

Attachment VI-4

Stormwater Management  
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Figure 1a.....100 Year 24-Hour Rainfall Isopach Map

Figure 1b.....25 Year 24-Hour Rainfall Isopach Map

Figure 2.....Stormwater Drainage Patterns After Closure

## STORMWATER MANAGEMENT

Stormwater management at the Grassy Mountain Facility provides for the control of surface water drainage, resulting from precipitation falling on areas that are tributary to or from the landfill cells. Precipitation that falls on the site will do one of the following: infiltrate directly into the ground; evaporate; adhere directly to vegetation; or run off into the drainage ways and be transported to collection points or runoff directly into collection points. The stormwater management plan consists of facilities to control runoff inside and outside of the landfill cells. The control facilities outside of the cells will control runoff from precipitation which fall outside of the landfill cells, whereas the control facilities inside of the cells will control runoff from precipitation which falls inside of the landfill cells. These together make up the “runoff management system.”

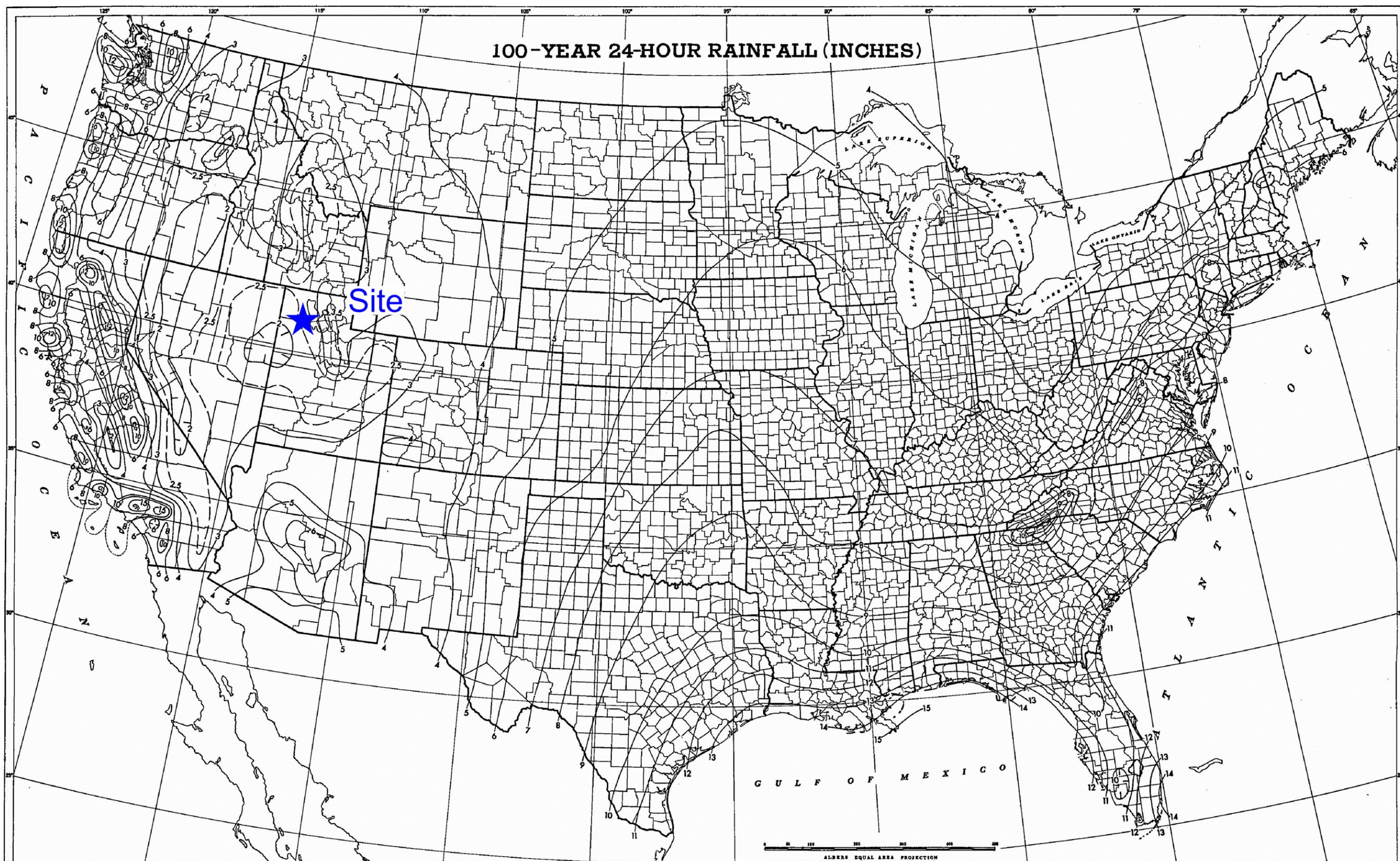
The control facilities inside the cells must be capable of collecting and controlling the runoff water volume resulting from a 25-year, twenty-four hour storm as required by Utah Admin. Code R315-264-301 of the Utah Hazardous Waste Management Rules. The system is designed to manage the volume of runoff that would be produced by a 100-year, twenty-four hour storm event, thus meeting and exceeding the requirements of the rules. These requirements are met by maintaining enough capacity in the open cells to contain the necessary amount of water.

Outside of the cells, the stormwater runoff from uncontaminated surfaces, including exterior cell embankment surfaces and caps of closed cells, is managed via dikes, conveyance facilities (ditches, culverts, drain boxes, etc.), and ponds. The facility is relatively flat. Allowing stormwater to accumulate around the toe of the cell berms would be a nuisance to facility operations. These controls are implemented to minimize the negative impact that the accumulation of stormwater would have on operations.

Currently, the facility has nine (9) identified stormwater run-off ponds that provided for drainage from each RCRA, PCB, and Industrial Waste Landfill Cells, as well as, the Bulk Container Storage Areas East and West. A series of ditches provide for containment of run-off from parking and sampling areas.

Figures 1a and 1b, presents the rainfall frequency distribution for the Clive Area. Figures 1a and 1b were developed from U.S. Department of Commerce Weather Bureau Technical Paper No 40. (Jershfield, D.M). As illustrated on Figure 1a, the rainfall depth for the 100-year, 24-hour precipitation event in the Clive area is approximately 2.5 inches and as shown on figure 1b, 2.0 inches for a 25-year, 24-hour precipitation event. Figure 2 shows the stormwater drainage patters that the run off management system was designed to create in the area of Disposal Cells 8 – 13 and Surface Impoundment B. The size of the stormwater containment ponds was based on assumptions as to the amount of precipitation that run off the embankments and cell caps which are tributary to the ponds and the volume of rain produced by a 100-year, 24-hour precipitation event.

100-YEAR 24-HOUR RAINFALL (INCHES)



ALBERS EQUAL AREA PROJECTION  
 STANDARD PARALLEL 36° AND 64°

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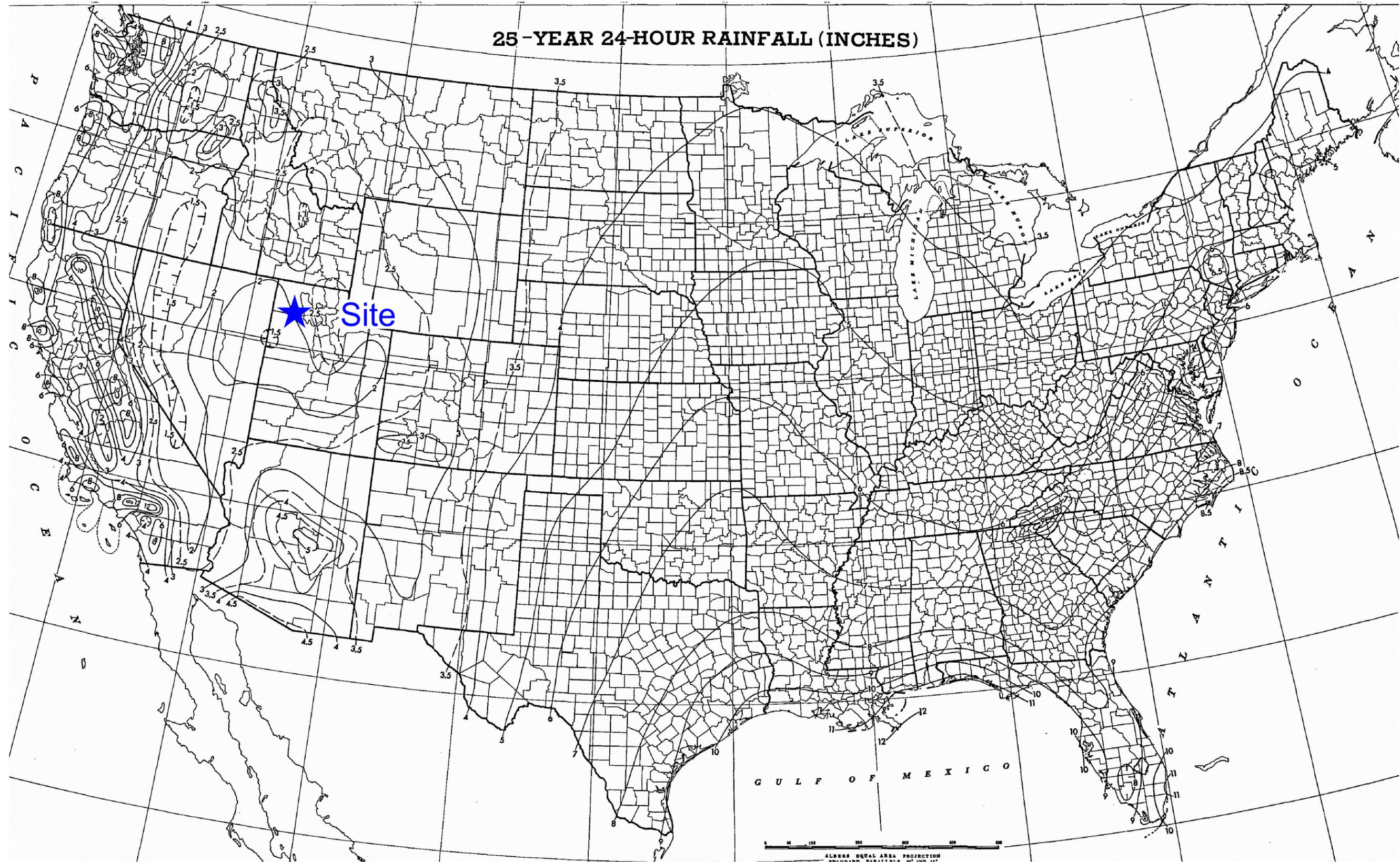
**Cameron-Cole**  
 5777 CENTRAL AVENUE, SUITE 200  
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FIGURE 1a

100-YEAR 24-HOUR RAINFALL (INCHES)  
 CLEAN HARBORS GRASSY MOUNTAIN, LLC

SCALE:	AS SHOWN	PROJECT:	1968
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25-YEAR 24-HOUR RAINFALL (INCHES)



★ Site



ALBERS EQUAL AREA PROJECTION

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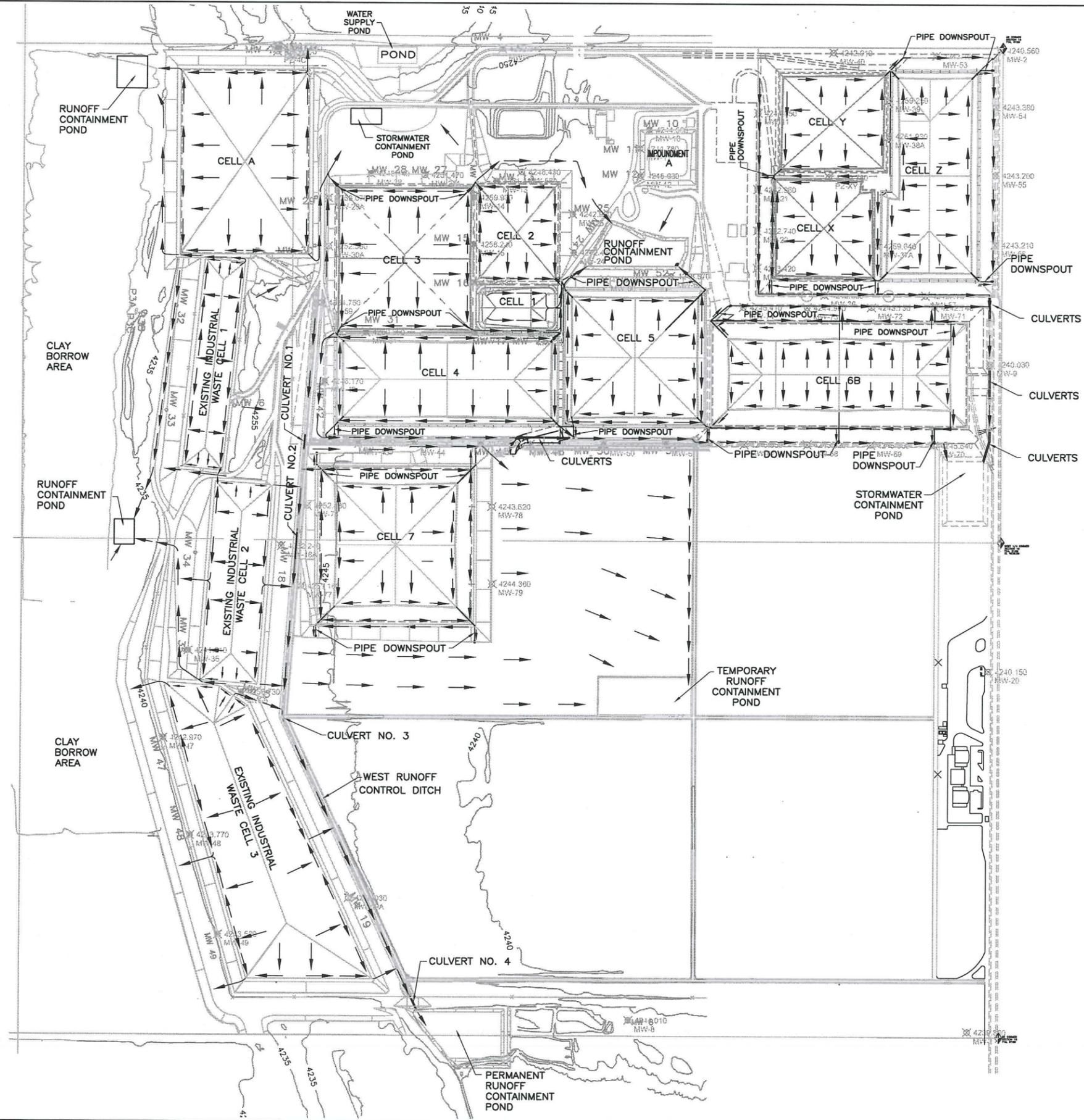


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FIGURE 1b

25-YEAR 24-HOUR RAINFALL (INCHES)  
 CLEAN HARBORS GRASSY MOUNTAIN, LLC

SCALE:	AS SHOWN	PROJECT:	1968
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4243.670 PZ-7

4243.380 MW-54

4243.200 MW-55

4243.210 MW-56

4241.910 PZ-4

4240.030 MW-9

4241.760 PZ-3

4240.150 MW-20

4242.010 PZ-1

4240.560 MW-2

4241.780 MW-38A

4241.780 MW-38B

4243.130 MW-71

4243.720 MW-72

4243.620 MW-78

4244.360 MW-79

4240.010 MW-8



FILE NAME:  
FILE DATE:

10/07

**HANSEN  
ALLEN  
& LOE**  
ENGINEERS

DESIGNED	GLJ	3
DRAFTED	CAH	2
CHECKED	MEA	1
DATE	FEBRUARY 2012	NO.
		DATE

REVISIONS		BY	APVD.

SCALE  
1"=600'



GRASSY MOUNTAIN FACILITY  
STORMWATER DRAINAGE PATTERNS AFTER  
CLOSURE OF ALL LANDFILL CELLS

SHEET  
**Figure 1**  
64.83.100