

Comments on Volume 2, Section A8 – “Technical Specifications”

General Comment

1. Section 01400.1 of the specifications is stated to be the earthworks Construction Quality Assurance (CQA) Plan, and is independent and separate from the Construction Quality Control (CQC) Program to be implemented by the contractor. While the Division agrees with this concept, the specific CQC Plan must also be submitted by the applicant and approved by the Division as part of the license application. In particular, the Division finds that the soil testing frequency shown in Table 01400.1-1 appears to be adequate for CQA, provided that the CQC Plan commits to the remainder of the testing frequency expected to be performed. Therefore, please provide the CQC Plan for review.

Specific Comments

2. Section 01050.0, Part 1.05 B.3 – This specification states that a subgrade contour interval of 10-ft will be used for drawings, however Part 1.05 B requires a 2-ft topographic contour interval. A 10-ft interval is not accurate enough for the record drawings. Please change the requirement in this specification to 2-ft, to be consistent with Part 1.05 B.
3. Section 01400.1, Part 2.04 – Please clarify this section by stating that Engineer of Record (EOR) is independent from the Contractor, and in the event that Golder is not retained as the EOR, the EOR will still be independent from the Contractor.
4. Section 01400.1, Part 2.05 – In addition to the items discussed in this section, the CQA Monitor should also review submitted survey reports for tolerance, grade, elevation, and thickness, where appropriate, to verify the project requirements have been achieved.
5. Section 01400.1, Part 2.05.8 – a) In addition to approved deviations from the project specifications and drawings, the CQA Report should discuss, and highlight, any non-conformances with project specifications and drawings. b) Will two separate CQA Reports be written for this project? Part 2.04 of this specification states that two different companies, Golder and Kleinfelder, will each be considered the EOR for their specific area of design. Please clarify how this will be coordinated both in the field as well as how the report will be signed and sealed.
6. Section 01400.1, Part 2.06 – In this section, please also include the responsibility of conducting the QC Program by the Contractor, as discussed in Part 1 of this specification.
7. Section 01400.1, Part 5.01 – Please invite the Division to attend the pre-construction meeting.

8. Section 01400.1, Part 6 – Please include all of the other tests shown on Table 01400.1-1 as part of the sampling and testing responsibilities of the CQA Monitor.
9. Section 01400.1, Part 6.01 – The second sentence states that testing shall be performed on soil to verify the material meets specifications. However, the next sentence states that the testing will be performed after placement of the materials. The Division assumes that some CQC testing will be done prior to placement that shows the material is acceptable for its intended purpose. Please confirm this assumption.
10. Section 01400.1, Part 7.01 – Verify that the information described in this section will be included in the CQA Report.
11. Section 01400.1, Part 7.02.4 – Clarify that the locations and elevations of the tests and samples will be performed by survey according to Section 01050.0.
12. Section 01400.1, Part 7.04 – Once the specifications for construction are approved, *all* design changes require approval by the Division. Please change the language of this specification. It is the intent of the Division to not delay the Contractor during a proposed design change review. However, it must be understood that the Contractor will be proceeding at risk should the proposed design change not be approved by the Division.
13. Section 01400.1, Part 7.06 – In addition to the drawings and specifications, please add that the work has also been performed in compliance with the CQA Plan.
14. Section 01400.2, Part 2.07 – Please add destructive seam testing to the list of responsibilities for the Installer.
15. Section 01400.2, Part 6.02 – This specification requires geosynthetic conformance sampling at the rate of one test per 150,000 sf. Although we are not aware of specific guidance for tailings cell liners, both EPA (1993)¹ and the Division's Solid Waste Guidance² requires geosynthetic conformance sampling and testing at the frequency of one test per 100,000 sf. Please change the frequency to one test per 100,000 sf for this project.
16. Section 01400.2, Part 6.02.1 – Please include the following conformance tests for the geomembrane: asperity (ASTM D 7466), carbon black dispersion (ASTM D 5596), puncture (D 4833), and tear (ASTM D 1004).
17. Section 01400.2, Part 6.02.2 – Please include the following conformance tests for the geocomposite: carbon black content (ASTM D 4218 or D 1603), density (ASTM D 1505 or 792), thickness (ASTM D 5199), and tensile strength (ASTM D 5035).

18. Section 01400.2, Part 6.02.4 – Please include the following conformance testing for the geosynthetic clay liner (GCL): moisture content (ASTM D 2216 or D 4643), and index flux (ASTM D 5887).
19. Section 01400.2, Part 6.02.5 – Please include the following conformance testing for the geotextile: permittivity (ASTM D 4491), grab tensile (ASTM D 4632), and trapezoidal tear (ASTM D 4533).
20. Section 01400.2, Part 6.04.1 – Please clarify this specification by indicating that all lines and grades will be surveyed, not just verified, by a land surveyor.
21. Section 01400.2, Part 6.04.2 – In addition the Installer, both the CQA Monitor and the Manager, or their designated agents, should also sign all subgrade acceptance certificates.
22. Section 01400.2, Part 6.04.7 – Clarify that this specification requires seams to be placed “parallel” to slopes, and not across the direction of slope.
23. Section 01400.2, Part 6.04.01, Trial Seams – Include additional trial seams if the ambient air temperature changes greater than 20° F within a seaming period.
24. Section 01400.2, Part 6.04.03, Nondestructive Testing – It is unclear what testing this specification refers to. Please state the testing and the requirements.
25. Section 01400.2, Part 7.04 – Similar to the Comment 12 above, *all* design changes require approval by the Division. Please change the language of this specification.
26. Section 02200.0, Part 1.04.C. – Similar to Comment 1 above, please provide the Contractor Quality Control Plan to the Division for review and approval.
27. Section 02200.0, Part 2.01.A.1 – We understand that deep excavations may be required for the various facilities, thus requiring large amounts of backfill. The use of up to 8-in rock sizes may be acceptable for the deeper parts of the excavation. However, we suggest that the upper 2-ft of the fill not contain rocks greater than 3-in maximum size. Please add this to the specification. In addition, rocks exceeding the maximum size requirement should not be “broken down” within the fill, as there is no way to confirm that has been done. Material exceeding the maximum size requirement should be removed.
28. Section 02200.0, Part 2.01.A.5. – This specification states that cushion soil should not consist of soils with high concentrations of calcium. The maximum percent of calcium that is acceptable should be stated, along with a testing requirement and frequency of testing to be performed for calcium in the cushion material.

29. Section 02200.0, Part 2.01.A.7 – This specification states that the anchor trench lift thickness shall be no greater than 2-ft. However, Part 3.07.F.2 states that the anchor trench lifts be between 8 to 12-inches. Please check and change. We also recommend that the maximum particle size for the anchor trench be changed from 6-inches to 2-inches.
30. Section 02200.0, Part 3.07.B.4 – Consistent with Section 01400.1, Part 2.03, the Design Engineer, not the CQA Monitor, should be the person to change the method specification and adjust the acceptable moisture range. Please change.
31. Section 02200.0, Part 3.07.C.4 – The density requirement should be removed for the lower 6-inches of cushion material and replaced with a method specification. A nuclear gage could potentially penetrate the GCL below when trying to obtain a test area. Therefore, in order to eliminate this potential penetration, a method specification should be provided.
32. Section 02200.0, Part 3.07.D.4 and Part 3.07.E.2 – A wrinkle height greater than 3-inches, rather than the 6-inches used in these specifications, should require repair. Please change.
33. Section 02200.0, Part 3.07.F.2 – This specification starts by stating that a method specification shall be used for backfilling the anchor trench. The specification then provides a required performance specification (92% MDD, \pm 3% OMC). This is confusing. Will a method specification be provided after a test pad confirms a proposed method? Please clarify this specification.
34. Section 02200.0, Part 3.07.I.2 – This specification states that any areas deflecting during proofrolling shall be removed and replaced. A deflection amount, typically greater than 2-inches, is usually specified. Please provide the amount of allowable deflection for this specification.
35. Section 02710.0, General – The division has two general comments for this section:
 - a) Part 1.03 of this section states that all work shall be performed in accordance with the CQA Plan. The CQA Plan related to piping could not be found in these specifications or elsewhere in the application. Please provide the piping CQA Plan for review.
 - b) After installation, piping is normally pressure tested to manufacturer's requirements. Please include pressure testing/manufacturer's requirements as part of the project specifications or CQA Plan.
36. Section 02776.0, Part 1.02.C.2 – In addition to the Contractor, the Division strongly recommends that the CQA Monitor also sign the subgrade surface acceptance certificates.

37. Section 02776.0, Part 1.05.A.1 – If the ambient air temperature is between 5° and 32° F, then the provisions for cold weather seaming discussed in Geosynthetic Research Institute (GRI) guide GM9³ should be followed.
38. Section 02776.0, Tables 02776-2A, 02776-2B, and 02776-2C – UV Resistance should be verified for the geomembranes using GM11, ASTM D 3895, or ASTM D 5885 and should be included in these Tables.
39. Section 02776.0, Part 2.02.A.4 – The Division recommends that this specification be deleted. It is our experience that the heat applied from using a Leister may actually “thin” the geomembrane. A letter or other acknowledgement from the geomembrane vendor that it is acceptable to temporarily bond the geomembrane using a Leister prior to seaming should be provided if this specification remains.
40. Section 02776.0, Part 3.07.D.1 – Similar to Comment 23, include additional trial seams if the ambient air temperature changes greater than 20° F within a seaming period.
41. Section 02776.0, Part 3.11.B – The conformance testing for the geomembrane in this section should also include those tests requested to be added in Comment 16.
42. Section 02776.1, Part 3.06.B – The conformance testing for the GCL described in this section should be expanded to include language similar to that found for geomembranes in Section 02776.0, Part 3.11. Please clarify that samples of the actual GCL to be used for the project will be obtained and tested. The sampling may be performed either at the manufacturer’s facility or after delivery to the project site.
43. Section 02777.1, Table 02777.0-1 – For this Table, please include the tests and ASTM test methods for geotextiles as discussed in Comment 19 above.

¹ EPA, 1993, *Technical Guidance Document, Quality Assurance and Quality Control for Waste Containment Facilities*, EPA/600/R-93/182.

² <http://www.cdphe.state.co.us/hm/engdesignqaqc.pdf>

³ <http://www.geosynthetic-institute.org/grispecs/gm9.pdf>