CONSTRUCTION QUALITY ASSURANCE REPORT

EVERETT RIVERFRONT BUILDING B

December 19, 2023

RIVERFRONT COMMERCIAL INVESTMENTS, LLC

CONSTRUCTION QUALITY ASSURANCE REPORT

FOR

EVERETT RIVERFRONT BUILDING B

Prepared By:

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EVERETT RIVERFRONT BUILDING B
CONSTRUCTION QUALITY ASSURANCE REPORT

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APPENDICES

1.0 CQA Report for Everett Riverfront Development, Riverfront Building B

RIVERFRONT COMMERCIAL INVESTMENT LLC
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Tel. 425.559.2300

December 4, 2023

Mr. Randy Loveless, PE
Senior Engineer; Everett Public Works Department
CITY OF EVERETT
3200 Cedar Street
Everett, WA 98201

Re: CQA Implementation Report for Everett Riverfront Development, Building B

Dear Randy.

This report documents the Construction Quality Assurance (CQA) activities conducted for the above referenced project per the requirements of the Everett Landfill/Tire Fire Site Consent Decree (CD). The CD requires that protective measures be implemented for any new development on the landfill site to ensure protection of human health and the environment from exposure to contaminants or landfill gas (LFG) present in the site subsurface.

The purpose of the Riverfront Building B CQA Report is to ensure that the construction of the mixed-use project was performed in general conformance with the requirements and intent of the accepted CQA Plan, Drawings and Specifications. During construction of the project, Riverfront Phase 1, LLC, retained and managed a multi-discipline team who completed and performed the required observations, tests, and documentation of the observed quality of materials and work in accordance with an approved CQA Plan. (Section's 2.0 – 10).

This CQA Report documents the completion of construction activities for Building B per the approved design and subsequent approved updates through Requests for Information (RFI's). This report provides verification of compliance with all CD requirements in accordance with the approved CQA Plan. This report is comprised of individual CQA documentation from the Riverfront Phase 1 consultant engineers, who were each responsible for specific components of the design and CQA as listed below. In addition, submittals, RFIs, and as-built plans documenting the completed project are appended to this report. The consultant engineers' reports address the following topics.

- Section 2.0 – HWA Geosciences Inc.: Geotechnical and structural pile components, and placement and testing of low permeability soil barrier and bentonite sand barrier elements.
- Section 3.0 – Herrera Environmental Consultants, Inc.: Composite and geomembrane elements, LFG system, and methane monitoring and ventilation system elements.
- Section 4.0 – Follett Engineering: Electrical and instrumentation and control systems.

Sincerely,

DocuSigned by:
Renay Luzama
323309D9312747C...

Renay Luzama

Sincerely,

DocuSigned by:
Eric Evans
7B78D69F851B465...

Eric C. Evans

2.0 HWA Compliance with CQA Report – Geotechnical Engineer

HWA GeoSciences Inc.
DBE/MWBE

September 21, 2023
HWA Project No. 2015-061-21

Riverfront Commercial Investment, LLC.
11624 SE 5th Street Suite 210
Everett, WA 98201

Subject: **CQA Summary Report for Riverfront Development Phase I Building B**

This letter documents the Construction Quality Assurance (CQA) activities conducted for the above referenced project per the requirements of the Everett Landfill Consent Decree and observed by HWA GeoSciences Inc. (HWA), from June 2021 through September, 2023.

Description

Riverfront Commercial Investment, LLC is in the process of constructing a new multi-phased, mixed-use development on the old Everett Landfill. This report is in reference to the now completed, Phase I Building B area which is located on the west side of Riverfront Boulevard and north of the proposed Phase I Building A. The Phase I Building B site area included grade supported utilities below the proposed building, piles for support of the new building and a concrete apron around the building.

Construction of the Phase I Building B site required implementing environmental controls in compliance with the Everett Landfill Consent Decree. Environmental controls included expansion of the site's landfill gas (LFG) system, utility installation, management, and proper disposal of encountered refuse materials, and installation of a low permeability cover system.

Cleanup actions were required for any new development, improvements, and environmental controls on this site in accordance with the site's Consent Decree. Designs for cleanup actions required by the Consent Decree were required to be approved by the Washington State Department of Ecology (Ecology). This approval is obtained through review of and approval of an Engineering Design Report (EDR) and Plans and Specifications of the required facilities.

During construction, Riverfront Commercial Investment, LLC was responsible for providing Construction Quality Assurance (CQA) activities. The CQA activities consisted of an independent review, observation, and testing to confirm that the Contractor's work was completed in general conformance with the Plans, Specifications, and the CQA Plan. A CQA Plan was included in the EDR that identifies specific CQA activities to be performed and the required documentation of those activities, which are compiled in this CQA Report.

Construction Activities

The work requiring environmental monitoring and documentation for this CQA report included installation of utilities, LFG system installation, and installation of low permeability landfill gas barrier. Within the Riverfront Development Phase I Building B area, the sewer, water, storm, and electrical lines are being installed in addition to new sections of the site landfill gas system. Areas within the landfill refuse area utilize at least one type of low permeability barrier. Below the buildings this consists of low permeability pile supported concrete, or membranes systems designed and inspected by Herrera Environmental Consultants, Inc (Herrera). Transitions to areas immediately outside of the buildings may also consist of layers of at least three continuous feet of bentonite sand backfill (BSB) and/or low permeability soil barrier (LPSB) or a layer of HDPE geosynthetic membrane.

Construction components that are covered by this CQA report are described below:

Low Permeability Soil Barrier (LPSB) – LPSB inhibits migration of LFG upward and enhances the capability of the active LFG collection system. In addition to providing LFG control, the LPSB provides a hydraulic barrier, reducing infiltration and the generation of leachate. LPSB was used around the perimeter of the building near the surface of the site to provide a suitable gas barrier for the transition from the building and perimeter apron to the grade supported site around its perimeter. LPSB is any soil exhibiting a measurable in-place permeability rate of less than 10^{-5} cm/sec. See the documentation in Appendix B, LPSB Laboratory Analysis, and Appendix C, HWA Field Reports.

Bentonite Sand Backfill (BSB) – Similar to LPSB, BSB inhibits migration of LFG upward and enhances the capability of the active LFG collection system. BSB is an engineered material consisting of a combination of sand, bentonite powder and water. BSB has the added benefit of being easier to shape and compact while exhibiting an in-place permeability rate of less than 10^{-5} cm/sec. BSB was mostly used around pipes and penetrations into manholes and vaults and is used to limit gas migration through the landfill cap. BSB was used to supplement low permeability cover requirements where pipes were noted to have less than three feet of LPSB material above them. BSB was also used in combination with LPSB in other areas to maintain the minimum of 3 feet of low permeable soil materials. See the documentation in Appendix B, BSB Laboratory Analysis, and Appendix C, HWA Field Reports.

Other Imported Soil Materials – HWA performed conformance testing of materials brought to the site from outside sources. Imported materials consisted of gravel drainage materials and dredge sand utilized as backfill outside of areas where LPSB and BSB were required, and for use as a component in the production of BSB. Imported soils came from WSDOT approved sources that provided initial testing data. Laboratory testing was also conducted on samples collected in the field. These materials were tested in conformance with the CQA plan, project plans and specifications. Observation and testing on these materials did not pertain to the LFG barrier and as such lab data and field reports that only pertain to them are not included in this CQA summary report.

Refuse Disposal – HWA observed excavation within the refuse materials on the site. HWA documented when these materials were encountered, noted that that they received daily cover and when and how they were disposed of in predetermined refuse disposal areas. As the buildings do not contain refuse disposal areas, reports for this disposal are provided in the Phase I and II site work CQA summary report; however, information on refuse encountered and excavated within the building is documented in this CQA summary letter in the attached daily field reports in Appendix C.

Geotextile Installation – HWA observed placement of geotextile fabrics where required by the project CQA plan, site plans and specifications. See the documentation in Appendix C, HWA Field Reports.

Landfill Gas (LFG) System – The LFG system installation has been noted by HWA but is not part of our monitoring scope. HWA observed soil backfill placement, but confirmation of conformance with the CQA plan, site plans and specifications was the responsibility of Herrera.

HDPE Geomembrane Installation – HDPE geomembrane was placed in locations where Pile supported concrete, LPSB or BSB were not utilized as the LFG barrier. Confirmation of conformance with the CQA plan, site plans and specifications was the responsibility of Herrera.

Low Permeability Concrete – Low permeability concrete was used as a barrier on the pile supported apron around the perimeter of the building. The low permeability concrete was used to allow for the transition from building LFG barriers to the LFG barriers within the grade supported areas outside of the building perimeter apron.

Pile Installation – Driven grout piles were installed as part of the building foundation system. Steel casings with a steel boot on the end were driven at each proposed pile location and through the refuse, peat and fine-grained alluvial soils that comprise the aquitard below the refuse. Then a hollow mandrel was inserted into each casing, which was used to break off the boot and allow for the installation of driven grout portions of the piles that are embedded into the dense soils below the landfill. Piles were installed in accordance with HWA's geotechnical recommendations in accordance with requirements of the consent decree. Pile observations were documented in our field report which are included in Appendix C.

CQA Observation

CQA observation was provided by HWA on behalf of Riverfront Commercial Investment, LLC to monitor the installation of the various environmental controls utilized at the site. HWA was present during activities which required our CQA oversight. HWA provided evaluation of geotechnical material and conducted field testing for comparison with laboratory analyses.

CQA Testing

CQA laboratory and field testing of materials were conducted for LPSB, BSB, and low permeability concrete. Testing was conducted by HWA and the results of laboratory and field tests are summarized below.

Low Permeability Soil Barrier (LPSB)

Prior to performing work on the Riverfront Development, HWA obtained samples of existing cap soils on the site and conducted laboratory analyses to recommend material gradation specifications, and determine the appropriate moisture content and density relationship of the material placed during construction that would result in an in-place permeability of less than 10^{-5} cm/sec. Based on several rounds of testing of onsite soils with variable fines contents, HWA determined that, provided the existing soil materials contained at least 15% fines (defined as percent passing the No. 200 sieve by weight) and were compacted to at least 95% of Modified Proctor (ASTM D1557), they exhibit an in-place permeability rate of less than 10^{-5} cm/sec. LPSB was utilized around the perimeter of the building and within utility trenches near the transition from the perimeter of the proposed building apron to the grade supported areas outside of the building.

Additionally, laboratory testing was conducted on LPSB samples taken throughout the course of the project in accordance with the CQA Plan. See the documentation on LPSB acceptance testing in Appendix B and test results of field compaction testing in HWA field reports in Appendix C. Note that LPSB testing conducted around the perimeter of the building was conducted as part of the Phase I site work and reports were issued under that phase of work; however, the relevant reports related to the LPSB flipping around the perimeter of the building are included in Appendix C and a map showing the areas where low permeable soils placement occurred on site is available in Appendix D.

Bentonite Sand Backfill (BSB)

Prior to BSB placement, field tests and laboratory analyses were conducted on samples of the BSB material mixture with 5, 7 and 10 percent bentonite per dry unit weight of sand. The BSB was mixed onsite by the Contractor under observation from HWA. The moisture content and density of the samples were then measured in the lab. Permeability testing (per ASTM D5084) was used to determine the acceptable zone of moisture content and density needed to achieve the required permeability. Placement of BSB was then monitored by measuring in-place moisture content and density with a nuclear gauge to ensure the in-place moisture/density properties were within the acceptable range, and thus consistent with the laboratory findings to meet the required permeability. CQA test results for laboratory analyses are contained in Appendix B and field measured densities are recorded in HWA's field reports in Appendix C.

Low Permeability Concrete.

Prior to the start of construction HWA performed testing on the proposed mix design for the building concrete perimeter apron. Based on the results the proposed mix design was found to have a permeability significantly less than 1.0×10^{-5} cm/sec, and is sufficient to meet the project requirements for low permeability concrete. When this concrete was used, HWA reviewed the test results from the concrete testing, conducted by others to noted that it was consistent with the

mix designs that were analyzed and found to meet the requirements of low permeability concrete. CQA test results for laboratory analyses are contained in Appendix B.

HWA Comments

The original plans for the building included the placement of BSB around the LFG riser pipes below the building. However, as stated in RFI 141 for the Building B work, the BSB below the Building, which has its own barrier systems, does not provide a benefit once settlement occurs and a void is created below the building foundation. As such, BSB around the LFG Risers was determined to not be necessary and was not placed around the risers in Building B

As noted in previous Quarterly CQA Summary Report, some of the grout quantities reported for certain piles where high (over 30% greater than theoretical volume) based on reported counts; however, grout levels within the pile did not drop significantly after pile completion and no other signs other signs of significant grout losses were noted. Piles with grout counts that predict volumes in excess of 30% were PB-25B, PB-36A, PB-36B, PB-41, and PB-150.

Grout volumes are based on stroke count from the concrete pump being used. High grout readings could have been a result of not properly resetting the stroke counter prior to pumping or clogs in the line that temporarily block flow through the grout hose. Also grout sometimes overtops the piles and thus is represented in the stroke counts used to calculate the grout volume but would not be in the actual pile. Additionally, every pile will have a slightly different shape resulting from the variation in density and thickness of materials encountered below, while our theoretical volumes are based on the assumption that piles are perfectly cylindrical. However, because the upper sections of piles though refuse are cased, HWA believes that the pile shape through this section are more cylindrical, and that grout loss (increased take) did not occur in the section of the pile through the refuse materials.

As all piles are grouted, voids created by the pile driving activity below the refuse would be filled with grout. As such HWA does not have additional concern about the creation of preferential pathways between the landfill leachate and underlying groundwater, resultant from driven pile installation.

Although HWA does not perform the concrete testing on the site, completed by Krazan and Associates Inc. (Krazan), documenting placement and field testing of the low permeability concrete are included in Appendix C. HWA was provided concrete cylinders from the concrete pour on September 24, 2021 to conduct hydraulic conductivity testing on low permeability concrete which easily met the permeability requirements. The field tests for slump, air entrainment and temperature were all within typical test parameter for this type of concrete and are similar enough to the field test result of the other concrete pours to confirm that the permeability results from our laboratory testing is indicative of the concrete throughout the concrete aprons. As such based on our laboratory testing and the field testing data, provided by Krazan, it appears that the concrete delivered on site was placed in accordance with the project plans and specifications and meets the requirements for use as low permeability concrete.

Documentation of CQA Activities

Documentation of the CQA activities is presented below.

- *Construction Quality Assurance (CQA) Declaration:* A declaration stating that the construction activities were performed in conformance with the Plans and Specifications is included in Appendix A.

- *CQA Testing and Construction Observation:* Daily construction reports related to required CQA activities covering the CQA testing, observation, and other activities are provided in the Appendixes:
    - Appendix B: Laboratory Analyses by HWA on LPSB, BSB, and low permeability concrete.
    - Appendix C: HWA Field reports summarizing site summarizing observations by HWA during pile installation, LFG system installation, LPSB, and BSB placement, including compaction testing and low permeability material depth verifications.
    - Appendix D: Everett Riverfront Low Permeability Soil Barrier Log Map.

Conclusion

The Everett Landfill Consent Decree requires that protective measures and cleanup actions be implemented for any new development on the landfill site. As part of the process, this CQA report documents these procedures for the construction of this project. The construction activities have included installation of piles and utilities such as storm, sewer, water, and electrical in addition to additions to the site's LFG system. HWA has monitored these activities and noted pile installation, along with LPSB, BSB and low permeability concrete materials used as landfill gas barrier, noting proper installation in accordance with the project CQA plan, site plans and specifications. Documentation of the CQA activities is included in the appendices of this letter report.

September 21, 2023
HWA Project No. 2015-061-21

If you have any question pertaining to this CQA letter report please feel free to contact the undersigned at 425-774-0106.

Sincerely,
HWA GeoSciences Inc.,

Michael S. Place, P.E.
Senior Geotechnical Engineer

Attachments:

Appendix A: CQA Declaration
Appendix B: Laboratory Analyses
Appendix C: HWA Field reports
Appendix D: Everett Riverfront Low Permeability Soil Barrier Log Map

Appendix A:

CONSTRUCITON QUALITY ASSURANCE (CQA) DECLARATION