LeBreton Library Parcel

Constructability Report

April 2022 | TYLin Ref. 10399

Dream Asset Management

dream | TYLin

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APPENDICES

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1 INTRODUCTION

TYLin has been retained by Dream Asset Management to compile a Constructability Report for the proposed redevelopment of the LeBreton Library Parcel, located at 665 Albert Street, Ottawa, Ontario ("the site").

The intent of this report is to consolidate project information relevant to protection of existing buried City infrastructure in the vicinity of the site – and to document the proposals in place for the necessary protection of this infrastructure through the construction and operation of the redeveloped site.

The report should be read in conjunction with supporting Site Plan Application materials – including, but not limited to the Geotechnical Investigation Report, Site Servicing/Grading drawing package, as well as the Architectural and Landscape Architecture drawing sets.

1.1 Existing Infrastructure

In existing conditions, the site generally consists of hard-packed gravel areas used for vehicular access – understood to remain from its previous use as a construction staging area for the City's Stage 1 Light Rail Transit (OLRT) project. The site is predominantly flat but slopes down relatively steeply along the northern edge to the elevation of the OLRT tracks.

The key pieces of City infrastructure in the vicinity of the project site are:

- 2400 mm internal diameter concrete sewer pipe ("EWT", East-West Tunnel), which crosses the northwest corner of the site and connects the diversion chamber within Booth Street to the Combined Sewer Storage Tunnel (CSST) east of the site.
  - As per City as-built drawings provided (and through reference to the City's GeoOttawa online portal data) the invert elevation of this pipe at the western edge of the site is approximately 45.7 m (and it drops at around 0.25% as it runs east).
- 1800 mm internal diameter concrete Interceptor Outfall Sewer (IOS) trunk sanitary sewer, which crosses the northwest corner of the site.
  - With reference to the City's GeoOttawa online portal data, the invert elevation of this IOS pipe at the western edge of the site is approximately 44.8 m (and it drops as it runs east).
- 3000 mm internal diameter concrete storm sewer pipe, which crosses the northwest corner of the site before turning north and passing below the OLRT tracks.
  - As per City as-built drawings provided (and through reference to GeoOttawa) the invert elevation of this pipe at the western edge of the site is approximately 46.7 m

(and it drops at around 0.25% as it runs east).

- 1220 mm internal diameter steel high pressure water main (HPWM) running east-west with Albert Street, to the south of the site.

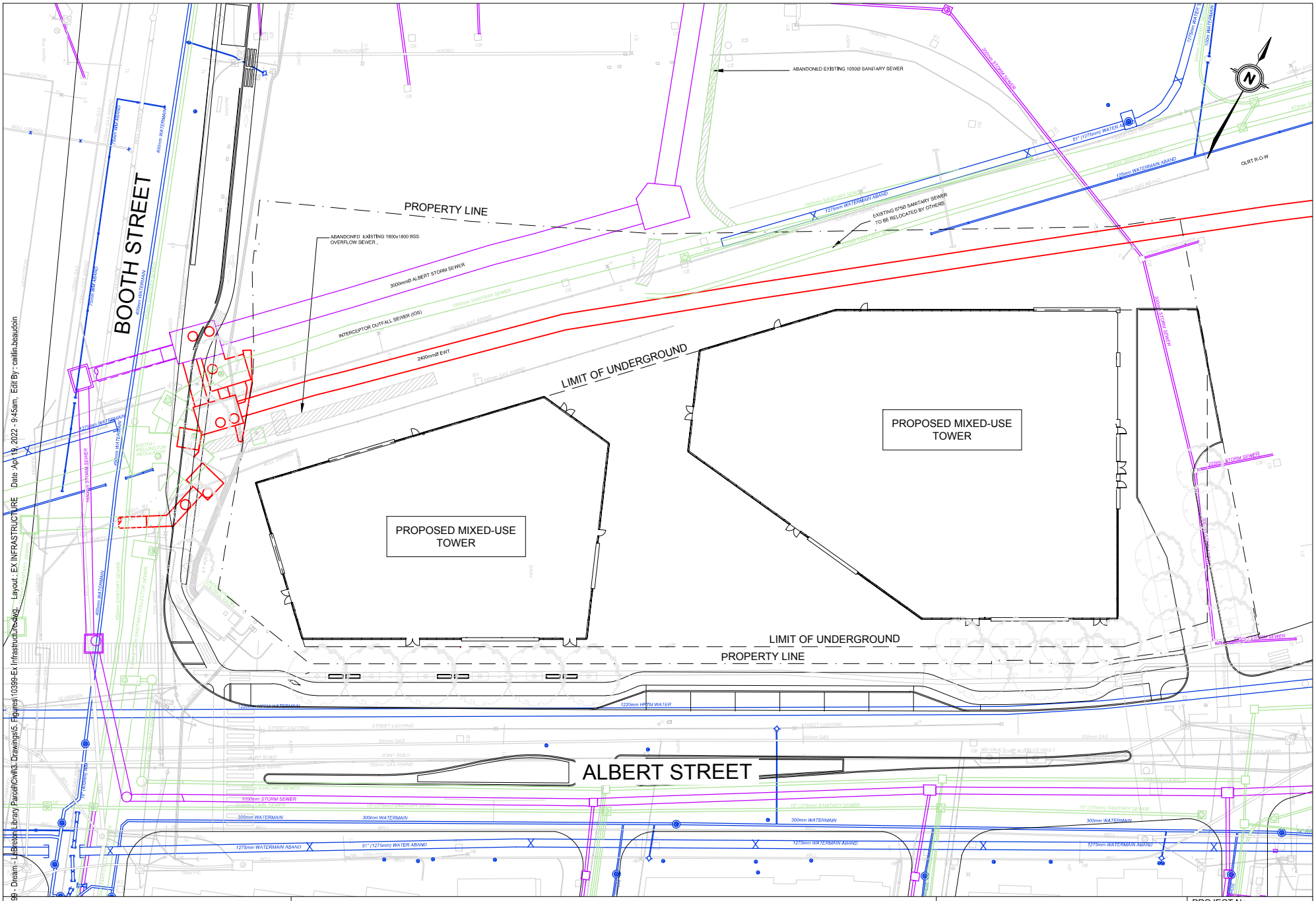
Please refer to **Figure 1-1** for illustration of the existing infrastructure described above, relative to proposed site plan development.

1.2 Existing Geotechnical Conditions

Golder Associates Ltd. completed a Geotechnical Investigation for the site (Golder Report Ref. 22511882, dated April 2022). The report describes the results of fieldwork investigations undertaken on site – including 6 no. boreholes (BHs) previously completed by Golder as part of a previous assignment on the project site in 2011, supplemented by an additional 5 no. BH locations advanced in February 2022.

The study documents a subsurface stratigraphy within the project area of surficial fill materials overlying glacial till, which in turn overlies limestone and shale bedrock.

- **Fill Material** was encountered in each of the boreholes from ground surface (to depths ranging from 2.1 to 3.7 m below the existing surface) – generally heterogeneous in nature ranging from silty sand to sand. The fill also contained gravel, brick fragments, concrete and mortar fragments, glass, wood and layers of organic material and clay – as well cobbles and boulders encountered during drilling. Testing indicated that the fill has a highly variable very loose to very dense state of packing.
- **Glacial Till** deposits were encountered beneath the fill material at all boreholes, typically consisting of a heterogeneous mixture of gravel, cobbles, and boulders in a matrix of sand and silt with a trace to some clay. The 2011 boreholes did not fully penetrate the till layer, however the five boreholes drilled during the 2022 investigation were all extended through the till and into the underlying bedrock, confirming the till extended to depths of 11.2 to 14.7 m below existing ground. Standard penetration testing indicated that the majority of the till has a dense to very dense state of packing.
- **Bedrock**: The 2011 boreholes were all terminated at refusal at depths of 4.2 m to 10.0 m below existing surface, however it is considered unlikely that these refusals were the result of encountering bedrock. The 2022 boreholes were extended through the glacial till deposit into the underlying bedrock and provided elevations of between 48.2 m and 50.5 m (masl) for bedrock elevation. The bedrock consists of limestone with shale interbeds of the Verulam formation.
- **Groundwater** levels have been measured (February 2022) at elevations ranging from 48.7 m to 55.1 m (masl), although it is noted that these elevations will vary seasonally.



File : G:\Projects\2022\10399 - Dream - LeBreton Library Parcel\Civil\3. Drawings\5. Figures\10399-Ex Infrastructure.dwg Layout : EX INFRASTRUCTURE Date: Apr 19, 2022 - 9:45am, Edit By: caitlin.beaudoin

TYLin

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f: 905.738.0065

EXISTING CITY INFRASTRUCTURE

665 ALBERT STREET

DREAM ASSET MANAGEMENT

SCALE:	1:750
DATE:	APRIL 2022
DESIGNED BY:	n/a
CHECKED BY:	C.B.

PROJECT No.
10399

FIGURE No.
1-1

2 PROPOSED SITE DEVELOPMENT

The proposed site development consists of two towers over low-rise podium structures, with a single two-level basement structure extending over the footprint of both towers. Vehicular access to the site will be via an extension of Empress Avenue at the eastern edge of the site (north off Albert Street) and into the basement via a ramp in the north-east corner of the structure. The current architectural design proposals have set the finished elevation of the P2 basement level 8.7 m below finished ground floor of the new structure (at 54.0 m).

The majority of the ground-level space outside the new buildings will be non-vehicular public realm. A new retaining wall structure will address the grade change between plaza level (which is continuous with Booth Street) and the new multi-use pathway (MUP) running east-west alongside the OLRT line (and passing below Booth Street) along the north edge of the site.

The podiums will contain a variety of commercial and community uses at lower levels, before a shared terrace area marks the transition to the residential apartments in the towers. The residential component will include a high proportion of affordable housing units.

Please refer to the associated Architectural drawing set (Perkins & Will and KPMB) for full details of the proposed development, and the Landscape Architectural set (PFS) for at-grade public realm design. The TYLin/TMIG engineering drawing set shows proposed grading and servicing details.

It is also noted that the City is currently at a relatively advanced stage in terms of tendering reconstruction works for Albert Street, as part of the Albert-Slater Reconstruction Project. It is understood that there are two ongoing projects associated with this, and that the split of work occurs approximately at Empress Avenue – works along Albert Street east of this point are ahead in terms of schedule, with works to the west following as part of a second tender/construction process.

3 INFRASTRUCTURE PROTECTION REQUIREMENTS

For the Albert Street HPWM, initial City Engineering feedback provided on the bid-level submission (comments document dated December 2021) requested a 6-9 m setback from the water main, depending on depth and soil conditions. The document also noted that Vibration and Settlement Monitoring Programs will be required during construction (to be prepared by a specialist Vibration Monitoring Engineer and Geotechnical Engineer, respectively).

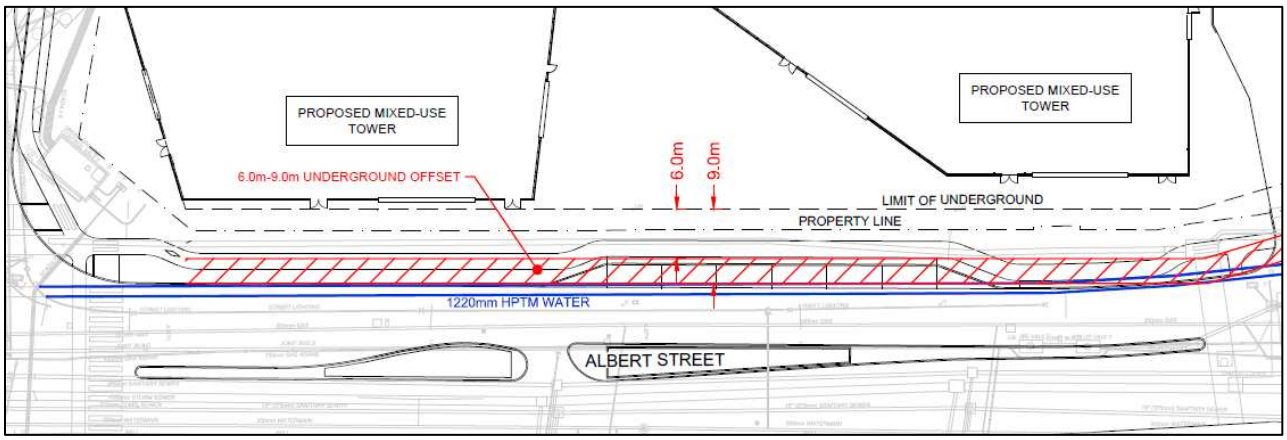
The team has reviewed the City of Ottawa *Infrastructure Build Over Policy* document (dated January 21, 2014 and understood to have been provided as a report to Planning Committee and Council during the Confederation Line Stage 1 OLRT project). This report is supportive of Transit-Oriented Development (TOD) such as the Library Parcel project, and the recommendations direct City staff to implement a uniform, risk-based approach to the assessment of development applications that build over (or adjacent) to City infrastructure. However, no *specific* protection requirements appear to be set out in this document that would dictate provisions for the buried pipework crossing the north-west corner of the site – including the 2400 mm diameter Combined EWT Sewer Pipe (CSST connection), 1800 mm diameter Interceptor Outfall Sewer, or the 3000 mm diameter storm sewer pipe. The team therefore looks forward to working with City staff – through review/comments on this initial report and any necessary subsequent meetings – to develop a reasonable set of infrastructure protection proposals that address City concerns while advancing the project.

4 PROPOSED PROTECTION MEASURES

4.1 Setbacks and Temporary Shoring Design

As illustrated below in **Figure 4-1** the proposed basement structure along Albert Street is horizontally set back from the HPWM by a minimum of 9.0 m along the majority of the project frontage. There is an inflection point in the basement wall alignment close to the south-east corner where the setback temporarily reduces to approximately 7.7 m, however the proposals are considered compliant with the City requirement for a 6.0 to 9.0 m setback.

Figure 4-1 Albert Street HPWM Setback



Through discussion with the project construction partner (Ellis Don) it is understood that current intent is to provide perimeter shoring along Albert Street and Booth Street, with the remainder of the basement extent to be constructed via open cut. While this represents the current planned approach, it is noted that construction approach remains subject to change as the design progresses and more information becomes available. Further details on the shoring design will be developed in due course and additional details provided as part of subsequent submissions. For reference the preliminary Ellis Don Construction Logistics Plan is included in **Appendix A**.

4.2 Settlement and Vibration Monitoring

As detailed design progresses – and as City requirements become clearer through this engagement on the constructability aspects of the project – suitable Settlement and Vibration Monitoring programs will be developed by qualified professionals, and further details will be provided as part of subsequent submissions.

4.3 Structural Loading

At this time, it is anticipated that the structure will be supported on reinforced concrete caissons drilled down and socketed into the bedrock. For some lightly loaded columns, spread footings bearing on the till will be provided.

As discussed in Section 1.1, three key pieces of City infrastructure run along the north foundation wall of the proposed development site. The closest service is the 2400 mm diameter EWT concrete sewer pipe running parallel to the north foundation wall with an invert elevation of approximately 45 m. The conduit is horizontally offset from the foundation wall by over 10 m at the east and west edges of the structure, and a minimum of approximately 3 m at a midpoint of the basement.

The structural caissons below the foundation wall will be socketed 1m into the bedrock, hence loading the rock in friction between elevation 47 and 48m. The minimum horizontal distance from the buried pipe to the edge of the caisson being at least 3m (3 times the diameter of the proposed caisson). The invert elevation of the pipe is around elev. 45m, providing a minimum 1H:1V slope from the invert to the highest point of application of the caisson force in the rock. Based on Golder's geotechnical recommendations, these conditions should not impose any significant stress increase to the existing services.

The proposed spread footings will follow a similar design approach to ensure their zone of influence does not add any significant stress increase to the existing sewer pipes.

Golder will remain closely involved in all design phases of the project to confirm that the existing City infrastructure will see no significant stress increase from the proposed development.

Please refer to **Appendix B** for confirmation of the above design approach from the Project Structural Engineer (RJC).

4.4 Pre and Post Construction CCTV Surveys

As per City requirements, the contractor will be responsible for undertaking pre and post-development CCTV surveys of the identified buried infrastructure crossing the project site to document the existing conditions and demonstrate that works were completed without damage to City infrastructure.

5 CONCLUSIONS

This Constructability Report is provided to document the presence of existing buried City infrastructure crossing (or in close proximity to) the project site, and to summarize the current design/construction intent with respect to protection of these existing City assets through development. The team hopes to engage with City staff following review of this initial submission to discuss and refine the proposals as needed to advance the project.

Respectfully submitted,

On behalf of TYLin,

Ben Worth, P.Eng.

Senior Project Manager

Disclaimer:

This report includes numerous references to investigations, findings and recommendations of third parties – specifically, from the project Geotechnical Engineer (Golder Associates Ltd.), the project Structural Engineer (RJC Ltd.), and the project construction partner (Ellis Don). This information is consolidated in the Constructability Report for the purposes of City review, however TYLin does not take responsibility for the approval, validation, or ownership of these recommendations from third parties.

APPENDIX A

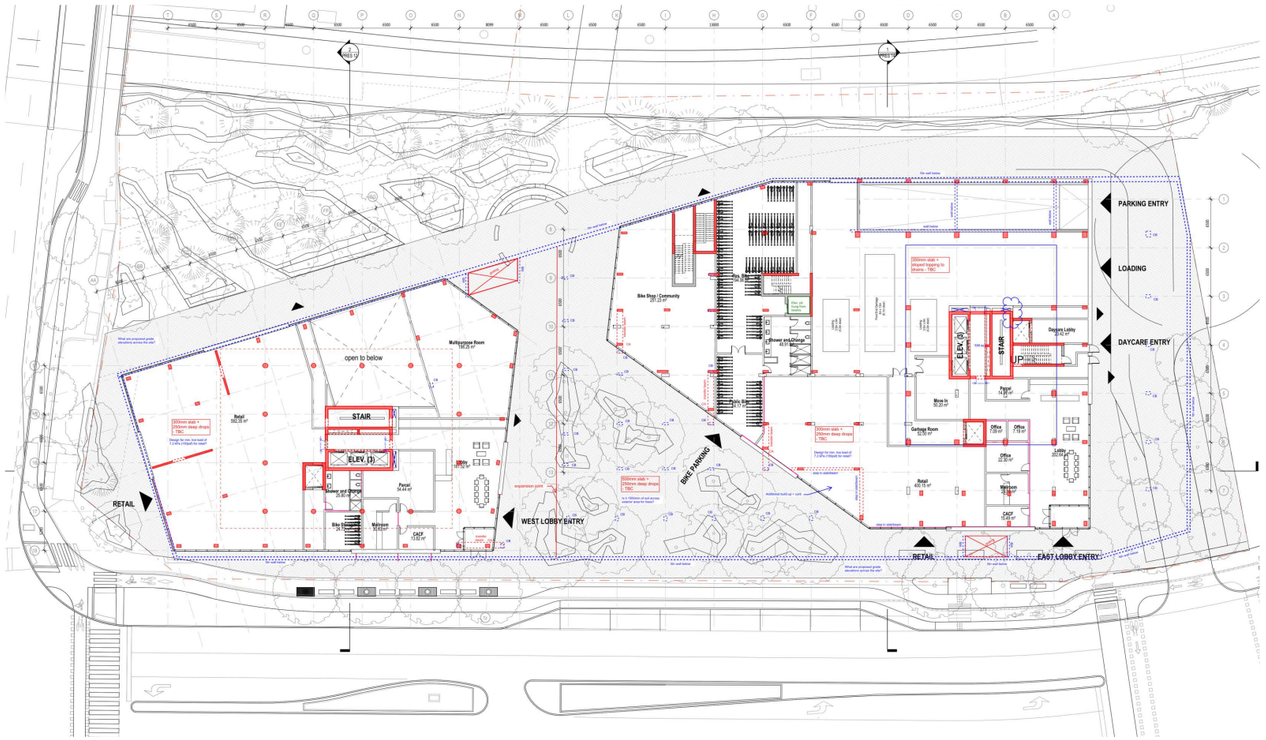
Construction Logistics Plan

LEBRETON LIBRARY PARCEL

655 ALBERT ST. OTTAWA. ONTARIO.

LOGISTICS DRAWINGS

ISSUE DATE: SEPTEMBER 1, 2021



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DRAWING #	DRAWING TITLE	ISSUE DATE
LLP-LOG-00	Cover Page	Sept 1, 2021
LLP-LOG-01	Mobilization and Site Offices	Sept 1, 2021
LLP-LOG-02	Excavation Works	Sept 1, 2021
LLP-LOG-03	Substructure - Level P1	Sept 1, 2021
LLP-LOG-04	Superstructure - Level 1	Sept 1, 2021
LLP-LOG-05	Superstructure - Level 3	Sept 1, 2021
LLP-LOG-06	Superstructure - Towers Construction	Sept 1, 2021
LLP-LOG-07	Site Safety Plan COVID-19	Sept 1, 2021
LLP-LOG-08	South Elevation	Sept 1, 2021

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Project Name:
Lebreton Library Parcel

655 Albert St. Ottawa,
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Drawing Title: Site Logistics
Cover Page

Date: Sept 1, 2021 | Scale: 1 : 40 | Drawn By: MR

Job Number: | LLP-LOG-00 | Rev: 0

MR

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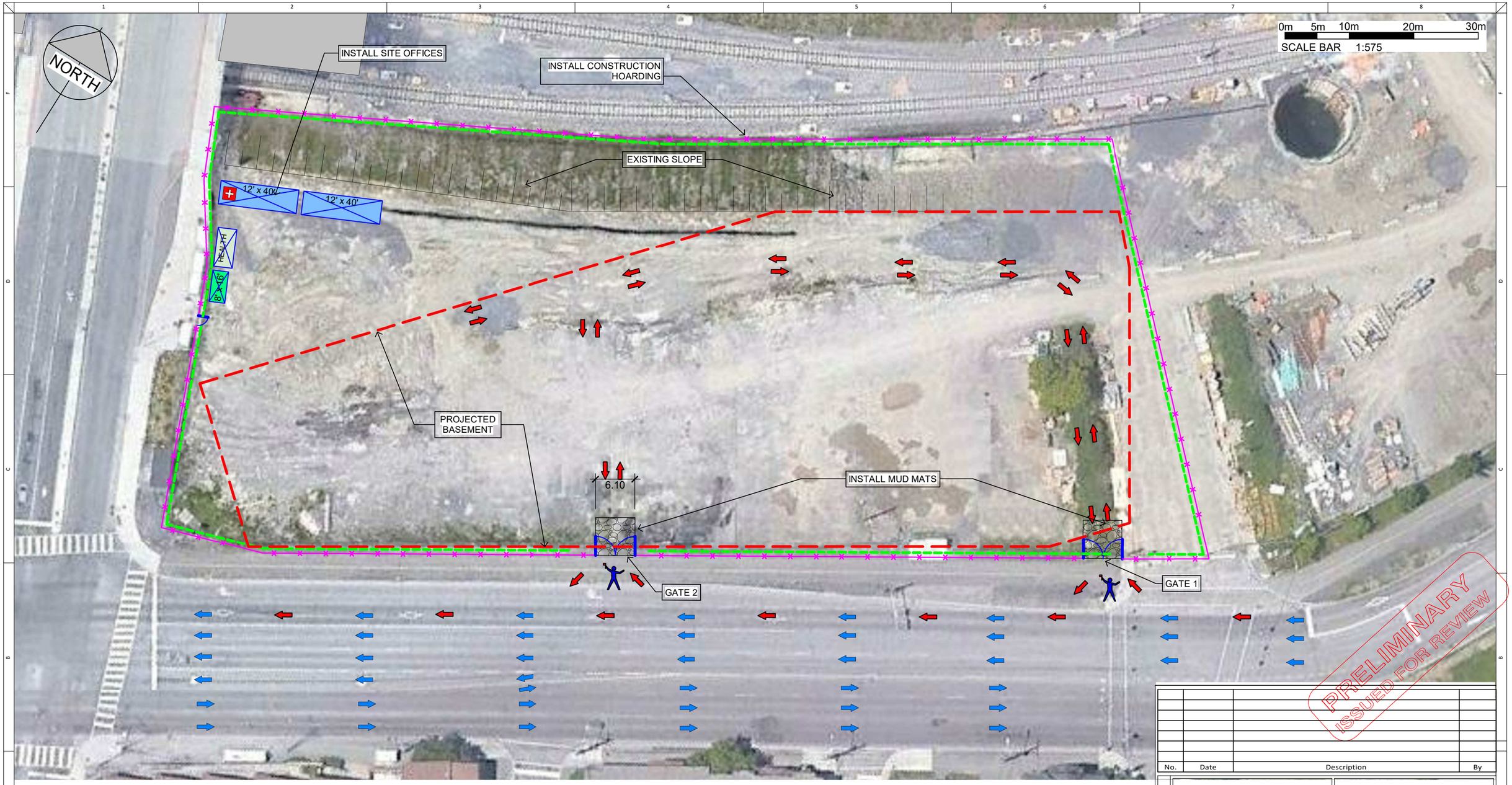

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- LAYDOWN AREA
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- PROPERTY LINE
- CONSTRUCTION HOARDING
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Drawing Title: Site Logistics
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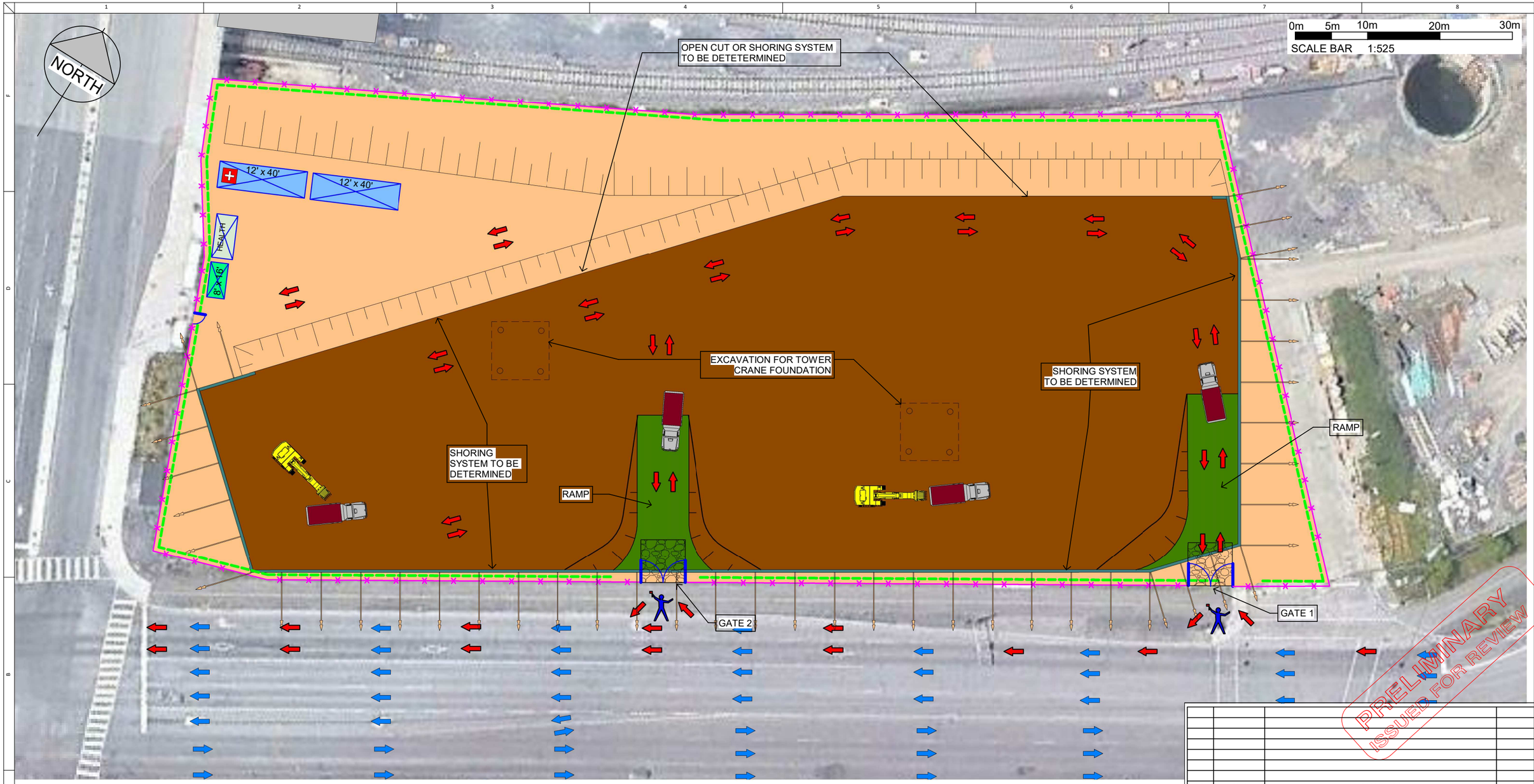

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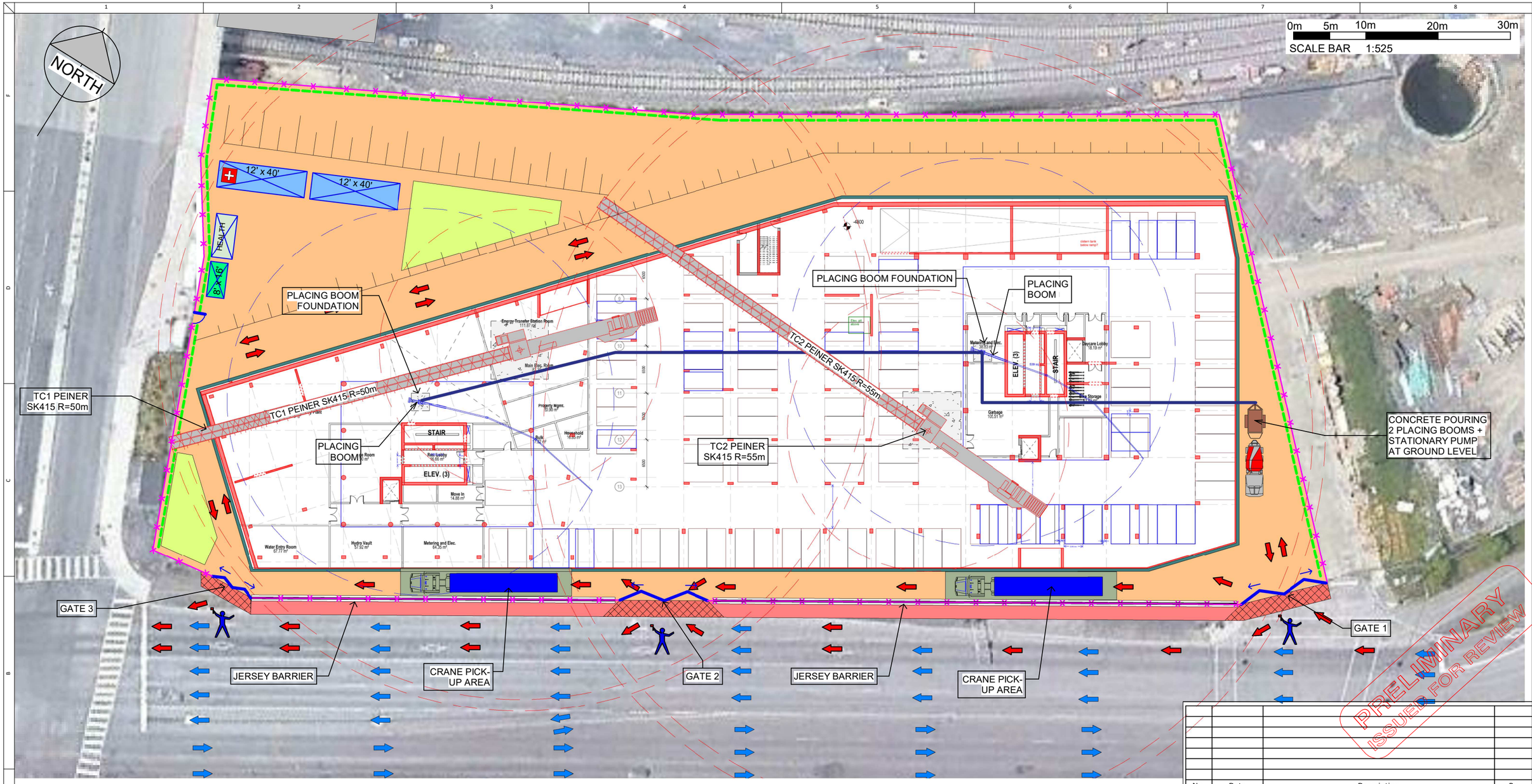

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Drawing Title: Site Logistics
Substructure - Level P1

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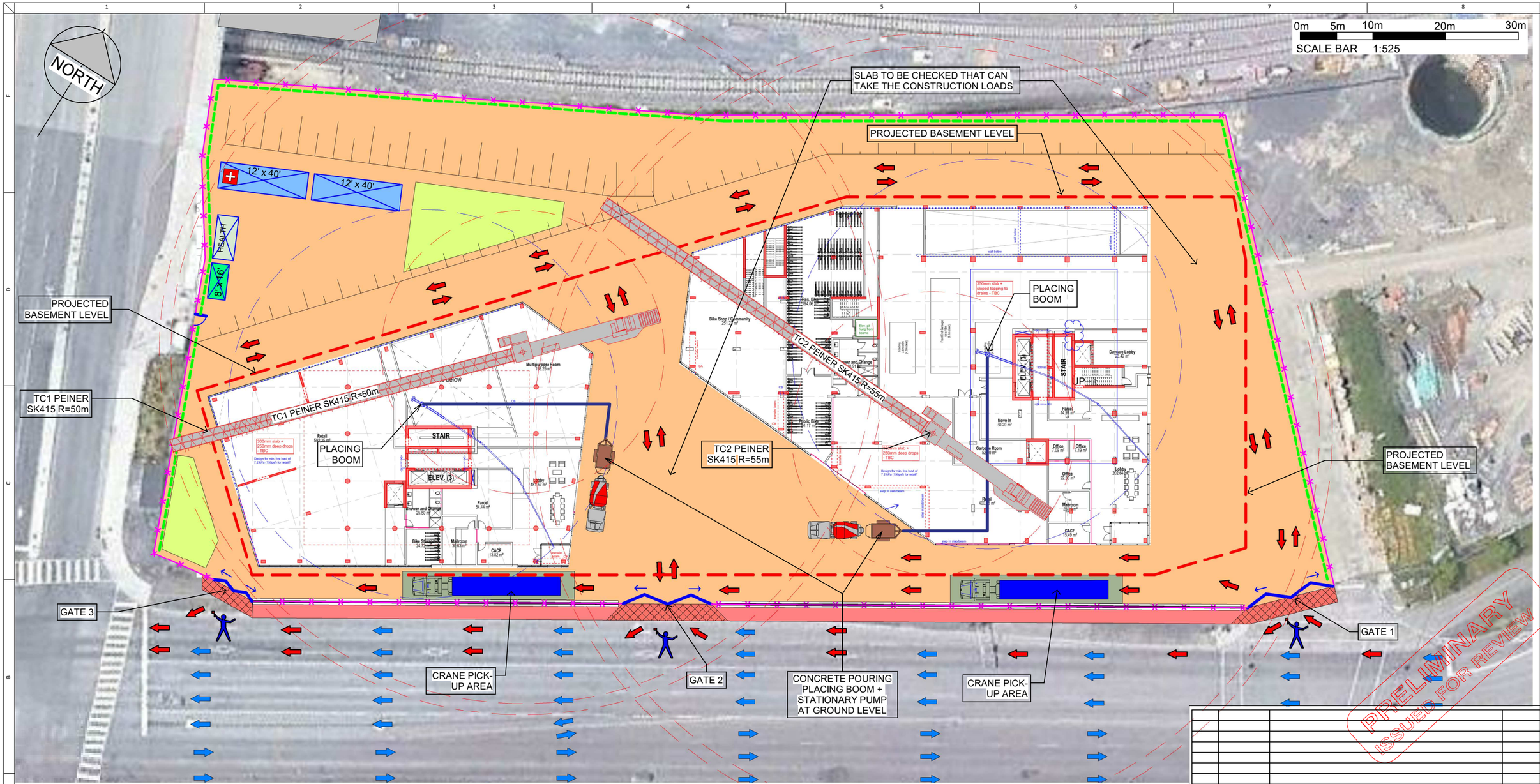

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Project Name: Lebreton Library Parcel

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Drawing Title: Site Logistics
Superstructure - Level 1

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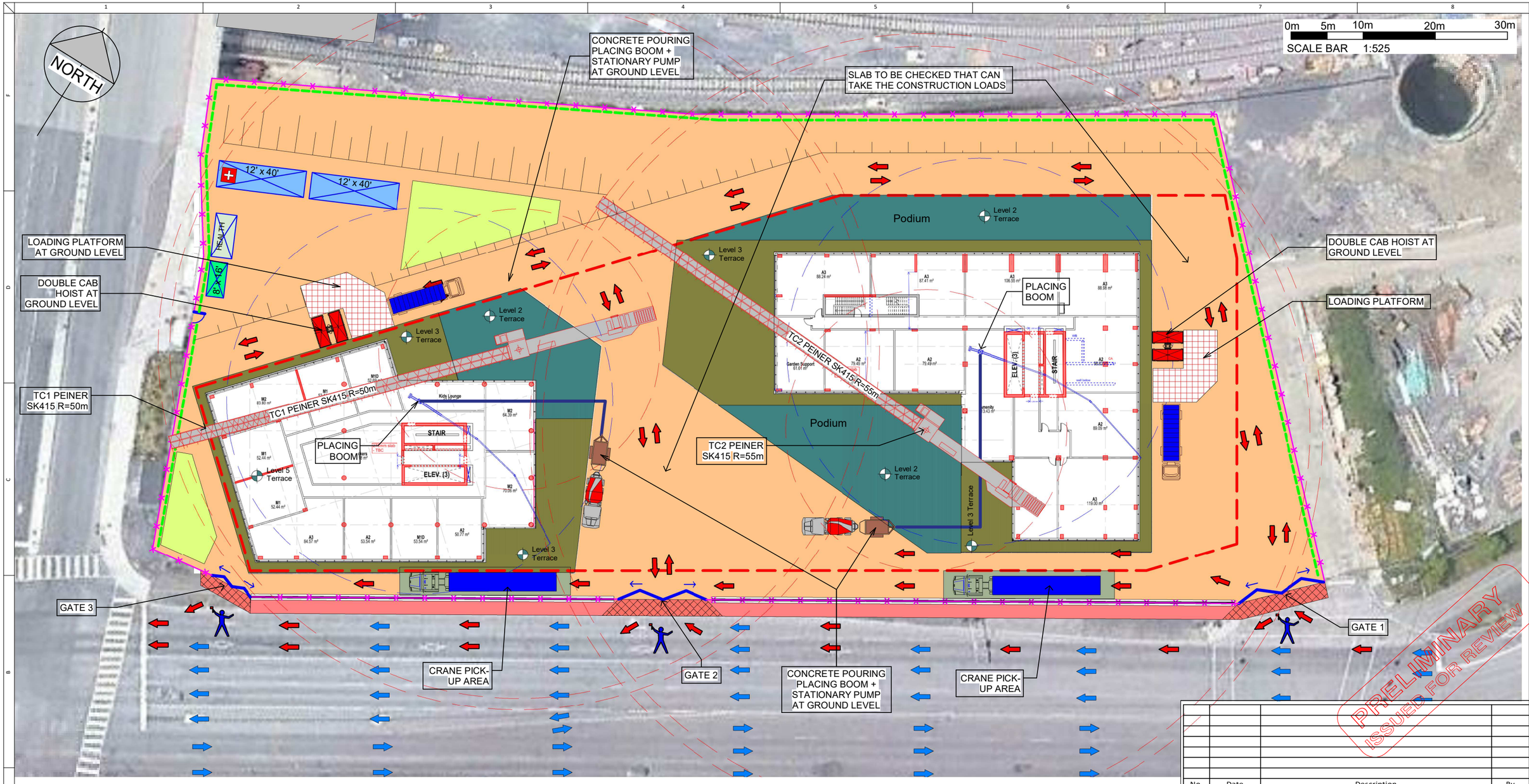

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Project Name:
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Drawing Title: Site Logistics
Superstructure - Level 3

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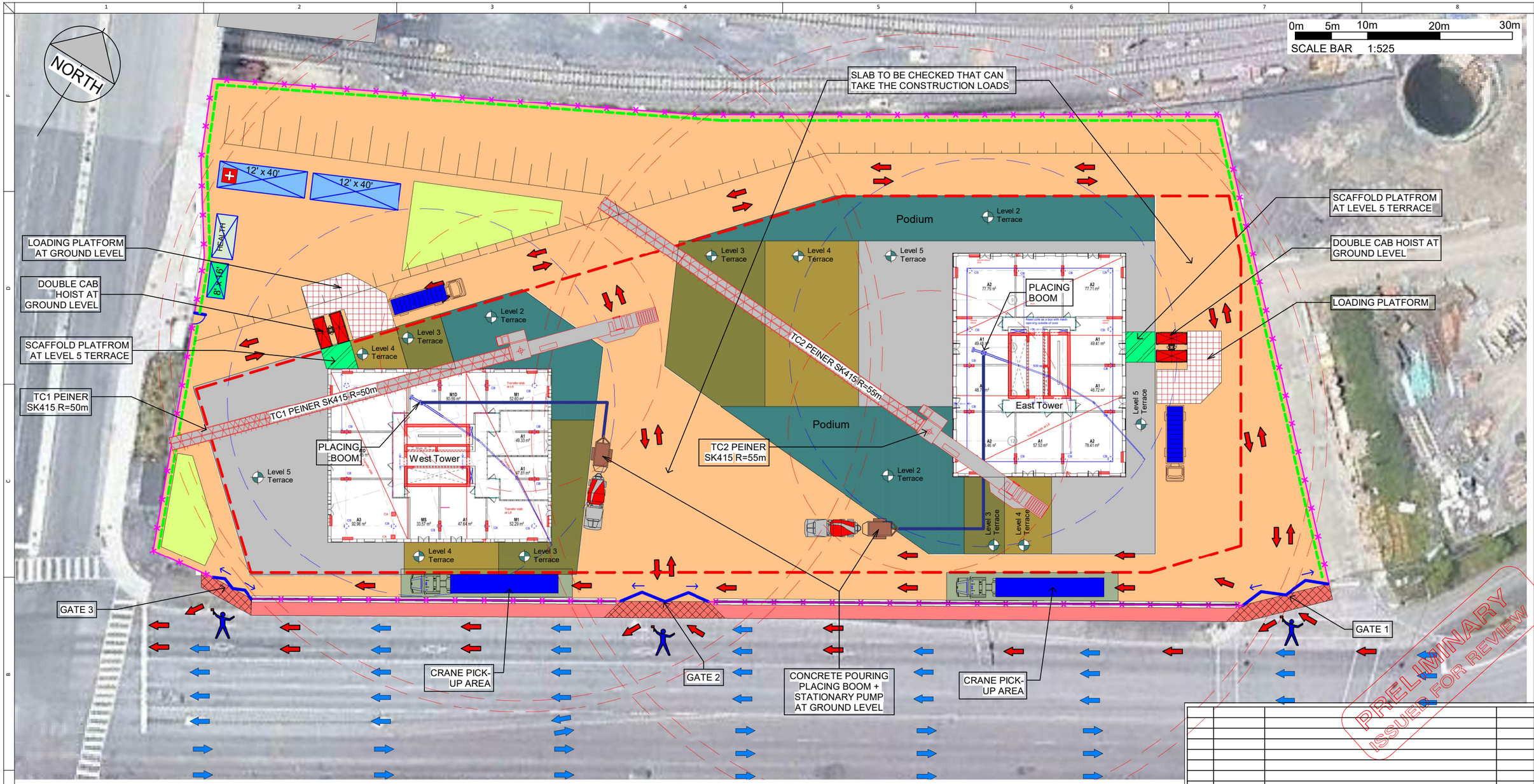

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Project Name: Lebreton Library Parcel

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Drawing Title: Site Logistics
Superstructure - Towers Construction

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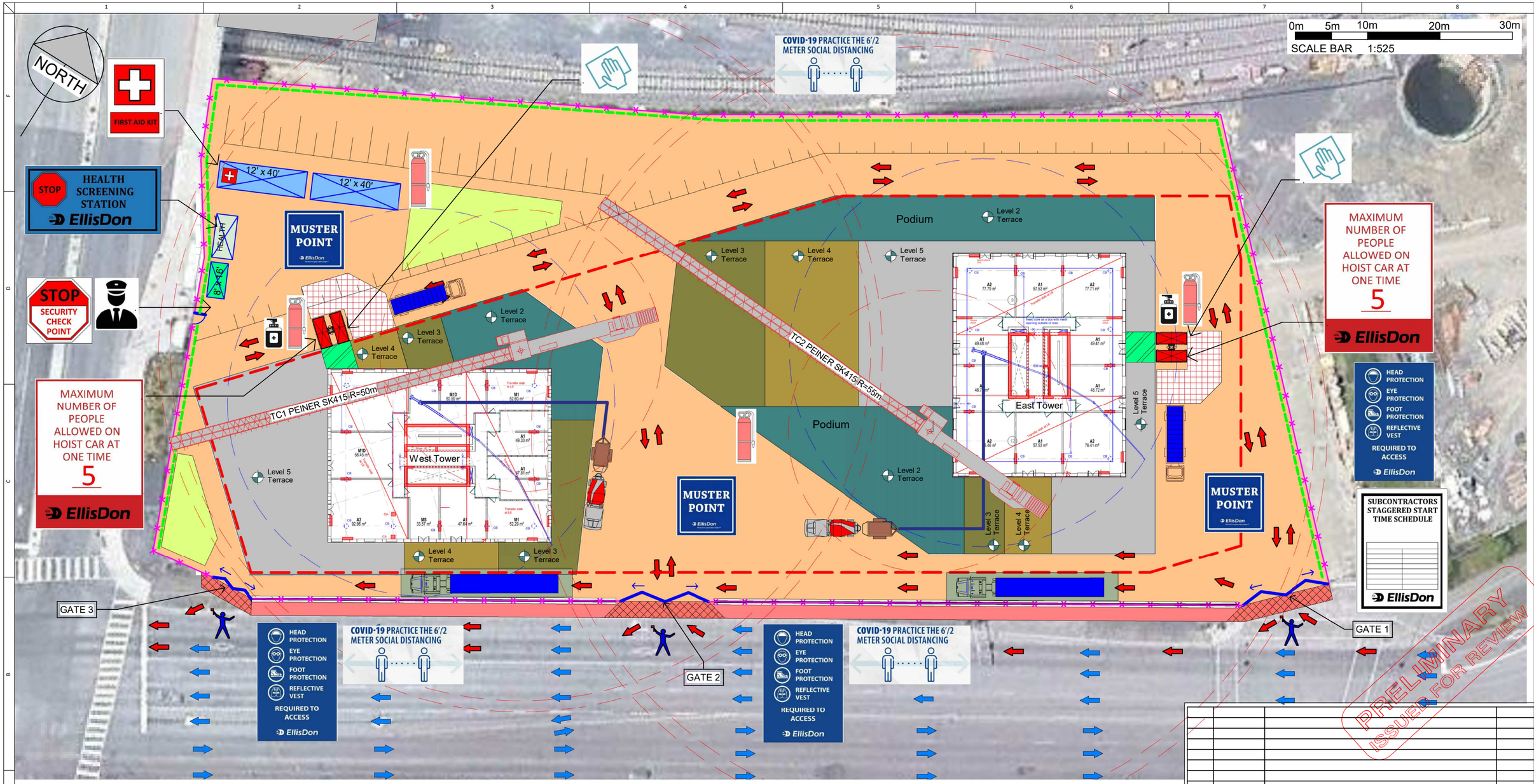

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- FIRE EXTINGUISHER
- SECURITY GUARD
- HAND SANITIZING BOTTLE
- HAND WASH STATION
- HEAD PROTECTION / EYE PROTECTION / FOOT PROTECTION / REFLECTIVE VEST — REQUIRED TO ACCESS — EllisDon
- LOW RISK EXPOSURE TO COVID-19 STANDARD PPE REQUIRED
- COMMONLY TOUCHED SURFACES OR AREAS THAT REQUIRE MORE FREQUENT CLEANING/SANITIZING (ELEVATOR/ HOIST CONTROLS / BUTTONS, SITE TRAILERS, DOORS HANDLES, EQUIPMENT, ETC.)

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Drawing Title: Site Logistics
Site Safety Plan COVID-19

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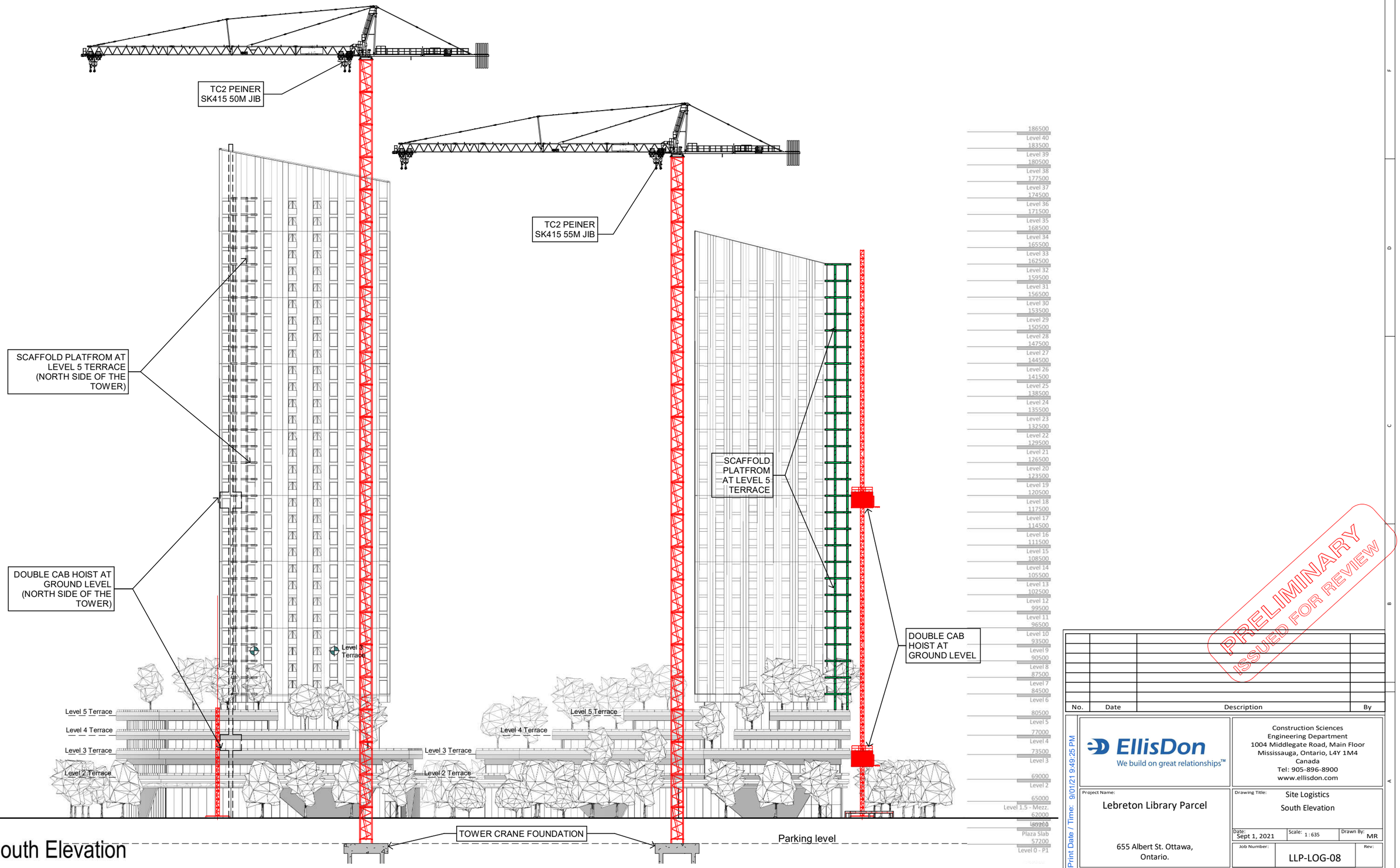

South Elevation

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Project Name:
Lebreton Library Parcel

655 Albert St. Ottawa,
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South Elevation

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LLP-LOG-08	

Author

Filename: N:\AutoCAD\PROPOSAL\Data Centres\XXXX - Lebreton Library Parcel\
C:\Users\rivasm\PROJETCS\38 - Lebreton Library\C - Logistics\Lebreton Library - Logistics Drawings 2021-08-23_R0.rvt

APPENDIX B

Structural Engineering Documentation

April 21, 2022

Engineers

Justin Robitaille
Dream
30 Adelaide st. E
Toronto, ON, M5C 3H1
jrobitaille@dream.ca

Dear Justin Robitaille,

RE: LeBreton Library Parcel **RJC No. [OTT.128984.0001]**
Structural approach for construction adjacent to existing City infrastructure
665 Albert St. Ottawa

The intent of this letter is to describe the approach taken by the design team to mitigate any structural impact of the proposed development to the existing City infrastructure running in the vicinity of the site.

At this time, it is anticipated that the structure will be supported on reinforced concrete caissons drilled down and socketed into the bedrock. For some lightly loaded columns, spread footings bearing on the till will be provided.

Based on the as-built drawings available to RJC, three key pieces of City infrastructure run along the north foundation wall of the proposed development site. The closest service is the 2400mm EWT concrete sewer pipe running parallel to the north foundation wall with an invert elevation of approximately 45m. The conduit runs at a distance of 3 to 10m from the foundation wall. No existing conduit is planned to remain within the footprint of the proposed development.

As per Golder's geotechnical recommendations, the structural caissons below the foundation wall and adjacent columns will be socketed 1m into the bedrock, hence loading the rock in friction between elevation 47 and 48m. Based on the provided as-built drawings of the existing services, the minimum horizontal distance from the buried pipe to the edge of the caisson is at least 3m (3 times the diameter of the proposed caisson). The invert elevation of the pipe is around elev. 45m, providing a minimum 1H:1V slope from the invert to the highest point of application of the caisson force in the rock. Based on Golder's geotechnical recommendations, these conditions should not impose any significant stress increase to the existing services.

The proposed spread footings will follow similar design rules to make sure their zone of influence do not add any significant stress increase to the existing sewer pipes.

Golder will be closely involved in all design phases of the project to confirm the existing services will see no significant stress increase from the proposed development.

Trusting this letter is sufficient to confirm that the proposed structural foundation system is being designed to mitigate any structural impact on the existing city infrastructure running north of the site. RJC remains available to respond to any questions on this matter.

Best regards,

Benoit Boulanger, MASc, P.Eng.
Regional Manager, Associate