

## **APPENDIX C – GEOTECHNICAL ASSESSMENT 1916, 1918, 1920 ST. MARY'S ROAD, WINNIPEG MANITOBA**



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*"Engineering and Testing Solutions That Work for You"*

February 27, 2022

File No. 21-166-95

City of Winnipeg  
Planning, Property & Development Department  
15 – 30 Fort Street  
Winnipeg, Manitoba  
R3C 4X5

**Attention:** Kendall Theissen, P.Eng., Riverbank Management Engineer

**RE:** Waterway Permit No. 017/2022 – Riverbank Stabilization Works at  
1916/1918/1920 St. Mary's Road, Winnipeg, Manitoba

### **Introduction**

ENG-TECH Consulting Limited (ENG-TECH) completed the inspection of riverbank stabilization works consisting of rockfill columns installation at the property known as 1916/1918/1920 St. Mary's Road, Winnipeg, Manitoba. The designed rockfilled caissons were Type 1 (52) and Type 2 (27). As-constructed drawings and photographs showing in-progress and completed work are attached to this letter.

### **Site Inspections**

ENG-TECH supervised the proposed works during construction and concludes the work was conducted in general accordance with our design recommendations and permit requirements as described below.

- Eighty-two (82) rockfill caissons were installed in two and three rows in the lower bank from August 16 to September 28, 2022. Type 1 (55) caissons with 1.8 m in diameter and Type 2 (27) caissons with 2.1 m in diameter. Some abandoned broken/unused steel pipes were observed at some spots during the caisson installation at depths ranging between 4.5 m and 6 m below existing grade. All the pipes were cleared out at the caisson locations.
- Twenty nine (29) Type 1 rockfill caissons plus twenty seven (27) Type 2 rockfill caissons were installed in three rows on the northwest side of the property. Twenty-three (23) plus three (3) Type 1 rockfill caissons were installed on the southwest side of the property. Sloughing/Caving of the some boreholes were encountered during the construction of Type 1 caissons such as a40. This caissons was relocated (a40R) but still encountered the same issue. Type 1 caisson number a40, a40R were abandoned and a39 and a51 were not installed due to ground conditions in that area. After further assessments, new caissons (a51N, a39N, a40N) were installed at locations shown on Figure 1.
- 50 mm to 150 mm diameter. crushed limestone was placed in the caissons shaft, and was compacted to the specifications with VibroLance VL-110 owned and operated by Preset Piling Ltd. A total of +/- 5434 tonnes of crushed limestone was used for all the 82 installed caissons.

- The till was encountered between Elev. +/- 216.8 m and 219.5 m as the construction of the caissons initiated from the south property line to the north. The drilled depth into the hard till for the caisson varied and were between 0.9 m and 1.2 m.
- The final regrading and clean-up of the site were conducted from October 3 to 5, 2022. The as-constructed elevations are shown on Table 1. The clay cap was placed using medium to highly plastic clay with thicknesses ranging from 0.3 to 1.5 m. Photos taken during and after the construction are shown on Figure 2.

### Summary and Conclusion

ENG-TECH completed the site inspection of the riverbank stabilization works at the above property. Type 1 caissons No. a39, a40, a51 were relocated, as shown on Figure 1, due to sloughing/caving of the boreholes. All the work including the side grading and construction of the caissons were completed to ENG-TECH’s satisfaction.

### Closure

ENG-TECH trusts the above is all the information the City of Winnipeg requires for closing the Waterway Permit No. 017/2022. If you have any questions or require additional information, please contact the undersigned.

Sincerely,  
ENG-TECH Consulting Limited

  
Amruthraj Muthuraj, M.Eng., EIT.  
Engineering Department

  
Clark Hryhoruk, M.Sc., P.Eng.  
Principal, Geotechnical Engineer

CDH/raj

Attachments: Table 1 – Caisson Log Sheet on Site  
Figure 1 – Site Plan With As-Built Caisson Layout  
Figure 2 – Photographs During and After Installation of Caissons

cc: Kendall Theissen – City of Winnipeg  
Samuel Goszer – Alesta Developments Corporation





File No.  
Project:

21-166-95  
1916, 1918, 1920 St. Mary's road

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**TABLE 1 - CAISSON LOG SHEET ON SITE**

| Caisson # | Installation Date (1) (mm/dd/yy) | Existing Grade (m) | Top Rock Elevation (m) | Depth Below Grade (m) | Bottom Rock Elevation (m) | Depth into Till (m) (2) | Final Grade (m) | Clay Cap thickness (m) |  |
|-----------|----------------------------------|--------------------|------------------------|-----------------------|---------------------------|-------------------------|-----------------|------------------------|--|
| a2        | 08/31/2022                       | 229                | 228.15                 | 13.4                  | 215.6                     | 1.2                     | 229.1           | 0.95                   |  |
| a3        | 08/31/2022                       | 229                | 227.93                 | 13.3                  | 215.7                     | 1.1                     | 228.9           | 0.97                   |  |
| a4        | 09/01/2022                       | 229                | 227.97                 | 13.4                  | 215.6                     | 1.2                     | 228.8           | 0.83                   |  |
| a5        | 09/01/2022                       | 229                | 227.73                 | 13.4                  | 215.6                     | 1.2                     | 229.1           | 1.37                   |  |
| a6        | 09/02/2022                       | 229                | 227.62                 | 13.3                  | 215.7                     | 1.1                     | 229.1           | 1.48                   |  |
| a7        | 09/02/2022                       | 229                | 227.58                 | 13.3                  | 215.7                     | 1.1                     | 229.1           | 1.52                   |  |
| a8        | 09/06/2022                       | 229                | 227.81                 | 13.3                  | 215.7                     | 1.1                     | 229             | 1.19                   |  |
| a9        | 09/06/2022                       | 229                | 227.66                 | 13.4                  | 215.6                     | 1.2                     | 229.1           | 1.44                   |  |
| a10       | 09/07/2022                       | 229                | 227.84                 | 13.3                  | 215.7                     | 1.1                     | 229.1           | 1.26                   |  |
| a11       | 09/06/2022                       | 229                | 227.87                 | 13.3                  | 215.7                     | 1.1                     | 229             | 1.13                   |  |
| a13       | 08/31/2022                       | 228.5              | 227.86                 | 13.0                  | 215.5                     | 1.3                     | 228.6           | 0.74                   |  |
| a14       | 08/31/2022                       | 228.5              | 227.79                 | 12.9                  | 215.6                     | 1.2                     | 228.6           | 0.81                   |  |
| a15       | 09/01/2022                       | 228.5              | 227.81                 | 12.6                  | 215.9                     | 0.9                     | 228.6           | 0.79                   |  |
| a16       | 09/01/2022                       | 228.5              | 227.63                 | 12.8                  | 215.7                     | 1.1                     | 228.8           | 1.17                   |  |
| a17       | 09/02/2022                       | 228.5              | 227.6                  | 13.0                  | 215.5                     | 1.3                     | 228.7           | 1.1                    |  |
| a18       | 09/02/2022                       | 228.5              | 227.58                 | 12.9                  | 215.6                     | 1.2                     | 228.4           | 0.82                   |  |
| a19       | 09/06/2022                       | 228.5              | 227.61                 | 12.9                  | 215.6                     | 1.2                     | 228.5           | 0.89                   |  |
| a20       | 09/06/2022                       | 228.5              | 227.72                 | 12.9                  | 215.6                     | 1.2                     | 228.4           | 0.68                   |  |
| a21       | 09/07/2022                       | 228.5              | 227.6                  | 12.9                  | 215.6                     | 1.2                     | 228.4           | 0.8                    |  |
| a24       | 08/31/2022                       | 228                | 227.85                 | 12.4                  | 215.6                     | 1.2                     | 228.2           | 0.35                   |  |
| a25       | 08/31/2022                       | 228                | 227.83                 | 12.2                  | 215.8                     | 1.0                     | 228.3           | 0.47                   |  |
| a26       | 09/01/2022                       | 228                | 227.78                 | 12.3                  | 215.7                     | 1.1                     | 228.2           | 0.42                   |  |
| a27       | 09/01/2022                       | 228                | 227.84                 | 12.3                  | 215.7                     | 1.1                     | 228.1           | 0.26                   |  |
| a28       | 09/02/2022                       | 228                | 227.89                 | 12.3                  | 215.7                     | 1.1                     | 228.3           | 0.41                   |  |
| a29       | 09/02/2022                       | 228                | 227.7                  | 12.3                  | 215.7                     | 1.1                     | 228.2           | 0.5                    |  |
| a30       | 09/06/2022                       | 228                | 227.75                 | 12.2                  | 215.8                     | 1.0                     | 228.1           | 0.35                   |  |
| a31       | 09/06/2022                       | 228                | 227.76                 | 12.4                  | 215.6                     | 1.2                     | 228.1           | 0.34                   |  |
| a32       | 09/07/2022                       | 228                | 227.85                 | 12.4                  | 215.6                     | 1.2                     | 228.1           | 0.25                   |  |
| a33       | 09/07/2022                       | 228                | 227.52                 | 12.3                  | 215.7                     | 1.1                     | 228.3           | 0.78                   |  |
| a34       | 08/23/2022                       | 228.5              | 227.67                 | 12.8                  | 215.7                     | 1.1                     | 228.5           | 0.83                   |  |
| a35       | 08/23/2022                       | 228.5              | 227.56                 | 12.7                  | 215.8                     | 1.0                     | 228.5           | 0.94                   |  |
| a36       | 08/23/2022                       | 228.5              | 227.63                 | 12.8                  | 215.7                     | 1.1                     | 228.4           | 0.77                   |  |
| a37       | 08/23/2022                       | 228.5              | 227.65                 | 12.6                  | 215.9                     | 0.9                     | 228.6           | 0.95                   |  |
| a38       | 08/23/2022                       | 228.5              | 227.64                 | 12.7                  | 215.8                     | 1.0                     | 228.3           | 0.66                   |  |
| a39N      | 18/08/2022                       | 228.5              | 227.61                 | 12.6                  | 215.9                     | 0.9                     | 228.5           | 0.89                   |  |
| a40N      | 18/08/2022                       | 228.5              | 227.41                 | 12.6                  | 215.9                     | 0.9                     | 228.4           | 0.99                   |  |
| a41       | 08/17/2022                       | 228.5              | 227.23                 | 12.6                  | 215.9                     | 0.9                     | 228.4           | 1.17                   |  |
| a42       | 08/17/2022                       | 228.5              | 227.37                 | 12.6                  | 215.9                     | 0.9                     | 228.3           | 0.93                   |  |
| a43       | 08/16/2022                       | 228.5              | 227.82                 | 12.4                  | 216.1                     | 0.7                     | 228.5           | 0.68                   |  |
| a44       | 08/16/2022                       | 228.5              | 227.45                 | 12.5                  | 216.0                     | 0.8                     | 228.4           | 0.95                   |  |
| a45       | 08/24/2022                       | 228                | 227.41                 | 12.1                  | 215.9                     | 0.9                     | 227.9           | 0.49                   |  |
| a46       | 08/23/2022                       | 228                | 227.46                 | 12.1                  | 215.9                     | 0.9                     | 228.2           | 0.74                   |  |
| a47       | 08/23/2022                       | 228                | 227.33                 | 12.2                  | 215.8                     | 1.0                     | 228             | 0.67                   |  |
| a48       | 08/23/2022                       | 228                | 227.56                 | 12.1                  | 215.9                     | 0.9                     | 228.1           | 0.54                   |  |



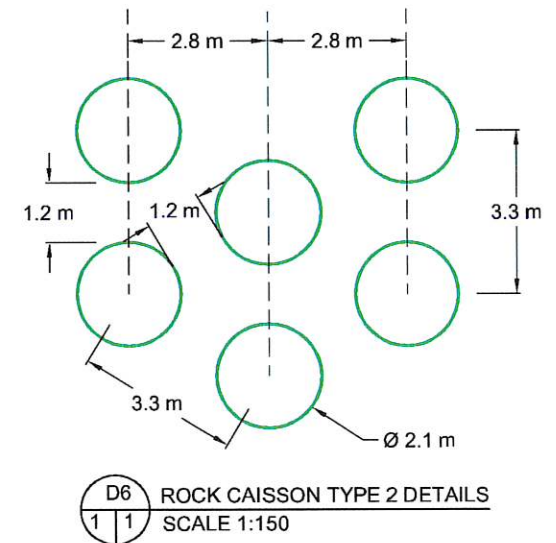
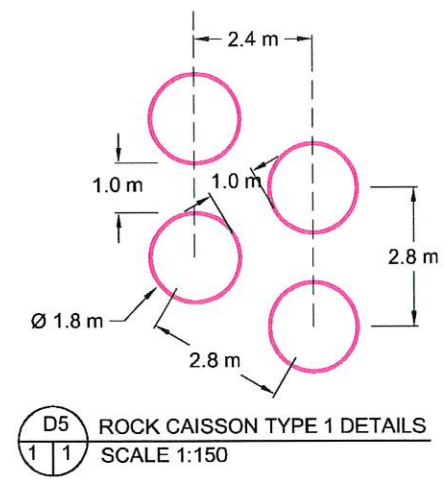
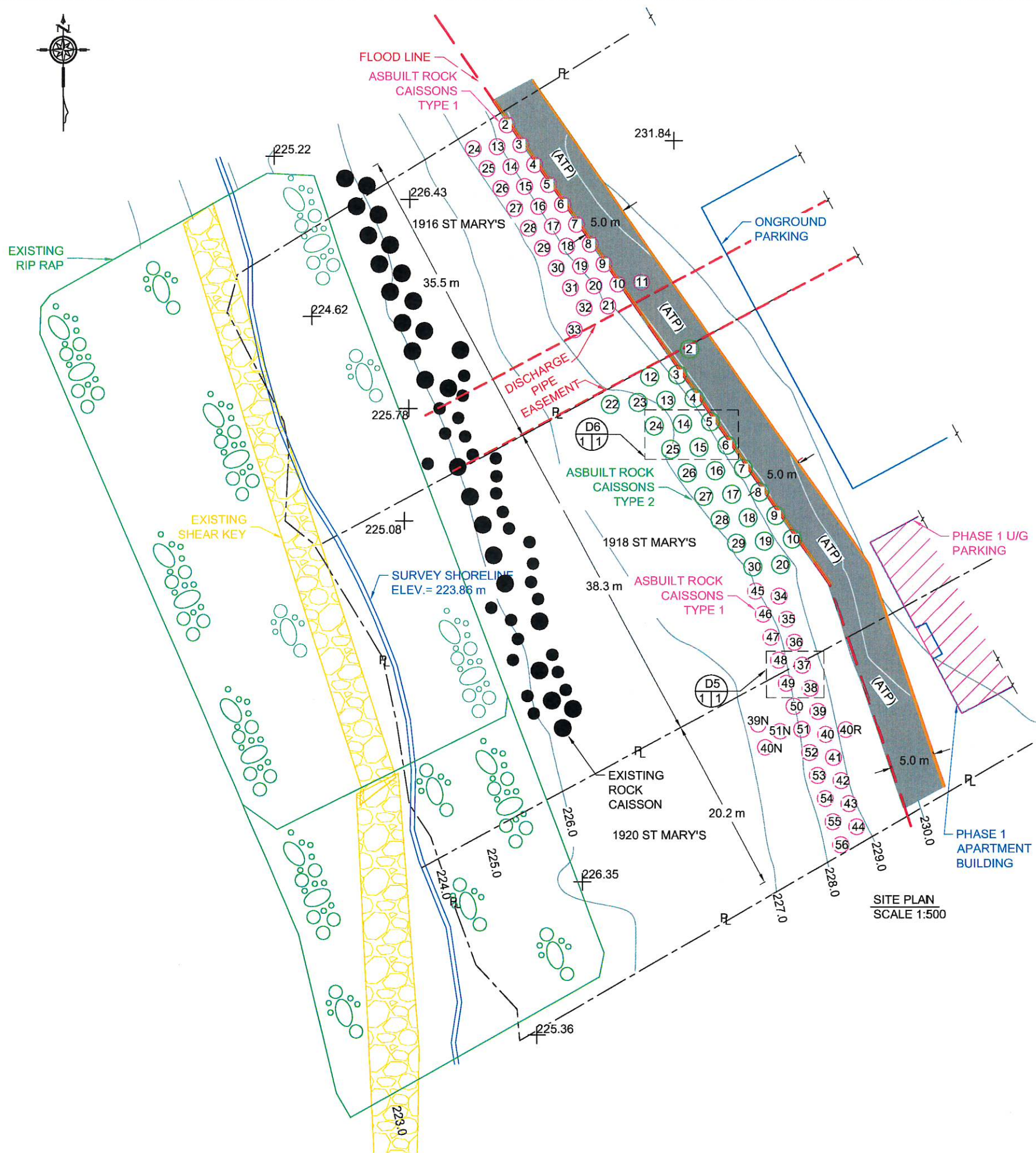
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**TABLE 1 - CAISSON LOG SHEET ON SITE**

| Caisson # | Date (mm/dd/yy) | Existing Grade (m) | Top Rock Elevation (m) | Depth Below Grade (m) | Bottom Rock Elevation (m) | Depth into Till (m) (2) | Final Elevation (m) | Clay Cap thickness (m) |  |
|-----------|-----------------|--------------------|------------------------|-----------------------|---------------------------|-------------------------|---------------------|------------------------|--|
| a49       | 08/23/2022      | 228                | 227.36                 | 12.2                  | 215.8                     | 1.0                     | 228.2               | 0.84                   |  |
| a50       | 08/23/2022      | 228                | 227.56                 | 12.2                  | 215.8                     | 1.0                     | 228.1               | 0.54                   |  |
| a51N      | 08/18/2022      | 228                | 227.38                 | 12.2                  | 215.8                     | 1.0                     | 228                 | 0.62                   |  |
| a52       | 08/18/2022      | 228                | 227.13                 | 12.2                  | 215.8                     | 1.0                     | 228                 | 0.87                   |  |
| a53       | 08/17/2022      | 228                | 227.41                 | 12.3                  | 215.7                     | 1.1                     | 228.2               | 0.79                   |  |
| a54       | 08/17/2022      | 228                | 227.63                 | 12.1                  | 215.9                     | 0.9                     | 228.1               | 0.47                   |  |
| a55       | 08/16/2022      | 228                | 227.89                 | 12.1                  | 215.9                     | 0.9                     | 228.4               | 0.51                   |  |
| a56       | 08/16/2022      | 228                | 227.88                 | 12.1                  | 215.9                     | 0.9                     | 228.2               | 0.32                   |  |
| a39       | NOT INSTALLED   |                    |                        |                       |                           |                         |                     |                        |  |
| a51       | NOT INSTALLED   |                    |                        |                       |                           |                         |                     |                        |  |
| a40       | ABANDONED       |                    |                        |                       |                           |                         |                     |                        |  |
| a40R      | ABANDONED       |                    |                        |                       |                           |                         |                     |                        |  |
|           |                 |                    |                        |                       |                           |                         |                     |                        |  |
| b2        | 09/07/2022      | 229                | 227.98                 | 13.2                  | 215.8                     | 1.0                     | 228.7               | 0.72                   |  |
| b3        | 08/30/2022      | 229                | 227.35                 | 13.4                  | 215.6                     | 1.2                     | 228.7               | 1.35                   |  |
| b4        | 08/30/2022      | 229                | 227.98                 | 13.1                  | 215.9                     | 0.9                     | 228.8               | 0.82                   |  |
| b5        | 08/26/2022      | 229                | 227.98                 | 13.3                  | 215.7                     | 1.1                     | 228.9               | 0.92                   |  |
| b6        | 08/26/2022      | 229                | 227.98                 | 13.3                  | 215.7                     | 1.1                     | 228.8               | 0.82                   |  |
| b7        | 08/25/2022      | 229                | 227.67                 | 13.2                  | 215.8                     | 1.0                     | 228.9               | 1.23                   |  |
| b8        | 08/25/2022      | 229                | 227.95                 | 13.3                  | 215.7                     | 1.1                     | 228.9               | 0.95                   |  |
| b9        | 08/25/2022      | 229                | 227.9                  | 13.1                  | 215.9                     | 0.9                     | 229                 | 1.1                    |  |
| b10       | 08/24/2022      | 229                | 227.78                 | 13.1                  | 215.9                     | 0.9                     | 229                 | 1.22                   |  |
| b12       | 09/08/2022      | 228.5              | 227.83                 | 12.5                  | 216                       | 0.8                     | 228.5               | 0.67                   |  |
| b13       | 08/30/2022      | 228.5              | 227.62                 | 12.6                  | 215.9                     | 0.9                     | 228.5               | 0.88                   |  |
| b14       | 08/30/2022      | 228.5              | 227.75                 | 12.4                  | 216.1                     | 0.7                     | 228.4               | 0.65                   |  |
| b15       | 08/26/2022      | 228.5              | 227.78                 | 12.4                  | 216.1                     | 0.7                     | 228.6               | 0.82                   |  |
| b16       | 08/25/2022      | 228.5              | 227.65                 | 12.5                  | 216                       | 0.8                     | 228.3               | 0.65                   |  |
| b17       | 08/25/2022      | 228.5              | 227.75                 | 12.6                  | 215.9                     | 0.9                     | 228.5               | 0.75                   |  |
| b18       | 08/25/2022      | 228.5              | 227.61                 | 12.4                  | 216.1                     | 0.7                     | 228.4               | 0.79                   |  |
| b19       | 08/24/2022      | 228.5              | 227.62                 | 12.3                  | 216.2                     | 0.6                     | 228.4               | 0.78                   |  |
| b20       | 08/24/2022      | 228.5              | 227.75                 | 12.5                  | 216                       | 0.8                     | 228.3               | 0.55                   |  |
| b22       | 09/08/2022      | 228                | 227.78                 | 12.1                  | 215.9                     | 0.9                     | 228.2               | 0.42                   |  |
| b23       | 09/07/2022      | 228                | 227.47                 | 12.2                  | 215.8                     | 1.0                     | 228.1               | 0.63                   |  |
| b24       | 08/30/2022      | 228                | 227.42                 | 11.9                  | 216.1                     | 0.7                     | 228                 | 0.58                   |  |
| b25       | 08/26/2022      | 228                | 227.88                 | 12.1                  | 215.9                     | 0.9                     | 228                 | 0.12                   |  |
| b26       | 08/26/2022      | 228                | 227.72                 | 12.1                  | 215.9                     | 0.9                     | 228.2               | 0.48                   |  |
| b27       | 08/25/2022      | 228                | 227.78                 | 12.1                  | 215.9                     | 0.9                     | 228.1               | 0.32                   |  |
| b28       | 08/24/2022      | 228                | 227.71                 | 12.1                  | 215.9                     | 0.9                     | 228.4               | 0.69                   |  |
| b29       | 08/24/2022      | 228                | 227.82                 | 12.2                  | 215.8                     | 1.0                     | 228.2               | 0.38                   |  |
| b30       | 08/24/2022      | 228                | 227.85                 | 12.1                  | 215.9                     | 0.9                     | 228.2               | 0.35                   |  |

Notes:

- Vibrance conducted from September 19 to 28, 2022.
- Till occurred between elevation of +/- 216.8 m and 219.5 below grade.



- LEGEND**
- SHORELINE
  - SPOT ELEVATION
  - SECTION/DETAIL No.
  - SECTION / DETAIL PAGE LOCATION
  - SECTION / DETAIL PAGE REFERENCE
  - PROPERTY LINE
  - FLOOD LINE
  - EXISTING ROCK CAISSONS
  - ASBUILT ROCK CAISSONS TYPE 1 (55)
  - ASBUILT ROCK CAISSONS TYPE 2 (27)
  - EXISTING SHEAR KEY
  - EXISTING RIP-RAP
  - (ATP) ACTIVE TRANSPORTATION PATH

- NOTES**
- ALL ELEVATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
  - ALL PROPERTY LINES ARE APPROX.
  - ENG-TECH SURVEYED AS-BUILT ON OCTOBER 3, 4, 5 2022 USING GPS
  - CONTOUR INTERVAL = 0.5 m.
  - FLOOD PROTECTION LEVEL (F.P.L.) = 231.80 m
  - CAISSONS ARE NOT INSTALLED IN THE EASEMENT ZONE DUE TO RESTRICTION BY CITY OF WINNIPEG.

| NO. | DATE      | ISSUE / REVISION |
|-----|-----------|------------------|
| 0   | Feb. 2023 | As-built letter  |

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CLIENT:  
ALESTA DEVELOPMENTS CORPORATION

PROJECT:  
GEOTECHNICAL ASSESSMENT  
1916, 1918 & 1920 ST. MARY'S ROAD  
WINNIPEG, MANITOBA

DWG DESCRIPTION:  
SITE PLAN WITH AS-BUILT CAISSON LAYOUT

SCALE:  
AS SHOWN

|                        |                        |
|------------------------|------------------------|
| DRAWN BY:<br>RAJ       | DATE:<br>FEBRUARY 2023 |
| FILE No.:<br>21-166-95 | CLIENT DWG/FIG. No.:   |
| ENG-TECH DWG/FIG. No.: | NO.:                   |

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