REPUBLIC SERVICES

Sustainability in Action

Received Waste Permits Division: 12/13/2024
Tracking No.: 30168338 (30564690)

December 12, 2024

Mr. Gordon Shields
MC 124
Municipal Solid Waste Permits Section
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087

Re: Response to Comments
Permit Modification – Final Contour Plan Improvements
McCarty Road Landfill – Permit No. MSW-261B
Harris County, Texas
Tracking No. 30168338

Dear Mr. Shields:

On behalf of McCarty Road Landfill TX, LP, please find attached one original and three copies of the replacement pages for the referenced permit modification. The attached replacement pages and comment responses below were developed to incorporate comments included in your email dated November 12, 2024. This response letter contains each comment identified by the TCEQ (in bold) and a response to each.

1. **Digital format mailing labels for adjacent property owner names and mailing addresses in Avery 5160 format are missing. Provide digital format mailing labels for adjacent property owner names and mailing addresses in Avery 5160 format (see bottom of page 11, TCEQ-00650-instr).**

Response:

Names and mailing addresses in Avery 5160 format have been provided in Attachment 3.

2. **Appendix B, table of SDP replacement pages, page B-1 lists Attachment 2 as including a table of contents but only a cover sheet is provided. Remove "and Table of Contents" and change "Pages were" to "Page was" in the explanation column.**

Response:

SDP Replacement Page was updated to exclude the Table of Contents.

3. The cover page for Attachment 6 is missing several previous revision dates, namely October 2009, August 2010, December 2010, and October 2014. Revise the cover page to include these previous revision dates and confirm that the proposed revisions are being made based the most recent version, with all these previous revisions incorporated.

Response:

The Attachment 6 cover page has been updated to incorporate the missing revision dates, and the most recent version of the document is being revised with this modification.

4. The cover page for Attachment 6A is missing the title "DRAINAGE DESIGN REPORT." Add "DRAINAGE DESIGN REPORT" to the cover page.

Response:

The cover page has been updated to include missing title and add a revision date of March 2024.

5. Throughout the permit, show the previous version dates and revision numbers redlined in the footers along with the new entries that will be used in the clean copy. For example, page 6A-13 should show "1/23/2012" and "Rev. 1" in the footer, along with the new entries of "9/2024" and "Rev. 2" that will be used in the clean copy.

Response:

Redlining the footers, as suggested, is not a consistent practice used in the development of permit modifications in the past. As of this resubmittal, the footers have not been redlined.

6. Page 6A-17 appears to be missing. Please provide this page, or confirm that this page is not missing, renumber 6A-18 as 6A-17, and update the table of contents and entry in table at top of page B-2.

Response:

Page 6A-18 has been renumbered to 6A-17.

7. Attachment 6A, Figure 4.7 the curves for the higher flow appear to be mislabeled as Q25 PEAK (colored blue) whereas it should be Q100. Also, the new results of 60,138 and 41,756 cubic feet per second (cfs) are much higher than the Rev. 1, 08/2006 results of 37,768 and 31,186 cfs for Q100 and Q25, respectively. Thirdly, the new figure has a Rev. 1 date of 10/2010. Please make changes where necessary and address each of these instances in the narrative.

Response:

The hydrograph has been relabeled as requested, and the revision dates have been updated. Peak flow rates in Greens Bayou significantly increase based on the latest hydrologic data and guidance provided by HCFCD. In most locations, the new 100-year peak flow rates are almost double the values in the permitted condition. This is due to significantly less-efficient detention and less hydrograph routing throughout the entire system.

8. Attachment 6A.2 has Rev. 1 as 10/2010 whereas the permit has Rev. 1 as 01/2012. Confirm Attachment 6A.2 can be replaced as submitted or state the revision dates need additional review, to be sure the revisions have been made using the most recent version.

Response:

All of Attachment 6A revisions have been reviewed and updated accordingly, including Attachment 6A.2.

9. Page 6A-A-109 is incorrectly listed in table of SDP Replacement Pages on page B-2. Change 6A-A-109 to 6A-A-110 on the 15th row in the table on page B-2.

Response:

SDP Replacement Page numbering was revised per the comment.

10. Pages 6A-B.2A-5 through 6A-B.2A-7 have no changes. Change "6A-B.2A-7" to "6A-B.2A-4" in table of SDP Replacement Pages on page B-2 in the 20th row.

Response:

The same charts were used for apron calculations, however interpolation lines used have been updated. Results from previous and updated information are reported on page 6A-B.2A-4. No additional revisions were made. No revision was made to the SDP Replacement Pages.

11. Page 6A-B.2B1-3 hydrograph for discharge point DCP-1 has tenfold decrease in flow from 2012 (to 77 from 1101 cfs). Explain this difference.

Response:

At DCP-1 the only flow in P116-00-00 is that from Basin P00O1, which has a peak flow of 77 cfs. In previous submittals, the flow in P116-00-00 at DCP-1 was incorrectly selected as the flow at the junction “NDCP” which has a much higher flow rate. This mistake has been corrected.

12. Page 6A-B.2B1-4 table of hydraulic calculations is missing a title that it is for discharge point DCP-1. Add a title similar to the current version that clarifies this is "At the outfall of DCP-1".

Response:

The table in question provides hydraulic calculations for all of P116-00-00, not just at DCP-1. DCP-1 is located at station 36+55 and DCP-3 occurs at station 23+50. No revisions were made to this table.

13. Appendix 6A-B.2B1 does not have a new hydrograph and table of hydraulic calculations for discharge point BSD-2. Confirm there are no changes for BSD-2.

Response:

The table on 6A-B.2B1 contains information for discharge point DCP-3. BSD-2 was converted to "DCP-3" as a part of a 2012 modification.

14. Page 6A-B.2B1-5 hydrograph as proposed has the same discharge point (DCP-3) and previous peak flow (1,103 cfs) that are listed on page 6A-B.2B1-7 in the permit. Change the page number to remain as 6A-B.2B1-7 (no red-line).

Response:

Pages 6A-B.2B1-4 and 6 from the permit are being removed and replaced with the table on new 6A-B.2B1-4, causing 6A-B.2B1-7 to change to 6A-B.2B1-5. The removed pages have been redlined and included in this resubmittal, for clarity.

15. Appendix 6A-B.2B1 does not have a new table of hydraulic calculations to accompany the new hydrograph and new peak flow rate for DCP-3. Provide a new table of hydraulic calculations "At the outfall of DCP-3."

Response:

The conditions in P116-00-00 at DCP-3 are summarized on 6A-B.2B1-4. DCP-3 occurs at station 23+50.

16. Pages 6A-B.2B1-45 through 6A-B.2B1-82 are present in the current permit concerning P114-00-00 (South Ditch), whereas the pages provided for the proposed modification end at 6A-B.2B1-44. Provide clarification on whether pages 45 through 82 are intended to be removed from the permit or if these are still relevant to Appendix 6A-B.2B1 and should be retained with no changes.

Response:

Pages 6A-B.2B1-45 through 6A-B.2B1-82 are not intended to be removed, as they are still relevant.

17. Reference to page "6A-B.2B2-3 through" in table of SDP Replacement Pages on page B-3, row 7, is a typographical error. Remove this entry.

Response:

Page B-3 was revised as requested.

18. Pages 6A-C-21 through 6A-C-27 have redline changes that do not match the text in the current permit (revision date in 2004). Revise the revision date or clarify the proposed revisions have been made using the most recent and cumulative version.

Response:

Redlined values for DA1/Chute 1 on 6A-C-21 and 6A-C-24 were updated to match permitted values. The example calculations on 6A-C-25 and 26 were also updated. All other redlined values match the permitted values.

19. Reference to Sheet 12-3 in table of SDP Replacement Pages, page B-5, is out of order. Move reference to Sheet 12-3 (page 3) to after "Figure 12.1" (page 2).

Response:

The order of the revision for Sheet 12-3 is consistent with the existing permit.

20. Incorrect references to "Attachment 12A" in table of SDP Replacement Pages, page B-5, last three rows. Change "Attachment 12A" to "Appendix 12A" in table of SDP Replacement Pages and on the cover sheet in redline and replacement pages of the application.

Response:

SDP Replacement Page summary was revised per the comment.

21. Cover sheet for Appendix 12A-A is missing. Provide cover sheet for Appendix 12A-A.

Response:

Cover sheet has been included, as requested.

22. Pages 12A-A.1, 12A-A.2, 12A-A.5, and 12A-A.6 do not appear to have any changes from the corresponding pages in the permit revisions from 2004. Confirm these pages do not have any changes and remove them from the application and references in table of SDP Replacement Pages, page B-5.

Response:

SDP Replacement Page 12A-A.1, 12A-A.2, 12A-A.5, and 12A-A.6 have been removed. Values changed, however the changes made were within rounding error of the values shown.

If you have any questions or require further information, please call.

Sincerely,
McCarty Road Landfill TX, LP

Raymond P. Whitlock

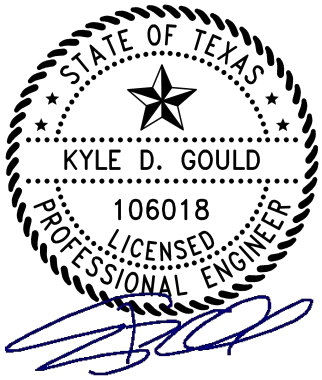
Raymond Whitlock
Environmental Manager

Attachments: Attachment 1 – Replacement Pages (Redline/Strikeout Version)
Attachment 2 – Replacement Pages (Clean Version)
Attachment 3 – TCEQ-20650 Form

cc: TCEQ Region 12 Office
Scott Trebus, McCarty Road Landfill TX, LP
Kyle D Gould, P.E., Weaver Consultants Group

ATTACHMENT 1

REPLACEMENT PAGES
(REDLINE/STRIKEOUT VERSION)



12/12/2024

INTRODUCTION

The following replacement pages have been developed to replace applicable sections of the permitted Site Development Plan. The following table summarizes the proposed replacement pages for the currently approved plans.

Site Development Plan Replacement Pages

Replacement or Additional Page Number	Explanation
SDP – Part III Cover Page	Page provided for updated engineer seal and signature.
SDP – Part III, Page III-13	Updated text. Updated revision number.
Attachment 1 – Cover Sheet	Page provided for updated engineer seal and signature. Added revision dates.
Attachment 1, Attachment 1C – Typical Section A	Updated final cover contours.
Attachment 1, Attachment 1D – Sector Development Plan	Updated final cover contours.
Attachment 1, Attachment 1E – Sector Development Plan	Updated final cover contours.
Attachment 1, Attachment 1F – Sector Development Plan	Updated final cover contours.
Attachment 1, Attachment 1G – Sector Development Plan	Updated final cover contours.
Attachment 1, Attachment 1H – Sector Development Plan	Updated final cover contours.
Attachment 2 – Cover Sheet ~~and Table of Contents~~	Page~~s were~~ was provided for updated engineer seal and signature. Added revision dates.
Attachment 2, Attachment 2A – Typical Section Plan	Updated final cover contours. Added revision dates.
Attachment 2, Attachment 2B – Typical Fill Cross Sections	Updated final cover contours.
Attachment 2, Attachment 2C – Typical Fill Cross Sections	Updated final cover contours.
Attachment 2, Attachment 2D – Typical Fill Cross Sections	Updated final cover contours.
Attachment 2, Attachment 2E – Typical Fill Cross Sections	Updated final cover contours.
Attachment 2, Attachment 2F – Typical Fill Cross Sections	Updated final cover contours. Added revision date.
Attachment 2, Attachment 2G – Typical Fill Cross Sections	Updated final cover contours.
Attachment 6 – Cover Sheet ~~and Table of Contents~~	Page provided for updated engineer seal and signature. Added revision dates.
Attachment 6, Attachment 6A – Cover Sheet ~~and Table of Contents~~	Page provided for updated engineer seal and signature. Added revision dates and updated title.

Site Development Plan Replacement Pages (Continued)

Replacement or Additional Page Number	Explanation
Attachment 6, Attachment 6A – Sheet 6A-13 through Sheet 6A-16 and Sheet 6A-18	Updated final contours, drainage areas, and discharge information. Updated revision number on all sheets. Revised page number 6A-18 to 6A-17.
Attachment 6, Attachment 6A – Figures 4.2, 4.3, 4.4, 4.5, 4.6, and 4.7	Updated hydrographs. Added and revised revision dates to all figures.
Attachment 6, Attachment 6A, Attachment 6A.1 – Drainage Structure Plan	Revised final contours. Revisions listed in the Title Block. Added revision dates.
Attachment 6, Attachment 6A, Attachment 6A.2 – Drainage Area Plan	Revised final contours and drainage areas. Revisions listed in the Title Block. Revised revision date.
Attachment 6, Attachment 6A, Attachment 6A.3 - Perimeter Drainage Plan	Revised channel outfall information. Revised revision date.
Attachment 6, Attachment 6A, Attachments 6A.4 through 6A.12	Revised channel information tables. Revised revision date on 6A-4 through 6A-6. Updated revision number on 6A-7 through 6A-12.
Attachment 6, Attachment 6A, Attachment 6A.14 – Drainage Details	Revised detail. Added revision date.
Attachment 6, Attachment 6A, Attachment 6A.17 – Energy Dissapator Details	Revised detail.
Attachment 6, Attachment 6A, Attachment 6A.17J – Letdown Details	Revised detail. Revised revision date
Attachment 6, Attachment 6A, Attachments 6A.20, 6A.21, 6A.22, 6A.24, and 6A.25	Revised storm stages. Updated revision number on 6A-21, 6A-22, 6A-24, and 6A-25.
Attachment 6, Attachment 6A, Attachments 6A.26, 6A.27, 6A.28, 6A.29, and 6A.30	Revised discharge information. Updated revision number on 6A.28, 6A.29, and 6A.30.
Attachment 6, Attachment 6A, Appendix 6A-A – Cover Sheet	Page provided for updated engineer seal and signature.
Attachment 6, Attachment 6A, Appendix 6A-A – Sheet 6A-A-2	Hypothetical storm data updated.
Attachment 6, Attachment 6A, Appendix 6A-A – Sheet 6A-A-12	Text on hypothetical storm data updated.
Attachment 6, Attachment 6A, Appendix 6A-A – Sheets 6A-A-13 through 6A-A-108 and 6A-A-~~109~~110 through 6A-A-125	HEC-HMS post development storm for 25-year and 100-year event reproduced.
Attachment 6, Attachment 6A, Appendix 6A-B – Cover Sheet	Page provided for updated engineer seal and signature.
Attachment 6, Attachment 6A, Appendix 6A-B, Appendix 6A-B.1 – Sheet 6A-B.1-1	Updated content reference.
Attachment 6, Attachment 6A, Appendix 6A-B, Appendix 6A-B.1 – Sheet 6A-B.1-2, 6A-B.1-3, 6A-B.1-4, 6A-B.1-5, 6A-B.1-6, 6A-B.1-7, 6A-B.1-8, 6A-B.1-9, and 6A-B.1-10	Revised channel calculations based on revisions to final contours. Updated revision number on , 6A-B.1-4, and 6A-B.1-5.
Attachment 6, Attachment 6A, Appendix 6A-B, Appendix 6A-B.2 – Sheets 6A-B.2-2 and 6A-B.2-3	Revised tailwater depth summary table.
Attachment 6, Attachment 6A, Appendix 6A-B, Appendix 6A-B.2A – Sheets 6A-B.2A-2 through 6A-B.2A-7	Revised detention pond design.
Attachment 6, Attachment 6A, Appendix 6A-B, Appendix 6A-B.2B1 – Sheets 6A-B.2B1-3 through 6A-B.2B1-~~5~~6	Revised tailwater depth determination. Sheets 6A-B.2B1-4 and 6A-B.2B1-6 are included to indicate removal from permit.
Attachment 6, Attachment 6A, Appendix 6A-B, Appendix 6A-B.2B1 – Sheet 6A-B.2B1-10A	Updated South Ditch flow elevations.

Site Development Plan Replacement Pages (Continued)

Replacement or Additional Page Number	Explanation
Attachment 6, Attachment 6A, Appendix 6A-B, Appendix 6A-B.2B1 – Sheets 6A-B.2B1-11 through 6A-B.2B1-26 and 6A-B.2B1-26A through 6A-B.2B1-260	Included HEC-RAS report for South Ditch.
Attachment 6, Attachment 6A, Appendix 6A-B, Appendix 6A-B.2B1 – Sheet 6A-B.2B1-28	Updated Greens Bayou flow elevations.
Attachment 6, Attachment 6A, Appendix 6A-B, Appendix 6A-B.2B1 – Sheets 6A-B.2B1-29 through 6A-B.2B1-36, 6A-B.2B1-37A, and 6A-B.2B1-37B	Included HEC-RAS report for Greens Bayou.
Attachment 6, Attachment 6A, Appendix 6A-B, Appendix 6A-B.2B1 – Sheet 6A-B.2B1-39	Updated hydraulic calculations for P116-00-00.
Attachment 6, Attachment 6A, Appendix 6A-B, Appendix 6A-B.2B1 – Sheets 6A-B.2B1-41, 6A-B.2B1-42, 6A-B.2B1-42A, 6A-B.2B1-43, and 6A-B.2B1-44	Revised tailwater and normal depth determination.
Attachment 6, Attachment 6A, Appendix 6A-B, Appendix 6A-B.2B2 – Sheets 6A-B.2B2-3 through 6A-B.2B2-10 and 6A-B.2B2-13 through 6A-B.2B2-20	Revised outlet structure design.
Attachment 6, Attachment 6A, Appendix 6A-B, Appendix 6A-B.2B2 – Sheets ~~6A-B.2B2-3 through~~ 6A-B.2B2-47 through 6A-B.2B2-82 and 6A-B.2B2-82A	Included HEC-RAS report for P114-00-00.
Attachment 6, Attachment 6A, Appendix 6A-C – Cover Sheet	Page provided for updated engineer seal and signature.
Attachment 6, Attachment 6A, Appendix 6A-C – Sheet 6A-C-1	Revised text for swales.
Attachment 6, Attachment 6A, Appendix 6A-C – Sheet 6A-C-2 -Swale Drainage Areas	Revised swale drainage areas.
Attachment 6, Attachment 6A, Appendix 6A-C – Sheets 6A-C-3 through 6A-C-12	Revised swale analysis for final cover modification and updated precipitation information.
Attachment 6, Attachment 6A, Appendix 6A-C – Sheets 6A-C-14 through 6A-C-16	Revised chute analysis for final cover modification and updated precipitation information.
Attachment 6, Attachment 6A, Appendix 6A-C – Sheet 6A-C-17 - Chute Drainage Areas	Revised chute drainage areas.
Attachment 6, Attachment 6A, Appendix 6A-C – Sheet 6A-C-18	Revised chute peak flows.
Attachment 6, Attachment 6A, Appendix 6A-C – Sheet 6A-C-21 through 6A-C-27 and 6A-C-30 through 6A-C-32	Updated chute design. Sheets 6A-C-21, 6A-C-24, 6A-C-25, and 6A-C-26 current permit information revised.
Attachment 6, Attachment 6A, Appendix 6A-C-A – Cover Sheet	Page provided for updated engineer seal and signature.
Attachment 6, Attachment 6A, Appendix 6A-C-A – Sheets 6A-C-A-2 through 6A-C-A-5	Updated FML letdown design.
Attachment 6, Attachment 6A, Appendix 6A-C-A – Sheets 6A-C-A-8 through 6A-C-A-10	Updated FML letdown design.
Attachment 6, Attachment 6A, Appendix 6A-C-A – Sheets 6A-C-A-13 through 6A-C-A-16	Updated FML letdown design.
Attachment 6, Attachment 6A, Appendix 6A-C-A – Sheet 6A-C-A-19	Updated FML letdown design.
Attachment 6, Attachment 6A, Appendix 6A-C-B – Cover Sheet	Page provided for updated engineer seal and signature.

Site Development Plan Replacement Pages (Continued)

Replacement or Additional Page Number	Explanation
Attachment 6, Attachment 6A, Appendix 6A-C-B – Sheets 6A-C-B-2 through 6A-C-B-5	Updated Flexamat letdown design.
Attachment 6, Attachment 6A, Appendix 6A-C-B – Sheets 6A-C-B-8 through 6A-C-B-10	Updated Flexamat letdown design.
Attachment 6, Attachment 6A, Appendix 6A-D – Cover Sheet	Page provided for updated engineer seal and signature.
Attachment 6, Attachment 6A, Appendix 6A-D – Sheets 6A-D-3 through 6A-D-5	Re-evaluated erosion layer.
Attachment 6, Attachment 6A, Appendix 6A-D – Sheet 6A-D-5a - Erosion Layer Analysis Section Locations	Revised final contours and swale locations. Revisions listed in the Title Block.
Attachment 6, Attachment 6A, Appendix 6A-D – Sheets 6A-D-14, 6A-D-15, 6A-D-18 through 6A-D-24	Re-evaluated erosion layer and updated precipitation data.
Attachment 6, Attachment 6A, Appendix 6A-E – Cover Sheet and Table of Contents	Page provided for updated engineer seal and signature.
Attachment 6, Attachment 6A, Appendix 6A-E – Sheet 6A-E-2	Hypothetical storm data updated.
Attachment 6, Attachment 6A, Appendix 6A-E – Figure 6A-E-12a - Permitted Drainage Areas	Updated figure to latest permitted condition. Revisions listed in the Title Block.
Attachment 6, Attachment 6A, Appendix 6A-E – Sheet 6A-E-16 through 6A-E-86	Replaced previous permit HEC-1 report with latest permit HEC-HMS report.
Attachment 6, Attachment 6A, Appendix 6A-G – Cover Sheet	Page provided for updated engineer seal and signature.
Attachment 6, Attachment 6A, Appendix 6A-G – Figure 2 - Swale Design Summary	Updated temporary add-on swale summary. Added revision date.
Attachment 6, Attachment 6A, Appendix 6A-G – Figure 3 - Letdown Design Summary	Revised letdown calculations. Added revision dates.
Attachment 6, Attachment 6A, Appendix 6A-G – Figure 4 - Sediment Control Pond Plan	Revised pond calculations. Added revision dates.
Attachment 6, Attachment 6A, Appendix 6A-G, Appendix 6A-G-1 – Cover Sheet	Page provided for updated engineer seal and signature.
Attachment 6, Attachment 6A, Appendix 6A-G, Appendix 6A-G-1 – Sheets 6A-G-1-2 through 6A-G-1-7 and 6A-G-1-10 through 6A-G-1-12	Updated temporary add-on swale design and precipitation data.
Attachment 6, Attachment 6A, Appendix 6A-G, Appendix 6A-G-2 – Cover Sheet	Page provided for updated engineer seal and signature.
Attachment 6, Attachment 6A, Appendix 6A-G, Appendix 6A-G-2 – Sheets 6A-G-2-2 through 6A-G-2-5, 6A-G-2-5A, and 6A-G-2-18	Updated temporary letdown design and precipitation data.
Attachment 6, Attachment 6A, Appendix 6A-G, Appendix 6A-G-3 – Cover Sheet	Page provided for updated engineer seal and signature.
Attachment 6, Attachment 6A, Appendix 6A-G, Appendix 6A-G-3 – Sheets 6A-G-3-2 through 6A-G-3-6	Updated temporary sediment control pond design and precipitation data.
Attachment 6, Attachment 6D – Cover Sheet	Page provided for updated engineer seal and signature.
Attachment 6, Attachment 6D – Attachment 6D.1C – GCL Completion Plan	Updated final cover contours.
Attachment 6, Attachment 6D – Attachment 6D.2 – Final Cover Details Subtitle D Area	Updated detail references.

Site Development Plan Replacement Pages (Continued)

Replacement or Additional Page Number	Explanation
Attachment 6, Attachment 6D – Attachment 6D.3 – Final Cover Details Pre-Subtitle D Area	Updated detail references.
Attachment 6, Attachment 6D – Attachment 6D.4 – Final Cover Tie-In Details	Updated detail references.
Attachment 6, Attachment 6D – Attachment 6D.4A – Alternative Final Cover Details Subtitle D Area	Updated detail references.
Attachment 6, Attachment 6D – Attachment 6D.4B – Alternative Final Cover Details Pre-Subtitle D Area	Updated detail references.
Attachment 6, Attachment 6D – Attachment 6D.4C – Alternative Final Cover Tie-In Details	Updated detail references.
Attachment 6, Attachment 6D – Attachment 6D.4D – Alternative Final Cover Transition	Updated detail references.
Attachment 7 – Cover Sheet	Page provided for updated engineer seal and signature.
Attachment 7, Attachment 7A – Landfill Completion Plan	Updated for final cover contours. Added revision dates.
Attachment 7, Attachment 7B – Post development Drainage Plan	Updated for final cover contours. Updated hydrographs.
Attachment 12 – Cover Sheet	Page provided for updated engineer seal and signature.
Attachment 12 – Figure 12.1	Updated final cover contours.
Attachment 12 – Figure 12.1A	Updated expedited final cover area.
Attachment 12 – Figure 12.2	Updated final cover contours.
Attachment 12 – Sheet 12-3	Updated text.
Attachment 12, ~~Attachment~~ Appendix 12A – Cover Sheet	Page provided for updated engineer seal and signature. Updated title.
Attachment 12,Appendix 12A, Appendix 12A-A – Cover Sheet	Page provided for updated engineer seal and signature.
Attachment 12, Appendix 12A~~Attachment~~ Appendix 12A-A – Sheets 12A-A.~~13~~ ~~through~~ and 12A-A.~~64~~	Updated calculations. Removed No Change sheets from this permit mod.
Attachment 12, Appendix 12A~~Attachment~~ Appendix 12A-A – Sheet 12A-A-7 – Drainage Pipe Layout	Updated final cover contours.

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

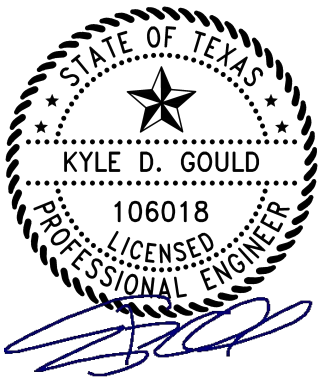
PART III – SITE DEVELOPMENT PLAN
SITE DEVELOPMENT PLAN NARRATIVE

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan August 2008
Revised June 2009
Revised October 2009
Revised February 2010
Revised December 2010
Revised January 2012
Revised October 2014
Revised March 2024

Revised December 2024



12/12/2024

Prepared by

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No. 0120-439-11-259

south of the site). The floodplain elevation in Greens Bayou ranges from approximately 30.5 ft-msl near US Highway 90 to 32 ft-msl near the northeast corner of the site. Over 4 feet of freeboard exists between the 100-year flood elevation in Greens Bayou and the limits of waste. As discussed in Attachment 6A, the proposed vertical expansion does not impact stormwater flow in Greens Bayou.

The entire waste fill footprint is located outside the 100-year floodplain as defined on the FIRM. The 100-year water surface profile for P116-00-00 and P114-00-00 are also presented in Attachment 6C. As shown in Attachment 6C, the 100-year storm event is contained within the channel banks of these two HCFCD channels.

Refer to Attachment 6C – Floodplain Information for additional information.

The Subtitle D Location Restriction Certification of Compliance for floodplains is included in Parts I/II, Appendix I/IIB.

3.8 Cover System Design

The final cover system will consist of a soil only (pre-Subtitle D areas) and composite (Subtitle D areas) cover system, as well as a GCL alternative final cover for both pre-Subtitle D and Subtitle D areas. The GCL alternative final cover includes replacing the compacted clay infiltration layer with a GCL. As discussed in Attachment 6D, the site will either select the compacted clay infiltration layer option or the GCL infiltration layer option for the remaining footprint that has not received final cover (i.e., only one of the final cover options will be used for the remaining footprint unless a subsequent permit modification is submitted). The final cover system will provide a low maintenance cover, protect against erosion, reduce rainfall percolation through the cover system, and subsequently minimize leachate generation within the landfill. As depicted on Attachment 7A – Landfill Completion Plan, a maximum of ~~5~~ 3.5 percent top slopes and 4H:1V sideslopes are provided to minimize erosion and facilitate drainage of the landfill. A composite final cover system will be constructed over the Subtitle D waste disposal areas. Components of the multi-layer final cover system for both pre-Subtitle D and Subtitle D areas include (from top to bottom):

Subtitle D Area

- An erosion layer consisting of a 24-inch-thick layer of earthen material (top 6 inches capable of sustaining plant growth). The vegetation layer will consist of native or introduced grasses capable of providing 90 percent coverage over the cover system.
- A drainage geocomposite will be used as the drainage layer.
- A 40-mil, smooth (topslope) and textured (sideslope), linear low-density polyethylene (LLDPE), geomembrane liner or other equivalent geomembrane liner material may be used.

An 18-inch-thick compacted clay infiltration layer with a coefficient of permeability of less than or equal to $1x10^{-5}$ cm/sec or a geosynthetic clay layer (GCL) with a coefficient of permeability of less than or equal to $3x10^{-9}$ cm/s. Unreinforced GCL will be used on the topslopes and reinforced GCL will be used on the sideslopes.

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

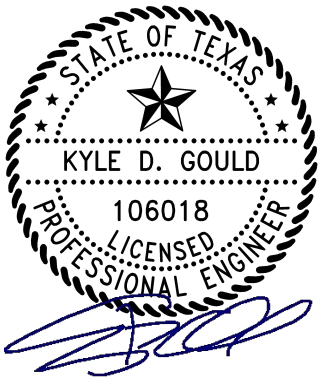
PART III - SITE DEVELOPMENT PLAN
ATTACHMENT 1
SITE LAYOUT PLANS

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised June 2009
Revised October 2009
Revised December 2010
Revised January 2011
Revised January 2012
Revised October 2014

Revised December 2024



12/12/2024

Weaver Consultants Group, LLC
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Fort Worth, Texas 76109
817-735-9770

WCG Project No.0120-439-11-259

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

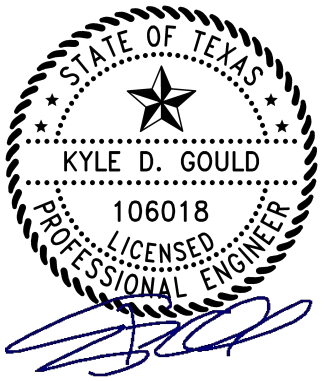
PART III - SITE DEVELOPMENT PLAN
ATTACHMENT 2
FILL CROSS SECTIONS

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised October 2009
Revised December 2010
Revised January 2011
Revised January 2012
Revised October 2014

Revised December 2024



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Weaver Consultants Group, LLC
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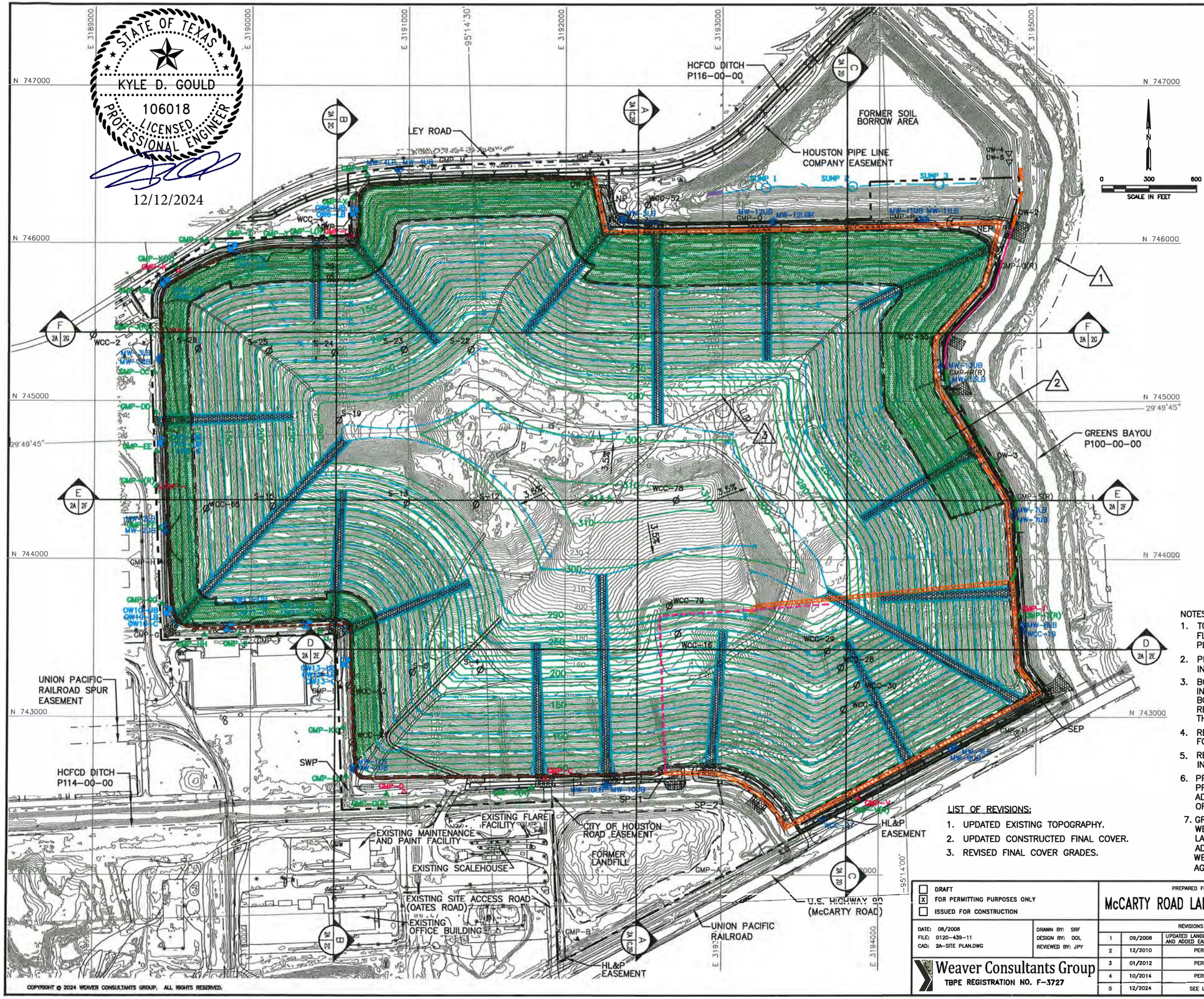
817-735-9770

WCG Project No.0120-439-11-259

STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED
PROFESSIONAL ENGINEER
12/12/2024



LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 5)
- N 746000 STATE PLANE COORDINATE SYSTEM
- 29°49'45" GEODETIC COORDINATE SYSTEM
- EXISTING CONTOUR
- 200 FINAL CONTOURS
- COMPACTED CLAY SLOPE LINER
- CLAY CUTOFF WALL
- SLURRY WALL
- DEEP SLURRY WALL
- NORTHERN EAST SLURRY WALL EXTENSION (REFER TO ATT. 6D)
- EAST SLURRY WALL EXTENSION (REFER TO ATT. 6D)
- SLURRY WALL EXTENSION OF GWRT (REFER TO ATT. 6D)
- MW-4UB EXISTING DETECTION GROUNDWATER MONITORING WELL
- OW7-UB PROPOSED OBSERVATION WELL CLUSTERS (SEE NOTE 7)
- OW-1 EXISTING OBSERVATION WELL (SEE NOTE 7)
- GMP-M EXISTING LANDFILL GAS MONITORING PROBE
- GMP-K EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED
- GMP-J(R) PROPOSED LANDFILL GAS MONITORING PROBE (SEE NOTE 6)
- EASEMENT BOUNDARY
- S-5 SOUTHWEST LAB SOIL BORING
- WCC-51 WOODWARD CLYDE SOIL BORING
- GABIONS
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- GROUND WATER RECOVERY TRENCH
- SUMP 2 GROUND WATER RECOVERY TRENCH SUMP
- CONSTRUCTED FINAL COVER
- 1 INDICATES REVISION (SEE LIST OF REVISIONS)

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. BORING LOCATIONS HAVE BEEN REPRODUCED FROM VARIOUS SUBSURFACE INVESTIGATIONS PREVIOUSLY COMPLETED AND ARE APPROXIMATE. ONLY BORINGS SHOWN ON SECTIONS ARE PRESENTED ON THIS DRAWING. PLEASE REFER TO ATTACHMENT 4, FIGURE 4B.2 FOR A FIGURE THAT SHOWS ALL THE BORINGS COMPLETED AT THE SITE.
4. REFER TO ATTACHMENT 1H FOR THE FINAL CONTOUR PLAN AND 1I FOR THE BOTTOM OF WASTE PLAN.
5. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
6. PROPOSED PROBES DESIGNATED WITH "(R)" ARE REPLACEMENT PROBES. PROPOSED PROBES GMP-W THROUGH GMP-LL WERE ADDED ALONG THE WESTERN PERIMETER OF THE LANDFILL AS PART OF THE AAWWE SETTLEMENT AGREEMENT.
7. GROUNDWATER OBSERVATION WELLS OW-1, OW-2, OW-3, OW-4 AND OW-5 WERE ADDED ALONG THE NORTHERN AND EASTERN PERIMETER OF THE LANDFILL AS PART OF THE HARRIS COUNTY SETTLEMENT AGREEMENT. ADDITIONAL PROPOSED OBSERVATION WELLS WERE ADDED ALONG THE WESTERN PERIMETER OF THE LANDFILL AS PART OF THE AAWWE SETTLEMENT AGREEMENT.

LIST OF REVISIONS:

1. UPDATED EXISTING TOPOGRAPHY.
2. UPDATED CONSTRUCTED FINAL COVER.
3. REVISED FINAL COVER GRADES.

- [ ] DRAFT
- [X] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 08/2008
FILE: 0120-439-11
CAD: 2A-SITE PLAN.DWG

DRAWN BY: SRF
DESIGN BY: DOL
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
1	09/2008	UPDATED LANDFILL GAS MONITORING PROBES AND ADDED EAST SLURRY WALL.
2	12/2010	PERMIT MODIFICATION
3	01/2012	PERMIT MODIFICATION
4	10/2014	PERMIT MODIFICATION
5	12/2024	SEE LIST OF REVISIONS

TYPICAL SECTION SITE PLAN

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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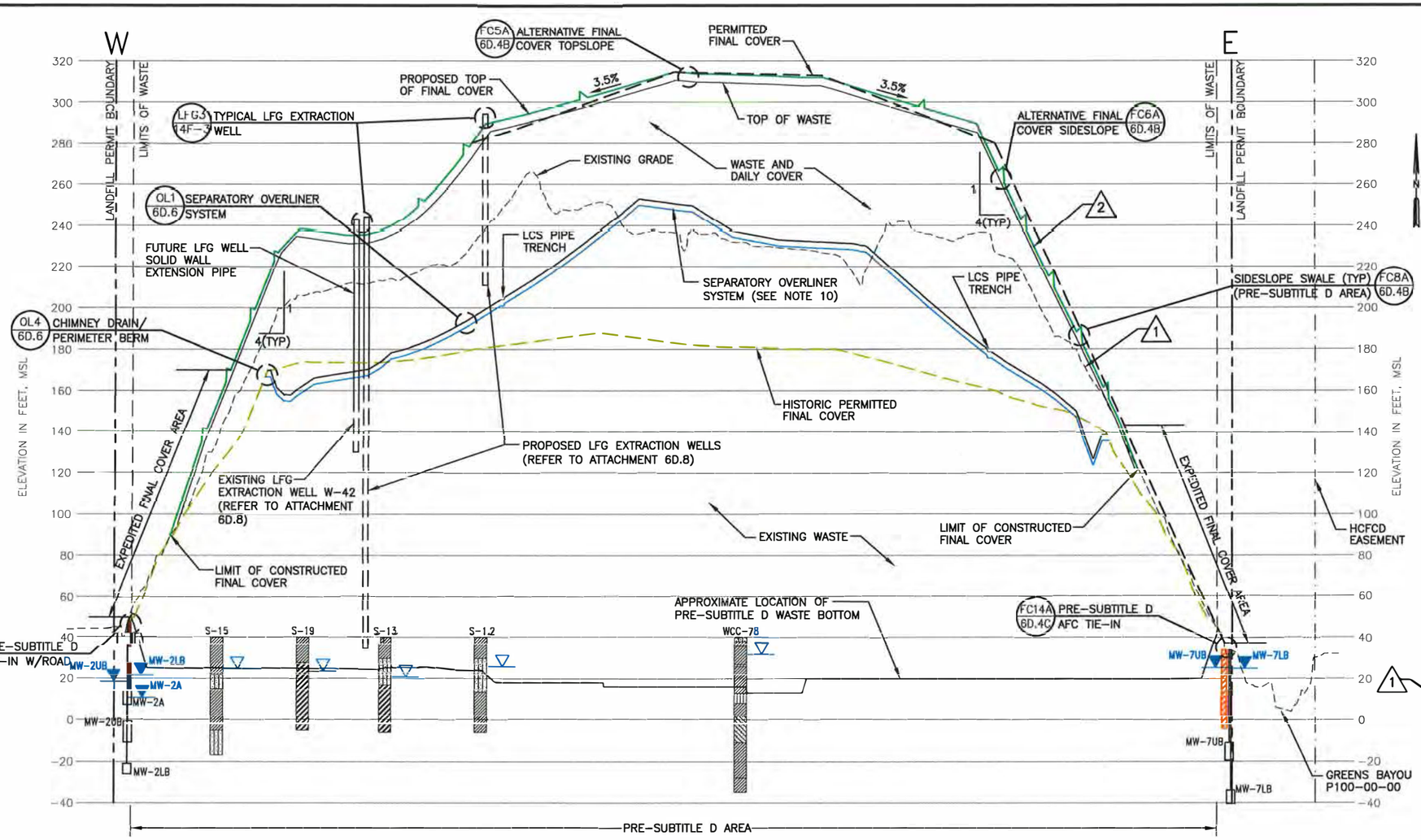
ATTACHMENT 2A

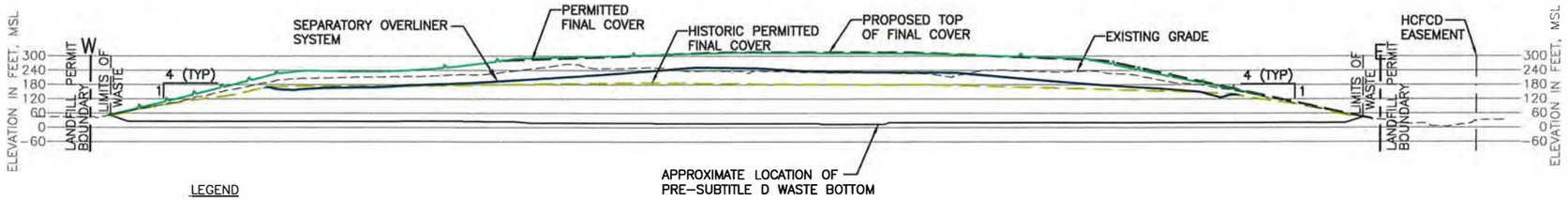
O:\0120\439\FIP MOD 2024\ATT 2\RLSO\ATT 2A-TYPICAL SECTION SITE PLAN.dwg, rarrington, 1:2



SECTION E
(EXAGGERATED VERTICAL SCALE)

HORIZONTAL SCALE: 0 300 600

VERTICAL SCALE: 0 30 60



SECTION E
(1H:1V)

HORIZONTAL SCALE: 0' 300' 600'

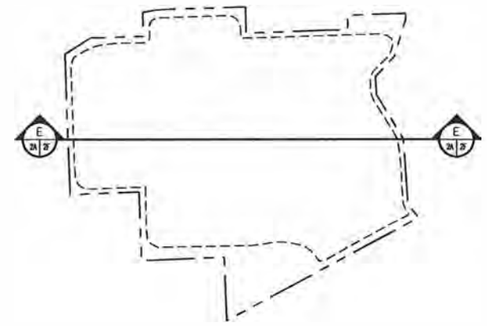
VERTICAL SCALE: 0' 300' 600'

LEGEND

- MW-10UB — APPROXIMATE POTENTIOMETRIC SURFACE IN NOVEMBER 2002
- APPROXIMATE ELEVATION THAT GROUNDWATER WAS FIRST ENCOUNTERED DURING DRILLING
- COMPACTED CLAY SLOPE LINER (SEE NOTE 8)
- SLURRY WALL (SEE NOTE 8)

LIST OF REVISIONS:

1. UPDATED EXISTING TOPOGRAPHY.
2. UPDATED PERMITTED AND PROPOSED GRADE PROFILES.
3. UPDATED NOTE TO REFLECT GCL FINAL COVER HEIGHT OF LANDFILL.



KEY MAP
(NTS)

BORING LEGEND

- LOW PLASTICITY CLAY
- HIGH PLASTICITY CLAY
- SILT
- SILTY SAND
- CLAYEY SAND
- 1 INDICATES REVISION (SEE LIST OF REVISIONS)

STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED
PROFESSIONAL ENGINEER
12/12/2024

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. REFER TO ATTACHMENT 6D FOR FINAL COVER SYSTEM DETAILS.
3. LANDFILL COMPLETION AND TOP OF LINER GRADES ARE SHOWN ON ATTACHMENTS 1H AND 1I.
4. SEE ATTACHMENT 4 FOR BORING DATA. BORINGS PROJECTED INTO THE LINE OF THE SECTION. SEE ATTACHMENT 2A FOR APPROXIMATE BORING LOCATIONS.
5. REFER TO ATTACHMENT 14 FOR DETAILS OF THE LANDFILL GAS MANAGEMENT PLAN.
6. DRAINAGE DESIGN INFORMATION IS PROVIDED IN ATTACHMENT 6A-DRAINAGE DESIGN REPORT.
7. MAXIMUM FINAL COVER ELEVATION IS 314.5 FT-MSL FOR GCL FINAL COVER. DEEPEST EXCAVATION IS 1.8 FT-MSL.
8. THE LOCATIONS OF THE SLURRY WALL AND COMPACTED CLAY SLOPE LINER WERE REPRODUCED FROM A DECEMBER 1992 DRAWING PREPARED BY HALL SOUTHWEST. REFER TO ATTACHMENT 1I FOR LOCATION.
9. MINIMUM BUFFER ZONE WIDTH BETWEEN THE PERMIT BOUNDARY AND LIMITS OF WASTE IS A MINIMUM OF 50 FEET.
10. REFER TO ATTACHMENT 6D FOR THE DESIGN OF THE SEPARATORY OVERLINER SYSTEM THAT WILL BE INSTALLED WITHIN THE PRE-SUBTITLE D AREA.

☐ DRAFT
☒ FOR PERMITTING PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 03/2004
FILE: 0120-439-11
CAD: SEC-E.DWG

DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
1	08/2004	RESPONSE TO TCEQ 1st TECHNICAL COMMENTS
2	09/2004	RESPONSE TO TCEQ 2nd TECHNICAL COMMENTS
3	02/2008	HARRIS COUNTY SETTLEMENT INFORMATION
4	09/2008	PERMIT MODIFICATION
5	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
TYPICAL SECTION E

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 2F

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

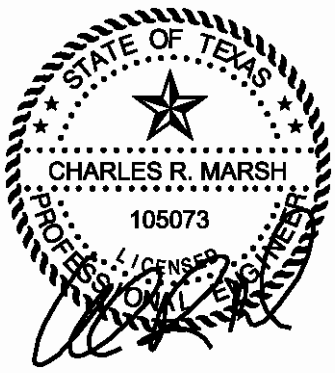
PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 6
GROUNDWATER AND SURFACE WATER PROTECTION PLAN

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised October 2009
Revised August 2010
Revised December 2010
Revised January 2011
Revised October 2014

Revised December 2024



12/12/2024

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817-735-9770

WCG Project No.0120-439-11-259

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

MAJOR PERMIT AMENDMENT APPLICATION

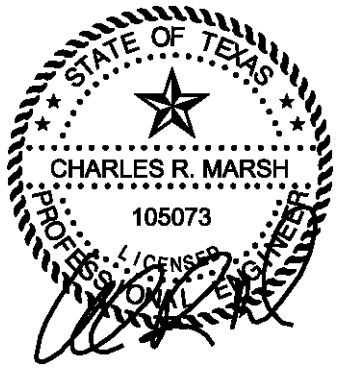
PART III - SITE DEVELOPMENT PLAN
ATTACHMENT 6A
DRAINAGE DESIGN REPORT

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised October 2010
Revised January 2012
Revised March 2024

Revised December 2024



12/12/2024

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No.0120-439-11-259

- HCFCD P100-00-00. This unit description belongs to Greens Bayou, which is located east of the site.

The peak flow generated from the area within the solid waste fill area will increase with this vertical expansion because the 4H:1V sideslope area has increased, the topdeck of the landfill has decreased, and the hydrologic modeling (e.g., precipitation model and modeling program) has been updated. Thus, drainage flowing from the landfill area will be conveyed to the perimeter channels faster than the currently permitted landfill configuration. To offset this increase in the peak flows, additional detention ponds and upgrades to the existing perimeter channels (and their outlet structures) have been incorporated into the design for the vertical expansion to attenuate the peak flows leaving the site. These drainage improvements are detailed in Attachments 6A.1 through 6A.30.

In addition, Table 6.1 has been developed to facilitate a comparison of flow rates and volumes entering the three downstream HCFCD drainage structures. A summary of peak flows and volumes is listed below.

- Peak Flow. As shown on Table 6.1, for each of these three discharges the peak flow for the landfill expansion condition is ~~not significantly changed from~~ consistent with the peak flow for the existing permitted landfill condition. The perimeter channel improvements and new detention ponds adequately attenuate the increase in peak flow generated by expanding the landfill vertically. In addition, the shape of the hydrographs in each case is similar. In general, for the expansion case the hydrograph peaks are reduced and the tail end of the hydrograph is slightly higher due to the additional detention that is added to the expansion drainage design.

Table 6.1
Flow Rates and Runoff Volumes for the Design Storm Event

Stormwater Discharge Point	Existing Permitted Conditions				Postdevelopment Conditions			
	Flow Rate (cfs)		Runoff Volume (ac-ft)		Flow Rate (cfs)		Runoff Volume (ac-ft)	
	25 year	100 year	25 year	100 year	25 year	100 year	25 year	100 year
North (P116-00-00)	~~646~~ 1,077	~~1,021~~ 1,456	~~94~~ 146	~~124~~ 241	~~883~~ 1,068	~~858~~ 1,451	~~125~~ 148	~~160~~ 240
East (P100-00-00)	~~674~~ 776	~~810~~ 1,027	~~78~~ 68	~~103~~ 136	~~674~~ 745	~~810~~ 1,002	~~78~~ 82	~~103~~ 132
South (P114-00-00)	~~530~~ 2,537	~~1,401~~ 3,842	~~138~~ 123	~~183~~ 240	~~1,041~~ 2,530	~~1,405~~ 3,822	128	~~181~~ 256
~~Total~~	~~1,711~~	~~2,605~~	~~309~~	~~410~~	~~2,367~~	~~3,254~~	~~326~~	~~459~~

- Volumes. As shown in Table 6.1, the volumes of flow entering each HCFCD channel for both the existing permitted condition and the proposed vertical

expansion condition are very similar. As discussed in Attachment 6A-A, the curve numbers used to represent the landfill final cover in both cases is 88. No change to the final cover system design is proposed. Therefore, the main reason for the additional volume ~~(less than 10% increase)~~ for the postdevelopment condition is the changes to the hydrologic model provided by HCFCD. The pond areas are modeled with a curve number of 100 (i.e., the decrease in infiltration due to the detention ponds results in a slightly increased total volume of runoff generated from the site).

Also shown in the Table 6.1, postdevelopment runoff volumes generated from the landfill's three drainage basins do not significantly alter the existing permitted conditions. This demonstration was submitted to the HCFCD in July 2011. Excerpts from the HCFCD submittal and their September 15, 2011 approval letter is included in Attachment 6B.

4.4 Effect of Vertical Expansion on Peak Flows, Volumes, and Velocities Entering and Exiting the Landfill Permit Boundary

The purpose of this section is to provide a demonstration that the peak flows, volumes, and velocities are not significantly altered at the landfill permit boundary. To complete this analysis, the HEC-HMS models for both the existing permitted and proposed vertical expansion cases were incorporated into the Greens Bayou model obtained from the HCFCD in ~~April 2011~~February 2024. The resulting model, which is included in Appendix 6A-A, assesses the impact of the proposed vertical expansion on the local and regional drainage patterns.

The results of this demonstration are provided on Table 6-2 and Figures 4.3 through 4.6. Each discharge point is discussed in the following subsections.

4.4.1 HCFCD Channel P116-00-00 (North)

As shown in Attachment 6A.1, the permit boundary encompasses P116-00-00 on the north portion of the site. The hydrographs for stormwater entering and exiting the permit boundary are shown on Figure 4.4 for the 25-year and 100-year storm events. As Figure 4.4 shows, the hydrographs entering the site are similar for each storm event. ~~The peak flow leaving the permit boundary in P116-00-00 is increased slightly for the vertical expansion case. However, the minimal increase in flow rate results in minimal (e.g., less than 0.10 foot)~~The proposed condition results in no increases in discharge rate nor increases in the water surface elevation in P116-00-00. Additionally, the increased flow rates do not cause erosive flow velocities in P116-00-00.

As shown in Table 6-2, the volume of flow entering and exiting the permit boundary is ~~decreased slightly~~consistent. The ~~decrease~~changes in volume is due to the changes made to the HCFCD hydrologic model.

The velocities entering and exiting the permit boundary in the channel are similar, as shown on Table 6-2. This is to be expected given that the flow rates are similar and the channel cross-sections are the same. As demonstrated in the approved HCFCD analysis

(see Appendix B), the increase in flow rate, volume, and velocity in P116-00-00 has no adverse impact on Greens Bayou downstream of the permit boundary.

4.4.2 HCFCD Channel P114-00-00 (South)

The permit boundary encompasses P114-00-00 on the southern portion of the site. The hydrographs entering and exiting the site are shown on Figure 4.5 for the 25-year and 100-year storm events. As with HCFCD channel P116-00-00, the hydrographs entering the permit boundary are similar for each storm event. The peak flow leaving the permit boundary for this channel is ~~increased due to the changes to the South Pond~~ decreased slightly.

As shown on Table 6-2 the volume of flow entering the permit boundary is ~~lower for~~ unchanged by the expansion condition. The volume exiting the permit boundary is ~~higher~~lower for the expansion condition. This result occurs because the differences between the drainage areas under the ~~existing~~permitted and proposed conditions (refer to Figure 4.2) and the hydrologic model differences.

The differences in velocities in the channel entering and exiting the permit boundary are similar to the differences in flow rates for the permitted expansion conditions, as shown on Table 6-2. This is to be expected given that the flow rate and channel cross-section is the same. In both cases, the velocities are well below an erosive velocity (i.e., 5 ft/sec).

As demonstrated in the approved HCFCD analysis (see Appendix B), the increase in flow rate, volume, and velocity in P114-00-00 has no adverse impact on Greens Bayou downstream of the permit boundary.

4.4.3 Greens Bayou (P100-00-00 located east of the site)

As shown on Figures 4.2 and 4.3, the location of the permitted outfalls will not be modified with the vertical expansion of the landfill along the eastern portion of the site. As shown on Figure 4.6, and listed in Table 6-2, the combined peak flow leaving the permit boundary on the eastern portion of the site for the vertical expansion is less than the permitted condition, due to the updates to the hydrologic model.

Also, the volume of flow has been ~~decreased by a small percentage~~increased, as shown in Table 6-2. This is due to the changes in the hydrologic modeling method and drainage area delineations.

A velocity comparison is not applicable to this portion of the site since the outfall locations and design have not been modified and the flow rates have slightly decreased (i.e., the velocities will be less). However, as demonstrated in Appendix 6A-B the outfall structures have been designed to manage the incremental velocities created at each outfall structure. Each outfall structure includes a low-water outlet and emergency spillway which is lined with gabions to protect the underlying soil from erosive velocities. In addition, the design of these outfalls, which are located within the HCFCD easement, have been approved by HCFCD (refer to Attachment 6B).

TABLE 6-2
FLOW RATE, VOLUME, AND VELOCITY COMPARISON AT PERMIT BOUNDARY

COMPARISON POINT	EXISTING PERMITTED CONDITION						VERTICAL EXPANSION CONDITION					
	FLOW RATE (cfs)		RUN-OFF VOLUME (ac-ft)		VELOCITY (ft/sec)		FLOW RATE (cfs)		RUN-OFF VOLUME (ac-ft)		VELOCITY (ft/sec)	
	25 year	100 year	25 year	100 year	25 year	100 year	25 year	100 year	25 year	100 year	25 year	100 year
ENTERING P116-00-00 (North)	~~112~~ 51	~~148~~ 77	~~103~~ 50	~~141~~ 81	~~2.81~~ 1.91	~~3.02~~ 2.55	~~40~~ 51	~~55~~ 77	~~41~~ 50	~~56~~ 81	~~2.14~~ 1.91	~~2.33~~ 2.55
LEAVING P116-00-00	~~677~~ 1,077	~~1,063~~ 1,456	~~197~~ 146	~~265~~ 241	~~3.73~~ 4.57	~~4.18~~ 3.00	~~883~~ 1,068	~~58~~ 1,451	~~125~~ 148	~~160~~ 240	~~3.99~~ 4.51	~~3.96~~ 4.98
ENTERING P114-00-00 (South)	~~752~~ 733	~~1,000~~ 1,080	~~863~~ 379	~~1,168~~ 634	~~3.38~~ 2.52	~~3.43~~ 3.63	~~582~~ 733	~~793~~ 1,080	~~296~~ 379	~~430~~ 634	~~1.32~~ 2.52	~~1.56~~ 3.63
LEAVING P114-00-00	~~1,150~~ 2,537	~~1,673~~ 3,842	~~1,019~~ 1,374	~~1,376~~ 2,314	~~2.65~~ 2.94	~~2.37~~ 3.08	~~1,910~~ 2,530	~~2,798~~ 3,822	~~1,111~~ 1,379	~~1,598~~ 2,300	~~2.75~~ 2.94	~~2.94~~ 3.07
Leaving Eastern Permit Boundary to Greens Bayou	~~674~~ 776	~~810~~ 1,027	~~78~~ 68	~~103~~ 136	N/A[1]	N/A[1]	~~674~~ 745	~~810~~ 1,002	~~78~~ 82	~~103~~ 132	N/A[1]	N/A[1]

1 A velocity comparison is not applicable to this portion of the site.

4.5 Effect of Vertical Expansion on Greens Bayou

Sections 4.3 and 4.4 demonstrated that the vertical expansion will not adversely alter existing drainage patterns. The purpose of this Section is to provide a final demonstration that shows the flow in Greens Bayou downstream of the site is also not adversely impacted by the proposed vertical expansion of the landfill.

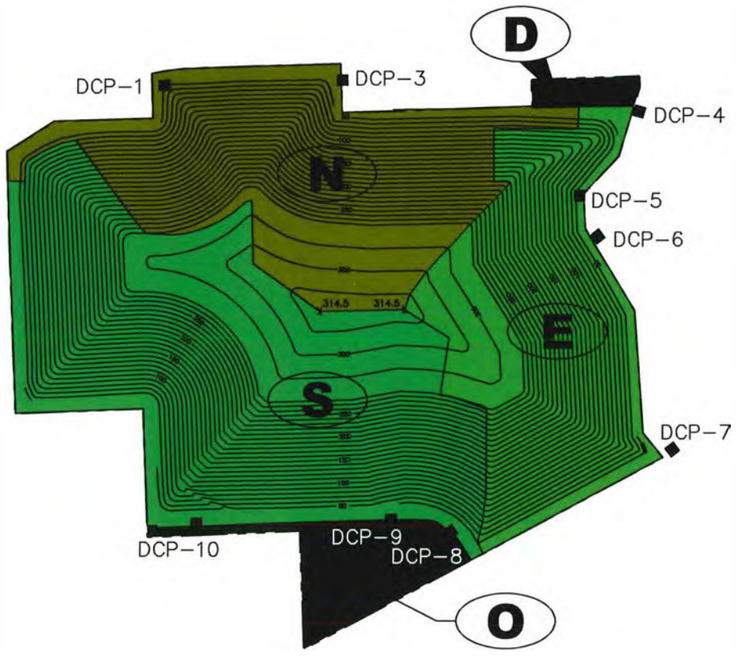
Figure 4.1 shows the Greens Bayou watershed in the area of the site. This figure also shows the individual drainage areas, as reproduced from previous HCFCD studies. Note that flow from the northern and eastern portion of the landfill discharges to Greens Bayou at a location adjacent to the site. Flow from the southern portion of the site drains to P114-00-00, which flows beneath US Highway 90 before discharging to Greens Bayou approximately 3,000 feet south of the site.

To demonstrate that the proposed vertical expansion does not adversely alter the existing drainage patterns of Greens Bayou, both the HEC-HMS analysis for the permitted and proposed conditions were incorporated into the regional study obtained from the HCFCD. Hydrographs for both conditions were developed at the downstream point of Area P100 T, as shown on Figure 4.1. The resulting hydrographs for both the 25-year and 100-year storm events are presented on Figure 4.7. As shown on Figure 4.7, the hydrographs for both the permitted and proposed vertical expansion conditions are similar in shape and scale. ~~However, the higher peak flow rate for the postdevelopment condition is due to the higher flow rates in Greens Bayou from contributing drainage basins upstream of the permit boundary.~~ As shown in Appendix 6B, when the permit boundary is incorporated into the existing HCFCD hydrologic model, the peak flow rates downstream of the permit boundary are decreased due to the timing of the hydrographs in Greens Bayou.

4.6 Summary

The updated detention pond designs will result in increased flow rates discharged from this permit boundary; however, the regional drainage patterns (e.g., flow rates in Greens Bayou downstream of the pemit boundary) are not adversely impacted.

From the hydrological evaluations of the existing permitted and postdevelopment conditions, the drainage conditions at the permit boundary will not be adversely altered by the proposed development. Given that: (1) drainage patterns are not adversely altered and (2) stormwater discharge outfall locations are consistent with the permitted and existing configurations, it is concluded that the proposed landfill development will not significantly alter existing permitted drainage patterns consistent with §330.56 (f)(4)(A)(iv) and §330.55(b)(5)(D).



CURRENTLY PERMITTED CONDITION
DRAINAGE AREAS

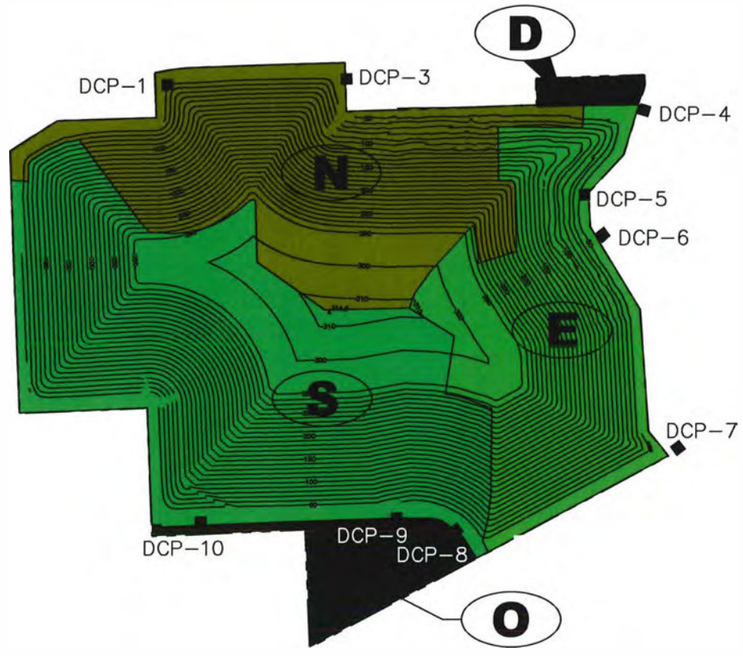
N= 125.99 ACRES

S= 195.10 ACRES

E= 105.41 ACRES

D= 5.49 ACRES

O= 26.26 ACRES



PROPOSED FINAL CONTOUR IMPROVEMENTS
DRAINAGE AREAS

N= 124.69 ACRES

S= 195.10 ACRES 1

E= 106.71 ACRES

D= 5.49 ACRES

O= 26.26 ACRES

NOTES:

1. DRAINAGE AREA D FLOWS INTO THE NORTHERN SOIL BORROW AREA.
2. DRAINAGE AREA O IS MOSTLY COMPRISED OF THE OLD LANDFILL.
3. SEE ATTACHMENT 7 FOR PROPOSED FINAL COMPLETION PLAN.
4. FLOW FROM DRAINAGE AREA (W) SHEET FLOWS TO AN AREA WEST OF THE SITE.

LEGEND

PERMIT BOUNDARY

100 ELEVATION OF FINAL COVER SYSTEM

DRAINAGE AREA BOUNDARY

S DRAINAGE AREA DESIGNATION

1 INDICATES REVISION (SEE LIST OF REVISIONS)

LIST OF REVISIONS:

1. UPDATED AREA DELINEATIONS.

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DATE: 03/2004
FILE: 0120-439-11
CAD: FIG-4.2DRAIN AREA.DWG
DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

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McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	08/2006	PERMIT MODIFICATION UPDATE
2	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
SITE DRAINAGE PATTERNS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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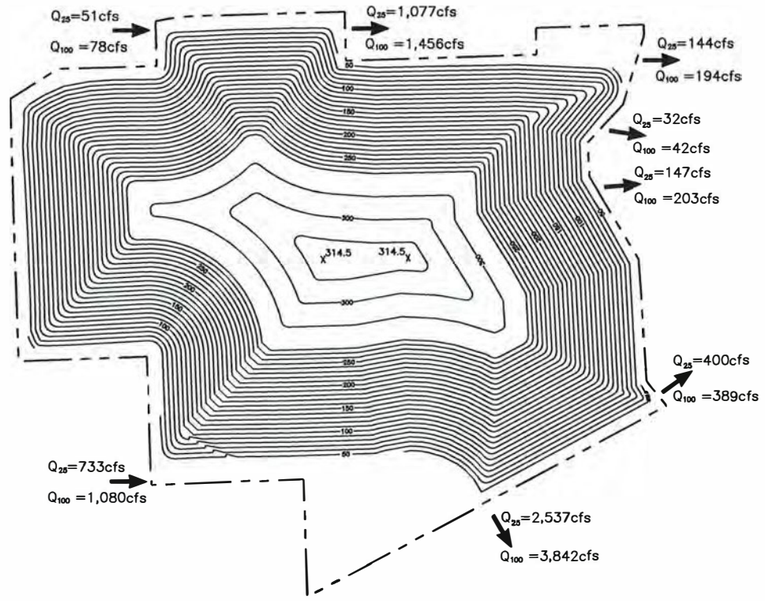
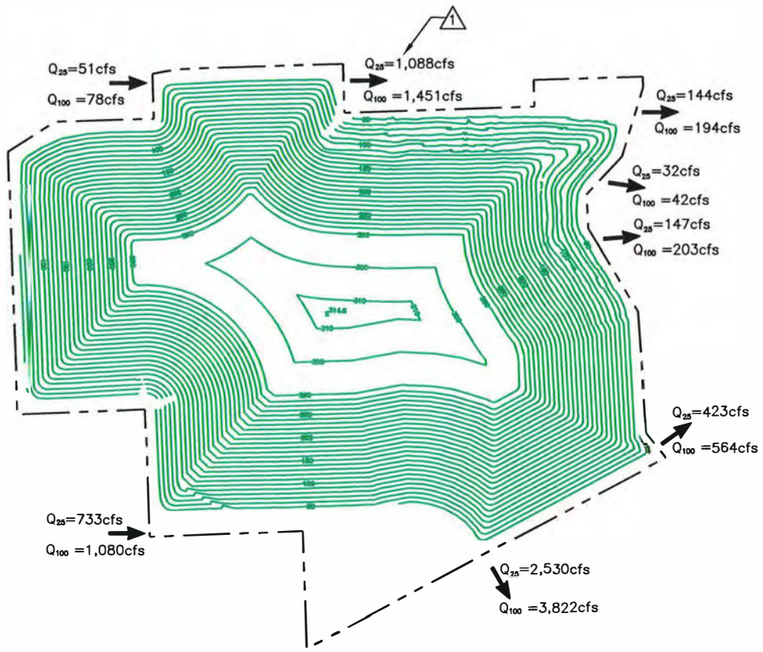
FIGURE 4.2

O:\0120\439\FLIP MOD 2024\ATT 6\FIGURES\FIG-4.2 DRAIN AREA.dwg, Farrington, 1:2



CURRENTLY PERMITTED CONDITION



PROPOSED FINAL CONTOUR IMPROVEMENTS

LEGEND

PERMIT BOUNDARY

100 ELEVATION OF FINAL COVER SYSTEM

1 INDICATES REVISION (SEE LIST OF REVISIONS)

LIST OF REVISIONS:

1. UPDATED FLOW RATES.

NOTES:

1. SEE ATTACHMENT 6A-A FOR POST DEVELOPMENT HYDROLOGIC INFORMATION.
2. SEE ATTACHMENT 6A-E FOR CURRENTLY PERMITTED HYDROLOGIC INFORMATION.

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CAD: FIG-4.3 PATTERNS.DWG
DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

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REVISIONS

NO.	DATE	DESCRIPTION
1	08/2006	PERMIT MODIFICATION UPDATE
2	01/2012	PERMIT MODIFICATION
3	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
SITE DRAINAGE PATTERNS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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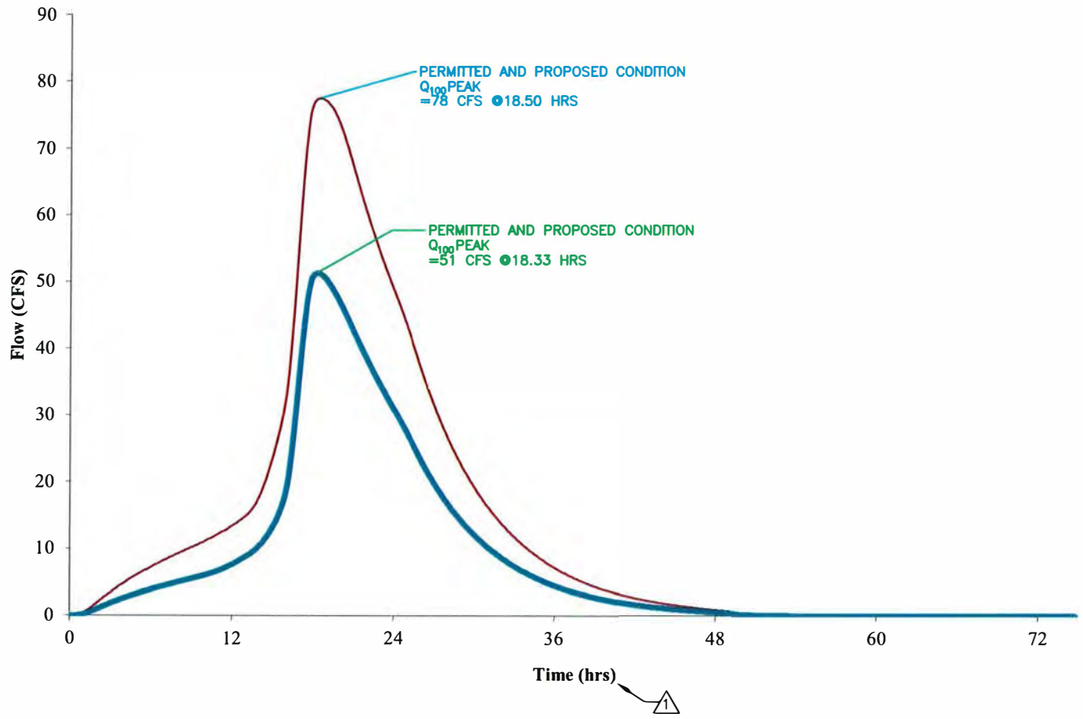
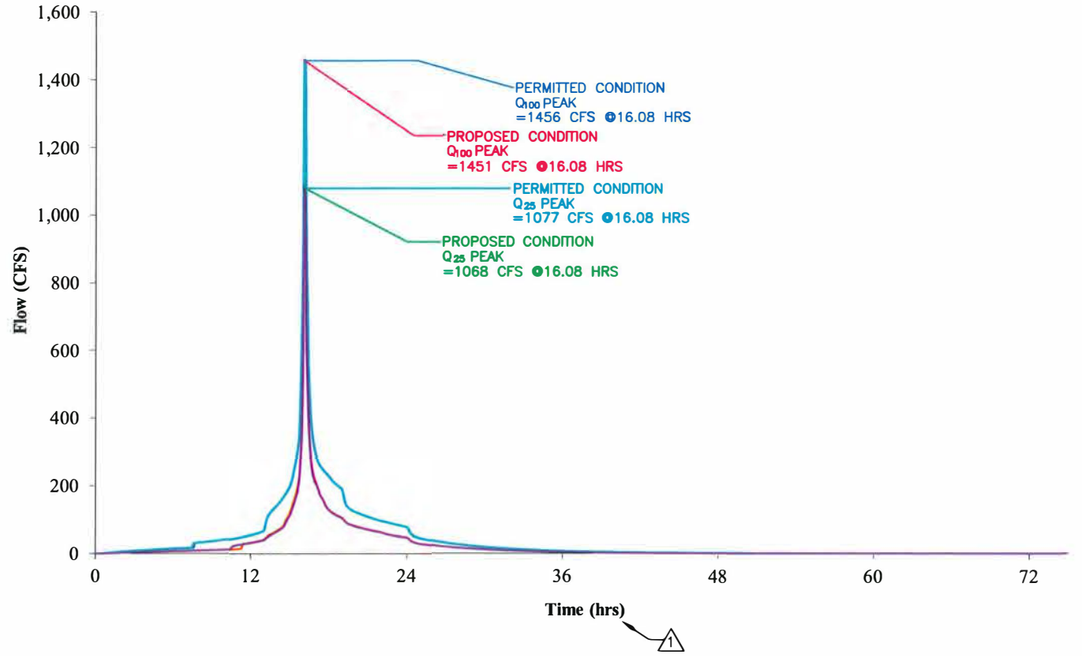
FIGURE 4.3

PEAK FLOW ENTERING NORTHWEST PERMIT BOUNDARY
HCFCD DITCH P116-00-00



PEAK FLOW LEAVING NORTHEAST PERMIT BOUNDARY
HCFCD DITCH P116-00-00



1 INDICATES REVISION
(SEE LIST OF REVISIONS)

LIST OF REVISIONS:
1. UPDATED FLOW RATES.

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DATE: 03/2004
FILE: 0120-439-11
CAD: FIG-4.4 PEAK.DWG

DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

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REVISIONS

NO.	DATE	DESCRIPTION
1	08/2006	PERMIT MODIFICATION UPDATE
2	01/2012	PERMIT MODIFICATION
3	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
PEAK FLOW COMPARISON HCFCD
DITCH P116-00-00 (NORTH)

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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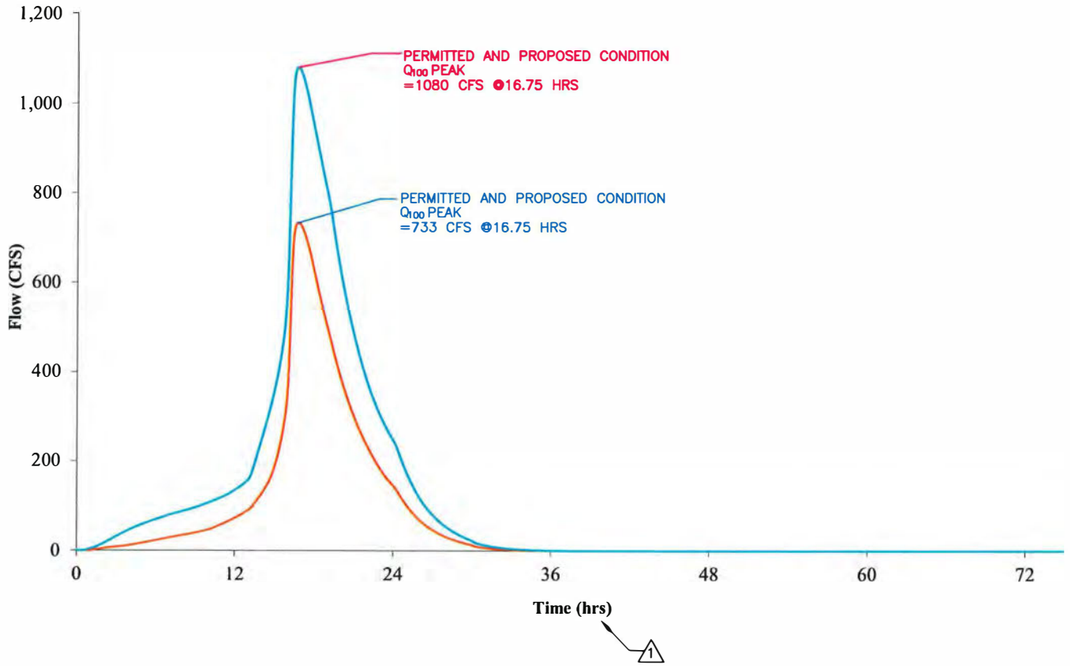
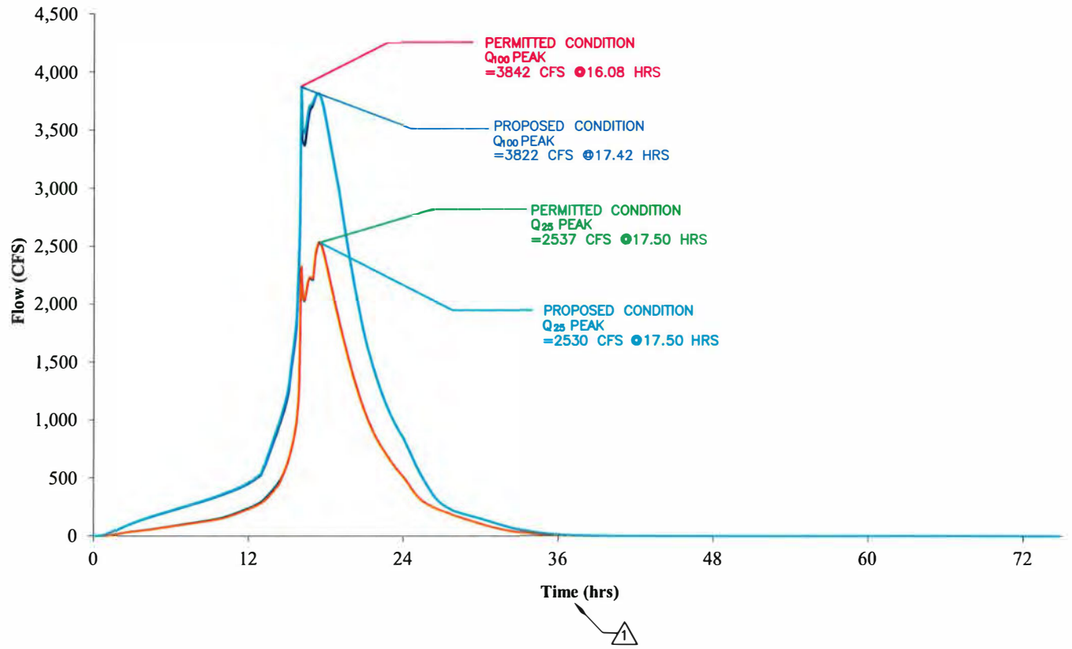
FIGURE 4.4

PEAK FLOW ENTERING SOUTHWEST PERMIT BOUNDARY
HCFCD DITCH P114-00-00



PEAK FLOW LEAVING SOUTH PERMIT BOUNDARY
HCFCD DITCH P114-00-00



1 INDICATES REVISION
(SEE LIST OF REVISIONS)

LIST OF REVISIONS:
1. UPDATED FLOW RATES.

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CAD: FIG-4.5 PEAK.DWG

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DESIGN BY: SAN
REVIEWED BY: JPY

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REVISIONS		
NO.	DATE	DESCRIPTION
1	08/2006	PERMIT MODIFICATION UPDATE
2	01/2012	PERMIT MODIFICATION
3	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
PEAK FLOW COMPARISON HCFCD
DITCH P114-00-00 (SOUTH)
McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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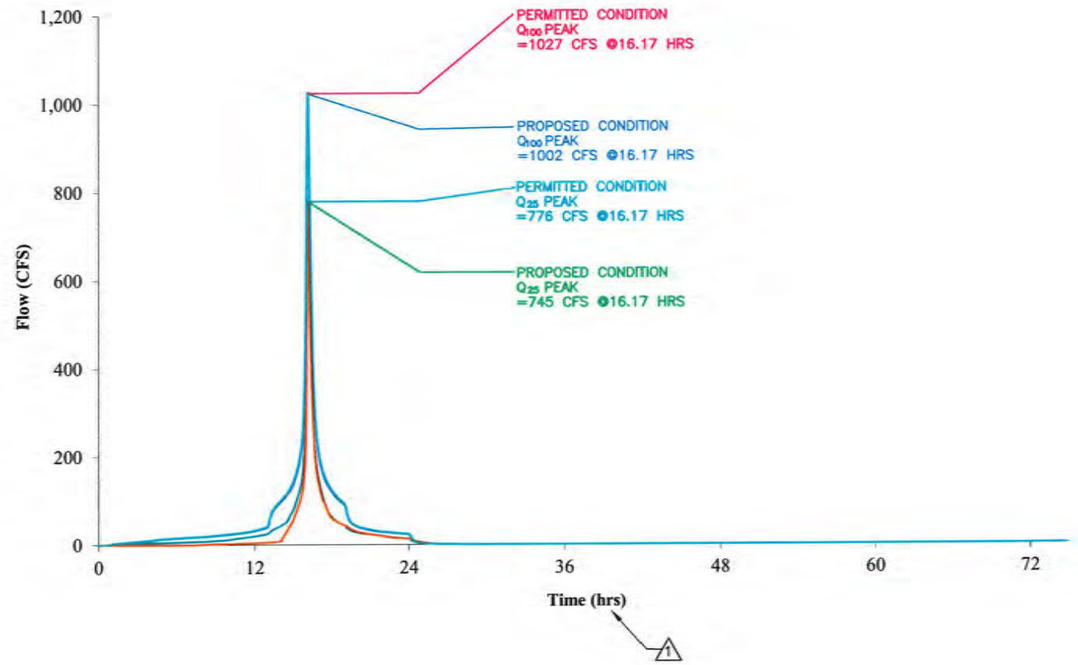
FIGURE 4.5

COMBINED FLOW INTO GREENS BAYOU (EAST)



1 INDICATES REVISION
(SEE LIST OF REVISIONS)

LIST OF REVISIONS:
1. UPDATED FLOW RATES.

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REVISIONS		
NO.	DATE	DESCRIPTION
1	08/2006	PERMIT MODIFICATION UPDATE
2	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
COMBINED FLOW
INTO GREENS BAYOU (EAST)
McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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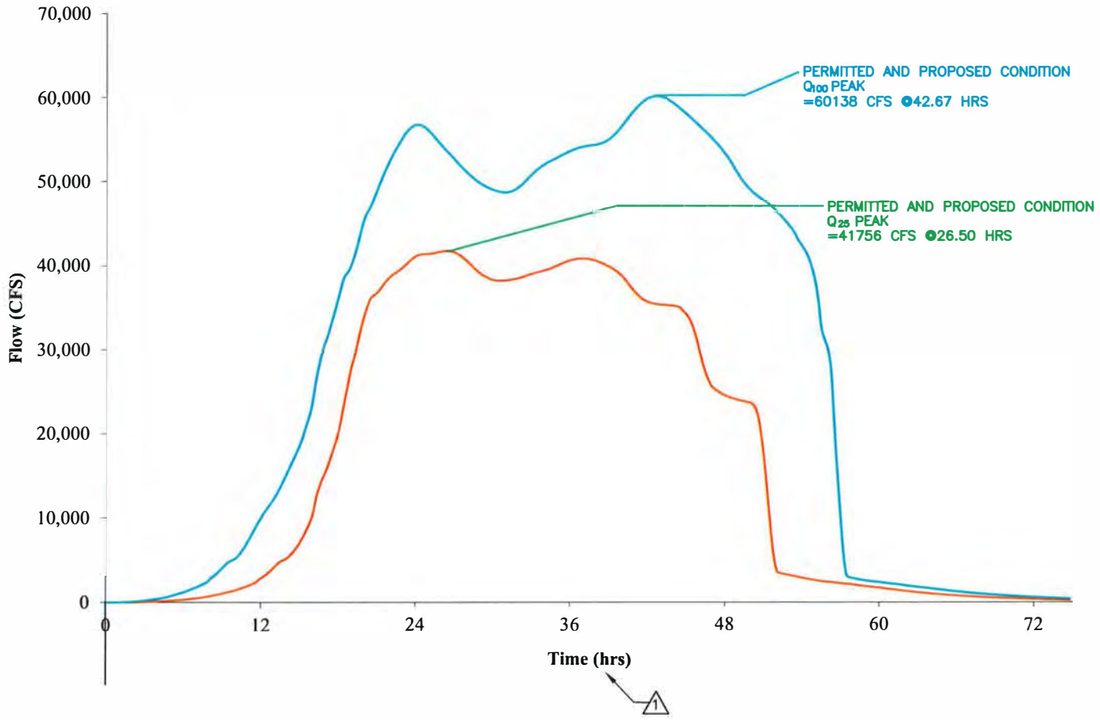
FIGURE 4.6

PEAK FLOW FOR COMBINED FLOW IN GREENS BAYOU
HCFCD CHANNEL P100-00-00



1 INDICATES REVISION
(SEE LIST OF REVISIONS)

LIST OF REVISIONS:
1. UPDATED FLOW RATES.

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1	08/2006	PERMIT MODIFICATION UPDATE
2	01/2012	PERMIT MODIFICATION
3	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
COMBINED FLOW COMPARISON
FOR GREENS BAYOU

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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FIGURE 4.7

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12/12/2024

E 3189000 E 3190000 E 3191000 E 3192000 E 3193000 E 3194000 E 3195000
95°14'30"
N 747000 N 746000 N 745000 N 744000 N 743000 N 742000
29°49'45"

S2 NORTH DETENTION POND OUTLET STRUCTURE
S3 NORTHWEST DETENTION POND OUTLET STRUCTURE
D1 SWALE/CHUTE CONFLUENCE (TYP)
D9 SWALE (TYP.)
D16 LOW WATER CROSSING (TYP)
D10 TOP DECK SWALE (TYP)
D11 GABION CHUTE TRANSITION (TYP)
D2 SWALE/CHUTE CONFLUENCE (TYP)
D18 TRAPEZOIDAL CHANNEL (TYP)
D6 SWALE/CHUTE CONFLUENCE (TYP)
D8 CHUTE (TYP)
D13 GABIONS
S4 SOUTHWEST DETENTION POND OUTLET STRUCTURE
S5 SOUTH-1 DETENTION POND OUTLET STRUCTURE
D12 CONCRETE TRAPEZOIDAL CHANNEL
D4 CHUTE/CHANNEL CONFLUENCE
D14 "V" CHANNEL (TYP)
D7 CHUTE (TYP)
S1 NORTHEAST DETENTION POND OUTLET STRUCTURE
S9 NORTHEAST "V" DITCH
S7 EAST DETENTION POND OUTLET STRUCTURE
D5 SWALE/CHUTE CONFLUENCE (TYP)
S6 SOUTH-2 DETENTION POND OUTLET STRUCTURE
S8 SOUTHEAST DETENTION POND OUTLET STRUCTURE
NEP
EP
SEP
SP-1
SP-2

NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 7)
- 200 FINAL CONTOUR
- 745000 N STATE PLANE COORDINATE SYSTEM
- 29°49'45" GEODETIC COORDINATE SYSTEM
- EXISTING GROUND CONTOUR
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN (SEE NOTE 9)
- MW-4UB EXISTING DETECTION GROUNDWATER MONITORING WELL
- MW-4UB EXISTING DETECTION GROUNDWATER MONITORING WELL TO BE DECOMMISSIONED
- MW-4UB PROPOSED DETECTION REPLACEMENT MONITORING WELL
- GMP-M EXISTING LANDFILL GAS MONITORING PROBE (SEE NOTE 8)
- GMP-J EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 8)
- GMP-J PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE (SEE NOTE 8)
- EASEMENT BOUNDARY
- GABIONS
- 100-YR FLOODPLAIN (REFER TO ATTACHMENT 6C)
- 1 INDICATES REVISION (SEE LIST OF REVISIONS)

N
0 300 600
SCALE IN FEET

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 7B FOR POST DEVELOPMENT DRAINAGE INFORMATION.
4. COVER DETAILS ARE PROVIDED IN ATTACHMENT 6D-FINAL COVER DETAILS.
5. TYPICAL SIDESLOPES ARE 4H:1V, TYPICAL TOPSLOPE IS 3.5%.
6. DETENTION POND INFORMATION IS PROVIDED ON ATTACHMENTS 6A.18 THROUGH 6A.25.
7. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
8. GAS MONITORING PROBES GMP-Q, GMP-R, AND GMP-S ARE BEING DECOMMISSIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS (WBC) IN APRIL 2004. GMP-T5 AND GMP-U ARE BEING DECOMMISSIONED IN A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP-T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.
9. GABION-LINED LETDOWN DETAILS ARE INCLUDED ON ATTACHMENTS 6A.13 THROUGH 6A.17. FLEXIBLE MEMBRANE LINED (FML) LETDOWN DETAILS ARE INCLUDED ON ATTACHMENTS 6A.17A THROUGH 6A.17C. FLEXAMAT LETDOWN DETAILS ARE INCLUDED ON ATTACHMENTS 6A.17D THROUGH 6A.17H. ARTICULATED BLOCK LETDOWN DETAILS ARE INCLUDED ON ATTACHMENTS 6A.17I THROUGH 6A.17L.

LIST OF REVISIONS:

1. UPDATED DETAIL CALLOUTS.
2. UPDATED EXISTING TOPOGRAPHY.
3. UPDATED FINAL COVER CONTOURS.

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DESIGN BY: SAN
REVIEWED BY: JPY

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REVISIONS		
NO.	DATE	DESCRIPTION
1	10/2010	PERMIT MODIFICATION
2	01/2012	PERMIT MODIFICATION
3	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
DRAINAGE STRUCTURE PLAN

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 6A.1

O:\0120\439\FIP MOD 2024\ATT 6\6A\6A.1-DR-STRUC-PLAN.dwg, farrington, 1:2

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HOUSTON PIPE LINE COMPANY EASEMENT

CITY OF HOUSTON ROAD EASEMENT

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0 300 600
SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 4)
- 200 FINAL CONTOUR
- 745000 N STATE PLANE COORDINATE SYSTEM
- 29°49'45" GEODETIC COORDINATE SYSTEM
- EXISTING CONTOUR
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- MW-4UB EXISTING DETECTION GROUNDWATER MONITORING WELL
- MW-4UB EXISTING DETECTION GROUNDWATER MONITORING WELL TO BE DECOMMISSIONED
- MW-4UB PROPOSED DETECTION REPLACEMENT MONITORING WELL
- GMP-M EXISTING LANDFILL GAS MONITORING PROBE (SEE NOTE 5)
- GMP-J EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 5)
- GMP-J(R) PROPOSED REPLACEMENT LANDFILL GAS MONITORING ROBE (SEE NOTE 5)
- EASEMENT BOUNDARY
- GABIONS
- 100-YR FLOODPLAIN (REFER TO ATTACHMENT 6C)
- DA9 DRAINAGE AREA DESIGNATION
- DRAINAGE AREA BOUNDARY

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 7B FOR POST DEVELOPMENT DRAINAGE INFORMATION.
4. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
5. GAS MONITORING PROBES GMP-Q, GMP-R, AND GMP-S ARE BEING DECOMMISSIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS (WBC) IN APRIL 2004. GMP-T5 AND GMP-U ARE BEING DECOMMISSIONED IN A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP-T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.

LIST OF REVISIONS:

1. UPDATED DRAINAGE AREAS.
2. UPDATED EXISTING TOPOGRAPHY.
3. UPDATED FINAL COVER CONTOURS.

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REVISIONS		
NO.	DATE	DESCRIPTION
1	01/2012	PERMIT MODIFICATION
2	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
DRAINAGE AREA PLAN

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 6A.2

G:\0120\439\PERMIT MOD 2024\ATT 6\6A\6a.02-PRO-DR-AREAS.dwg, farrington, 1:2

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E 3189000 E 3190000 E 3191000 -95°14'30" E 3192000 E 3193000 E 3195000

N 747000 N 746000 N 745000 29°49'45" N 744000 N 743000 N 742000

CHANNEL PI STA. 4+80.0 ELEV. 39.9
BEGIN CHANNEL STA. 0+00 ELEV. 39.4
CHANNEL PI STA. 6+54.7 ELEV. 40.1
CHANNEL PI STA. 7+70.3 ELEV. 40.2
CHANNEL PI STA. 10+18.2 ELEV. 40.45
CHANNEL PI STA. 11+30.4 ELEV. 40.6
CHANNEL PI STA. 12+90.0 ELEV. 40.7
CHANNEL PI STA. 14+88.1 ELEV. 40.9
CHANNEL PI STA. 15+58.7 ELEV. 41.0
CHANNEL PI STA. 16+48.5 ELEV. 41.1
END CHANNEL B STA. 17+71.6 ELEV. 41.2
END CHANNEL C STA. 39+47.41 ELEV. 36.04
CHANNEL PI STA. 33+48.78 ELEV. 36.44
CHANNEL PI STA. 0+75.95 ELEV. 39.5
CHANNEL PI STA. 1+97.98 ELEV. 39.6
CHANNEL PI STA. 2+57.36 ELEV. 39.7
CHANNEL PI STA. 8+87.8 ELEV. 40.3
CHANNEL PI STA. 2+82.4 ELEV. 39.7
CHANNEL PI STA. 21+86.1 ELEV. 34.28
CHANNEL PI STA. 20+92.2 ELEV. 34.2
CHANNEL PI STA. 20+20.01 ELEV. 34.1
CHANNEL PI STA. 19+88.4 ELEV. 34.0
CHANNEL PI STA. 13+23.4 ELEV. 33.4
CHANNEL PI STA. 18+16.4 ELEV. 33.9
CHANNEL PI STA. 15+86.8 ELEV. 33.7
CHANNEL PI STA. 2+59.2 ELEV. 31.7
BEGIN CHANNEL C STA. 0+00 ELEV. 31.1
CHANNEL PI STA. 9+53.8 ELEV. 33.1
CHANNEL PI STA. 9+02.7 ELEV. 32.9
CHANNEL PI STA. 8+50.2 ELEV. 31.4
END CHANNEL D STA. 13+08.8 ELEV. 31.8
BEGIN CHANNEL D STA. 0+00 ELEV. 30.1
CHANNEL PI STA. 3+55.9 ELEV. 30.9
BEGIN CHANNEL E STA. 0+00 ELEV. 27.0
END CHANNEL E STA. 4+35.9 ELEV. 27.4
CHANNEL PI STA. 1+37.0 ELEV. 37.2
CHANNEL PI STA. 1+50.7 ELEV. 37.5
CHANNEL PI STA. 1+89.1 ELEV. 37.8
BEGIN CHANNEL A STA. 0+00 ELEV. 37.1
END CHANNEL A STA. 16+89.6 ELEV. 38.8
CHANNEL PI STA. 1+90.3 ELEV. 27.2
CHANNEL PI STA. 0+53.7 ELEV. 27.1
CHANNEL PI STA. -0+64.2 ELEV. 27.1
CHANNEL PI STA. 13+15.4 ELEV. 27.5
END CHANNEL F STA. 16+15.1 ELEV. 28.1
END CHANNEL F STA. 17+61.4 ELEV. 28.4
BEGIN CHANNEL I STA. 0+00 ELEV. 28.7
END CHANNEL I STA. -1+18.0 ELEV. 28.8
BEGIN CHANNEL GMP-R STA. 0+00 ELEV. 28.6
CHANNEL PI STA. 0+98.2 ELEV. 28.6
CHANNEL PI STA. 2+72.6 ELEV. 29.1
CHANNEL PI STA. 5+71.7 ELEV. 29.7
CHANNEL PI STA. 8+25.6 ELEV. 28.7
CHANNEL PI STA. 4+85.3 ELEV. 29.2
CHANNEL PI STA. 6+14.9 ELEV. 29.3
CHANNEL PVI STA. 7+22.9 ELEV. 30.1
CHANNEL PI STA. 1+80.3 ELEV. 26.2
BEGIN CHANNEL G STA. 0+00 ELEV. 28.0
END CHANNEL G STA. 10+93.9 ELEV. 30.5
END CHANNEL H STA. 9+73.2 ELEV. 30.0
CHANNEL PI STA. 1+40.0 ELEV. 25.18
CHANNEL PI STA. 3+65.4 ELEV. 25.63
CHANNEL PI STA. 6+33.8 ELEV. 26.2
BEGIN CHANNEL E STA. 0+00 ELEV. 24.9

CHUTE DA1 OUTFALL Q_{25}=227 cfs Q_{100}=345 cfs
CHUTE DA16 OUTFALL Q_{25}=187 cfs Q_{100}=254 cfs
CHUTE DA15 OUTFALL Q_{25}=196 cfs Q_{100}=272 cfs
CHUTE DA17 OUTFALL Q_{25}=308 cfs Q_{100}=431 cfs
CHUTE DA5 OUTFALL Q_{25}=66 cfs Q_{100}=92 cfs
CHUTE DA6 OUTFALL Q_{25}=247 cfs Q_{100}=341 cfs
CHUTE DA7 OUTFALL Q_{25}=273 cfs Q_{100}=365 cfs
CHUTE DA2 OUTFALL Q_{25}=214 cfs Q_{100}=301 cfs
CHUTE DA8 OUTFALL Q_{25}=246 cfs Q_{100}=342 cfs
CHUTE DA9 OUTFALL Q_{25}=180 cfs Q_{100}=250 cfs
CHUTE DA10 OUTFALL Q_{25}=211 cfs Q_{100}=292 cfs
CHUTE DA11 OUTFALL Q_{25}=127 cfs Q_{100}=176 cfs
CHUTE DA3 OUTFALL Q_{25}=162 cfs Q_{100}=210 cfs
CHUTE DA4 OUTFALL Q_{25}=169 cfs Q_{100}=252 cfs
CHUTE DA14 OUTFALL Q_{25}=220 cfs Q_{100}=306 cfs
CHUTE DA13 OUTFALL Q_{25}=285 cfs Q_{100}=394 cfs
CHUTE DA12 OUTFALL Q_{25}=185 cfs Q_{100}=257 cfs

CHANNEL A
CHANNEL B
CHANNEL C
CHANNEL D
CHANNEL E
CHANNEL F
CHANNEL G
CHANNEL H
CHANNEL I
SWP
SP-1
SP-2
NEP
SEP
EP

MW-1LB MW-2LB MW-3LB MW-4LB MW-5LB MW-6LB MW-7LB MW-8LB MW-9LB MW-10LB MW-11LB MW-12LB MW-13LB MW-14LB MW-15LB MW-16LB MW-17LB MW-18LB MW-19LB MW-20LB MW-21LB MW-22LB MW-23LB MW-24LB MW-25LB MW-26LB MW-27LB MW-28LB MW-29LB MW-30LB MW-31LB MW-32LB MW-33LB MW-34LB MW-35LB MW-36LB MW-37LB MW-38LB MW-39LB MW-40LB MW-41LB MW-42LB MW-43LB MW-44LB MW-45LB MW-46LB MW-47LB MW-48LB MW-49LB MW-50LB MW-51LB MW-52LB MW-53LB MW-54LB MW-55LB MW-56LB MW-57LB MW-58LB MW-59LB MW-60LB MW-61LB MW-62LB MW-63LB MW-64LB MW-65LB MW-66LB MW-67LB MW-68LB MW-69LB MW-70LB MW-71LB MW-72LB MW-73LB MW-74LB MW-75LB MW-76LB MW-77LB MW-78LB MW-79LB MW-80LB MW-81LB MW-82LB MW-83LB MW-84LB MW-85LB MW-86LB MW-87LB MW-88LB MW-89LB MW-90LB MW-91LB MW-92LB MW-93LB MW-94LB MW-95LB MW-96LB MW-97LB MW-98LB MW-99LB MW-100LB MW-101LB MW-102LB MW-103LB MW-104LB MW-105LB MW-106LB MW-107LB MW-108LB MW-109LB MW-110LB MW-111LB MW-112LB MW-113LB MW-114LB MW-115LB MW-116LB MW-117LB MW-118LB MW-119LB MW-120LB MW-121LB MW-122LB MW-123LB 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GMP-A GMP-B GMP-C GMP-D GMP-E GMP-F GMP-G GMP-H GMP-I GMP-J GMP-J(R) GMP-K GMP-K(R) GMP-L GMP-L(R) GMP-M GMP-N GMP-O GMP-P GMP-Q GMP-R GMP-S GMP-T GMP-T1 GMP-U

WCC-1 WCC-2 WCC-3

0 300 600
SCALE IN FEET

POND LABELS	
NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 4)
- 745000 N — STATE PLANE COORDINATE SYSTEM
- 29°49'45" — GEODETIC COORDINATE SYSTEM
- 20 — EXISTING CONTOUR
- MW-4UB — EXISTING DETECTION GROUNDWATER MONITORING WELL
- MW-4UB — EXISTING DETECTION GROUNDWATER MONITORING WELL TO BE DECOMMISSIONED
- MW-4UB — PROPOSED DETECTION REPLACEMENT MONITORING WELL
- GMP-M — EXISTING LANDFILL GAS MONITORING PROBE (SEE NOTE 5)
- GMP-J — EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 5)
- GMP-J(R) — PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE (SEE NOTE 5)
- EASEMENT BOUNDARY
- GABIONS
- CONCRETE
- PI: POINT OF INTERSECTION
- PVI: POINT OF VERTICAL INTERSECTION
- STA: STATION (FT)
- ELEV: ELEVATION (FT-MSL)
- Q_{25}=89 cfs — 25-YEAR PEAK FLOW RATE (CUBIC FEET PER SECOND)
- Q_{100}=129 cfs — 100-YEAR PEAK FLOW RATE (CUBIC FEET PER SECOND)

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. CHANNEL PROFILE INFORMATION PRESENTED ON ATTACHMENTS 6A.4 THROUGH 6A.13.
4. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
5. GAS MONITORING PROBES GMP-Q, GMP-R, AND GMP-S ARE BEING DECOMMISSIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS (WBC) IN APRIL 2004. GMP-T5 AND GMP-U ARE BEING DECOMMISSIONED IN A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP-T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA.

LIST OF REVISIONS:

1. UPDATED OUTFALL INFORMATION.
2. UPDATED EXISTING TOPOGRAPHY.

O:\0120\439\FIP MOD 2024\ATT 6\6A\6a.03-PER-STRUC-PLAN.dwg, rarrington, 1:2

- [ ] DRAFT
- [X] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 03/2004
FILE: 0120-439-11
CAD: 6A.03-PR-STRUC-PLAN.DWG
DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

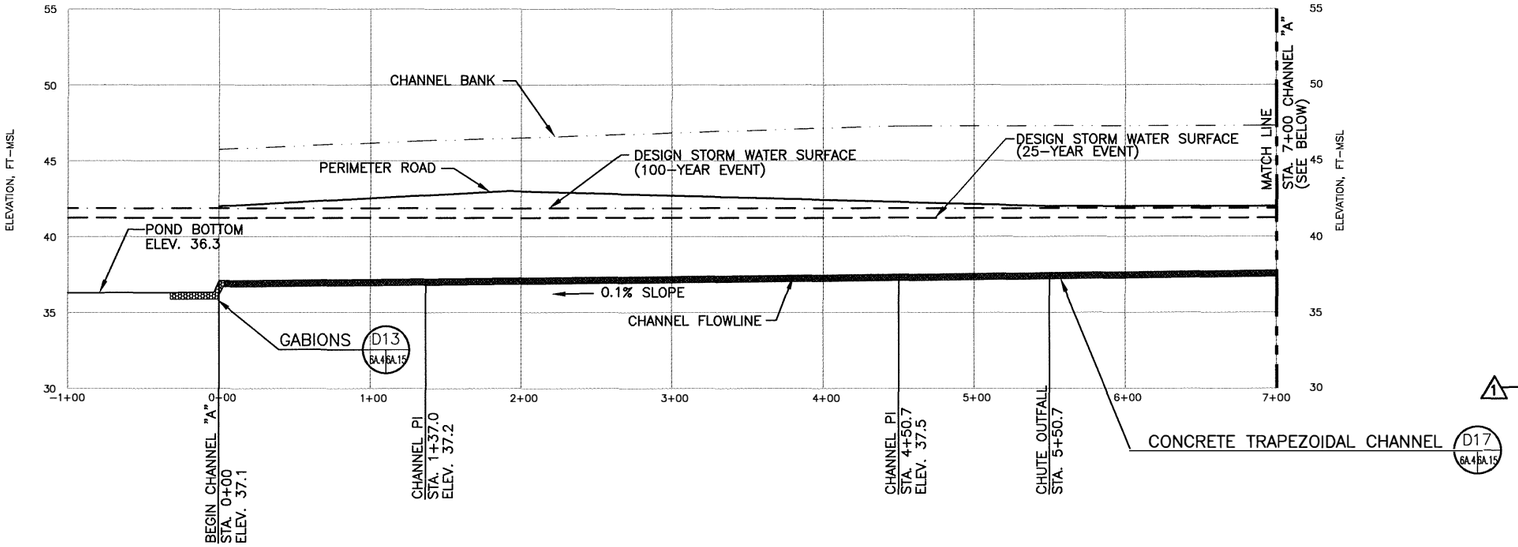
REVISIONS		
NO.	DATE	DESCRIPTION
1	01/2012	PERMIT MODIFICATION
2	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT PERIMETER DRAINAGE PLAN

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

WWW.WCGRP.COM

ATTACHMENT 6A.3



CHANNEL "A" PA 6A.3 6A.4

0 50 100 SCALE IN FEET — HORIZONTAL

0 5 10 SCALE IN FEET — VERTICAL

25-YEAR CHANNEL "A" INFORMATION

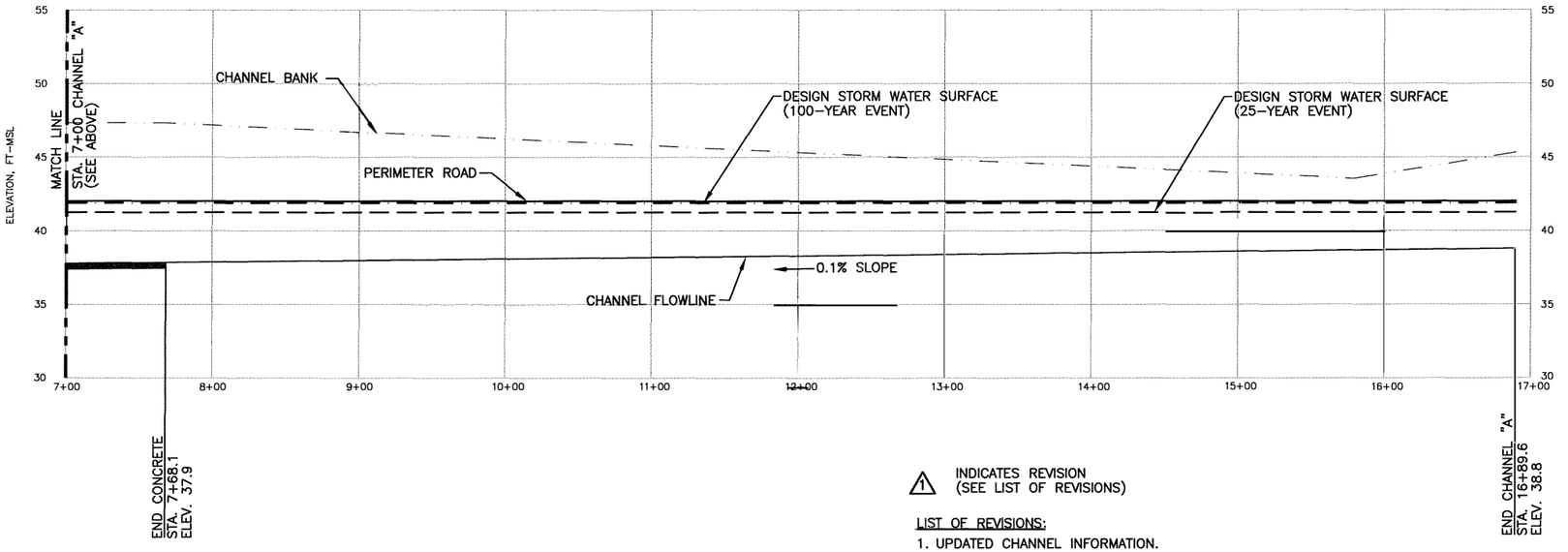
CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+37	12	315	0.1	2.99	5.02
1+37	4+50.7	12	315	0.1	2.99	5.02
4+50.7	7+68.1	12	315	0.1	2.99	5.02
7+68.1	16+89.6	0	34	0.1	2.82	1.43

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "A" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+37	12	432	0.1	3.50	5.47
1+37	4+50.7	12	432	0.1	3.50	5.47
4+50.7	7+68.1	12	432	0.1	3.50	5.47
7+68.1	16+89.6	0	48	0.1	3.21	1.55

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.



1 INDICATES REVISION (SEE LIST OF REVISIONS)

LIST OF REVISIONS:

1. UPDATED CHANNEL INFORMATION.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

CHANNEL "A" PA 6A.3 6A.4

0 50 100 SCALE IN FEET — HORIZONTAL

0 5 10 SCALE IN FEET — VERTICAL

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER
12/12/2024

☐ DRAFT
☒ FOR PERMITTING PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 03/2004
FILE: 0120-439-11
CAD: 6A.04-PROA.DWG
DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS NO.	DATE	DESCRIPTION
1	01/2012	PERMIT MODIFICATION
2	12/2024	SEE LIST OF REVISIONS

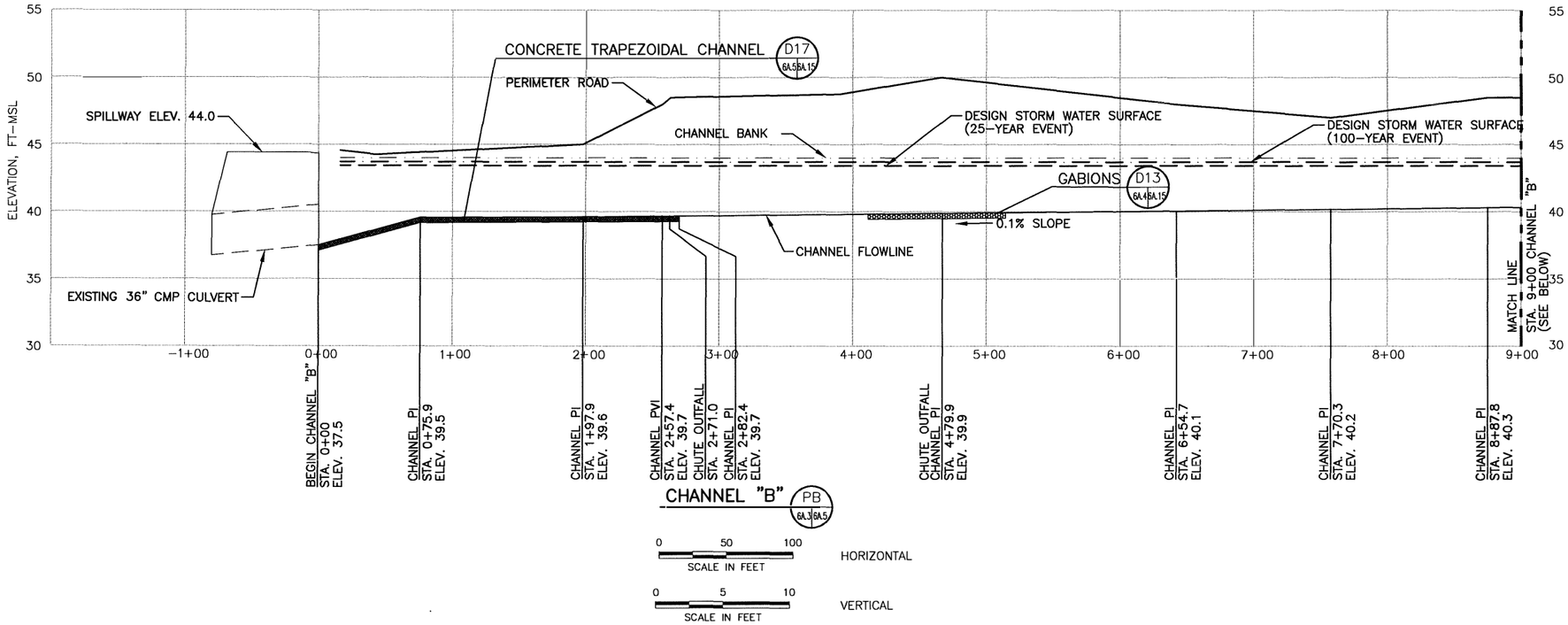
Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

MAJOR PERMIT AMENDMENT
PERIMETER CHANNEL "A" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

WWW.WCGRP.COM

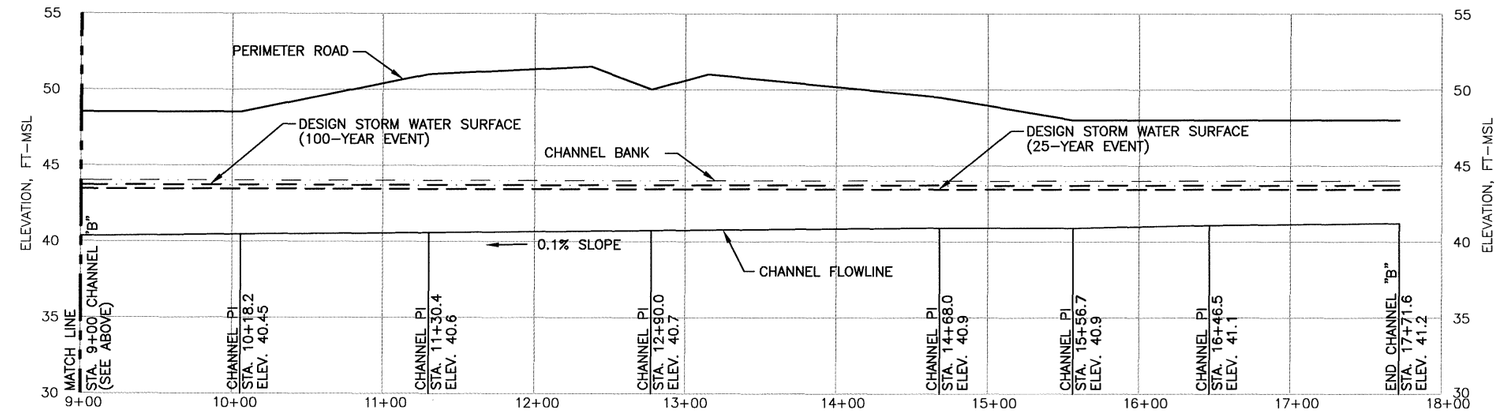
ATTACHMENT 6A.4



CHANNEL "B" PB 6A.3 6A.5

0 50 100 SCALE IN FEET — HORIZONTAL

0 5 10 SCALE IN FEET — VERTICAL



CHANNEL "B" PB 6A.3 6A.5

0 50 100 SCALE IN FEET — HORIZONTAL

0 5 10 SCALE IN FEET — VERTICAL

STATE OF TEXAS
CHARLES R. MARSH
105073
PROFESSIONAL ENGINEER
LICENSED

12/12/2024

25-YEAR CHANNEL "B" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+75.9	25	378	0.1	2.49	5.07
0+75.9	1+97.9	25	378	0.1	2.49	5.07
1+97.9	2+57.4	25	378	0.1	2.49	5.07
2+57.4	2+82.4	25	113	0.1	1.23	3.35
2+82.4	4+79.9	25	113	0.1	2.18	1.76
4+79.9	6+54.7	25	37	0.1	1.13	1.20
6+54.7	7+70.3	25	37	0.1	1.13	1.20
7+70.3	8+87.8	25	37	0.1	1.13	1.20
8+87.8	10+18.2	25	37	0.1	1.13	1.20
10+18.2	11+30.4	25	37	0.1	1.13	1.20
11+30.4	12+90.0	25	37	0.1	1.13	1.20
12+90.0	14+68.0	25	37	0.1	1.13	1.20
14+68.0	15+56.7	25	37	0.1	1.13	1.20
15+56.7	16+46.5	25	37	0.1	1.13	1.20
16+46.5	17+71.6	25	37	0.1	1.13	1.20

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "B" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+75.9	25	525	0.1	3.00	5.65
0+75.9	1+97.9	25	525	0.1	3.00	5.65
1+97.9	2+57.4	25	525	0.1	3.00	5.65
2+57.4	2+82.4	25	159	0.1	1.50	3.78
2+82.4	4+79.9	25	159	0.1	2.66	1.98
4+79.9	6+54.7	25	54	0.1	1.42	1.37
6+54.7	7+70.3	25	54	0.1	1.42	1.37
7+70.3	8+87.8	25	54	0.1	1.42	1.37
8+87.8	10+18.2	25	54	0.1	1.42	1.37
10+18.2	11+30.4	25	54	0.1	1.42	1.37
11+30.4	12+90.0	25	54	0.1	1.42	1.37
12+90.0	14+68.0	25	54	0.1	1.42	1.37
14+68.0	15+56.7	25	54	0.1	1.42	1.37
15+56.7	16+46.5	25	54	0.1	1.42	1.37
16+46.5	17+71.6	25	54	0.1	1.42	1.37

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

1 INDICATES REVISION (SEE LIST OF REVISIONS)

LIST OF REVISIONS:

1. UPDATED CHANNEL INFORMATION.

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DATE: 03/2004
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CAD: 6A.05-PROB.DWG
DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS NO.	DATE	DESCRIPTION
1	01/2012	PERMIT MODIFICATION
2	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
PERIMETER CHANNEL "B" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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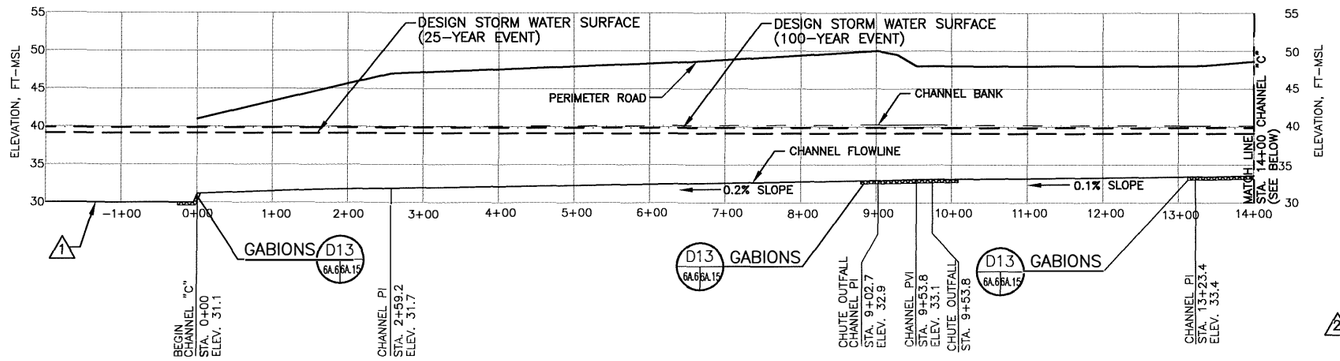
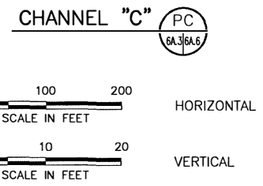
ATTACHMENT 6A.5

O:\0120\439\FLIP MOD 2024\ATT 6\6A\6A.05-PROB.dwg, rarrington, 1:200





1 INDICATES REVISION (SEE LIST OF REVISIONS)

LIST OF REVISIONS:

1. UPDATED POND DESIGNS.
2. UPDATED CHANNEL INFORMATION.

2

25-YEAR CHANNEL "C" INFORMATION

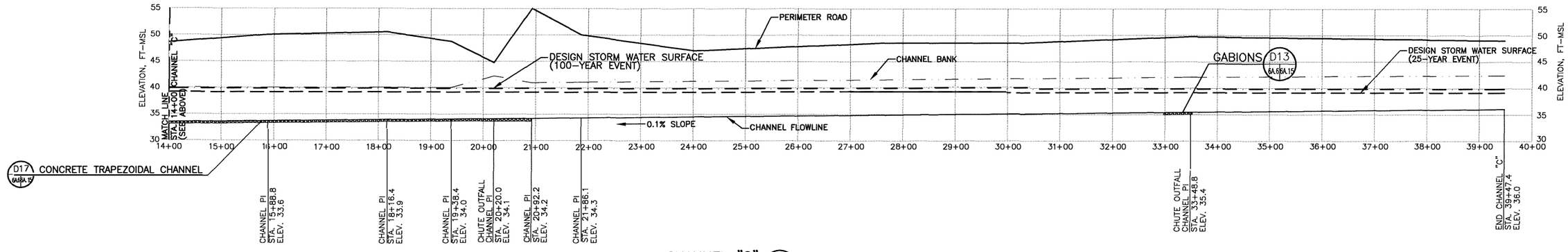
CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	2+59.2	25	1090	0.2	6.38	4.53
2+59.2	9+02.7	25	1090	0.2	6.38	4.53
9+02.7	9+53.8	25	1090	0.2	6.38	4.53
9+53.8	13+23.4	25	654	0.1	5.84	3.05
13+23.4	15+88.8	15	654	0.1	4.29	6.46
15+88.8	18+16.4	15	654	0.1	4.29	6.46
18+16.4	19+38.4	15	654	0.1	4.29	6.46
19+38.4	20+20.0	15	654	0.1	4.29	6.46
20+20.0	20+92.2	15	375	0.1	5.35	2.72
20+92.2	21+86.1	15	375	0.1	5.35	2.72
21+86.1	33+48.8	15	375	0.1	5.35	2.72
33+48.8	39+47.8	15	29	0.1	1.31	1.26

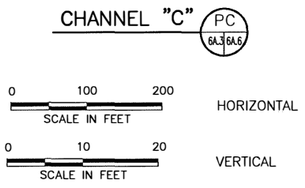
NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "C" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	2+59.2	25	1551	0.2	7.68	5.00
2+59.2	9+02.7	25	1551	0.2	7.68	5.00
9+02.7	9+53.8	25	1551	0.2	7.68	5.00
9+53.8	13+23.4	25	949	0.1	7.12	3.40
13+23.4	15+88.8	15	949	0.1	5.21	7.16
15+88.8	18+16.4	15	949	0.1	5.21	7.16
18+16.4	19+38.4	15	949	0.1	5.21	7.16
19+38.4	20+20.0	15	949	0.1	5.21	7.16
20+20.0	20+92.2	15	531	0.1	6.38	2.99
20+92.2	21+86.1	15	531	0.1	6.38	2.99
21+86.1	33+48.8	15	531	0.1	6.38	2.99
33+48.8	39+47.4	15	36	0.1	1.91	1.56

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.





NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

STATE OF TEXAS
CHARLES R. MARSH
105073
PROFESSIONAL LICENSED ENGINEER
12/12/2024

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REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS NO.	DATE	DESCRIPTION
1	01/2012	PERMIT MODIFICATION
2	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
PERIMETER CHANNEL "C" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 6A.6

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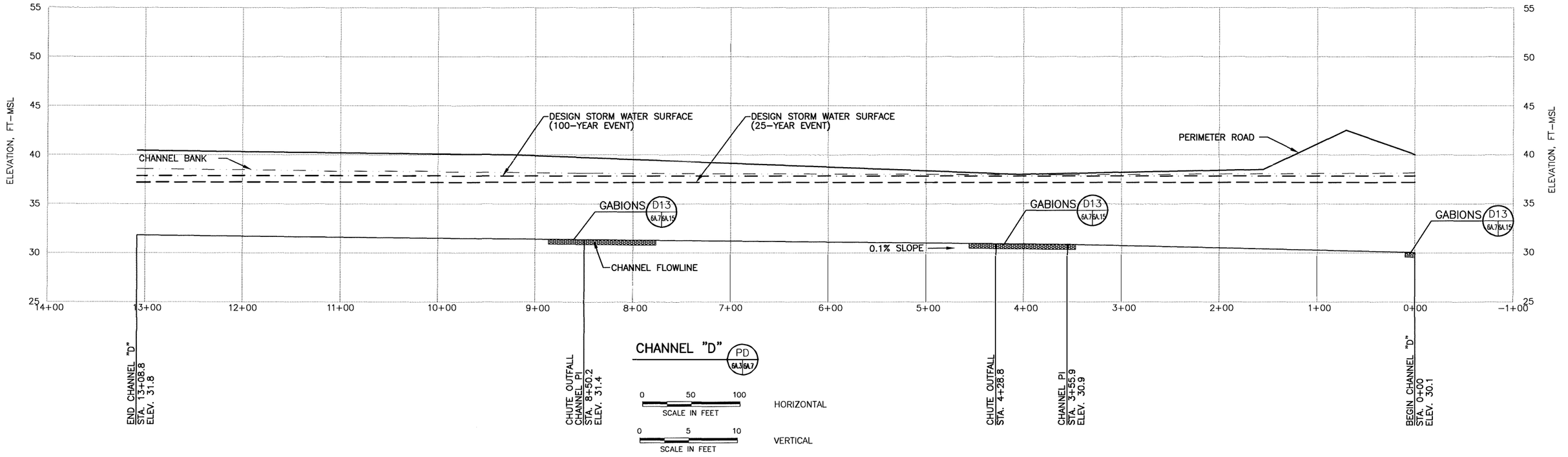

25-YEAR CHANNEL "D" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	3+55.9	15	452	0.1	5.41	2.67
3+55.9	8+50.2	10	265	0.1	4.68	2.36
8+50.2	13+08.8	15	29	0.1	1.28	1.21

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "D" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	3+55.9	15	649	0.1	6.43	2.94
3+55.9	8+50.2	10	371	0.1	5.47	2.57
8+50.2	13+08.8	15	40	0.1	1.53	1.34

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. THE PEAK WATER SURFACE ELEVATION FOR PILOT CHANNEL "D" WAS TAKEN FROM THE PROPOSED HEC-1 ANALYSIS FOR SOUTH POND-2 IN ATTACHMENT 6A-B.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

1 INDICATES REVISION (SEE LIST OF REVISIONS)

LIST OF REVISIONS:

1. UPDATED CHANNEL INFORMATION.

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER

12/12/2024

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TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS NO.	DATE	DESCRIPTION
1	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
PERIMETER CHANNEL "D" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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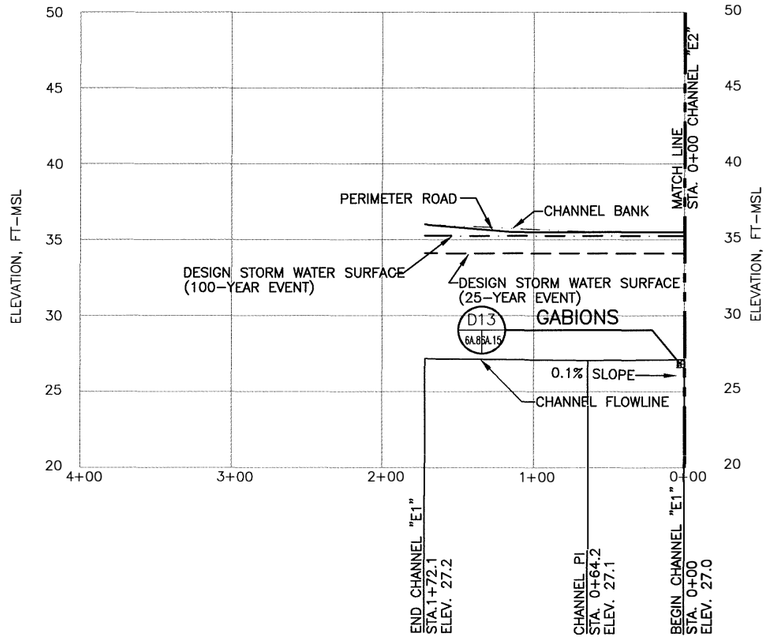
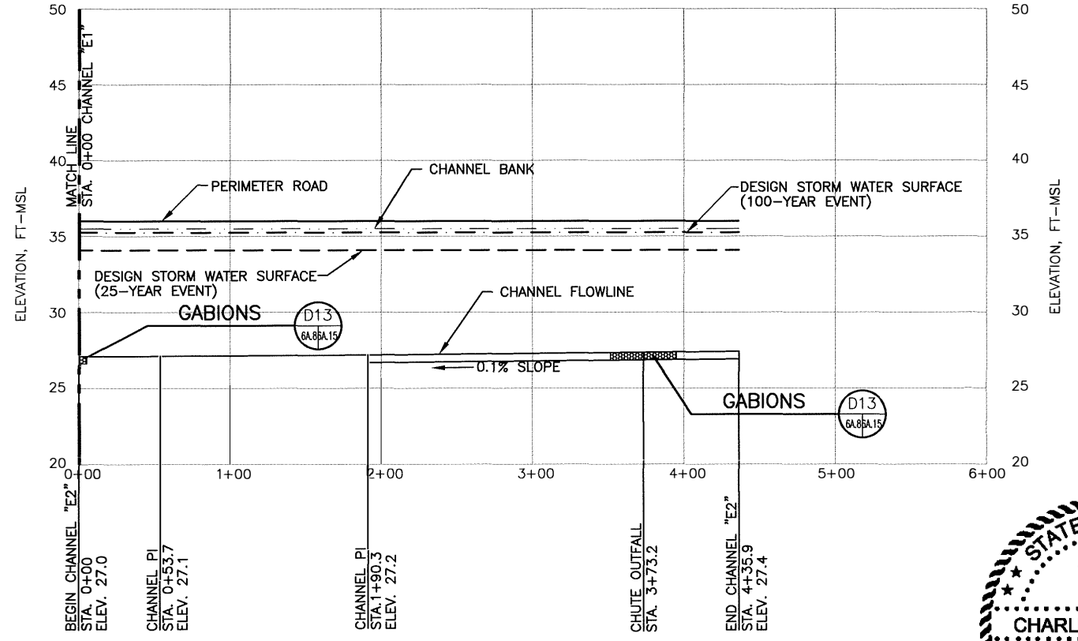
ATTACHMENT 6A.7





CHANNEL "E1" PE1 6A.3&6A.8

0 50 100
SCALE IN FEET
HORIZONTAL

0 5 10
SCALE IN FEET
VERTICAL

CHANNEL "E2" PE2 6A.3&6A.8

0 50 100
SCALE IN FEET
HORIZONTAL

0 5 10
SCALE IN FEET
VERTICAL

STATE OF TEXAS
CHARLES R. MARSH
105073
PROFESSIONAL ENGINEER
LICENSED

12/12/2024

25-YEAR CHANNEL "E1" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+64.2	25	26	0.1	0.91	1.03
0+64.2	1+72.1	30	26	0.1	0.82	0.98

1 NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "E1" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+64.2	25	37	0.1	1.12	1.17
0+64.2	1+72.1	30	37	0.1	1.01	1.11

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

25-YEAR CHANNEL "E2" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+53.6	25	318	0.1	3.76	2.33
0+53.6	1+90.3	35	318	0.1	3.21	2.22
1+90.3	4+35.9	45	318	0.1	2.82	2.11

1 NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "E2" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+53.6	25	442	0.1	4.48	2.57
0+53.6	1+90.3	35	442	0.1	3.86	2.46
1+90.3	4+35.9	45	442	0.1	3.41	2.35

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

1 INDICATES REVISION (SEE LIST OF REVISIONS)

LIST OF REVISIONS:

1. UPDATED CHANNEL INFORMATION.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

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REVIEWED BY: JPY

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TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS NO.	DATE	DESCRIPTION
1	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
PERIMETER CHANNEL "E" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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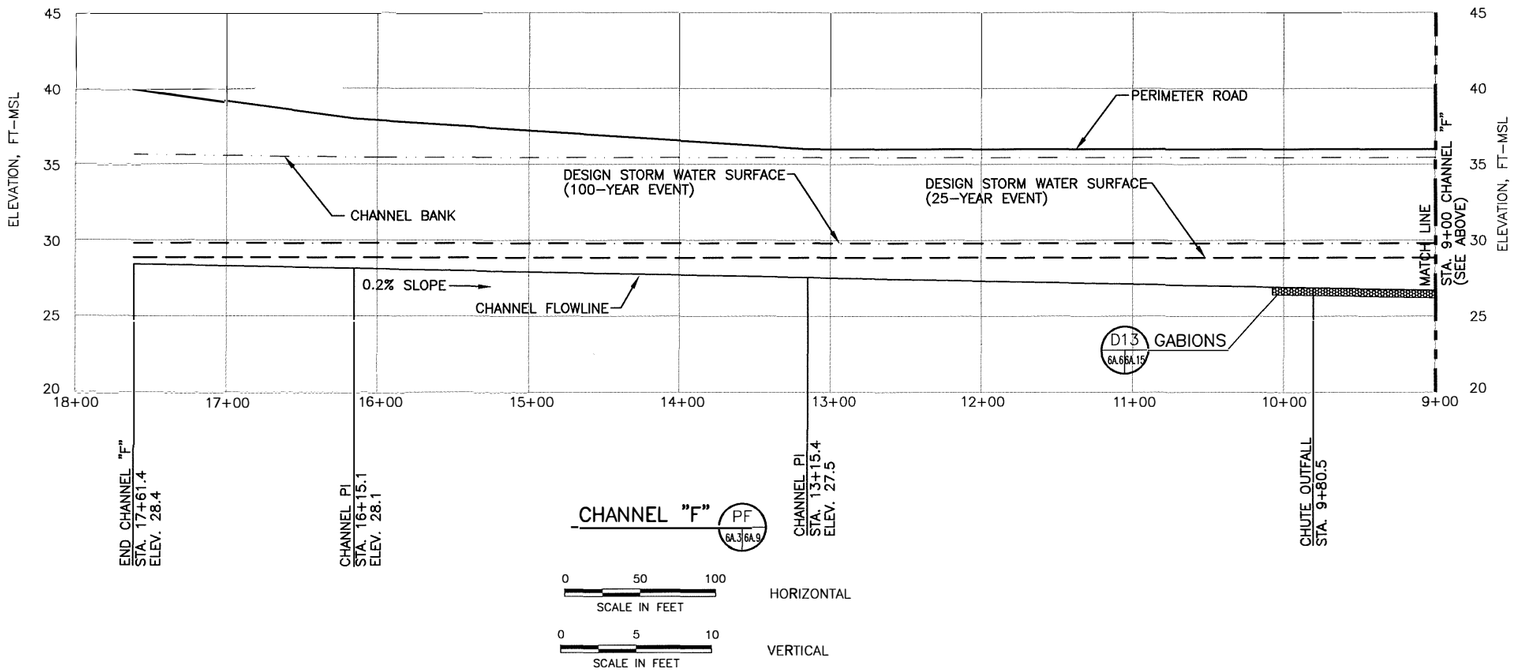
ATTACHMENT 6A.8



CHANNEL "F" PF 6A.3 6A.9

0 50 100 SCALE IN FEET HORIZONTAL

0 5 10 SCALE IN FEET VERTICAL

CHANNEL "F" PF 6A.3 6A.9

0 50 100 SCALE IN FEET HORIZONTAL

0 5 10 SCALE IN FEET VERTICAL

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER

12/12/2024

25-YEAR CHANNEL "F" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+39.9	35	594	0.2	3.81	3.50
1+39.9	3+65.4	20	221	0.2	2.88	2.82
3+65.4	6+33.8	15	221	0.2	3.27	2.91
6+33.8	13+15.4	15	35	0.2	1.18	1.65
13+15.4	16+15.1	12	35	0.2	1.32	1.73
16+15.1	17+61.4	12	35	0.2	1.32	1.73

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "F" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+39.9	35	817	0.2	4.56	3.86
1+39.9	3+65.4	20	817	0.2	5.78	4.11
3+65.4	6+33.8	15	817	0.2	6.35	3.20
6+33.8	13+15.4	15	50	0.2	1.45	1.85
13+15.4	16+15.1	12	50	0.2	1.62	1.93
16+15.1	17+61.4	12	50	0.2	1.62	1.93

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

NOTES:

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3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

1 INDICATES REVISION (SEE LIST OF REVISIONS)

LIST OF REVISIONS:

1. UPDATED CHANNEL INFORMATION.

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McCARTY ROAD LANDFILL TX, LP

REVISIONS NO.	DATE	DESCRIPTION
1	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
PERIMETER CHANNEL "F" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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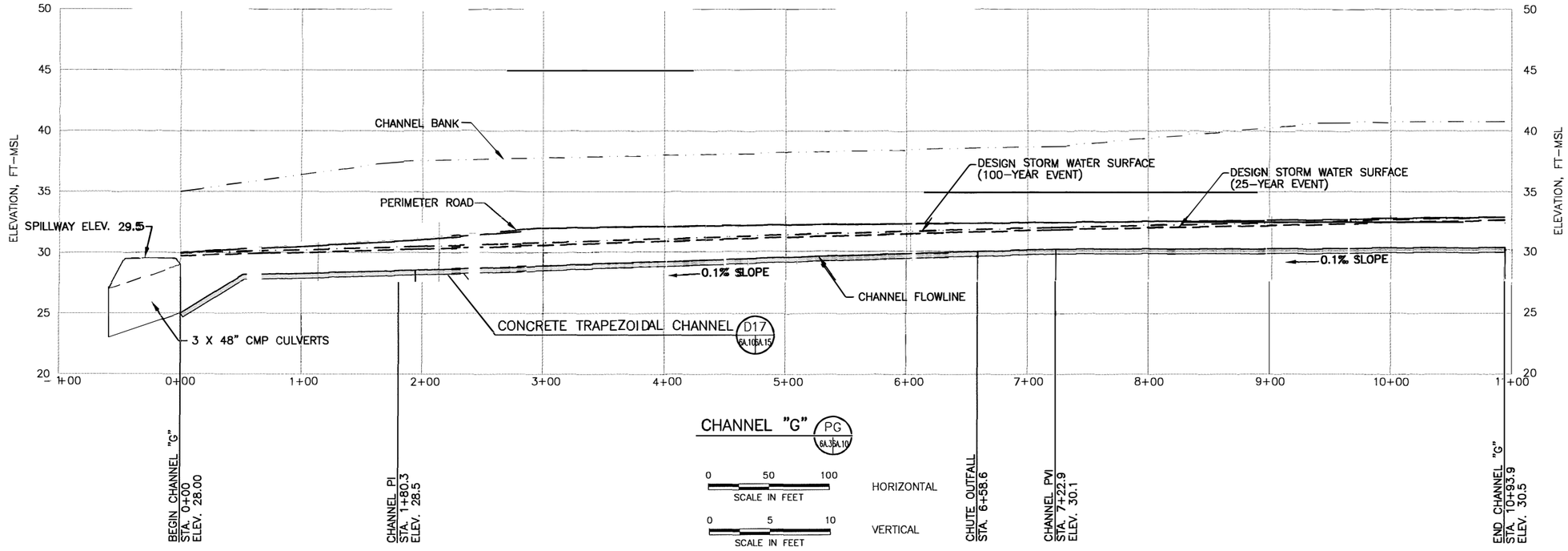
ATTACHMENT 6A.9



1

25-YEAR CHANNEL "G" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+80.3	12	179	0.1	2.23	4.28
1+80.3	7+22.9	12	179	0.1	2.23	4.28
7+22.9	10+93.9	0	33	0.1	1.93	2.96

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "G" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+80.3	12	246	0.1	2.64	4.69
1+80.3	7+22.9	12	246	0.1	2.64	4.69
7+22.9	10+93.9	0	246	0.1	4.10	4.88

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

1 INDICATES REVISION (SEE LIST OF REVISIONS)

LIST OF REVISIONS:

1. UPDATED CHANNEL INFORMATION.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER
12/12/2024

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McCARTY ROAD LANDFILL TX, LP

REVISIONS NO.	DATE	DESCRIPTION
1	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
PERIMETER CHANNEL "G" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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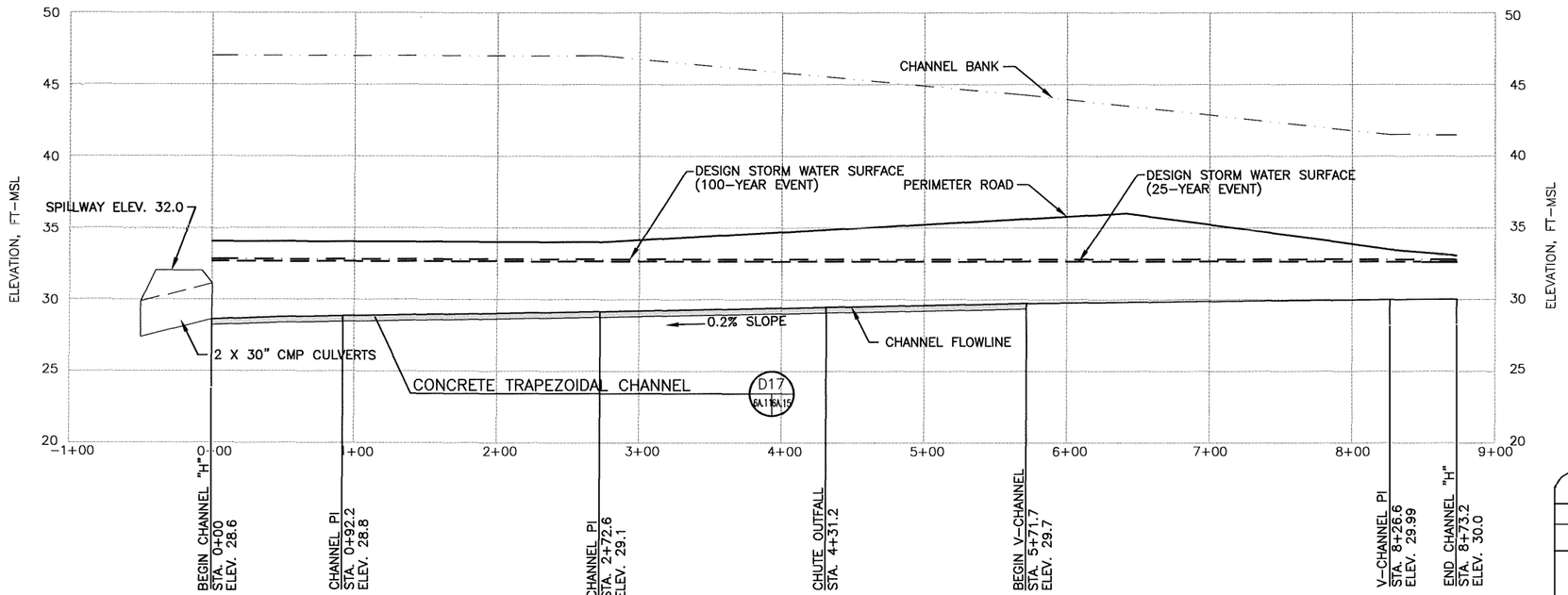
ATTACHMENT 6A.10



CHANNEL "H" (PH 6A.3&6A.11)

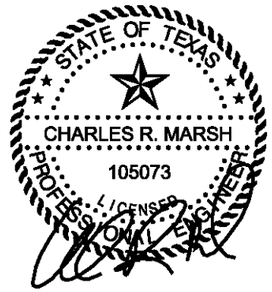
0 50 100 SCALE IN FEET — HORIZONTAL

0 5 10 SCALE IN FEET — VERTICAL

1 INDICATES REVISION (SEE LIST OF REVISIONS)

LIST OF REVISIONS:

1. UPDATED CHANNEL INFORMATION.



12/12/2024

25-YEAR CHANNEL "H" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+48.6	12	270	0.2	2.31	6.17
0+48.6	2+72.9	12	270	0.2	2.31	6.17
2+72.9	5+71.7	12	270	0.2	2.31	6.17
5+71.7	8+26.6	0	25	0.2	2.21	1.71
8+26.6	8+73.2	0	25	0.2	2.21	1.71

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

2

100-YEAR CHANNEL "H" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+48.6	12	374	0.2	2.74	6.76
0+48.6	2+72.6	12	374	0.2	2.74	6.76
2+72.6	5+71.7	12	374	0.2	2.74	6.76
5+71.7	8+26.6	0	35	0.2	2.50	1.86
8+26.6	8+73.2	0	35	0.2	2.50	1.86

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

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DESIGN BY: SAN
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS NO.	DATE	DESCRIPTION
1	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
PERIMETER CHANNEL "H" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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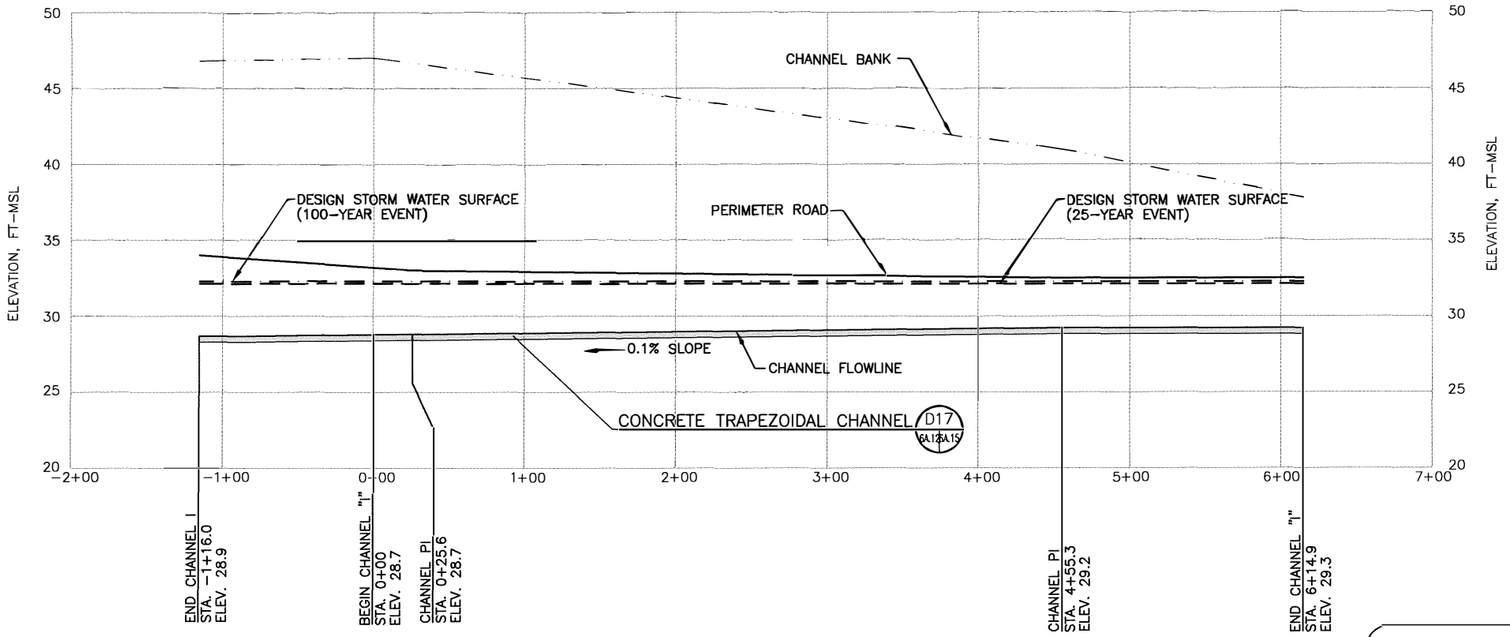
ATTACHMENT 6A.11



CHANNEL "I" PI 6A.3 6A.12

0 50 100 SCALE IN FEET — HORIZONTAL

0 5 10 SCALE IN FEET — VERTICAL

1 INDICATES REVISION (SEE LIST OF REVISIONS)

LIST OF REVISIONS:

1. UPDATED CHANNEL INFORMATION.

25–YEAR CHANNEL "I" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW 25–YEAR (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
–1+16.0	0+00	0	41	0.1	2.09	3.12
0+00	0+25.6	0	41	0.1	2.09	3.12
0+25.6	4+55.3	0	41	0.1	2.09	3.12
4+55.3	6+14.9	0	41	0.1	2.09	3.12

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100–YEAR CHANNEL "I" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW 25–YEAR (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
–1+16.0	0+00	0	50	0.1	2.26	3.28
0+00	0+25.6	0	50	0.1	2.26	3.28
0+25.6	4+55.3	0	50	0.1	2.26	3.28
4+55.3	6+14.9	0	50	0.1	2.26	3.28

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED PROFESSIONAL ENGINEER
12/12/2024

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A–B.

☐ DRAFT
☒ FOR PERMITTING PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 03/2004
FILE: 0120–439–11
CAD: 6A.12–PROI.DWG

DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS NO.	DATE	DESCRIPTION
1	12/2024	SEE LIST OF REVISIONS

Weaver Consultants Group
TBPE REGISTRATION NO. F–3727

MAJOR PERMIT AMENDMENT
PERIMETER CHANNEL "I" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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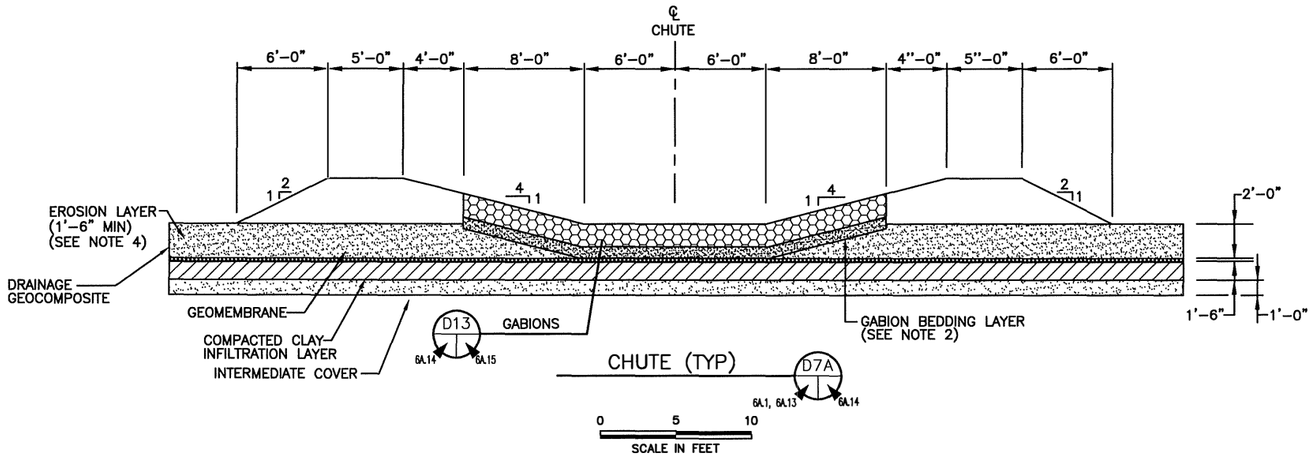
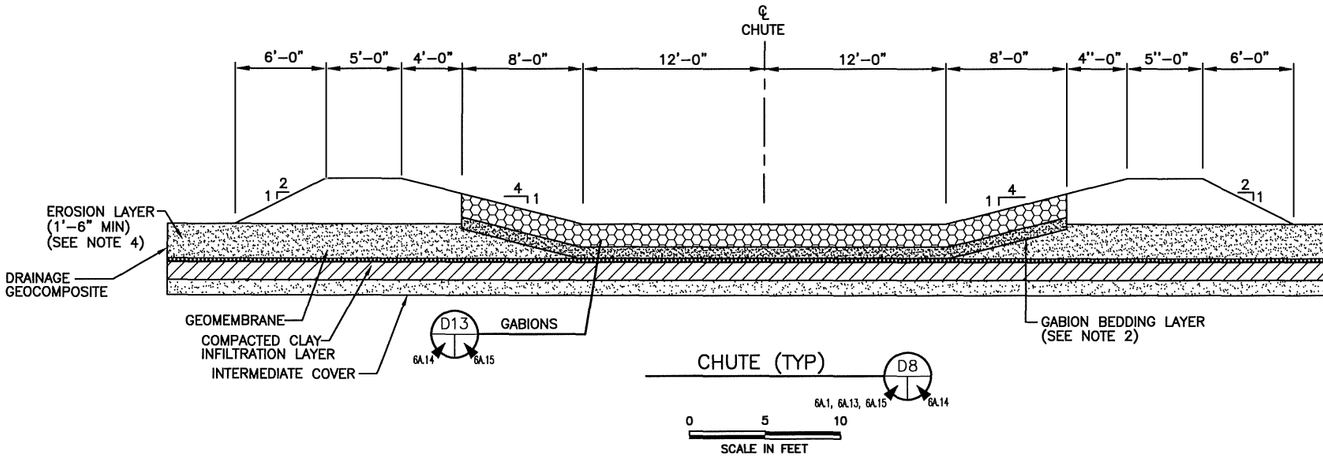
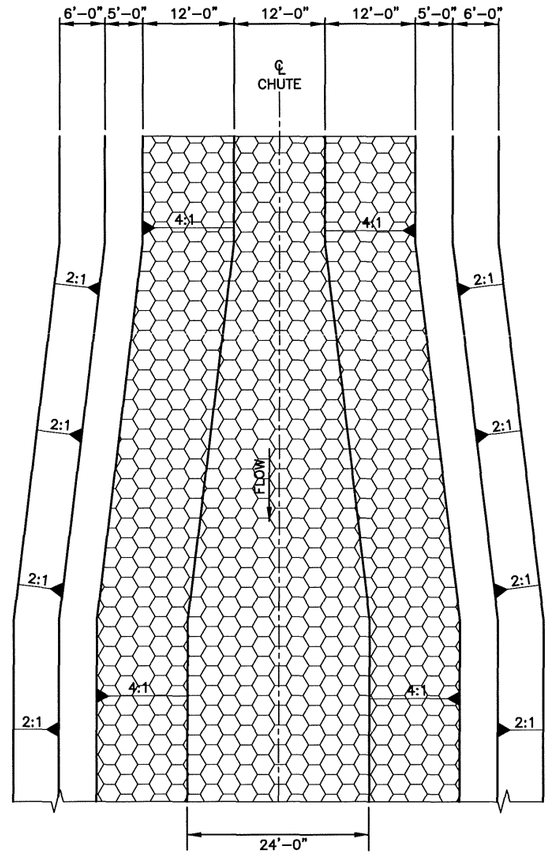
ATTACHMENT 6A.12





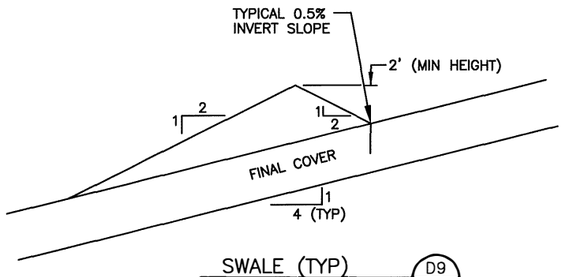
NOTES:

1. REFER TO ATTACHMENT 6A.1–DRAINAGE STRUCTURE PLAN FOR LOCATION OF DETAILS.
2. BEDDING MATERIAL WILL CONSIST OF A SW OR SP MATERIAL AS DEFINED BY UNIFIED SOIL CLASSIFICATION SYSTEM. (USCS).
3. BOTTOM WIDTH OF CHUTES WILL VARY PER ENERGY DISSIPATOR CALCULATIONS (SEE APPENDIX 6A–C).
4. TOP 6 INCHES OF EROSION LAYER WILL BE CAPABLE OF SUSTAINING VEGETATIVE GROWTH.
5. DETAILS ARE SHOWN WITH SUBTITLE–D FINAL COVER CONFIGURATION.
6. REFER TO ATTACHMENT 6A.17A THROUGH 6A.17C FOR GEOMEMBRANE LETDOWN DETAILS. REFER TO ATTACHMENT 6A.17D THROUGH 6A.17H FOR FLEXAMAT LETDOWN DETAILS. REFER TO ATTACHMENT 6A.17I THROUGH 6A.17L FOR ARTICULATED BLOCK LETDOWN DETAILS.



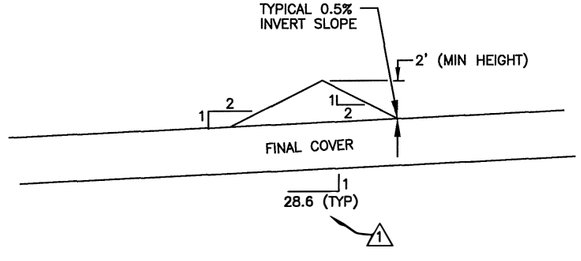
GABION CHUTE TRANSITION (TYP) D11 (6A.1, 6A.14)

0 10 20
SCALE IN FEET



SWALE (TYP) D9 (6A.1, 6A.13, 6A.14)

0 3 6
SCALE IN FEET



TOP DECK SWALE (TYP) D10 (6A.1, 6A.13, 6A.10)

0 3 6
SCALE IN FEET

STATE OF TEXAS
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12/12/2024

1 INDICATES REVISION (SEE LIST OF REVISIONS)

LIST OF REVISIONS:

1. REVISED TOP DECK SWALE GEOMETRY.

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DATE: 03/2004
FILE: 0120–439–11
CAD: 6A–14–DRAINDET1.DWG

DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F–3727

PREPARED FOR
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REVISIONS		
NO.	DATE	DESCRIPTION
1	10/2010	PERMIT MODIFICATION
2	01/2012	PERMIT MODIFICATION
3	12/2024	SEE LIST OF REVISIONS

DRAINAGE DETAILS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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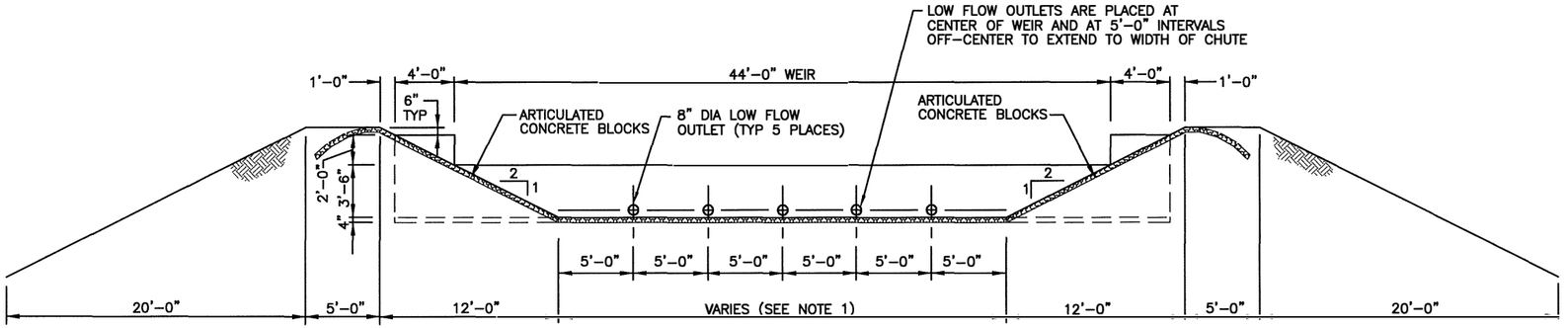
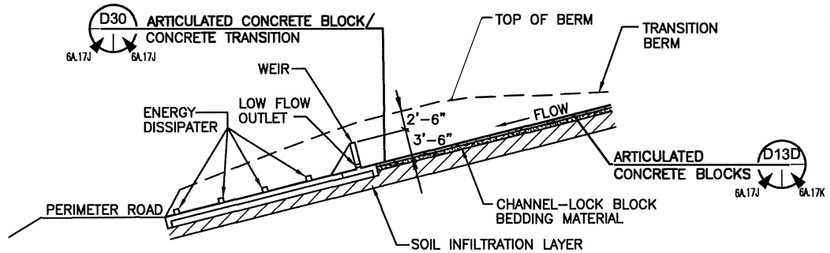
ATTACHMENT 6A.14



SECTION D20D

0 5 10 6A.17L 6A.17J

SCALE IN FEET



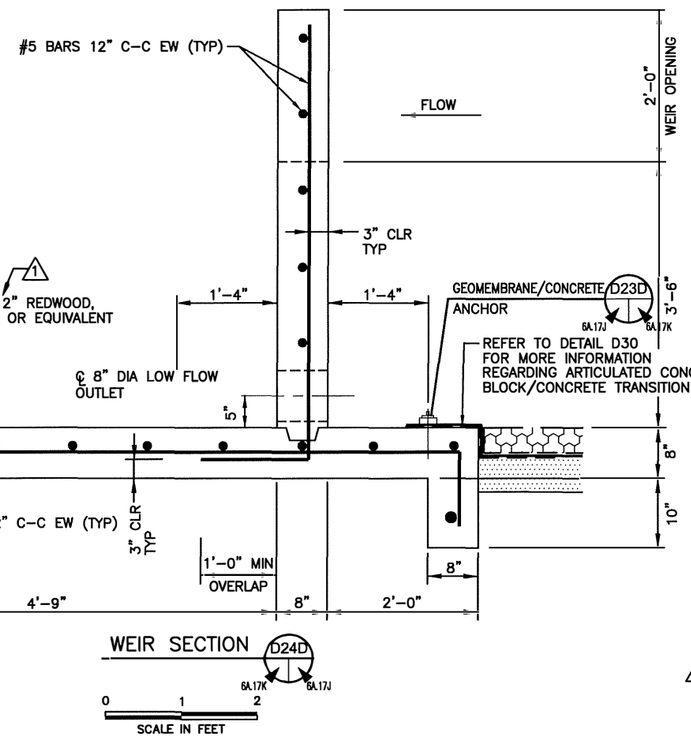
LONGITUDINAL SECTION D21D

0 10 20 6A.17I 6A.17J

SCALE IN FEET

STATE OF TEXAS
CHARLES R. MARSH
105073
PROFESSIONAL ENGINEER
LICENSED

12/12/2024

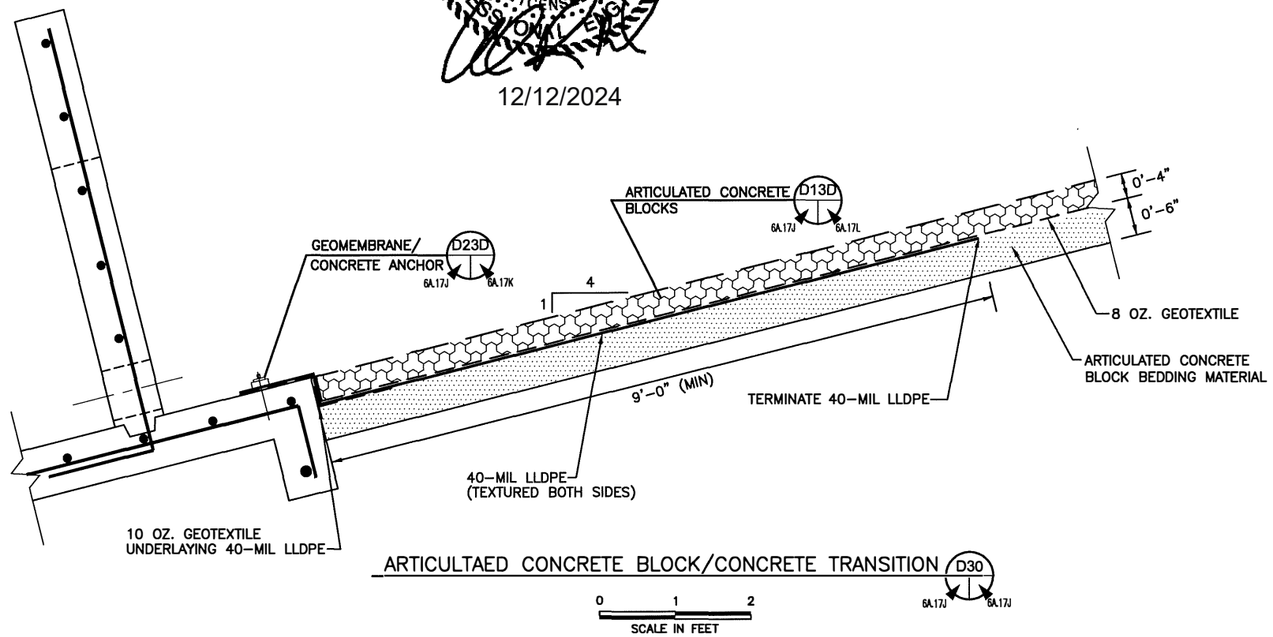


WEIR SECTION D24D

6A.17K 6A.17J

0 1 2

SCALE IN FEET



ARTICULTAED CONCRETE BLOCK/CONCRETE TRANSITION D30

0 1 2 6A.17J 6A.17J

SCALE IN FEET

LEGEND

1 INDICATES REVISION (SEE LIST OF REVISIONS)

LIST OF REVISIONS:

1. REVISED DISSIPATOR DESIGN.

NOTE:

1. DESIGN DIMENSIONS SHOWN ARE BASED ON CHUTE WITH 30-FOOT BOTTOM WIDTH. DESIGN ELEMENTS FOR EACH CHUTE WILL BE BASED ON CALCULATIONS PRESENTED IN APPENDIX 6A-C AND MAY VARY FROM THE DIMENSIONS SHOWN ON THIS PLAN.

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DATE: 03/2004
FILE: 0120-439-11
CAD: 6A.17J-LETDOWN DETAILS.DWG

DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

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McCARTY ROAD LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION
1	01/2012	PERMIT MODIFICATION
2	12/2024	SEE LIST OF REVISIONS

LETDOWN DETAILS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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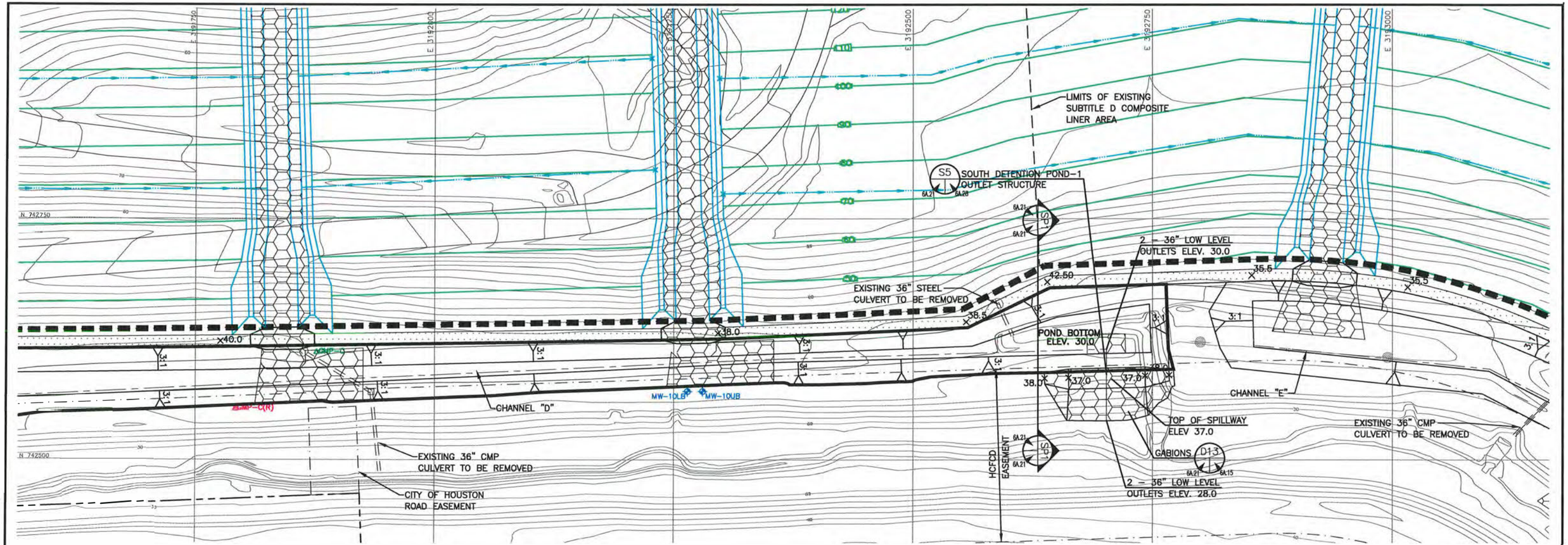
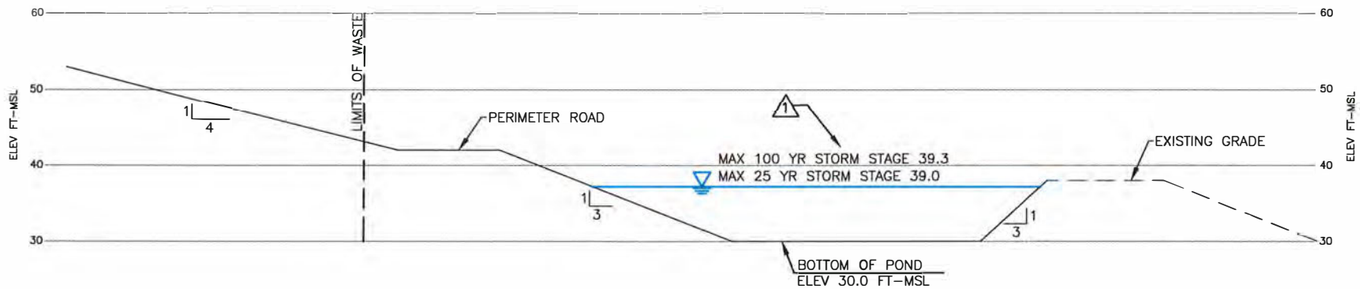
ATTACHMENT 6A.17J



LEGEND

- PERMIT BOUNDARY
- EXISTING CONTOUR
- N 746000 STATE PLANE COORDINATE SYSTEM
- 50 FINAL CONTOUR
- LIMITS OF WASTE
- EASEMENT BOUNDARY
- PROPOSED DRAINAGE LETDOWN
- GABIONS
- PROPOSED DRAINAGE SWALE
- MW-11UB EXISTING DETECTION GROUNDWATER MONITORING WELL
- GMP-J EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED
- GMP-J PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE
- POND LIMITS
- 1 INDICATES REVISION (SEE LIST OF REVISIONS)



SOUTH DETENTION POND-1 SECTION SP1 6A.21 6A.21

0 10 20 SCALE IN FEET HORIZONTAL

0 10 20 SCALE IN FEET VERTICAL

LIST OF REVISIONS:

1. UPDATED STAGES.

N

0 50 100 SCALE IN FEET

STATE OF TEXAS
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12/12/2024

SOUTH DETENTION POND-1

ELEVATION (FT-MSL)	SURFACE AREA (AC)
30.0	0.0012
32.0	0.5971
34.0	0.9844
36.0	1.3785
38.0	1.7659

* BOLD OUTLINE OF THE POND REPRESENTS THE LIMITS OF THE POND.

- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
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DATE: 03/2004
FILE: 0120-439-11
CAD: 6A.21-S-POND1.DWG

DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

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REVISIONS

NO.	DATE	DESCRIPTION
1	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
SOUTH POND-1

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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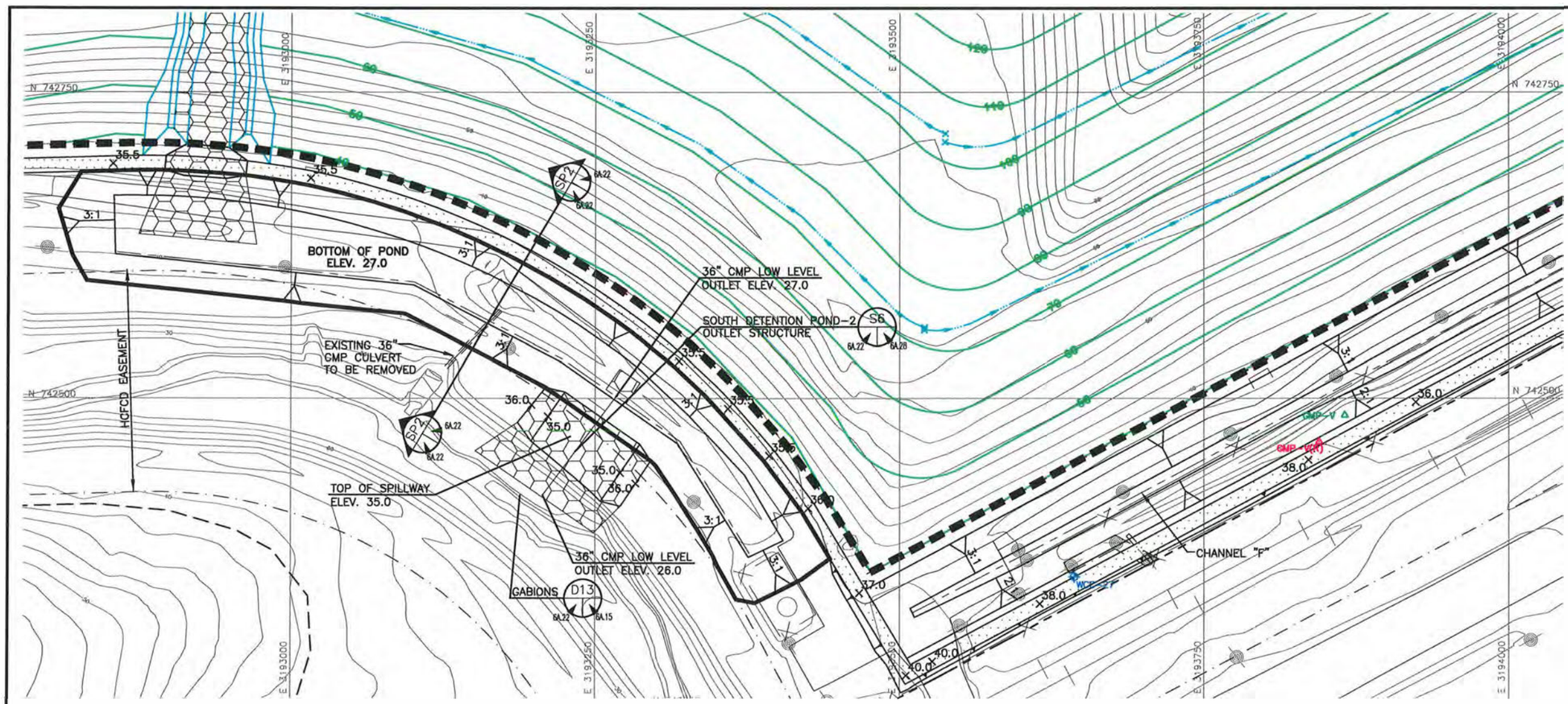
ATTACHMENT 6A.21

O:\0120\439\FLIP MOD 2024\ATT 6\6A\6A.21-S-POND1.dwg, rarrington, 1:2



0 50 100
SCALE IN FEET

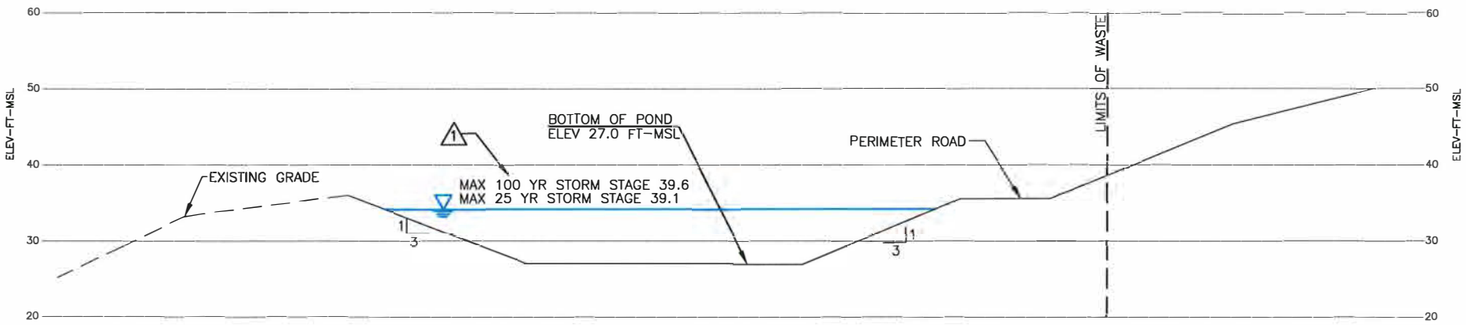
SOUTH DETENTION POND-2

ELEVATION (FT-MSL)	SURFACE AREA (AC)
27.0	0.0010
28.0	0.5542
29.0	0.6472
30.0	0.7417
31.0	0.8379
32.0	0.9357
33.0	1.0352
34.0	1.1362
35.0	1.2332
36.0	1.3376

* BOLD OUTLINE OF THE POND REPRESENTS THE LIMITS OF THE POND.

LEGEND

- PERMIT BOUNDARY
- EXISTING CONTOUR
- N 746000 — STATE PLANE COORDINATE SYSTEM
- 50 — FINAL CONTOUR
- LIMITS OF WASTE
- EASEMENT BOUNDARY
- PROPOSED DRAINAGE LETDOWN
- GABIONS
- PROPOSED DRAINAGE SWALE
- WCC-27 — EXISTING DETECTION GROUNDWATER MONITORING WELL
- GMP-J — EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED
- GMP-J(R) — PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE
- POND LIMITS
- 1 — INDICATES REVISION (SEE LIST OF REVISIONS)



SOUTH DETENTION POND-2 SECTION (SP2, 6A.22 — 6A.22)

0 10 20 SCALE IN FEET — HORIZONTAL

0 10 20 SCALE IN FEET — VERTICAL

LIST OF REVISIONS:

1. UPDATED STAGES.

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DATE: 03/2004
FILE: 0120-439-11
CAD: 6A.22-S-POND.DWG

DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

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REVISIONS		
NO.	DATE	DESCRIPTION
1	12/24	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
SOUTH POND-2

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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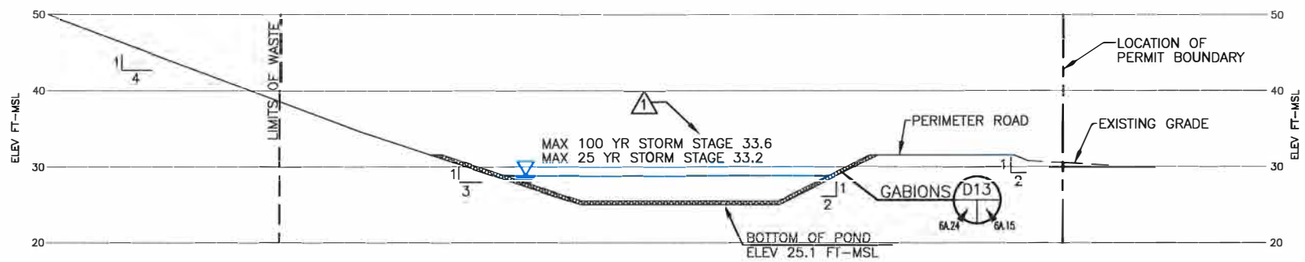
ATTACHMENT 6A.22

SOUTHEAST DETENTION POND	
ELEVATION (FT–MSL)	SURFACE AREA (AC)
25.0	0.0556
26.0	0.3693
27.0	0.6752
28.0	1.0046
29.0	1.3702
30.0	1.7328

* BOLD OUTLINE OF THE POND REPRESENTS THE LIMITS OF THE POND.

LEGEND

- PERMIT BOUNDARY
- EXISTING CONTOUR
- N 746000 STATE PLANE COORDINATE SYSTEM
- 50 FINAL CONTOUR
- LIMITS OF WASTE
- EASEMENT BOUNDARY
- PROPOSED DRAINAGE LETDOWN
- GABIONS
- CONCRETE
- PROPOSED DRAINAGE SWALE
- GMP–M EXISTING LANDFILL GAS MONITORING PROBE (SEE NOTE 1)
- GMP–J EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 1)
- POND LIMITS
- 1 INDICATES REVISION (SEE LIST OF REVISIONS)



SOUTHEAST DETENTION POND SECTION SEP

0 10 20 SCALE IN FEET HORIZONTAL

0 5 10 SCALE IN FEET VERTICAL

LIST OF REVISIONS:

1. UPDATED STAGES.

NOTE:

1. GMP–T5 AND GMP–U ARE BEING DECOMMISSIONED VIA A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP–T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
CHARLES R. MARSH
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PROFESSIONAL ENGINEER
LICENSED

12/12/2024

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DATE: 03/2004
FILE: 0120–439–11
CAD: 6A.24–SE–POND.DWG

DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F–3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
SOUTHEAST POND

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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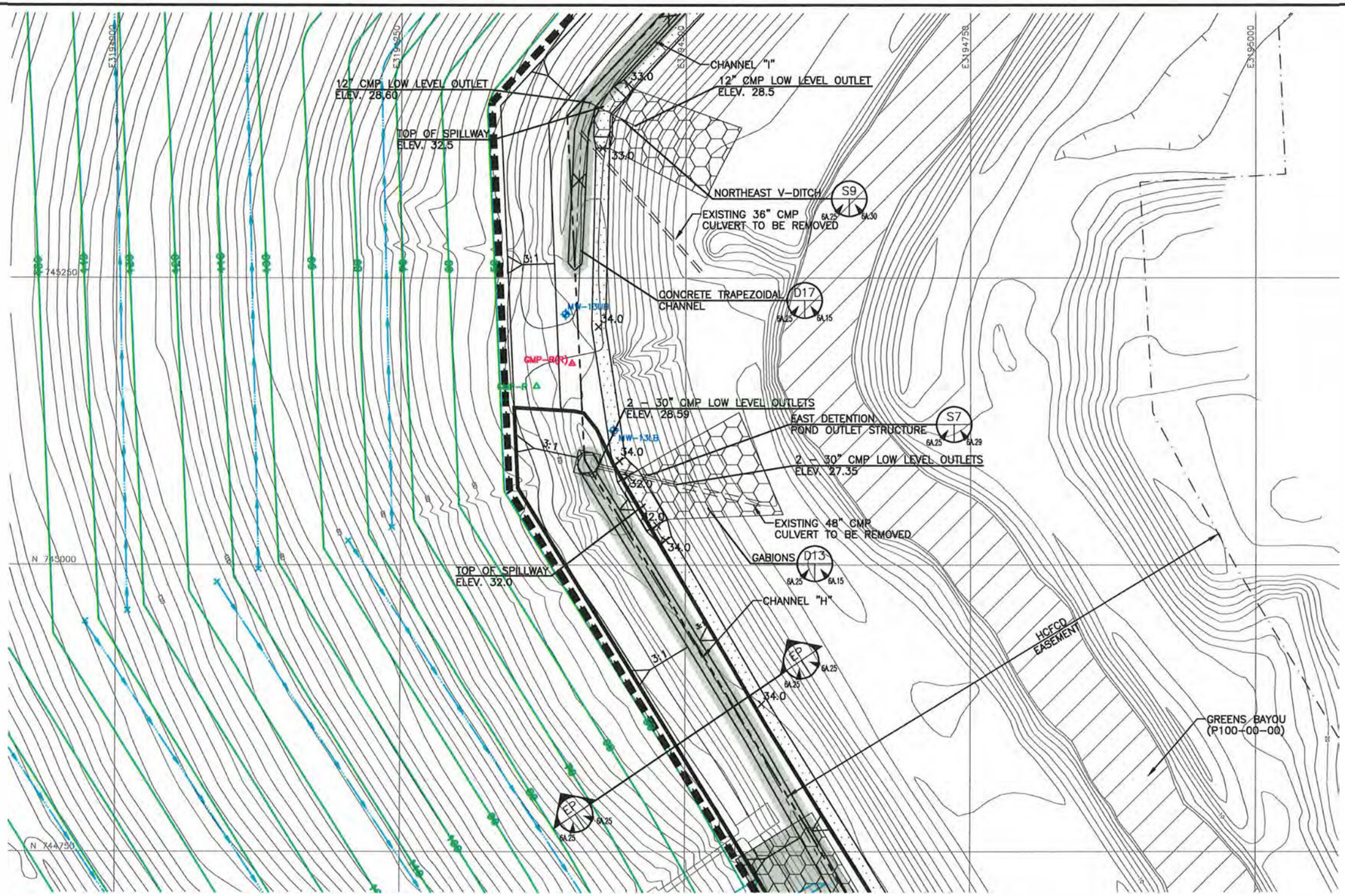
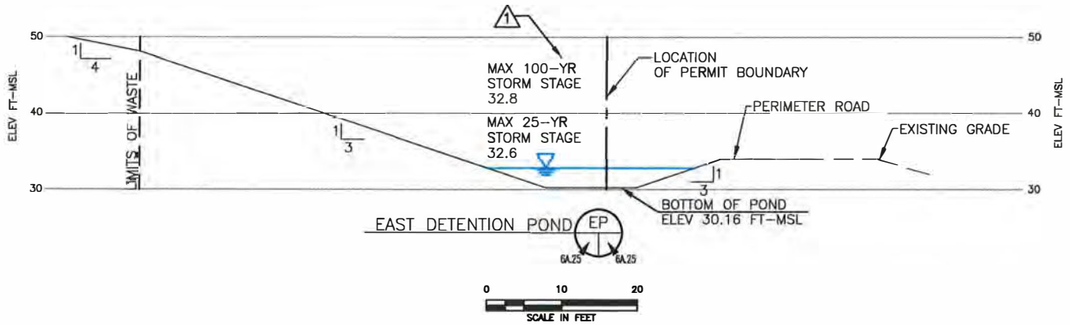
ATTACHMENT 6A.24

O:\0120\439\PLP MOD 2024\ATT 6\6A\6A.24–SE–POND.dwg, rarrington, 1:2





LEGEND

- PERMIT BOUNDARY
- EXISTING CONTOUR
- N 746000 — STATE PLANE COORDINATE SYSTEM
- 50 — FINAL CONTOUR
- LIMITS OF WASTE
- EASEMENT BOUNDARY
- GABIONS
- CONCRETE
- PROPOSED DRAINAGE SWALE
- MW-11UB — EXISTING DETECTION GROUNDWATER MONITORING WELL
- GMP-M — EXISTING LANDFILL GAS MONITORING PROBE
- GMP-R — EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 1)
- GMP-R(R) — PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE (SEE NOTE 1)
- POND LIMITS
- 1 — INDICATES REVISION (SEE LIST OF REVISIONS)

STATE OF TEXAS
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12/12/2024

EAST DETENTION POND

ELEVATION (FT-MSL)	SURFACE AREA (AC)
28.6	0.0061
29.0	0.1531
30.0	0.2422
31.0	0.3672
32.0	0.4937
33.0	0.6217

* BOLD OUTLINE OF THE POND REPRESENTS THE LIMITS OF THE POND.

NOTE:

1. GAS MONITORING PROBE GMP-R WILL BE DECOMMISIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS IN APRIL 2004. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.

LIST OF REVISIONS:

1. UPDATED STAGES.

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DATE: 03/2004
FILE: 0120-439-11
CAD: 6A.14-SW-POND.DWG

DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
EAST POND

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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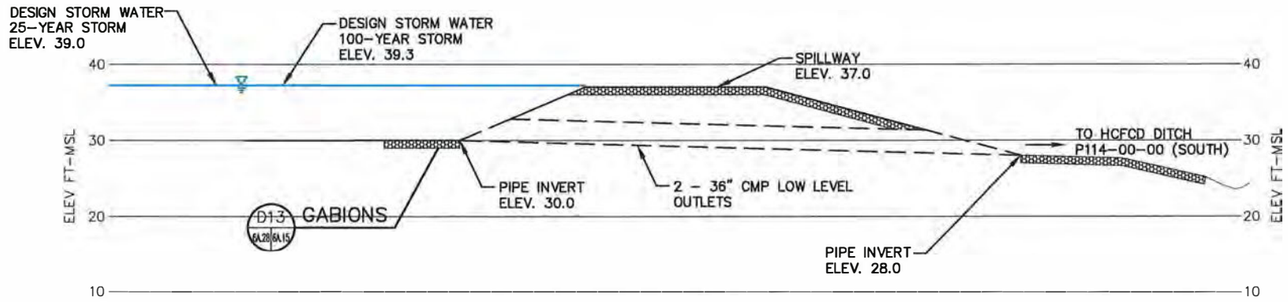
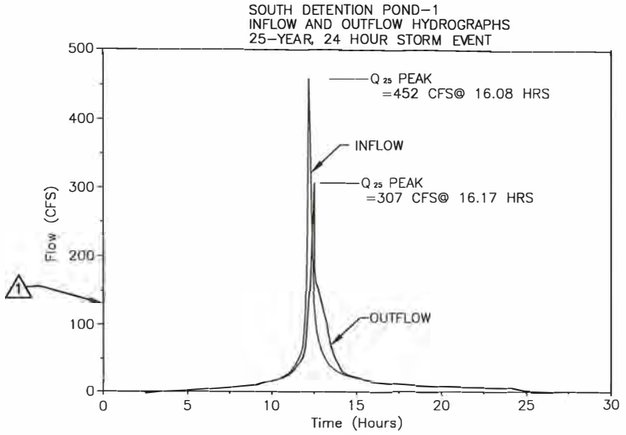
ATTACHMENT 6A.25

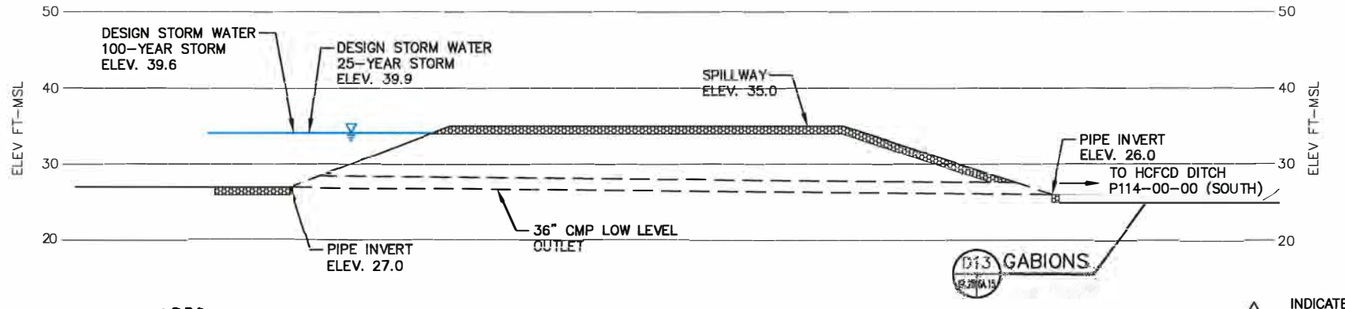


SOUTH DETENTION POND–1
OUTLET STRUCTURE
S5
6A.28
6A.1,6A.21

0 10 20
SCALE IN FEET

SOUTH DETENTION POND–1	
BOTTOM ELEVATION	30.0 FT.
SPILLWAY ELEVATION	37.0 FT.
SPILLWAY LENGTH	80.0 FT.
PEAK 25–YEAR EVENT INFLOW	452.0 CFS
PEAK 25–YEAR EVENT OUTFLOW	307.0 CFS
PEAK 100–YEAR EVENT INFLOW	649.0 CFS
PEAK 100–YEAR EVENT OUTFLOW	415.0 CFS





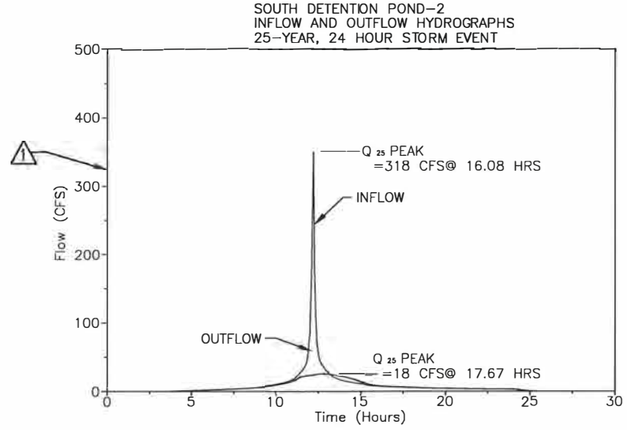
SOUTH DETENTION POND–2
OUTLET STRUCTURE
S6
6A.28
6A.1,6A.22

0 10 20
SCALE IN FEET

1 INDICATES REVISION
(SEE LIST OF REVISIONS)

LIST OF REVISIONS:
1. UPDATED DISCHARGE INFORMATION.

SOUTH DETENTION POND–2	
BOTTOM ELEVATION	27.0 FT.
SPILLWAY ELEVATION	35.0 FT.
SPILLWAY LENGTH	75.0 FT.
PEAK 25–YEAR EVENT INFLOW	318.0 CFS
PEAK 25–YEAR EVENT OUTFLOW	18.0 CFS
PEAK 100–YEAR EVENT INFLOW	442.0 CFS
PEAK 100–YEAR EVENT OUTFLOW	75.0 CFS



STATE OF TEXAS
CHARLES R. MARSH
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PROFESSIONAL LICENSED ENGINEER
12/12/2024

☐ DRAFT
☒ FOR PERMITTING PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 03/2004
FILE: 0120–439–11
CAD: 6A–28 OUTLET SP1&SP2.DWG
DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F–3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
POND OUTLET STRUCTURE DETAILS

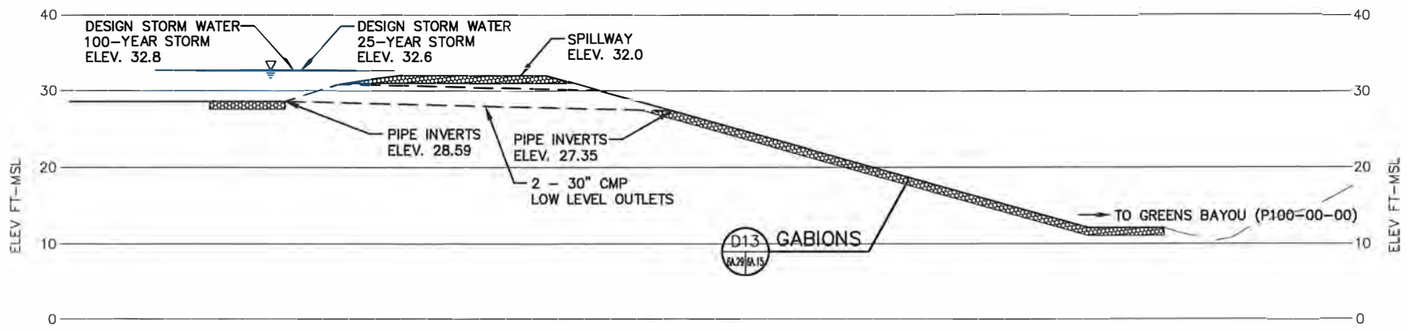
McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

WWW.WCGRP.COM

ATTACHMENT 6A.28

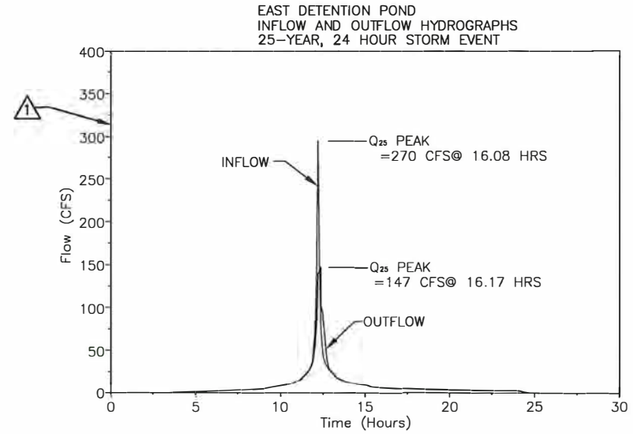
O:\0120\439\FIP MOD 2024\ATT 6\6A\6A.28OUTLET SP1&SP2.dwg, rarrington, 1:2

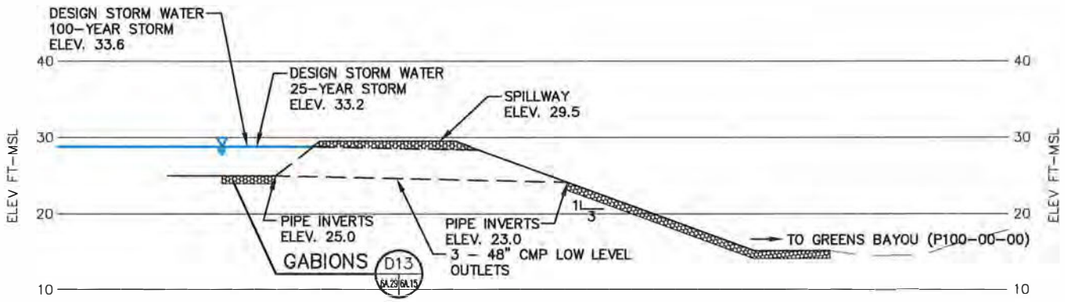
EAST DETENTION POND	
BOTTOM ELEVATION	28.59 FT.
SPILLWAY ELEVATION	32.0 FT.
SPILLWAY LENGTH	80.0 FT.
PEAK 25–YEAR EVENT INFLOW	270.0 CFS
PEAK 25–YEAR EVENT OUTFLOW	147.0 CFS
PEAK 100–YEAR EVENT INFLOW	374.0 CFS
PEAK 100–YEAR EVENT OUTFLOW	203.0 CFS



EAST DETENTION POND
OUTLET STRUCTURE (S7, 6A.29) 6A.1,6A.25

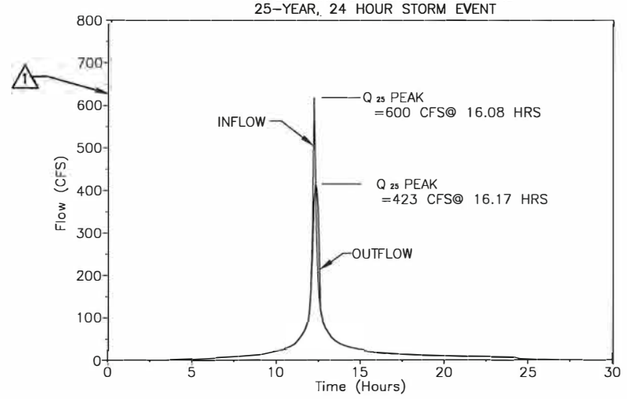
0 10 20
SCALE IN FEET





SOUTHEAST DETENTION POND
OUTLET STRUCTURE (S8, 6A.29) 6A.1,6A.24

0 10 20
SCALE IN FEET



1 INDICATES REVISION
(SEE LIST OF REVISIONS)

LIST OF REVISIONS:
1. UPDATED DISCHARGE INFORMATION.

SOUTHEAST DETENTION POND	
BOTTOM ELEVATION	25.0 FT.
SPILLWAY ELEVATION	29.5 FT.
SPILLWAY LENGTH	60.0 FT.
PEAK 25–YEAR EVENT INFLOW	600.0 CFS
PEAK 25–YEAR EVENT OUTFLOW	423.0 CFS
PEAK 100–YEAR EVENT INFLOW	817.0 CFS
PEAK 100–YEAR EVENT OUTFLOW	564.0 CFS

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER
12/12/2024

☐ DRAFT
☒ FOR PERMITTING PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 03/2004
FILE: 0120–439–11
CAD: 6A–29 OUTLET E&SE.DWG
DRAWN BY: JOW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F–3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

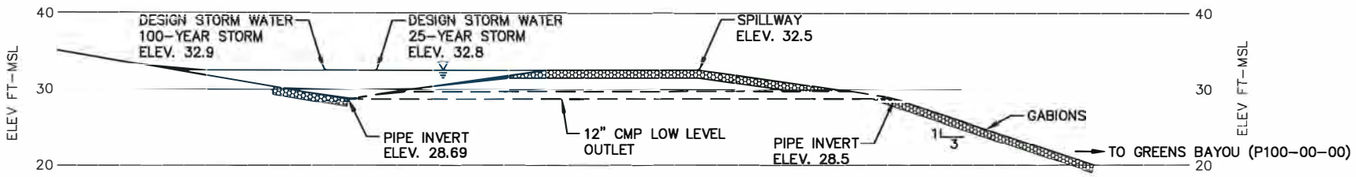
REVISIONS		
NO.	DATE	DESCRIPTION
1	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
POND OUTLET STRUCTURE DETAILS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

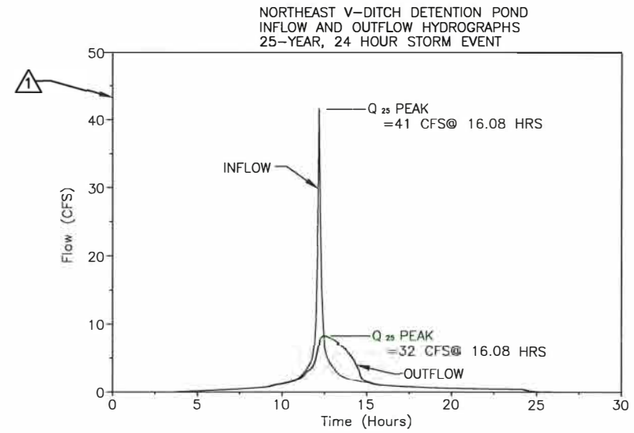
WWW.WCGRP.COM

ATTACHMENT 6A.29



NORTHEAST V-DITCH DETENTION POND OUTLET STRUCTURE (S9, 6A.30, 6A.1, 6A.25)

SCALE IN FEET: 0 10 20



1

NORTHEAST V-DITCH	
BOTTOM ELEVATION	28.7 FT.
SPILLWAY ELEVATION	32 FT.
SPILLWAY LENGTH	50 FT.
PEAK 25-YEAR EVENT INFLOW	41 CFS
PEAK 25-YEAR EVENT OUTFLOW	32 CFS
PEAK 100-YEAR EVENT INFLOW	50 CFS
PEAK 100-YEAR EVENT OUTFLOW	42 CFS

1 INDICATES REVISION
(SEE LIST OF REVISIONS)

LIST OF REVISIONS:
1. UPDATED DISCHARGE INFORMATION.

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER

12/12/2024

0:\0120\439\FLIP MOD 2024\ATT 6\6A\6A.30OUTLET NEV.dwg, rarrington, 1:2

☐ DRAFT
☒ FOR PERMITTING PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 03/2004
FILE: 0120-439-11
CAD: 6A-30OUTLET NEV.DWG

DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
POND OUTLET STRUCTURE DETAILS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

WWW.WCGRP.COM

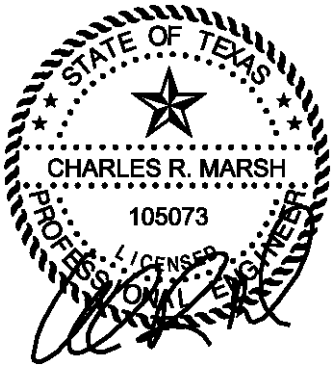
ATTACHMENT 6A.30

ATTACHMENT 6A

APPENDIX 6A-B

PERIMETER CHANNEL AND DETENTION POND DESIGN

Includes pages 6A-B.1-1 through 6A-B.2B2-20



12/12/2024

McCARTY ROAD LANDFILL
0120-439-11-03-11
PERIMETER CHANNEL HYDRAULIC ANALYSIS
100-YEAR NORMAL DEPTH CALCULATIONS

Example Calculation: Calculate the normal depth for Channel C between stations 2+59.2 and 9+02.7.

List of Symbols

Q_d = design flow rate for channel, cfs
R = hydraulic radius, ft
n = Manning's roughness coefficient
S = channel slope, ft/ft
b = bottom width of channel, ft
z = z-ratio (ratio of run to rise for channel sideslope)
A_f = flow area, sf
g = gravitational acceleration = 32.2 ft/s^2
T = top width of flow, ft
d = normal depth of channel, ft

The program uses an iterative process to calculate the normal depth of the channel to satisfy Manning's Equation

$$Q = \frac{1.486}{n} A R^{0.67} S^{0.5}$$

Design Inputs:

Q_d =	~~1427~~	1551	cfs (from 100-year, 24-hour storm HEC-1 analysis, Attacl
S =		0.002	ft/ft
b =		25	ft
z =		2	(H) : 1 (V)
n =		0.04	

Step 1 - Based on the geometry of the channel cross-section, solve for R and A_f

$$R = \frac{bd + zd^2}{b + 2d(z^2 + 1)^{0.5}}$$

$$A_f = bd + zd^2$$

assume: d=	~~8.59~~	7.68	ft
R =	~~5.714~~	5.223	ft
A_f =	~~292.04~~	310.10	sf
solve for Q: Q =	~~1427~~	1551	

if Q is not equal to Q_d, select a new d and repeat calculations

Step 2 - solve for velocity, T, Froude number, velocity head, and energy head

$Q = VA \Rightarrow \quad V = Q/A$

$V =$ ~~4.89~~ 5.00 ft/s

$T = b + 2(z \times d)$

$T =$ ~~54.42~~ 55.73 ft

$$F_r = \frac{V}{(gA/T)^{0.5}}$$

$F_r =$ ~~372~~ 0.374

$$\text{Velocity Head} = \frac{V^2}{2g}$$

Velocity Head = ~~0.37~~ 0.39 ft

Energy Head = water elevation + velocity head

Energy Head = ~~8.96~~ 8.07 ft

TRAPEZOIDAL CHANNEL ANALYSIS
NORMAL DEPTH COMPUTATION
At the outfall of DCP-1
Permitted Conditions
July 12, 2006

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Flow Rate (cfs)	1,101.0
Channel Bottom Slope (ft/ft)	0.0016
Manning's Roughness Coefficient (n-value)	0.03
Channel Left Side Slope (horizontal/vertical)	3.0
Channel Right Side Slope (horizontal/vertical)	3.0
Channel Bottom Width (ft)	6.0

COMPUTATION RESULTS

DESCRIPTION	VALUE
Normal Depth (ft)	7.6
Flow Velocity (fps)	5.03
Froude Number	0.431
Velocity Head (ft)	0.39
Energy Head (ft)	7.99
Cross-Sectional Area of Flow (sq ft)	218.83
Top Width of Flow (ft)	51.59

TRAPEZOIDAL CHANNEL ANALYSIS
NORMAL DEPTH COMPUTATION
At the outfall of BSD-2
Permitted Conditions
July 12, 2006

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Flow Rate (cfs)	1,023.0
Channel Bottom Slope (ft/ft)	0.0016
Manning's Roughness Coefficient (n-value)	0.03
Channel Left Side Slope (horizontal/vertical)	3.0
Channel Right Side Slope (horizontal/vertical)	3.0
Channel Bottom Width (ft)	6.0

COMPUTATION RESULTS

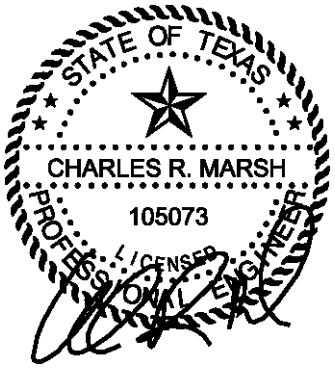
DESCRIPTION	VALUE
Normal Depth (ft)	7.37
Flow Velocity (fps)	4.94
Froude Number	0.429
Velocity Head (ft)	0.38
Energy Head (ft)	7.75
Cross-Sectional Area of Flow (sq ft)	207.11
Top Width of Flow (ft)	50.21

ATTACHMENT 6A

APPENDIX 6A-C

FINAL COVER EROSION CONTROL STRUCTURE DESIGN

Includes pages 6A-C-1 through 6A-C-32



12/12/2024

Prep By: VG
Date: 11/26/2024

McCARTY ROAD LANDFILL
0120-439-11-03-11
EROSION CONTROL STRUCTURE DESIGN
GABION-LINED CHUTE DESIGN
100-YEAR, 24 HOUR STORM

Chkd By: CRM
Date: 11/26/2024

Chute	Q^1		W	q		Y_C		Y_O		y_1		K_1		K_2	
1	~~307~~	345	30	~~10.23~~	11.50	~~1.48~~	1.60	~~0.70~~	0.75	~~1.65~~	1.78	~~3.24~~	3.52	~~0.91~~	0.98
2	~~287~~	301	30	~~9.57~~	10.03	~~1.42~~	1.46	~~0.67~~	0.69	~~1.58~~	1.63	~~3.09~~	3.20	~~0.87~~	0.90
3	~~232~~	210	25	~~9.28~~	8.40	~~1.39~~	1.30	~~0.66~~	0.62	~~1.55~~	1.45	~~3.03~~	2.82	~~0.85~~	0.80
4	~~242~~	252	25	~~9.68~~	10.08	~~1.43~~	1.47	~~0.67~~	0.69	~~1.59~~	1.63	~~3.12~~	3.21	~~0.88~~	0.90
5	92		20	4.60		0.87		0.43		0.97		1.84		0.53	
6	~~346~~	341	40	~~8.65~~	8.53	~~1.32~~	1.31	~~0.63~~	0.62	~~1.47~~	1.46	~~2.88~~	2.85	~~0.81~~	0.81
7	~~371~~	365	40	~~9.28~~	9.13	~~1.39~~	1.37	~~0.66~~	0.65	~~1.55~~	1.53	~~3.03~~	2.99	~~0.85~~	0.84
8	~~344~~	342	35	~~9.83~~	9.77	~~1.44~~	1.44	~~0.68~~	0.68	~~1.61~~	1.60	~~3.15~~	3.14	~~0.89~~	0.88
9	~~246~~	250	30	~~8.20~~	8.34	~~1.28~~	1.29	~~0.61~~	0.62	~~1.42~~	1.44	~~2.77~~	2.81	~~0.79~~	0.79
10	~~294~~	292	30	~~9.80~~	9.72	~~1.44~~	1.43	~~0.68~~	0.67	~~1.60~~	1.59	~~3.15~~	3.13	~~0.88~~	0.88
11	~~177~~	176	20	~~8.85~~	8.80	~~1.34~~	1.34	~~0.64~~	0.64	~~1.50~~	1.49	~~2.93~~	2.92	~~0.83~~	0.82
12	~~260~~	257	30	~~8.67~~	8.56	~~1.33~~	1.31	~~0.63~~	0.62	~~1.48~~	1.46	~~2.88~~	2.86	~~0.82~~	0.81
13	~~400~~	394	40	~~10.00~~	9.85	~~1.46~~	1.44	~~0.69~~	0.68	~~1.62~~	1.61	~~3.19~~	3.16	~~0.90~~	0.89
14	~~303~~	306	35	~~8.66~~	8.75	~~1.33~~	1.33	~~0.63~~	0.63	~~1.48~~	1.49	~~2.88~~	2.90	~~0.81~~	0.82
15	~~270~~	272	30	~~9.00~~	9.07	~~1.36~~	1.37	~~0.64~~	0.65	~~1.51~~	1.52	~~2.96~~	2.98	~~0.84~~	0.84
16	~~268~~	254	30	~~8.93~~	8.47	~~1.35~~	1.31	~~0.64~~	0.62	~~1.51~~	1.45	~~2.95~~	2.84	~~0.83~~	0.80
17	~~434~~	431	40	~~10.85~~	10.78	~~1.54~~	1.53	~~0.72~~	0.72	~~1.72~~	1.71	~~3.38~~	3.37	~~0.95~~	0.94

McCARTY ROAD LANDFILL
0120-439-11-03-11
CHUTE ANALYSIS
NORMAL DEPTH CALCULATIONS
25-YEAR, 24 HOUR STORM

Drainage Area	Flow Rate (cfs)		Bottom Slope (ft/ft)	Manning's n	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)		Flow Vel. (fps)		Froude Number		Velocity Head (ft)		Energy Head (ft)		Flow Area (sf)		Flow Top Width (ft)	
DA1	227		0.25	0.04	4.0	4.0	24.0	0.65		13.09		~~2.995~~	3.00	2.66		3.31		17.34		29.21	
DA2	~~215~~	214	0.25	0.04	4.0	4.0	24.0	~~0.63~~	0.63	~~12.84~~	12.82	~~2.982~~	2.980	~~2.56~~	2.55	~~3.19~~	3.18	~~16.74~~	16.69	~~29.05~~	29.04
DA3	~~172~~	162	0.25	0.04	4.0	4.0	24.0	~~0.55~~	0.53	~~11.85~~	11.60	~~2.925~~	2.909	~~2.18~~	2.09	~~2.74~~	2.62	~~14.51~~	13.97	~~28.43~~	28.28
DA4	~~178~~	169	0.25	0.04	4.0	4.0	24.0	~~0.56~~	0.55	~~12.00~~	11.78	~~2.933~~	2.920	~~2.24~~	2.16	~~2.80~~	2.70	~~14.83~~	14.35	~~28.52~~	28.38
DA5	~~69~~	66	0.25	0.04	4.0	4.0	12.0	~~0.48~~	0.47	~~10.39~~	10.23	~~2.825~~	2.815	~~1.68~~	1.63	~~2.15~~	2.09	~~6.64~~	6.45	~~15.82~~	15.72
DA5	~~69~~	66	0.25	0.04	4.0	4.0	24.0	~~0.32~~	0.31	~~8.45~~	8.31	~~2.687~~	2.675	~~1.11~~	1.07	~~1.43~~	1.39	~~8.17~~	7.95	~~26.58~~	26.52
DA6	~~256~~	247	0.25	0.04	4.0	4.0	12.0	~~1.00~~	0.98	~~15.91~~	15.74	~~3.129~~	3.123	~~3.93~~	3.85	~~4.94~~	4.84	~~16.09~~	15.69	~~20.04~~	19.88
DA6	~~256~~	247	0.25	0.04	4.0	4.0	24.0	~~0.70~~	0.68	~~13.66~~	13.49	~~3.026~~	3.017	~~2.90~~	2.83	~~3.60~~	3.51	~~18.74~~	18.31	~~29.59~~	29.48
DA7	~~267~~	273	0.25	0.04	4.0	4.0	12.0	~~1.03~~	1.04	~~16.12~~	16.23	~~3.140~~	3.145	~~4.04~~	4.09	~~5.07~~	5.13	~~16.56~~	16.82	~~20.22~~	20.33
DA7	~~267~~	273	0.25	0.04	4.0	4.0	24.0	~~0.72~~	0.73	~~13.86~~	13.97	~~3.037~~	3.043	~~2.99~~	3.03	~~3.70~~	3.76	~~19.26~~	19.54	~~29.73~~	29.81
DA8	~~248~~	246	0.25	0.04	4.0	4.0	12.0	~~0.99~~	0.98	~~15.76~~	15.72	~~3.124~~	3.122	~~3.86~~	3.84	~~4.85~~	4.82	~~15.74~~	15.65	~~19.89~~	19.86
DA8	~~248~~	246	0.25	0.04	4.0	4.0	24.0	~~0.69~~	0.68	~~13.51~~	13.47	~~3.018~~	3.016	~~2.84~~	2.82	~~3.52~~	3.50	~~18.36~~	18.26	~~29.49~~	29.47
DA9	~~193~~	180	0.25	0.04	4.0	4.0	12.0	~~0.86~~	0.83	~~14.57~~	14.25	~~3.065~~	3.049	~~3.30~~	3.16	~~4.16~~	3.98	~~13.25~~	12.63	~~18.87~~	18.60
DA9	~~193~~	180	0.25	0.04	4.0	4.0	24.0	~~0.59~~	0.57	~~12.35~~	12.05	~~2.954~~	2.936	~~2.37~~	2.26	~~2.96~~	2.82	~~15.62~~	14.94	~~28.74~~	28.55
DA10	~~216~~	211	0.25	0.04	4.0	4.0	12.0	~~0.91~~	0.90	~~15.11~~	15.00	~~3.095~~	3.090	~~3.55~~	3.50	~~4.46~~	4.40	~~14.30~~	14.07	~~19.31~~	19.21
DA10	~~216~~	211	0.25	0.04	4.0	4.0	24.0	~~0.63~~	0.62	~~12.86~~	12.75	~~2.983~~	2.977	~~2.57~~	2.53	~~3.20~~	3.15	~~16.79~~	16.54	~~29.06~~	28.99
DA11	~~131~~	127	0.25	0.04	4.0	4.0	12.0	~~0.69~~	0.68	~~12.86~~	12.73	~~2.974~~	2.967	~~2.57~~	2.52	~~3.26~~	3.20	~~10.18~~	9.97	~~17.52~~	17.42
DA11	~~131~~	127	0.25	0.04	4.0	4.0	24.0	~~0.47~~	0.46	~~10.74~~	10.60	~~2.856~~	2.841	~~1.79~~	1.75	~~2.26~~	2.21	~~12.20~~	11.98	~~27.77~~	27.71
DA12	~~195~~	185	0.25	0.04	4.0	4.0	12.0	~~0.86~~	0.84	~~14.62~~	14.37	~~3.067~~	3.055	~~3.32~~	3.21	~~4.18~~	4.05	~~13.34~~	12.87	~~18.91~~	18.71
DA12	~~195~~	185	0.25	0.04	4.0	4.0	24.0	~~0.60~~	0.58	~~12.40~~	12.17	~~2.957~~	2.943	~~2.39~~	2.30	~~2.99~~	2.88	~~15.73~~	15.20	~~28.77~~	28.62
DA13	~~297~~	285	0.25	0.04	4.0	4.0	12.0	~~1.09~~	1.07	~~16.65~~	16.44	~~3.163~~	3.154	~~4.31~~	4.20	~~5.40~~	5.27	~~17.84~~	17.33	~~20.72~~	20.53
DA13	~~297~~	285	0.25	0.04	4.0	4.0	24.0	~~0.76~~	0.74	~~14.39~~	14.19	~~3.065~~	3.054	~~3.22~~	3.13	~~3.98~~	3.87	~~20.63~~	20.09	~~30.10~~	29.96
DA14	~~213~~	220	0.25	0.04	4.0	4.0	12.0	~~0.91~~	0.92	~~15.04~~	15.19	~~3.092~~	3.098	~~3.52~~	3.59	~~4.42~~	4.51	~~14.16~~	14.48	~~19.25~~	19.38
DA14	~~213~~	220	0.25	0.04	4.0	4.0	24.0	~~0.63~~	0.64	~~12.80~~	12.95	~~2.979~~	2.987	~~2.54~~	2.60	~~3.17~~	3.24	~~16.64~~	16.99	~~29.02~~	29.12
DA15	~~207~~	196	0.25	0.04	4.0	4.0	12.0	~~0.89~~	0.87	~~14.91~~	14.64	~~3.086~~	3.069	~~3.45~~	3.33	~~4.35~~	4.20	~~13.88~~	13.39	~~19.14~~	18.93
DA15	~~207~~	196	0.25	0.04	4.0	4.0	24.0	~~0.62~~	0.60	~~12.67~~	12.42	~~2.972~~	2.958	~~2.49~~	2.40	~~3.11~~	3.00	~~16.34~~	15.78	~~28.94~~	28.78
DA16	~~206~~	187	0.25	0.04	4.0	4.0	12.0	~~0.89~~	0.84	~~14.89~~	14.42	~~3.084~~	3.058	~~3.44~~	3.23	~~4.33~~	4.08	~~13.84~~	12.97	~~19.12~~	18.75
DA16	~~206~~	187	0.25	0.04	4.0	4.0	24.0	~~0.62~~	0.58	~~12.65~~	12.21	~~2.971~~	2.946	~~2.48~~	2.32	~~3.10~~	2.90	~~16.29~~	15.31	~~28.92~~	28.65
DA17	~~309~~	308	0.25	0.04	4.0	4.0	12.0	~~1.11~~	1.11	~~16.85~~	16.83	~~3.172~~	3.171	~~4.41~~	4.40	~~5.53~~	5.51	~~18.34~~	18.30	~~20.92~~	20.90
DA17	~~309~~	308	0.25	0.04	4.0	4.0	24.0	~~0.78~~	0.78	~~14.59~~	14.58	~~3.075~~	3.074	~~3.31~~	3.30	~~4.09~~	4.08	~~21.17~~	21.13	~~30.25~~	30.23

Note: Calculations were performed using the HYDROCALC HYDRAULICS program developed by Dodson and Associates (Version ~~1.2a~~ 2.0.1, 1996).

McCARTY ROAD LANDFILL
0120-439-11-03-11
CHUTE ANALYSIS
NORMAL DEPTH CALCULATIONS
25-YEAR, 24 HOUR STORM

Example Calculation: Calculate the normal depth for the chute for DA10.

List of Symbols

Q_d = design flow rate for channel, cfs
R = hydraulic radius, ft
n = Manning's roughness coefficient
S = channel slope, ft/ft
b = bottom width of channel, ft
z = z-ratio (ratio of run to rise for channel sideslope)
A_f = flow area, sf
g = gravitational acceleration = 32.2 ft/s^2
T = top width of flow, ft
d = normal depth of chute, ft

The program uses an iterative process to calculate the normal depth of the chute to satisfy Manning's Equation

$$Q = \frac{1.486}{n} A R^{0.67} S^{0.5}$$

Design Inputs:				
	Q_d =	~~216~~ 211	cfs	(from ~~HEC-1~~ HEC-HMS analysis, Attachment 6A-A)
	S =	0.25	ft/ft	
	b =	12	ft	
	z =	4	(H) : 1 (V)	
	n =	0.04		

Step 1 - Based on the geometry of the chute cross-section, solve for R and A_f

$$R = \frac{bd + zd^2}{b + 2d(z^2 + 1)^{0.5}}$$

$$A_f = bd + zd^2$$

assume: d = ~~0.91~~ 0.90 ft

R = ~~0.000~~ 0.724 ft

A_f = ~~9.81~~ 14.07 sf

solve for Q: Q = ~~148~~ 211 cfs

if Q is not equal to Q_d, select a new d and repeat calculations

Step 2 - solve for velocity, T, Froude number, velocity head, and energy head

$Q = VA \Rightarrow \quad V = Q/A$

$V =$ ~~12.63~~ 15.00 ft/s

$T = b + 2(z \times d)$

$T =$ ~~17.35~~ 19.21 ft

$$F_r = \frac{V}{(gA/T)^{0.5}}$$

$F_r =$ ~~2.962~~ 3.090 ft

$$\text{Velocity Head} = \frac{V^2}{2g}$$

Velocity Head = ~~2.48~~ 3.50 ft

Energy Head = water elevation + velocity head

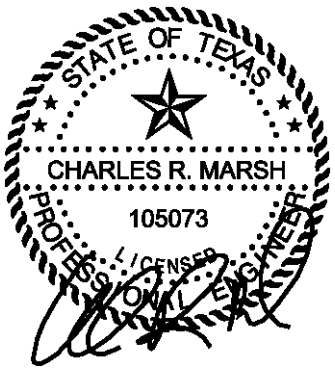
Energy Head = ~~3.39~~ 4.40 ft

ATTACHMENT 6A

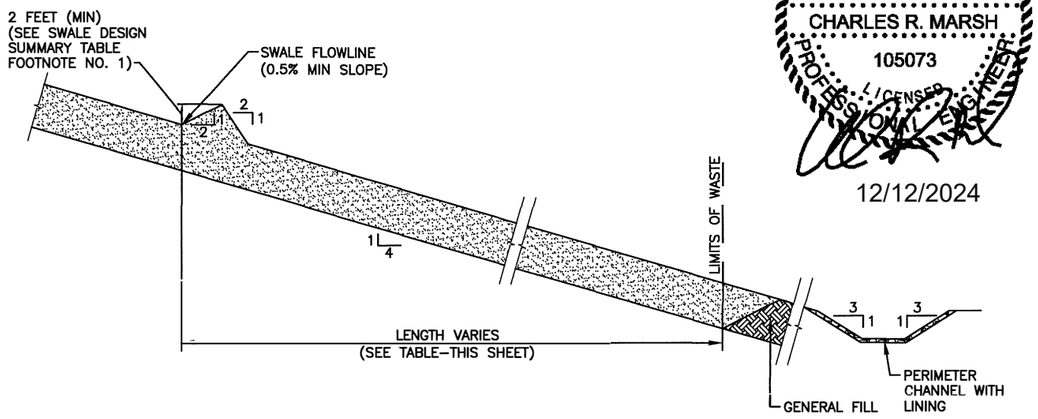
APPENDIX 6A-G

EROSION CONTROL PLAN FOR ALL PHASES OF LANDFILL OPERATION

Includes Pages 6A-G-1 through 6A-G-7



12/12/2024



A 1 2 SIDE SLOPE DRAINAGE SWALE

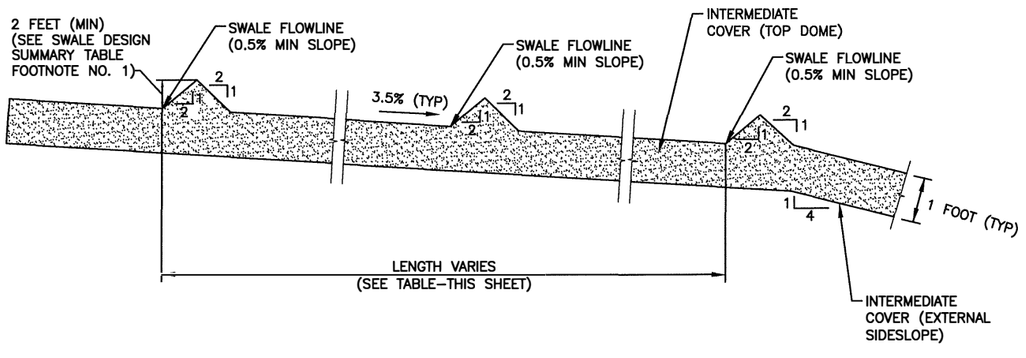
STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED PROFESSIONAL ENGINEER
12/12/2024

△1

SWALE DESIGN SUMMARY[1]							
SIDE SLOPE (4H:1V)				TOP SLOPE (3.5%)			
VEGETATIVE COVER PERCENTAGE	DISTANCE BETWEEN SWALES (FT)	ESTIMATED SOIL LOSS (TONS/ACRE/YEAR)	ADDITIONAL SEDIMENT CAPTURE REQUIRED[2]	VEGETATIVE COVER PERCENTAGE	DISTANCE BETWEEN SWALES (FT)	ESTIMATED SOIL LOSS (TONS/ACRE/YEAR)	ADDITIONAL SEDIMENT CAPTURE REQUIRED[2]
60	300	23.9	NO	60	500	1.4	NO
70	300	9.7	NO	70	500	0.6	NO
80	300	7.4	NO	80	500	0.4	NO
90	300	3.6	NO	90	500	0.2	NO
70	400	11.2	NO	60	600	1.5	NO
80	400	8.5	NO	70	600	0.6	NO
90	400	4.2	NO	80	600	0.5	NO
70	500	12.2	NO	90	600	0.2	NO
80	500	9.3	NO	60	700	1.6	NO
90	500	4.6	NO	70	700	0.6	NO
70	600	13.6	NO	80	700	0.5	NO
80	600	10.4	NO	90	700	0.2	NO
90	600	5.1	NO				
70	700	14.7	NO				
80	700	11.2	NO				
90	700	5.5	NO				
70	800	15.8	NO				
80	800	12.1	NO				
90	800	5.9	NO				

[1] REFER TO APPENDIX 6A–G–1 FOR SUPPORTING CALCULATIONS.

[2] IF SITE SPECIFIC CONDITIONS YIELD A MAXIMUM HORIZONTAL DISTANCE BETWEEN THE TOE OF THE SLOPE AND GRADE BREAK OF LESS THAN 300 FEET FOR SIDE SLOPES AND A DISTANCE OF 500 FEET FROM THE GRADE BREAK TO THE PEAK OF THE TOP SLOPES, ESTABLISHMENT OF 60% VEGETATION WILL BE SUFFICIENT MEANS OF EROSION CONTROL WITHOUT THE ADDITION OF TEMPORARY SWALES AND LETDOWNS GIVEN THAT THE TOTAL SOIL LOSS FOR THE SIDE SLOPE IS LESS THAN 50 TONS/ACRE/YEAR AND THE TOP SLOPE IS LESS THAN 50 TONS/ACRE/YEAR.



A 1 2 TOP DOME SURFACE DRAINAGE SWALE

△1

SWALE DRAINAGE AREA SUMMARY			
CONDITION (SWALE HEIGHT)	MAXIMUM DRAINAGE AREA (ACRES)	MINIMUM SWALE SPACING[1] (FEET)	MAXIMUM SWALE LENGTH[2] (FEET)
TOP SLOPE (2 FT SWALE)	26.9	500	2,343
TOP SLOPE (1.5 FT SWALE)	12.5	500	1,089
TOP SLOPE (1 FT SWALE)	4.5	500	392
SIDE SLOPE (2 FT SWALE)	5.0	300	726

[1] MINIMUM SWALE SPACING IS OBTAINED FROM THE CALCULATIONS PROVIDED ON PAGE 6A–G–1–9.

[2] MAXIMUM SWALE LENGTH CALCULATED USING THE FOLLOWING EQUATION:

MAXIMUM DRAINAGE AREA x (43,560 SF/ACRE)/MINIMUM SWALE SPACING

LEGEND

△1 INDICATES REVISION (SEE LIST OF REVISIONS)

LIST OF REVISIONS:

1. REVISED SWALE CALCULATIONS.

☐ DRAFT
☒ FOR PERMITTING PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 01/2010
FILE: 0120–439–11
CAD: FIG 2–SWALE DESIGN.DWG

DRAWN BY: SRF
DESIGN BY: BJL
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F–3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	01/2010	PERMIT MODIFICATION
2	12/2024	SEE LIST OF REVISIONS

EROSION CONTROL PLAN
SWALE DESIGN SUMMARY

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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FIGURE 2

O:\0120\439\FIIP MOD 2024\ECP\FIG 2–SWALE DESIGN.dwg, rarrington, 1:2

OPEN CHANNEL GEOMEMBRANE LETDOWN DESIGN SUMMARY

DESIGN IS APPLICABLE FOR A DRAINAGE AREA UP TO 35 ACRES (TOP DECK AND SIDE SLOPE).

25% SLOPE
MAXIMUM FLOW DEPTH = 0.62 FT.
BOTTOM WIDTH = 8 FT.

3.5% SLOPE
MAXIMUM FLOW DEPTH = 1.08 FT.
BOTTOM WIDTH = 8 FT.

OPEN CHANNEL GABION LETDOWN DESIGN SUMMARY

DESIGN IS APPLICABLE FOR A DRAINAGE AREA UP TO 25 ACRES (TOP DECK AND SIDE SLOPE).

25% SLOPE
MAXIMUM FLOW DEPTH = 1.36 FT.
BOTTOM WIDTH = 8 FT.

3.5% SLOPE
MAXIMUM FLOW DEPTH = 1.94 FT.
BOTTOM WIDTH = 8 FT.

OPEN CHANNEL ROCK RIPRAP LETDOWN DESIGN SUMMARY

DESIGN IS APPLICABLE FOR A DRAINAGE AREA UP TO 25 ACRES (TOP DECK ONLY).

3.5% SLOPE
MAXIMUM FLOW DEPTH = 1.94 FT.
BOTTOM WIDTH = 8 FT.

OPEN CHANNEL GROUTED RIPRAP LETDOWN DESIGN SUMMARY

DESIGN IS APPLICABLE FOR A DRAINAGE AREA UP TO 25 ACRES (TOP DECK) AND 35 ACRES (SIDE SLOPE).

25% SLOPE
MAXIMUM FLOW DEPTH = 1.36 FT.
BOTTOM WIDTH = 8 FT.

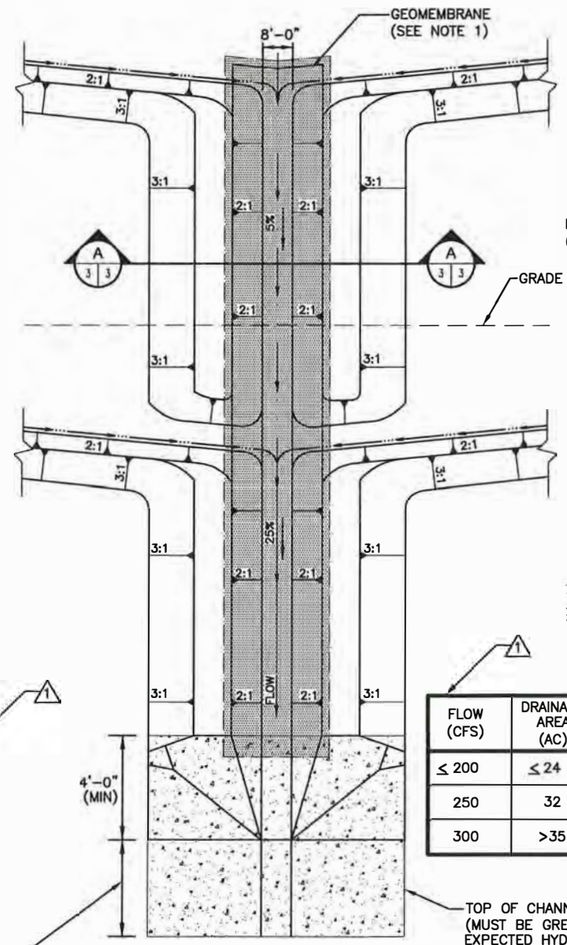
3.5% SLOPE
MAXIMUM FLOW DEPTH = 1.94 FT.
BOTTOM WIDTH = 8 FT.

OPEN CHANNEL TURF REINFORCEMENT LETDOWN DESIGN SUMMARY

DESIGN IS APPLICABLE FOR A DRAINAGE AREA UP TO 35 ACRES (TOP DECK AND SIDE SLOPE).

25% SLOPE
MAXIMUM FLOW DEPTH = 1.36 FT.
BOTTOM WIDTH = 8 FT.

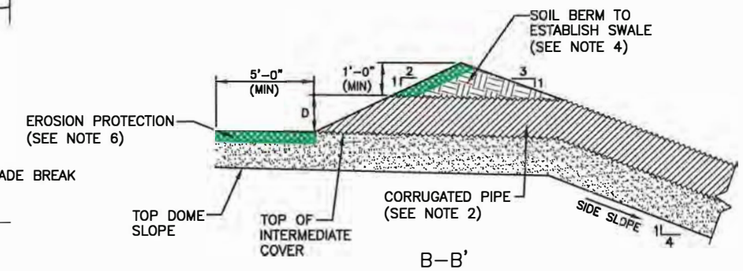
3.5% SLOPE
MAXIMUM FLOW DEPTH = 1.99 FT.
BOTTOM WIDTH = 8 FT.



FLOW (CFS)	DRAINAGE AREA (AC)	HYDRAULIC JUMP DEPTH (FT)	RIPRAP LENGTH (FT)
≤ 200	≤ 24	10	10
250	32	16	16
300	>35	25	25

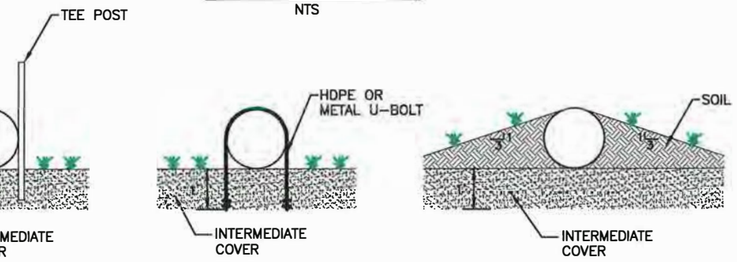
TEMPORARY OPEN CHANNEL LETDOWN (B, 1 | 3)

0 20 40
SCALE IN FEET



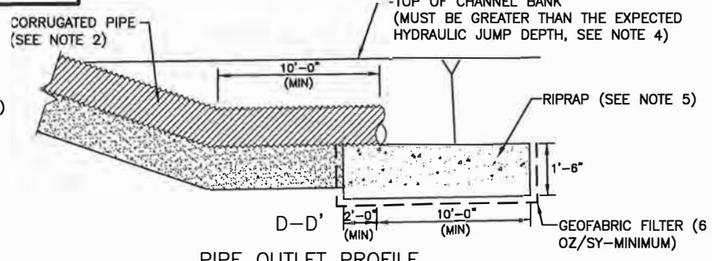
B–B'

PIPE INLET PROFILE
NTS



C–C'

ANCHORING DETAILS
NTS



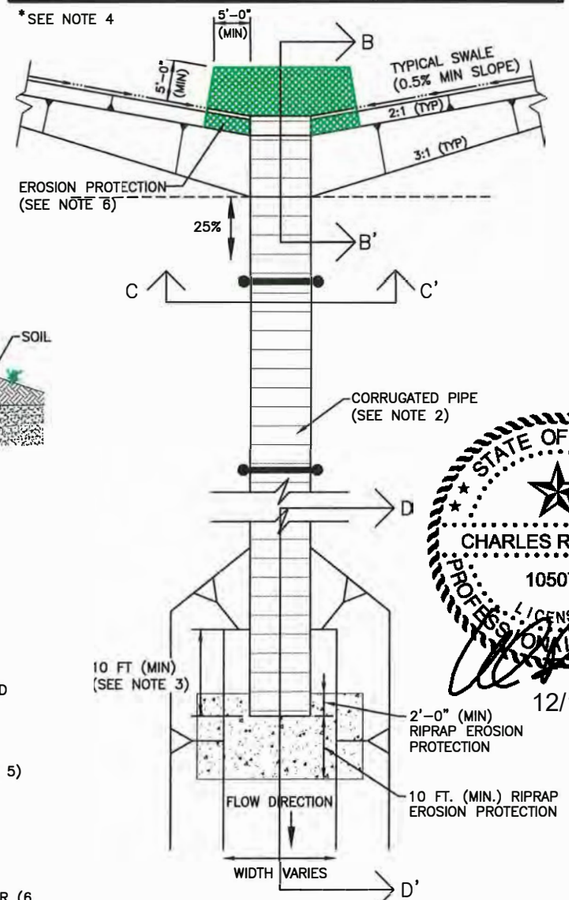
D–D'

PIPE OUTLET PROFILE (SEE NOTE 3)
NTS

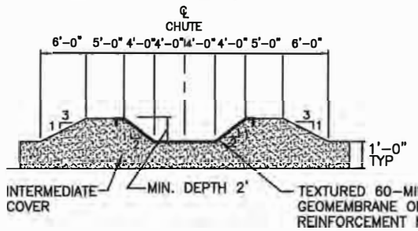
PIPE LETDOWN DESIGN SUMMARY* (USE OF PIPE LETDOWN IS LIMITED TO 1–INLET)

DRAINAGE AREA (ACRE)	DESIGN FLOW RATE (CFS)	REQUIRED PIPE DIAMETER (FT)
2.0	16.0	2
2.7	21.0	3

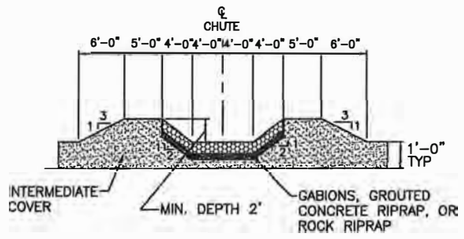
*SEE NOTE 4



TEMPORARY PIPE LETDOWN
NTS



A1 | 3 | 3 TEMPORARY GEOMEMBRANE OR TURF REINFORCEMENT LETDOWN OPTION



A2 | 3 | 3 TEMPORARY GABION LETDOWN OPTION

0 10 20
SCALE IN FEET

0 10 20
SCALE IN FEET

LEGEND

△1 INDICATES REVISION (SEE LIST OF REVISIONS)

LIST OF REVISIONS:

1. REVISED LETDOWN CALCULATIONS.

NOTES:

1. GEOMEMBRANE TEXTURED ON BOTH SIDES WILL BE USED FOR GEOMEMBRANE LETDOWN LINING. AS AN ALTERNATIVE, TEMPORARY LETDOWN CAN BE LINED WITH GABIONS, GROUTED CONCRETE RIPRAP, TURF REINFORCEMENT MAT, OR ROCK RIPRAP.
2. PIPE DRAINAGE LETDOWN WILL BE ANCHORED BY USING SOIL BERM AT THE INLET LOCATED WITHIN THE SWALE. ADDITIONAL ANCHORING ON THE SIDE SLOPE MAY BE PROVIDED USING SOIL, HDPE, METAL U–BOLTS, T–POSTS OR EQUIVALENT MATERIALS.
3. PIPE WILL BE EXTENDED INTO THE CHANNEL TO MINIMIZE EROSION.
4. PIPE LETDOWNS WILL BE LIMITED TO 1 INLET PER LETDOWN. SOIL BERMS AROUND THE PIPE INLET WILL BE EXTENDED A MINIMUM 1–FOOT ABOVE THE LETDOWN PIPE INLET. REFER TO PAGE 6A–G–2–9 FOR HYDRAULIC ANALYSIS.
5. RIPRAP APRON DESIGN IS PROVIDED ON PAGES 6A–G–2–19 AND 20. D_{50} FOR RIPRAP IS 5–INCHES MINIMUM.
6. RIPRAP, GROUTED RIPRAP, GABIONS, GEOMEMBRANE, EXISTING VEGETATION, OR TURF REINFORCEMENT MAY BE USED FOR INLET EROSION PROTECTION.
7. REFER TO PAGE 6A–G–2–5A FOR EROSION PROTECTION DESIGN. IF LETDOWN DISCHARGES TO A POND, 10 FEET OF RIPRAP WILL BE SUFFICIENT.

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED PROFESSIONAL ENGINEER
12/12/2024

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☒ FOR PERMITTING PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 05/2010
FILE: 0120–439–11
CAD: FIG 3–LETDOWN DESIGN.DWG
DRAWN BY: SRF
DESIGN BY: BJL
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F–3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	01/2010	1ST TCEQ COMMENT RESPONSE
2	05/2010	P ERMIT MODIFICATION
3	12/2024	SEE LIST OF REVISIONS

EROSION CONTROL PLAN
LETDOWN DESIGN SUMMARY

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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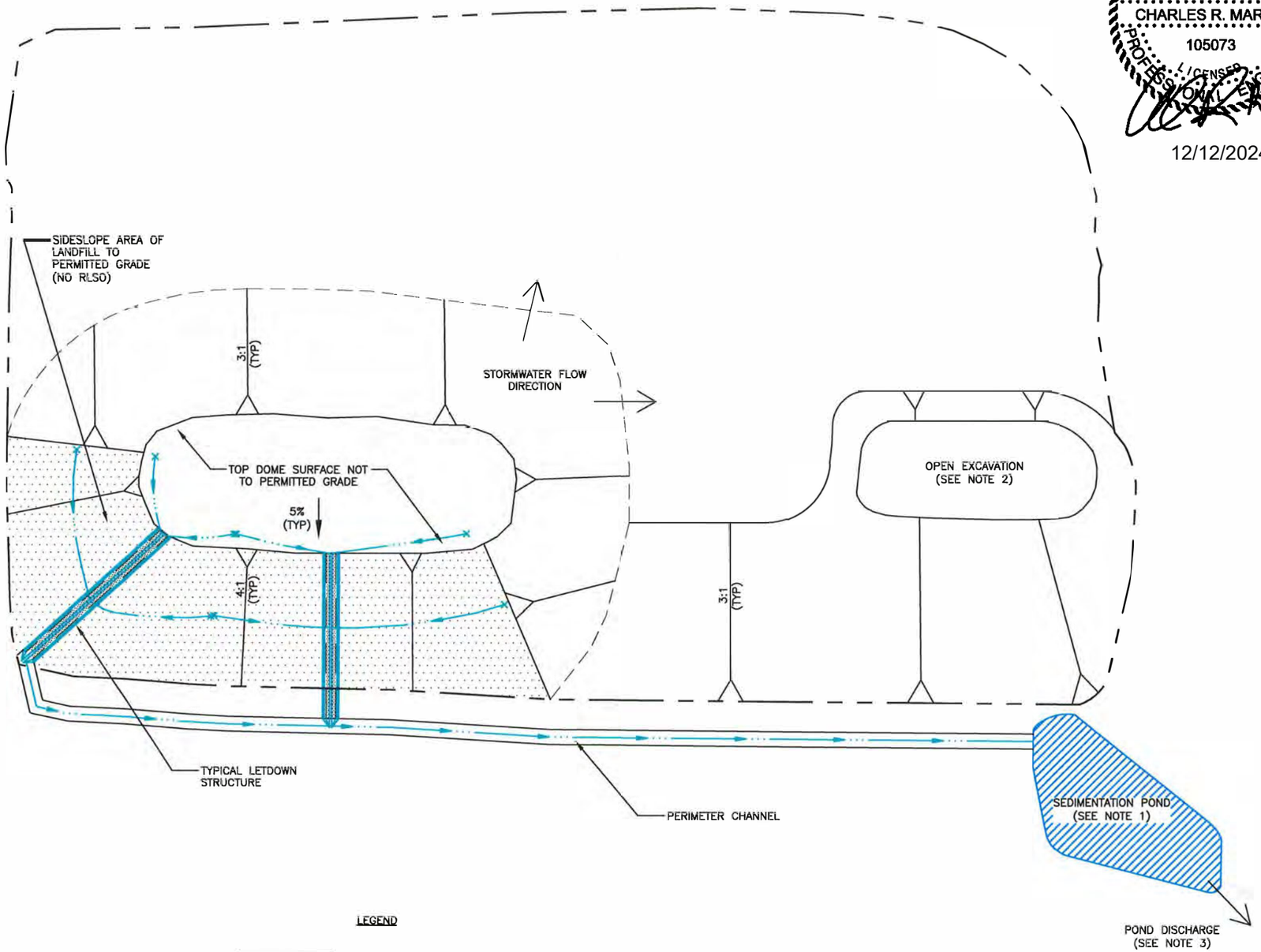
FIGURE 3



LEGEND

- EXTERNAL SIDE SLOPE TO PERMITTED GRADE
- LETDOWN
- DRAINAGE SWALE
- STORMWATER FLOW DIRECTION
- ⚠1 INDICATES REVISION (SEE LIST OF REVISIONS)

STATE OF TEXAS
CHARLES R. MARSH
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PROFESSIONAL ENGINEER

12/12/2024

EXAMPLE CALCULATION

REQUIRED POND SIZE = EXTERNAL EMBANKMENT AREA (ACRES) X POND AREA REQUIRED/ UNIT DRAINAGE AREA FACTOR

EXTERNAL EMBANKMENT AREA DRAINING TO POND = 50 ACRES

ADDITIONAL UPLAND AREA DRAINING TO POND = 0 ACRES (SEE NOTE 1)

REQUIRED SEDIMENT REMOVAL FROM EXTERNAL SIDE SLOPE AREA = 80 TONS/ACRE/YEAR TO 50 TONS/ACRE/YEAR

POND AREA REQUIRED/UNIT DRAINAGE AREA FACTOR (FROM TABLE BELOW) = 0.105

REQUIRED POND SIZE = 50 ACRES X 0.105 = 5.25 ACRES

SIZE OF POND REQUIRED[1]		
REQUIRED SEDIMENT REMOVAL (TONS/ACRE/YEAR)	POND AREA REQUIRED/ UNIT DRAINAGE AREA FACTOR	EFFICIENCY OF POND (DYNAMIC AND QUIESCENT)
80 TO 50	0.040	18.0%
70 TO 50	0.070	29.3%
80 TO 50	0.105	37.3%
90 TO 50	0.125	43.8%
100 TO 50	0.140	51.9%
200 TO 50	0.375	75.3%

⚠1

[1] REFER TO APPENDIX 6A-G-3 FOR MORE INFORMATION. THE POND DESIGN AND DEMONSTRATION ARE PROVIDED TO ENSURE THAT SEDIMENT DISCHARGE FROM THE SITE WILL BE PREVENTED DURING INITIAL ESTABLISHMENT OF VEGETATION OVER THE SIDESLOPES AND TOP DOME SURFACES.

NOTES:

1. EXAMPLE POND CONFIGURATION IS SHOWN. THE POND WILL BE LOCATED WITHIN THE PERMIT BOUNDARY. A DEMONSTRATION WILL BE INCLUDED IN THE SITE OPERATING RECORD TO SHOW THAT THE POND HAS THE CAPABILITY TO CAPTURE SEDIMENT SUCH THAT DISCHARGE IS LESS THAN OR EQUAL TO 50 TONS/ACRE/YEAR FROM THE EXTERNAL SIDE SLOPE AND TOP DOME AREA. THE DEMONSTRATION WILL ACCOUNT FOR THE ADDITIONAL SEDIMENT CREATED BY THE UPLAND AREA THAT FLOWS TO THE POND. FOR DEMONSTRATION PURPOSES, THE POND DEPTH WILL BE AN AVERAGE OF 4 FEET. OVERALL SEDIMENT DISCHARGE FROM THE SITE MUST COMPLY WITH THE CURRENT TPDES PERMIT FOR THE SITE.
2. EXCAVATED FUTURE CELL AREAS OR SOIL BORROW AREAS CAN ALSO BE USED AS SEDIMENTATION PONDS. IF THESE AREAS ARE USED FOR PONDS, A DEMONSTRATION NOTING THAT THE EXCAVATED FUTURE CELL AREA OR SOIL BORROW AREA HAS MORE CAPACITY THAN THE VOLUME PRODUCED BY THE 25-YEAR, 24-HOUR STORM WILL BE DOCUMENTED AND MAINTAINED IN THE SITE OPERATING RECORD.
3. AS STATED IN SECTION 2.2, A STATEMENT WILL BE ADDED TO THE SITE OPERATING RECORD EACH TIME A SEDIMENTATION POND IS INSTALLED TO NOTE HOW THE TEMPORARY SEDIMENTATION POND AND THE POND OUTLET WERE CONSTRUCTED CONSISTENT WITH THE REQUIREMENTS OF THE SITE DEVELOPMENT PLAN.

LIST OF REVISIONS:
1. REVISED POND CALCULATIONS.

- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 05/2010
FILE: 0120-439-11
CAD: FIG 4-RETENTION POND PLAN.DWG
DRAWN BY: SRF
DESIGN BY: BJL
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	01/2010	1ST TCEQ COMMENT RESPONSE
2	05/2010	PERMIT MODIFICATION
3	12/2024	SEE LIST OF REVISIONS

EROSION CONTROL PLAN SEDIMENT CONTROL POND PLAN

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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FIGURE 4

G:\0120\439\FIGP MOD 2024\ECP\FIG 4-SED CAPTURE DET POND DESIGN.dwg, rarrington, 1:2

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

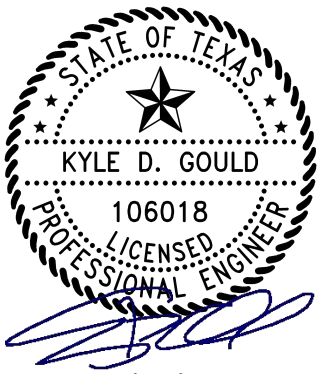
PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 7
LANDFILL COMPLETION PLAN

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised October 2008
Revised December 2010
Revised January 2012

Revised December 2024



12/12/2024

Prepared by

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No. 0120-439-11-259

STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED
PROFESSIONAL ENGINEER
12/12/2024

95°14'30"
29°49'45"

E 3189000 E 3190000 E 3191000 E 3192000 E 3193000 E 3194000 E 3195000
N 747000 N 746000 N 745000 N 744000 N 743000

ALTERNATIVE FINAL COVER SIDESLOPE (FC6A)
ALTERNATIVE FINAL COVER TOPSLOPE (FC5A)
HCFCD DITCH (P116-00-00)
FORMER SOIL BORROW AREA
PRE SUBTITLE D TIE-IN (FC14A)
LEY ROAD
PRE-SUBTITLE D TIE-IN W/ROAD (FC13A)
PRE-SUBTITLE D TIE-IN W/ROAD (FC13)
GCL/PRE-SUBTITLE D FINAL COVER TRANSITION (FC15)
ALTERNATIVE FINAL COVER TOPSLOPE/SIDESLOPE TRANSITION (FC7A)
PRE-SUBTITLE D AREA
GREENS BAYOU (P100-00-00)
ALTERNATIVE FINAL COVER-SIDESLOPE (FC2A)
ALTERNATIVE FINAL COVER TOPSLOPE/SIDESLOPE TRANSITION (FC3A)
SUBTITLE D TIE-IN (FC12A)
SUBTITLE D AREA
SIDESLOPE SWALE (PRE-SUBTITLE D AREA) (FC8A)
SIDESLOPE SWALE (SUBTITLE D AREA) (FC9A)
UNION PACIFIC RAILROAD SPUR
HCFCD DITCH (P114-00-00)
COMPOSITE FINAL COVER-TOPSLOPE (FC1A)
SUBTITLE D TIE-IN W/ROAD (FC11A)
PRE-SUBTITLE D FINAL COVER TIE-IN (FC4A)
CITY OF HOUSTON ROAD EASEMENT
EXISTING LANDFILL GAS FACILITY
EXISTING MAINTENANCE AND PAINT FACILITY
EXISTING SCALEHOUSE
EXISTING OFFICE BUILDING
EXISTING SITE ACCESS ROAD (OATES ROAD)
HL&P EASEMENT
U.S. HIGHWAY 90 (McCARTY ROAD)
UNION PACIFIC RAILROAD

NWP NP NEP EP SEP SWP SP-1 SP-2
GMP-A GMP-B GMP-C GMP-D GMP-E GMP-F GMP-G GMP-H GMP-I GMP-J GMP-K GMP-L GMP-M GMP-N GMP-O(R) GMP-P GMP-Q GMP-R(R)
MW-1LB MW-2UB MW-2LB MW-3UB MW-3LB MW-4UB MW-4LB MW-5UB MW-5LB MW-6LB MW-6UB MW-7UB MW-7LB MW-8UB MW-8LB MW-9UB MW-9LB MW-10UB MW-10LB MW-11UB MW-11LB MW-12UB MW-12LB MW-13UB MW-13LB

0 300 600
SCALE IN FEET

POND LABELS	
NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 10)
- 200 FINAL CONTOURS
- 745000 N STATE PLANE COORDINATE SYSTEM
- 29°49'45" GEODETIC COORDINATE SYSTEM
- 20 EXISTING CONTOUR
- MW-11UB GROUNDWATER MONITORING WELL
- GMP-M LANDFILL GAS MONITORING PROBE
- EASEMENT BOUNDARY
- 100-YR FLOODPLAIN (REFER TO ATTACHMENT 6C)
- GABIONS
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- CONSTRUCTED FINAL COVER
- 1 INDICATES REVISION (SEE LIST OF REVISIONS)

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 7B FOR POST DEVELOPMENT DRAINAGE INFORMATION.
4. FINAL COVER DETAILS ARE PROVIDED IN ATTACHMENT 6D-FINAL COVER DETAILS.
5. MAXIMUM FINAL COVER ELEVATION: 314.5 FT-MSL
   MAXIMUM WASTE ELEVATION: 313.5 FT-MSL. (4)
6. REFER TO ATTACHMENT 2 FOR TYPICAL CROSS SECTION INFORMATION.
7. DRAINAGE DESIGN INFORMATION INCLUDED IN ATTACHMENT 6A.
8. THE TOP DECK WILL BE MARKED AND LIGHTED. CONSISTENT WITH FAA REQUIREMENTS. REFER TO PARTS I/II, APPENDIX I/IIA FOR MORE INFORMATION.
9. REFER TO ATTACHMENT 14 FOR DETAILS OF THE LANDFILL GAS MANAGEMENT PLAN.
10. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.

LIST OF REVISIONS:

1. UPDATED TOPOGRAPHIC MAPPING.
2. REVISED FINAL COVER CONTOURS.
3. ADDED CONSTRUCTED FINAL COVER AREA.
4. UPDATED MAXIMUM FINAL COVER ELEVATION FOR GCL ALTERNATIVE.

D:\0120\439\FIP MOD 2024\ATT 7\7-A COMPLETION PLAN.dwg, farrington, 1:2

- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 03/2004
FILE: 0120-439-11
CAD: 5.04-PRO-DR.DWG
DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	0 9'2008	UPDATED GROUNDWATER OBSERVATION WELLS AND LANDFILL GAS MONITORING PROBES
2	12/2010	PERMIT MODIFICATION
3	01/2012	PERMIT MODIFICATION
4	12/2024	SEE LIST OF REVISIONS

MAJOR PERMIT AMENDMENT
LANDFILL COMPLETION PLAN

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 7A

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

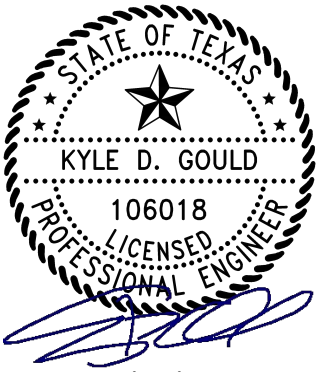
PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 12
FINAL CLOSURE PLAN

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised October 2009
Revised September 2011
Revised February 2013
Revised August 2020

Revised December 2024



12/12/2024

Prepared by

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No. 0120-439-11-259

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

MAJOR PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
~~ATTACHMENT~~APPENDIX 12A
FINAL COVER SYSTEM QUALITY CONTROL PLAN

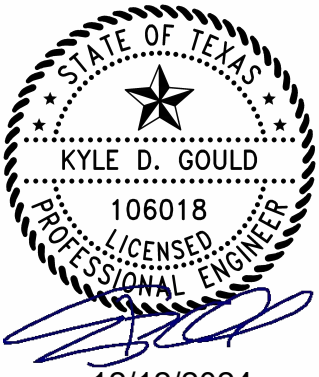
Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan August 2008

Revised March 2011

Revised December 2024



12/12/2024

Prepared by

Weaver Consultants Group, LLC
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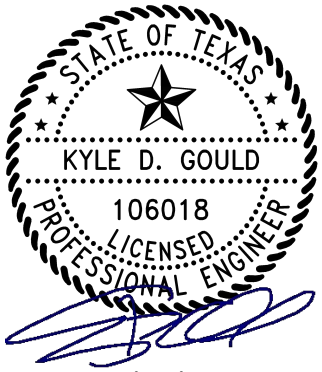
Fort Worth, Texas 76109
817-735-9770

WCG Project No. 0120-439-11-259

APPENDIX 12A-A

FINAL COVER DRAINAGE LAYER DESIGN

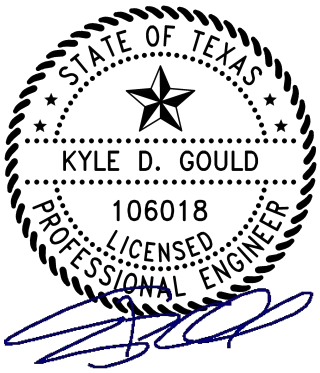
Includes pages 12A-A.1 through 12A-A.7



12/12/2024

ATTACHMENT 2

REPLACEMENT PAGES
(CLEAN VERSION)



12/12/2024

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

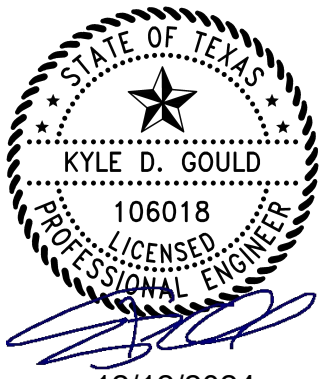
PART III – SITE DEVELOPMENT PLAN
SITE DEVELOPMENT PLAN NARRATIVE

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan August 2008
Revised June 2009
Revised October 2009
Revised February 2010
Revised December 2010
Revised January 2012
Revised October 2014
Revised March 2024

Revised December 2024



12/12/2024

Prepared by

Weaver Consultants Group, LLC
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6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No. 0120-439-11-259

south of the site). The floodplain elevation in Greens Bayou ranges from approximately 30.5 ft-msl near US Highway 90 to 32 ft-msl near the northeast corner of the site. Over 4 feet of freeboard exists between the 100-year flood elevation in Greens Bayou and the limits of waste. As discussed in Attachment 6A, the proposed vertical expansion does not impact stormwater flow in Greens Bayou.

The entire waste fill footprint is located outside the 100-year floodplain as defined on the FIRM. The 100-year water surface profile for P116-00-00 and P114-00-00 are also presented in Attachment 6C. As shown in Attachment 6C, the 100-year storm event is contained within the channel banks of these two HCFCD channels.

Refer to Attachment 6C – Floodplain Information for additional information.

The Subtitle D Location Restriction Certification of Compliance for floodplains is included in Parts I/II, Appendix I/IIB.

3.8 Cover System Design

The final cover system will consist of a soil only (pre-Subtitle D areas) and composite (Subtitle D areas) cover system, as well as a GCL alternative final cover for both pre-Subtitle D and Subtitle D areas. The GCL alternative final cover includes replacing the compacted clay infiltration layer with a GCL. As discussed in Attachment 6D, the site will either select the compacted clay infiltration layer option or the GCL infiltration layer option for the remaining footprint that has not received final cover (i.e., only one of the final cover options will be used for the remaining footprint unless a subsequent permit modification is submitted). The final cover system will provide a low maintenance cover, protect against erosion, reduce rainfall percolation through the cover system, and subsequently minimize leachate generation within the landfill. As depicted on Attachment 7A – Landfill Completion Plan, a maximum of 3.5 percent top slopes and 4H:1V sideslopes are provided to minimize erosion and facilitate drainage of the landfill. A composite final cover system will be constructed over the Subtitle D waste disposal areas. Components of the multi-layer final cover system for both pre-Subtitle D and Subtitle D areas include (from top to bottom):

<u>Subtitle D Area</u>

- An erosion layer consisting of a 24-inch-thick layer of earthen material (top 6 inches capable of sustaining plant growth). The vegetation layer will consist of native or introduced grasses capable of providing 90 percent coverage over the cover system.
- A drainage geocomposite will be used as the drainage layer.
- A 40-mil, smooth (topslope) and textured (sideslope), linear low-density polyethylene (LLDPE), geomembrane liner or other equivalent geomembrane liner material may be used.

An 18-inch-thick compacted clay infiltration layer with a coefficient of permeability of less than or equal to $1x10^{-5}$ cm/sec or a geosynthetic clay layer (GCL) with a coefficient of permeability of less than or equal to $3x10^{-9}$ cm/s. Unreinforced GCL will be used on the topslopes and reinforced GCL will be used on the sideslopes.

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

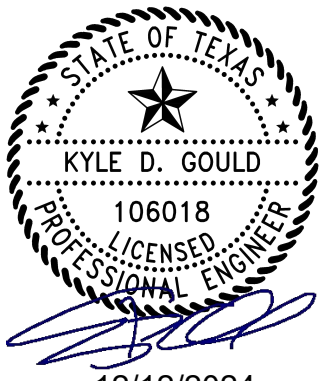
PART III - SITE DEVELOPMENT PLAN
ATTACHMENT 1
SITE LAYOUT PLANS

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised June 2009
Revised October 2009
Revised December 2010
Revised January 2011
Revised January 2012
Revised October 2014

Revised December 2024



12/12/2024

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6420 Southwest Boulevard, Suite 206
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817-735-9770

WCG Project No.0120-439-11-259

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

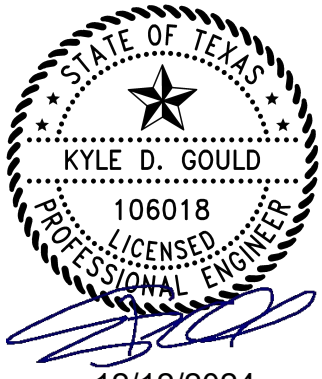
PART III - SITE DEVELOPMENT PLAN
ATTACHMENT 2
FILL CROSS SECTIONS

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised October 2009
Revised December 2010
Revised January 2011
Revised January 2012
Revised October 2014

Revised December 2024



12/12/2024

Weaver Consultants Group, LLC
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Fort Worth, Texas 76109
817-735-9770

WCG Project No.0120-439-11-259

STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED
PROFESSIONAL ENGINEER
12/12/2024

HCFCD DITCH P116-00-00
FORMER SOIL BORROW AREA
LEY ROAD
HOUSTON PIPE LINE COMPANY EASEMENT
GREENS BAYOU P100-00-00
UNION PACIFIC RAILROAD SPUR EASEMENT
HCFCD DITCH P114-00-00
EXISTING FLARE FACILITY
EXISTING MAINTENANCE AND PAINT FACILITY
EXISTING SCALEHOUSE
EXISTING SITE ACCESS ROAD (OATES ROAD)
EXISTING OFFICE BUILDING
CITY OF HOUSTON ROAD EASEMENT
FORMER LANDFILL
HL&P EASEMENT
U.S. HIGHWAY 90 (McCARTY ROAD)
UNION PACIFIC RAILROAD
SEP
NEP
SWP

N 747000
N 746000
N 745000
N 744000
N 743000
E 3189000
E 3190000
E 3191000
E 3192000
E 3193000
E 3195000
-95°14'30"
29°49'45"

0 300 600
SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 5)
- N 746000 — STATE PLANE COORDINATE SYSTEM
- 29°49'45" — GEODETIC COORDINATE SYSTEM
- EXISTING CONTOUR
- 200 — FINAL CONTOURS
- COMPACTED CLAY SLOPE LINER
- CLAY CUTOFF WALL
- SLURRY WALL
- DEEP SLURRY WALL
- NORTHERN EAST SLURRY WALL EXTENSION (REFER TO ATT. 6D)
- EAST SLURRY WALL EXTENSION (REFER TO ATT. 6D)
- SLURRY WALL EXTENSION OF GWRT (REFER TO ATT. 6D)
- MW-4UB — EXISTING DETECTION GROUNDWATER MONITORING WELL
- OW7-UB — PROPOSED OBSERVATION WELL CLUSTERS (SEE NOTE 7)
- OW-1 — EXISTING OBSERVATION WELL (SEE NOTE 7)
- GMP-M — EXISTING LANDFILL GAS MONITORING PROBE
- GMP-K — EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED
- GMP-J(R) — PROPOSED LANDFILL GAS MONITORING PROBE (SEE NOTE 6)
- EASEMENT BOUNDARY
- S-5 — SOUTHWEST LAB SOIL BORING
- WCC-51 — WOODWARD CLYDE SOIL BORING
- GABIONS
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- GROUND WATER RECOVERY TRENCH
- SUMP 2 — GROUND WATER RECOVERY TRENCH SUMP
- CONSTRUCTED FINAL COVER

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. BORING LOCATIONS HAVE BEEN REPRODUCED FROM VARIOUS SUBSURFACE INVESTIGATIONS PREVIOUSLY COMPLETED AND ARE APPROXIMATE. ONLY BORINGS SHOWN ON SECTIONS ARE PRESENTED ON THIS DRAWING. PLEASE REFER TO ATTACHMENT 4, FIGURE 4B.2 FOR A FIGURE THAT SHOWS ALL THE BORINGS COMPLETED AT THE SITE.
4. REFER TO ATTACHMENT 1H FOR THE FINAL CONTOUR PLAN AND 1I FOR THE BOTTOM OF WASTE PLAN.
5. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
6. PROPOSED PROBES DESIGNATED WITH "(R)" ARE REPLACEMENT PROBES. PROPOSED PROBES GMP-W THROUGH GMP-LL WERE ADDED ALONG THE WESTERN PERIMETER OF THE LANDFILL AS PART OF THE AAWWE SETTLEMENT AGREEMENT.
7. GROUNDWATER OBSERVATION WELLS OW-1, OW-2, OW-3, OW-4 AND OW-5 WERE ADDED ALONG THE NORTHERN AND EASTERN PERIMETER OF THE LANDFILL AS PART OF THE HARRIS COUNTY SETTLEMENT AGREEMENT. ADDITIONAL PROPOSED OBSERVATION WELLS WERE ADDED ALONG THE WESTERN PERIMETER OF THE LANDFILL AS PART OF THE AAWWE SETTLEMENT AGREEMENT.

- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 08/2008
FILE: 0120-439-11
CAD: 2A-SITE PLAN.DWG
DRAWN BY: SRF
DESIGN BY: DOL
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
1	09/2008	UPDATED LANDFILL GAS MONITORING PROBES AND ADDED EAST SLURRY WALL.
2	12/2010	PERMIT MODIFICATION
3	01/2012	PERMIT MODIFICATION
4	10/2014	PERMIT MODIFICATION
5	12/2024	PERMIT MODIFICATION

TYPICAL SECTION SITE PLAN

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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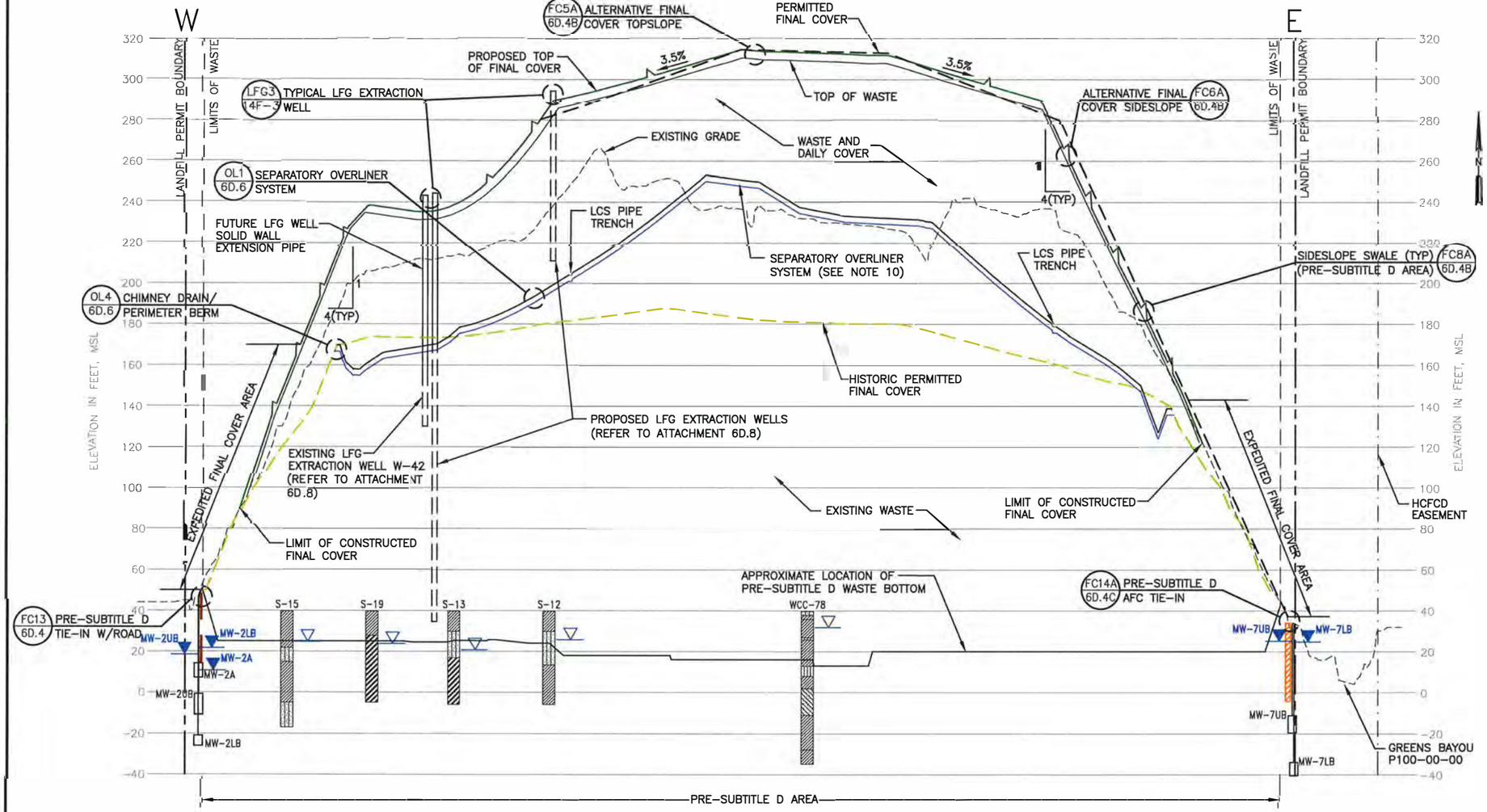
ATTACHMENT 2A

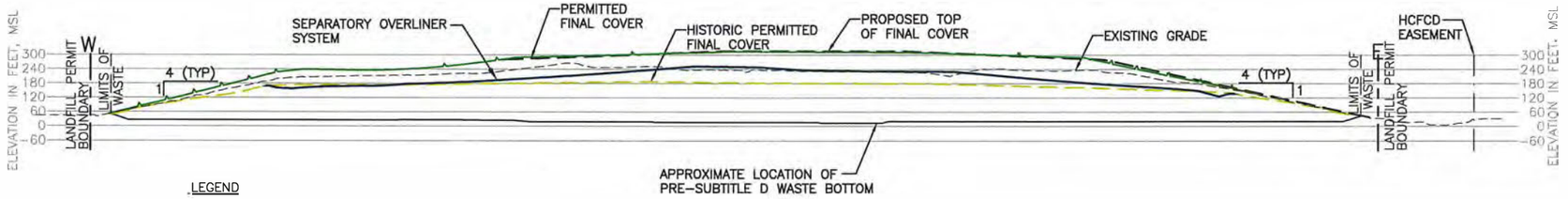
O:\0120\439\PLIP MOD 2024\ATT 2\CLEAN\ATT 2A-TYPICAL SECTION SITE PLAN.dwg, vgurman, 1:2



SECTION E (EXAGGERATED VERTICAL SCALE) — E 2A,7A 2F

HORIZONTAL SCALE: 0 300 600

VERTICAL SCALE: 0 30 60



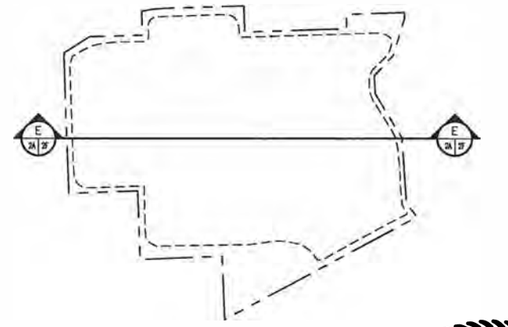
SECTION E (1H:1V) — E 2A,7A 2F

HORIZONTAL SCALE: 0' 300' 600'

VERTICAL SCALE: 0' 300' 600'

LEGEND

- MW-10UB — APPROXIMATE POTENTIOMETRIC SURFACE IN NOVEMBER 2002
- APPROXIMATE ELEVATION THAT GROUNDWATER WAS FIRST ENCOUNTERED DURING DRILLING
- COMPACTED CLAY SLOPE LINER (SEE NOTE 8)
- SLURRY WALL (SEE NOTE 8)



KEY MAP (NTS)

BORING LEGEND

- LOW PLASTICITY CLAY
- HIGH PLASTICITY CLAY
- SILT
- SILTY SAND
- CLAYEY SAND

STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED PROFESSIONAL ENGINEER
12/12/2024

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. REFER TO ATTACHMENT 6D FOR FINAL COVER SYSTEM DETAILS.
3. LANDFILL COMPLETION AND TOP OF LINER GRADES ARE SHOWN ON ATTACHMENTS 1H AND 1I.
4. SEE ATTACHMENT 4 FOR BORING DATA. BORINGS PROJECTED INTO THE LINE OF THE SECTION. SEE ATTACHMENT 2A FOR APPROXIMATE BORING LOCATIONS.
5. REFER TO ATTACHMENT 14 FOR DETAILS OF THE LANDFILL GAS MANAGEMENT PLAN.
6. DRAINAGE DESIGN INFORMATION IS PROVIDED IN ATTACHMENT 6A-DRAINAGE DESIGN REPORT.
7. MAXIMUM FINAL COVER ELEVATION IS 314.5 FT-MSL FOR GCL FINAL COVER. DEEPEST EXCAVATION IS 1.8 FT-MSL.
8. THE LOCATIONS OF THE SLURRY WALL AND COMPACTED CLAY SLOPE LINER WERE REPRODUCED FROM A DECEMBER 1992 DRAWING PREPARED BY HALL SOUTHWEST. REFER TO ATTACHMENT 1I FOR LOCATION.
9. MINIMUM BUFFER ZONE WIDTH BETWEEN THE PERMIT BOUNDARY AND LIMITS OF WASTE IS A MINIMUM OF 50 FEET.
10. REFER TO ATTACHMENT 6D FOR THE DESIGN OF THE SEPARATORY OVERLINER SYSTEM THAT WILL BE INSTALLED WITHIN THE PRE-SUBTITLE D AREA.

☐ DRAFT
☒ FOR PERMITTING PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 03/2004
FILE: 0120-439-11
CAD: SEC-E.DWG

DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
1	06/2004	RESPONSE TO TCEQ 1st TECHNICAL COMMENTS
2	09/2004	RESPONSE TO TCEQ 2nd TECHNICAL COMMENTS
3	02/2008	HARRIS COUNTY SETTLEMENT INFORMATION
4	09/2008	PERMIT MODIFICATION
5	12/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
TYPICAL SECTION E

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 2F

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

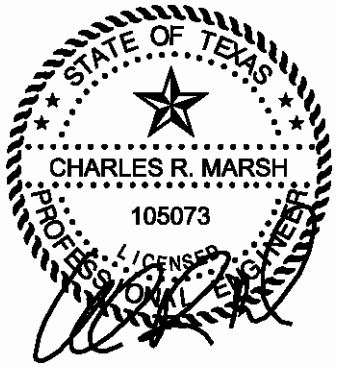
PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 6
GROUNDWATER AND SURFACE WATER PROTECTION PLAN

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised October 2009
Revised August 2010
Revised December 2010
Revised January 2011
Revised October 2014

Revised December 2024



12/12/2024

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No.0120-439-11-259

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

MAJOR PERMIT AMENDMENT APPLICATION

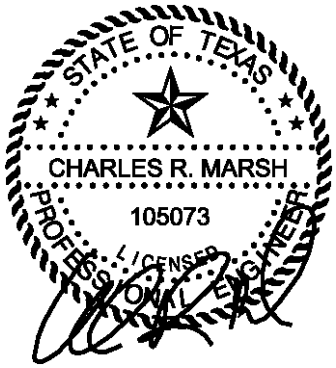
PART III - SITE DEVELOPMENT PLAN
ATTACHMENT 6A
DRAINAGE DESIGN REPORT

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised October 2010
Revised January 2012
Revised March 2024

Revised December 2024



12/12/2024

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No.0120-439-11-259

- HCFCD P100-00-00. This unit description belongs to Greens Bayou, which is located east of the site.

The peak flow generated from the area within the solid waste fill area will increase with this vertical expansion because the 4H:1V sideslope area has increased, the topdeck of the landfill has decreased, and the hydrologic modeling (e.g., precipitation model and modeling program) has been updated. Thus, drainage flowing from the landfill area will be conveyed to the perimeter channels faster than the currently permitted landfill configuration. To offset this increase in the peak flows, additional detention ponds and upgrades to the existing perimeter channels (and their outlet structures) have been incorporated into the design for the vertical expansion to attenuate the peak flows leaving the site. These drainage improvements are detailed in Attachments 6A.1 through 6A.30.

In addition, Table 6.1 has been developed to facilitate a comparison of flow rates and volumes entering the three downstream HCFCD drainage structures. A summary of peak flows and volumes is listed below.

- Peak Flow. As shown on Table 6.1, for each of these three discharges the peak flow for the landfill expansion condition is consistent with the peak flow for the existing permitted landfill condition. The perimeter channel improvements and new detention ponds adequately attenuate the increase in peak flow generated by expanding the landfill vertically. In addition, the shape of the hydrographs in each case is similar. In general, for the expansion case the hydrograph peaks are reduced and the tail end of the hydrograph is slightly higher due to the additional detention that is added to the expansion drainage design.

Table 6.1
Flow Rates and Runoff Volumes for the Design Storm Event

Stormwater Discharge Point	Existing Permitted Conditions				Postdevelopment Conditions			
	Flow Rate (cfs)		Runoff Volume (ac-ft)		Flow Rate (cfs)		Runoff Volume (ac-ft)	
	25 year	100 year	25 year	100 year	25 year	100 year	25 year	100 year
North (P116-00-00)	1,077	1,456	146	241	1,068	1,451	148	240
East (P100-00-00)	776	1,027	68	136	745	1,002	82	132
South (P114-00-00)	2,537	3,842	123	240	2,530	3,822	128	256

- Volumes. As shown in Table 6.1, the volumes of flow entering each HCFCD channel for both the existing permitted condition and the proposed vertical

expansion condition are very similar. As discussed in Attachment 6A-A, the curve numbers used to represent the landfill final cover in both cases is 88. No change to the final cover system design is proposed. Therefore, the main reason for the additional volume for the postdevelopment condition is the changes to the hydrologic model provided by HCFCD. The pond areas are modeled with a curve number of 100 (i.e., the decrease in infiltration due to the detention ponds results in a slightly increased total volume of runoff generated from the site).

Also shown in the Table 6.1, postdevelopment runoff volumes generated from the landfill's three drainage basins do not significantly alter the existing permitted conditions. This demonstration was submitted to the HCFCD in July 2011. Excerpts from the HCFCD submittal and their September 15, 2011 approval letter is included in Attachment 6B.

4.4 Effect of Vertical Expansion on Peak Flows, Volumes, and Velocities Entering and Exiting the Landfill Permit Boundary

The purpose of this section is to provide a demonstration that the peak flows, volumes, and velocities are not significantly altered at the landfill permit boundary. To complete this analysis, the HEC-HMS models for both the existing permitted and proposed vertical expansion cases were incorporated into the Greens Bayou model obtained from the HCFCD in February 2024. The resulting model, which is included in Appendix 6A-A, assesses the impact of the proposed vertical expansion on the local and regional drainage patterns.

The results of this demonstration are provided on Table 6-2 and Figures 4.3 through 4.6. Each discharge point is discussed in the following subsections.

4.4.1 HCFCD Channel P116-00-00 (North)

As shown in Attachment 6A.1, the permit boundary encompasses P116-00-00 on the north portion of the site. The hydrographs for stormwater entering and exiting the permit boundary are shown on Figure 4.4 for the 25-year and 100-year storm events. As Figure 4.4 shows, the hydrographs entering the site are similar for each storm event. The proposed condition results in no increases in discharge rate nor increases in the water surface elevation in P116-00-00. Additionally, the increased flow rates do not cause erosive flow velocities in P116-00-00.

As shown in Table 6-2, the volume of flow entering and exiting the permit boundary is consistent. The changes in volume is due to the changes made to the HCFCD hydrologic model.

The velocities entering and exiting the permit boundary in the channel are similar, as shown on Table 6-2. This is to be expected given that the flow rates are similar and the channel cross-sections are the same. As demonstrated in the approved HCFCD analysis

(see Appendix B), the increase in flow rate, volume, and velocity in P116-00-00 has no adverse impact on Greens Bayou downstream of the permit boundary.

4.4.2 HCFCD Channel P114-00-00 (South)

The permit boundary encompasses P114-00-00 on the southern portion of the site. The hydrographs entering and exiting the site are shown on Figure 4.5 for the 25-year and 100-year storm events. As with HCFCD channel P116-00-00, the hydrographs entering the permit boundary are similar for each storm event. The peak flow leaving the permit boundary for this channel is decreased slightly.

As shown on Table 6-2 the volume of flow entering the permit boundary is unchanged by the expansion condition. The volume exiting the permit boundary is lower for the expansion condition. This result occurs because the differences between the drainage areas under the permitted and proposed conditions (refer to Figure 4.2) and the hydrologic model differences.

The differences in velocities in the channel entering and exiting the permit boundary are similar to the differences in flow rates for the permitted expansion conditions, as shown on Table 6-2. This is to be expected given that the flow rate and channel cross-section is the same. In both cases, the velocities are well below an erosive velocity (i.e., 5 ft/sec).

As demonstrated in the approved HCFCD analysis (see Appendix B), the increase in flow rate, volume, and velocity in P114-00-00 has no adverse impact on Greens Bayou downstream of the permit boundary.

4.4.3 Greens Bayou (P100-00-00 located east of the site)

As shown on Figures 4.2 and 4.3, the location of the permitted outfalls will not be modified with the vertical expansion of the landfill along the eastern portion of the site. As shown on Figure 4.6, and listed in Table 6-2, the combined peak flow leaving the permit boundary on the eastern portion of the site for the vertical expansion is less than the permitted condition, due to the updates to the hydrologic model.

Also, the volume of flow has been increased, as shown in Table 6-2. This is due to the changes in the hydrologic modeling method and drainage area delineations.

A velocity comparison is not applicable to this portion of the site since the outfall locations and design have not been modified and the flow rates have slightly decreased (i.e., the velocities will be less). However, as demonstrated in Appendix 6A-B the outfall structures have been designed to manage the incremental velocities created at each outfall structure. Each outfall structure includes a low-water outlet and emergency spillway which is lined with gabions to protect the underlying soil from erosive velocities. In addition, the design of these outfalls, which are located within the HCFCD easement, have been approved by HCFCD (refer to Attachment 6B).

TABLE 6-2
FLOW RATE, VOLUME, AND VELOCITY COMPARISON AT PERMIT BOUNDARY

COMPARISON POINT	EXISTING PERMITTED CONDITION						VERTICAL EXPANSION CONDITION					
	FLOW RATE (cfs)		RUN-OFF VOLUME (ac-ft)		VELOCITY (ft/sec)		FLOW RATE (cfs)		RUN-OFF VOLUME (ac-ft)		VELOCITY (ft/sec)	
	25 year	100 year	25 year	100 year	25 year	100 year	25 year	100 year	25 year	100 year	25 year	100 year
ENTERING P116-00-00 (North)	51	77	50	81	1.91	2.55	51	77	50	81	1.91	2.55
LEAVING P116-00-00	1,077	1,456	146	241	4.57	3.00	1,068	1,451	148	240	4.51	4.98
ENTERING P114-00-00 (South)	733	1,080	379	634	2.52	3.63	733	1,080	379	634	2.52	3.63
LEAVING P114-00-00	2,537	3,842	1,374	2,314	2.94	3.08	2,530	3,822	1,379	2,300	2.94	3.07
Leaving Eastern Permit Boundary to Greens Bayou	776	1,027	68	136	N/A[1]	N/A[1]	745	1,002	82	132	N/A[1]	N/A[1]

1 A velocity comparison is not applicable to this portion of the site.

4.5 Effect of Vertical Expansion on Greens Bayou

Sections 4.3 and 4.4 demonstrated that the vertical expansion will not adversely alter existing drainage patterns. The purpose of this Section is to provide a final demonstration that shows the flow in Greens Bayou downstream of the site is also not adversely impacted by the proposed vertical expansion of the landfill.

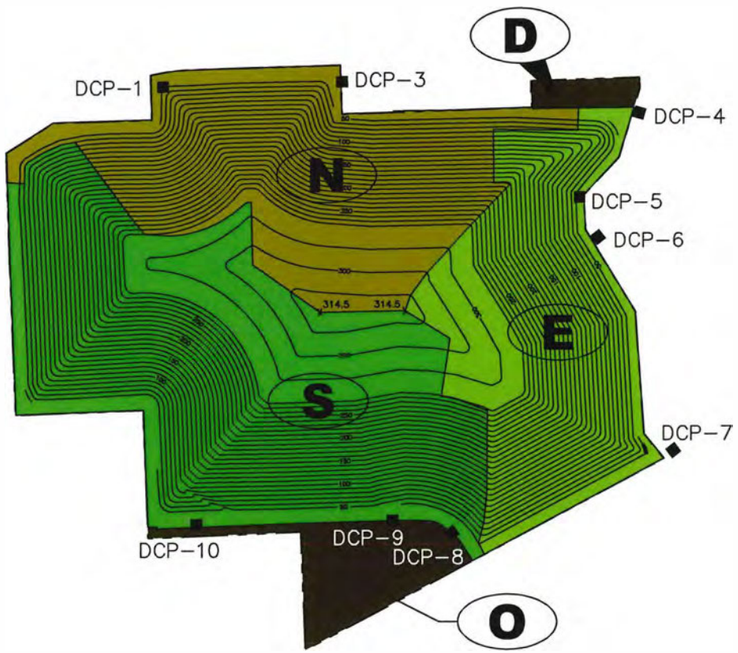
Figure 4.1 shows the Greens Bayou watershed in the area of the site. This figure also shows the individual drainage areas, as reproduced from previous HCFCD studies. Note that flow from the northern and eastern portion of the landfill discharges to Greens Bayou at a location adjacent to the site. Flow from the southern portion of the site drains to P114-00-00, which flows beneath US Highway 90 before discharging to Greens Bayou approximately 3,000 feet south of the site.

To demonstrate that the proposed vertical expansion does not adversely alter the existing drainage patterns of Greens Bayou, both the HEC-HMS analysis for the permitted and proposed conditions were incorporated into the regional study obtained from the HCFCD. Hydrographs for both conditions were developed at the downstream point of Area P100 T, as shown on Figure 4.1. The resulting hydrographs for both the 25-year and 100-year storm events are presented on Figure 4.7. As shown on Figure 4.7, the hydrographs for both the permitted and proposed vertical expansion conditions are similar in shape and scale. As shown in Appendix 6B, when the permit boundary is incorporated into the existing HCFCD hydrologic model, the peak flow rates downstream of the permit boundary are decreased due to the timing of the hydrographs in Greens Bayou.

4.6 Summary

The updated detention pond designs will result in increased flow rates discharged from this permit boundary; however, the regional drainage patterns (e.g., flow rates in Greens Bayou downstream of the permit boundary) are not adversely impacted.

From the hydrological evaluations of the existing permitted and postdevelopment conditions, the drainage conditions at the permit boundary will not be adversely altered by the proposed development. Given that: (1) drainage patterns are not adversely altered and (2) stormwater discharge outfall locations are consistent with the permitted and existing configurations, it is concluded that the proposed landfill development will not significantly alter existing permitted drainage patterns consistent with §330.56 (f)(4)(A)(iv) and §330.55(b)(5)(D).



CURRENTLY PERMITTED CONDITION
DRAINAGE AREAS

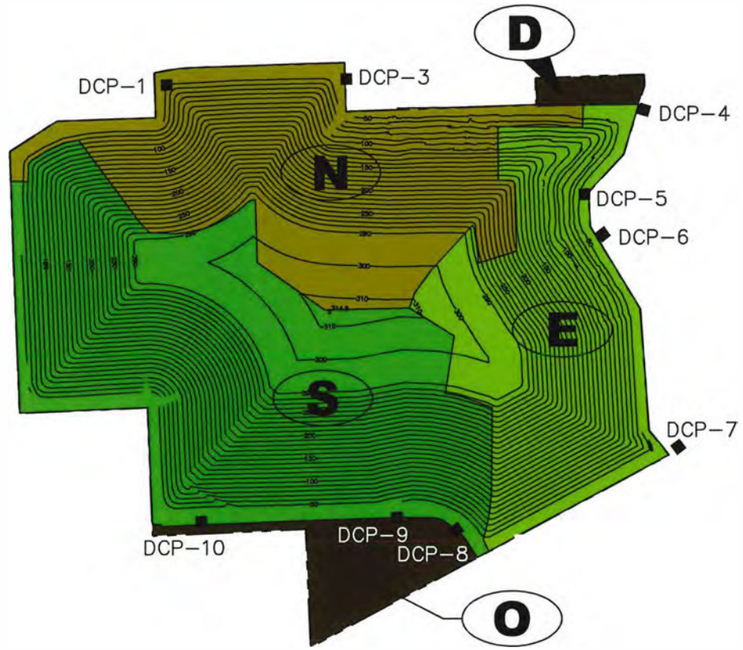
N= 125.99 ACRES

S= 195.10 ACRES

E= 105.41 ACRES

D= 5.49 ACRES

O= 26.26 ACRES



PROPOSED FINAL CONTOUR IMPROVEMENTS
DRAINAGE AREAS

N= 124.69 ACRES

S= 195.10 ACRES

E= 106.71 ACRES

D= 5.49 ACRES

O= 26.26 ACRES

STATE OF TEXAS
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105073
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NOTES:

1. DRAINAGE AREA D FLOWS INTO THE NORTHERN SOIL BORROW AREA.
2. DRAINAGE AREA O IS MOSTLY COMPRISED OF THE OLD LANDFILL.
3. SEE ATTACHMENT 7 FOR PROPOSED FINAL COMPLETION PLAN.
4. FLOW FROM DRAINAGE AREA Ⓦ SHEET FLOWS TO AN AREA WEST OF THE SITE.

LEGEND

PERMIT BOUNDARY

ELEVATION OF FINAL COVER SYSTEM

DRAINAGE AREA BOUNDARY

S — DRAINAGE AREA DESIGNATION

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DATE: 03/2004
FILE: 0120-439-11
CAD: FIG-4.2DRAIN AREA.DWG
DRAWN BY: JDW
DESIGN BY: SAN/ALO
REVIEWED BY: JPY

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

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MAJOR PERMIT AMENDMENT
SITE DRAINAGE PATTERNS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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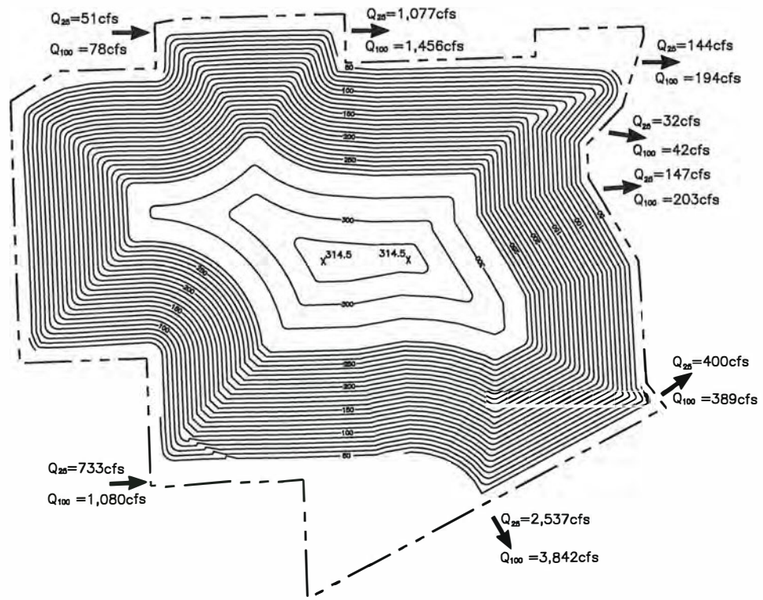
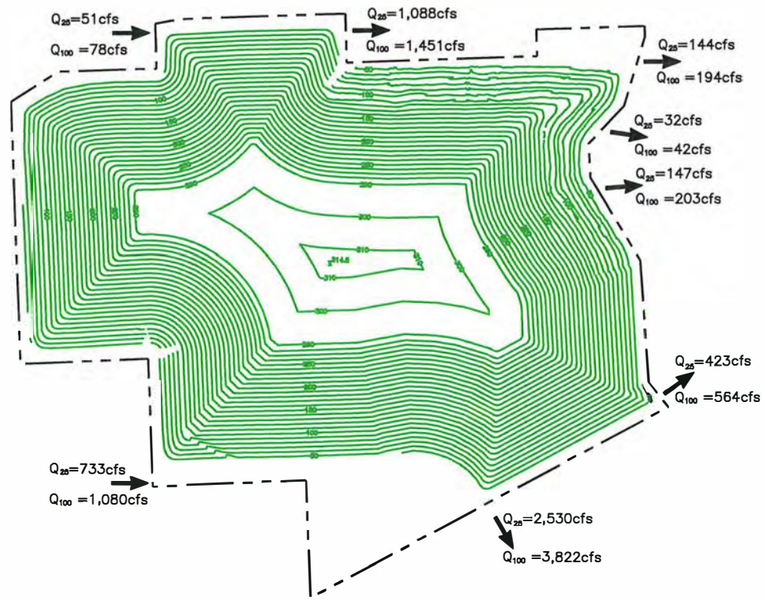
FIGURE 4.2



CURRENTLY PERMITTED CONDITION



PROPOSED FINAL CONTOUR IMPROVEMENTS

LEGEND

PERMIT BOUNDARY

100 ELEVATION OF FINAL COVER SYSTEM

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NOTES:

1. SEE ATTACHMENT 6A–A FOR POST DEVELOPMENT HYDROLOGIC INFORMATION.
2. SEE ATTACHMENT 6A–E FOR CURRENTLY PERMITTED HYDROLOGIC INFORMATION.

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REVIEWED BY: JPY

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MAJOR PERMIT AMENDMENT
SITE DRAINAGE PATTERNS

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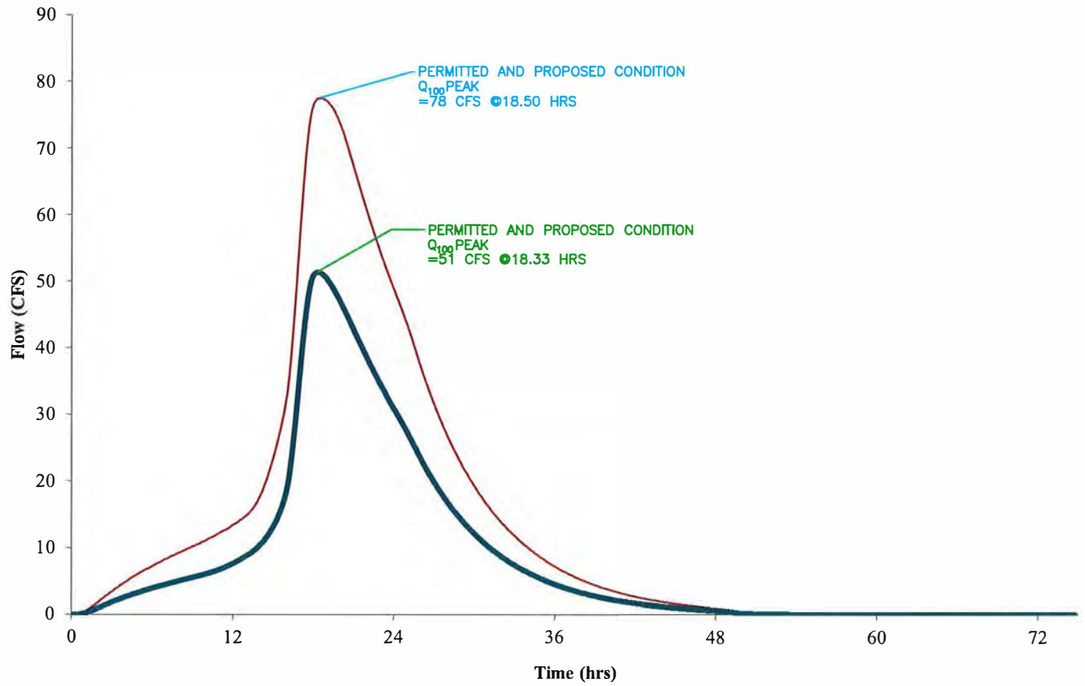
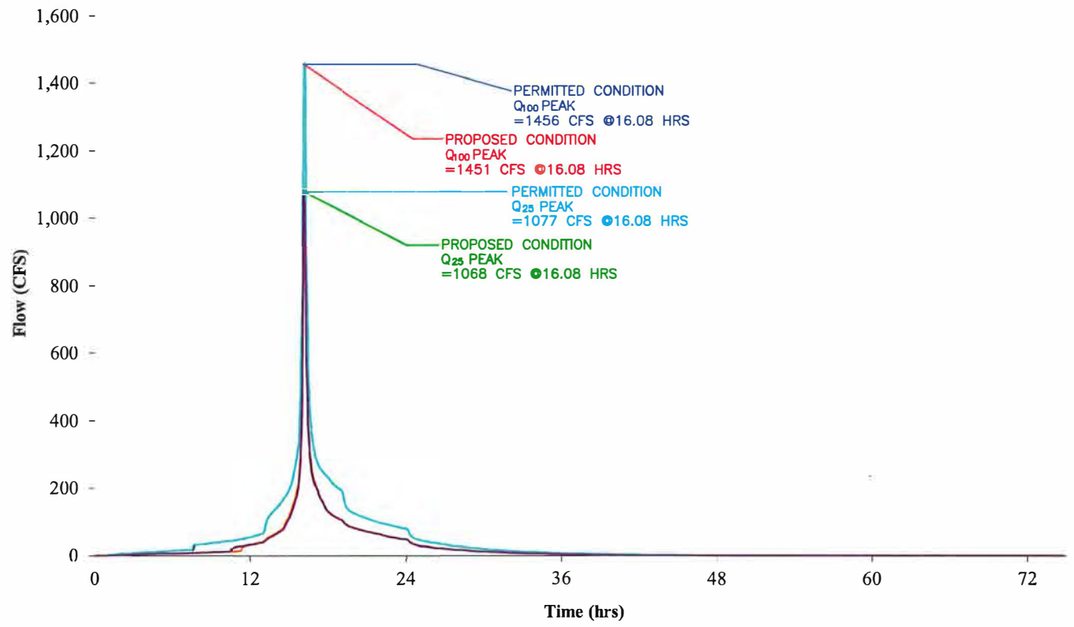
FIGURE 4.3

G:\0120\439\PLIP MOD 2024\ATT 6\FIGURES\CLEAN\FIG-4.3 PATTERNS.dwg, vguzman, 1:2

PEAK FLOW ENTERING NORTHWEST PERMIT BOUNDARY
HCFCD DITCH P116-00-00



PEAK FLOW LEAVING NORTHEAST PERMIT BOUNDARY
HCFCD DITCH P116-00-00



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0:\0120\439\FIP MOD 2024\ATT 6\FIGURES\CLEAN\FIG-4.4 PEAK.dwg, vguzman, 1:2

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CAD: FIG-4.4 PEAK.DWG
DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

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MAJOR PERMIT AMENDMENT
PEAK FLOW COMPARISON HCFCD
DITCH P116-00-00 (NORTH)

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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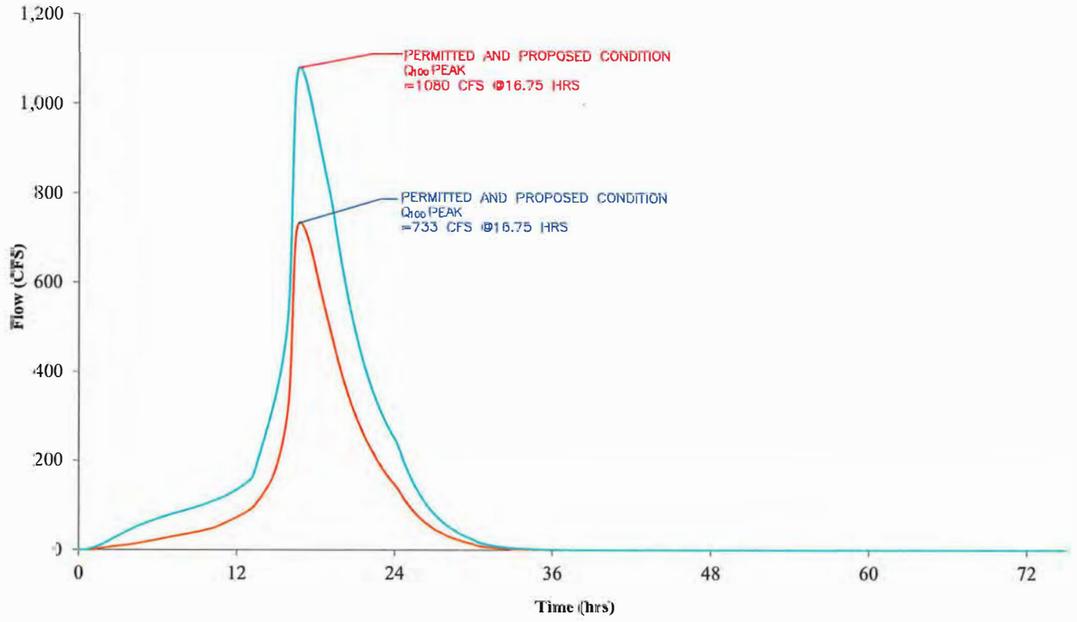
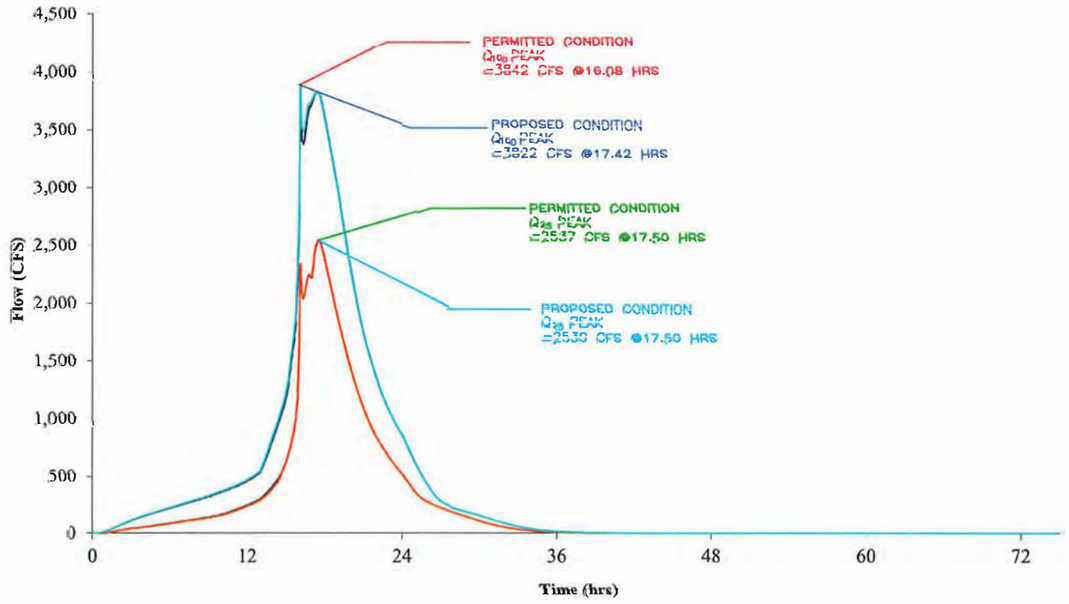
FIGURE 4.4

PEAK FLOW ENTERING SOUTHWEST PERMIT BOUNDARY
HCFCD DITCH P114-00-00



PEAK FLOW LEAVING SOUTH PERMIT BOUNDARY
HCFCD DITCH P114-00-00



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O:\0120\439\FLIP MOD 2024\ATT 6\FIGURES\CLEAN\FIG-4.5 PEAK.dwg, vguzman, 1:2

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CAD: FIG-4.5 PEAK.DWG
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DESIGN BY: SAN
REVIEWED BY: JDW

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MAJOR PERMIT AMENDMENT
PEAK FLOW COMPARISON HCFCD DITCH P114-00-00 (SOUTH)
McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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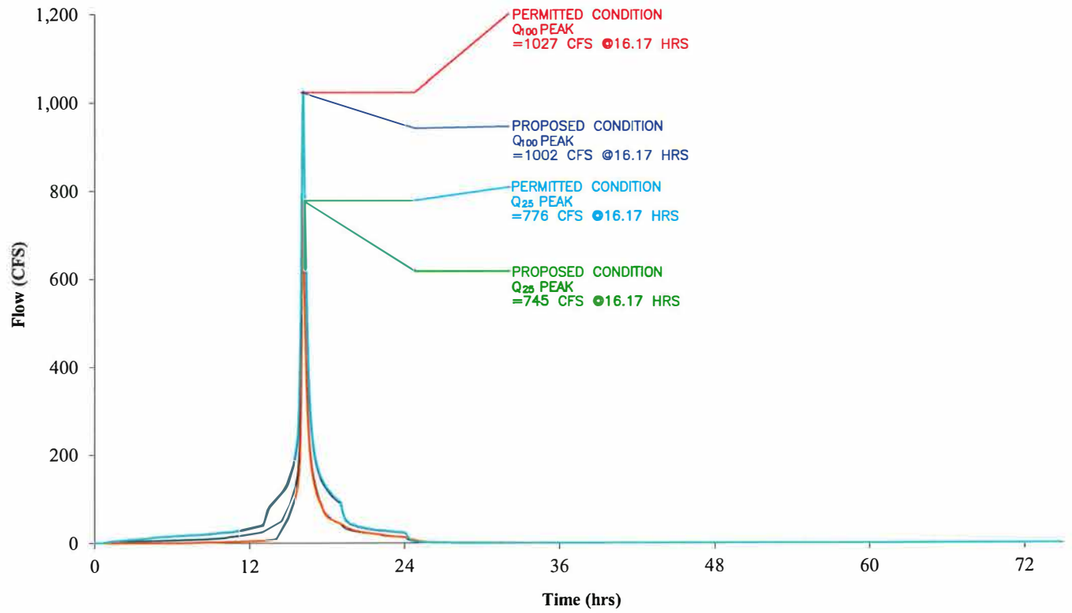
FIGURE 4.5

COMBINED FLOW INTO GREENS BAYOU (EAST)



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CAD: FIG-4.6 PEAK.DWG
DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

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MAJOR PERMIT AMENDMENT
COMBINED FLOW
INTO GREENS BAYOU (EAST)
McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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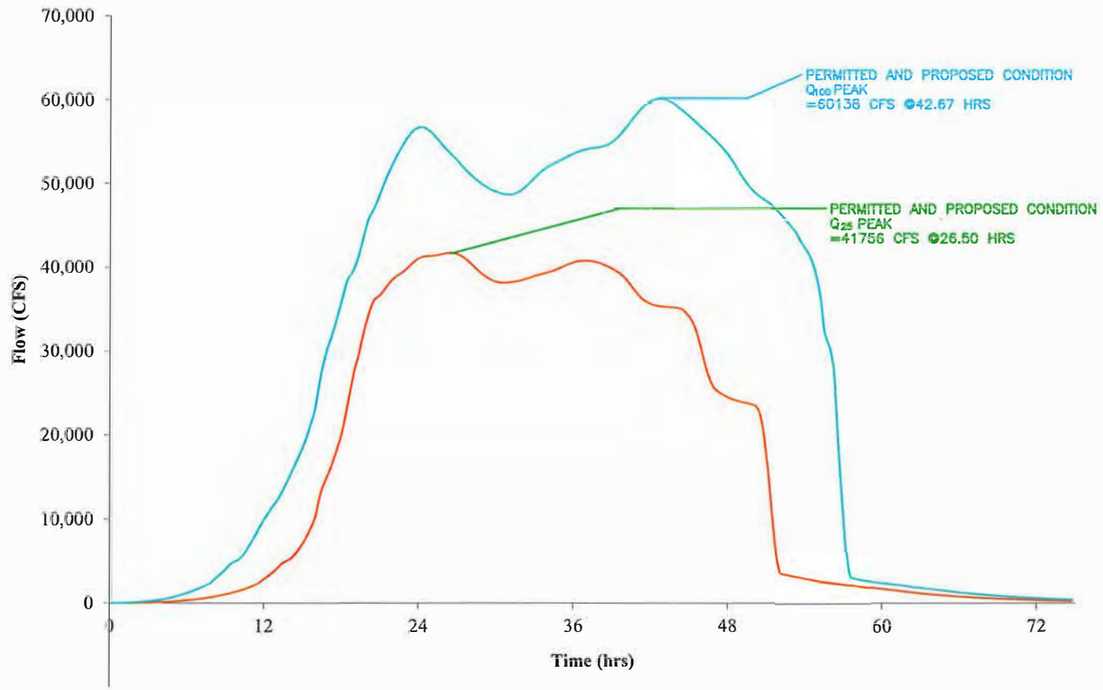
FIGURE 4.6

D:\0120\439\FIP MOD 2024\ATT 6\FIGURES\CLEAN\FIG-4.6 PEAK.dwg, vguzman, 1:2

PEAK FLOW FOR COMBINED FLOW IN GREENS BAYOU
HCFCD CHANNEL P100-00-00



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DATE: 03/2004 FILE: 0120-436-11 CAD: FIG-4.7 PEAK.DWG DRAWN BY: JDW DESIGN BY: SAN REVIEWED BY: JPY	REVISIONS NO. 1 DATE 08/2008 DESCRIPTION PERMIT MODIFICATION UPDATE 2 01/2012 PERMIT MODIFICATION 3 12/2024 PERMIT MODIFICATION	
Weaver Consultants Group TBPE REGISTRATION NO. F-3727		WWW.WCGRP.COM FIGURE 4.7

D:\0120\439\FIP MOD 2024\ATT 6\FIGURES\CLEAN\FIG-4.7 PEAK.dwg, vguzman, 1:2

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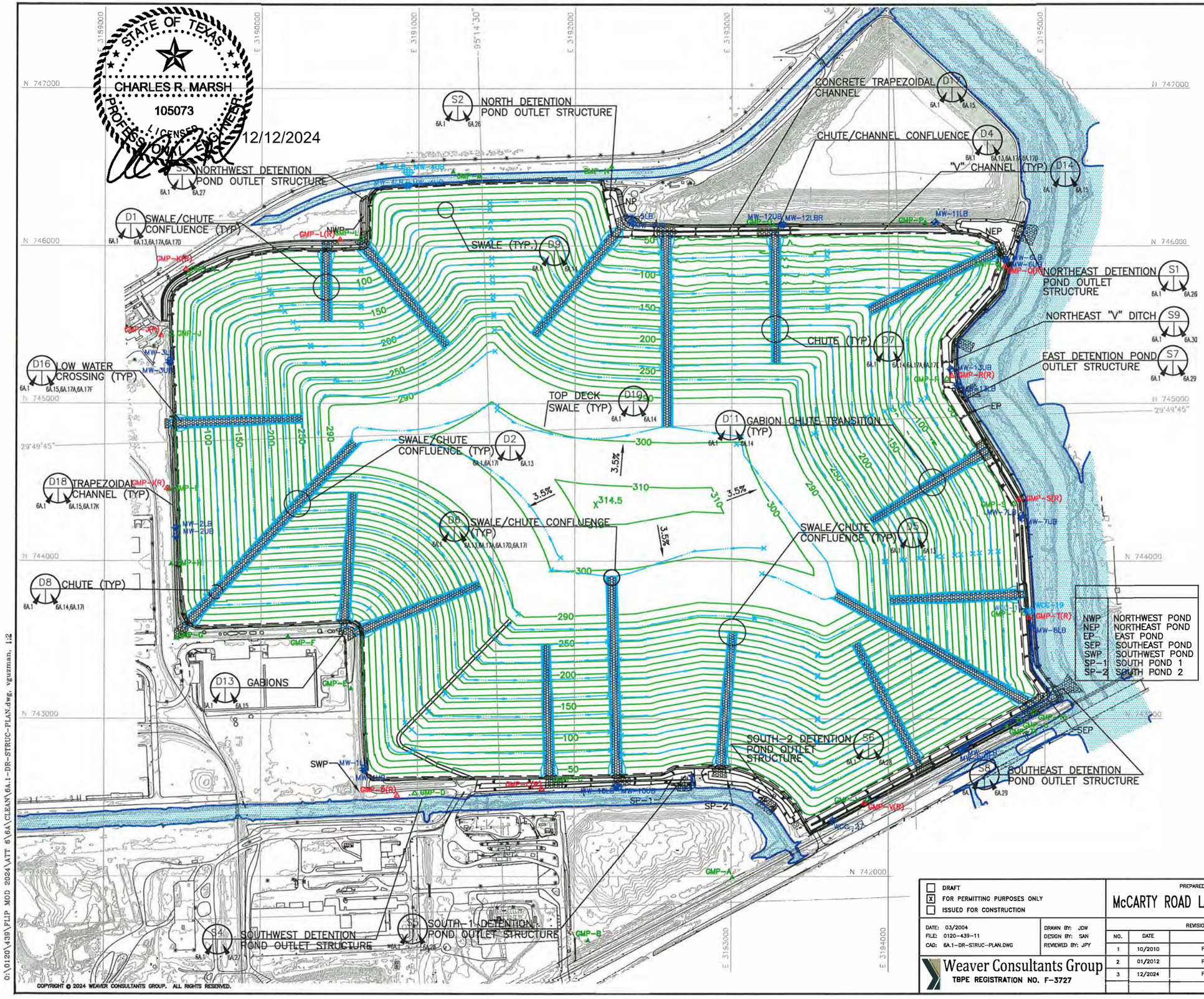

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 7)
- 200 FINAL CONTOUR
- 745000 N STATE PLANE COORDINATE SYSTEM
- 29°49'45" GEODETIC COORDINATE SYSTEM
- EXISTING GROUND CONTOUR
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN (SEE NOTE 9)
- MW-4UB EXISTING DETECTION GROUNDWATER MONITORING WELL
- MW-4UB EXISTING DETECTION GROUNDWATER MONITORING WELL TO BE DECOMMISSIONED
- MW-4UB PROPOSED DETECTION REPLACEMENT MONITORING WELL
- GMP-M EXISTING LANDFILL GAS MONITORING PROBE (SEE NOTE 8)
- GMP-J EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 8)
- GMP-J PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE (SEE NOTE 8)
- EASEMENT BOUNDARY
- GABIONS
- 100-YR FLOODPLAIN (REFER TO ATTACHMENT 6C)

N

0 300 600
SCALE IN FEET

NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 7B FOR POST DEVELOPMENT DRAINAGE INFORMATION.
4. COVER DETAILS ARE PROVIDED IN ATTACHMENT 6D-FINAL COVER DETAILS.
5. TYPICAL SIDESLOPES ARE 4H:1V, TYPICAL TOPSLOPE IS 3.5%.
6. DETENTION POND INFORMATION IS PROVIDED ON ATTACHMENTS 6A.18 THROUGH 6A.25.
7. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
8. GAS MONITORING PROBES GMP-Q, GMP-R, AND GMP-S ARE BEING DECOMMISSIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS (WBC) IN APRIL 2004. GMP-T5 AND GMP-U ARE BEING DECOMMISSIONED IN A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP-T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.
9. GABION-LINED LETDOWN DETAILS ARE INCLUDED ON ATTACHMENTS 6A.13 THROUGH 6A.17. FLEXIBLE MEMBRANE LINED (FML) LETDOWN DETAILS ARE INCLUDED ON ATTACHMENTS 6A.17A THROUGH 6A.17C. FLEXAMAT LETDOWN DETAILS ARE INCLUDED ON ATTACHMENTS 6A.17D THROUGH 6A.17H. ARTICULATED BLOCK LETDOWN DETAILS ARE INCLUDED ON ATTACHMENTS 6A.17I THROUGH 6A.17L.

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FILE: 0120-439-11
CAD: 6A.1-DR-STRUC-PLAN.DWG
DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

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PREPARED FOR
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1	10/2010	PERMIT MODIFICATION
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3	12/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT DRAINAGE STRUCTURE PLAN

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 6A.1

STATE OF TEXAS
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105073
LICENSED PROFESSIONAL ENGINEER
12/12/2024

HOUSTON PIPE LINE COMPANY EASEMENT

CITY OF HOUSTON ROAD EASEMENT

N
0 300 600
SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 4)
- 200 FINAL CONTOUR
- 745000 N STATE PLANE COORDINATE SYSTEM
- 29°49'45" GEODETIC COORDINATE SYSTEM
- EXISTING CONTOUR
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- MW-4UB EXISTING DETECTION GROUNDWATER MONITORING WELL
- MW-4UB EXISTING DETECTION GROUNDWATER MONITORING WELL TO BE DECOMMISSIONED
- MW-4UB PROPOSED DETECTION REPLACEMENT MONITORING WELL
- GMP-M EXISTING LANDFILL GAS MONITORING PROBE (SEE NOTE 5)
- GMP-J EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 5)
- GMP-J(R) PROPOSED REPLACEMENT LANDFILL GAS MONITORING ROBE (SEE NOTE 5)
- EASEMENT BOUNDARY
- GABIONS
- 100-YR FLOODPLAIN (REFER TO ATTACHMENT 6C)
- DA9 DRAINAGE AREA DESIGNATION
- DRAINAGE AREA BOUNDARY

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 7B FOR POST DEVELOPMENT DRAINAGE INFORMATION.
4. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
5. GAS MONITORING PROBES GMP-Q, GMP-R, AND GMP-S ARE BEING DECOMMISSIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS (WBC) IN APRIL 2004. GMP-T5 AND GMP-U ARE BEING DECOMMISSIONED IN A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP-T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.

O:\0120\439\FLIP MOD 2024\ATT 6\6A\CLEAN\6a.02-PRO-DR-AREAS.dwg, yguzman, 1:2

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DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
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2	12/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
DRAINAGE AREA PLAN

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 6A.2

STATE OF TEXAS
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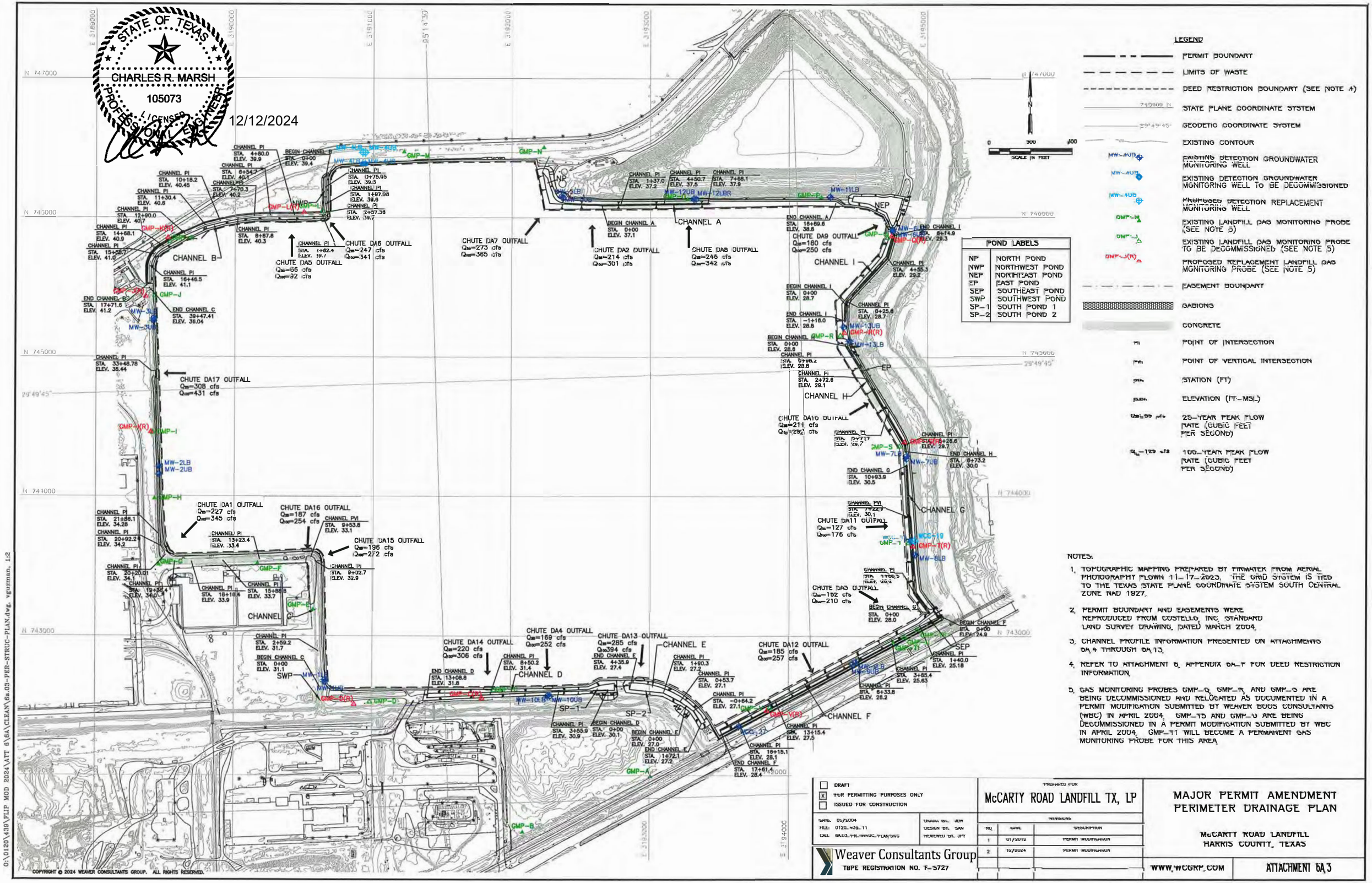
12/12/2024



POND LABELS

NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 4)
- 745000 N — STATE PLANE COORDINATE SYSTEM
- 29°49'45" — GEODETIC COORDINATE SYSTEM
- EXISTING CONTOUR
- MW-4UB — EXISTING DETECTION GROUNDWATER MONITORING WELL
- MW-4UB — EXISTING DETECTION GROUNDWATER MONITORING WELL TO BE DECOMMISSIONED
- MW-4UB — PROPOSED DETECTION REPLACEMENT MONITORING WELL
- GMP-M — EXISTING LANDFILL GAS MONITORING PROBE (SEE NOTE 5)
- GMP-J — EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 5)
- GMP-J(R) — PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE (SEE NOTE 5)
- EASEMENT BOUNDARY
- GABIONS
- CONCRETE
- PI: POINT OF INTERSECTION
- PVI: POINT OF VERTICAL INTERSECTION
- STA. STATION (FT)
- ELEV. ELEVATION (FT-MSL)
- Q25=59 cfs — 25-YEAR PEAK FLOW RATE (CUBIC FEET PER SECOND)
- Q100=129 cfs — 100-YEAR PEAK FLOW RATE (CUBIC FEET PER SECOND)

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. CHANNEL PROFILE INFORMATION PRESENTED ON ATTACHMENTS DA-4 THROUGH DA-13.
4. REFER TO ATTACHMENT B, APPENDIX DA-F FOR DEED RESTRICTION INFORMATION.
5. GAS MONITORING PROBES GMP-Q, GMP-R, AND GMP-S ARE BEING DECOMMISSIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS (WBC) IN APRIL 2004. GMP-T5 AND GMP-U ARE BEING DECOMMISSIONED IN A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP-T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA.

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DATE: 05/2004
FILE: 0120.439.11
CAD: GAO3-PR-STRUC-PLAN.DWG
DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPT

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	01/2012	PERMIT MODIFICATION
2	12/2024	PERMIT MODIFICATION

Weaver Consultants Group
TBPE REGISTRATION NO. F-5727

MAJOR PERMIT AMENDMENT PERIMETER DRAINAGE PLAN

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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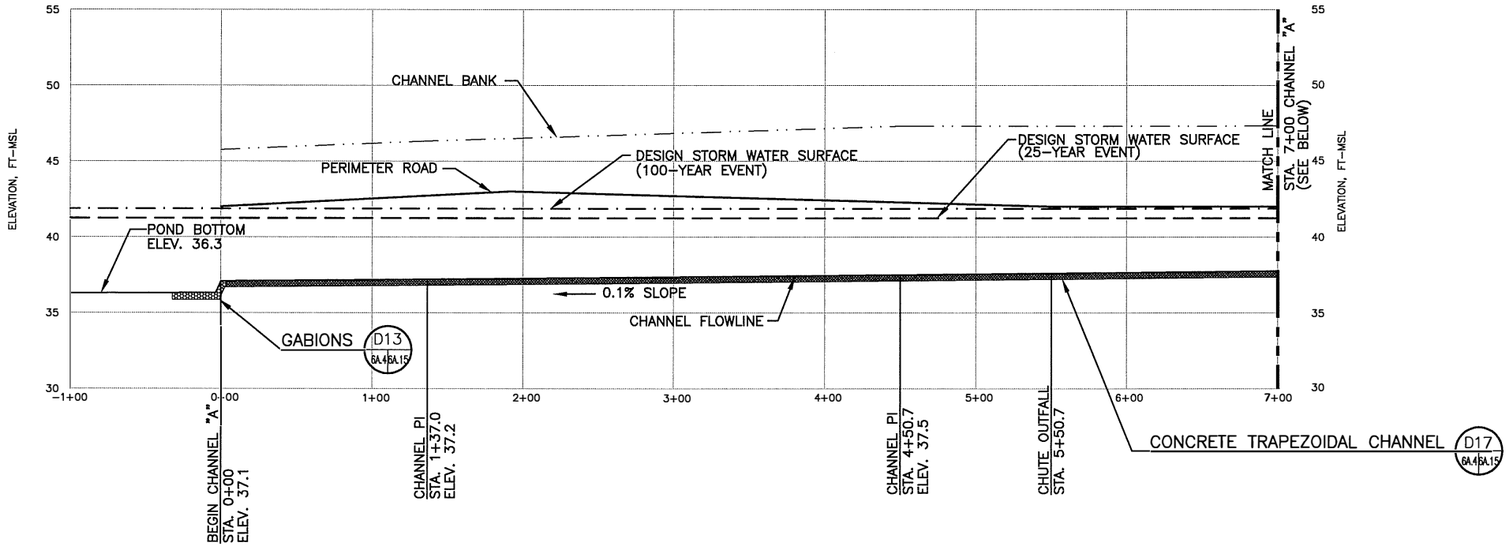
ATTACHMENT DA.3

0A\0120\439\FLIP MOD 2024\ATT B\DA\CLEAN\da.03-PER-STRUC-PLAN.dwg, vguzman, 1:2



CHANNEL "A" PA 6A.3 6A.4

0 50 100 SCALE IN FEET — HORIZONTAL

0 5 10 SCALE IN FEET — VERTICAL

25-YEAR CHANNEL "A" INFORMATION

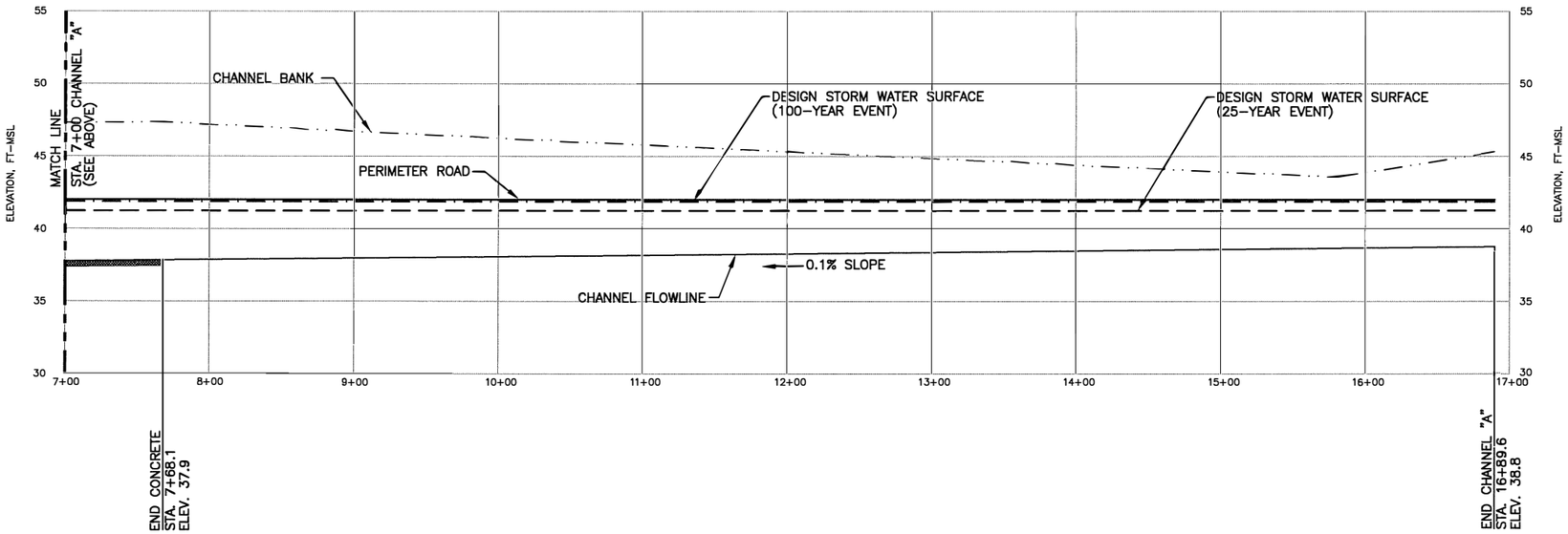
CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+37	12	315	0.1	2.99	5.02
1+37	4+50.7	12	315	0.1	2.99	5.02
4+50.7	7+68.1	12	315	0.1	2.99	5.02
7+68.1	16+89.6	0	34	0.1	2.82	1.43

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "A" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+37	12	432	0.1	3.50	5.47
1+37	4+50.7	12	432	0.1	3.50	5.47
4+50.7	7+68.1	12	432	0.1	3.50	5.47
7+68.1	16+89.6	0	48	0.1	3.21	1.55

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.



CHANNEL "A" PA 6A.3 6A.4

0 50 100 SCALE IN FEET — HORIZONTAL

0 5 10 SCALE IN FEET — VERTICAL

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED PROFESSIONAL ENGINEER
12/12/2024

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DATE: 03/2004
FILE: 0120-439-11
CAD: 6A.04-PROA.DWG
DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS NO.	DATE	DESCRIPTION
1	01/2012	PERMIT MODIFICATION
2	12/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
PERIMETER CHANNEL "A" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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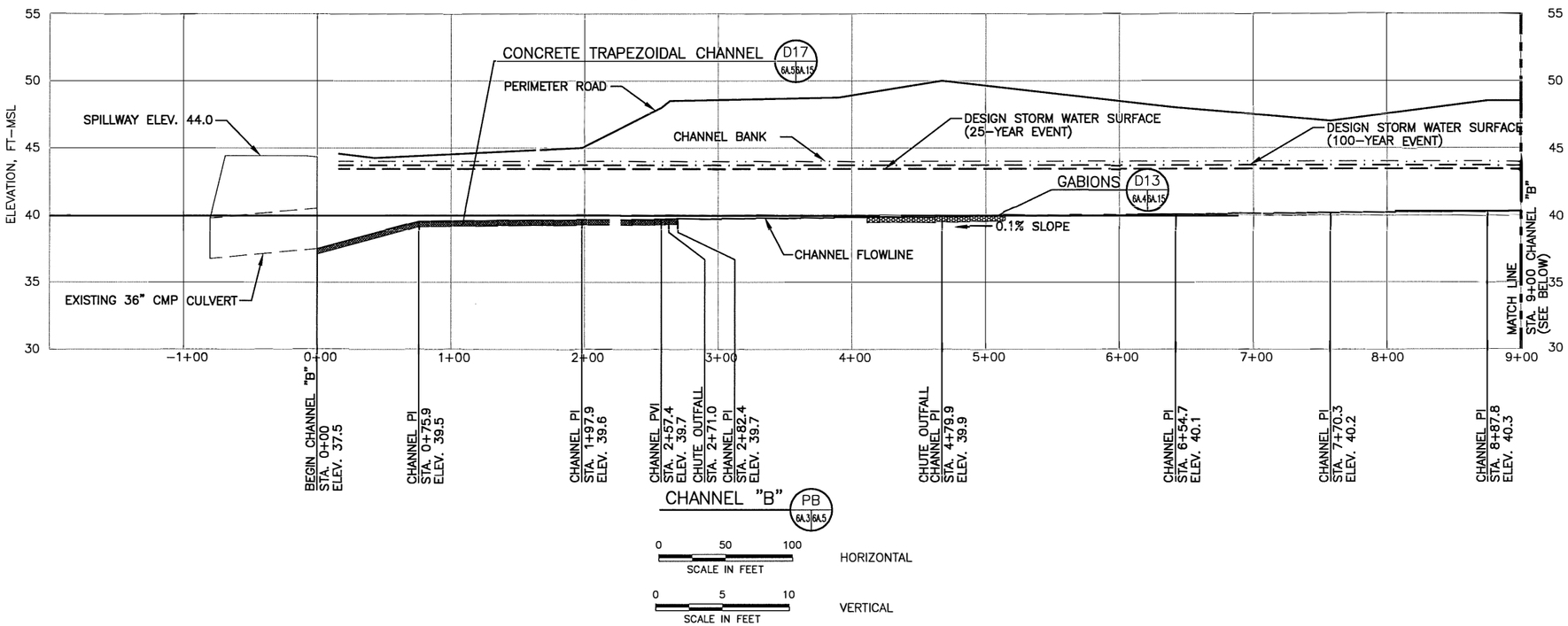
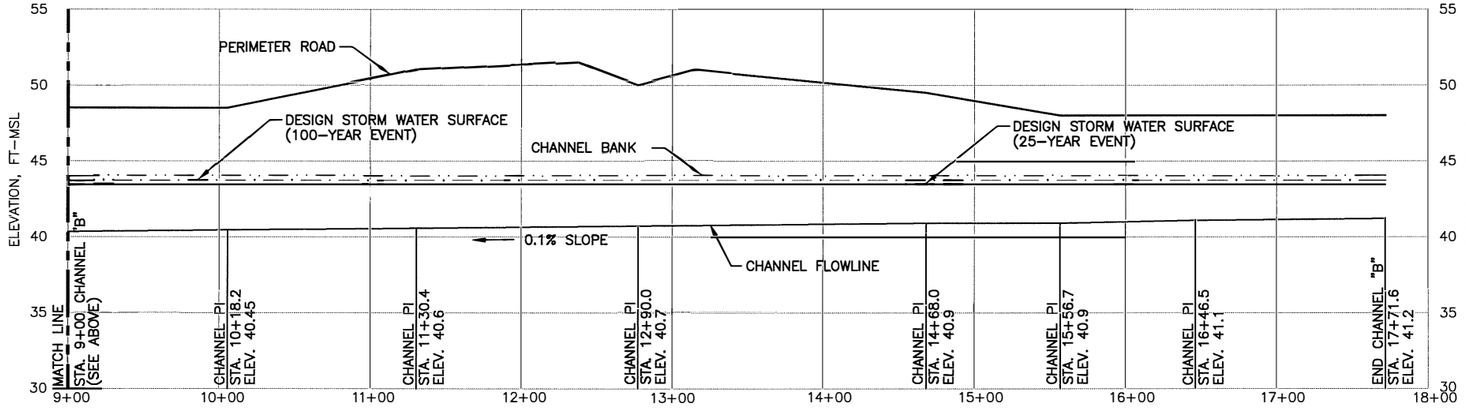
ATTACHMENT 6A.4





25-YEAR CHANNEL "B" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+75.9	25	378	0.1	2.49	5.07
0+75.9	1+97.9	25	378	0.1	2.49	5.07
1+97.9	2+57.4	25	378	0.1	2.49	5.07
2+57.4	2+82.4	25	113	0.1	1.23	3.35
2+82.4	4+79.9	25	113	0.1	2.18	1.76
4+79.9	6+54.7	25	37	0.1	1.13	1.20
6+54.7	7+70.3	25	37	0.1	1.13	1.20
7+70.3	8+87.8	25	37	0.1	1.13	1.20
8+87.8	10+18.2	25	37	0.1	1.13	1.20
10+18.2	11+30.4	25	37	0.1	1.13	1.20
11+30.4	12+90.0	25	37	0.1	1.13	1.20
12+90.0	14+68.0	25	37	0.1	1.13	1.20
14+68.0	15+56.7	25	37	0.1	1.13	1.20
15+56.7	16+46.5	25	37	0.1	1.13	1.20
16+46.5	17+71.6	25	37	0.1	1.13	1.20

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "B" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+75.9	25	525	0.1	3.00	5.65
0+75.9	1+97.9	25	525	0.1	3.00	5.65
1+97.9	2+57.4	25	525	0.1	3.00	5.65
2+57.4	2+82.4	25	159	0.1	1.50	3.78
2+82.4	4+79.9	25	159	0.1	2.66	1.98
4+79.9	6+54.7	25	54	0.1	1.42	1.37
6+54.7	7+70.3	25	54	0.1	1.42	1.37
7+70.3	8+87.8	25	54	0.1	1.42	1.37
8+87.8	10+18.2	25	54	0.1	1.42	1.37
10+18.2	11+30.4	25	54	0.1	1.42	1.37
11+30.4	12+90.0	25	54	0.1	1.42	1.37
12+90.0	14+68.0	25	54	0.1	1.42	1.37
14+68.0	15+56.7	25	54	0.1	1.42	1.37
15+56.7	16+46.5	25	54	0.1	1.42	1.37
16+46.5	17+71.6	25	54	0.1	1.42	1.37

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED PROFESSIONAL ENGINEER
12/12/2024

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DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS NO.	DATE	DESCRIPTION
1	01/2012	PERMIT MODIFICATION
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MAJOR PERMIT AMENDMENT
PERIMETER CHANNEL "B" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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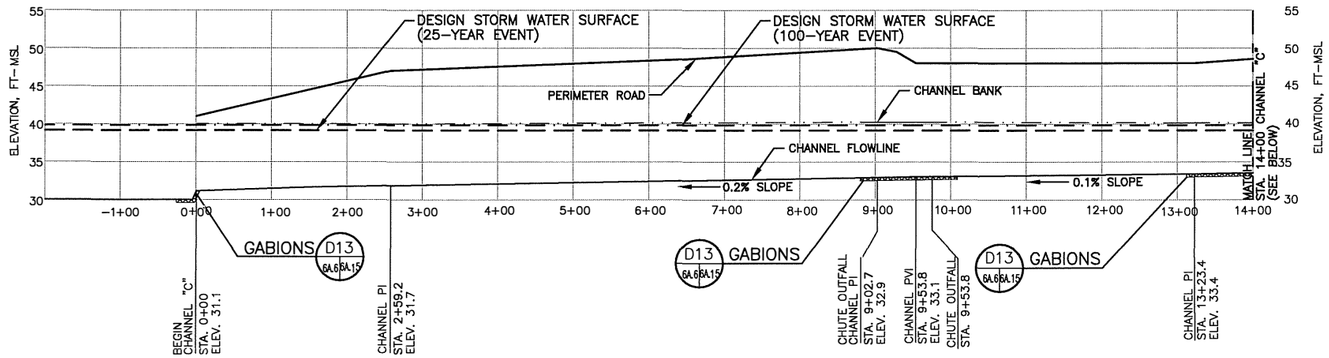
ATTACHMENT 6A.5



CHANNEL "C" PC 6A.3&A.6

0 100 200 SCALE IN FEET — HORIZONTAL

0 10 20 SCALE IN FEET — VERTICAL

25-YEAR CHANNEL "C" INFORMATION

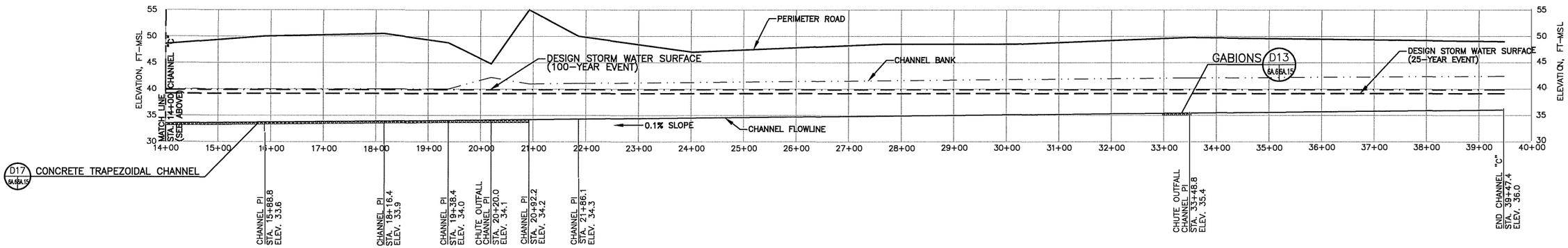
CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	2+59.2	25	1090	0.2	6.38	4.53
2+59.2	9+02.7	25	1090	0.2	6.38	4.53
9+02.7	9+53.8	25	1090	0.2	6.38	4.53
9+53.8	13+23.4	25	654	0.1	5.84	3.05
13+23.4	15+88.8	15	654	0.1	4.29	6.46
15+88.8	18+16.4	15	654	0.1	4.29	6.46
18+16.4	19+38.4	15	654	0.1	4.29	6.46
19+38.4	20+20.0	15	654	0.1	4.29	6.46
20+20.0	20+92.2	15	375	0.1	5.35	2.72
20+92.2	21+86.1	15	375	0.1	5.35	2.72
21+86.1	33+48.8	15	375	0.1	5.35	2.72
33+48.8	39+47.8	15	29	0.1	1.31	1.26

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "C" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	2+59.2	25	1551	0.2	7.68	5.00
2+59.2	9+02.7	25	1551	0.2	7.68	5.00
9+02.7	9+53.8	25	1551	0.2	7.68	5.00
9+53.8	13+23.4	25	949	0.1	7.12	3.40
13+23.4	15+88.8	15	949	0.1	5.21	7.16
15+88.8	18+16.4	15	949	0.1	5.21	7.16
18+16.4	19+38.4	15	949	0.1	5.21	7.16
19+38.4	20+20.0	15	949	0.1	5.21	7.16
20+20.0	20+92.2	15	531	0.1	6.38	2.99
20+92.2	21+86.1	15	531	0.1	6.38	2.99
21+86.1	33+48.8	15	531	0.1	6.38	2.99
33+48.8	39+47.4	15	36	0.1	1.91	1.56

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.



CHANNEL "C" PC 6A.3&A.6

0 100 200 SCALE IN FEET — HORIZONTAL

0 10 20 SCALE IN FEET — VERTICAL

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER

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DESIGN BY: SAN
REVIEWED BY: JPY

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TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
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MAJOR PERMIT AMENDMENT
PERIMETER CHANNEL "C" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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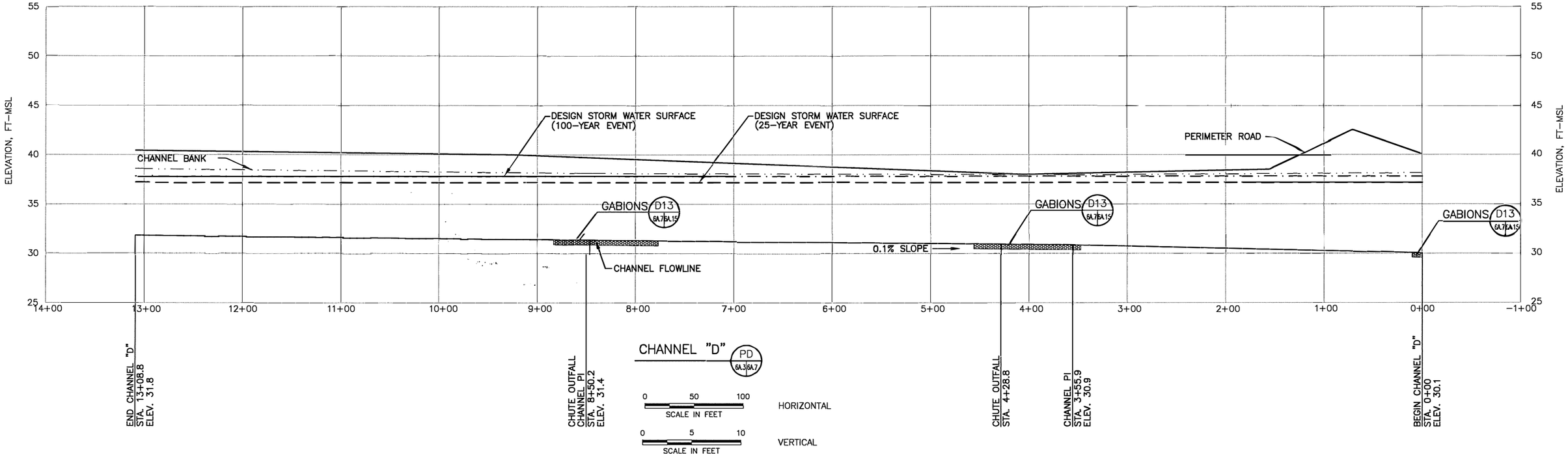
ATTACHMENT 6A.6



25-YEAR CHANNEL "D" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	3+55.9	15	452	0.1	5.41	2.67
3+55.9	8+50.2	10	265	0.1	4.68	2.36
8+50.2	13+08.8	15	29	0.1	1.28	1.21

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "D" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	3+55.9	15	649	0.1	6.43	2.94
3+55.9	8+50.2	10	371	0.1	5.47	2.57
8+50.2	13+08.8	15	40	0.1	1.53	1.34

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. THE PEAK WATER SURFACE ELEVATION FOR PILOT CHANNEL "D" WAS TAKEN FROM THE PROPOSED HEC-1 ANALYSIS FOR SOUTH POND-2 IN ATTACHMENT 6A-B.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

STATE OF TEXAS
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12/12/2024

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DESIGN BY: SAN
REVIEWED BY: JPY

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REVISIONS		
NO.	DATE	DESCRIPTION
1	12/2024	PERMIT MODIFICATION

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MAJOR PERMIT AMENDMENT
PERIMETER CHANNEL "D" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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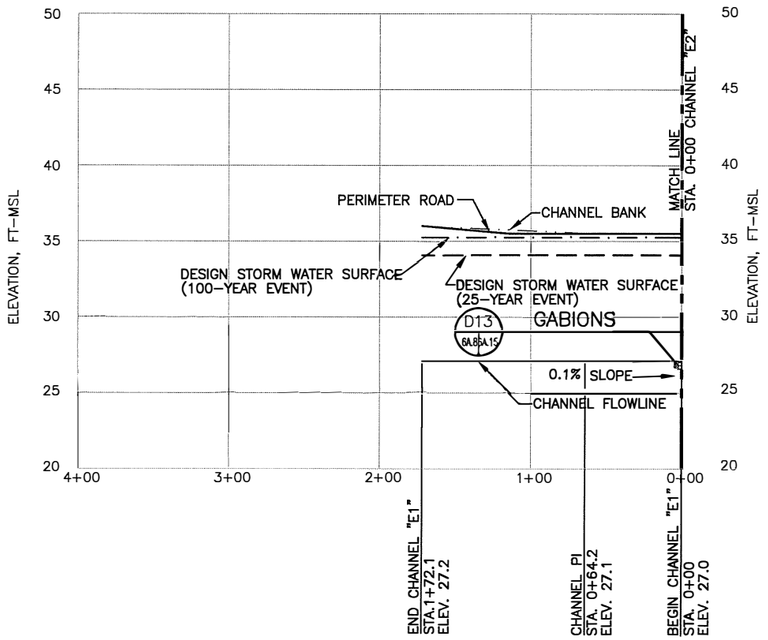
ATTACHMENT 6A.7



CHANNEL "E1" PE1 6A.3&6A.8

0 50 100
SCALE IN FEET
HORIZONTAL

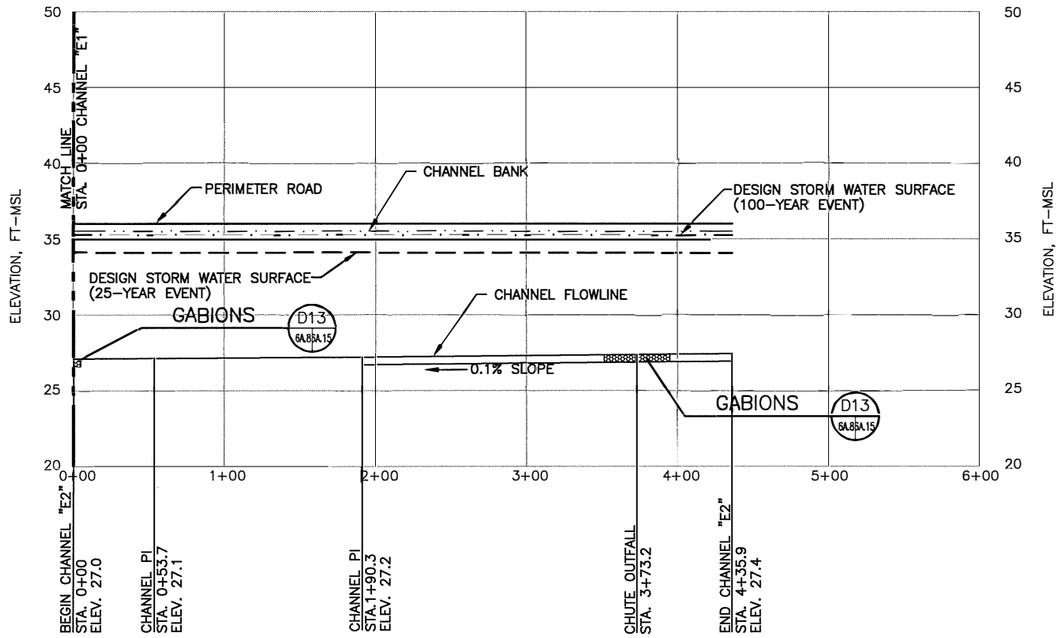
0 5 10
SCALE IN FEET
VERTICAL

25-YEAR CHANNEL "E1" INFORMATION						
CHANNEL STATION		BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
FROM	TO					
0+00	0+64.2	25	26	0.1	0.91	1.03
0+64.2	1+72.1	30	26	0.1	0.82	0.98

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "E1" INFORMATION						
CHANNEL STATION		BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
FROM	TO					
0+00	0+64.2	25	37	0.1	1.12	1.17
0+64.2	1+72.1	30	37	0.1	1.01	1.11

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.



CHANNEL "E2" PE2 6A.3&6A.8

0 50 100
SCALE IN FEET
HORIZONTAL

0 5 10
SCALE IN FEET
VERTICAL

25-YEAR CHANNEL "E2" INFORMATION						
CHANNEL STATION		BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
FROM	TO					
0+00	0+53.6	25	318	0.1	3.76	2.33
0+53.6	1+90.3	35	318	0.1	3.21	2.22
1+90.3	4+35.9	45	318	0.1	2.82	2.11

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "E2" INFORMATION						
CHANNEL STATION		BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
FROM	TO					
0+00	0+53.6	25	442	0.1	4.48	2.57
0+53.6	1+90.3	35	442	0.1	3.86	2.46
1+90.3	4+35.9	45	442	0.1	3.41	2.35

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

12/12/2024

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

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DATE: 03/2004
FILE: 0120-439-11
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DRAWN BY: JOW
DESIGN BY: SAN
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	12/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
PERIMETER CHANNEL "E" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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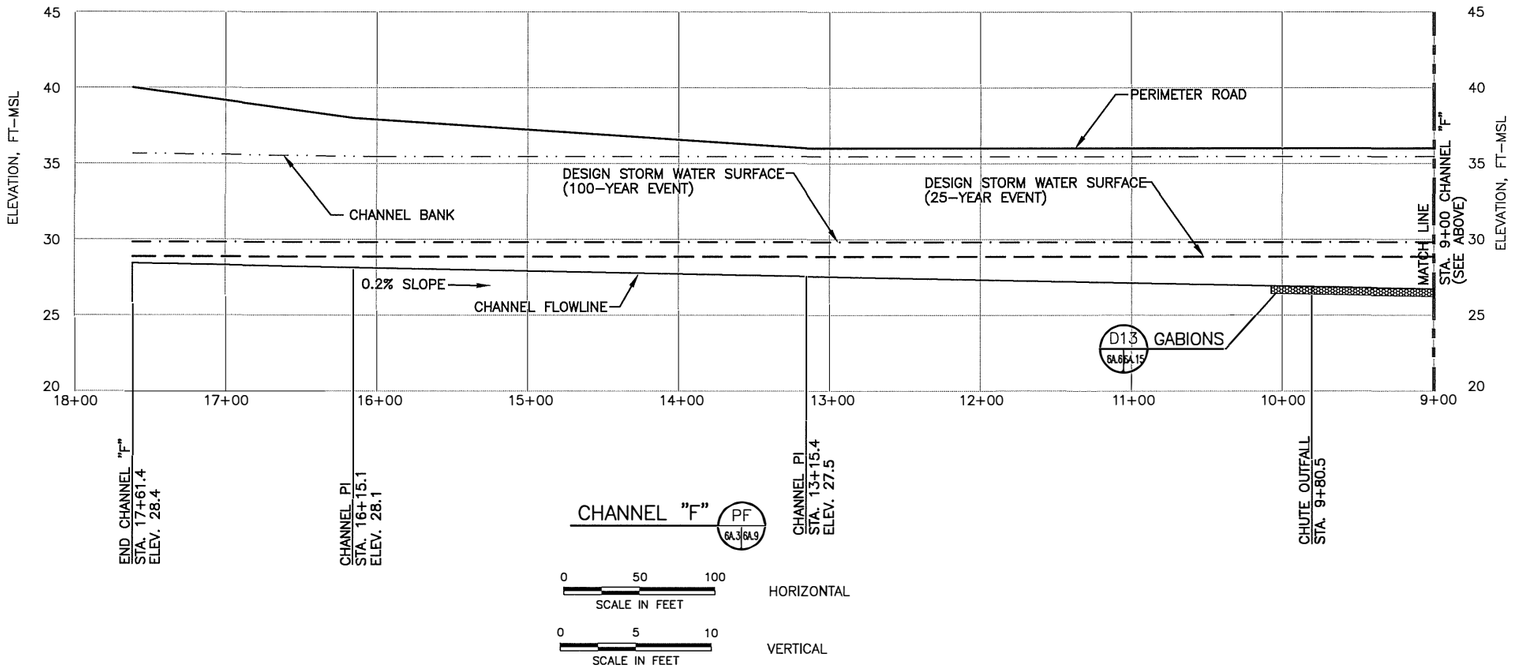
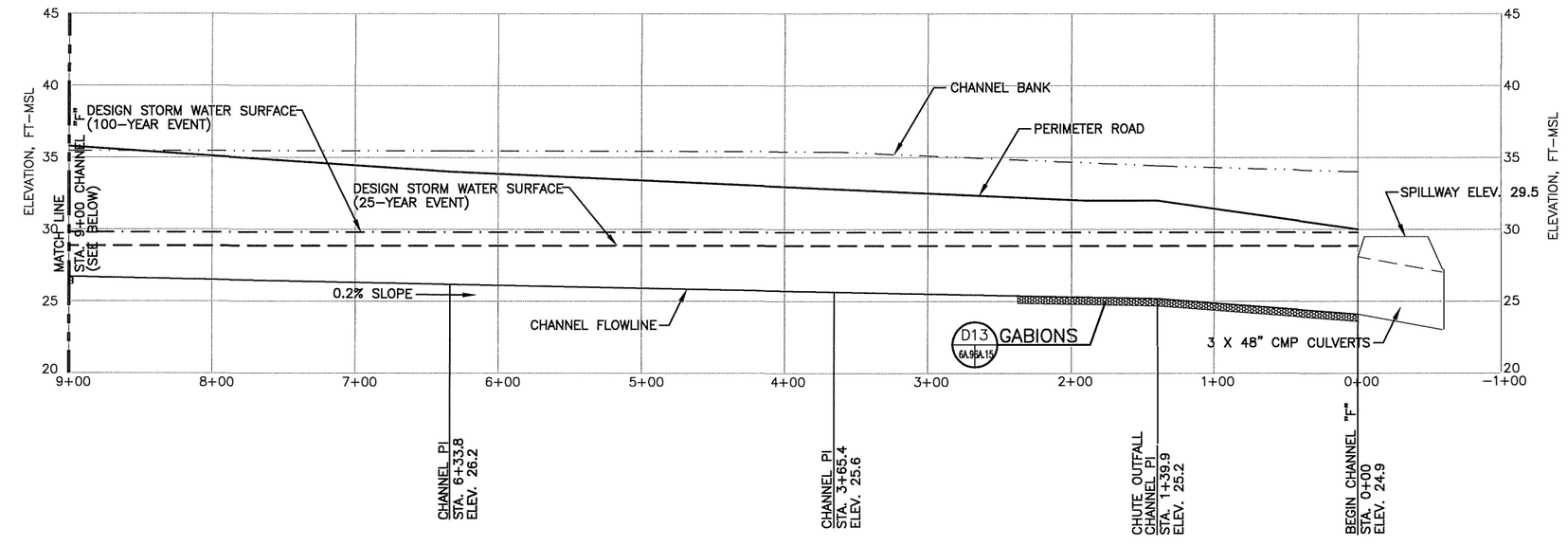
ATTACHMENT 6A.8

O:\0120\439\FIP MOD 2024\ATT 6\6A\CLEAN\6A.08-PROF.dwg, vguzman, 1:200





STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER

12/12/2024

25-YEAR CHANNEL "F" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+39.9	35	594	0.2	3.81	3.50
1+39.9	3+65.4	20	221	0.2	2.88	2.82
3+65.4	6+33.8	15	221	0.2	3.27	2.91
6+33.8	13+15.4	15	35	0.2	1.18	1.65
13+15.4	16+15.1	12	35	0.2	1.32	1.73
16+15.1	17+61.4	12	35	0.2	1.32	1.73

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "F" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+39.9	35	817	0.2	4.56	3.86
1+39.9	3+65.4	20	817	0.2	5.78	4.11
3+65.4	6+33.8	15	817	0.2	6.35	3.20
6+33.8	13+15.4	15	50	0.2	1.45	1.85
13+15.4	16+15.1	12	50	0.2	1.62	1.93
16+15.1	17+61.4	12	50	0.2	1.62	1.93

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

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DESIGN BY: SAN
REVIEWED BY: JPY

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS NO.	DATE	DESCRIPTION
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Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

MAJOR PERMIT AMENDMENT
PERIMETER CHANNEL "F" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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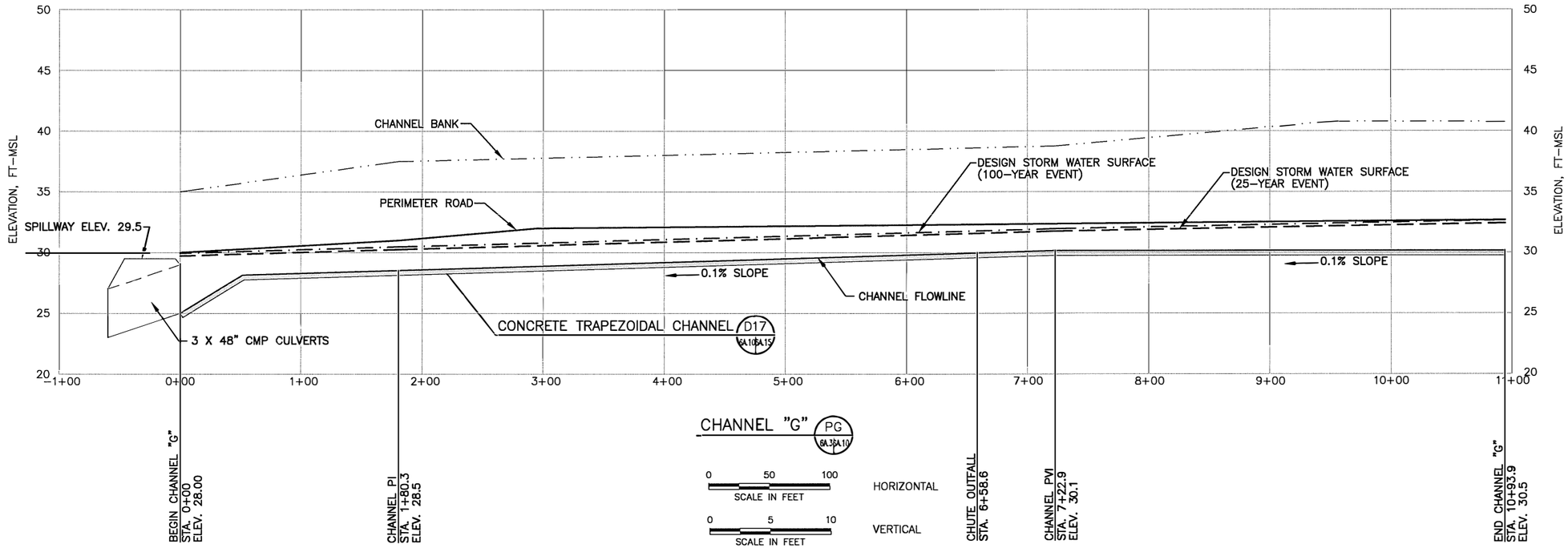
ATTACHMENT 6A.9



25-YEAR CHANNEL "G" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+80.3	12	179	0.1	2.23	4.28
1+80.3	7+22.9	12	179	0.1	2.23	4.28
7+22.9	10+93.9	0	33	0.1	1.93	2.96

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "G" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+80.3	12	246	0.1	2.64	4.69
1+80.3	7+22.9	12	246	0.1	2.64	4.69
7+22.9	10+93.9	0	246	0.1	4.10	4.88

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

STATE OF TEXAS
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105073
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PROFESSIONAL ENGINEER
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TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

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PERIMETER CHANNEL "G" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 6A.10

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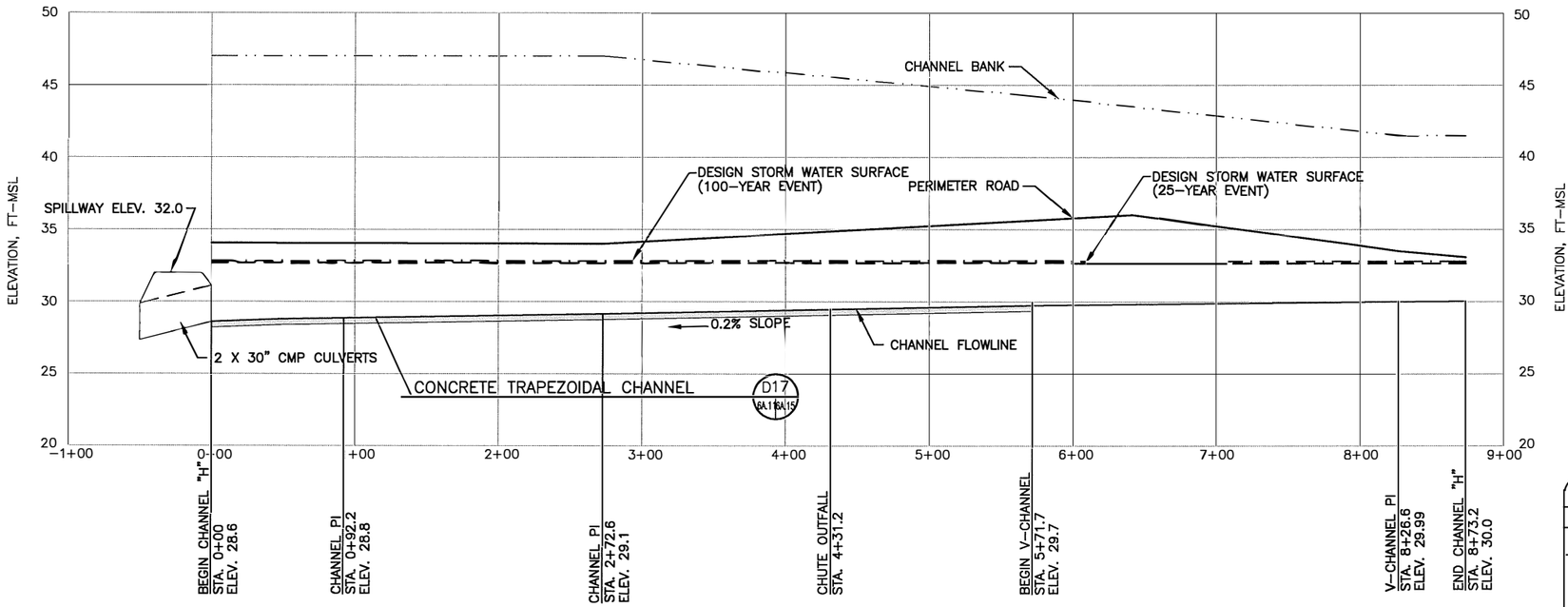

CHANNEL "H" PH 6A.3&A.11

0 50 100
SCALE IN FEET
HORIZONTAL

0 5 10
SCALE IN FEET
VERTICAL

STATE OF TEXAS
CHARLES R. MARSH
105073
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12/12/2024

25-YEAR CHANNEL "H" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+48.6	12	270	0.2	2.31	6.17
0+48.6	2+72.9	12	270	0.2	2.31	6.17
2+72.9	5+71.7	12	270	0.2	2.31	6.17
5+71.7	8+26.6	0	25	0.2	2.21	1.71
8+26.6	8+73.2	0	25	0.2	2.21	1.71

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "H" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+48.6	12	374	0.2	2.74	6.76
0+48.6	2+72.6	12	374	0.2	2.74	6.76
2+72.6	5+71.7	12	374	0.2	2.74	6.76
5+71.7	8+26.6	0	35	0.2	2.50	1.86
8+26.6	8+73.2	0	35	0.2	2.50	1.86

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

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PERIMETER CHANNEL "H" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 6A.11

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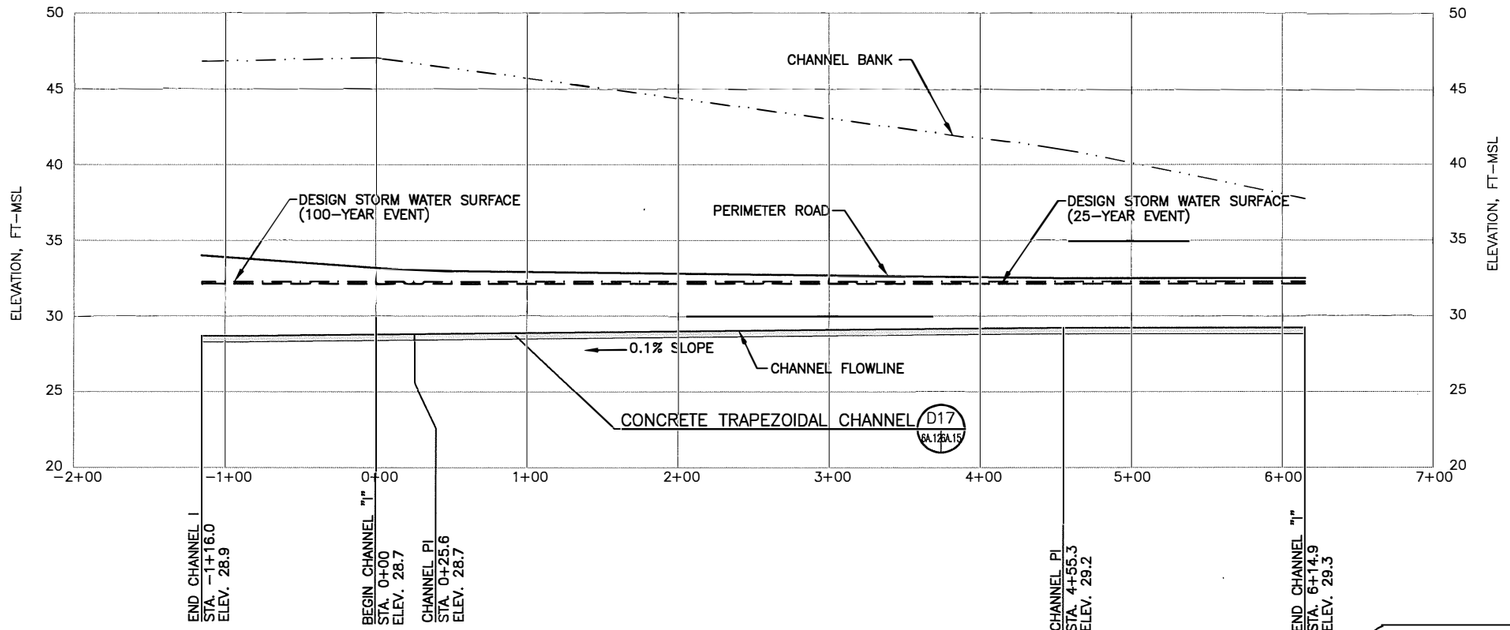

CHANNEL "I" PI 6A.3 6A.12

0 50 100
SCALE IN FEET
HORIZONTAL

0 5 10
SCALE IN FEET
VERTICAL

25–YEAR CHANNEL "I" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW 25–YEAR (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
–1+16.0	0+00	0	41	0.1	2.09	3.12
0+00	0+25.6	0	41	0.1	2.09	3.12
0+25.6	4+55.3	0	41	0.1	2.09	3.12
4+55.3	6+14.9	0	41	0.1	2.09	3.12

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100–YEAR CHANNEL "I" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW 25–YEAR (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
–1+16.0	0+00	0	50	0.1	2.26	3.28
0+00	0+25.6	0	50	0.1	2.26	3.28
0+25.6	4+55.3	0	50	0.1	2.26	3.28
4+55.3	6+14.9	0	50	0.1	2.26	3.28

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A–B.

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER
12/12/2024

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MAJOR PERMIT AMENDMENT
PERIMETER CHANNEL "I" PROFILE

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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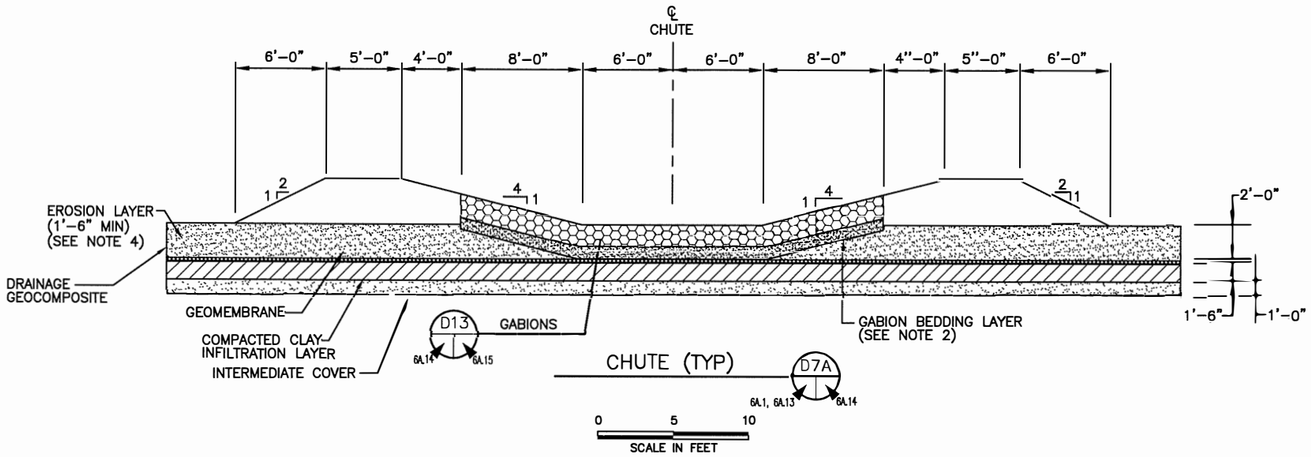
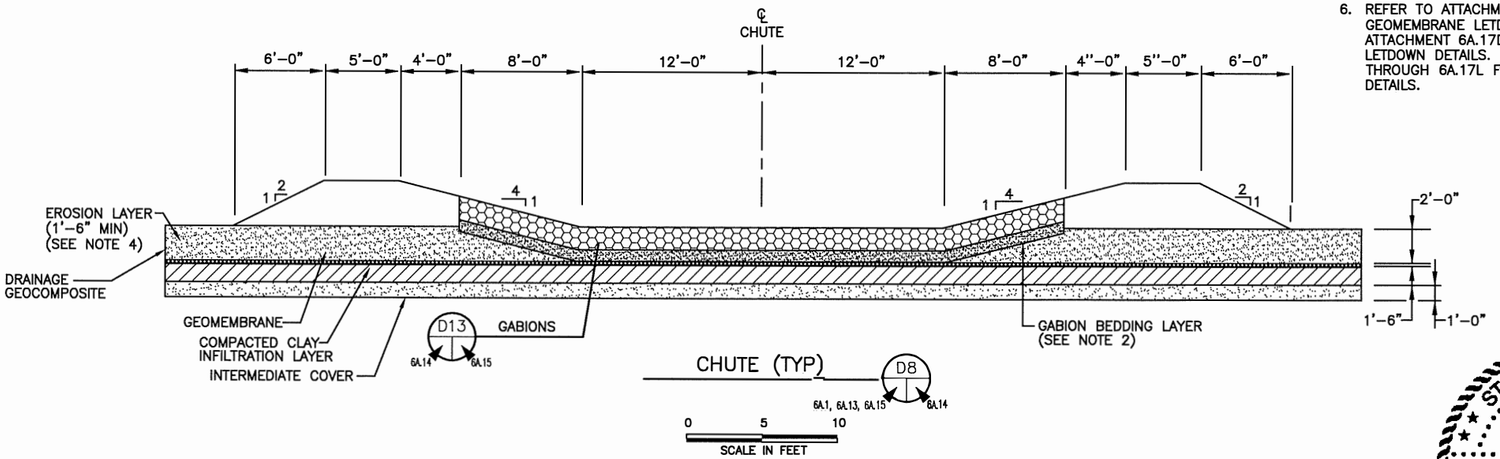
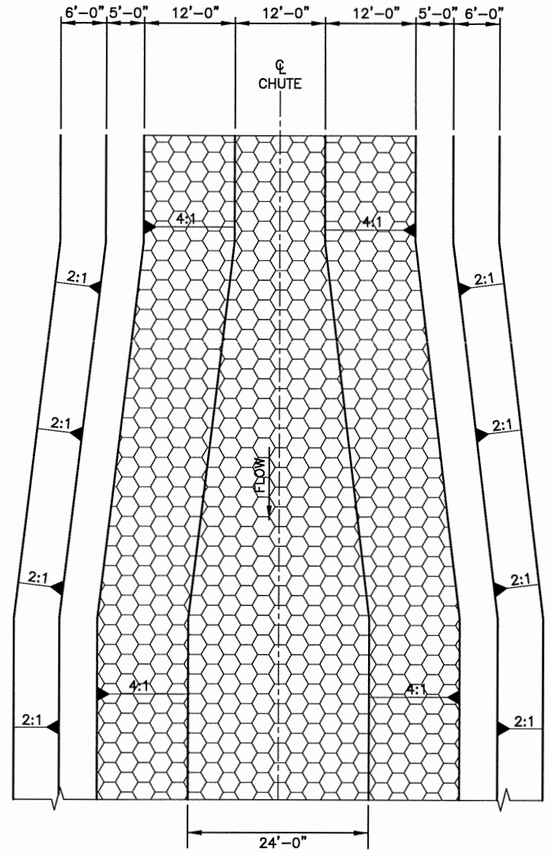
ATTACHMENT 6A.12





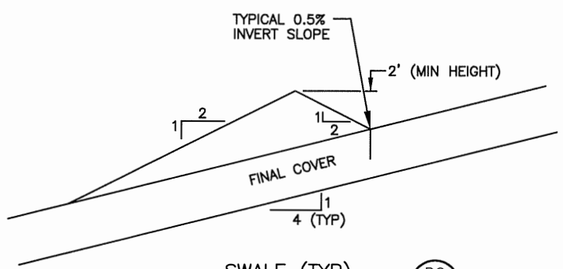
NOTES:

1. REFER TO ATTACHMENT 6A.1–DRAINAGE STRUCTURE PLAN FOR LOCATION OF DETAILS.
2. BEDDING MATERIAL WILL CONSIST OF A SW OR SP MATERIAL AS DEFINED BY UNIFIED SOIL CLASSIFICATION SYSTEM. (USCS).
3. BOTTOM WIDTH OF CHUTES WILL VARY PER ENERGY DISSIPATOR CALCULATIONS (SEE APPENDIX 6A–C).
4. TOP 6 INCHES OF EROSION LAYER WILL BE CAPABLE OF SUSTAINING VEGETATIVE GROWTH.
5. DETAILS ARE SHOWN WITH SUBTITLE–D FINAL COVER CONFIGURATION.
6. REFER TO ATTACHMENT 6A.17A THROUGH 6A.17C FOR GEOMEMBRANE LETDOWN DETAILS. REFER TO ATTACHMENT 6A.17D THROUGH 6A.17H FOR FLEXAMAT LETDOWN DETAILS. REFER TO ATTACHMENT 6A.17I THROUGH 6A.17L FOR ARTICULATED BLOCK LETDOWN DETAILS.



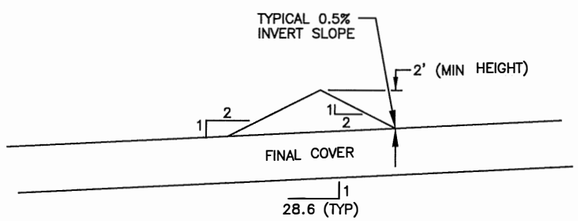
GABION CHUTE TRANSITION (TYP) D11 6A.1 6A.14

0 10 20
SCALE IN FEET



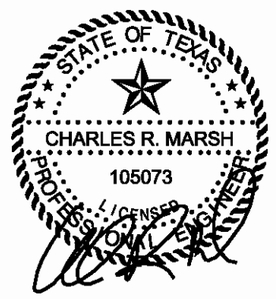
SWALE (TYP) D9 6A.1, 6A.13 6A.14

0 3 6
SCALE IN FEET



TOP DECK SWALE (TYP) D10 6A.1, 6A.13 6A.10

0 3 6
SCALE IN FEET



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2	01/2012	PERMIT MODIFICATION
3	12/2024	PERMIT MODIFICATION

DRAINAGE DETAILS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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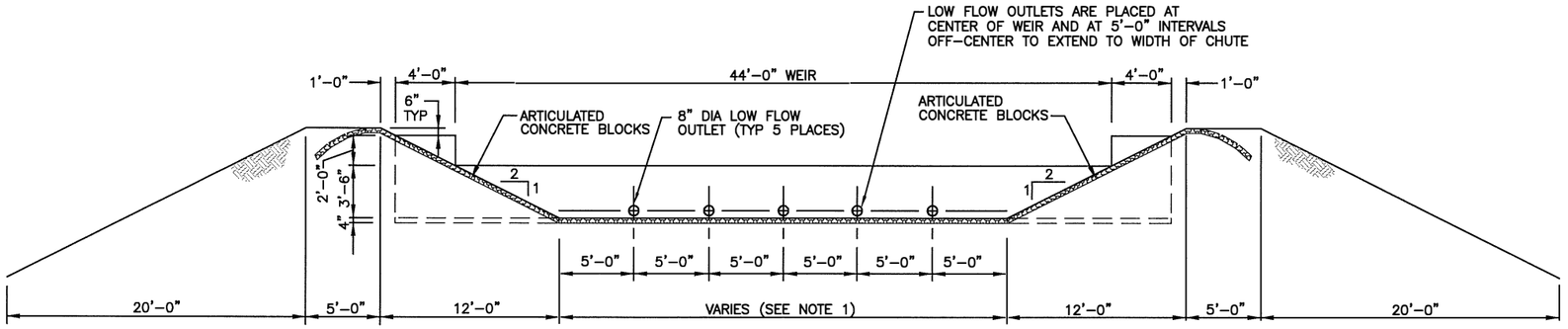
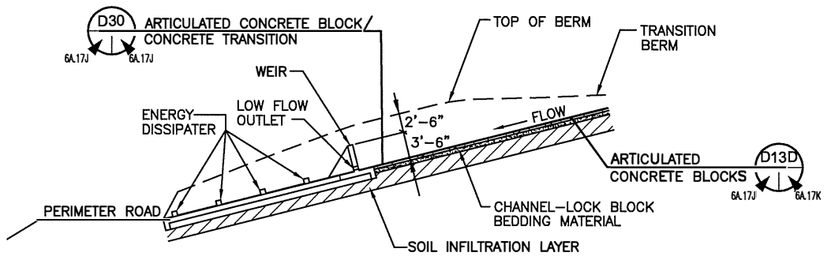
ATTACHMENT 6A.14



SECTION D20D

0 5 10 6A.17L 6A.17J

SCALE IN FEET



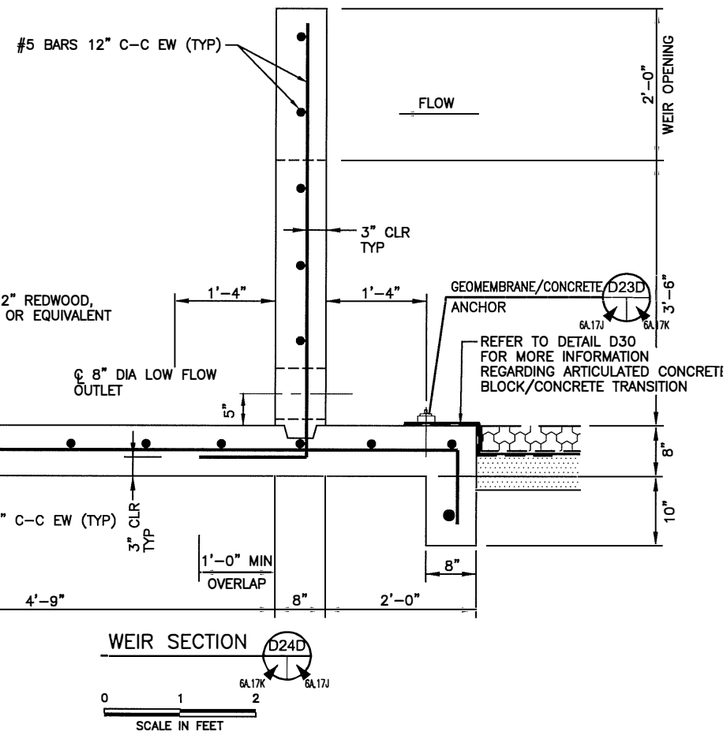
LONGITUDINAL SECTION D21D

0 10 20 6A.17J 6A.17J

SCALE IN FEET

STATE OF TEXAS
CHARLES R. MARSH
105073
PROFESSIONAL LICENSED ENGINEER

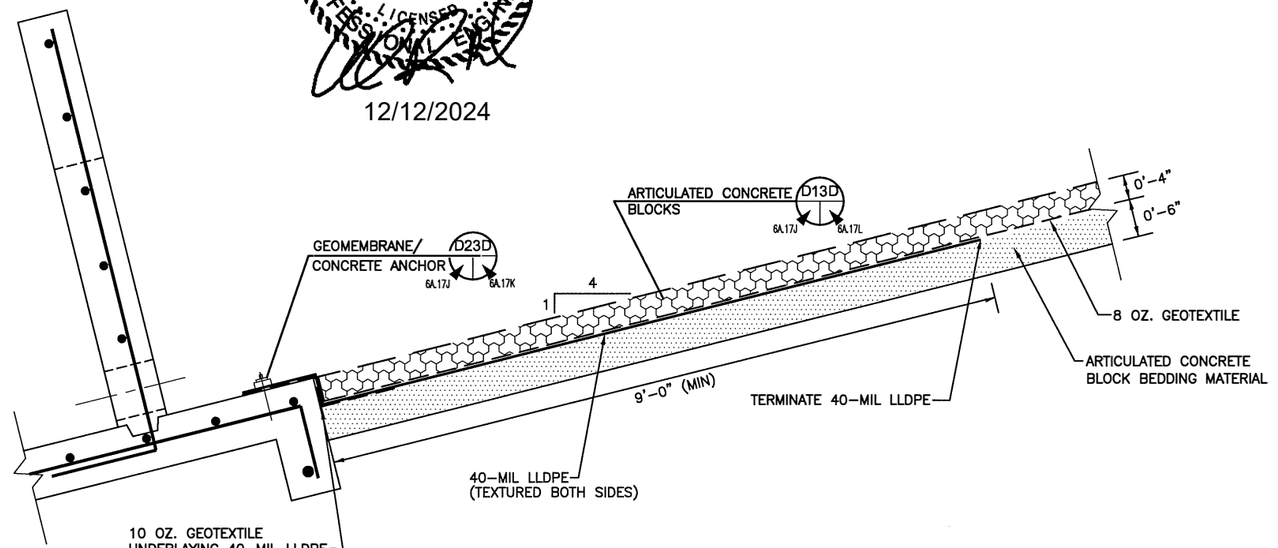
12/12/2024



WEIR SECTION D24D

0 1 2 6A.17K 6A.17J

SCALE IN FEET



ARTICULTAED CONCRETE BLOCK/CONCRETE TRANSITION D30

0 1 2 6A.17J 6A.17J

SCALE IN FEET

NOTE:

1. DESIGN DIMENSIONS SHOWN ARE BASED ON CHUTE WITH 30-FOOT BOTTOM WIDTH. DESIGN ELEMENTS FOR EACH CHUTE WILL BE BASED ON CALCULATIONS PRESENTED IN APPENDIX 6A-C AND MAY VARY FROM THE DIMENSIONS SHOWN ON THIS PLAN.

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REVIEWED BY: JPY

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LETDOWN DETAILS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 6A.17J

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LIMITS OF EXISTING SUBTITLE D COMPOSITE LINER AREA

S5 SOUTH DETENTION POND–1 OUTLET STRUCTURE 6A.21 6A.28

SP1 6A.21 6A.21

2 – 36" LOW LEVEL OUTLETS ELEV. 30.0

EXISTING 36" STEEL CULVERT TO BE REMOVED

POND BOTTOM ELEV. 30.0

TOP OF SPILLWAY ELEV 37.0

GABIONS D13 6A.21 6A.15

2 – 36" LOW LEVEL OUTLETS ELEV. 28.0

HCFCD EASEMENT

CHANNEL "D"

CHANNEL "E"

MW–10LB MW–10UB

EXISTING 36" CMP CULVERT TO BE REMOVED

CITY OF HOUSTON ROAD EASEMENT

EXISTING 36" CMP CULVERT TO BE REMOVED

GMP–C(R)

GMP–D

N 742750

N 742500

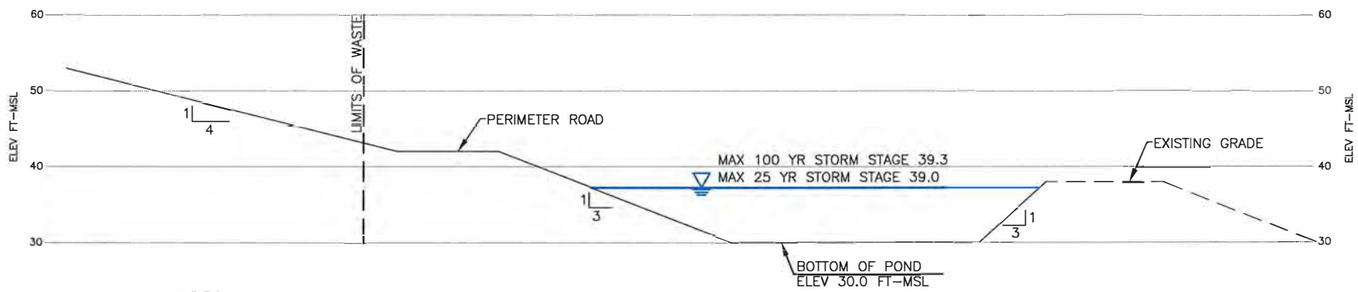
E 3192500 E 3192750 E 3193000

40.0 38.0 38.5 42.50 35.5 35.5 38.0 37.0 37.0 37.0

3:1

LEGEND

- PERMIT BOUNDARY
- EXISTING CONTOUR
- N 746000 STATE PLANE COORDINATE SYSTEM
- 50 FINAL CONTOUR
- LIMITS OF WASTE
- EASEMENT BOUNDARY
- PROPOSED DRAINAGE LETDOWN
- GABIONS
- PROPOSED DRAINAGE SWALE
- MW–11UB EXISTING DETECTION GROUNDWATER MONITORING WELL
- GMP–J EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED
- GMP–J PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE
- POND LIMITS



SOUTH DETENTION POND–1 SECTION SP1 6A.21 6A.21

0 10 20 SCALE IN FEET HORIZONTAL

0 10 20 SCALE IN FEET VERTICAL

N

0 50 100 SCALE IN FEET

SOUTH DETENTION POND–1

ELEVATION (FT–MSL)	SURFACE AREA (AC)
30.0	0.0012
32.0	0.5971
34.0	0.9844
36.0	1.3785
38.0	1.7659

* BOLD OUTLINE OF THE POND REPRESENTS THE LIMITS OF THE POND.

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED PROFESSIONAL ENGINEER

12/12/2024

C:\0120\439\PIP MOD 2024\ATT 6\6A\CLEAN\6A.21-S-POND1.dwg, vgusman, 1:2

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DESIGN BY: SAN/ALD
REVIEWED BY: JPY

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MAJOR PERMIT AMENDMENT SOUTH POND–1

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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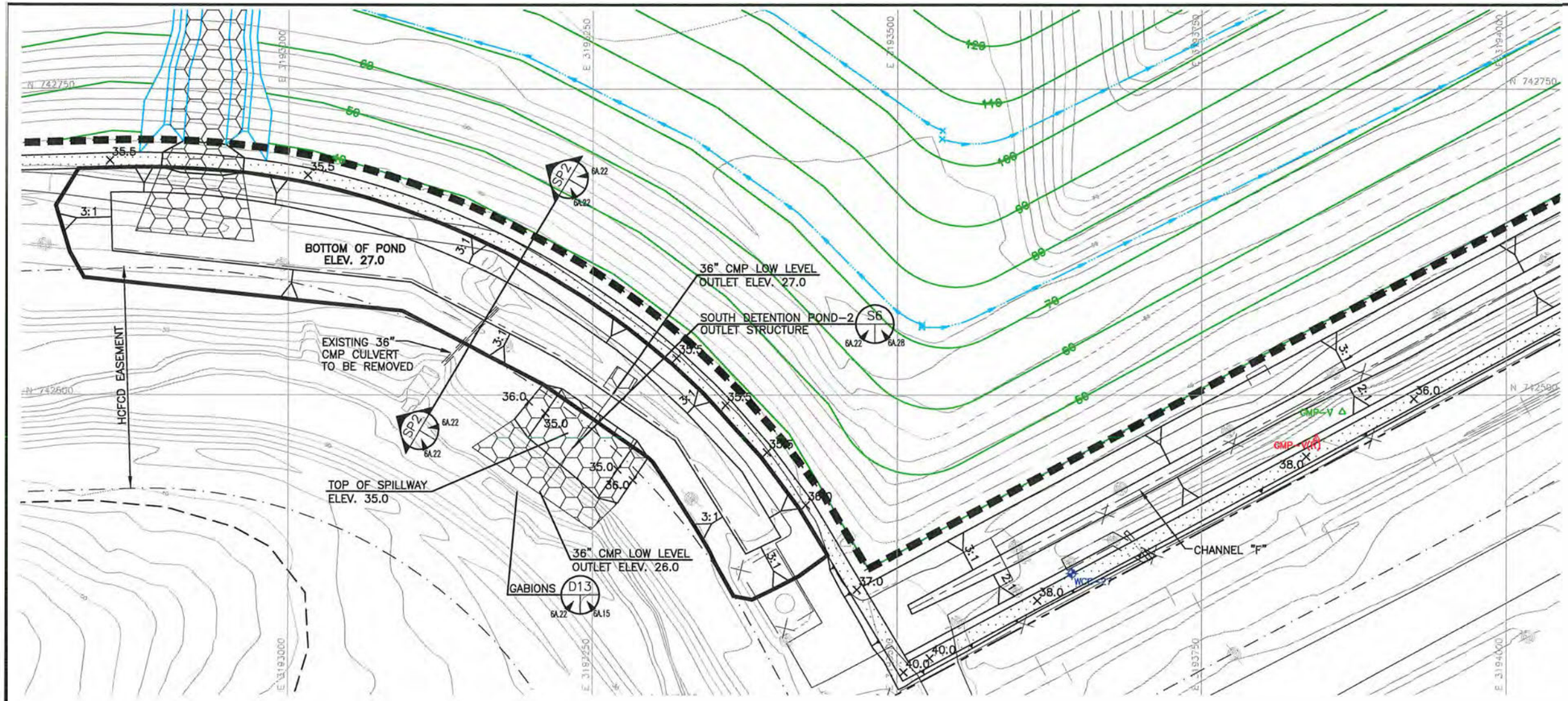
ATTACHMENT 6A.21



0 50 100
SCALE IN FEET

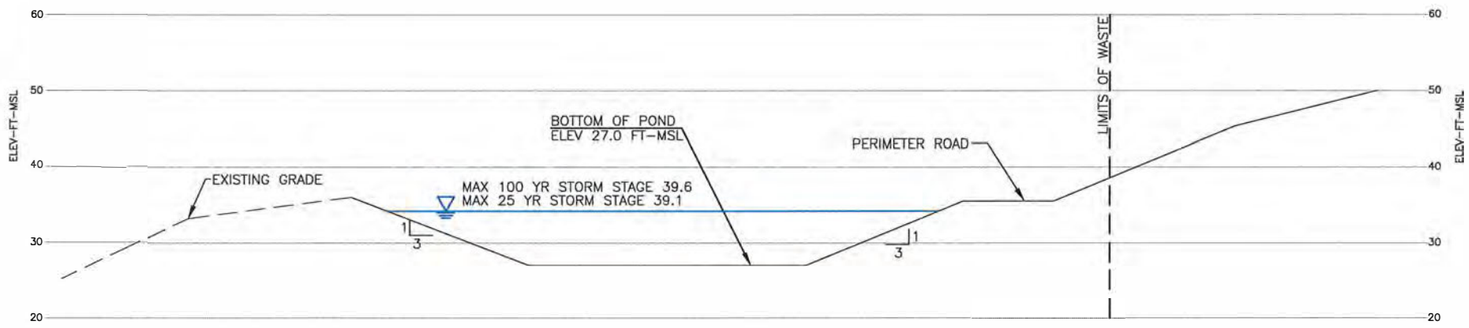
SOUTH DETENTION POND-2

ELEVATION (FT-MSL)	SURFACE AREA (AC)
27.0	0.0010
28.0	0.5542
29.0	0.6472
30.0	0.7417
31.0	0.8379
32.0	0.9357
33.0	1.0352
34.0	1.1362
35.0	1.2332
36.0	1.3376

* BOLD OUTLINE OF THE POND REPRESENTS THE LIMITS OF THE POND.

LEGEND

- PERMIT BOUNDARY
- EXISTING CONTOUR
- N 746000 STATE PLANE COORDINATE SYSTEM
- 50 FINAL CONTOUR
- LIMITS OF WASTE
- EASEMENT BOUNDARY
- PROPOSED DRAINAGE LETDOWN
- GABIONS
- PROPOSED DRAINAGE SWALE
- WCC-27 EXISTING DETECTION GROUNDWATER MONITORING WELL
- GMP-J EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED
- GMP-J(R) PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE
- POND LIMITS



SOUTH DETENTION POND-2 SECTION SP2 6A.22 6A.22

0 10 20
SCALE IN FEET
HORIZONTAL

0 10 20
SCALE IN FEET
VERTICAL

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DESIGN BY: SAN/ALD
REVIEWED BY: JPY

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MAJOR PERMIT AMENDMENT
SOUTH POND-2

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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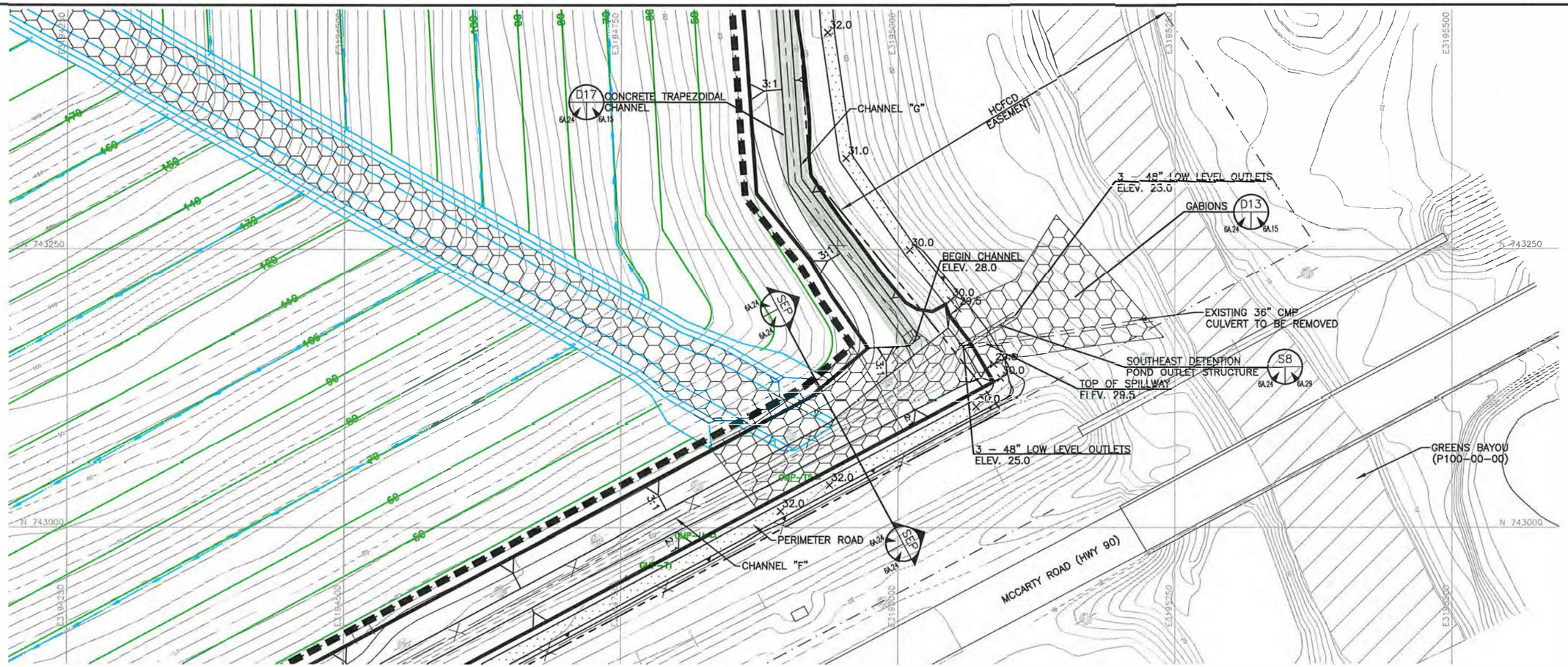
ATTACHMENT 6A.22

O:\0120\439\FIP MOD 2024\ATT 6\6A\CLEAN\6A.22-S-POND-2.dwg, vguzman, 1:2

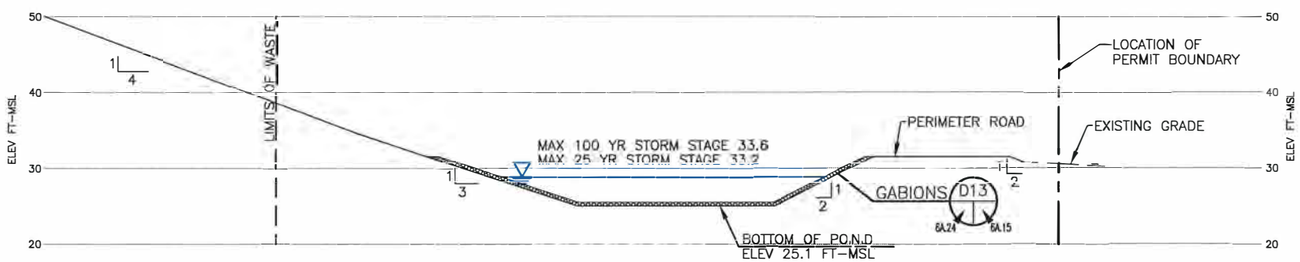


SOUTHEAST DETENTION POND	
ELEVATION (FT–MSL)	SURFACE AREA (AC)
25.0	0.0556
26.0	0.3693
27.0	0.6752
28.0	1.0046
29.0	1.3702
30.0	1.7328

* BOLD OUTLINE OF THE POND REPRESENTS THE LIMITS OF THE POND.

LEGEND

- PERMIT BOUNDARY
- EXISTING CONTOUR
- N 7460 00 STATE PLANE COORDINATE SYSTEM
- 50 FINAL CONTOUR
- LIMITS OF WASTE
- EASEMENT BOUNDARY
- PROPOSED DRAINAGE LETDOWN
- GABIONS
- CONCRETE
- PROPOSED DRAINAGE SWALE
- GMP–M EXISTING LANDFILL GAS MONITORING PROBE (SEE NOTE 1)
- GMP–U EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 1)
- POND LIMITS



NOTE:

1. GMP–T5 AND GMP–U ARE BEING DECOMMISSIONED VIA A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP–T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.

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NO.	DATE	DESCRIPTION
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MAJOR PERMIT AMENDMENT
SOUTHEAST POND

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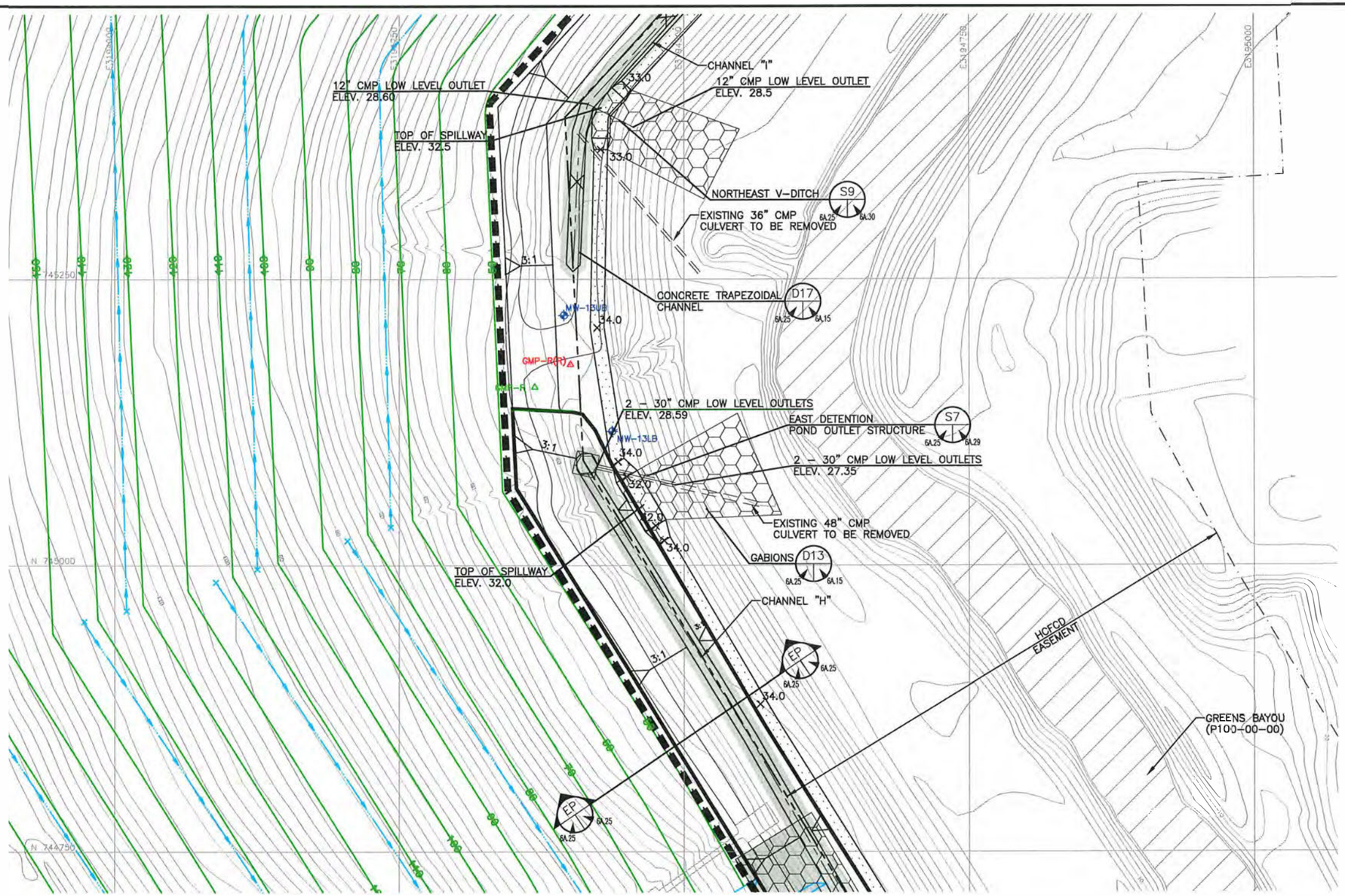
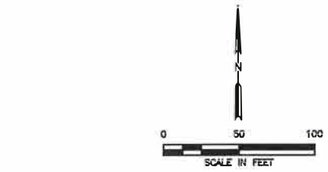
ATTACHMENT 6A.24

O:\0120\439\FLIP MOD 2024\ATT 6\6A\CLEAN\6A.24–SE–POND.dwg, vguzman, 1:2





LEGEND

- PERMIT BOUNDARY
- EXISTING CONTOUR
- N 746000 STATE PLANE COORDINATE SYSTEM
- 50 FINAL CONTOUR
- LIMITS OF WASTE
- EASEMENT BOUNDARY
- GABIONS
- CONCRETE
- PROPOSED DRAINAGE SWALE
- MW-11UB EXISTING DETECTION GROUNDWATER MONITORING WELL
- GMP-M, GMP-R EXISTING LANDFILL GAS MONITORING PROBE
- GMP-R(R) EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 1)
- PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE (SEE NOTE 1)
- POND LIMITS

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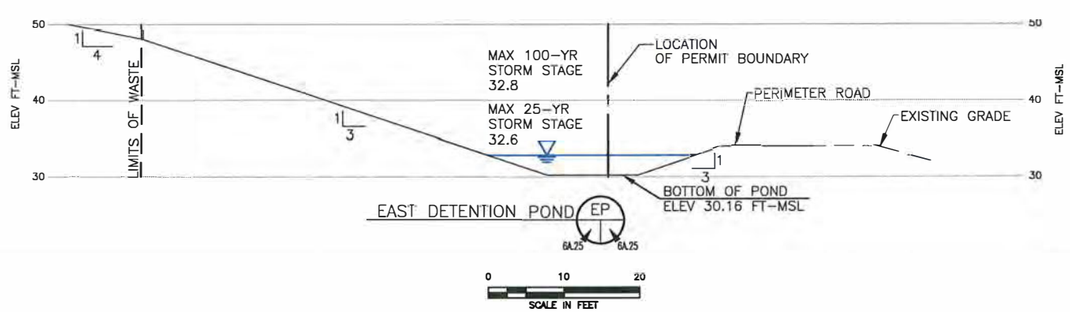
EAST DETENTION POND

ELEVATION (FT-MSL)	SURFACE AREA (AC)
28.6	0.0061
29.0	0.1531
30.0	0.2422
31.0	0.3672
32.0	0.4937
33.0	0.6217

* BOLD OUTLINE OF THE POND REPRESENTS THE LIMITS OF THE POND.

NOTE:

1. GAS MONITORING PROBE GMP-R WILL BE DECOMMISIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS IN APRIL 2004. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.



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FILE: 0120-439-11
CAD: 6A.14-SW-POND.DWG
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DESIGN BY: SAN/ALD
REVIEWED BY: JPY

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NO.	DATE	DESCRIPTION
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MAJOR PERMIT AMENDMENT
EAST POND

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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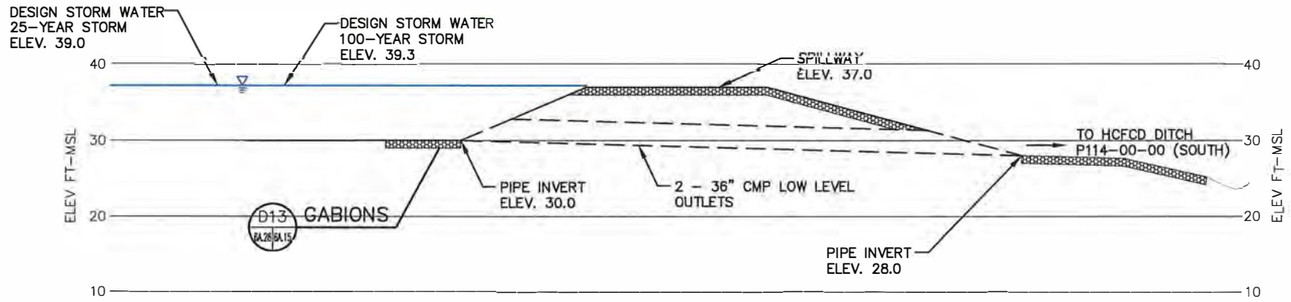
ATTACHMENT 6A.25

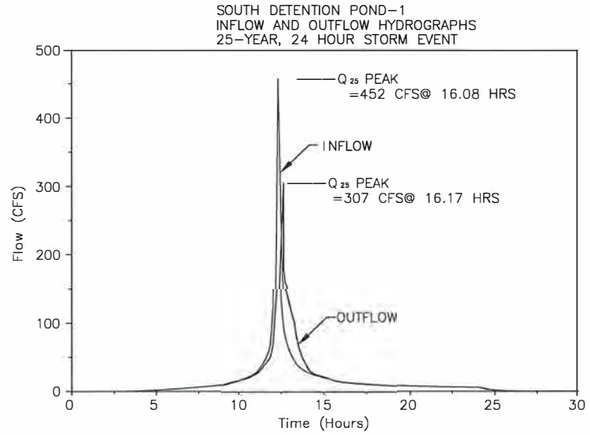
O:\0120\439\PMP MOD 2024\ATT 6\6A\CLEAN\6A.25-R-OUTLET.dwg, vguzman, 1:2

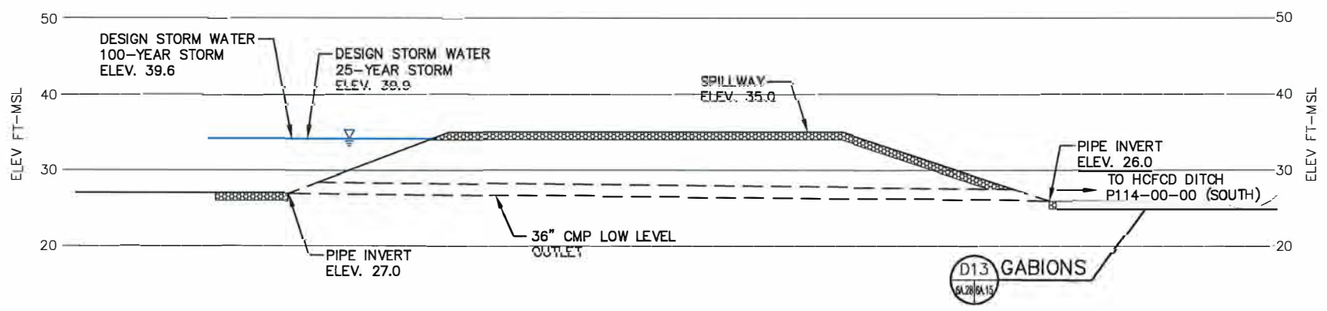


SOUTH DETENTION POND-1
OUTLET STRUCTURE (S5)

0 10 20
SCALE IN FEET

SOUTH DETENTION POND-1	
BOTTOM ELEVATION	30.0 FT.
SPILLWAY ELEVATION	37.0 FT.
SPILLWAY LENGTH	80.0 FT.
PEAK 25-YEAR EVENT INFLOW	452.0 CFS
PEAK 25-YEAR EVENT OUTFLOW	307.0 CFS
PEAK 100-YEAR EVENT INFLOW	649.0 CFS
PEAK 100-YEAR EVENT OUTFLOW	415.0 CFS





SOUTH DETENTION POND-2
OUTLET STRUCTURE (S6)

0 10 20
SCALE IN FEET

SOUTH DETENTION POND-2	
BOTTOM ELEVATION	27.0 FT.
SPILLWAY ELEVATION	35.0 FT.
SPILLWAY LENGTH	75.0 FT.
PEAK 25-YEAR EVENT INFLOW	318.0 CFS
PEAK 25-YEAR EVENT OUTFLOW	18.0 CFS
PEAK 100-YEAR EVENT INFLOW	442.0 CFS
PEAK 100-YEAR EVENT OUTFLOW	75.0 CFS

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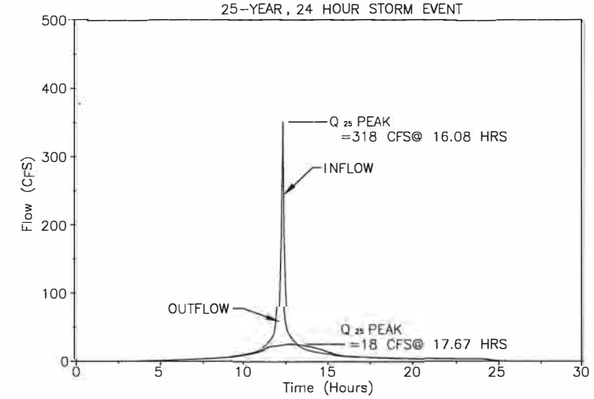

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DATE: 03/2004
FILE: 0120-439-11
CAD: 6A-28 OUTLET SP1&SP2.DWG
DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

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MAJOR PERMIT AMENDMENT
POND OUTLET STRUCTURE DETAILS

McCARTY ROAD LANDFILL
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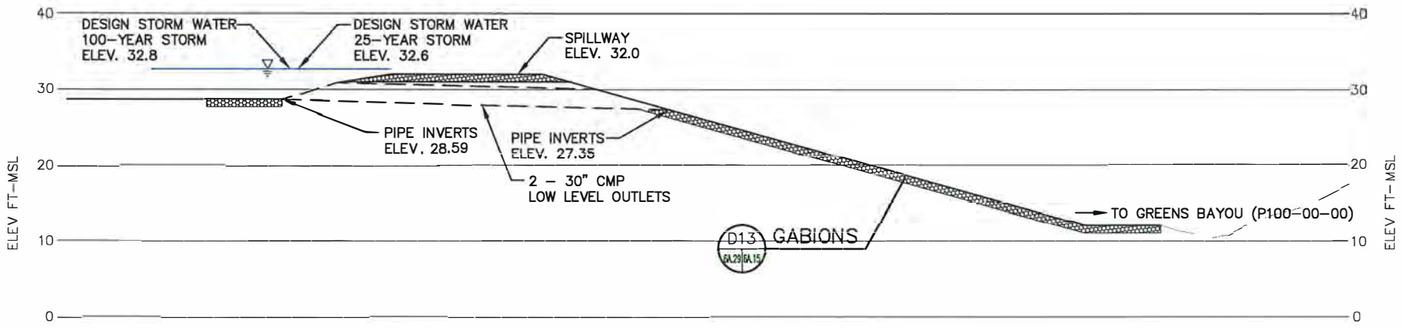
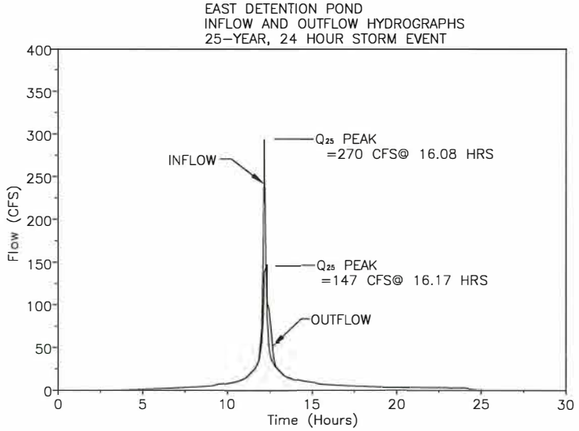
ATTACHMENT 6A.28

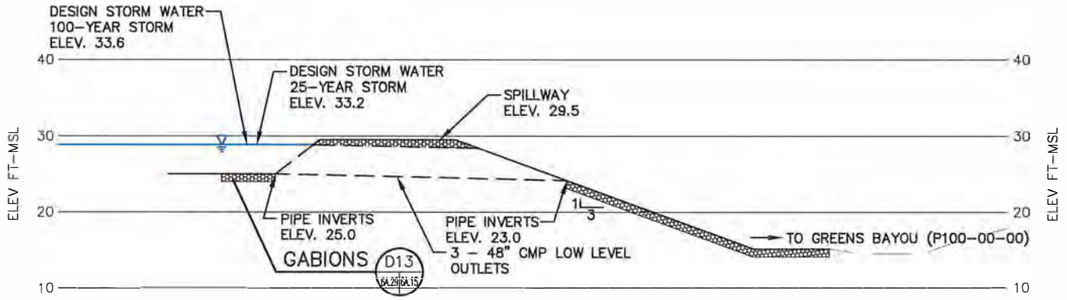
EAST DETENTION POND	
BOTTOM ELEVATION	28.59 FT.
SPILLWAY ELEVATION	32.0 FT.
SPILLWAY LENGTH	80.0 FT.
PEAK 25-YEAR EVENT INFLOW	270.0 CFS
PEAK 25-YEAR EVENT OUTFLOW	147.0 CFS
PEAK 100-YEAR EVENT INFLOW	374.0 CFS
PEAK 100-YEAR EVENT OUTFLOW	203.0 CFS



EAST DETENTION POND
OUTLET STRUCTURE (S7, 6A.29, 6A.1, 6A.25)

0 10 20
SCALE IN FEET

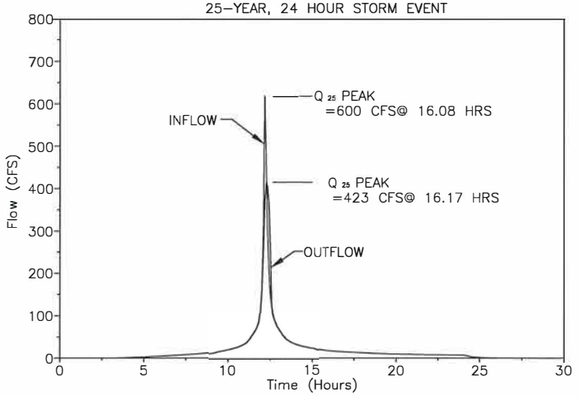




SOUTHEAST DETENTION POND
OUTLET STRUCTURE (S8, 6A.29, 6A.1, 6A.24)

0 10 20
SCALE IN FEET

SOUTHEAST DETENTION POND	
BOTTOM ELEVATION	25.0 FT.
SPILLWAY ELEVATION	29.5 FT.
SPILLWAY LENGTH	60.0 FT.
PEAK 25-YEAR EVENT INFLOW	600.0 CFS
PEAK 25-YEAR EVENT OUTFLOW	423.0 CFS
PEAK 100-YEAR EVENT INFLOW	817.0 CFS
PEAK 100-YEAR EVENT OUTFLOW	564.0 CFS



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FILE: 0120-439-11
CAD: 6A-29 OUTLET E&SE.DWG

DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

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MAJOR PERMIT AMENDMENT
POND OUTLET STRUCTURE DETAILS

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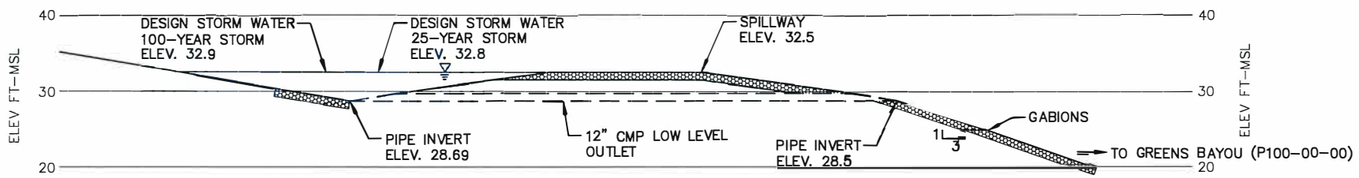
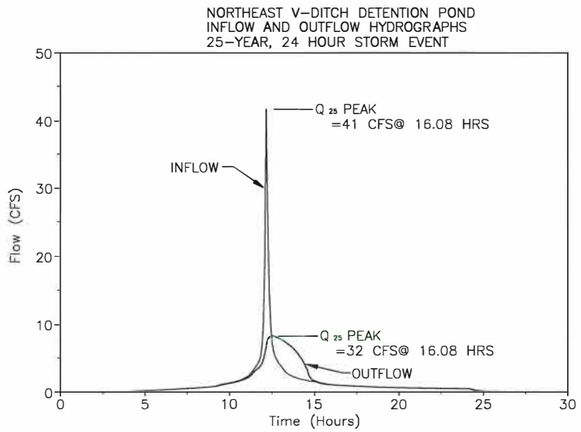
ATTACHMENT 6A.29

0:\0120\439\FIP MOD 2024\ATT 6\6A\CLEAN\6A.29OUTLET E&SE.dwg, vguzman, 1:2



NORTHEAST V-DITCH DETENTION POND (S9)
OUTLET STRUCTURE
6A1,6A25 6A30

0 10 20
SCALE IN FEET



NORTHEAST V-DITCH	
BOTTOM ELEVATION	28.7 FT.
SPILLWAY ELEVATION	32 FT.
SPILLWAY LENGTH	50 FT.
PEAK 25-YEAR EVENT INFLOW	41 CFS
PEAK 25-YEAR EVENT OUTFLOW	32 CFS
PEAK 100-YEAR EVENT INFLOW	50 CFS
PEAK 100-YEAR EVENT OUTFLOW	42 CFS

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CAD: 6A-30OUTLET NEV.DWG

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DESIGN BY: SAN/ALD
REVIEWED BY: JPY

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1	12/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
POND OUTLET STRUCTURE DETAILS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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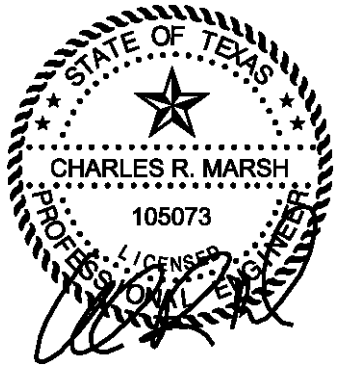
ATTACHMENT 6A.30

ATTACHMENT 6A

APPENDIX 6A-B

PERIMETER CHANNEL AND DETENTION POND DESIGN

Includes pages 6A-B.1-1 through 6A-B.2B2-20



12/12/2024

McCARTY ROAD LANDFILL
0120-439-11-03-11
PERIMETER CHANNEL HYDRAULIC ANALYSIS
100-YEAR NORMAL DEPTH CALCULATIONS

Example Calculation: Calculate the normal depth for Channel C between stations 2+59.2 and 9+02.7.

List of Symbols

Q_d = design flow rate for channel, cfs
R = hydraulic radius, ft
n = Manning's roughness coefficient
S = channel slope, ft/ft
b = bottom width of channel, ft
z = z-ratio (ratio of run to rise for channel sideslope)
A_f = flow area, sf
g = gravitational acceleration = 32.2 ft/s^2
T = top width of flow, ft
d = normal depth of channel, ft

The program uses an iterative process to calculate the normal depth of the channel to satisfy Manning's Equation

$$Q = \frac{1.486}{n} A R^{0.67} S^{0.5}$$

Design Inputs:

Q_d =	1551	cfs (from 100-year, 24-hour storm HEC-1 analysis, Attachment 6A-A
S =	0.002	ft/ft
b =	25	ft
z =	2	(H) : 1 (V)
n =	0.04	

Step 1 - Based on the geometry of the channel cross-section, solve for R and A_f

$$R = \frac{bd + zd^2}{b + 2d(z^2 + 1)^{0.5}}$$

$$A_f = bd + zd^2$$

assume: d= 7.68 ft

R = 5.223 ft

A_f = 310.10 sf

solve for Q Q = 1551

if Q is not equal to Q_d, select a new d and repeat calculations

Step 2 - solve for velocity, T, Froude number, velocity head, and energy head

$Q = VA \Rightarrow \quad V = Q/A$

$V =$ 5.00 ft/s

$T = b + 2(z \times d)$

$T =$ 55.73 ft

$$F_r = \frac{V}{(gA/T)^{0.5}}$$

$F_r =$ 0.374

$$\text{Velocity Head} = \frac{V^2}{2g}$$

Velocity Head = 0.39 ft

Energy Head = water elevation + velocity head

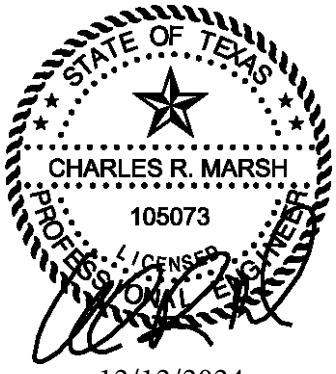
Energy Head = 8.07 ft

ATTACHMENT 6A

APPENDIX 6A-C

FINAL COVER EROSION CONTROL STRUCTURE DESIGN

Includes pages 6A-C-1 through 6A-C-32



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McCARTY ROAD LANDFILL
0120-439-11-03-11
EROSION CONTROL STRUCTURE DESIGN
GABION-LINED CHUTE DESIGN
100-YEAR, 24 HOUR STORM

Chute	Q^1	W	q	Y_C	Y_O	y_1	K_1	K_2
1	345	30	11.50	1.60	0.75	1.78	3.52	0.98
2	301	30	10.03	1.46	0.69	1.63	3.20	0.90
3	210	25	8.40	1.30	0.62	1.45	2.82	0.80
4	252	25	10.08	1.47	0.69	1.63	3.21	0.90
5	92	20	4.60	0.87	0.43	0.97	1.84	0.53
6	341	40	8.53	1.31	0.62	1.46	2.85	0.81
7	365	40	9.13	1.37	0.65	1.53	2.99	0.84
8	342	35	9.77	1.44	0.68	1.60	3.14	0.88
9	250	30	8.34	1.29	0.62	1.44	2.81	0.79
10	292	30	9.72	1.43	0.67	1.59	3.13	0.88
11	176	20	8.80	1.34	0.64	1.49	2.92	0.82
12	257	30	8.56	1.31	0.62	1.46	2.86	0.81
13	394	40	9.85	1.44	0.68	1.61	3.16	0.89
14	306	35	8.75	1.33	0.63	1.49	2.90	0.82
15	272	30	9.07	1.37	0.65	1.52	2.98	0.84
16	254	30	8.47	1.31	0.62	1.45	2.84	0.80
17	431	40	10.78	1.53	0.72	1.71	3.37	0.94

McCARTY ROAD LANDFILL
0120-439-11-03-11
CHUTE ANALYSIS
NORMAL DEPTH CALCULATIONS
25-YEAR, 24 HOUR STORM

Drainage Area	Flow Rate (cfs)	Bottom Slope (ft/ft)	Manning's n	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel. (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sf)	Flow Top Width (ft)
DA1	227	0.25	0.04	4.0	4.0	24.0	0.65	13.09	3.00	2.66	3.31	17.34	29.21
DA2	214	0.25	0.04	4.0	4.0	24.0	0.63	12.82	2.980	2.55	3.18	16.69	29.04
DA3	162	0.25	0.04	4.0	4.0	24.0	0.53	11.60	2.909	2.09	2.62	13.97	28.28
DA4	169	0.25	0.04	4.0	4.0	24.0	0.55	11.78	2.920	2.16	2.70	14.35	28.38
DA5	66	0.25	0.04	4.0	4.0	12.0	0.47	10.23	2.815	1.63	2.09	6.45	15.72
DA5	66	0.25	0.04	4.0	4.0	24.0	0.31	8.31	2.675	1.07	1.39	7.95	26.52
DA6	247	0.25	0.04	4.0	4.0	12.0	0.98	15.74	3.123	3.85	4.84	15.69	19.88
DA6	247	0.25	0.04	4.0	4.0	24.0	0.68	13.49	3.017	2.83	3.51	18.31	29.48
DA7	273	0.25	0.04	4.0	4.0	12.0	1.04	16.23	3.145	4.09	5.13	16.82	20.33
DA7	273	0.25	0.04	4.0	4.0	24.0	0.73	13.97	3.043	3.03	3.76	19.54	29.81
DA8	246	0.25	0.04	4.0	4.0	12.0	0.98	15.72	3.122	3.84	4.82	15.65	19.86
DA8	246	0.25	0.04	4.0	4.0	24.0	0.68	13.47	3.016	2.82	3.50	18.26	29.47
DA9	180	0.25	0.04	4.0	4.0	12.0	0.83	14.25	3.049	3.16	3.98	12.63	18.60
DA9	180	0.25	0.04	4.0	4.0	24.0	0.57	12.05	2.936	2.26	2.82	14.94	28.55
DA10	211	0.25	0.04	4.0	4.0	12.0	0.90	15.00	3.090	3.50	4.40	14.07	19.21
DA10	211	0.25	0.04	4.0	4.0	24.0	0.62	12.75	2.977	2.53	3.15	16.54	28.99
DA11	127	0.25	0.04	4.0	4.0	12.0	0.68	12.73	2.967	2.52	3.20	9.97	17.42
DA11	127	0.25	0.04	4.0	4.0	24.0	0.46	10.60	2.841	1.75	2.21	11.98	27.71
DA12	185	0.25	0.04	4.0	4.0	12.0	0.84	14.37	3.055	3.21	4.05	12.87	18.71
DA12	185	0.25	0.04	4.0	4.0	24.0	0.58	12.17	2.943	2.30	2.88	15.20	28.62
DA13	285	0.25	0.04	4.0	4.0	12.0	1.07	16.44	3.154	4.20	5.27	17.33	20.53
DA13	285	0.25	0.04	4.0	4.0	24.0	0.74	14.19	3.054	3.13	3.87	20.09	29.96
DA14	220	0.25	0.04	4.0	4.0	12.0	0.92	15.19	3.098	3.59	4.51	14.48	19.38
DA14	220	0.25	0.04	4.0	4.0	24.0	0.64	12.95	2.987	2.60	3.24	16.99	29.12
DA15	196	0.25	0.04	4.0	4.0	12.0	0.87	14.64	3.069	3.33	4.20	13.39	18.93
DA15	196	0.25	0.04	4.0	4.0	24.0	0.60	12.42	2.958	2.40	3.00	15.78	28.78
DA16	187	0.25	0.04	4.0	4.0	12.0	0.84	14.42	3.058	3.23	4.08	12.97	18.75
DA16	187	0.25	0.04	4.0	4.0	24.0	0.58	12.21	2.946	2.32	2.90	15.31	28.65
DA17	308	0.25	0.04	4.0	4.0	12.0	1.11	16.83	3.171	4.40	5.51	18.30	20.90
DA17	308	0.25	0.04	4.0	4.0	24.0	0.78	14.58	3.074	3.30	4.08	21.13	30.23

Note: Calculations were performed using the HYDROCALC HYDRAULICS program developed by Dodson and Associates (Version 2.0.1, 1996).

McCARTY ROAD LANDFILL
0120-439-11-03-11
CHUTE ANALYSIS
NORMAL DEPTH CALCULATIONS
25-YEAR, 24 HOUR STORM

Example Calculation: Calculate the normal depth for the chute for DA10.

List of Symbols

Q_d = design flow rate for channel, cfs
R = hydraulic radius, ft
n = Manning's roughness coefficient
S = channel slope, ft/ft
b = bottom width of channel, ft
z = z-ratio (ratio of run to rise for channel sideslope)
A_f = flow area, sf
g = gravitational acceleration = 32.2 ft/s^2
T = top width of flow, ft
d = normal depth of chute, ft

The program uses an iterative process to calculate the normal depth of the chute to satisfy Manning's Equation

$$Q = \frac{1.486}{n} A R^{0.67} S^{0.5}$$

Design Inputs:			
	Q_d =	211	cfs (from HEC-HMS analysis, Attachment 6A-A)
	S =	0.25	ft/ft
	b =	12	ft
	z =	4	(H) : 1 (V)
	n =	0.04	

Step 1 - Based on the geometry of the chute cross-section, solve for R and A_f

$$R = \frac{bd + zd^2}{b + 2d(z^2 + 1)^{0.5}}$$

$$A_f = bd + zd^2$$

assume: d = 0.90 ft

R = 0.724 ft

A_f = 14.07 sf

solve for Q: Q = 211 cfs

if Q is not equal to Q_d, select a new d and repeat calculations

Step 2 - solve for velocity, T, Froude number, velocity head, and energy head

$Q = VA \Rightarrow \quad V = Q/A$

$V =$ 15.00 ft/s

$T = b + 2(z \times d)$

$T =$ 19.21 ft

$$F_r = \frac{V}{(gA/T)^{0.5}}$$

$F_r =$ 3.090 ft

$$\text{Velocity Head} = \frac{V^2}{2g}$$

Velocity Head = 3.50 ft

Energy Head = water elevation + velocity head

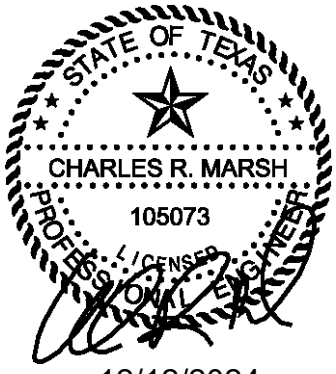
Energy Head = 4.40 ft

ATTACHMENT 6A

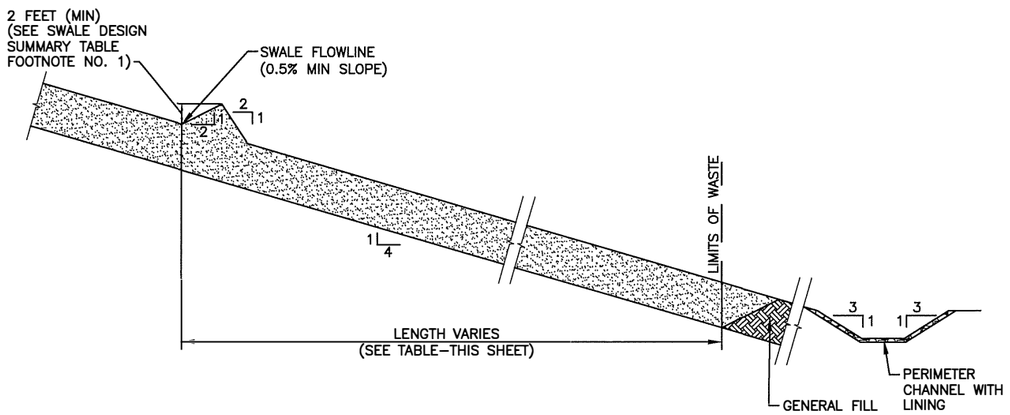
APPENDIX 6A-G

EROSION CONTROL PLAN FOR ALL PHASES OF LANDFILL OPERATION

Includes Pages 6A-G-1 through 6A-G-7



12/12/2024

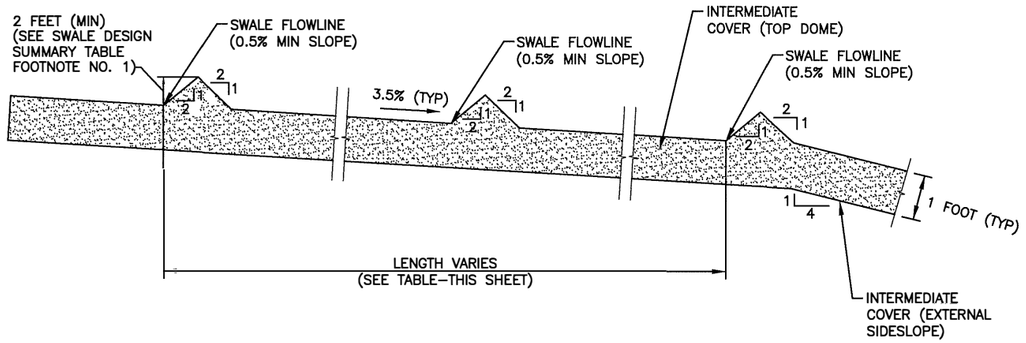


A
1 2 SIDE SLOPE DRAINAGE SWALE

SWALE DESIGN SUMMARY[1]							
SIDE SLOPE (4H:1V)				TOP SLOPE (3.5%)			
VEGETATIVE COVER PERCENTAGE	DISTANCE BETWEEN SWALES (FT)	ESTIMATED SOIL LOSS (TONS/ACRE/YEAR)	ADDITIONAL SEDIMENT CAPTURE REQUIRED[2]	VEGETATIVE COVER PERCENTAGE	DISTANCE BETWEEN SWALES (FT)	ESTIMATED SOIL LOSS (TONS/ACRE/YEAR)	ADDITIONAL SEDIMENT CAPTURE REQUIRED[2]
60	300	23.9	NO	60	500	1.4	NO
70	300	9.7	NO	70	500	0.6	NO
80	300	7.4	NO	80	500	0.4	NO
90	300	3.6	NO	90	500	0.2	NO
70	400	11.2	NO	60	600	1.5	NO
80	400	8.5	NO	70	600	0.6	NO
90	400	4.2	NO	80	600	0.5	NO
70	500	12.2	NO	90	600	0.2	NO
80	500	9.3	NO	60	700	1.6	NO
90	500	4.6	NO	70	700	0.6	NO
70	600	13.6	NO	80	700	0.5	NO
80	600	10.4	NO	90	700	0.2	NO
90	600	5.1	NO				
70	700	14.7	NO				
80	700	11.2	NO				
90	700	5.5	NO				
70	800	15.8	NO				
80	800	12.1	NO				
90	800	5.9	NO				

[1] REFER TO APPENDIX 6A–G–1 FOR SUPPORTING CALCULATIONS.

[2] IF SITE SPECIFIC CONDITIONS YIELD A MAXIMUM HORIZONTAL DISTANCE BETWEEN THE TOE OF THE SLOPE AND GRADE BREAK OF LESS THAN 300 FEET FOR SIDE SLOPES AND A DISTANCE OF 500 FEET FROM THE GRADE BREAK TO THE PEAK OF THE TOP SLOPES, ESTABLISHMENT OF 60% VEGETATION WILL BE SUFFICIENT MEANS OF EROSION CONTROL WITHOUT THE ADDITION OF TEMPORARY SWALES AND LETDOWNS GIVEN THAT THE TOTAL SOIL LOSS FOR THE SIDE SLOPE IS LESS THAN 50 TONS/ACRE/YEAR AND THE TOP SLOPE IS LESS THAN 50 TONS/ACRE/YEAR.



A
1 2 TOP DOME SURFACE DRAINAGE SWALE

SWALE DRAINAGE AREA SUMMARY			
CONDITION (SWALE HEIGHT)	MAXIMUM DRAINAGE AREA (ACRES)	MINIMUM SWALE SPACING[1] (FEET)	MAXIMUM SWALE LENGTH[2] (FEET)
TOP SLOPE (2 FT SWALE)	26.9	500	2,343
TOP SLOPE (1.5 FT SWALE)	12.5	500	1,089
TOP SLOPE (1 FT SWALE)	4.5	500	392
SIDE SLOPE (2 FT SWALE)	5.0	300	726

[1] MINIMUM SWALE SPACING IS OBTAINED FROM THE CALCULATIONS PROVIDED ON PAGE 6A–G–1–9.

[2] MAXIMUM SWALE LENGTH CALCULATED USING THE FOLLOWING EQUATION:

MAXIMUM DRAINAGE AREA x (43,560 SF/ACRE)/MINIMUM SWALE SPACING

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DATE: 01/2010
FILE: 0120–439–11
CAD: FIG 2–SWALE DESIGN.DWG
DRAWN BY: SRF
DESIGN BY: BJL
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F–3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	01/2010	PERMIT MODIFICATION
2	12/2024	PERMIT MODIFICATION

EROSION CONTROL PLAN
SWALE DESIGN SUMMARY

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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FIGURE 2

OPEN CHANNEL GEOMEMBRANE LETDOWN DESIGN SUMMARY

DESIGN IS APPLICABLE FOR A DRAINAGE AREA UP TO 35 ACRES (TOP DECK AND SIDE SLOPE).

25% SLOPE
MAXIMUM FLOW DEPTH = 0.62 FT.
BOTTOM WIDTH = 8 FT.

3.5% SLOPE
MAXIMUM FLOW DEPTH = 1.08 FT.
BOTTOM WIDTH = 8 FT.

OPEN CHANNEL GABION LETDOWN DESIGN SUMMARY

DESIGN IS APPLICABLE FOR A DRAINAGE AREA UP TO 25 ACRES (TOP DECK AND SIDE SLOPE).

25% SLOPE
MAXIMUM FLOW DEPTH = 1.36 FT.
BOTTOM WIDTH = 8 FT.

3.5% SLOPE
MAXIMUM FLOW DEPTH = 1.94 FT.
BOTTOM WIDTH = 8 FT.

OPEN CHANNEL ROCK RIPRAP LETDOWN DESIGN SUMMARY

DESIGN IS APPLICABLE FOR A DRAINAGE AREA UP TO 25 ACRES (TOP DECK ONLY).

3.5% SLOPE
MAXIMUM FLOW DEPTH = 1.94 FT.
BOTTOM WIDTH = 8 FT.

OPEN CHANNEL GROUTED RIPRAP LETDOWN DESIGN SUMMARY

DESIGN IS APPLICABLE FOR A DRAINAGE AREA UP TO 25 ACRES (TOP DECK) AND 35 ACRES (SIDE SLOPE).

25% SLOPE
MAXIMUM FLOW DEPTH = 1.36 FT.
BOTTOM WIDTH = 8 FT.

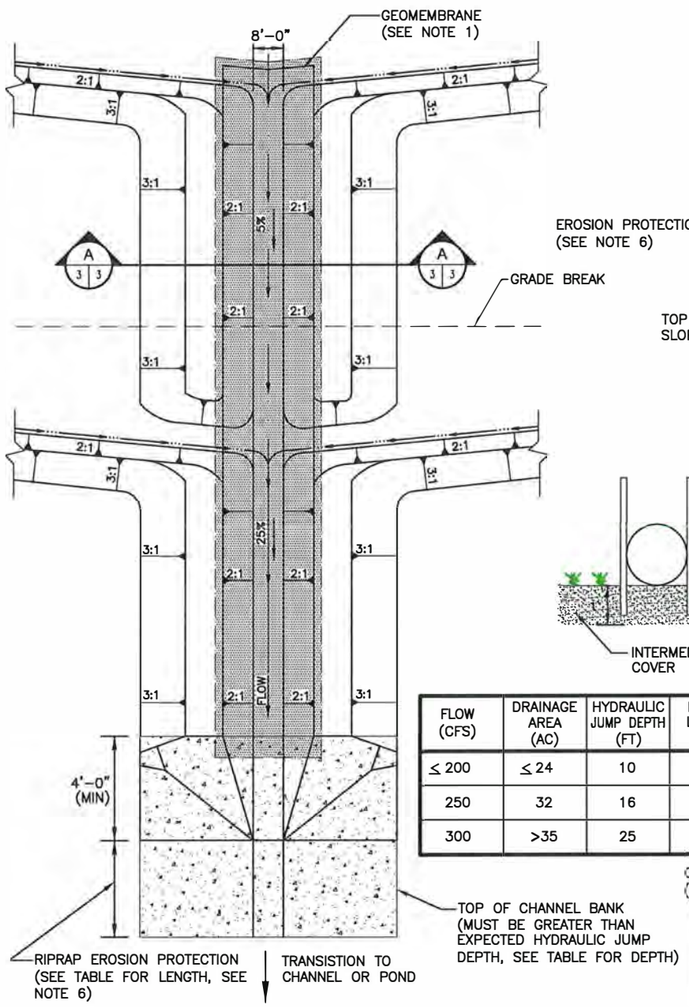
3.5% SLOPE
MAXIMUM FLOW DEPTH = 1.94 FT.
BOTTOM WIDTH = 8 FT.

OPEN CHANNEL TURF REINFORCEMENT LETDOWN DESIGN SUMMARY

DESIGN IS APPLICABLE FOR A DRAINAGE AREA UP TO 35 ACRES (TOP DECK AND SIDE SLOPE).

25% SLOPE
MAXIMUM FLOW DEPTH = 1.36 FT.
BOTTOM WIDTH = 8 FT.

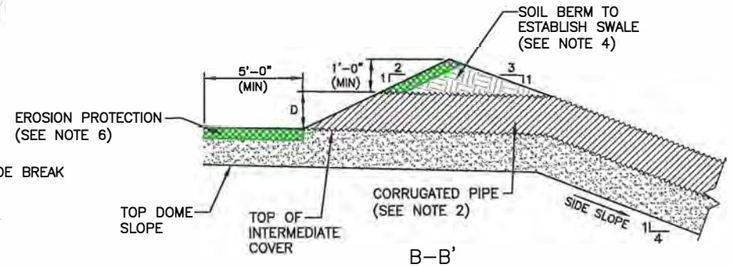
3.5% SLOPE
MAXIMUM FLOW DEPTH = 1.99 FT.
BOTTOM WIDTH = 8 FT.



TEMPORARY OPEN CHANNEL LETDOWN B 1 3

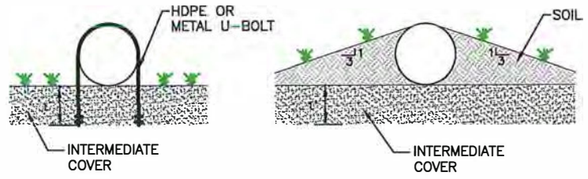
0 20 40
SCALE IN FEET

FLOW (CFS)	DRAINAGE AREA (AC)	HYDRAULIC JUMP DEPTH (FT)	RIPRAP LENGTH (FT)
≤ 200	≤ 24	10	10
250	32	16	16
300	>35	25	25



B–B'

PIPE INLET PROFILE
NTS

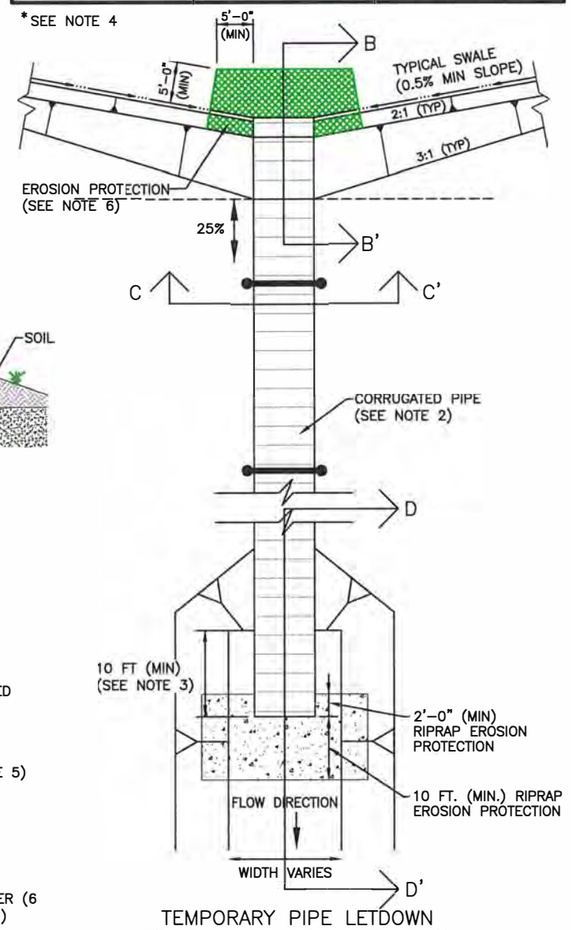


C–C'

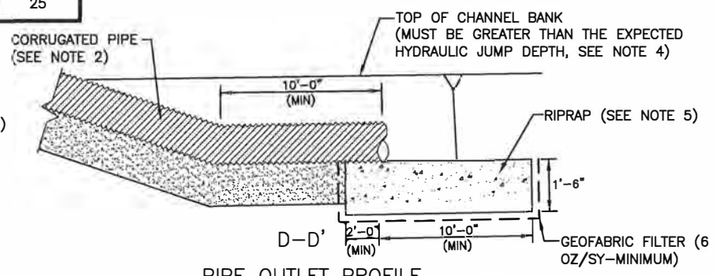
ANCHORING DETAILS
NTS

PIPE LETDOWN DESIGN SUMMARY* (USE OF PIPE LETDOWN IS LIMITED TO 1–INLET)		
DRAINAGE AREA (ACRE)	DESIGN FLOW RATE (CFS)	REQUIRED PIPE DIAMETER (FT)
2.0	16.0	2
2.7	21.0	3

*SEE NOTE 4

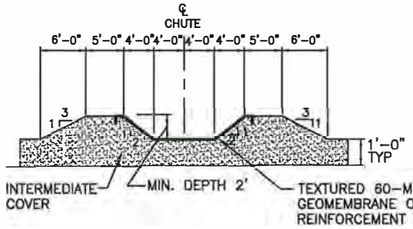


TEMPORARY PIPE LETDOWN
NTS



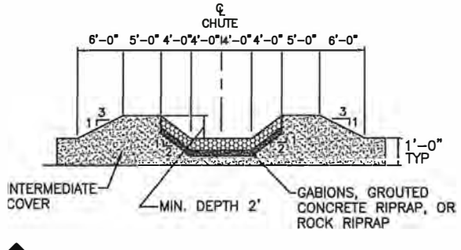
D–D'

PIPE OUTLET PROFILE (SEE NOTE 3)
NTS



A1 3 3 TEMPORARY GEOMEMBRANE OR TURF REINFORCEMENT LETDOWN OPTION

0 10 20
SCALE IN FEET



A2 3 3 TEMPORARY GABION LETDOWN OPTION

0 10 20
SCALE IN FEET

12/12/2024

NOTES:
1. GEOMEMBRANE TEXTURED ON BOTH SIDES WILL BE USED FOR GEOMEMBRANE LETDOWN LINING. AS AN ALTERNATIVE, TEMPORARY LETDOWN CAN BE LINED WITH GABIONS, GROUTED CONCRETE RIPRAP, TURF REINFORCEMENT MAT, OR ROCK RIPRAP.
2. PIPE DRAINAGE LETDOWN WILL BE ANCHORED BY USING SOIL BERM AT THE INLET LOCATED WITHIN THE SWALE. ADDITIONAL ANCHORING ON THE SIDE SLOPE MAY BE PROVIDED USING SOIL, HDPE, METAL U–BOLTS, T–POSTS OR EQUIVALENT MATERIALS.
3. PIPE WILL BE EXTENDED INTO THE CHANNEL TO MINIMIZE EROSION.
4. PIPE LETDOWNS WILL BE LIMITED TO 1 INLET PER LETDOWN. SOIL BERMS AROUND THE PIPE INLET WILL BE EXTENDED A MINIMUM 1–FOOT ABOVE THE LETDOWN PIPE INLET. REFER TO PAGE 6A–G–2–9 FOR HYDRAULIC ANALYSIS.
5. RIPRAP APRON DESIGN IS PROVIDED ON PAGES 6A–G–2–19 AND 20. D_{50} FOR RIPRAP IS 5–INCHES MINIMUM.
6. RIPRAP, GROUTED RIPRAP, GABIONS, GEOMEMBRANE, EXISTING VEGETATION, OR TURF REINFORCEMENT MAY BE USED FOR INLET EROSION PROTECTION.
7. REFER TO PAGE 6A–G–2–5A FOR EROSION PROTECTION DESIGN. IF LETDOWN DISCHARGES TO A POND, 10 FEET OF RIPRAP WILL BE SUFFICIENT.

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DATE: 05/2010
FILE: 0120–439–11
CAD: FIG 3–LETDOWN DESIGN.DWG
DRAWN BY: SRF
DESIGN BY: BJL
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F–3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	01/2010	1ST TCEQ COMMENT RESPONSE
2	05/2010	PERMIT MODIFICATION
3	12/2024	PERMIT MODIFICATION

EROSION CONTROL PLAN LETDOWN DESIGN SUMMARY

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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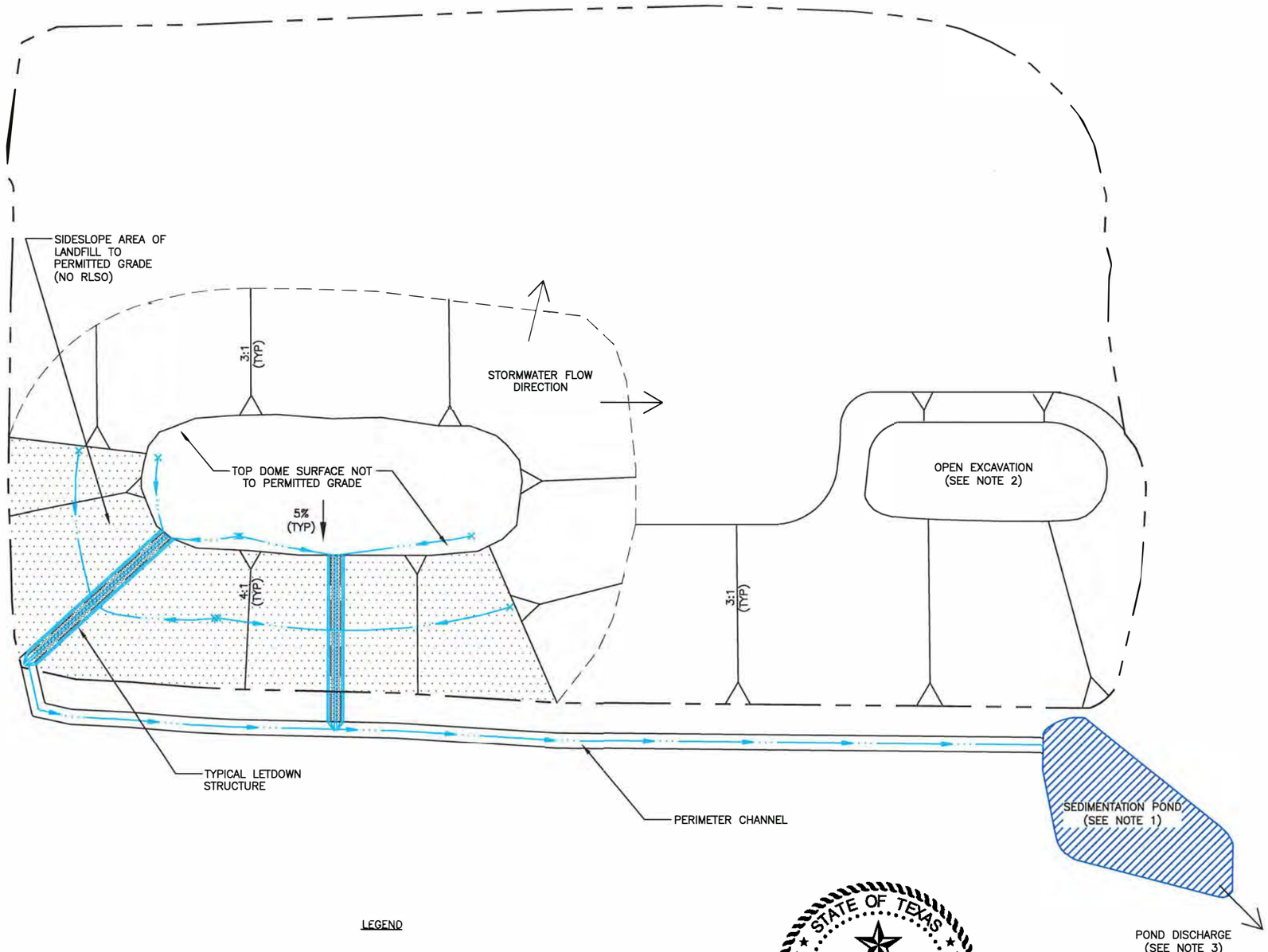
FIGURE 3



LEGEND

- EXTERNAL SIDE SLOPE TO PERMITTED GRADE
- LETDOWN
- DRAINAGE SWALE
- STORMWATER FLOW DIRECTION

EXAMPLE CALCULATION

REQUIRED POND SIZE = EXTERNAL EMBANKMENT AREA (ACRES) X POND AREA REQUIRED/ UNIT DRAINAGE AREA FACTOR

EXTERNAL EMBANKMENT AREA DRAINING TO POND = 50 ACRES

ADDITIONAL UPLAND AREA DRAINING TO POND = 0 ACRES (SEE NOTE 1)

REQUIRED SEDIMENT REMOVAL FROM EXTERNAL SIDE SLOPE AREA = 80 TONS/ACRE/YEAR TO 50 TONS/ACRE/YEAR

POND AREA REQUIRED/UNIT DRAINAGE AREA FACTOR = 0.105 (FROM TABLE BELOW)

REQUIRED POND SIZE = 50 ACRES X 0.105 = 5.25 ACRES

SIZE OF POND REQUIRED[1]		
REQUIRED SEDIMENT REMOVAL (TONS/ACRE/YEAR)	POND AREA REQUIRED/ UNIT DRAINAGE AREA FACTOR	EFFICIENCY OF POND (DYNAMIC AND QUIESCENT)
60 TO 50	0.040	18.0%
70 TO 50	0.070	29.3%
80 TO 50	0.105	37.3%
90 TO 50	0.125	43.8%
100 TO 50	0.140	51.9%
200 TO 50	0.375	75.3%

[1] REFER TO APPENDIX 6A–G–3 FOR MORE INFORMATION. THE POND DESIGN AND DEMONSTRATION ARE PROVIDED TO ENSURE THAT SEDIMENT DISCHARGE FROM THE SITE WILL BE PREVENTED DURING INITIAL ESTABLISHMENT OF VEGETATION OVER THE SIDESLOPES AND TOP DOME SURFACES.

NOTES:

1. EXAMPLE POND CONFIGURATION IS SHOWN. THE POND WILL BE LOCATED WITHIN THE PERMIT BOUNDARY. A DEMONSTRATION WILL BE INCLUDED IN THE SITE OPERATING RECORD TO SHOW THAT THE POND HAS THE CAPABILITY TO CAPTURE SEDIMENT SUCH THAT DISCHARGE IS LESS THAN OR EQUAL TO 50 TONS/ACRE/YEAR FROM THE EXTERNAL SIDE SLOPE AND TOP DOME AREA. THE DEMONSTRATION WILL ACCOUNT FOR THE ADDITIONAL SEDIMENT CREATED BY THE UPLAND AREA THAT FLOWS TO THE POND. FOR DEMONSTRATION PURPOSES, THE POND DEPTH WILL BE AN AVERAGE OF 4 FEET. OVERALL SEDIMENT DISCHARGE FROM THE SITE MUST COMPLY WITH THE CURRENT TPDES PERMIT FOR THE SITE.
2. EXCAVATED FUTURE CELL AREAS OR SOIL BORROW AREAS CAN ALSO BE USED AS SEDIMENTATION PONDS. IF THESE AREAS ARE USED FOR PONDS, A DEMONSTRATION NOTING THAT THE EXCAVATED FUTURE CELL AREA OR SOIL BORROW AREA HAS MORE CAPACITY THAN THE VOLUME PRODUCED BY THE 25–YEAR, 24–HOUR STORM WILL BE DOCUMENTED AND MAINTAINED IN THE SITE OPERATING RECORD.
3. AS STATED IN SECTION 2.2, A STATEMENT WILL BE ADDED TO THE SITE OPERATING RECORD EACH TIME A SEDIMENTATION POND IS INSTALLED TO NOTE HOW THE TEMPORARY SEDIMENTATION POND AND THE POND OUTLET WERE CONSTRUCTED CONSISTENT WITH THE REQUIREMENTS OF THE SITE DEVELOPMENT PLAN.

STATE OF TEXAS
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LICENSED
12/12/2024

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DATE: 05/2010
FILE: 0120-439-11
CAD: FIG 4-RETENTION POND PLAN.DWG
DRAWN BY: SRF
DESIGN BY: BJL
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

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NO.	DATE	DESCRIPTION
1	01/2010	1ST TCEQ COMMENT RESPONSE
2	05/2010	PERMIT MODIFICATION
3	12/2024	PERMIT MODIFICATION

EROSION CONTROL PLAN
SEDIMENT CONTROL POND PLAN

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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FIGURE 4

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

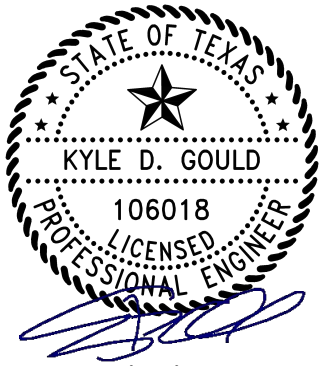
PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 7
LANDFILL COMPLETION PLAN

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised October 2008
Revised December 2010
Revised January 2012

Revised December 2024



12/12/2024

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817-735-9770

WCG Project No. 0120-439-11-259

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106018
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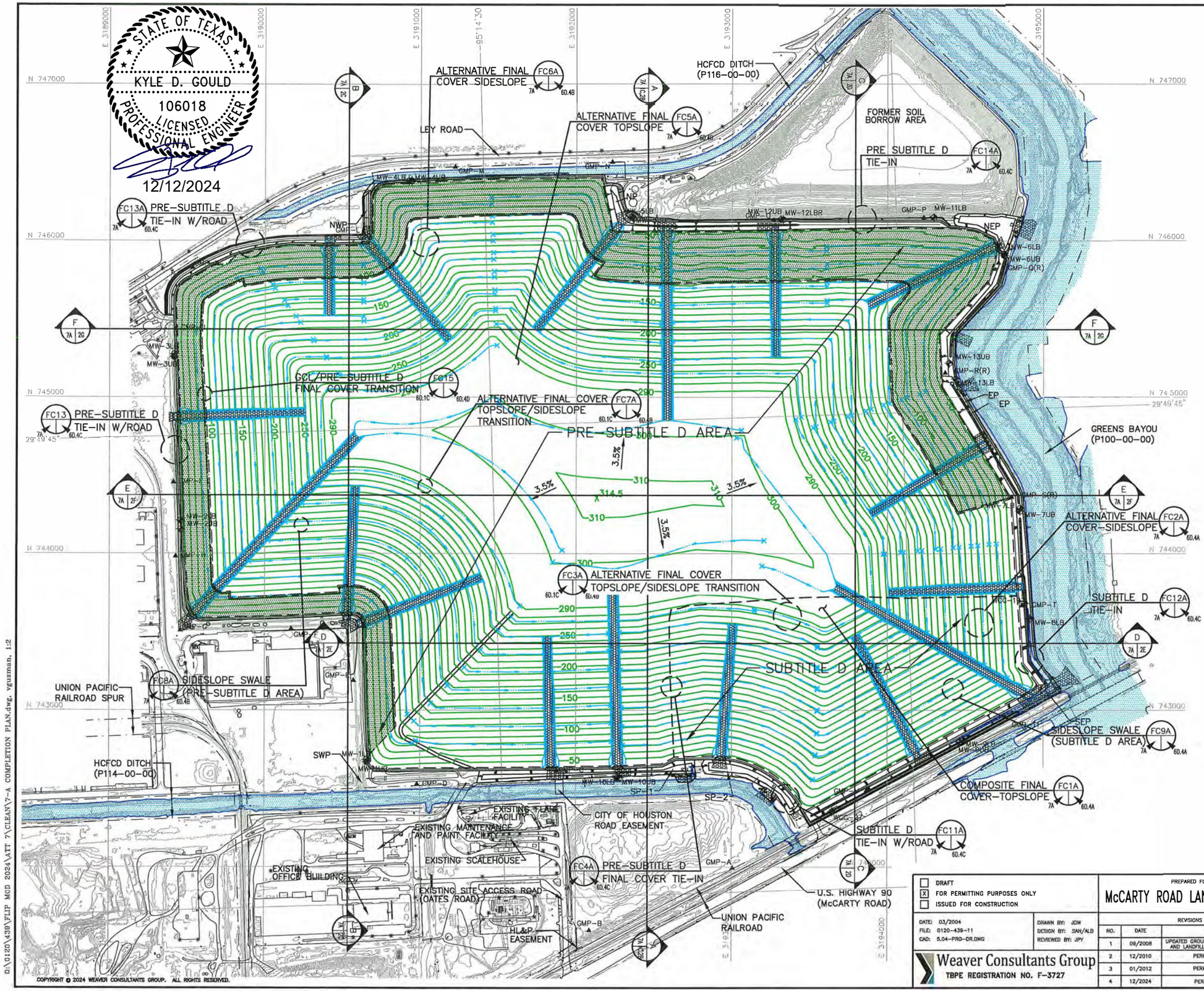
12/12/2024



POND LABELS	
NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

0 300 600
SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 10)
- 200 FINAL CONTOURS
- 745000 N STATE PLANE COORDINATE SYSTEM
- 29°49'45" GEODETIC COORDINATE SYSTEM
- EXISTING CONTOUR
- MW-11UB GROUNDWATER MONITORING WELL
- GMP-M LANDFILL GAS MONITORING PROBE
- EASEMENT BOUNDARY
- 100-YR FLOODPLAIN (REFER TO ATTACHMENT 6C)
- GABIONS
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- CONSTRUCTED FINAL COVER

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 7B FOR POST DEVELOPMENT DRAINAGE INFORMATION.
4. FINAL COVER DETAILS ARE PROVIDED IN ATTACHMENT 6D-FINAL COVER DETAILS.
5. MAXIMUM FINAL COVER ELEVATION: 314.5 FT-MSL MAXIMUM WASTE ELEVATION: 313.5 FT-MSL.
6. REFER TO ATTACHMENT 2 FOR TYPICAL CROSS SECTION INFORMATION.
7. DRAINAGE DESIGN INFORMATION INCLUDED IN ATTACHMENT 6A.
8. THE TOP DECK WILL BE MARKED AND LIGHTED. CONSISTENT WITH FAA REQUIREMENTS. REFER TO PARTS I/II, APPENDIX I/IIA FOR MORE INFORMATION.
9. REFER TO ATTACHMENT 14 FOR DETAILS OF THE LANDFILL GAS MANAGEMENT PLAN.
10. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.

G:\0120\439\FLIP MOD 2024\ATT 7\CLEAN\7-A COMPLETION PLAN.dwg, vguzman, 1:2

- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 03/2004
FILE: 0120-439-11
CAD: 5.04-PRO-DR.DWG
DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION
1	09/2008	UPDATED GROUNDWATER OBSERVATION WELLS AND LANDFILL GAS MONITORING PROBES
2	12/2010	PERMIT MODIFICATION
3	01/2012	PERMIT MODIFICATION
4	12/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT LANDFILL COMPLETION PLAN

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

WWW.WCGRP.COM

ATTACHMENT 7A

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

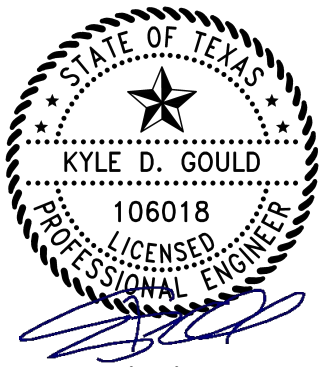
PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 12
FINAL CLOSURE PLAN

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised October 2009
Revised September 2011
Revised February 2013
Revised August 2020

Revised December 2024



12/12/2024

Prepared by

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No. 0120-439-11-259

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

MAJOR PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
APPENDIX 12A
FINAL COVER SYSTEM QUALITY CONTROL PLAN

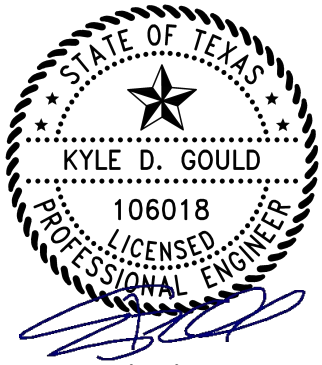
Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan August 2008

Revised March 2011

Revised December 2024



12/12/2024

Prepared by

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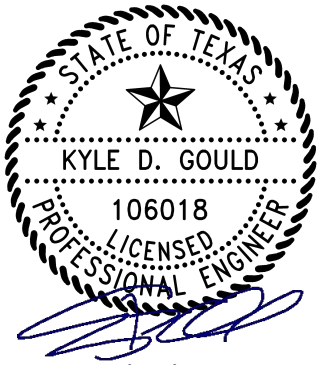
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No. 0120-439-11-259

APPENDIX 12A-A

FINAL COVER DRAINAGE LAYER DESIGN

Includes pages 12A-A.1 through 12A-A.7



12/12/2024

ATTACHMENT 3

TCEQ-20650 FORM

Texas Commission on Environmental Quality

Application Form for Municipal Solid Waste Permit or Registration Modification or Temporary Authorization

Application Tracking Information

Facility Name: McCarty Road Landfill

Permittee or Registrant Name: McCarty Road Landfill TX, LP

MSW Authorization Number: 261B

Initial Submission Date: 09/2024

Revision Date: 12/2024

Instructions for completing this form are provided in form TCEQ-20650-instr[1]. If you have questions, contact the Municipal Solid Waste Permits Section by email to [redacted] or by phone at 512-239-2335.

Application Data

1. Submission Type

☐ Initial Submission ☒ Notice of Deficiency (NOD) Response

2. Authorization Type

☒ Permit ☐ Registration

3. Application Type

☒ Modification with Public Notice ☐ Modification without Public Notice

☐ Temporary Authorization (TA) ☐ Modification for Name Change or Transfer

4. Application Fee

Amount

The application fee for a modification or temporary authorization is $150.

Payment Method

☐ Check

☒ Online through ePay portal www3.tceq.texas.gov/epay/

If paid online, enter ePay Trace Number: [redacted]

[1] www.tceq.texas.gov/downloads/permitting/waste-permits/msw/forms/20650-instr.pdf

Signature Page

Site Operator or Authorized Signatory

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: Raymond Whitlock Title: Environmental Manager

Email [redacted]

Signature: Raymond P. Whitlock Date: 12/12/2024

Operator or Principal Executive Officer Designation of Authorized Signatory

To be completed by the operator if the application is signed by an authorized representative for the operator.

I hereby designate _____ as my representative and hereby authorize said representative to sign any application, submit additional information as may be requested by the Commission; and/or appear for me at any hearing or before the Texas Commission on Environmental Quality in conjunction with this request for a Texas Water Code or Texas Solid Waste Disposal Act permit. I further understand that I am responsible for the contents of this application, for oral statements given by my authorized representative in support of the application, and for compliance with the terms and conditions of any permit which might be issued based upon this application.

Operator or Principal Executive Officer Name: _____

Email Address: _____

Signature: _____ Date: _____

Notary

SUBSCRIBED AND SWORN to before me by the said Raymond Whitlock

On this 12th day of December, 2024

My commission expires on the 11th day of August, 2026

Stacy M. Wilson

Notary Public in and for

Tarrant County, Texas

STACY M. WILSON
Notary Public, State of Texas
Comm. Expires 08-11-2026
Notary ID 133903285

Note: Application Must Bear Signature and Seal of Notary Public

MCCARTY ROAD LANDFILL TX
PO BOX 29246
PHOENIX AZ 29246

BFI
PO BOX 29246
PHOENIX AZ 85038-9246

JUAN M GONZALEZ &
PEDRO M GALLON
11530 SPICEWOOD LN
HOUSTON TX 77044-2610

BROWNING FERRIS
PO BOX 29246
PHOENIX AZ 85038-9246

F L GILL
PO BOX 1369
MUSKOGEE OK 74402-1369

DANIEL A QUINTANILLA LEAL
2430 CROMWELL ST
HOUSTON TX 77093-2420

SHANTIONE JACKSON
3414 KNOTTY OAKS TRAIL
HOUSTON TX 77045

ESTATE OF SAMUEL D KEEPER
2929 BUFFALO SPEEDWAY
UNIT 203
HOUSTON TX 77098-1719

HECTOR ARIAS & NORMA
MEDINA NAVA
11538 S SPICEWOOD LN
HOUSTON TX 77044-2610

CURRENT OWNER
ADDRESS UNKNOWN
HOUSTON TX 77001

ALBERT B LUM
1010 LAMAR ST
SUITE 350
HOUSTON TX 77002-6343

FRANCISCO PEREZ
11542 S SPICEWOOD LN
HOUSTON TX 77044-2610

MARY ALICE COOPER
ADDRESS UNKNOWN

HARRIS COUNTY FLOOD CONTROL
DISTRICT
9900 NORTHWEST FREEWAY
HOUSTON TX 77092-8601

RAFAEL HERIBERTO COBOS
19119 TIMBER WAY DR
HUMBLE TX 77346-5053

REUBEN J FINE
2236 BARTLETT ST
HOUSTON TX 77098-5202

YAHIA ZARIR
1805 GRAND VISTA HILL LN
RICHMOND TX 77407-1056

HERRERA GUILLERMO
7815 JOHN RALSTON RD
HOUSTON TX 77044-2635

MARY HERNANDEZ
5504 HILLMAN ST
HOUSTON TX 77023-3807

MARTIN DELGADO HERNANDEZ
606 E WELLINGTON
HOUSTON TX 77076-3427

KELLY BOWLING
2623 HAZELNUT CT
HEBRON KY 41048-6721

MRS ANNIE F BUCK
602 E 15TH ST
HOUSTON TX 77008-4517

ANTONIO VILLEDA
11514 S SPICEWOOD LN
HOUSTON TX 77044

MARK E ENTERPRISES
PO BOX 9945
HOUSTON TX 77213-0945

EDGAR E MURPHY
PO BOX 2544
DALLAS TX 75221

JOSE & LETICIA GAMBOA
11518 SPICEWOOD LN
HOUSTON TX 77044-2610

JUAN H & ROSE H JAUREGUI
8514 KILLENE ST
HOUSTON TX 77029-1034

E O FONDREN
PO BOX 935
MONT BELVIEU TX 77580-0935

MARCOS GARCIA & MATILDE N
MARTINEZ
11526 S SPICEWOOD LN
HOUSTON TX 77044-2610

VERONICA M GARZA
7526 JOHN RALSTON RD
HOUSTON TX 77044-2630

ELZA GONZALES
C/O ESTATE OF RAFAEL GONZALES
11811 DANVERS DR
HOUSTON TX 77044-2615

RAUL GARCIA
7125 JOHN RALSTON RD
HOUSTON TX 77044-2621

WASTE CORP TEXAS OF LP
ATTN TAX DEPARTMENT
100 NEW PARK PL
SUITE 500
VAUGHN ON L4K 0H9 CANADA

RAUDEL S SOTO
7601 JOHN RALSTON RD
HOUSTON TX 77044-2631

ARTURO & ROSA ALAS
773 TEAKWOOD LN
SAN DIMAS CA 91773-3634

ARNOLDO J RODAS
13126 ROSEMOUNT PARK LN
HOUSTON TX 77044-6552

JOSE A & NOHEMY A FLORES
7521 JOHN RALSTON RD
HOUSTON TX 77044-2629

J&M HOMES4GOOD TRANSITIONAL
LIVING LLC
PO BOX 96603
HOUSTON TX 77213-6603

JOSE I RODRIGUEZ
2214 FORREST RANCH DR
HOUSTON TX 77049-3132

JAMES BERNARD MCCULLUM
7417 JOHN RALSTON RD
HOUSTON TX 77044-2640

MZM REAL ESTATE LLC
PO BOX 741903
HOUSTON TX 77274-1903

DUMITRU HURGOIU
11831 LYNDA DR
HOUSTON TX 77038-3431

ROBERT L & PEGGY A STANLEY
7409 JOHN RALSTON RD
HOUSTON TX 77044-2641

JEMCO SERVICES INC
14703 BRINDLE TRAIL
HOUSTON TX 77044-4306

EQUIPMENT CARE CENTER OF
HOUSTON LLC
200 ESSEX AVE E
AVENEL NJ 07001-2045

RALPH S & DINAH L STANLEY
7409 JOHN RALSTON RD
HOUSTON TX 77044-2641

LUIS GUILLEN
1411 TEALSTONE FALLS CT
HOUSTON TX 77044-4956

HOUSTON PARKS BOARD LGC INC
300 N POST OAK LN
HOUSTON TX 77024-5904

WE MATCH GROUP LLC
7307 JOHN RALSTON RD
HOUSTON TX 77044-2625

JOSE EDGAR HERNANDEZ
20611 APACHE TRL
CROSBY TX 77523-3463

CONSOLIDATED TRUCK PARKING LLC
5050 QUORUM DR
DALLAS TX 75254-7564

VICTORIA N GONZALES
13810 BRIGHTON PARK DR
HOUSTON TX 77044-4996

SOUTHERN PACIFIC RAILROAD COMPANY
UNION PACIFIC RAILROAD COMPANY
1400 DOUGLAS ST
STOP 1640
OMAHA NE 68179-1001

TANIA O & ATENAS GONZALES
11300 BEAUMONT HWY
HOUSTON TX 77078-4814

ANAYA HIPPOLITO
307 BENNINGTON ST
HOUSTON TX 77022

MELITON A DELEON
13909 FOREST ACRES DR
HOUSTON TX 77050-3501

CITY OF HOUSTON
PO BOX 1562
HOUSTON TX 77251-1562

ALFREDO C JR & MARCIELA MEDELLIN
7209 JOHN RALSTON RD
HOUSTON TX 77044-2623

TEXAS DEPARTMENT OF
TRANSPORTATION
PO BOX 1386
HOUSTON TX 77251-1386

AHP INVESTMENTS LLC
23171 MILLS RD
PORTER TX 77365-4289

ISOCHEM LOGISTICS LLC
11000 BEAUMONT HWY
HOUSTON TX 77078-4806

EAST HOUSTON INDUSTRIAL
INVESTORES LLC
5728 LBJ FREEWAY
SUITE 225
DALLAS TX 75240-1200

ST JOHNS SCHOOL
2401 CLAREMONT LN
HOUSTON TX 77019-5811

RAP BEAUMONT PROPERTIES LP
% MATLACK LEASING LLC
163 HOOTON RD
MOUNT LAUREL NJ 08054-1353

RANGER H TX LP
C/O DRA ADVISORS LLC
220 E 42ND ST 27TH FLOOR
NEW YORK NY 10017-5819

CAROLYN C TAUB INTERESTS II LLC
PO BOX 27423
HOUSTON TX 77227-7423

MUNICIPAL CORRECTIONS FINANCE LP
ATTN TAX DEPARTMENT
4955 TECHNOLOGY WAY
BOCA RATON FL 33431-3367

SAIA MOTOR FREIGHT LINE INC
11465 JOHNS CREEK PARKWAY
DULUTH GA 30097-1574

METHODIST HOSPITAL SYSTEMS
75550 GREENBRIAR ST RB5-124
HOUSTON TX 77030

WBP LEASING INC
ATTN TAX DEPARTMENT
621 NW 53RD ST
SUITE 700
BOCA RATON FL 33487-8242

RANGER II RAILWOOD INDUSTRIAL LP
505 SANSOME ST
SUITE 1975
SAN FRANCISCO CA 9411-3140

SALTMINE INVESTMENT PARTNER
PO BOX 22227
HOUSTON TX 77227-2227

COUNTY OF HARRIS
PO BOX 1525
HOUSTON TX 77251

GSF ENERGY LLC
FOSTER PLAZA #10 5TH FLOOR
PITTSBURGH PA 15220-2740

YOLANDA & JESUS JR HERRERA
7433 DENISON ST
HOUSTON TX 77020-5509

TERESA GONZALES LUIS ARGUETA
% TRIPLE 7 PROPERTIES INC
3622 PARKSHIRE DR
PEARLAND TX 77584-9451

STAG TX HOLDINGS LP
ONE FEDERAL ST 23RD FLOOR
BOSTON MA 02110-2031

HOUSTON ISD
4400 W 18TH ST
HOUSTON TX 77092-8501

HOUSTON INDUSTRIAL YARD LLC
3657 BRIARPARK DR
SUITE 300
HOUSTON TX 77042-5266

DILIGENT DEALS LLC
9430 LEY RD
HOUSTON TX 77078-4416

EUGENIO & REBECCA PENA
9410 PALO BLANCO RD
HOUSTON TX 77078-4426

CCP LTD
PO BOX 42262
HOUSTON TX 77242-2262

C519 AT LEY RD LLC
PO BOX 20197
ATLANTA GA 30325-0197

MARVIN HUGHES
9406 PALO BLANCO RD
HOUSTON TX 77078-4426

RAILSPIKE LLC
2118 LAMAR ST
SUITE 105
HOUSTON TX 77003-3521

TEXAN LAND AND CATTLE II LTD
PO BOX 130979
HOUSTON TX 77219-0979

CHARLOTTE R & BENJAMIN JOHNSON
7901 PALO ALTO ST
HOUSTON TX 77078-4117

LINEAGE PFS TX HOUSTON RE LLC
ATTN TAX DEPARTMENT
46500 HUMBOLDT DR
NOVI MI 48377-2434

BAYLOR COLLEGE OF MEDICINE
ONE BAYLOR PLAZA BCM 200
HOUSTON TX 77030

BIG TEX AIR CONDITIONING LP
PO BOX 23296
HOUSTON TX 77228-3296

YOUNG MENS CHRISTIAN ASSOCIATES
PO BOX 3007
HOUSTON TX 77253-3007

ST LUKES UNITED METHODIST CHURCH
PO BOX 22013
HOUSTON TX 77227-2013

DEBAKEY MEDICAL FOUNDATION
C/O TRIPLETT & ASSOCIATES
PO BOX 55444
HOUSTON TX 77255-5444

EAST HOUSTON BAPTIST
9425 N GREEN RIVER DR
HOUSTON TX 77078-4125

NORMA L VALDEZ
11643 FILAREE TRL
HOUSTON TX 77044-1759

PIACIDO & ANGELITA GONZALEZ
4725 CLAY ST
HOUSTON TX 77023-1213

BLUE BIRD FOUNDATION
615 W ALABAMA ST
HOUSTON TX 77006-5003

ESTATE OF DORIS MOONEYHAM
9401 N GREEN RIVER DR
HOUSTON TX 77078-4125

SAM HOUSTON AREA COUNCIL
BOY SCOUTS OF AMERICA
PO BOX 924528
HOUSTON TX 77292-4528

JOSE A RODRIGUEZ
13527 DURBRUDGE TRAIL DR
HOUSTON TX 77065-5096

ST THOMAS UNIVERSITY
3812 MONTROSE BLVD
HOUSTON TX 77006-4626

HOUSTON PARKS BOARD
300 N POST OAK LN
HOUSTON TX 77024-5904

HERMENEGILDO & MARIA G LOPEZ
9234 N GREEN RIVER DR
HOUSTON TX 77078-4230

SOUTHERN METHODIST UNIVERSITY
PO BOX 750193
DALLAS TX 75275-0193

MENIL FOUNDATION
1519 BRANDARD ST
HOUSTON TX 77006-4721

FIRST UNITED METHODIST CHURCH
1320 MAIN ST
HOUSTON TX 7702-6803