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Inspection Report for Technical Area 73 Los Alamos County Airport Landfill, Solid Waste Management Units 73-001(a) and 73-001(d)

Prepared for the Department of Energy/Los Alamos Site Office

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EXECUTIVE SUMMARY

This report summarizes activities and findings of the landfill cover inspection conducted for the Los Alamos County Airport Technical Area 73 landfill July 2009, as part of post-closure care and monitoring requirements.

Inspection activities indicate the landfill cover is functioning as designed and that the overall condition and integrity of the cover is generally good. However, areas were identified that require restoration. In particular, erosion and channeling, or rilling, was noted on the upper reaches of the sloped, vegetated eastern portion of the landfill cover. Channeled surface water runoff in this area has also resulted in limited subsidence and rilling down slope. Erosion and rilling on the northernmost, unvegetated portion of sloped cover was also noted. Erosion in this area has resulted in displacement of straw wattles used as temporary erosion control measures.

Subsidence was noted in the northern portions of concrete hangar pads 2 and 3, with cracking noted in the middle portions of the pads. A similar degree of subsidence was also noted in the MatCon asphalt cover in the vicinity of the hangar pads; however, no apparent cracking in the MatCon was noted.

Based on the findings of the inspection activities, it is recommended that, at a minimum, measures be undertaken to restore the areas which require maintenance to their original design configuration. In some instances (in areas where erosion and rilling were noted), design enhancements may be incorporated to prevent the same issues from re-occurring in the future. The goal of possible enhancements is to minimize runoff and sediment transport; minimize discharge energy/velocity; increase storage and evapo-transpiration (ET) properties of the vegetated surface; and to maximize durability of the cover. Restorative enhancements may include the following.

- Advanced best management practices
- Rock armor/benching
- ET or vegetative ground cover

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1.0 INTRODUCTION

This landfill cover inspection report summarizes the findings of inspection activities conducted at the Los Alamos County Airport Technical Area (TA) 73 Solid Waste Management Unit (SWMU) 73-001(a) landfill and SWMU 73-001(d) (debris disposal area, or DDA) from July 7 through July 10, 2009. Inspection activities were conducted as part of post-closure and care and monitoring requirements as required under 40 Code of Regulations 265.310 for Resource Conservation and Recovery Act Subtitle C landfill facilities. Post-closure care and monitoring inspection and reporting requirements are described in the *Final Implementation Strategy for Post Closure Inspection and Maintenance of the DOE/NNSA LASO Airport Landfill SWMU 73-001(a) and Debris Disposal Area SWMU 73-001(d), Los Alamos County Airport, New Mexico, July 2009*, and the *Post-Closure Care and Monitoring Plan for the Los Alamos Site Office TA-73 Airport Landfill, April 2006*.

2.0 BACKGROUND

Two inactive solid waste disposal sites [the airport landfill, SWMU 73-001(a) and the DDA, SWMU 73-001(d)] are located at the Los Alamos County Airport. The airport landfill was operated from 1943 to 1973 for the disposal of solid waste consisting of household trash from the Los Alamos townsite and office trash from Los Alamos National Laboratory. Prior to 1965, some of the waste was incinerated and subsequently buried in the airport landfill. Approximately 489,500 cubic yards of waste, which consisted primarily of municipal solid waste, was disposed of in the landfill. However, the presence of non-municipal solid waste could not be ruled out. Approximately 50,000 cubic yards of waste was relocated within the SWMU boundary during the 2006 Final Remedy construction activities. With the exception of a single container of Freon-113 uncovered and subsequently disposed off site, no other hazardous or radioactive materials were discovered.

From 1984 to 1986, approximately 126,000 cubic yards of burned debris was excavated from the western end of the airport landfill and reburied in a pair of parallel trenches at the DDA.

In late 2006 and early 2007, the Final Remedy landfill cover system was installed at the airport landfill. The Final Remedy design and completion activities for the airport landfill and the DDA are provided in the *Remedy Completion Report DOE LASO TA-73 Airport Landfill SWMUs 73-001(a) and 73-001(d) April 2007*. After the waste relocation, compaction, and regrading were conducted, the following features were installed for the Airport Landfill cover.

- Approximately 6 acres of MatCon™ (Modified Asphalt Technology for Waste Containment) asphalt pavement
- Five concrete hangar pads within the MatCon™ pavement area
- A landfill-gas collection system
- Two rock retaining walls
- A concrete retaining wall
- Turf reinforcement mats
- Revegetation of approximately 4 acres with native grasses
- A storm-water collection system consisting of five trench drains, seven drain inlets, approximately 1,950 feet of associated buried concrete storm-sewer lines, an 18-inch diameter HDPE outfall pipe approximately 110 feet in length, and three rip rap drainage channels.

The airport landfill cover and associated features are shown on Figure 1.

3.0 INSPECTION ACTIVITIES

Inspection activities were conducted from July 7 through July 10, 2009, by a New Mexico-licensed professional engineer and in accordance with the *Final Implementation Strategy for Post Closure Inspection and Maintenance of the DOE/NNSA LASO Airport Landfill SWMU 73-001(a) and Debris Disposal Area SWMU 73-001(d), Los Alamos County Airport, New Mexico, July 2009*, and the *Post-Closure Care and Monitoring Plan for the Los Alamos Site Office TA-73 Airport Landfill, April 2006*.

Inspection activities were focused on the individual elements of the landfill cover described above, including: the MatCon pavement area and hangar pads, vegetated areas, rip rap drainage channels, concrete and rock retaining walls, the storm water collection system, and all temporary erosion control features. Inspection activities evaluated the condition (e.g., damage or erosional features) and overall integrity of each element. In addition, landfill-gas monitoring was conducted throughout the landfill cover to evaluate the presence of potentially combustible gases (methane). Inspection activities and findings are described below. The location, description, and recommended action for specific areas identified as requiring continued monitoring or restoration are shown on Figures 2 and 3.

The DDA, located at the eastern end of the airport runway (Figure 4), was inspected for evidence of erosion or diminished vegetation.

3.1 MatCon Pavement and Concrete Hangar Pads

A survey of the MatCon asphalt pavement and the five concrete hangar pads was conducted by walking along the four edges of each hangar pad and along a transect down the center of each pad. Additional transects were walked along the western, eastern, southern areas of the MatCon pavement, and in between each hangar pad. The survey looked for evidence of cracking, subsidence, or separation between expansion joints and between the concrete pads and the MatCon pavement.

Visible subsidence was noted on the northern half of hangar pads 2 and 3. Subsidence was also indicated on the northwest quarter of hangar pad 4, but to a lesser degree than pads 2 and 3. An elevation survey of pads 1, 2, and 3, commissioned by the Los Alamos County Airport, determined that the northern half of pads 2 and 3 were approximately 1 foot lower than the southern half of the pads. Cracking associated with the subsidence of the pads was also noted throughout the central portion of each pad. Typical cracking observed at pad 3 is shown in Photo 1. Cracks in pads 2 and 3 have been treated using an epoxy or similar fill material. Significant separation of one expansion joint in the central portion of pad 3 was noted, with a gap measuring approximately 3 inches at its widest point.

Subsidence was visually noticeable in the MatCon pavement near the northwest quarters of hangar pads 2 and 3. This subsidence was comparable to the degree observed in the concrete pads, indicating the same cause was responsible. No cracking of the MatCon pavement surface was noted. All joints between the MatCon pavement and the concrete hangar pads appeared to be in good condition with no cracking or separation noted.

3.2 Vegetated (Seeded) Areas

Inspection of the vegetated areas focused on evidence of erosion, subsidence, sparse vegetation, and animal burrows. Two parallel transects were walked along the northern vegetated area located between the MatCon pavement and the chain-link perimeter fence; three parallel transects were walked along the

upper reaches of the eastern, sloped area; and three parallel transects were walked along the lower reaches of the eastern, sloped area.

Erosion and/or subsidence caused by storm water runoff was noted in fifteen areas during the inspection. Two minor rill areas were noted on the northern vegetated area (Areas A and B, Figure 2), but do not appear to warrant restoration. A small erosional depression was noted near the northwest corner of the MatCon cover (Area C, Photo 2). Extensive rilling was noted on the south face of the upper reaches of the sloped portion of the landfill cover (Areas F, G, I, H, and J, Figure 3). Rills in this area ranged from extensive, but shallow at 2 to 6 inches deep, covering approximately 5% of an approximately 11,200-square foot area (Area H), to individual deep rills 2 feet deep and 90 feet long (Areas I and J, Photos 3 and 4, respectively). Rilling associated with Area G is shown in Photo 5. All areas of rilling noted on this portion of the slope will require restoration. Areas of rilling requiring restoration were also noted on the west face of the upper reach of the landfill slope (Area E, Figure 3), and on the lower reaches of the slope (Areas M, N, and O, Figure 3).

Rilling noted on the northern vegetated area and on the upper reaches of the sloped portion of the landfill cover appear to be a result of storm water runoff from the nearby MatCon cover (Areas A, B, and C) and from the taxiway (Areas F, G, I, H, and J). Rilling on the west face of the landfill slope appears to be a result of storm water overflow from the rip rap drainage channel that runs between the MatCon cover and the sloped portion of the landfill cover. Erosion noted on the lower reaches of the slope appear to be a result of storm water overflow from the eastern end of the mid-slope rip rap drainage channel (Area N) and from an area of the drainage channel that has subsided (Area L, see Section 3.4) due to upslope erosion (Area G).

Three areas of subsidence were noted on the sloped portion of the landfill cover. Area D (and associated, downslope erosion Area E) is an area approximately 2,225 square feet, 1 to 2 feet deep (Photo 6), and appears to be a result of storm water overflow from the rip rap drainage channel that runs between the MatCon cover and the sloped portion of the landfill cover. Area M, a small area located adjacent and downslope of Area L (see Section 3.4) is a result of the subsidence of the rip rap drainage channel and upslope erosion (Area G). Area N is located adjacent to and downslope of the eastern end of the mid-slope rip rap drainage channel. Rills or cracks were also noted in this area, running parallel to the rip rap drainage channel (Photo 7), which may indicate slumping of the slope at this location. Observations indicate general cap maintenance issues; however, cap function is not diminished.

3.3 Storm Water Collection System

The visible components of the storm water collection system consist of six grated trench drains (five of which run adjacent to each of the five hangar pads), 13 drain inlets, a manhole, and the outfall pipe (Figures 2 and 3). The length of each trench drain was walked and inspected for standing water, cracking, excessive sedimentation, and displacement of grates. The integrity of the drain inlet grates and concrete structures were inspected for cracking or displacement. The outfall pipe was inspected for damage and/or displacement.

General cracking was noted along the concrete channels of the five trench drains adjacent to the hangar pads. Larger cracks (approximately 0.25 inches in width) and displacement of the concrete channels associated with hangar pad subsidence were noted in the trench drains adjacent to hangar pads 2, 3, and 4 (Areas X, Y, and Z). Cracks in the trench drains adjacent to pads 2 and 3 appear to have been previously repaired with grout (Photo 1). The 13 drain inlets, manhole, and outfall all appeared to be in good working order.

3.4 Rip Rap Drainage Channels

Two rip rap gravel drainage channels are located along the eastern and southeastern edges of the MatCon cover; a third rip rap gravel channel is located mid-slope on the sloped portion of the landfill cover (Figures 1, 2, and 3). The length of each drainage channel was inspected for evidence of subsidence, erosion, vegetation, or excessive sedimentation. Areas below each end of the mid-slope drainage channel that receive flow from the channels were also inspected for signs of subsidence, erosion, and sedimentation

The drainage channels located along the edges of the MatCon cover appeared to be in good working order. Evidence of storm water overflow was indicated on the north end of the channel that borders the east side of the MatCon cover by the presence of subsidence (Area D, see Section 3.2) and erosion (Area E, see Section 3.2).

An area of significant subsidence (Area L) was observed in the mid-slope drainage channel running along the south face of the landfill slope (Figure 3, Photo 8). The area measures approximately 400 square feet and is located below an eroded area (Area G, see Section 3.2) receiving channelized storm water flow from the taxiway. Flow from the eroded area appears to have undermined the fill material underneath the rip rap and geotextile layers of the drainage channel. Subsidence at this location has also resulted in a lesser area of subsidence (Area M) adjacent to and down-slope of the drainage channel, as well as rilling further down-slope (Area O). Significant sedimentation was also observed within the depression of the subsidence and along the length of the channel discharging to the east (Photo 9).

Significant erosion and rilling were observed in areas receiving discharge from each end of the mid-slope drainage channel. At the north end, a large, unvegetated area approximately 7,700 square feet (Area S) was heavily eroded with rills observed down to the depth of the drainage composite (Figure 3, Photo 10). Straw wattles placed along the slope (see Section 3.6) were bridged and displaced within the most heavily rilled areas. Significant sedimentation was observed along the wattles placed closer to the chain-link perimeter fence.

Several significant areas of erosion were observed near and below the east end of the mid-slope rip rap drainage channel (Areas P, T, and U, Figure 3). Area P is a general area of erosion along the edge of the southernmost gabion rock retaining wall (see Section 3.5) that resulted in minor undercutting of a section of the retaining wall and sediment deposition adjacent to the face of the wall (Photo 11). The integrity of the wall did not appear to be compromised. Area T is a deeply eroded channel running directly below the discharge point of the rip rap drainage channel (Photo 12). Area U is an area of extensive erosion and sediment deposition running along the fence line (Photo 13). Observations indicate general maintenance issues, which may be minimized with possible drainage enhancements.

3.5 Retaining Walls

The concrete retaining wall and two rock retaining (rock basket/gabion) walls are located at the toe of the sloped portion of the landfill cover (Figure 3). The top and face of each wall were inspected for areas of cracking, separation, rotation, erosion/sedimentation, or slumping. The existing sedimentation basin at the toe of the concrete retaining wall, which receives discharge from three retaining wall drainlines, was inspected for vegetation and sedimentation.

Vegetation and some sedimentation were observed within the sedimentation basin (Area R). An minor erosional depression approximately 6-inches deep (Area V) was also noted near the base of the concrete retaining wall, likely a result of runoff associated with discharge from the mid-slope rip rap drainage

channel. With the exception of erosion noted along the edge of the southernmost gabion rock retaining wall (Area P), the retaining walls appeared to be in good condition.

3.6 Temporary Erosion Control Features

Temporary erosion control features installed during the designed remedy implementation generally include straw wattles, hay bales, and erosion fencing. As part of the landfill construction, straw wattles were placed on the unvegetated slopes below the discharge points for the mid-slope rip rap drainage channels. Hay bales were placed at runoff discharge locations near the Area C erosional depression and near the Area R sedimentation basin.

As noted in Section 3.4, straw wattles placed on the unvegetated slopes below the mid-slope rip rap drainage channel discharge points were bridged and displaced within the most heavily rilled areas of the Area S erosional area. Significant sedimentation was observed along the wattles near the chain-link perimeter fence in this area. Straw bales placed near Areas C and R were heavily eroded and providing minimal runoff control.

3.7 Landfill-Gas Monitoring

Landfill-gas monitoring was conducted at various locations, including the landfill gas collection system riser vents, along the hangar pads, trench drains, drain inlets, and within the northern and eastern vegetated areas. Gas monitoring locations are shown on Figure 1. Landfill-gas monitoring included the measurement of methane, oxygen, and carbon dioxide in air. No landfill-gas monitoring was conducted at the DDA.

Concentrations of methane, oxygen, and carbon dioxide were measured in percent (%) values using a Landtec GEM 500 landfill gas monitor calibrated by a licensed service representative. Measured values are provided in Table 1. Methane was detected at a single location: a gas collection system riser vent (PS-04) at a concentration of 0.4%. The lower explosive limit (LEL) of methane in air is 4.4%. At 0.4%, the measured concentration is 9.1% of the LEL, well below 25% of the LEL, which is the action level for an enclosed structure. Methane was not detected at any other location.

Vent risers had not been installed at locations PS-02, -03, and -05 (Figure 1), but were completed with blind flange fittings. Landfill-gas monitoring results are below current action levels, indicating the system meets design criteria.

3.8 Debris Disposal Area

Inspection of the DDA did not identify any areas of erosion. The general area appeared to be well vegetated.

4.0 RECOMMENDATIONS

Inspection activities indicate that all features of the landfill cover are functioning properly and that the overall condition and integrity of the cover is generally good. However, several areas were identified that require restoration. Proposed recommendations vary from areas where relatively small erosional damage has occurred but has some probability of increasing in the future, to restoration and/or enhancements to the original design plan (detailed in the *Remedy Completion Report DOE LASO TA-73 Airport Landfill SWMUs 73-001(a) and 73-001(d) April 2007*). The majority of restoration activities consist of repairing

erosion areas to the minimum standards set forth in the original design and are considered necessary for allowing the landfill cap to function as originally designed.

Enhancements to the original design may include more substantial repairs or amendments to the original design to prevent the same issues from re-occurring in the future. Amendments, if implemented, will meet the goals of the original design.

4.1 MatCon Pavement and Concrete Hangar Pads

As noted above, the MatCon pavement was observed to be in relatively good condition with very few areas of cracking or subsidence. One exception is in the areas of hangar pads 2, 3, and 4 where the MatCon pavement appears to have subsided along with the hangar pads and to the same degree. Repair of the MatCon pavement in these areas should be done in conjunction with repairs to the hangar pads. Remedies for the permanent correction of the hangar pad subsidence are beyond the scope of this report and will be analyzed by a structural engineer. One temporary measure that may be used to seal the concrete cracking is application of a concrete grout or epoxy. Overall, the MatCon pavement was observed to be in relatively good condition and meeting its designed function.

4.2 Vegetated (Seeded) Areas

The vegetated areas consist of an engineered landfill cap designed to limit the volume of ground surface runoff that reaches the underlying landfill debris. Beginning at the ground surface and continuing to the landfill debris, the cross sectional material includes 6 inches of topsoil with turf reinforcement mat, 12 inches of infiltration layer material, double-sided synthetic drainage composite, an additional 6 inches of infiltration layer material, and the existing/relocated interim cover material. With respect to cross section, the recommended repair of the damaged vegetated area will depend on the depth to which the damage extends.

In some cases it will be acceptable to repair vegetated area erosional damage with the appropriate depth of topsoil. A topsoil fill repair will generally be required where rill damage extends to a depth of no more than 6 inches. Area H includes vegetated areas where the backfill material is assumed to include only topsoil. In some cases, where the rill damage extends to depths beyond 6 inches, additional infiltration layer material should be used to match the original design section. Areas F, G, I, J, N, and O are vegetated areas where the backfill material includes both topsoil and infiltration layer material. Damage to the double-sided drainage composite was not observed within the vegetated areas during the site visit and it is not anticipated that repair to or beyond this layer will be required.

Subsidence within the vegetated areas generally meets the required landfill cap cross section, which is not to exceed 6 inches. Filling the subsidence with topsoil is considered an acceptable repair. This condition was noted in Areas D, E, and M and should be repaired by filling the subsidence with sufficient volume of topsoil to eliminate depressions.

Areas K and Q are the two areas noted for sparse vegetation. Repair of these areas may include reseeding once topsoil has been placed. Additional mulching, erosion control blanketing, watering, and maintenance may be required. The seeding effort should not start until all landfill repair procedures have been performed and the repair has been accepted.

Modifications to prevent future erosion to the vegetated areas may include the construction of additional asphalt curbing and/or the use of a bio roll or triangular silt dike. The introduction of curbing or similar structure along the northern edge of the taxiway may reduce the volume and rate of runoff from the taxiway assumed to be a major cause of the extensive erosional damage to Areas F, G, I, K, H, J, L, M,

and N. A bio roll or triangular silt dike or similar structure may act as a slope interruption mechanism to promote sheet flow and reduce the rill causing channelized flow. In general, the features notes do not undermine overall cap functionality, however, proper maintenance and/or enhancement will improve long-term cap performance.

4.3 Storm Water Collection System

The storm water collection system was determined to be functioning properly with the exception of the trench drains adjacent to hangar pads 2, 3, and 4. Areas W, X, and Y are areas of concern. The subsidence of the northern portions of these structures is causing the invert elevations on the northern portions of the trench drains to drop, resulting in ineffective drainage within the trench drains and potential standing water. Cracking of the trench drains may have the potential to compromise designed landfill cap drainage. Grout may be used to fill trench drain cracks to prevent leakage.

4.4 Rip Rap Drainage Channels

The rip rap drainage channels appear to be functioning as designed with the exception of Area L which incurred subsidence associated with rill erosion within Area G. As part of the engineered landfill cap, the rip rap channel section was designed to reduce the infiltration of surface runoff into the existing landfill debris below the channel. The channel was designed with a rip rap layer of material over a geosynthetic liner. The channel was also designed to promote positive drainage so that the runoff will discharge to outfalls at the end of the channels.

Subsidence of the channel may result in runoff ponding on the landfill cap, which has the potential to cause damage to the geosynthetic liner located beneath the rip rap. Repair of this subsidence will be a considerable effort including the removal of the rip rap and geosynthetic liner, replacement and compaction of suitable fill to bring the channel subgrade to an acceptable level, replacement, seaming, and testing of the geosynthetic liner, and the replacement of the rip rap at an elevation to produce positive drainage according to the original design.

Also evaluated in this section are Areas S, T, and V due to the erosional damage caused by runoff from the two outfall locations at the end of the mid-slope rip rap channels. As a minimum repair associated with Area S, the existing straw wattles should be removed to allow for the regrading of the area to promote sheet flow to the eventual outfall location. The regrading effort should also include the replacement of the straw wattles with new bio rolls and seeding the area. A reinforced turf mat may also be used that is appropriate for the anticipated flow rates. Where rills extend to depths greater than 6 inches, infiltration layer material should be placed and compacted to the original design requirements.

Repair of Area T may include the placement of rip rap along the channel of main erosion and rerouting of runoff to flow onto the flat area to the east of the concrete retaining wall. Rip rap along this outfall may reduce the amount of erosion that is occurring by increasing the shearing capacity of the channel material. A more stable grouted rip rap channel may also be considered, which may limit the amount of runoff infiltrating through the rip rap section.

Enhancements to the rip rap drainage channels may include grouted rip rap indicated for Area T as well as a rip rap channel and sedimentation basin to minimize future erosion in Area S. The addition of a rip rap channel to Area S could extend from the flat area to the east of the reinforced concrete wall (or sedimentation basin, if implemented) to the existing rip rap bench. A filter fabric material could be used between the existing ground surface and the bottom of the rip rap channel to limit sediment from entering the rip rap void spaces as well as reduce any erosion that may occur under the channel. An additional

sedimentation basin may provide a means of allowing sediment to drop out of the runoff prior to being discharged off site. However, available space will be a limiting factor associated with the size and construction of a sedimentation basin. A detailed evaluation of an appropriately-configured sedimentation basin is beyond the scope of this inspection report and requires further evaluation.

4.5 Retaining Walls

The retaining walls appear to be in good condition and functioning according to the original design. Therefore, the only recommended repairs associated with the retaining walls are areas located adjacent to the walls which include Areas P and R. The minor undercutting associated with Area P should be repaired with a compacted fill to bring the ground elevation adjacent to the wall up to the original design elevation. The associated sediment deposition pile should also be removed. Area R is the sedimentation basin at the toe of the retaining wall. To perform as designed, the sedimentation basin should be cleared of all existing vegetation and sedimentation.

4.6 Temporary Erosion Control Features

Temporary erosion control features were noted in Areas C, Area S, and just to the east of Area R. As part of restoration activities, the straw wattles on the Area S slope may be removed and replaced with more permanent features such as bio rolls. Bio rolls can reduce runoff velocities and capture sedimentation thereby allowing the vegetation to better establish downstream of the roll. Straw bales were noted at the discharge point in Area C and on the east side of the perimeter fence adjacent to Area R. It is assumed that these straw bales were placed in their current location as a temporary best management practice for construction and are no longer serving their intended purpose. These straw bales therefore should be removed and discarded. Addition of best management practices should be considered as an erosion control enhancement in Areas C and R.

The Department of Energy–Los Alamos Site Office has initiated development of design specifications for erosion control enhancements. Site work is anticipated to begin in the Fall of 2009.

5.0 REFERENCES

CE2 Corporation, July 2009. “Final Implementation Strategy for Post Closure Inspection and Maintenance of the DOE/NNSA LASO Airport Landfill SWMU 73-001(a) and Debris Disposal Area SWMU 73-001(d), Los Alamos County Airport, New Mexico,” Pleasanton, California.

North Wind, Inc., April 2006. “Post-Closure Care and Monitoring Plan for the Los Alamos Site Office TA-74 Airport Landfill,” North Wind report NW-ID-2004-027, Revision 2, Idaho Falls, Idaho.

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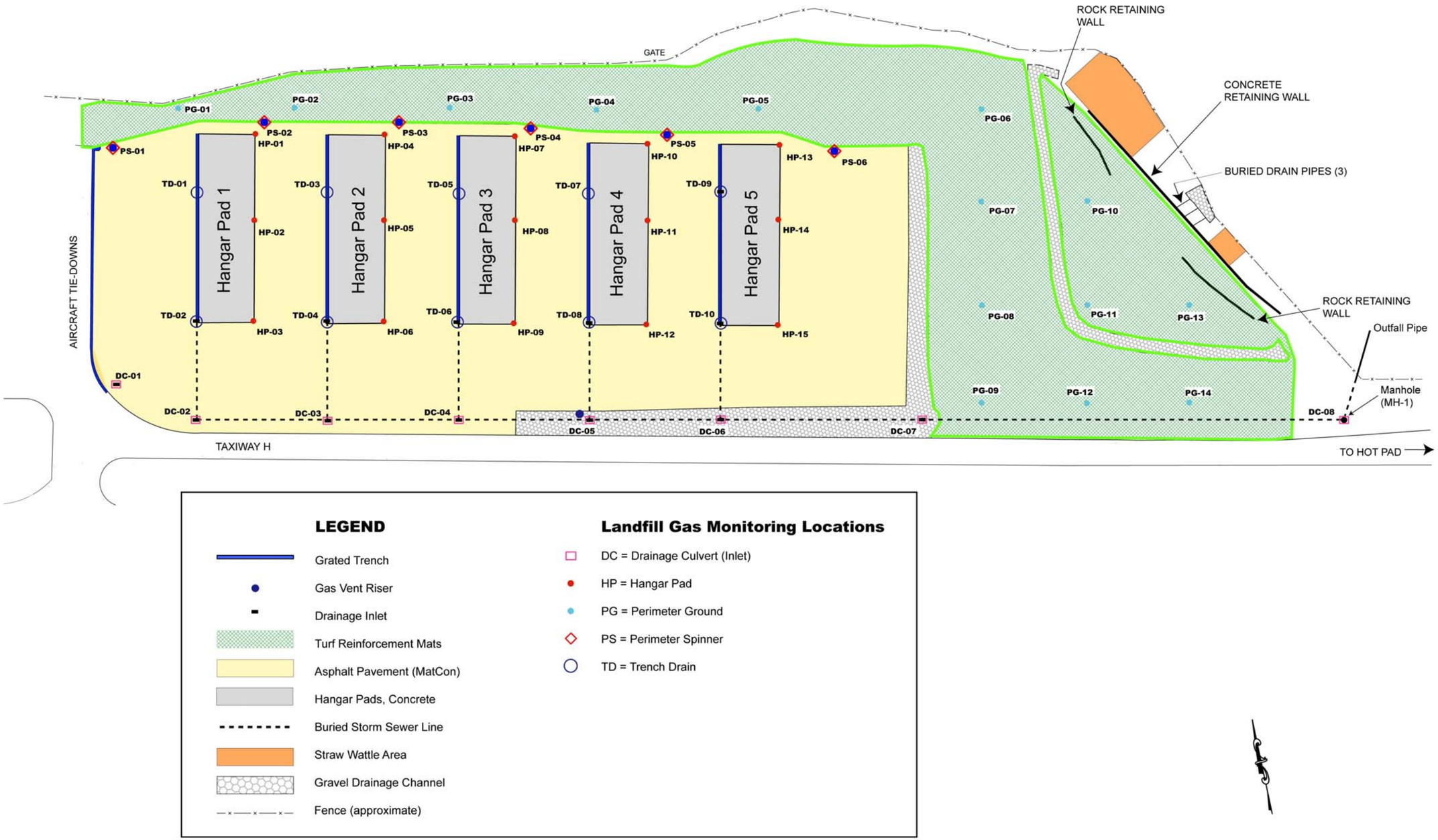


Figure taken from CE2 report (see Section 5.0 References)

Figure 1 Airport Landfill site features

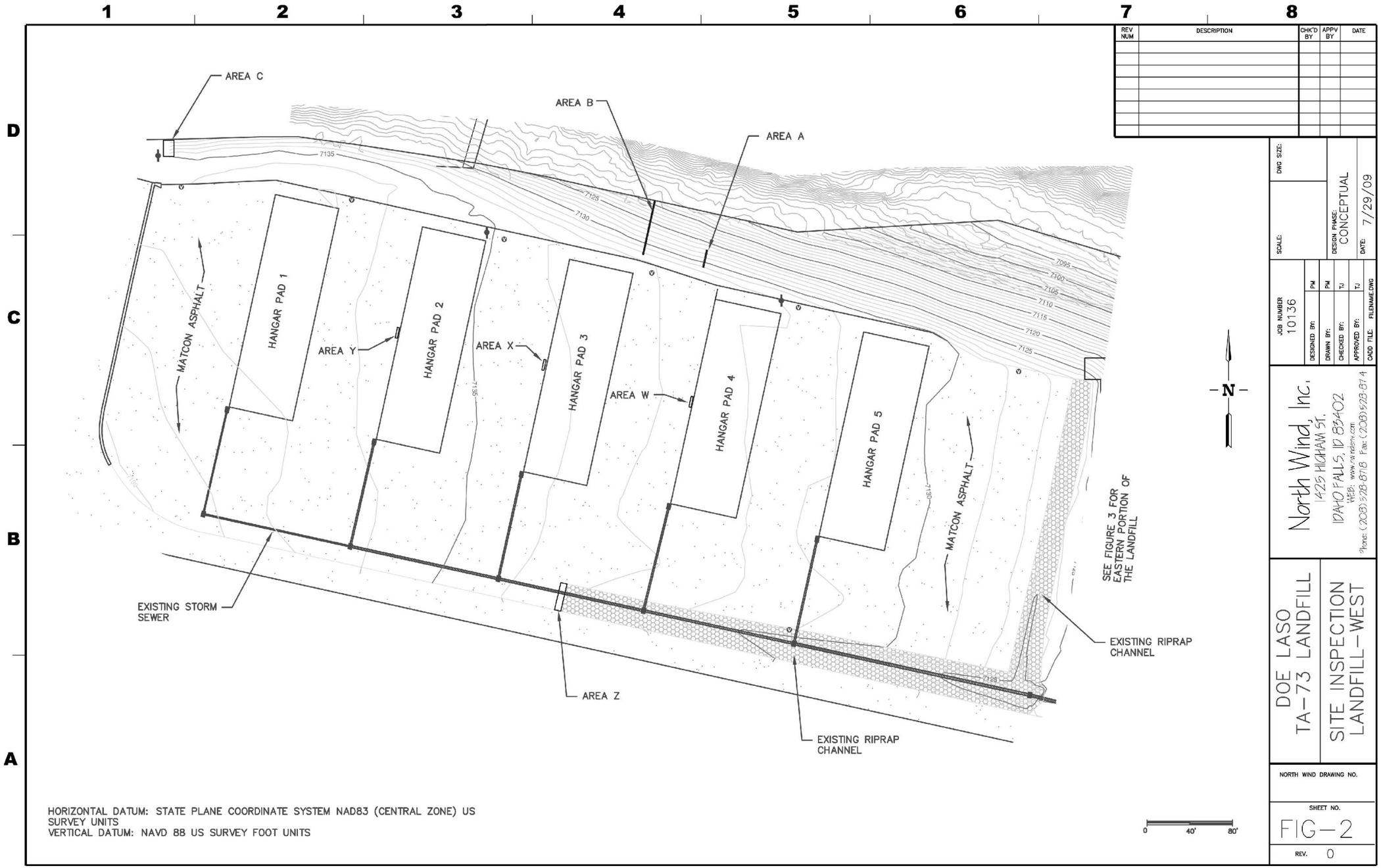
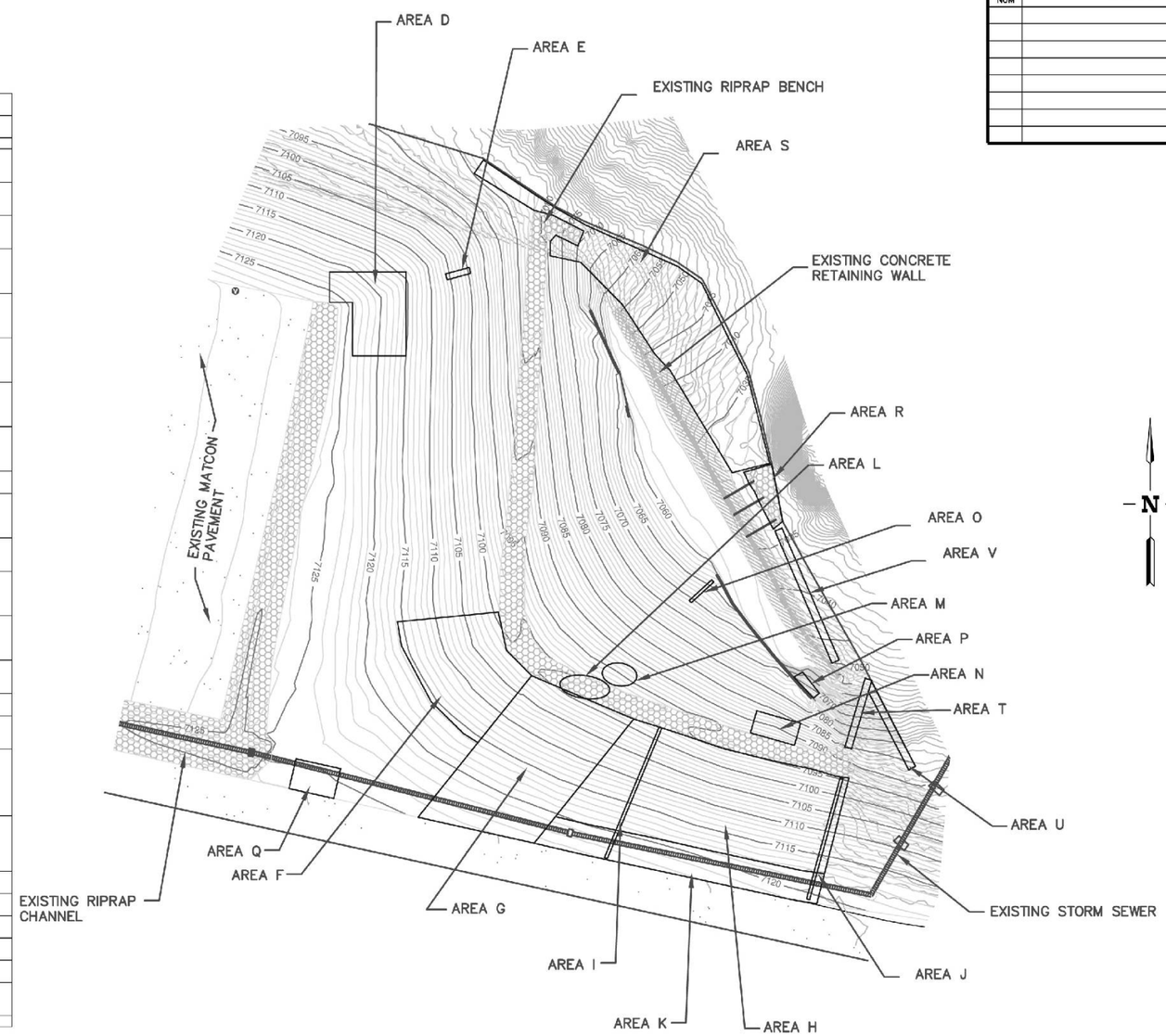


Figure 2 **Landfill inspection areas–western section**

EROSIONAL CONCERN TABLE

EROSIONAL CONCERN AREA	OBSERVATIONS	DIMENSIONS (LxWxD) ft or AREA sf
AREA A	Rill erosion	16x1x0.67
AREA B	Rill erosion	10x0.67x0.33
AREA C	Overland flow erosion from ponding water above existing inlet	15x10x0.5
AREA D	Area of subsidence and sparse vegetation due to overtopping of bench runoff	55x50x1
AREA E	Area of subsidence and sparse vegetation	16x4x1
AREA F	Area of rill erosion-assume 10% rilling by area and 4-12" deep	4,500
AREA G	Area of rill erosion-assume 30% rilling by area and 8-18" deep	7,800
AREA H	Area of rill erosion-assume 5% rilling by area and 2-6" deep	11,200
AREA I	Major rill erosion	90x1x2
AREA J	Major rill erosion	90x1x2
AREA K	Area of sparse vegetation	3700
AREA L	Area of major subsidence on the riprap bench and filled with clay material from above erosion	400
AREA M	Area of subsidence north of Area L	270
AREA N	Area of side slope sloughing and/or rilling perpendicular to slope-assume 20% rilling by area and 2-10" deep	450
AREA O	Major rill erosion	20x0.67x1
AREA P	Minor undercutting of gabion wall and sediment deposition adjacent to face from above erosion	105
AREA Q	Area of sparse vegetation	600
AREA R	Existing sedimentation basin	525
AREA S	Area of extensive rilling and no vegetation along the ramp to the toe of the concrete retaining wall-rilling-200x2x2	7,700
AREA T	Area of extensive erosion from bench outfall to fence line	50x3x2
AREA U	Area of extensive erosion along fence line	300
AREA V	Erosional depression at base of concrete retaining wall	100x5x0.5
AREA W	Trench drain cracking on hangar pad 4	
AREA X	Trench drain cracking on hangar pad 3	
AREA Y	Trench drain cracking on hangar pad 2	
AREA Z	Area of Matcon pavement subsidence with minor cracking	160



HORIZONTAL DATUM: STATE PLANE COORDINATE SYSTEM NAD83 (CENTRAL ZONE) US SURVEY UNITS
VERTICAL DATUM: NAVD 88 US SURVEY FOOT UNITS

REV NUM	DESCRIPTION	CHK'D BY	APPV BY	DATE

DWG SIZE:
SCALE:
DESIGN PHASE: CONCEPTUAL
DATE: 7/29/09
JOB NUMBER 10136
DESIGNED BY: PM
DRAWN BY: PM
CHECKED BY: TJ
APPROVED BY: TJ
CADD FILE: FILENAME.DWG

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DOE LASO
TA-73 LANDFILL
SITE INSPECTION
LANDFILL-EAST

NORTH WIND DRAWING NO.
SHEET NO. FIG-3
REV. 0

Figure 3 Landfill inspection areas–eastern section

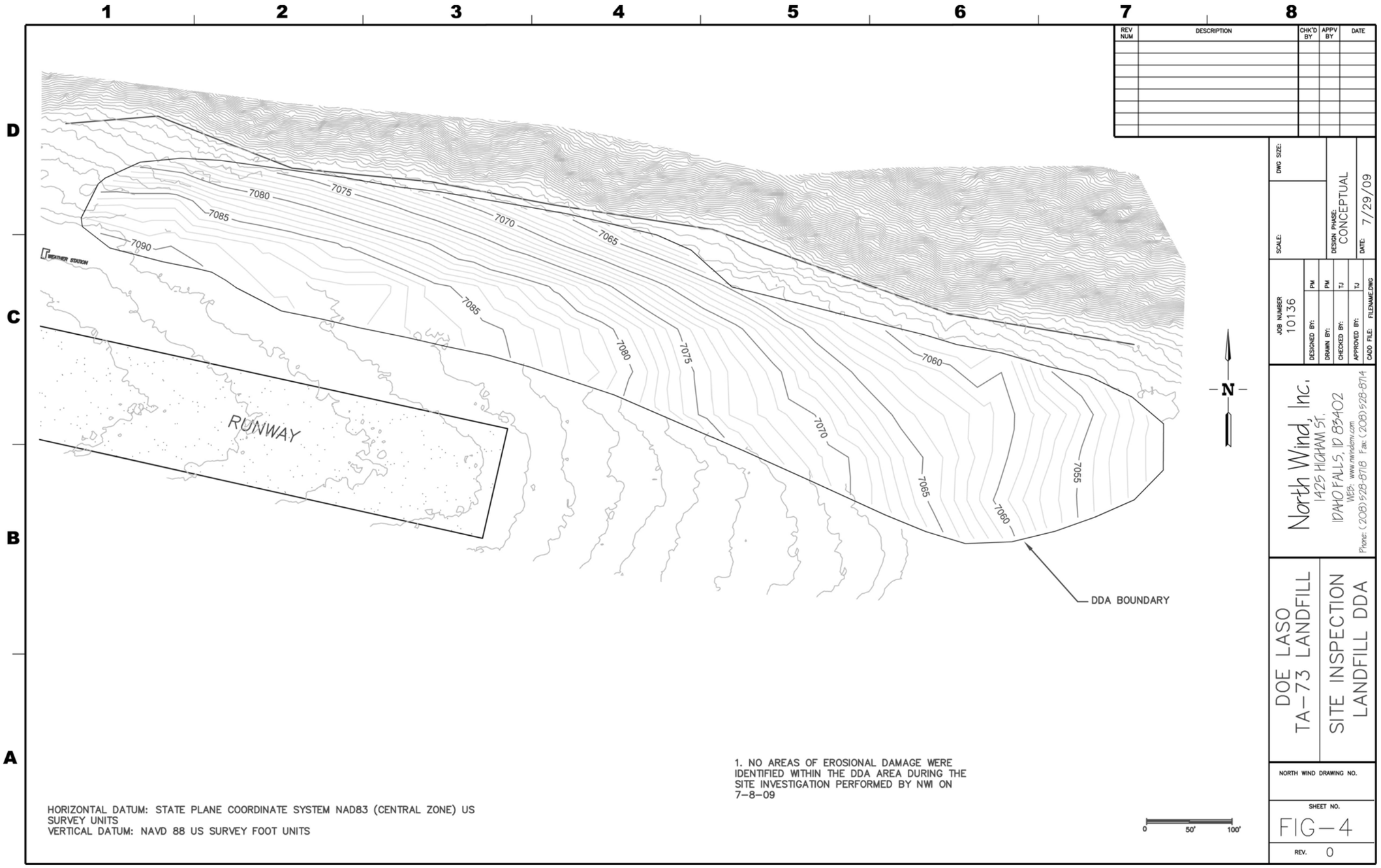

Figure 4 **Landfill inspection-debris disposal area**

Photo 1 Area X (hangar pad 3)

Photo 2 Area C

Photo 3 Area I

Photo 4 Area J

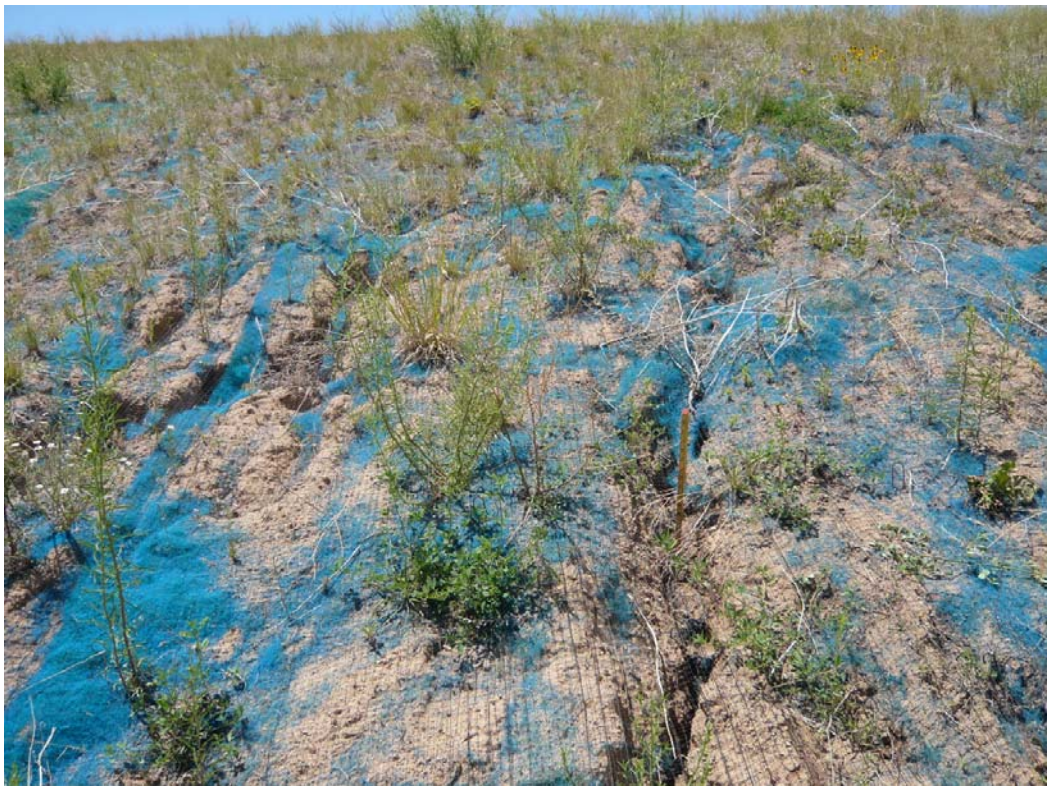

Photo 5 Area G

Photo 6 Area D

Photo 7 Area N

Photo 8 Area L

Photo 9 Sediment Rip Rap Drainage Channel

Photo 10 Area S

Photo 11 Area P

Photo 12 Area T

Photo 13 Area U

Table 1. Landfill Gas Monitoring Results

Sample Location	Height (ft)	Time	CH_4 % (%LEL)	O_2 %	CO_2 %
Hangar Pads (east side of each pad along the expansion joint)					
HP-01	2 inches above expansion joint	10:38	0	21.0	0
HP-02	2 inches above expansion joint	10:36	0	20.6	0
HP-03	2 inches above expansion joint	10:34	0	20.6	0
HP-04	2 inches above expansion joint	10:42	0	20.9	0
HP-05	2 inches above expansion joint	11:21	0	20.6	0
HP-06	2 inches above expansion joint	11:23	0	20.6	0
HP-07	2 inches above expansion joint	10:57	0	20.6	0
HP-08	2 inches above expansion joint	10:55	0	20.6	0
HP-09	2 inches above expansion joint	10:53	0	20.6	0
HP-10	2 inches above expansion joint	11:10	0	20.6	0
HP-11	2 inches above expansion joint	11:08	0	20.6	0
HP-12	2 inches above expansion joint	11:06	0	20.6	0
HP-13	2 inches above expansion joint	11:12	0	20.4	0
HP-14	2 inches above expansion joint	11:10	0	20.6	0
HP-15	2 inches above expansion joint	11:08	0	20.6	0
Trench drains (west side of each hangar pad)					
TD-01	4 inches below trench grate	10:30	0	21.0	0
TD-02	4 inches below trench grate	10:32	0	21.0	0
TD-03	4 inches below trench grate	10:42	0	20.9	0
TD-04	4 inches below trench grate	10:40	0	20.9	0
TD-05	4 inches below trench grate	10:43	0	20.6	0
TD-06	4 inches below trench grate	10:45	0	20.6	0
TD-07	4 inches below trench grate	11:00	0	20.6	0
TD-08	4 inches below trench grate	11:02	0	20.6	0
TD-09	4 inches below trench grate	11:04	0	20.4	0
TD-10	4 inches below trench grate	11:06	0	20.4	0
Drainage culverts (drainage inlets on the buried storm sewer lines)					
DC-01	4 inches below grate or lid	11:17	0	21.1	0
DC-02	4 inches below grate or lid	11:19	0	21.0	0
DC-03	4 inches below grate or lid	11:25	0	20.9	0
DC-04	4 inches below grate or lid	11:27	0	20.6	0
DC-05	4 inches below grate or lid	11:40	0	20.6	0
DC-06	4 inches below grate or lid	11:42	0	20.4	0
DC-07	4 inches below grate or lid	11:43	0	20.3	0
DC-08	4 inches below grate or lid	NA[1]	-	-	-
DC-09	4 inches below grate or lid	11:45	0	20.2	0

Table 1 continued

Sample Location	Height (ft)	Time	CH_4 % (%LEL)	O_2 %	CO_2 %
Northern perimeter (ground and spinner [wind turbine] locations)					
PG-01	2 inches above ground surface	11:30	0	20.3	0
PG-02	2 inches above ground surface	11:32	0	20.2	0
PG-03	2 inches above ground surface	11:34	0	20.2	0
PG-04	2 inches above ground surface	11:36	0	20.2	0
PG-05	2 inches above ground surface	11:38	0	20.3	0
PG-06	2 inches above ground surface	11:46	0	20.3	0
PG-07	2 inches above ground surface	11:59	0	20.3	0
PG-08	2 inches above ground surface	11:57	0	20.3	0
PG-09	2 inches above ground surface	11:55	0	20.3	0
PG-10	2 inches above ground surface	12:00	0	20.1	0
PG-11	2 inches above ground surface	11:49	0	20.3	0
PG-12	2 inches above ground surface	11:53	0	20.3	0
PG-13	2 inches above ground surface	11:47	0	20.3	0
PG-14	2 inches above ground surface	11:51	0	20.3	0
PS-01	at spinner (4 ft above pavement)	10:28	0	21.1	0
PS-02	at spinner (4 ft above pavement)	NA[2]	-	-	-
PS-03	at spinner (4 ft above pavement)	NA[2]	-	-	-
PS-04	at spinner (4 ft above pavement)	10:59	0.4 (9.1)	19.5	0.7
PS-05	at spinner (4 ft above pavement)	NA[2]	-	-	-
PS-06	at spinner (4 ft above pavement)	11:15	0	20.4	0

1 Location does not exist.

2 Monitoring location not accessible.