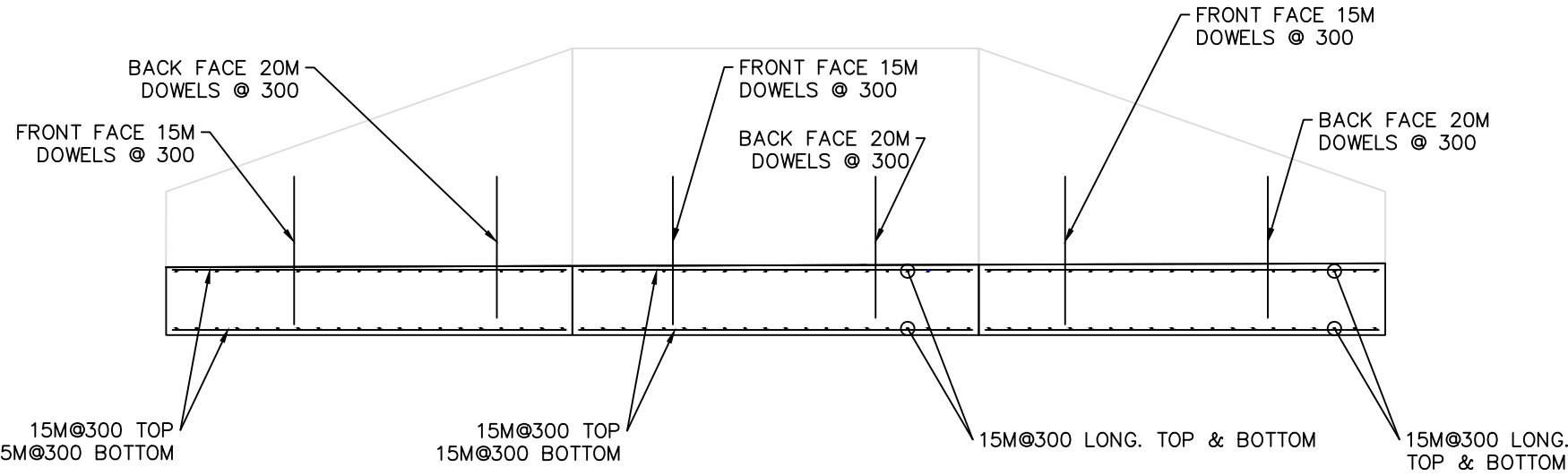
PLAN - DIMENSIONS
SCALE 1:200



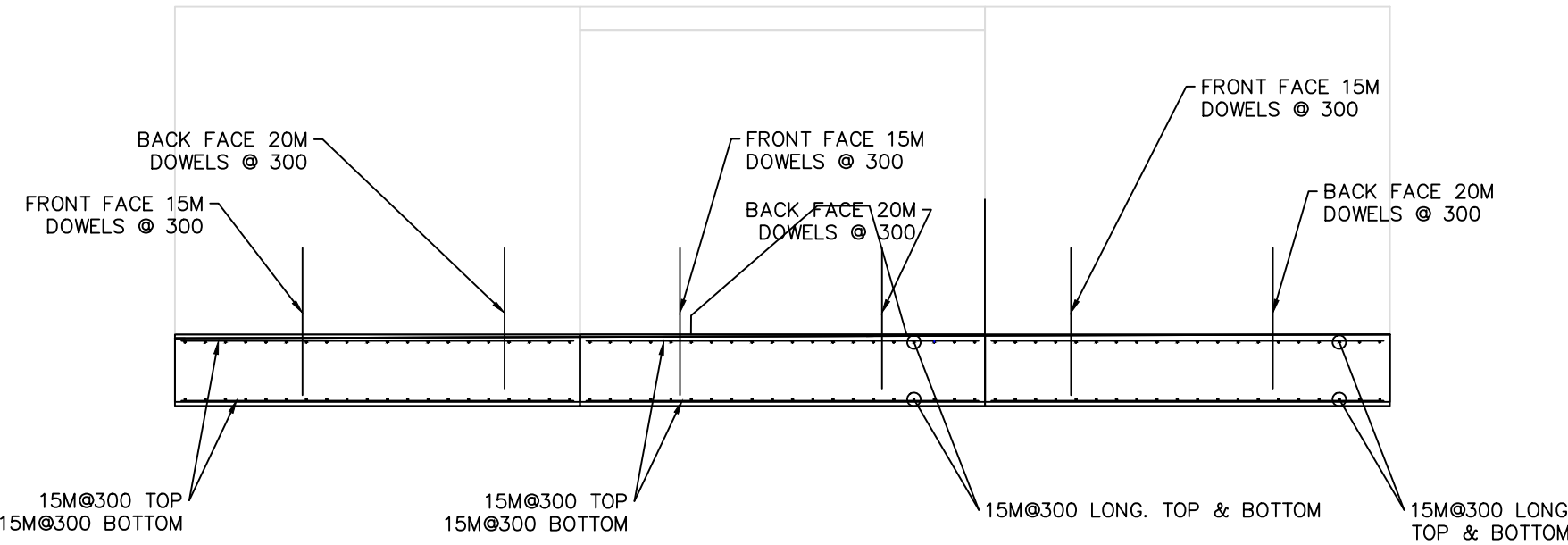
PLAN - REINFORCEMENT
SCALE 1:200



SECTION OF BASE SLAB
SCALE 1:100



SOUTH ABUTMENT FOUNDATIONS
SCALE 1:100



NORTH ABUTMENT FOUNDATIONS
SCALE 1:100

GENERAL NOTES:

DIMENSIONS IN MILLIMETRES AND ELEVATIONS IN METRES
CONTRACTOR TO VERIFY ALL DIMENSIONS AND TO ALERT THE
ENGINEER OF ANY DISCREPANCIES.

CLASS OF CONCRETE

ALL CONCRETE TO BE EXPOSURE CLASS C-1
COMPRESSIVE STRENGTH 35 MPa

CLEAR COVER TO REINFORCING STEEL

FOOTINGS 100 ± 25
DECK TOP 70 ± 20
DECK BOTTOM 50 ± 10
REMAINDER 70 ± 20 UNLESS OTHERWISE NOTED

REINFORCING STEEL

REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE
SPECIFIED.

UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES FOR BLACK OR
COATED REINFORCING STEEL BARS SHALL BE CLASS B.

STAINLESS REINFORCING STEEL SHALL BE TYPE 316LN, DUPLEX 2205
OR XM-28 AND HAVE A MINIMUM YIELD STRENGTH OF 500 MPa,
UNLESS OTHERWISE SPECIFIED.
BAR MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.

BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING
MINIMUM BEND DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE
MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE
WITH THE STRUCTURAL STANDARD DRAWINGS SS12-1 AND SS12-2,
UNLESS INDICATED OTHERWISE.

CONSTRUCTION NOTES

BACKFILL SHALL NOT BE PLACED BEHIND THE ABUTMENTS UNTIL THE
CONCRETE HAS REACHED 70% OF ITS DESIGN STRENGTH.

NO CONSTRUCTION EQUIPMENT WILL BE PERMITTED ON THE
MAINTENANCE ACCESS RAMP UNTIL THE DECK CONCRETE HAS
ATTAINED 70% OF ITS DESIGN STRENGTH.

TEMPORARY BENCHMARK

TBM
TOP OF NORTH CONCRETE WINGWALL ON BY-PASS
STRUCTURE.
ELEVATION = 273.421 m
NORTHING = 4805455.981
EASTING = 551365.231

REVISIONS

SEI, Sanchez Engineering Inc.

8440 Danforth Road
Cobourg, Ontario
Tel: 905-372-9594
Fax: 905-372-7812
sei.eng@sanchezengineering.ca
www.sanchezengineering.ca

CITY OF CAMBRIDGE

SPEED RIVER

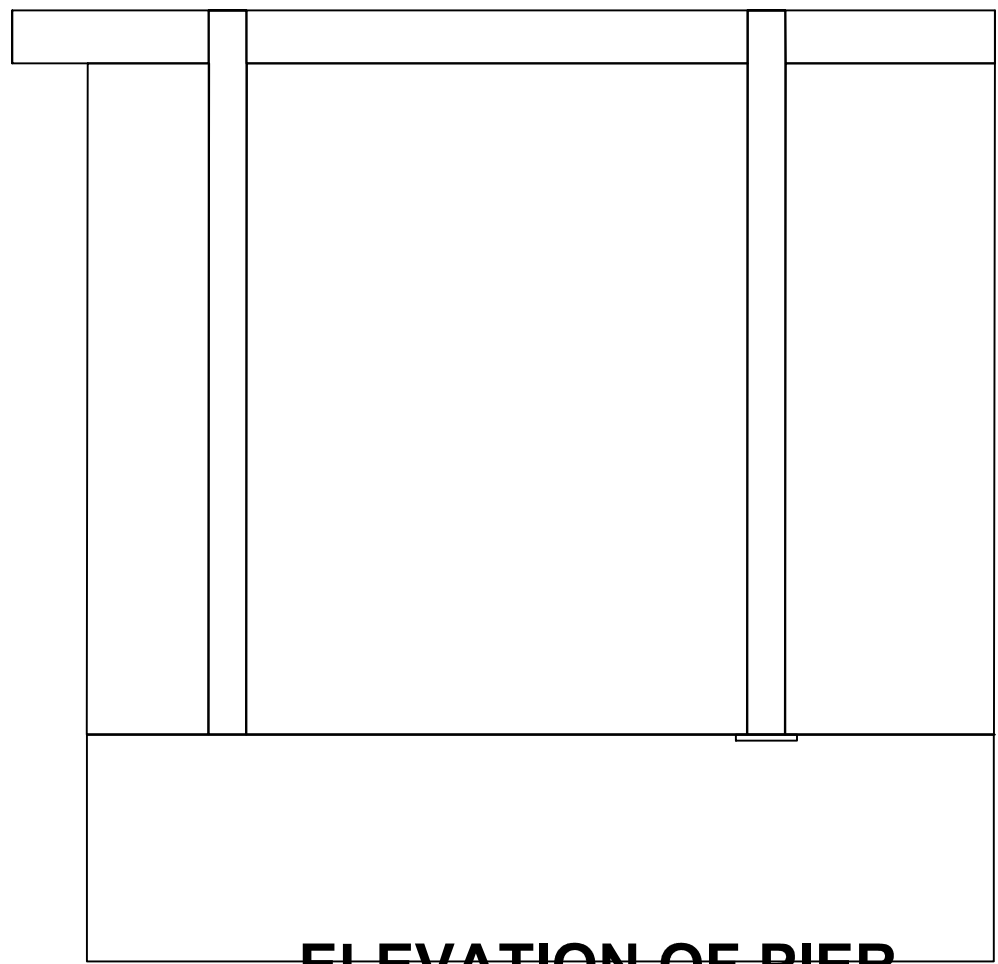
RIVERSIDE DAM
RECONSTRUCTION

DWG. TITLE
FOUNDATIONS

PROJECT NO:	SN0426	DRAWN BY:	L.S.C.
		DESIGNED BY:	L.S.
		CHECKED BY:	L.S.

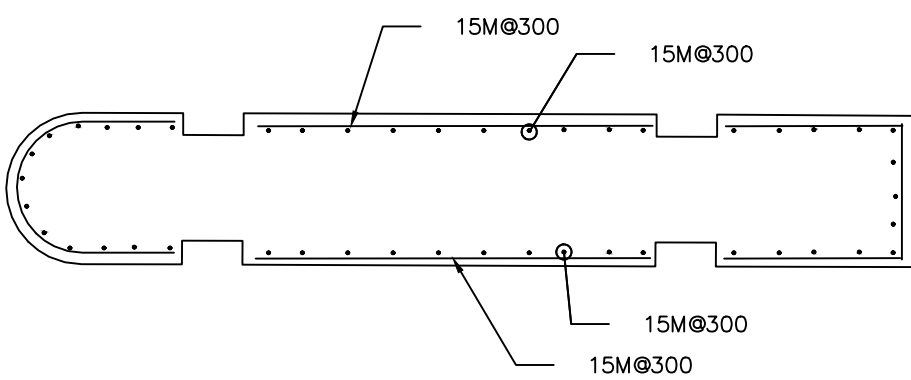
DATE: OCTOBER 2021

SCALE:	DWG. NO.:
AS SHOWN	D02



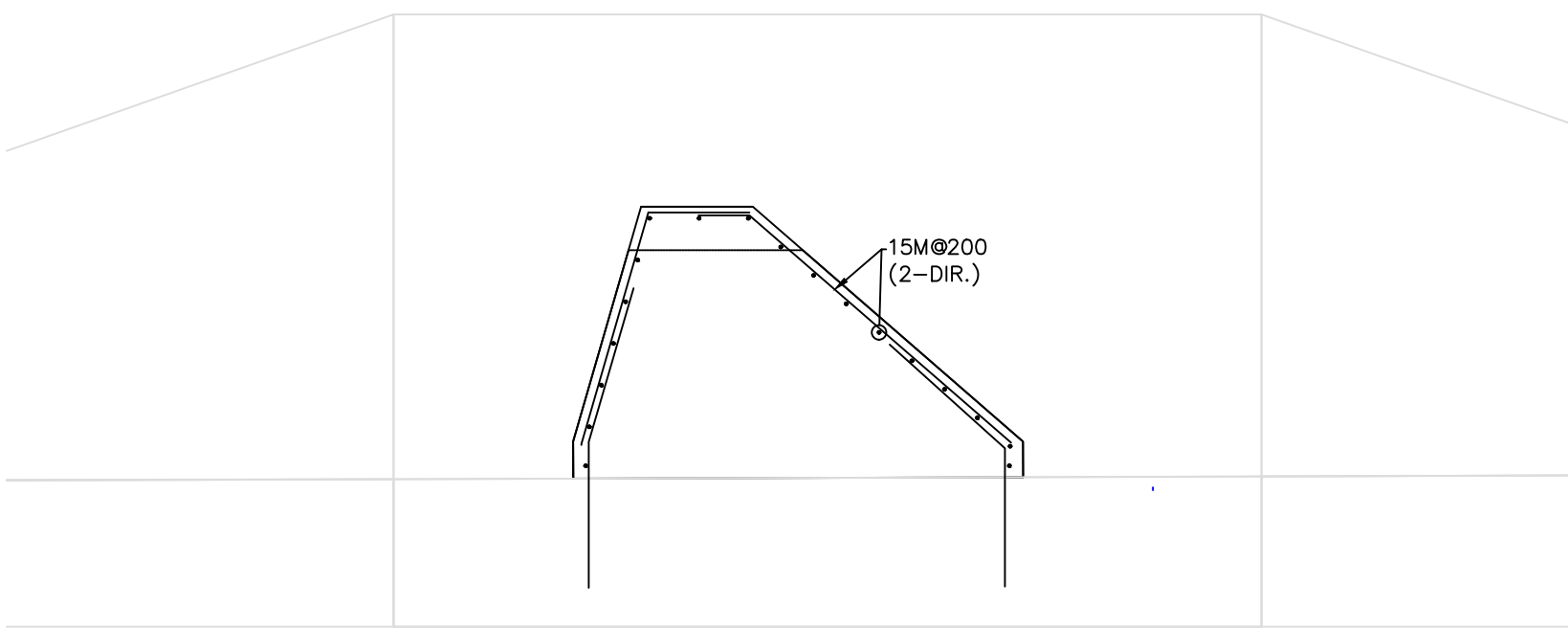
ELEVATION OF PIER

SCALE 1:50



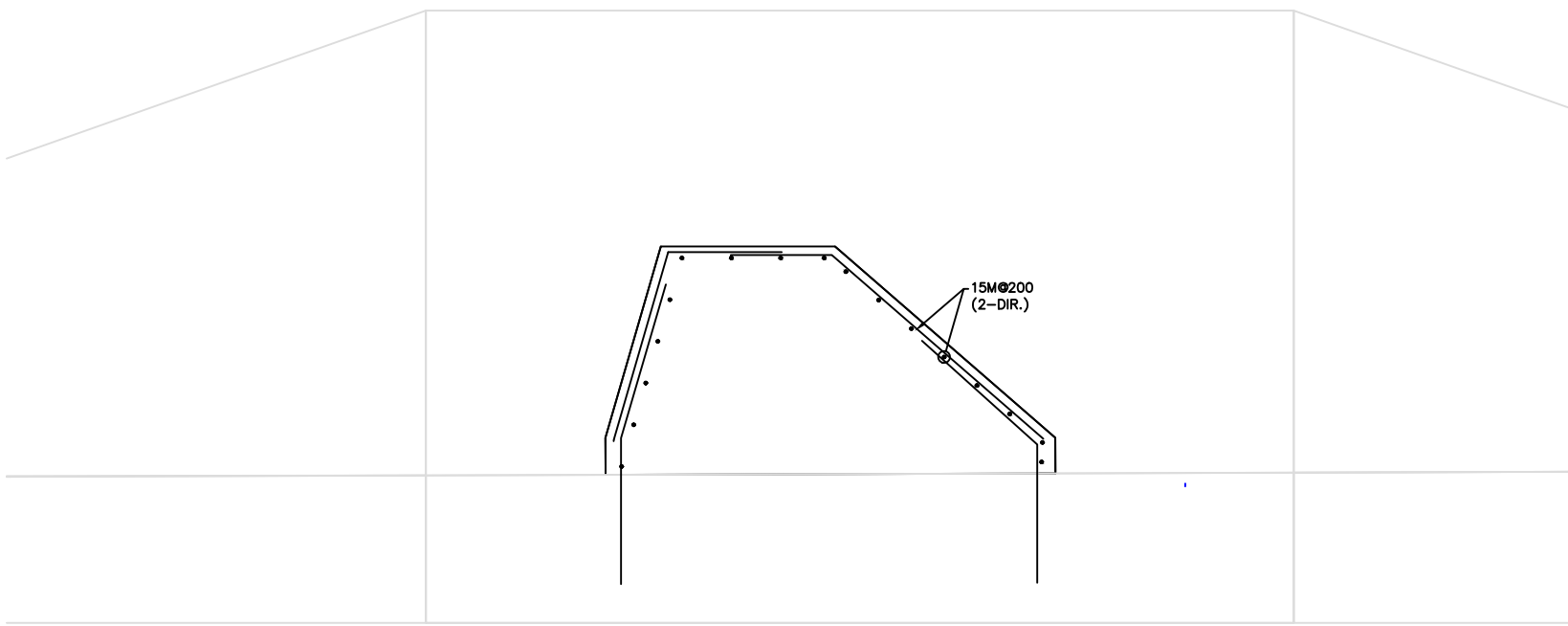
PLAN OF PIER

SCALE 1:50



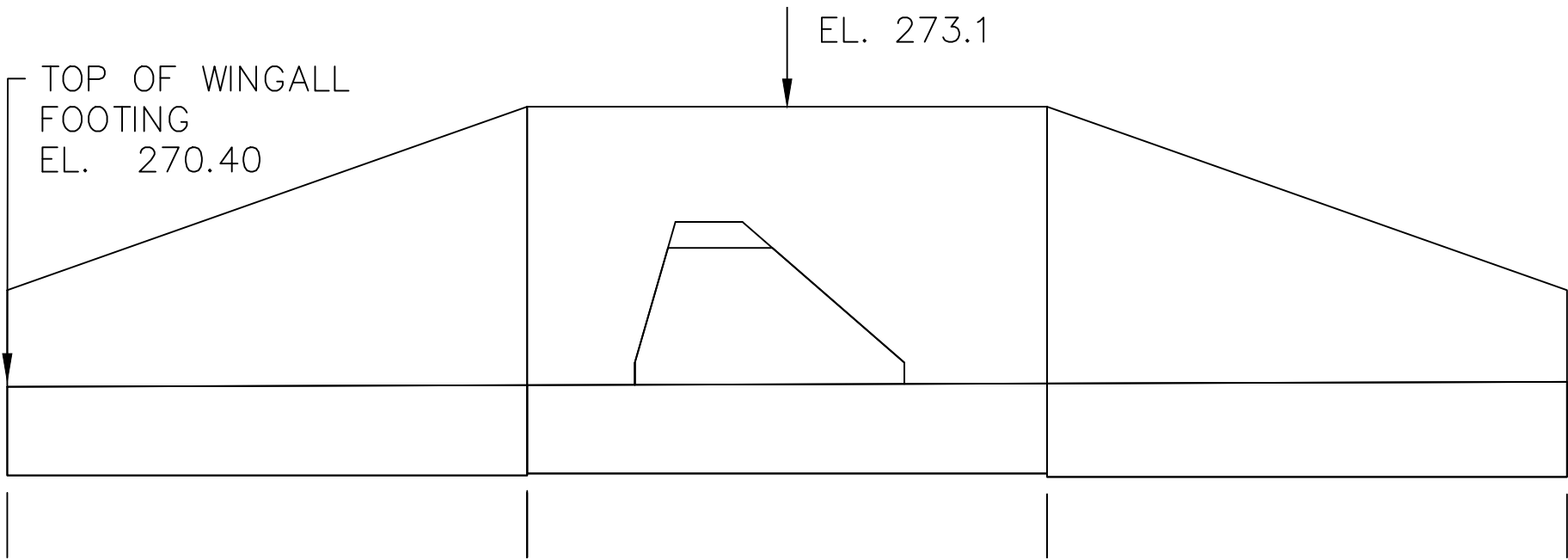
SECTION THROUGH WEIR

SCALE 1:50



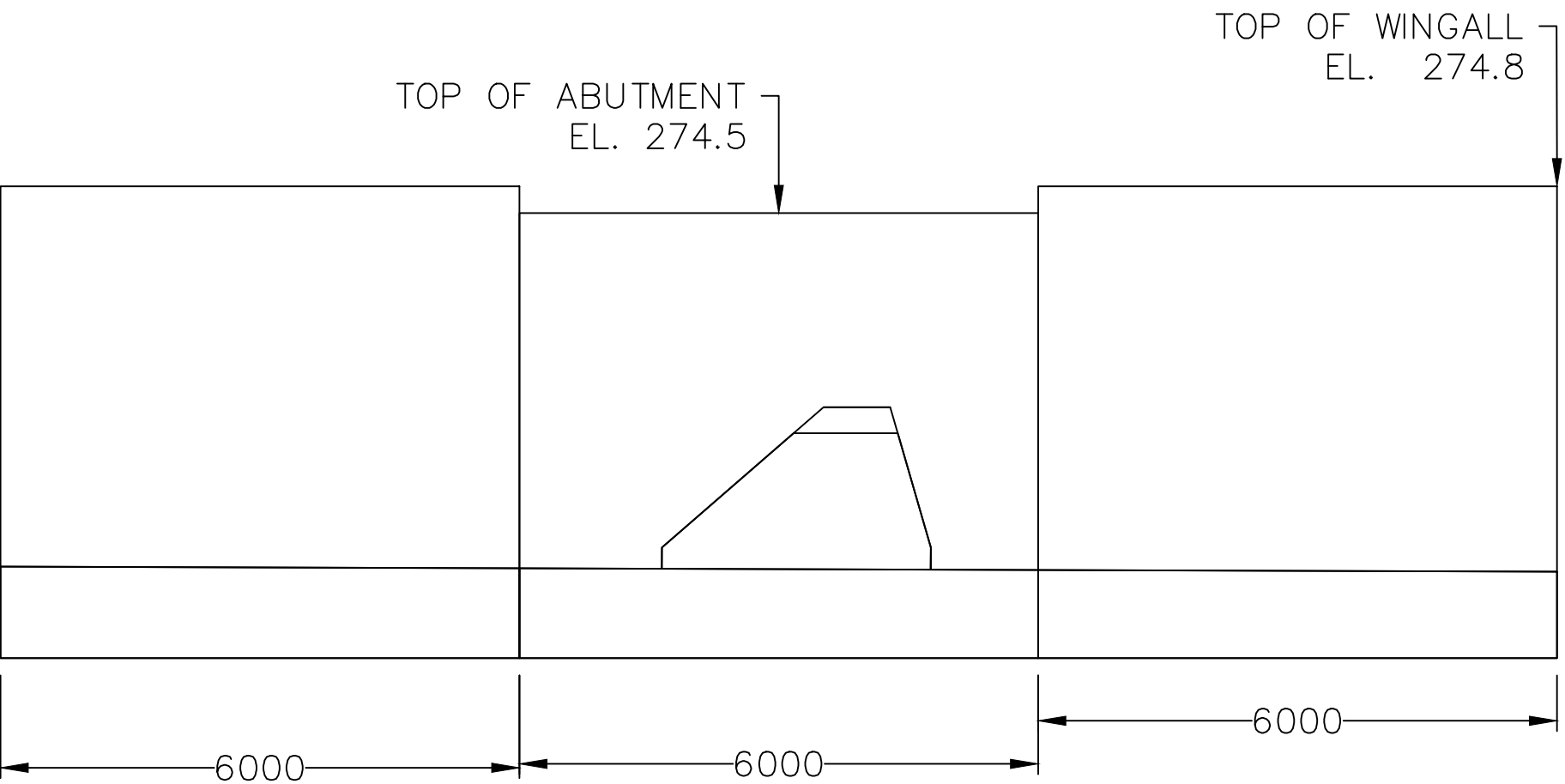
SECTION THROUGH FISH PASSAGE

SCALE 1:50



SOUTH ABUTMENT AND WINGWALLS

SCALE 1:75



NORTH ABUTMENT AND WINGWALLS

SCALE 1:75

TEMPORARY BENCHMARK

TBM

TOP OF NORTH CONCRETE WINGWALL ON BY-PASS STRUCTURE.
ELEVATION = 273.421 m
NORTHING = 4805455.981
EASTING = 551365.231

REVISIONS

SE Sanchez Engineering Inc.

8440 Danforth Road
Cobourg, Ontario
Tel: 905-372-9594
Fax: 905-372-7812
sei.eng@sanchezengineering.ca
www.sanchezengineering.ca

CITY OF CAMBRIDGE

SPEED RIVER

RIVERSIDE DAM
RECONSTRUCTION

DWG. TITLE

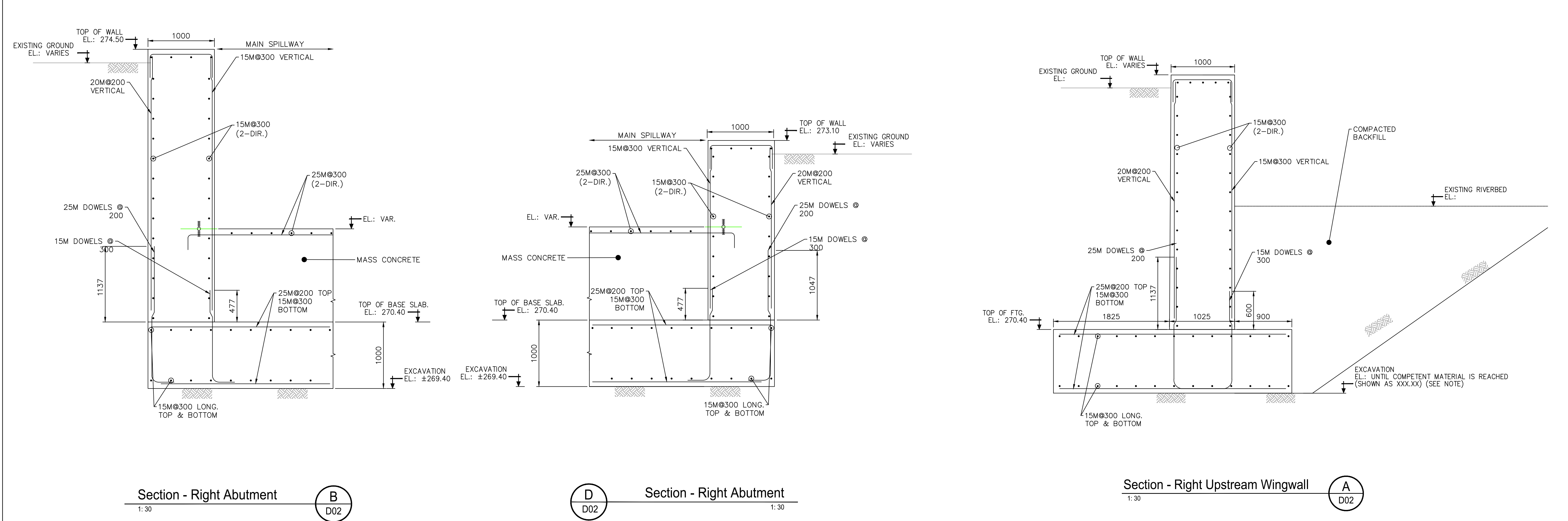
PIERS & WEIR

PROJECT NO:	SN0426	DRAWN BY:	L.S.C.
		DESIGNED BY:	L.S.
		CHECKED BY:	L.S.

DATE: OCTOBER 2021

SCALE: AS SHOWN

DWG. NO.: D03



TEMPORARY BENCHMARK

TBM
TOP OF NORTH CONCRETE WINGWALL ON BY-PASS STRUCTURE.
ELEVATION = 273.421 m
NORTHING = 4805455.981
EASTING = 551365.231

REVISIONS

SEI Sanchez Engineering Inc.

8440 Danforth Road
Cobourg, Ontario
Tel: 905-372-9594
Fax: 905-372-7812
sei.eng@sanchezengineering.ca
www.sanchezengineering.ca

CITY OF CAMBRIDGE

SPEED RIVER

RIVERSIDE DAM
RECONSTRUCTION

DWG. TITLE ABUTMENTS & WINGWALLS

PROJECT NO: SN0426
DRAWN BY: L.S.C.
DESIGNED BY: L.S.
CHECKED BY: L.S.

DATE: OCTOBER 2021

SCALE: AS SHOWN
DWG. NO.: **D04**