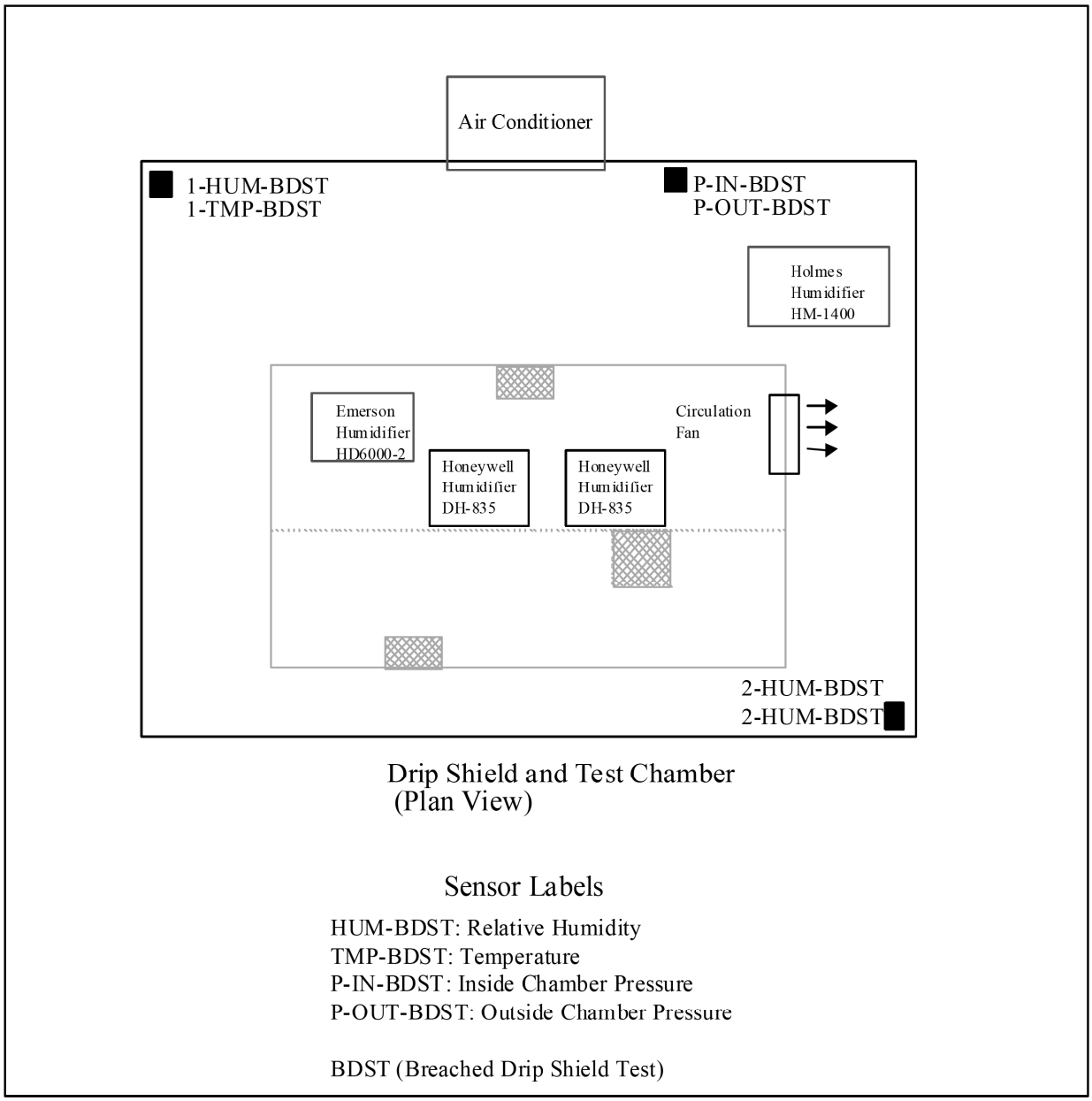
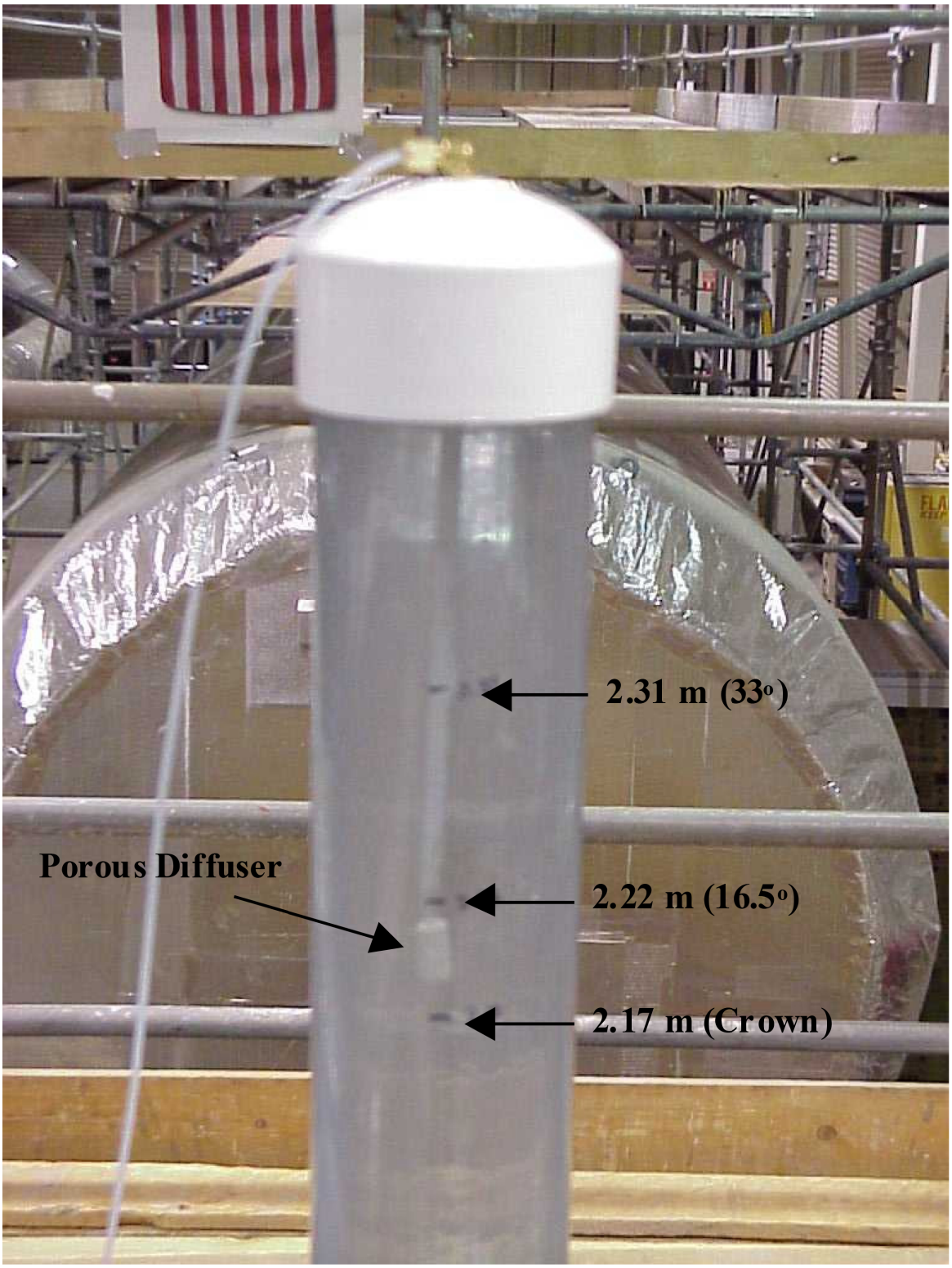
Source: Howard 2002b, p. 70.

Figure 6. Rough Drip Shield Texture



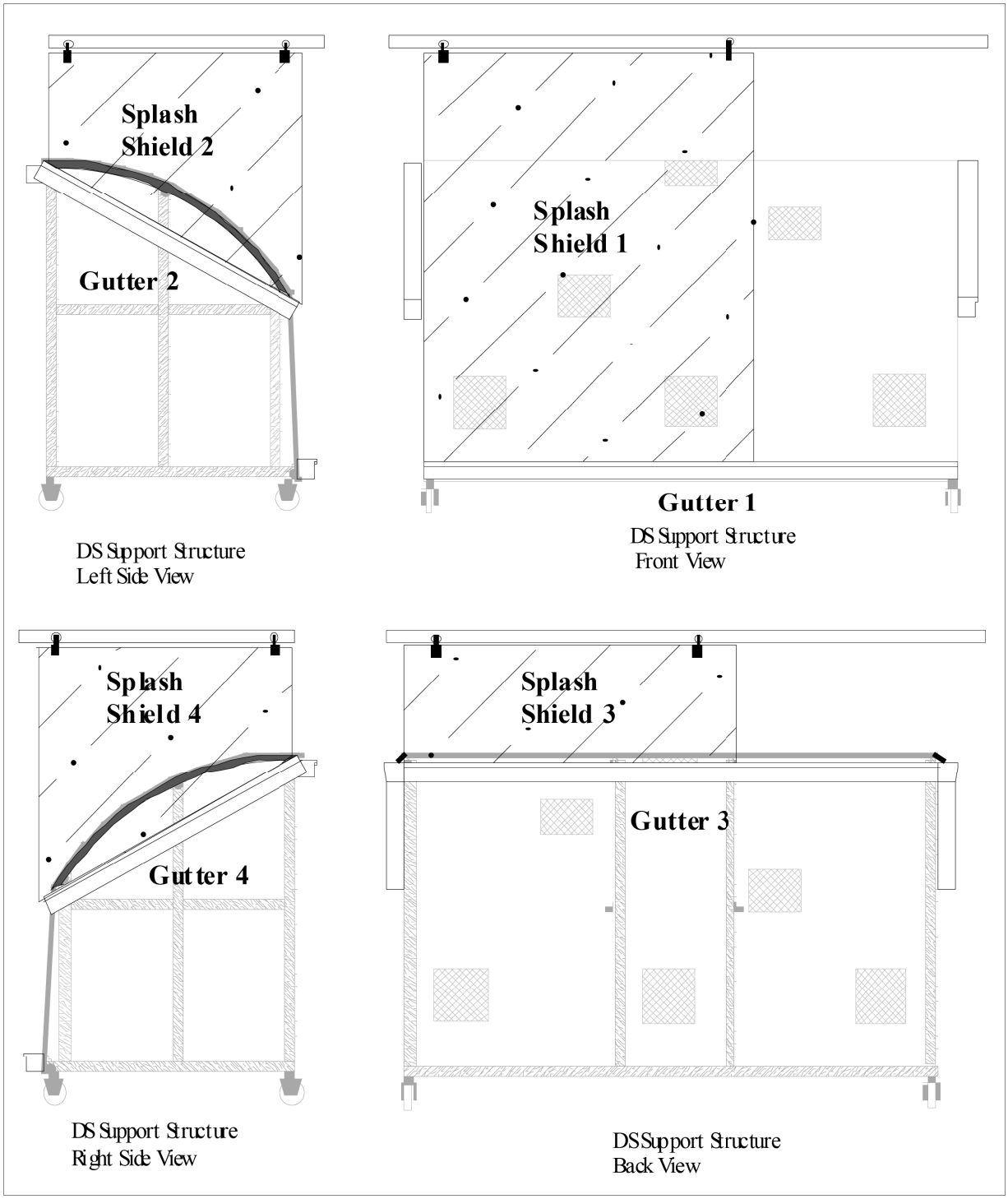
Source: Howard 2002a, p. 108

Figure 7. Test Chamber Environment Control and Instrumentation



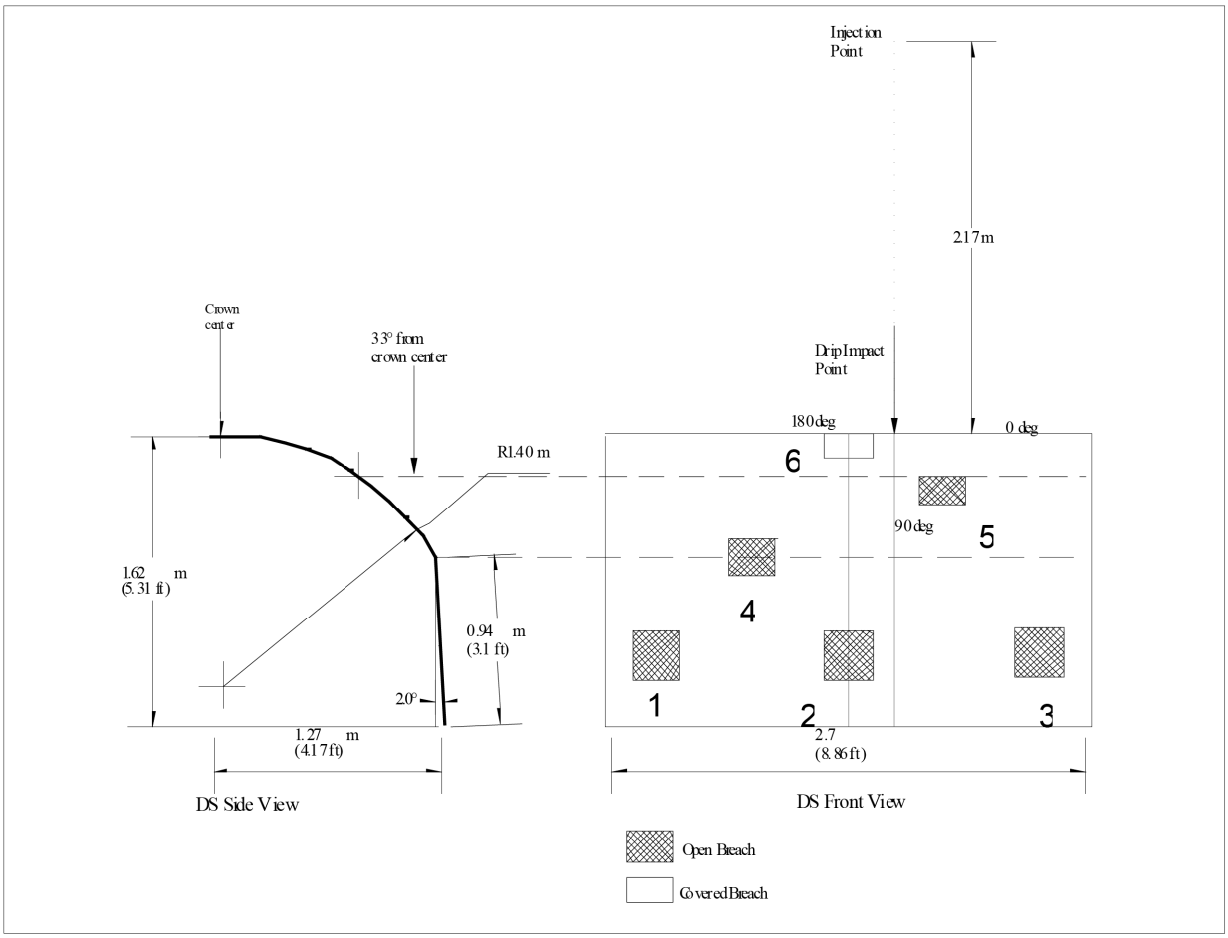
Source: Howard 2002a, p. 22.

Figure 8. Drip Tower



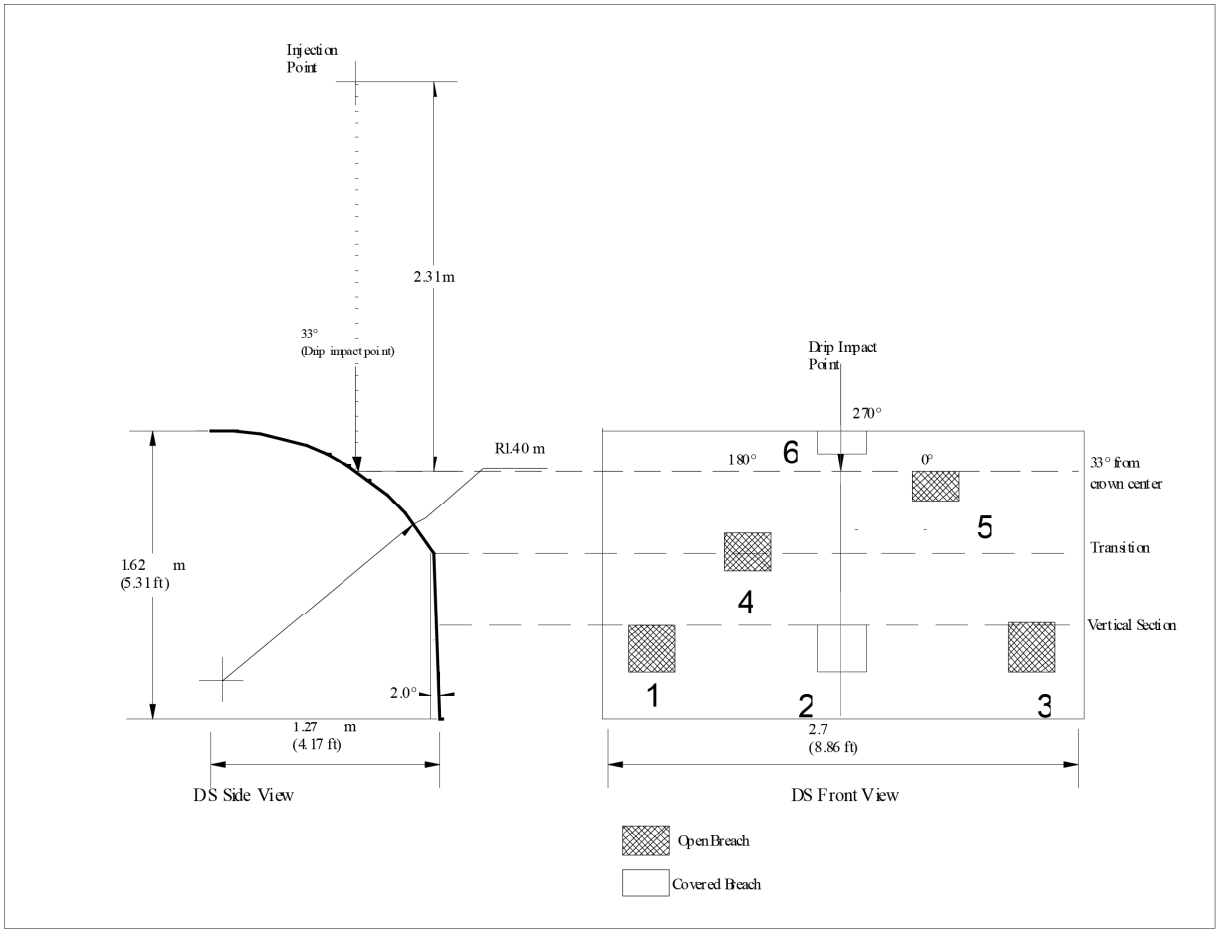
Source: Howard 2002a, pp. 18-19.

Figure 9. Collection System Gutters and Splash Shields



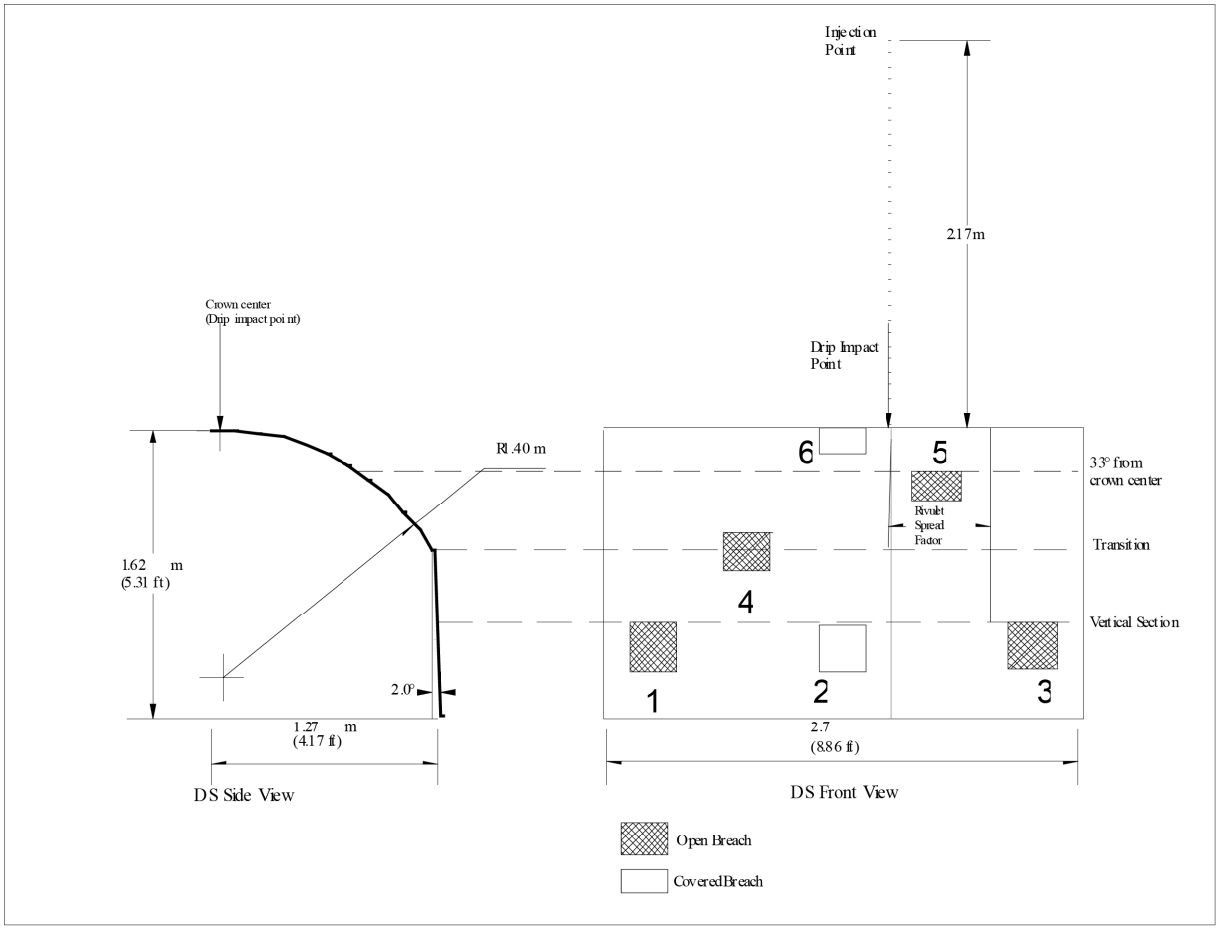
Source: Howard 2002a, p. 40.

Figure 10. Splash Radius Test #1 Geometry on Smooth DS Surface



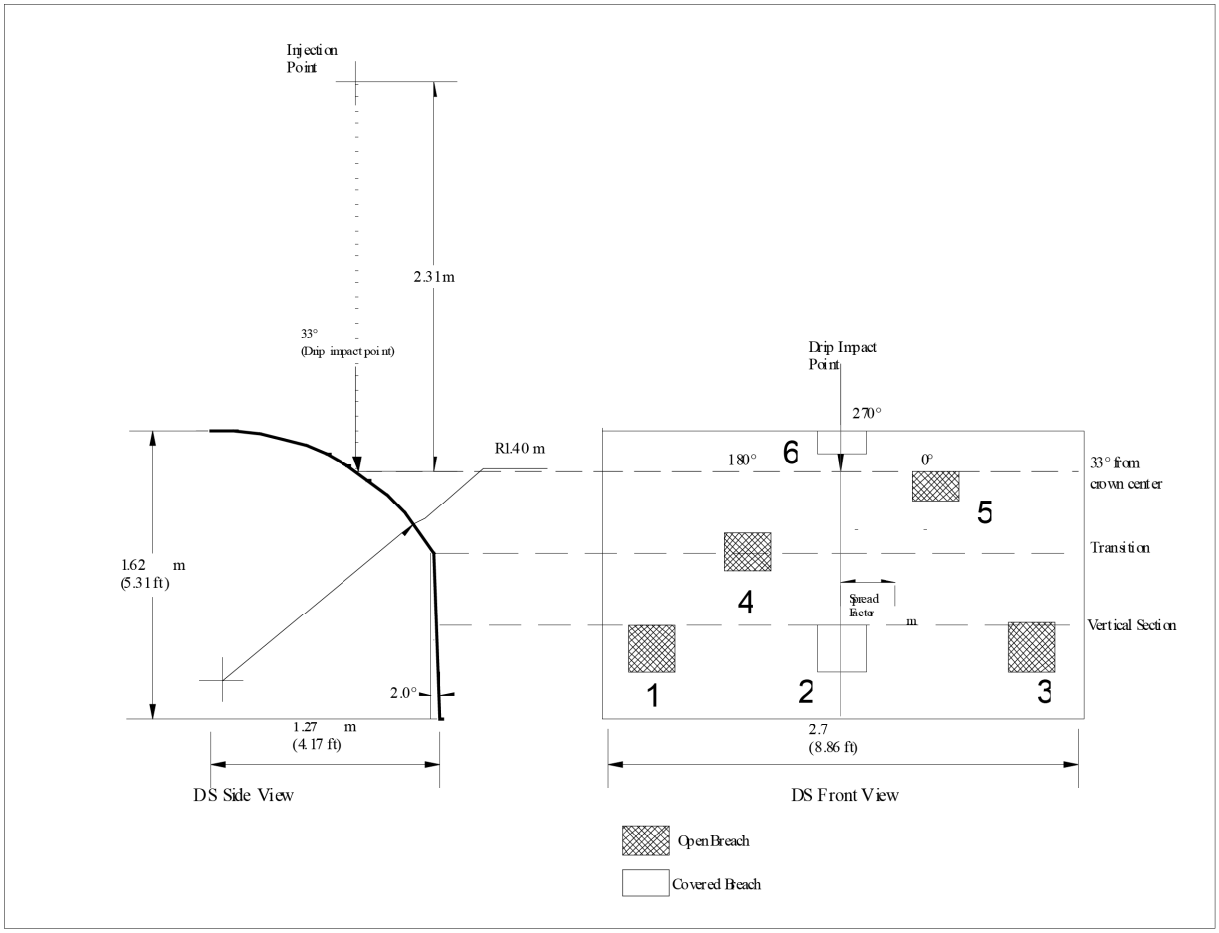
Source: Howard 2002a, p. 58.

Figure 11. Splash Radius Test #2 Geometry on Smooth DS Surface



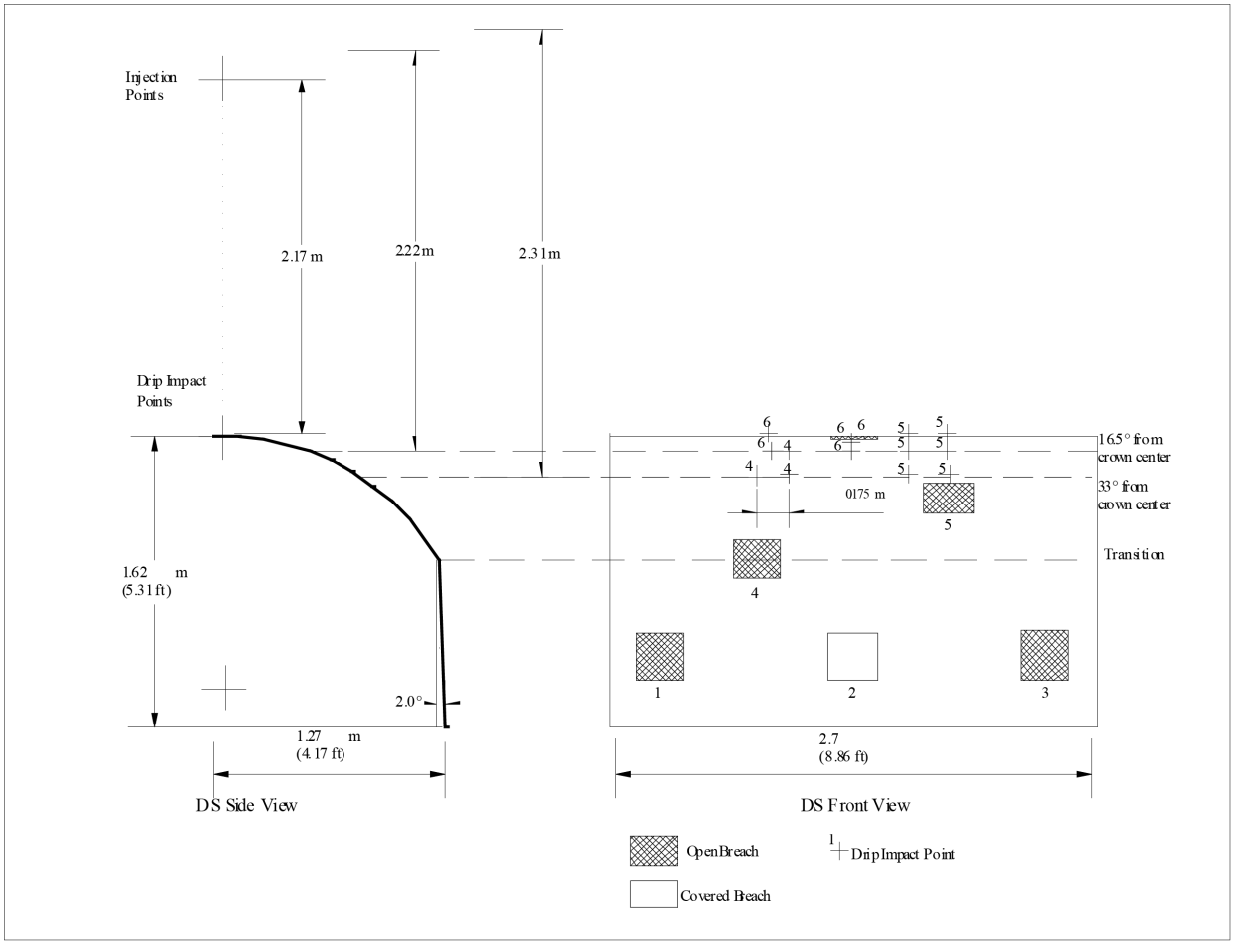
Source: Howard 2002a, p. 46.

Figure 12. Spread Factor Test #1 Geometry on Smooth DS Surface



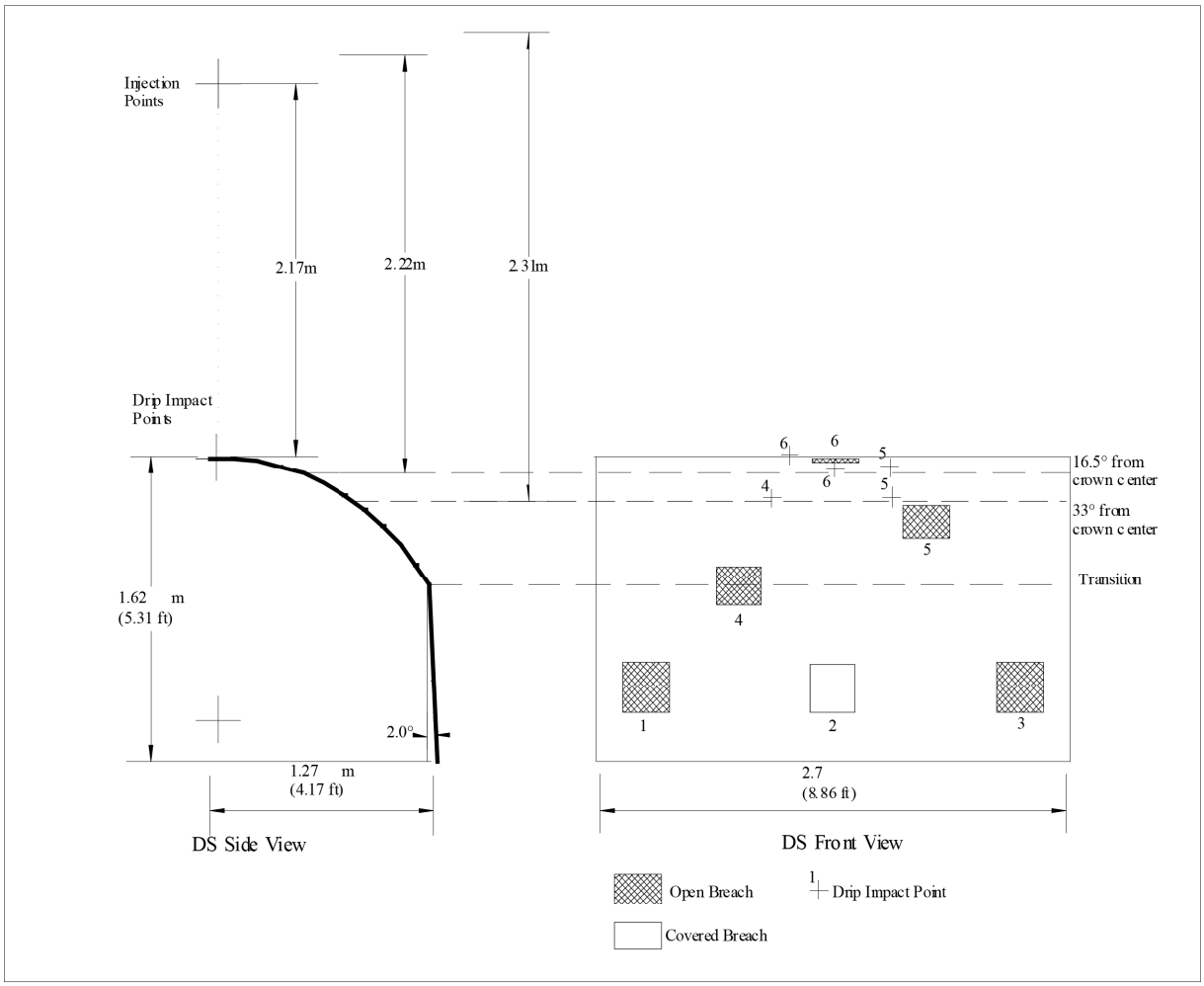
Source: Howard 2002a, p. 62.

Figure 13. Spread Factor Test #4 Geometry on Smooth DS Surface



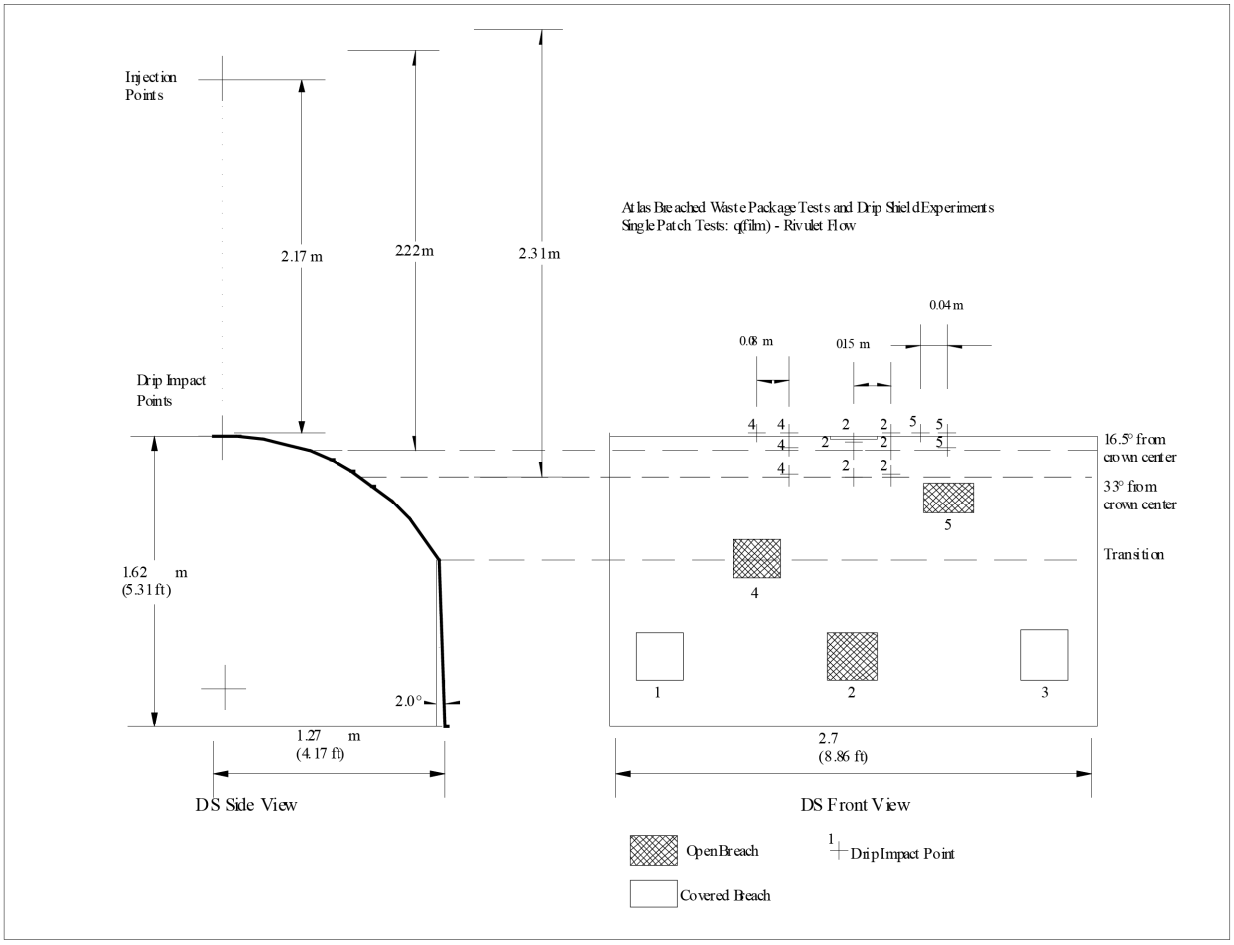
Source: Howard 2002a, p. 68

Figure 14. Single Patch q(splash) Tests on Smooth DS Surface



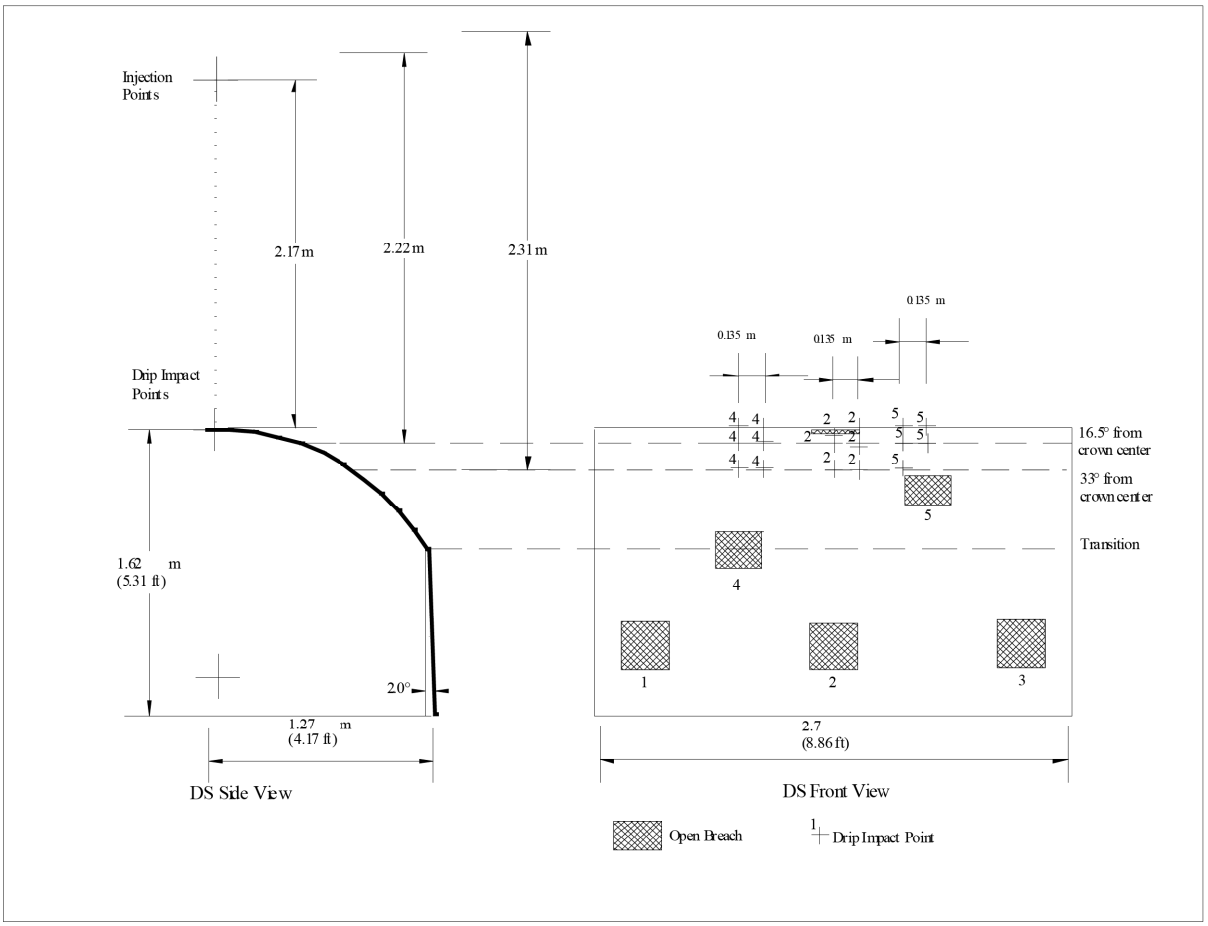
Source: Howard 2002b, p. 92.

Figure 15. Single Patch q(splash) Tests on Rough DS Surface



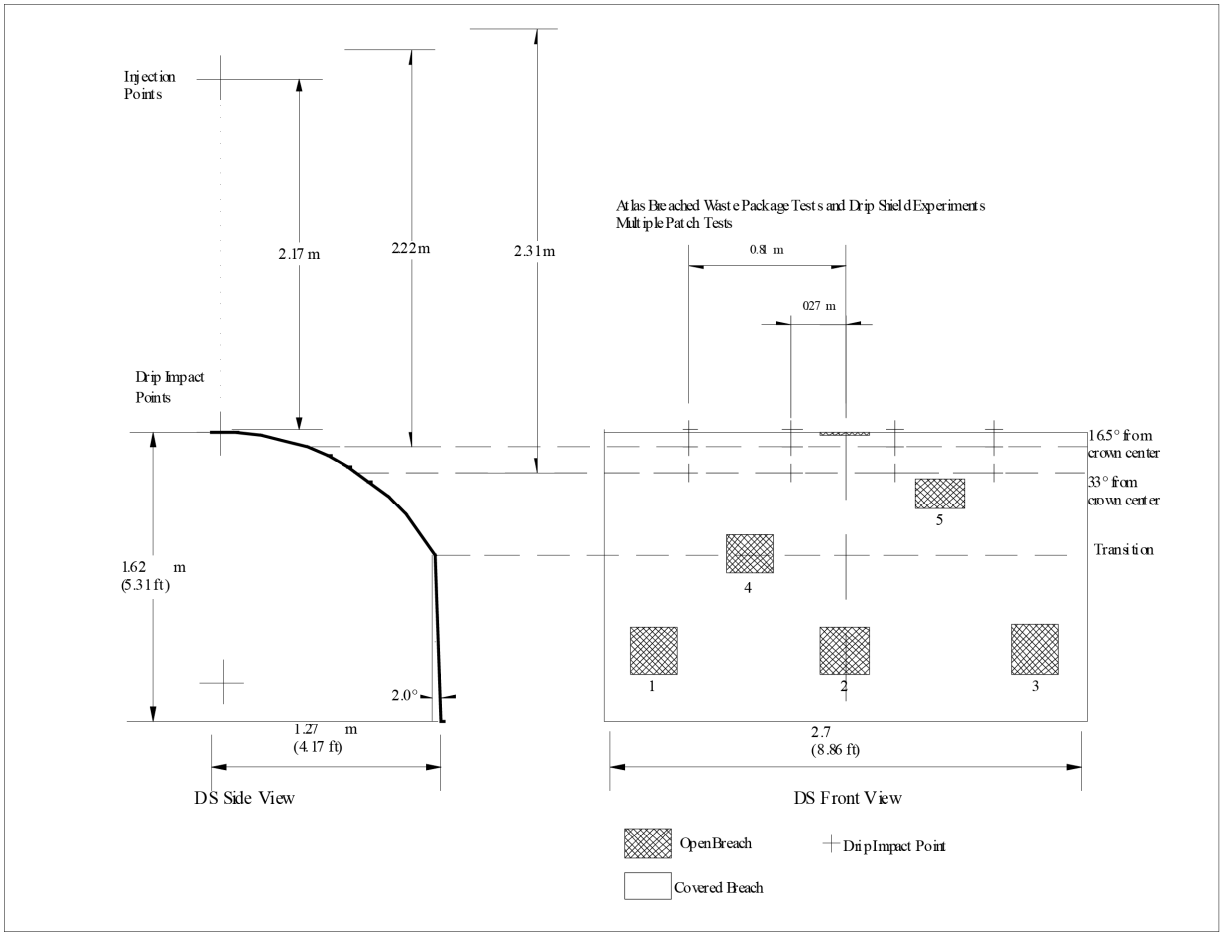
Source: Howard 2002a, p. 110.

Figure 16. Single Patch q (film) Tests on Smooth DS Surface



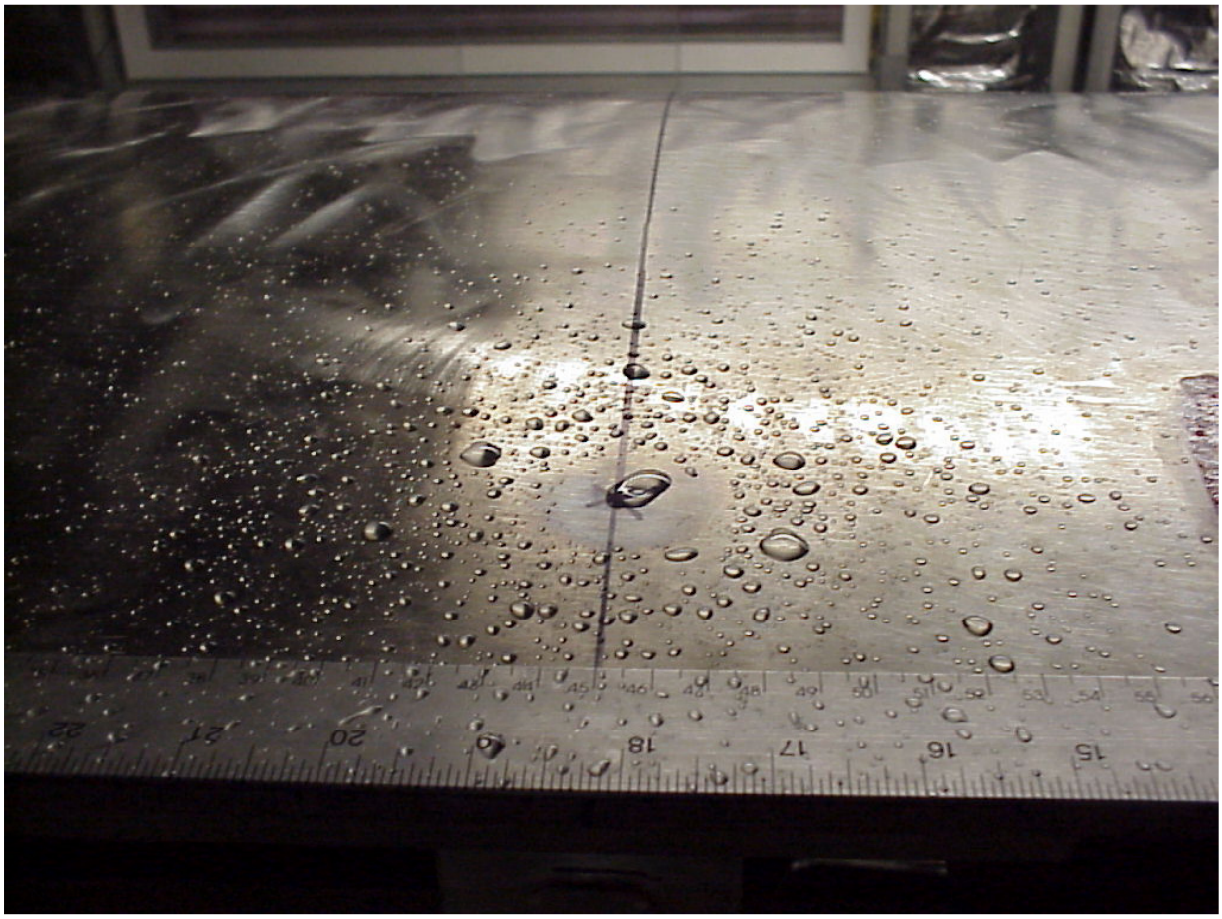
Source: Howard 2002b, p. 107.

Figure 17. Single Patch q(film) Tests on Rough DS Surface



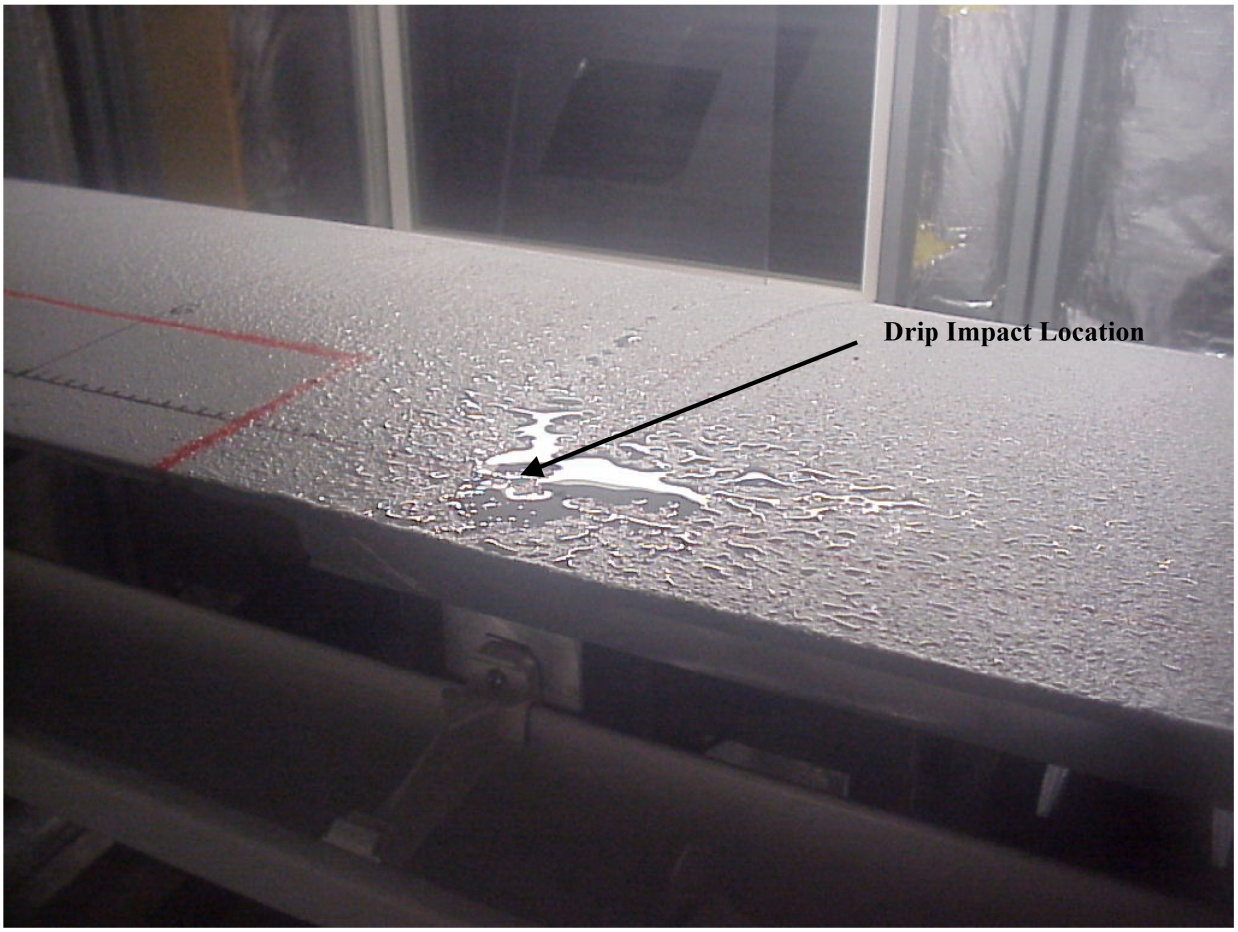
Source: Howard 2002a, p. 140.

Figure 18. Multiple Patch Tests on Smooth and Rough DS Surfaces



Source: Howard 2002a, p. 44.

Figure 19. Water Droplet Formation on the Smooth DS Surface



Source: Howard 2002b, p. 76.

Figure 20. Water Pooling on Rough DS Surface

Table 1 EBS/Repository Design Parameters

Parameter	Parameter Value	Source
Drip Shield Height	2521 mm	CRWMS M&O 2000a
Drip Shield Width	2512 mm	CRWMS M&O 2000a
Drip Shield Radius of Curvature	1.3 m	CRWMS M&O 2000a
Invert Depth	0.806 m	CRWMS M&O 2000c
Drift Diameter	5.5 m	CRWMS M&O 1999
WP Diameter	1.564 m	CRWMS M&O 2000b
Fall Distance From Drift Crown to DS Crown (see Figure 1)	2173 mm	Drift Diameter – (DS Height + Invert Depth)

Source: BSC (Bechtel SAIC Company) 2002, p. 8.

Table 2. BWPDSE Instrument Accuracy

Instrument	Range	Accuracy
Temperature/Humidity Probe (Vaisala HMP 235A)	10-100% RH 0-100 °C	± 2% RH @ 10-90% RH, ± 3.0% RH above 90% RH; Temperature ± 2.0 °C
Pressure Transducer (Setra 270)	800-1100 mbar	± 0.05% Full Scale
Analytical Balance (Mettler PM4000)	0-4000 g	Minimum Accuracy ± 0.06 g
Analytical Balance (Mettler PJ360)	0-300 g	Minimum Accuracy ± 0.06 g
RTD (Omega RTD-809)	Calibrated Range: 15, 45, and 100 °C	± 0.3 °C

Source: Howard 2002a, pp. 25-34; Howard 2002c, pp. 223-240.

Table 3. Water Measurement Descriptions

Measurement Type	Measurement Description
Input Water	Injection source water in beaker located on Analytical Balance PM4000 (Howard 2002b, p. 3) inside the test chamber. RTD probe submerged in water and reading was taken after 30 sec.
DS Beaker Water	Water in glass beaker placed in contact with the DS surface throughout the test. RTD probe is placed below water surface in beaker and reading was taken after 30 sec.
DS Surface Water	Water film remaining on the DS following a test. RTD probe is placed in contact with the DS. The probe is not submerged in water, and in most cases only a thin film is present. Reading is taken after 30 sec.
Air Temperature	RTD probe is mounted so that it is not in contact with DS any other surface. Reading is taken after 30 sec.

Source: Howard 2002b, pp. 220-222.

Table 4. BWPDSE Test Matrix

Tests Conducted on Smooth DS Surface	Tests Conducted on Rough DS Surface
Initial/Preliminary Tests: Splash Radius (Drip Splash) Test #1 Splash Radius (Drip Splash) Test #2 Spread Factor Test #1 Spread Factor Test #2 Spread Factor Test #3 Spread Factor Test #4	Initial/Preliminary Tests: Splash Radius (Drip Splash) Test #1 Splash Radius (Drip Splash) Test #2 Splash Radius (Drip Splash) Test #3 Splash Radius (Drip Splash) Test #4 Splash Radius (Drip Splash) Test #5 Spread Factor Test #1 Spread Factor Test #2 Spread Factor Test #3
Single Patch q(splash) Tests	Single Patch q(splash) Tests
Single Patch q(film) – Rivulet Flow Tests	Single Patch q(film) – Rivulet Flow Tests
Multiple Patch Tests	Multiple Patch Tests

Source: Howard 2002a, pp. 39-151; Howard 2002b, pp. 9-219.

Table 5. Single Patch q(splash) Drip Location on Smooth DS Surface

Patch/Breach	Drip Location	Drop Distance (m)
Patch 4	Patch center, 33°	2.31
	17.5 cm right of center, 33°	2.31
	17.5 cm right of center, 16.5°	2.22
	Patch center, 16.5°	2.22
Patch 5	Patch center, crown	2.17
	17.5 cm left of center, crown	2.17
	Patch center, 16.5°	2.22
	17.5 cm left of center, 16.5°	2.22
	Patch center, 33°	2.31
	17.5 cm left of center, 33°	2.31
Patch 6	37 cm left of center, crown	2.17
	36.5 cm left of center, between patch edge and 16.5°	2.17
	Patch center, between crown and 16.5°	2.17
	35.5 cm left of center, 16.5°	2.22
	Patch center, 16.5°	2.22

Source: Howard 2002a, p. 67.

Table 6. Single Patch Drip Locations on Rough DS Surface

Patch/Breach	Drip Location	Drop Distance (m)
Patch 4	27 cm right of Patch 4 center, 33°	2.31
Patch 5	20 cm left of Patch 5 center, 33°	2.31
	20 cm left of Patch 5 center, 16.5°	2.22
Patch 6	20 cm left of Patch 6 center, Crown	2.17
	Center of Patch 6, 15 cm forward from crown along DS center.	2.17
	Center of Patch 6, 16.5°	2.22

Source: Howard 2002b, p. 90.

Table 7. Single Patch q(film) Drip Locations on Smooth DS Surface

Patch/Breach	Drip Location	Drop Distance (m)
Patch 2	15 cm right of patch center, crown	2.17
	Patch center, 10.5 cm forward from crown	2.17
	Patch center, 33°	2.31
	15 cm right of patch center, 16.5°	2.22
	Patch center, 16.5°	2.22
	15 cm right of patch center, 33°	2.31
Patch 4	8 cm right of patch center, 33°	2.31
	8 cm right of patch center, crown	2.17
	Patch center, crown	2.17
	8 cm right of patch center, 16.5°	2.22
Patch 5	Patch center, crown	2.17
	4 cm left of center, crown	2.17
	4 cm left of center, 16.5°	2.22

Source: Howard 2002a, p. 109.

Table 8. Single Patch q(film) Drip Locations on Rough DS Surface

Patch/Breach	Drip Location	Drop Distance (m)
Patch 2	13.5 cm right of patch center, 10.5 cm forward from crown	2.17
	Patch center, 10.5 cm forward from crown	2.17
	Patch center, 33°	2.31
	13.5 cm right of patch center, 16.5°	2.22
	Patch center, 16.5°	2.22
	13.5 cm right of patch center, 33°	2.31
Patch 4	13.5 cm right of patch center, 33°	2.31
	13.5 cm right of patch center, 16.5°	2.22
	13.5 cm right of patch center, crown	2.17
	Patch center, 33°	2.31
	Patch center, 16.5°	2.22
	Patch center, crown	2.17
Patch 5	Patch center, crown	2.17
	Patch center, 16.5°	2.22
	13.5 cm left of patch center, crown	2.17
	13.5 cm left of patch center, 16.5°	2.22
	13.5 cm left of patch center, 33°	2.31

Source: Howard 2002 b, p. 105.

Table 9. Multiple Patch Drip Locations for Smooth and Rough DS Surface Tests

Crown	0.81 m left of DS centerline	0.27 m left of DS centerline	0.27 m right of DS centerline	0.81 m right of DS centerline	Drip distance: 2.17 m
16.5° Line	0.81 m left of DS centerline	0.27 m left of DS centerline	0.27 m right of DS centerline	0.81 m right of DS centerline	Drip distance: 2.22 m
33° Line	0.81 m left of DS centerline	0.27 m left of DS centerline	0.27 m right of DS centerline	0.81 m right of DS centerline	Drip distance: 2.31 m

Source: Howard 2002a, p. 139.

Table 10. Bounding Flow Rate Drip Locations for Smooth and Rough DS Surface Tests

Crown	0.54 m left of DS centerline	0.27 m left of DS centerline	0.27 m right of DS centerline	Drip distance: 2.17 m
16.5° Line	0.54 m left of DS centerline	0.27 m left of DS centerline	0.27 m right of DS centerline	Drip distance: 2.22 m
33° Line	0.54 m left of DS centerline	0.27 m left of DS centerline	0.27 m right of DS centerline	Drip distance: 2.31 m

Source: Howard 2002b, p. 27.

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APPENDIX A:
M&TE Used in the BWPDSE

Data System Identifier	Description	Sensor Serial Number	Sensor Model	Calibration Dates	Conversion	Basis
1-HUM-BDST	Relative Humidity	T2310004	Vaisala HMP235A	Pre-test Cal Date: 05/07/02 Due: 05/07/03 Post-test Cal Date: 09/11/2002	Use display panel	Bechtel Nevada Calibration Lab Cal ID 998256
1-TMP-BDST	Air Temperature	T2310004	Vaisala HMP235A	Pre-test Cal Date: 05/07/02 Due: 05/07/03 Post-test Cal Date: 09/11/2002	Use display panel	Bechtel Nevada Calibration Lab Cal ID 998256
2-HUM-BDST	Relative Humidity	T4510008	Vaisala HMP235A	Pre-test Cal Date: 05/07/02 Due: 05/07/03 Post-test Cal Date: 09/13/2002	Use display panel	Bechtel Nevada Calibration Lab Cal ID 998236
2-TMP-BDST	Air Temperature	T4510008	Vaisala HMP235A	Pre-test Cal Date: 05/07/02 Due: 05/07/03 Post-test Cal Date: 09/13/2002	Use display panel	Bechtel Nevada Calibration Lab Cal ID 998236
P-IN-BDST	Test chamber pressure	416325	Setra 270	Pre-test Cal Date: 05/07/02 Due: 05/07/03 Post-test Cal Date: 08/29/2002	Y=0.1X+600 X = mVolt	Bechtel Nevada Calibration Lab Cal ID 007763
P-OUT-BDST	Ambient pressure	416325	Setra 270	Pre-test Cal Date: 05/07/02 Due: 05/07/03 Post-test Cal Date: 08/29/2002	Y=0.1X+600 X = mVolt	Bechtel Nevada Calibration Lab Cal ID 007763
Ambient RH (EBS-0429)	Ambient Relative Humidity	W2320024	Vaisala HMP235A	Pre-test Cal Date: 05/07/02 Due: 05/07/03 Post-test Cal Date: 09/11/2002	Use display panel	Bechtel Nevada Calibration Lab Cal ID 315820
Ambient Temp. (EBS-0429)	Ambient Temperature	W2320024	Vaisala HMP235A	Pre-test Cal Date: 05/07/02 Due: 05/07/03 Post-test Cal Date: 09/11/2002	Use display panel	Bechtel Nevada Calibration Lab Cal ID 315820

Source: Howard 2002a, pp. 24-34; Howard 2002c, pp. 83-110.

M&TE Used in the BWPDSE, Continued

Data System Identifier	Description	Sensor Serial Number	Sensor Model	Calibration Dates	Conversion	Basis
Fluke Mulitmeter	Voltage (Pressure) Resistance (RTD Temp.)	6700202	Fluke 702	Pre-test Cal Date: 06/11/01 Due: 06/11/02 Post-test Cal Date: 06/14/2002	Use display panel	Bechtel Nevada Calibration Lab Cal ID 007462
Fluke Mulitmeter	Voltage (Pressure) Resistance (RTD Temp.)	6695202	Fluke 702	Pre-test Cal Date: 01/16/02 Due: 01/16/03 Post-test Cal Date: 08/28/2002	Use display panel	Bechtel Nevada Calibration Lab Cal ID 007463
Analytical Balance PM4000	Water mass Input/ Collection	J48850	Mettler PM4000	Pre-test Cal Date: 12/27/01 Due: 06/27/02 Post-test Cal Date: 07/29/2002	Use display panel	Bechtel Nevada Calibration Lab Cal ID 307277
Analytical Balance PM4000	Water mass Input/Collection	J48849	Mettler PM4000	Pre-testCal Date: 02/06/02 Due: 08/06/02 Post-test Cal Date: 08/19/2002	Use display panel	Bechtel Nevada Calibration Lab Cal ID 307232
Analytical Balance PJ360	Water mass Collection	H78850	Mettler PJ360	Cal Date: 02/06/02 Pre-test Due: 08/06/03 Post-test Cal Date: 08/19/2002	Use display panel	Bechtel Nevada Calibration Lab Cal ID 301293
DS-RTD-01	Temperature Probe RTD-809	343	Omega RTD-809	Pre-test Cal Date: 03/27/02 Due: 03/27/03 Post-test Cal Datc: 09/05/2002	Use Fluke 702 in RTD mode	Bechtel Nevada Calibration Lab Cal ID 992993

Source: Howard 2002a, pp. 24-34; Howard 2002c, pp. 83-110.