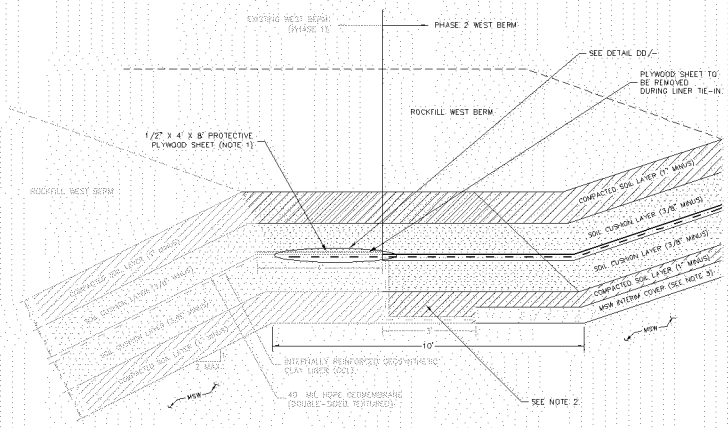
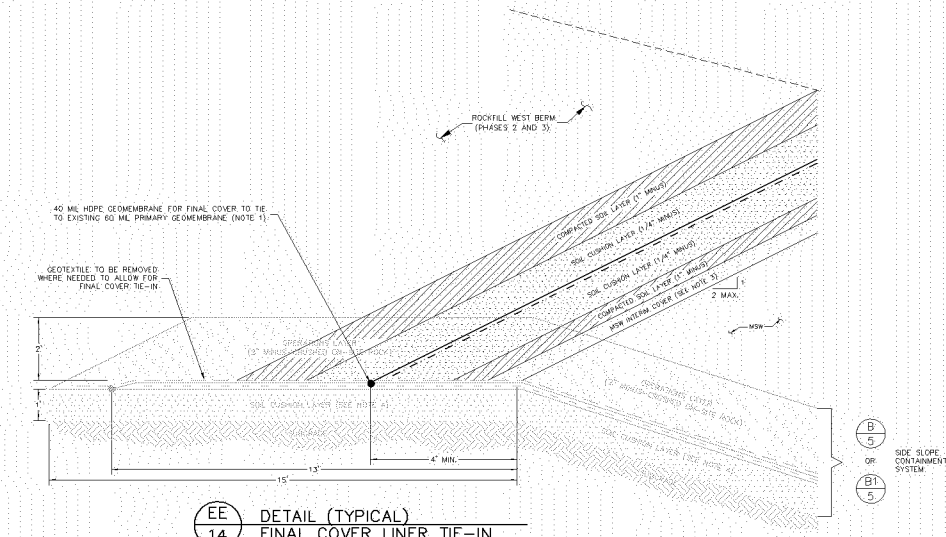
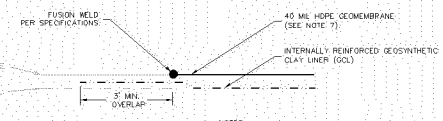



CC/12 DETAIL (TYPICAL)
FINAL COVER LINER TIE-IN BELOW WEST BERM
NOT TO SCALE

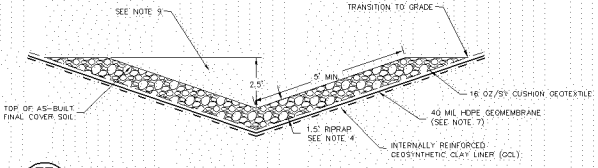



EE/14 DETAIL (TYPICAL)
FINAL COVER LINER TIE-IN ALONG CELLS MSW 11 AND E6
NOT TO SCALE

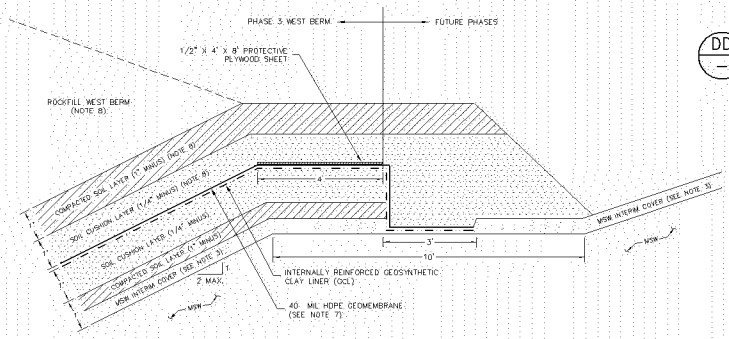



NOTES:
IF EXISTING GCL IS IN HYDRATED CONDITION, PLACE 18" WIDE GEOMEMBRANE STRIP ALONG EDGE OF EXISTING HYDRATED GCL BEFORE OVERLAPPING NEW GCL ON TOP OF EXISTING GCL.

DD/– DETAIL (TYPICAL)
TIE-IN OVERLAP BELOW WEST BERM (NOTE 1)
NOT TO SCALE




FF/13/15 DETAIL (TYPICAL)
SURFACE WATER SWALE (NOTE 9)
NOT TO SCALE




GG/12/14 DETAIL (TYPICAL)
FINAL COVER LINER TERMINATION BELOW WEST BERM (NOTE 8)
NOT TO SCALE

NOTES:

1. CONTRACTOR TO FIELD LOCATE AND UNCOVER EXISTING LINER SYSTEM AND FINAL COVER TERMINATIONS IN THE AREA OF WEST BERM. EXTEND AND CONNECT NEW FINAL COVER SYSTEM TO EXISTING CONTAINMENT SYSTEM OR FINAL COVER SYSTEM AS NECESSARY TO MAINTAIN A CONTINUOUS CONTAINMENT SYSTEM I.E.; (A) WELD NEW GEOMEMBRANE TO EXISTING GEOMEMBRANE; AND (B) OVERLAP THE NEW GCL A MINIMUM OF 3 FT OVER THE EXISTING GCL.

2. CONTRACTOR TO FIELD-VERIFY EXISTING LINER/FINAL COVER TERMINATIONS. IF CONDITIONS VARY, CHANGES TO DIMENSIONS MAY BE MADE UPON APPROVAL FROM THE ENGINEER.

3. EXISTING INTERIM COVER ABOVE MSW MAY ACCOUNT FOR A PORTION OF THE COMPACTED SOIL LAYER THICKNESS PROVIDED THE INTERIM COVER MATERIAL MEETS REQUIREMENTS IN THE SPECIFICATIONS FOR COMPACTED SOIL (I.E., COMPACTION AND GRADATION).

4. RIPRAP WITH A $D_{50}$ = 12 INCHES SHOULD BE PLACED TO 5 FEET OF EITHER SIDE OF THE SURFACE WATER SWALE AS PROTECTION AGAINST EROSION. HORIZONTAL EXTENT OF SURFACE WATER SWALE AS SHOWN ON SHEET 4.

5. DURING CONSTRUCTION INSTALLER/CONTRACTOR MAY REQUIRE SAND BAGS TO ADDRESS WIND UPLIFT OF GEOSYNTHETICS.

6. SCREENED BACK FEATURES CORRESPOND TO EXISTING OR FUTURE LAYERS.

7. GEOMEMBRANES SHALL BE DOUBLE-SIDED TEXTURED.

8. (I) STAGING OF PLACEMENT OF SOIL CUSHION, COMPACTED SOIL, AND ROCKFILL SHALL BE NECESSARY.
(II) CONTRACTOR SHALL ANCHOR THE GEOSYNTHETICS AND COMPLETE THE PLACEMENT OF OVERLYING COMPACTED SOIL AND CUSHION LAYERS ON THE BENCH PRIOR TO PLACEMENT OF OVERLYING SOIL CUSHION AND COMPACTED SOIL LAYERS ON THE SLOPE.
(III) CONTRACTOR SHALL PLACE SOIL CUSHION LAYER ABOVE GEOMEMBRANE A MAXIMUM LENGTH OF 15 FEET MEASURED ALONG THE SLOPE. CONTRACTOR SHALL USE A CATERPILLAR D3C LGP OR EQUIVALENT TO PLACE SOIL CUSHION WITHOUT BRAKING.
(iv) CONTRACTOR SHALL PLACE COMPACTED SOIL LAYER AND ROCKFILL BERM TO BUTTRESS THE PREVIOUSLY PLACED SOIL CUSHION LAYER ABOVE THE GEOMEMBRANE.
(v) COMPACTED SOIL LAYER AND WEST BERM MATERIAL SHALL ONLY BE COMPACTED IN HORIZONTAL LAYERS AND NOT BE COMPACTED UP AND DOWN THE SLOPE.

9. CONTRACTOR TO BUILD SWALE TO DISCHARGE TO THE EXISTING SURFACE WATER SWALE AND/OR DITCH.

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No. 10004
HAWAII, U.S.A.

P:\CADD\Land Projects 3\WM Waimanalo\dwg\Cells E3-E8 and Partial West Berm Construction\E3-E8 DETAILS CONSTRUCTION (1-15).dwg, 1-15-10, Dennis

| REVISIONS | | | |
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| NO. | DESCRIPTION | DATE | BY |
| | | | |

WASTE MANAGEMENT

Geosyntec consultants

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Oakland, CA 94612

WEST BERM FINAL COVER DETAILS I

CELLS E5 THROUGH E8
WAIMANALO GULCH LANDFILL
EWA BEACH, OAHU, HAWAII

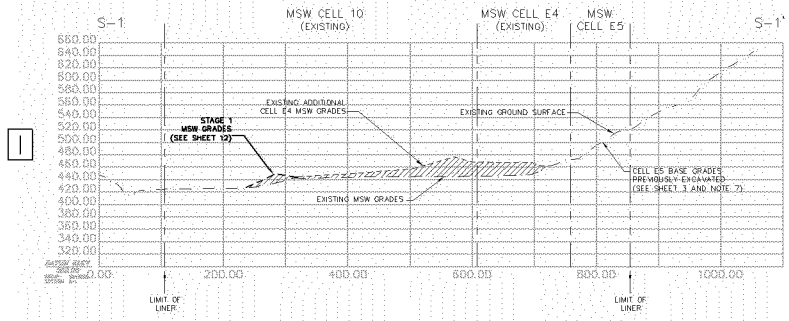
CONSTRUCTION DRAWINGS

| | |
|---|---|
| DES BY: ACP | DATE: JANUARY 2010 |
| DRN BY: ACP | SCALE: AS SHOWN |
| CHK BY: FWS | PROJECT: WL0770 |
| REV BY: HDS | DOCUMENT: |
| APP BY: HDS | |
| FILE: | |

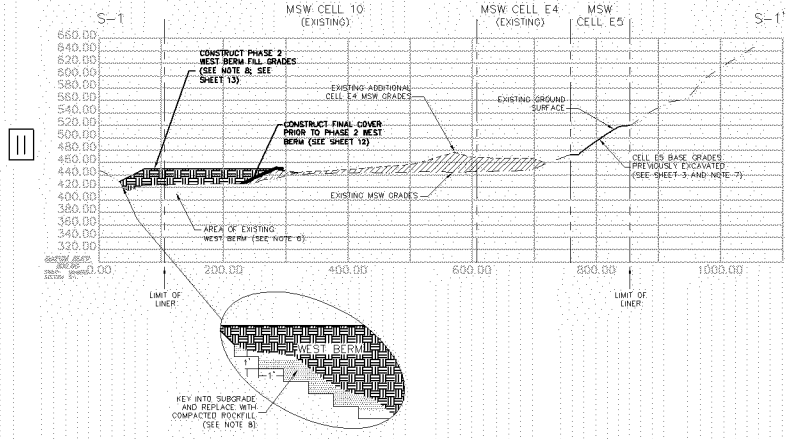
SHEET NO. 17

WMH000937

## STAGE 1
(PLACE STAGE 1 MSW TO ELEVATION +450' MSL)




## PHASE 2
(CONSTRUCT PHASE 2 WEST BERM TO ELEVATION +450' MSL; STAGE 1 MSW MUST BE BUILT PRIOR TO PHASE 2 WEST BERM CONSTRUCTION – SEE NOTE 6)




NOTES:

1. EXISTING TOPOGRAPHY BASED ON 16 MARCH 2009 AERIAL SURVEY PROVIDED BY OWNER.
2. THE LOCATION OF TIE-IN TO EXISTING LINER SHOWN IS APPROXIMATE. ACTUAL LOCATION OF TIE-IN SHOULD BE FIELD VERIFIED PRIOR TO CONSTRUCTION AND MAY VARY FROM LAYOUT SHOWN. CONTRACTOR TO FIELD LOCATE AND UNCOVER EXISTING LINER SYSTEM TERMINATION, AND EXTEND AND CONNECT NEW LINER SYSTEM COMPONENTS TO EXISTING AS NECESSARY TO MAINTAIN LINER SYSTEM CONTINUITY.
3. GRADES ALONG TIE-IN MAY BE ADJUSTED AS NEEDED TO MATCH EXISTING SUBGRADE CONDITIONS WITH APPROVAL BY THE ENGINEER.
4. FOR VEHICULAR TRAFFIC ON LINER SYSTEM, MINIMUM ALLOWABLE GROUND PRESSURES AND COVER MATERIAL REQUIREMENTS IN THE SPECIFICATIONS TO BE FOLLOWED AT ALL TIMES DURING AND AFTER CONSTRUCTION.
5. BEFORE, DURING, AND AFTER STORM EVENTS, CONTRACTOR TO CONTROL AND DIRECT SURFACE WATER RUNOFF BY PUMPING OR OTHER METHODS. CONTRACTOR TO COORDINATE WITH OWNER FOR EROSION CONTROL METHODS.
6. PHASE 1 WEST BERM UP TO ELEV ~400 FT MSL CONSTRUCTED BY OTHERS AS OF 2006.
7. PORTION OF CELL E5 BASE GRADES CONSTRUCTED BY OTHERS AS OF 2006.
8. THE BERM IS TO BE KEYED INTO THE COMPETENT NATIVE SUBGRADE IN A STEP CONFIGURATION.

HARI D. SHARMA
LICENSED PROFESSIONAL ENGINEER
No. 10584
HAWAII, U.S.A.
Hari D. Sharma

### LEGEND

- EXISTING GROUND SURFACE (16 MARCH 2009 TOPOGRAPHY)
- WEST BERM FILL GRADES TO ELEVATION +450 FT MSL
- CELL E5 BASE GRADES (LINER GRADES)
- MSW GRADES PRIOR TO STAGE 1 MSW PLACEMENT
- MSW GRADES PRIOR TO PHASE 2 WEST BERM
- CELL BOUNDARY
- I II SEQUENCE OF CONSTRUCTION IN ORDER

100 40 0 100 200
SCALE IN FEET

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WASTE MANAGEMENT

Geosyntec consultants
475 14th Street
Suite 400
Oakland, CA 94612

**CONSTRUCTION CROSS SECTION– SECTION S-1**

CELLS E5 THROUGH E8
WAIMANALO GULCH LANDFILL
EWA BEACH, OAHU, HAWAII

| CONSTRUCTION DRAWINGS | |
|---|---|
| DES BY: ACP | DATE: JANUARY 2010 |
| DRN BY: ACP | SCALE: AS SHOWN |
| CHK BY: FWS | PROJECT: WL0770 |
| REV BY: HDS | DOCUMENT: |
| APP BY: HDS | |
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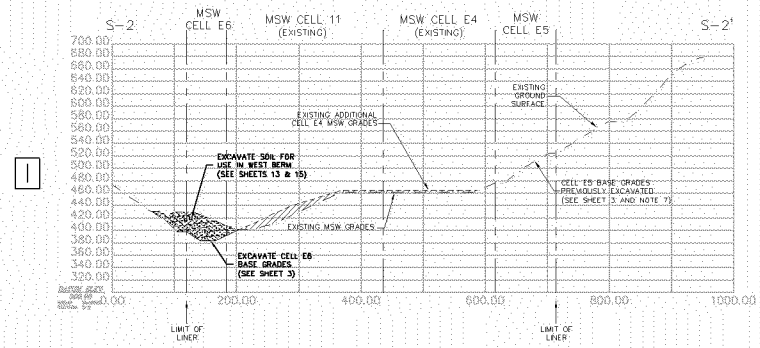
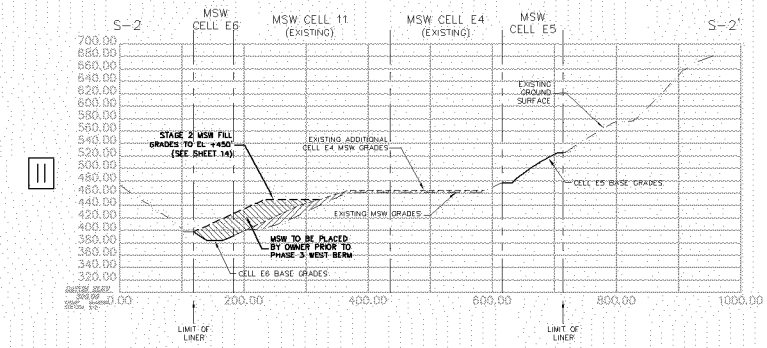
SHEET NO. 18

WMH000938

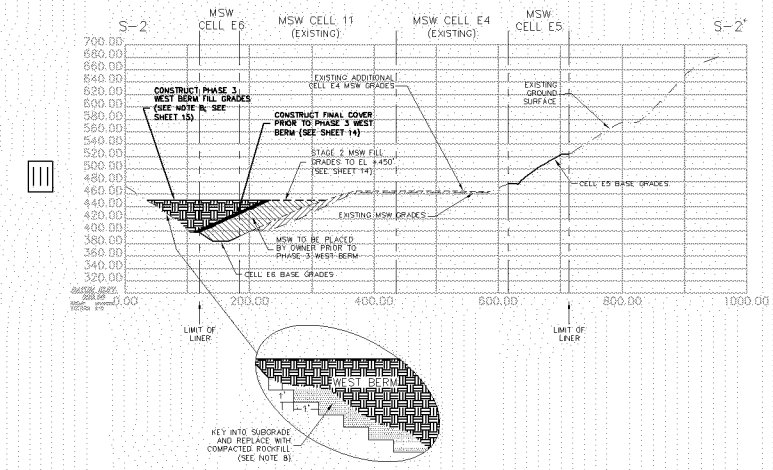
## EXCAVATION
(EXCAVATE MSW CELL E6 BASE GRADES TO THE ELEVATIONS SHOWN ON SHEET 3)



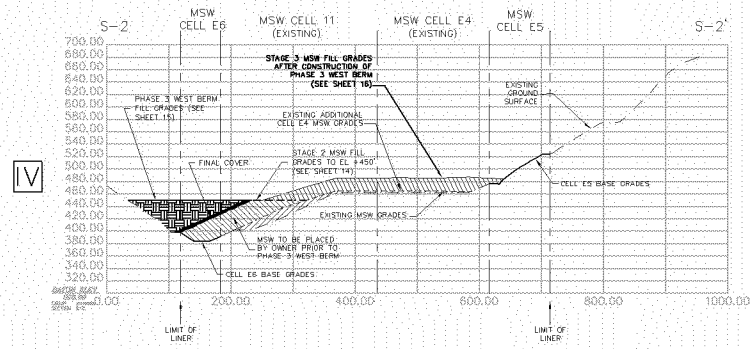

## STAGE 2
(STAGE 2 MSW CANNOT BE PLACED UNTIL EXCAVATION FOR CELL E6 HAS BEEN COMPLETED)




## PHASE 3
(STAGE 2 MSW MUST BE BUILT PRIOR TO PHASE 3 WEST BERM CONSTRUCTION)




## STAGE 3
(STAGE 3 MSW CANNOT BE PLACED UNTIL PHASE 3 WEST BERM HAS BEEN CONSTRUCTED TO ELEVATION GRADES SHOWN ON SHEET 15)




NOTES:

1. EXISTING TOPOGRAPHY BASED ON 16 MARCH 2009 AERIAL SURVEY PROVIDED BY OWNER.
2. THE LOCATION OF TIE-IN TO EXISTING LINER SHOWN IS APPROXIMATE. ACTUAL LOCATION OF TIE-IN SHOULD BE FIELD VERIFIED PRIOR TO CONSTRUCTION AND MAY VARY FROM LAYOUT SHOWN. CONTRACTOR TO FIELD LOCATE AND UNCOVER EXISTING LINER SYSTEM TERMINATION, AND EXTEND AND CONNECT NEW LINER SYSTEM COMPONENTS TO EXISTING AS NECESSARY TO MAINTAIN LINER SYSTEM CONTINUITY.
3. GRADES ALONG TIE-IN MAY BE ADJUSTED AS NEEDED TO MATCH EXISTING SUBGRADE CONDITIONS WITH APPROVAL BY THE ENGINEER.
4. FOR VEHICULAR TRAFFIC ON LINER SYSTEM, MINIMUM ALLOWABLE GROUND PRESSURES AND COVER MATERIAL REQUIREMENTS IN THE SPECIFICATIONS TO BE FOLLOWED AT ALL TIMES DURING AND AFTER CONSTRUCTION.
5. BEFORE, DURING, AND AFTER STORM EVENTS, CONTRACTOR TO CONTROL AND DIRECT SURFACE WATER RUNOFF BY PUMPING OR OTHER METHODS. CONTRACTOR TO COORDINATE WITH OWNER FOR EROSION CONTROL METHODS.
6. PHASE 1 WEST BERM UP TO ELEV. ~400 FT MSL CONSTRUCTED BY OTHERS AS OF 2006.
7. PORTION OF CELL E5 BASE GRADES CONSTRUCTED BY OTHERS AS OF 2006.
8. THE BERM IS TO BE KEYED INTO THE COMPETENT NATIVE SUBGRADE IN A STEP CONFIGURATION.

HARI D. SHARMA
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### LEGEND

- EXISTING GROUND SURFACE (16 MARCH 2009 TOPOGRAPHY)
- WEST BERM FILL GRADES TO ELEVATION +450 FT MSL
- CELLS E5 AND E6 BASE GRADES (LINER GRADES)
- MSW GRADES PRIOR TO STAGE 2 MSW PLACEMENT
- MSW GRADES PRIOR TO PHASE 3 WEST BERM
- STAGE 3 MSW FILL GRADES
- CELL BOUNDARY
- I II III IV SEQUENCE OF CONSTRUCTION IN ORDER

100 50 0 100 200
SCALE IN FEET

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WASTE MANAGEMENT

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Oakland, CA 94612

**CONSTRUCTION CROSS SECTION–SECTION S–2**

CELLS E5 THROUGH E8
WAIMANALO GULCH LANDFILL
EWA BEACH, OAHU, HAWAII

**CONSTRUCTION DRAWINGS**

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| DES BY: ACP | DATE: JANUARY 2010 | | |
| DRN BY: ACP | SCALE: AS SHOWN | | |
| CHK BY: FWS | PROJECT: WL0770 | | |
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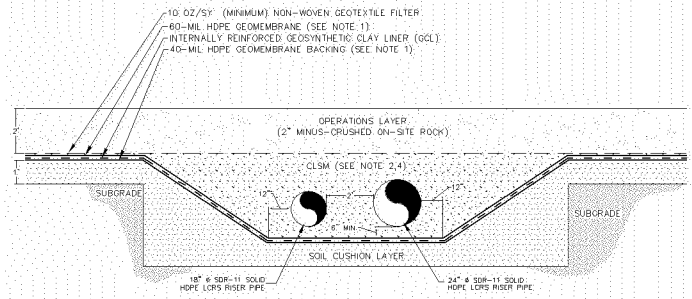
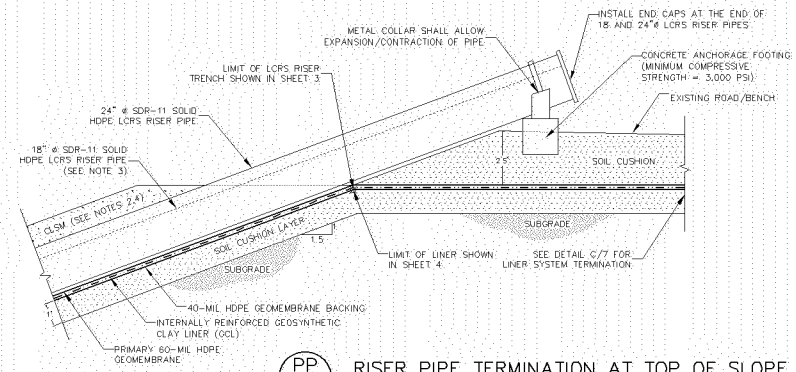
SHEET NO. 19

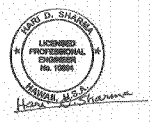
WMH000939




00/4 DETAIL (TYPICAL)
E8 RISER TRENCH
NOT TO SCALE




PP/3/4 RISER PIPE TERMINATION AT TOP OF SLOPE
FOR CELLS E6 & E8
NOT TO SCALE




NOTES:

1. FOR ALL CELLS, GEOMEMBRANE SHALL BE TEXTURED ON BOTH SIDES.
2. CLSM TO BE USED FOR CELL E8 LCRS RISER PIPE TRENCH SHALL HAVE A MAXIMUM PARTICLE SIZE FOR THE AGGREGATE OF 1"ϕ.
3. LCRS RISER PIPE IS ALSO GAS EXTRACTION PIPE FOR E6 RISER.
4. CLSM SHALL BE PLACED IN STAGES TO MAINTAIN RISER TRENCH STABILITY.

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WASTE MANAGEMENT

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CONTAINMENT SYSTEM DETAILS VIII

CELLS E5 THROUGH E8
WAIMANALO GULCH LANDFILL
EWA BEACH, OAHU, HAWAII

CONSTRUCTION DRAWINGS

| | | | |
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| DES BY: ACP | DATE: JANUARY 2010 | | |
| DRN BY: ACP | SCALE: AS SHOWN | | |
| CHK BY: FWS | PROJECT: WL0770 | | |
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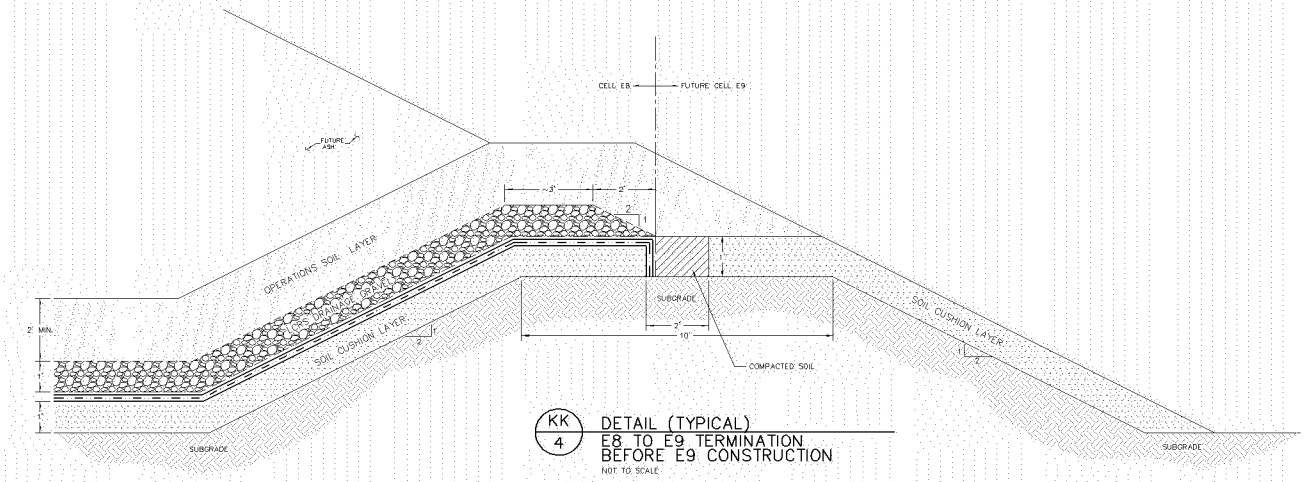
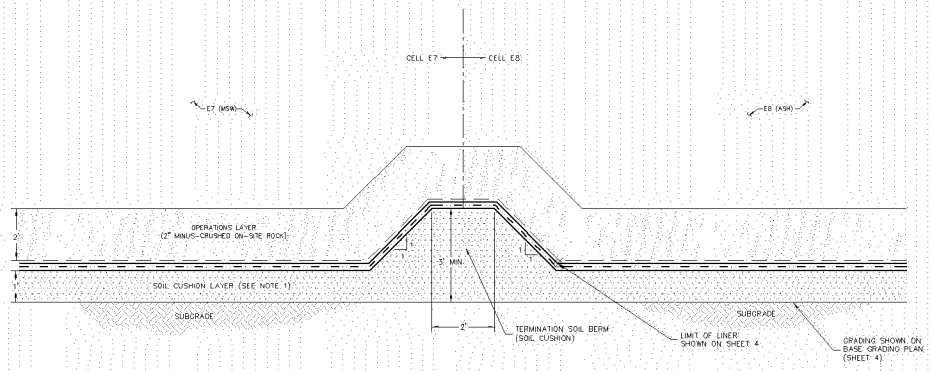
SHEET NO. 20

WMH000940




KK 4 DETAIL (TYPICAL)
E8 TO E9 TERMINATION
BEFORE E9 CONSTRUCTION
NOT TO SCALE




LL 4 DETAIL (TYPICAL)
LINER CONNECTION
CELL E7 TO E8 (NOTE 2)
NOT TO SCALE

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NOTES:

1. IF SOIL CUSHION LAYER CAN NOT BE PLACED ON THE SIDE SLOPES, THEN THE SUBGRADE SHALL RECEIVE GUNITE HAVING SURFACE PROJECTIONS LESS THAN 0.25 INCH TO RECEIVE GEOSYNTHETICS.
2. ASSUMES CELLS E7 AND E8 ARE CONSTRUCTED CONCURRENTLY.

| REVISIONS | | | |
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WASTE MANAGEMENT

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CONTAINMENT SYSTEM DETAILS IX

CELLS E5 THROUGH E8
WAIMANALO GULCH LANDFILL
EWA BEACH, OAHU, HAWAII

CONSTRUCTION DRAWINGS

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|---|---|
| DES BY: ACP | DATE: JANUARY 2010 |
| DRN BY: ACP | SCALE: AS SHOWN |
| CHK BY: FWS | PROJECT: WL0770 |
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| APP BY: HDS | |
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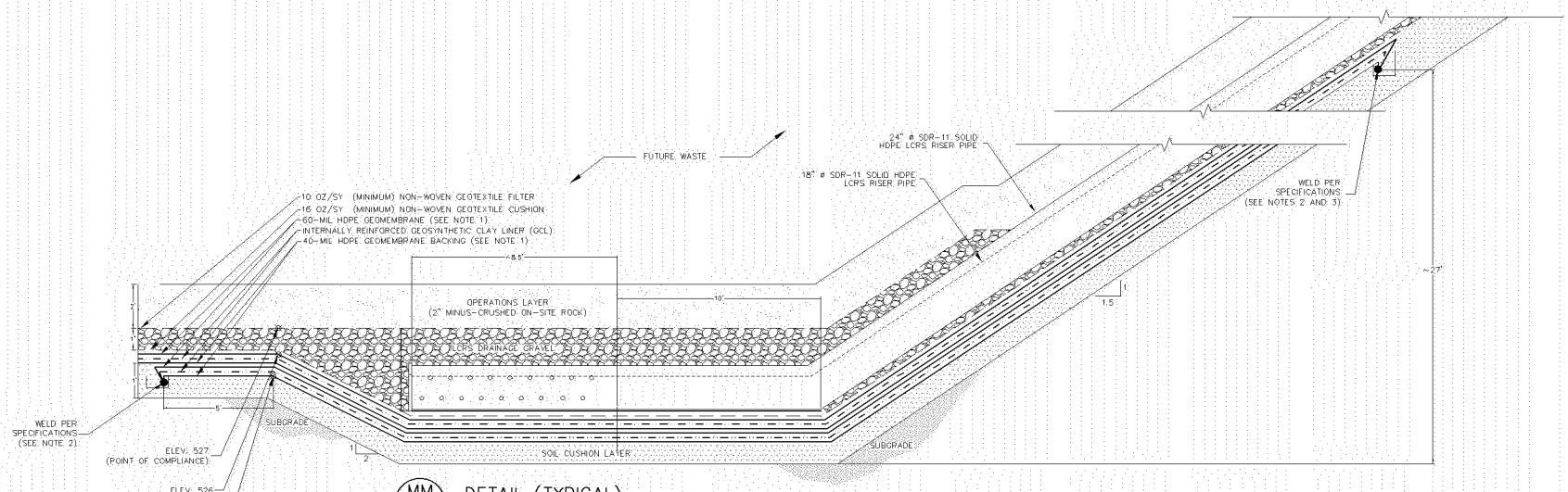
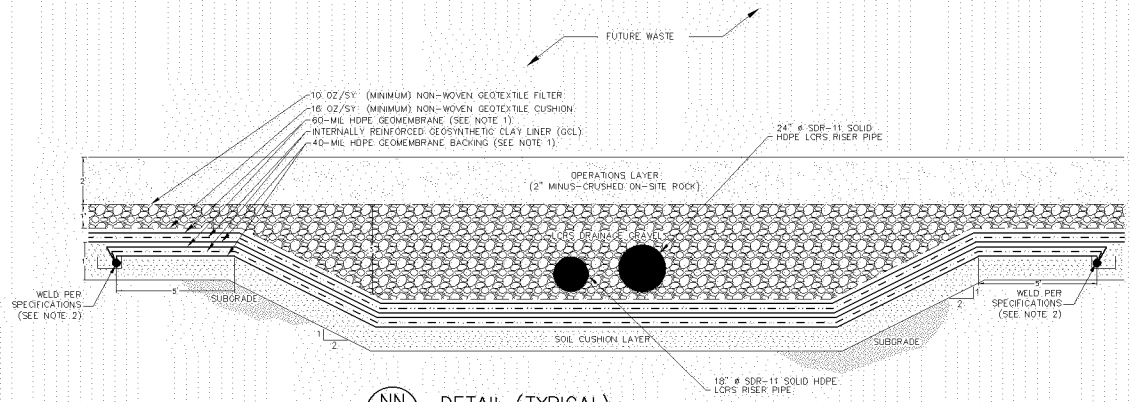
SHEET NO. 21

WMH000941




MM 4 DETAIL (TYPICAL)
E8 SUMP WEST-EAST DIRECTION
NOT TO SCALE




NN 4 DETAIL (TYPICAL)
E8 SUMP NORTH-SOUTH DIRECTION
NOT TO SCALE

HARI D. SHARMA
LICENSED PROFESSIONAL ENGINEER
No. 10984
HAWAII, U.S.A.

NOTES:

1. FOR ALL CELLS, GEOMEMBRANE SHALL BE TEXTURED ON BOTH SIDES.

2. INSERT SECONDARY ENCAPSULATED LINER SYSTEM INTO 6" DEEP TERMINATION TRENCH AND BACKFILL WITH COMPACTED SOIL CUSHION.

3. EXTEND DOUBLE-LINER SYSTEM FROM SUMP TO BENCH AT ELEVATION 549 FT APPROXIMATELY.

| REVISIONS | | | |
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| NO. | DESCRIPTION | DATE | BY |

WASTE MANAGEMENT

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CONTAINMENT SYSTEM DETAILS X

CELLS E5 THROUGH E8
WAIMANALO GULCH LANDFILL
EWA BEACH, OAHU, HAWAII

CONSTRUCTION DRAWINGS

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| DES BY: ACP | DATE: JANUARY 2010 |
| DRN BY: ACP | SCALE: AS SHOWN |
| CHK BY: FWS | PROJECT: WL0770 |
| REV BY: HDS | DOCUMENT: |
| APP BY: HDS | |
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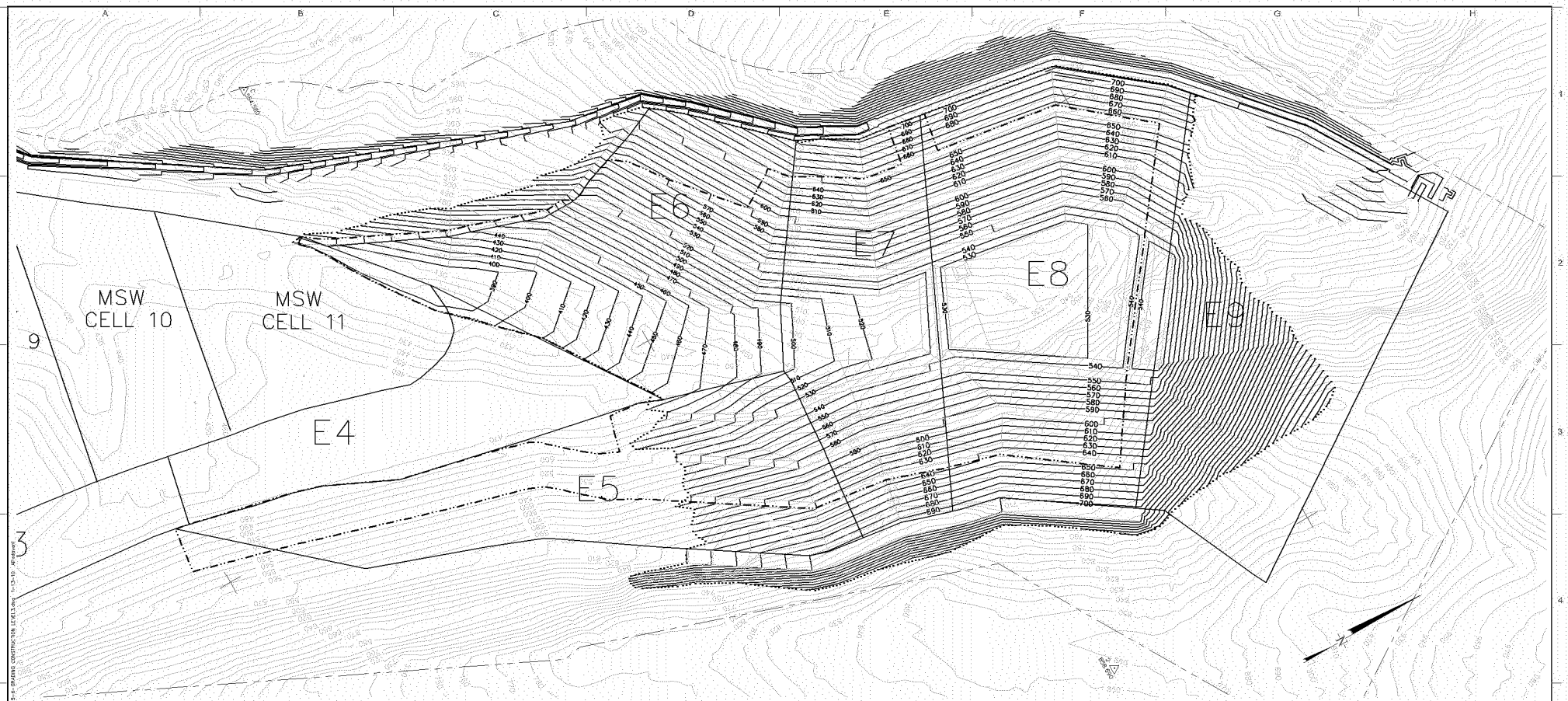
SHEET NO. 22

WMH000942




NOTES:

1. EXISTING TOPOGRAPHY BASED ON 16 MARCH 2009 AERIAL SURVEY PROVIDED BY OWNER. WASTE ELEVATIONS MAY VARY.

2. THE LOCATION OF TIE-IN TO EXISTING LINER SHOWN IS APPROXIMATE. ACTUAL LOCATION OF TIE-IN SHOULD BE FIELD VERIFIED PRIOR TO CONSTRUCTION AND MAY VARY FROM LAYOUT SHOWN. CONTRACTOR TO FIELD LOCATE AND UNCOVER EXISTING LINER SYSTEM TERMINATION, AND EXTEND AND CONNECT NEW LINER SYSTEM COMPONENTS TO EXISTING AS NECESSARY TO MAINTAIN LINER SYSTEM CONTINUITY.

3. GRADES ALONG TIE-IN MAY BE ADJUSTED AS NEEDED TO MATCH EXISTING SUBGRADE CONDITIONS WITH APPROVAL BY THE ENGINEER.

4. FOR VEHICULAR TRAFFIC ON LINER SYSTEM, MINIMUM ALLOWABLE GROUND PRESSURES AND COVER MATERIAL REQUIREMENTS IN THE SPECIFICATIONS TO BE FOLLOWED AT ALL TIMES DURING AND AFTER CONSTRUCTION.

5. BEFORE, DURING, AND AFTER STORM EVENTS, CONTRACTOR TO CONTROL AND DIRECT SURFACE WATER RUNOFF BY PUMPING OR OTHER METHODS. CONTRACTOR TO COORDINATE WITH OWNER FOR EROSION CONTROL METHODS.

6. EXISTING CONCRETE CHANNEL (INCLUDING WINGWALLS AND HEADWALL) AND EXISTING 48" ⌀ PIPES TO BE REMOVED WITHIN THIS AREA, PRIOR TO SUBGRADE PREPARATION OF CELL E6.

7. BENCHES THAT WILL NOT RECEIVE LINER SHALL BE LOCALLY GRADED SO THAT WATER FLOWS AWAY FROM LANDFILL.

8. IF COLLUVIUM OR ALLUVIUM ARE ENCOUNTERED DURING EXCAVATION, SLOPES SHALL BE RE-EVALUATED AND MAY NEED TO BE FLATTENED.

9. A SUBDRAIN PIPE MAY BE REQUIRED TO COLLECT SEEPS. SEEPS TO BE IDENTIFIED BY A GEOLOGIST. SUBDRAIN PIPE MAY NEED TO BE EXTENDED PAST THE LIMITS CURRENTLY SHOWN.

10. SLOPES SHALL BE EXCAVATED FROM TOP DOWN. CONTRACTOR SHALL ALLOW A GEOLOGIST TO ACCESS THE EXCAVATED SLOPES FOR GEOLOGIC MAPPING AND TO CONFIRM THAT THE SLOPES WILL BE STABLE.

NOTES (CONT.):

11. RISER PIPES SHALL BE EXTENDED AS WEST BERM IS CONSTRUCTED.

12. AREA OF INCREASED GRAVEL THICKNESS SHOWN ON SHEET 4.

**13. EXCAVATION FOR SUMP AREA AND ITS VICINITY WILL REQUIRE SPECIAL PROVISIONS; THEREFORE COORDINATION WITH OWNER/OPERATOR WILL BE REQUIRED.**

14. A MINIMUM OF THREE DAYS BEFORE STARTING CONSTRUCTION AND AS PART OF MOBILIZATION, CONTRACTOR WITH OWNER/OPERATOR SHALL CLEARLY MARK/IDENTIFY THE LOCATION OF EXITING UTILITIES AND/OR FACILITIES. EXISTING UTILITIES MAY BE OVERHEAD, ABOVE-GROUND, OR BURIED. EXISTING UTILITIES INCLUDE, BUT ARE NOT LIMITED TO, OVERHEAD POWER LINES AND EXISTING FOUNDATIONS; GROUNDWATER MONITORING WELLS; LANDFILL GAS PROBES; LANDFILL GAS WELLS; SURFACE WATER SAMPLING LOCATIONS; LANDFILL GAS, LANDFILL CONDENSATE, AND LEACHATE PIPELINES; SURFACE CONTROL PIPES, ETC. COORDINATION WITH LOCAL UTILITIES AND/OR A PRIVATE UTILITY LOCATION SERVICE MAY BE REQUIRED.

LOCATION OF EXISTING UTILITIES SHALL BE CLEARLY MARKED BY FLAGGED 4-FT HIGH WOODEN STAKES AT 100-FT INTERVALS AND PAINT ON THE GROUND SURFACE. NEARER INTERVALS MAY BE REQUIRED BASED ON FIELD CONDITIONS. CONTRACTOR SHALL MONITOR AND MAINTAIN THE MARKINGS DURING THE CONSTRUCTION PROJECT UNTIL FINAL ACCEPTANCE OF THE WORK BY THE OWNER/OPERATOR.

15. CONTRACTOR SHALL FOLLOW ALL APPLICABLE CITY, STATE AND FEDERAL HEALTH AND SAFETY REQUIREMENTS TO GUARD AND PROTECT ALL WORKERS, PEDESTRIANS, AND THE PUBLIC FROM EXCAVATIONS, BLASTING OPERATIONS, CONSTRUCTION EQUIPMENT, TRAFFIC, CONSTRUCTION OPERATIONS, ALL OBSTRUCTIONS, AND OTHER DANGEROUS ITEMS (E.G., LANDFILL GAS) OR AREAS. A HEALTH AND SAFETY PLAN IS REQUIRED AS PART OF THE WORK.

16. EXPECTED TO BE CONSTRUCTED BETWEEN 2010 AND 2014.

17. LIMIT OF FUTURE WASTE FILL IN CELLS E5 THROUGH E8 MAY CHANGE DEPENDING ON FUTURE WASTE STREAM.

HARI D. SHARMA
LICENSED PROFESSIONAL ENGINEER
No. 10886
HAWAII, U.S.A.

LEGEND

- 480 — CELLS E5 THROUGH E8 BASE GRADE 10-FT CONTOUR (MSL)
- EXISTING GROUND 10-FT CONTOUR (MSL)
- 4 / 28616 — EXISTING BENCHMARK
- CELL BOUNDARY/LIMIT OF FUTURE WASTE FILL (NOTE 17)
- PROPERTY LINE
- APPROXIMATE LIMIT OF EARTHWORK
- APPROXIMATE CELLS E5 THROUGH E8 LINER LIMIT (NOTE 16)

100 50 0 100 200
SCALE IN FEET

| REVISIONS | | | |
|---|---|---|---|
| NO. | DESCRIPTION | DATE | BY |

WASTE MANAGEMENT

Geosyntec consultants
475 14th Street
Suite 400
Oakland, CA 94612

# CELL BOUNDARIES AND PROPOSED LINER LIMIT

CELLS E5 THROUGH E8
WAIMANALO GULCH LANDFILL
EWA BEACH, OAHU, HAWAII

| CONSTRUCTION DRAWINGS | | |
|---|---|---|
| DES BY: ACP | DATE: JANUARY 2010 | |
| DRN BY: ACP | SCALE: AS SHOWN | |
| CHK BY: FWS | PROJECT: WL077D | |
| REV BY: HDS | DOCUMENT: | |
| APP BY: HDS | | |
| FILE: | | |

SHEET NO. 23

WMH000943