APPENDIX A

FIELD SUMMARY REPORT
UNDERWATER INSPECTION OF UNDERWATER STRUCTURES, NORTH AND SOUTH POND

FIELD SUMMERY REPORT
UNDERWATER INSPECTION
OF
UNDERWATER STRUCTURES
NORTH AND SOUTH POND

Date of inspection: November 21, 2006

Personnel:

Inner Tech

Stephen Antoniou	Diving Inspector
Mike Bradshaw	STB diver- tender
Frank Carliglio	Tender

Fuss&O'Neill

Andrew Lombard	Engineer Inspector
Nils Wieberg	Engineer Inspector- project principle

Work Scope: Underwater inspection of various structures in the North and South Ponds as detailed below.

South Pond

- Inspection of the spillway floor- weep holes, const. joints, concrete
- Stone pavement in front of spillway floor
- Spillway upstream
- Face of spillway weir
- 24ci blow off pipe
- Upstream spillway floor-footing-compacted fill
- Intake structure-screen and piping integrity

North Pond

- Intake structure – screen condition and concrete box details

Dive station: The dive station was trailered to site and set-up adjacent to the structure to be inspected. Air supply was via compressor and umbilical, cold water diver support was provided using water heaters. Communications was maintained between diver and tender at all times.

Environmental conditions:
Air Temperature 45-50F
Water Temperature 50F
Water Visibility less than 2 feet

Inspection methods:
The contract calls for a visual inspection of various structures, concrete hardness was tested via a brick hammer and pick.. Poor water visibility precluded the use of an underwater camera to aid the inspection.

Observations - South Pond

Face of spillway and weir:
Most of this area was observable out of the water. The face of the spillway appeared rough and grainy. The concrete surfaces are map cracked and efflorescence can be seen coming out of the cracks. The spillway surfaces were sounded with a pick. The surfaces around the cracks sounded hollow and delaminated from the spillway structure. Underwater spillway concrete appeared rough and grainy with exposed fine and course aggregate. The crest of the weir has a cast in place steel rail. The vertical portions of the rail were sounded and appeared to be not firmly attached to the structure. The long horizontal portion of the rail, across the weir, sounded firmly attached. Transition concrete near the rail has cracked and is loose or missing.

Spillway floor to base of weir:
The spillway floor consists of a concrete stab, approximately 100ft X 25 ft. The floor was covered with a layer of mud and silt, except for the area directly in front of the weir (area of current flow). The concrete surfaces appeared rough and grainy with fine and course aggregate exposed. The surface was tested for hardness using a pick. The surfaces tested somewhat soft, i.e., course aggregative could be chipped out without a great deal of effort. The structure has multiple construction joints. Approximately 10ft of joint was observable. The joint appeared tight and without spalls. 2 weep holes were located. The holes are lined with steel pipe and filled with sand.

Stone Pavement:
The spillway floor to stone pavement transition was relatively smooth. No undermining was observed. The stone pavement appears more like placed riprap (6 to 12 inch) than actual hand placed pavers. Much of the stone pavement is covered with mud and silt. No washed out areas or displaced pavement was observed. Some of the pavement rocks could be seen on the spillway floor.

Spillway upstream:
Upstream underwater portions of the spillway appear rough with exposed fine aggregates. Occasional spalled areas were noted, approximately 4 inches sq. These areas appear to be due to casting defects at the time of construction. Multiple construction joints were observed on the upstream face. The edges of the joints are opened approximately ¼ inch from deterioration. The joints appear tight beneath the outer edges. The concrete surfaces were randomly sounded using a pick. The concrete sounded relatively hard (harder than the spillway floor) and without voids. Cracks were not observable on the concrete surfaces.

Upstream spillway floor – compacted fill:
Most of the upstream spillway floor was covered with mud and silt and not observable. The concrete surfaces felt somewhat smooth. The transition from the spillway floor to the fill was covered with a layer of mud approximately 6 inches thick. No undermining was noted under the upstream spillway floor. The compacted fill was not found during the inspection. The area upstream from the concrete structure, which plans show as compacted fill, appeared as a layer of mud approximately 12 to 18 inches thick. A uniform layer of placed small stones could be felt beneath the mud.

24ci blow off pipe:
The blow off pipe appeared intact and the opening unobstructed.

South Pond intake structure and screens:
The dive station was moved to the South Pond intake and the structure inspected. Newport Water personnel reported turtles and animals being captured in the filters and this structure was believed to be the opening for the animals. The Intake structure was modified and now consists of a number of flanged and victualic coupled pipe sections within a concrete box. The intake pipe connections are detailed on the drawing following. All pipe sections and fasteners appeared heavily rusted and covered with blooms of hard rust.

The stainless screens appeared lightly fouled with algae. No screening was observed on top of the concrete box. No cracks or breaks were observed in the couplings or piping. Following the inspection, the screens were lightly cleaned of algae and debris.

Observations – North Pond Intake Structure

The dive station was moved to the North Pond intake structure, adjacent to the pump – filter house. The screens are visible within a concrete box. The box was surrounded with rip-rap. The front side of the box has two openings approximately 18 X 36 inches. The stainless screens and piping were intact. The screens were partially fouled with algae. Following the inspection, the screens were lightly cleaned. Chain link fencing on top of the concrete box opening was deteriorated and in very poor condition. Access to the stainless screens was through holes in the chain link fencing.

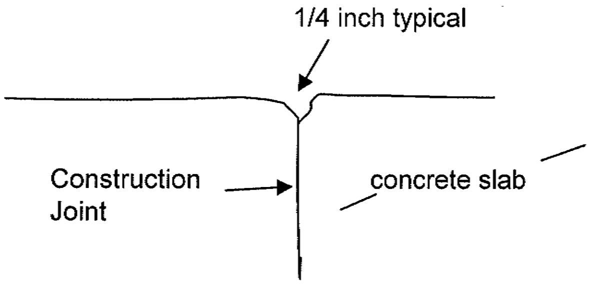
Additional structures inspected

An open pipe, just to the east of the South Pond Intake Structure was located. The pipe was just below the surface of the water, during the time of the inspection. The pipe was draining water from the South Pond. No screen or filter was observed on the pipe. This was believed to be the access for animals into the filter beds.

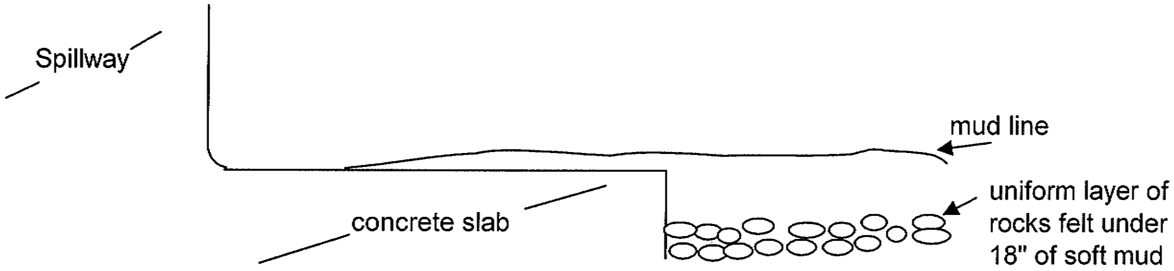
north

SOUTH POND INSPECTION DETAILS

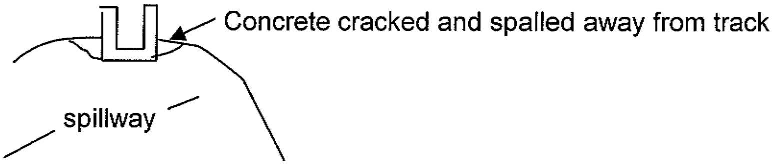
Not to scale



Plan view of typical construction joint



X section of upstream - upper spillway floor to compacted fill detail

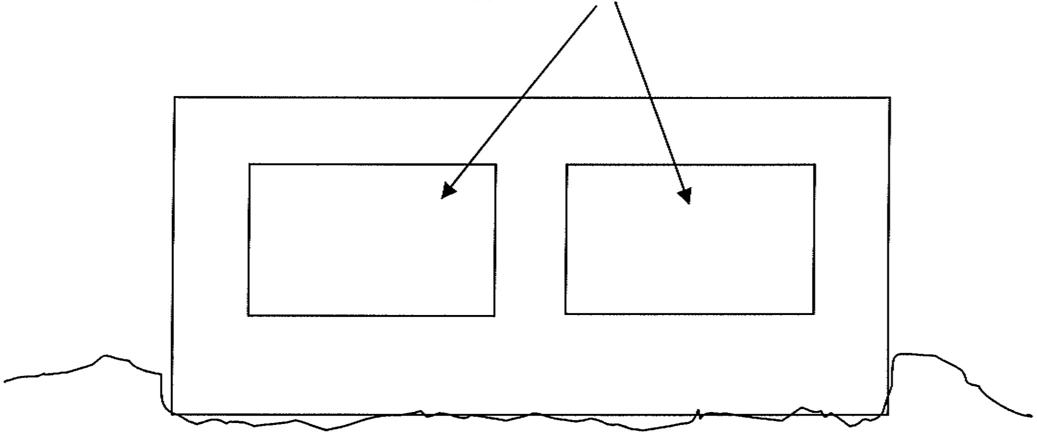


X section of crest of weir showing cast iron track

north

FRONT VIEW OF NORTH POND INTAKE STRUCTURE

Not to scale



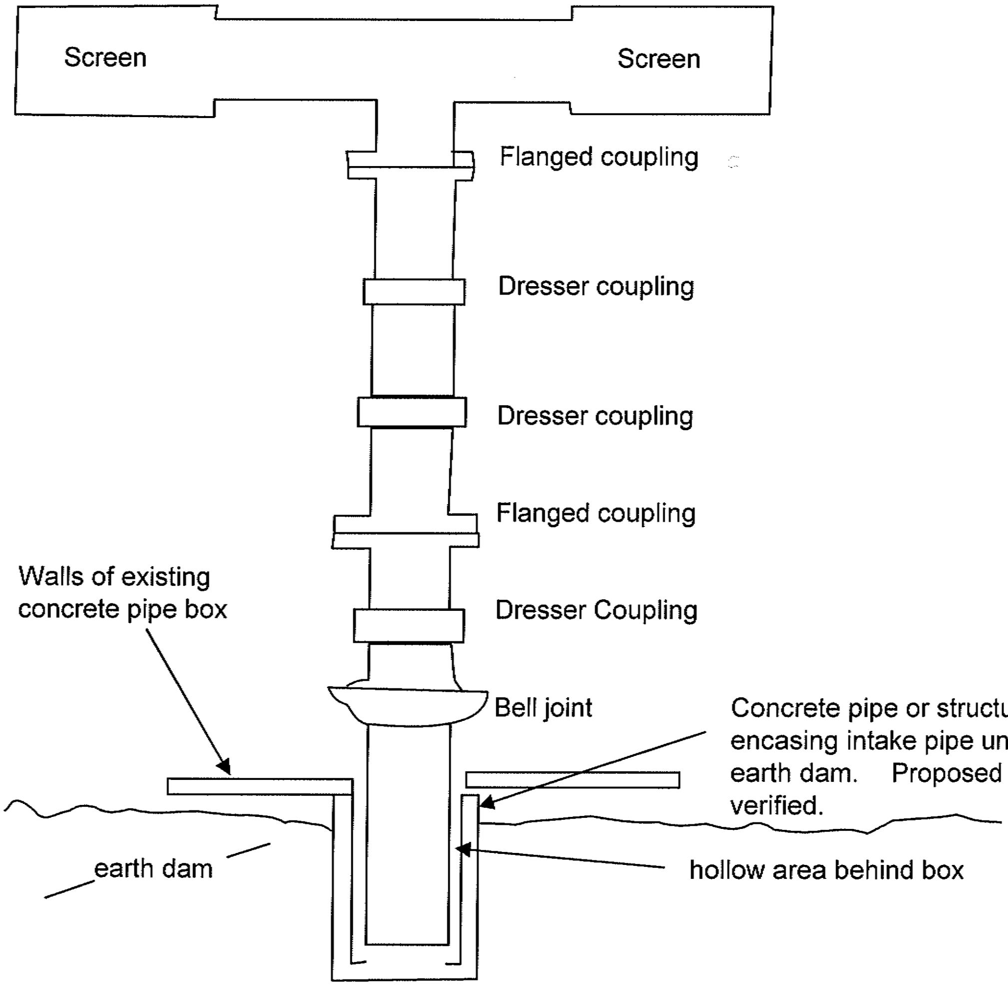
Two openings observed, approximately 18 X 36 inches

Rip rap surrounding structure

north

SOUTH POND INTAKE STRUCTURE
PIPING DETAILS

Not to scale



Notes: 1. The diver followed the pipe to the earth dam and was able to feel the pipe behind the box in a hollow area.

APPENDIX B

DAM INSPECTION PHOTOGRAPHS


South Pond Spillway - drawdown structure chamber


South Pond Spillway - Settlement adjacent to left spillway abutment

South Pond Spillway - Settlement adjacent to left spillway abutment

South Pond Spillway - Cracking and efflorescence on face of downstream spillway

South Pond Spillway - Concrete spalling along spillway weir board rail

South Pond Spillway - Cracking and efflorescence on face of right downstream spillway


South Pond Spillway - Cracking and efflorescence on face of left downstream spillway


South Pond Spillway - Cracking and efflorescence on face of downstream spillway

North Pond Primary Spillway - Cracking and efflorescence on face of left abutment

D

North Pond Primary Spillway - Ceiling and rear wall of void at bottom of left abutment

North Pond Primary Spillway - Concrete spillway bar and vegetation; missing scour protection downstream of spillway bar

North Pond Primary Spillway - Missing scour protection downstream of spillway bar at junction with right abutment

North Pond Primary Spillway - Cracking at face of right abutment

North Pond Primary Spillway - Footpath and runoff channel adjacent to downstream right abutment

North Pond Primary Spillway – Runoff channel adjacent to upstream right abutment

South Embankment - Footpath on embankment crest

South Embankment – Narrow bench along downstream toe of slope

South Embankment - Wet area with rutting on narrow bench along downstream toe of slope

South Embankment - Footpath on embankment crest

South Embankment - Wet area with rutting on narrow bench along downstream toe of slope

South Embankment - Footpath on embankment crest

South Embankment – Scarps on upstream slope resulting in narrow crest

West Embankment - Footpath on embankment crest

West Embankment - No bench along downstream toe of slope

West Embankment - Repair area on upstream slope

West Embankment – Narrow bench along downstream toe of slope, erosion along moat channel

West Embankment – Footpath on embankment crest

West Embankment – Narrow saturated bench along downstream toe of slope; equipment rutting

West Embankment – Narrow saturated bench along downstream toe of slope; equipment rutting

West Embankment – Severe scarps on upstream slope resulting in narrow crest width

West Embankment – Severe scarps on upstream slope resulting in narrow crest width

West Embankment – Severe scarps on upstream slope resulting in narrow crest width

West Embankment – Severe scarps on upstream slope resulting in narrow crest width

Erosion at upstream end of left wall along moat channel

West Embankment – Saturated bench and rutting along downstream toe of slope

West Embankment – Severe scarp on upstream slope resulting in narrow crest width

West Embankment – Severe scarp on upstream slope resulting in narrow crest width

West Embankment – Repaired scarps on upstream slope

North Embankment – Footpath on embankment crest

North Embankment – Riprap protection on upstream slope

North Embankment – Rilling on upstream slope

North Embankment – Scarp repair on upstream slope

North Embankment – Narrow bench / moat scouring along downstream slope

North Embankment - Riprap protection on upstream slope

North Embankment – Gravel fill reinforcement on bench along downstream toe of slope

North Embankment – Saturated bench and equipment rilling along moat channel


East Embankment – Footpath/erosion rill on downstream slope

East Embankment - Footpath/erosion rill on downstream slope

East Embankment - Vegetation on embankment, narrow crest width

East Embankment - Vegetation on embankment, narrow crest width

East Embankment –Vegetation on embankment, narrow crest width

East Embankment – Drainage channel near submerged culvert outlet overflowing embankment crest resulting in erosion and scarp on upstream embankment.

East Embankment – Informal drainage overflow pathway along downstream toe of slope downgradient of submerged channel outlet

South Pond / North Pond Dividing Embankment – Footpath on embankment crest

South Pond / North Pond Dividing Embankment – Severe scarp on downstream slope

South Pond / North Pond Dividing Embankment – Scarps on downstream slope

North Pond Embankment – Woody vegetation and scouring along discharge outlet structure

North Pond Embankment – Trees at north end of embankment

North Pond Embankment – Trees at north end of embankment

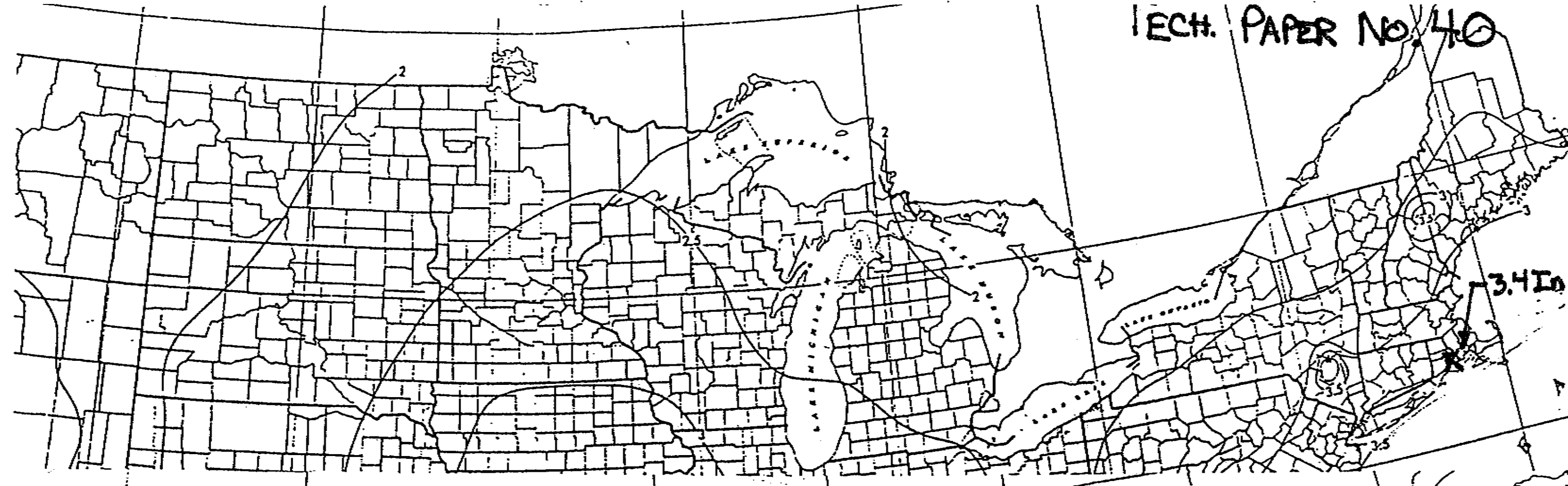
North Pond Embankment – Cleared embankment adjacent to North Pond emergency overflow spillway

North Pond Embankment – Saturated area with ponding water downstream of North Pond emergency overflow spillway; significant vegetation in downstream channel

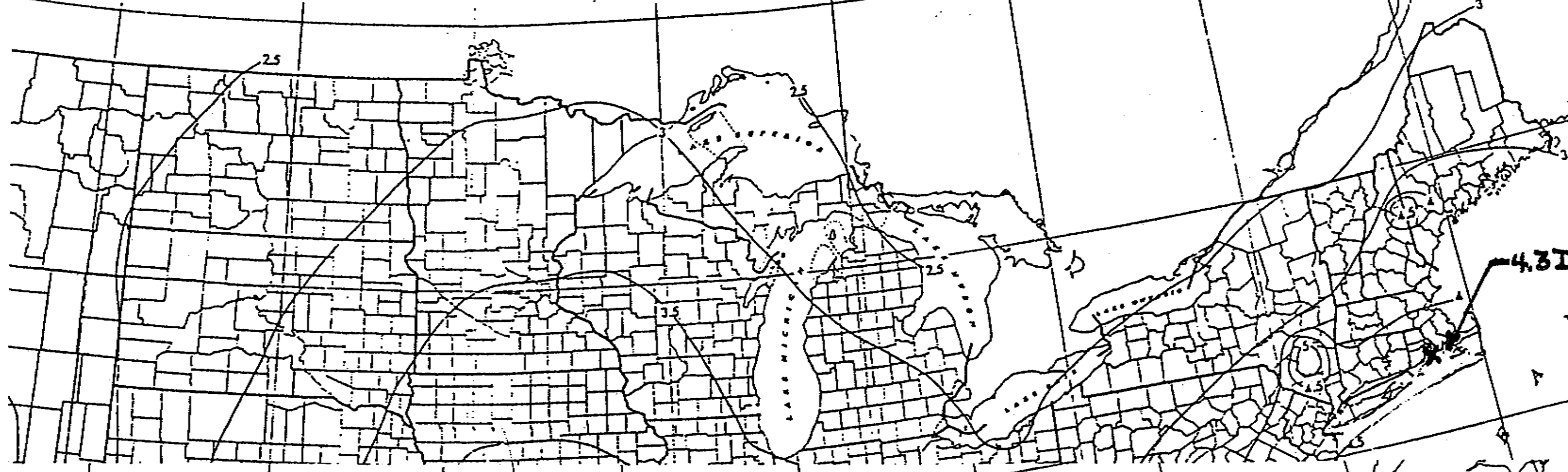
APPENDIX C

TECHNICAL PAPER NO. 4
RUNOFF CURVE NUMBERS FOR URBAN AREAS AND TR-20 ANALYSIS PRE-DEVELOPMENT CONDITONS

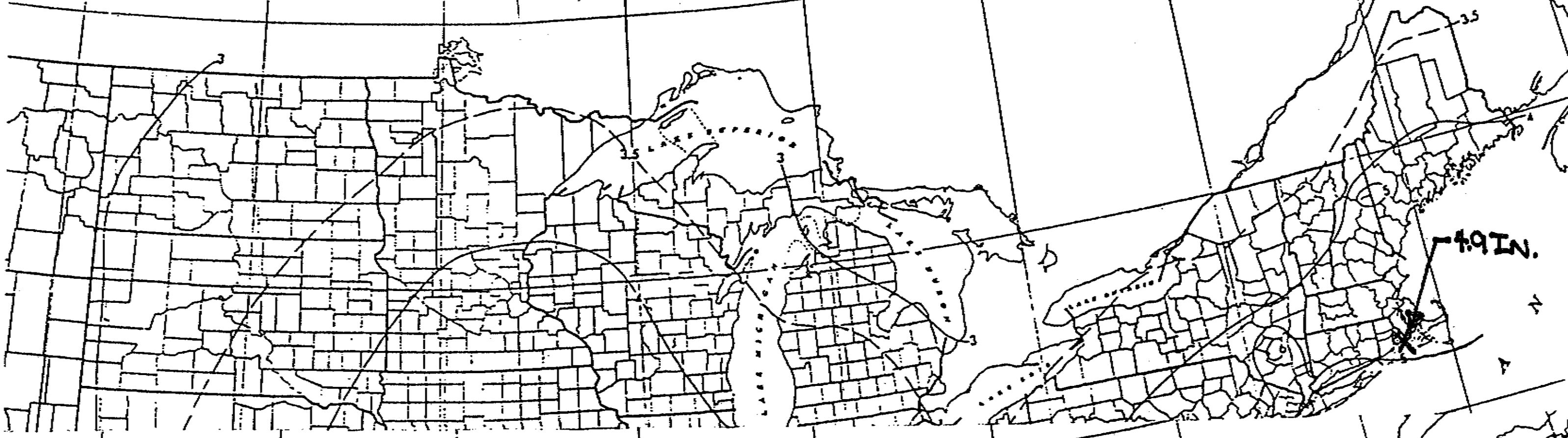
TECH. PAPER NO. 40



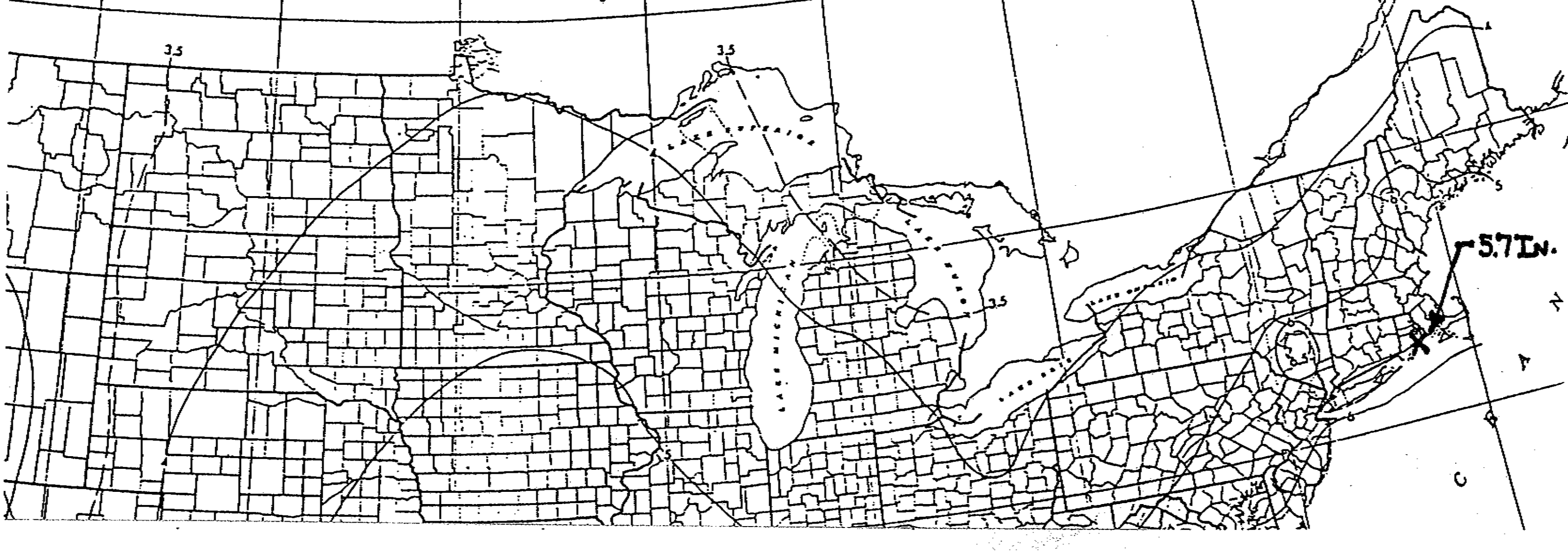
5-YEAR 24-HOUR RAINFALL (INCHES)



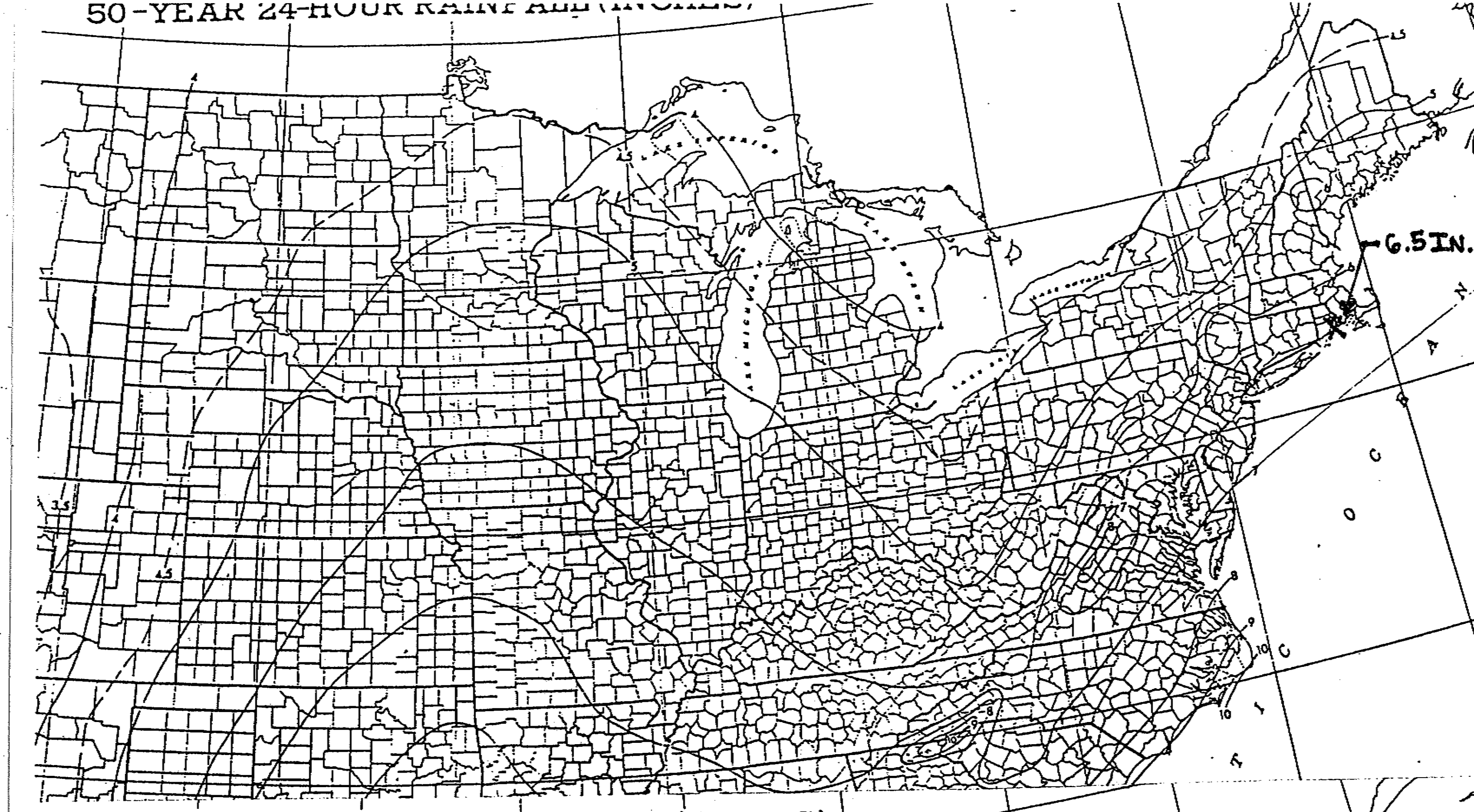
10-YEAR 24-HOUR RAINFALL (INCHES)



25-YEAR 24-HOUR RAINFALL (INCHES)



50-YEAR 24-HOUR RAINFALL (INCHES)



100-YEAR 24-HOUR RAINFALL (INCHES)

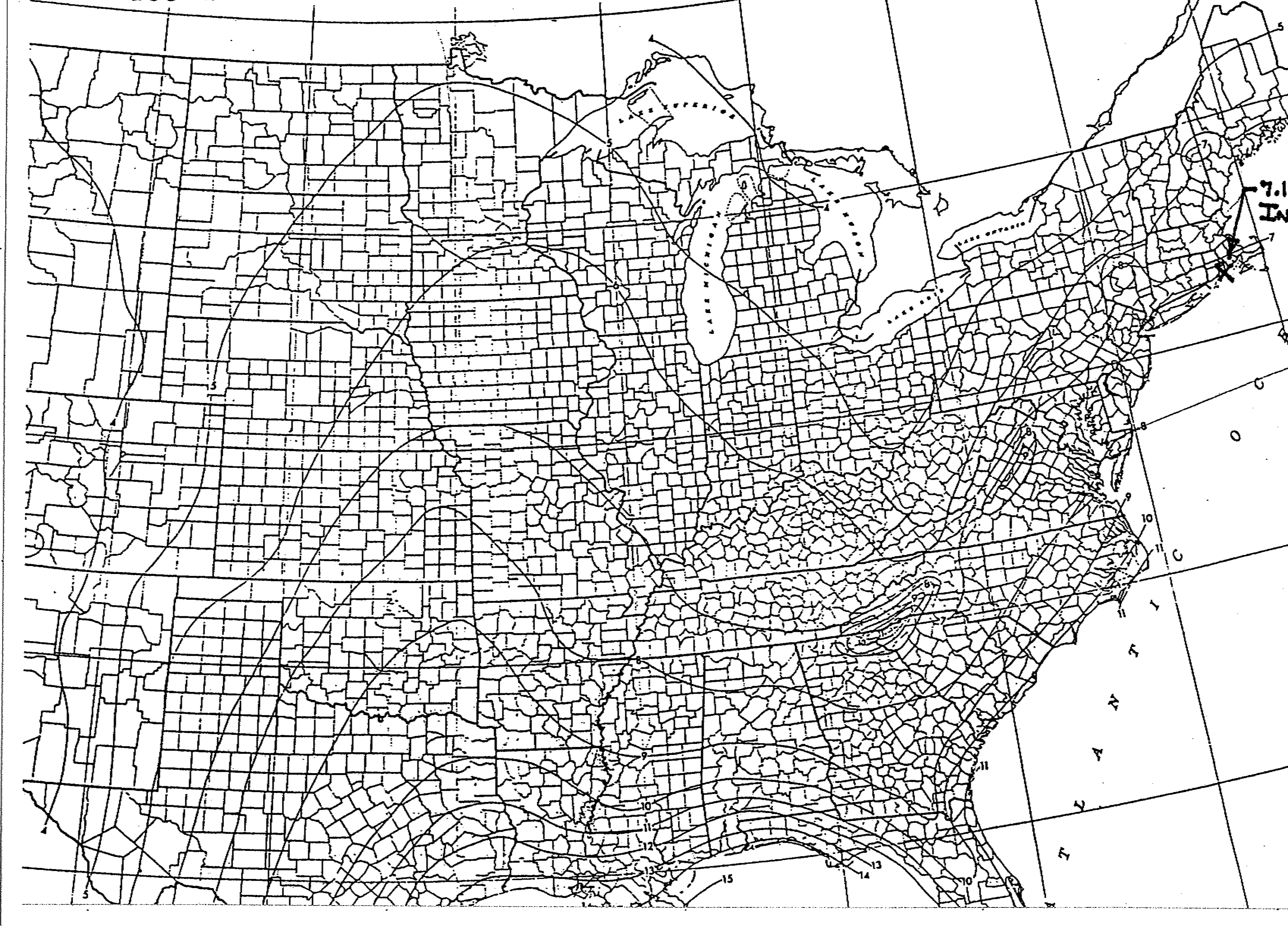


Table 2-2a.—Runoff curve numbers for urban areas[1]

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

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[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4, based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b.—Runoff curve numbers for cultivated agricultural lands[1]

Cover description			Curve numbers for hydrologic soil group—			
Cover type	Treatment[2]	Hydrologic condition[3]	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T + CR	Poor	65	73	79	81
		Good	61	70	77	80
ll grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T + CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

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[1] Average runoff condition, and $I_a = 0.2S$.

[2] *Crop residue cover* applies only if residue is on at least 5% of the surface throughout the year.

[3] Hydrologic condition is based on combination of factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes in rotations, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c.—Runoff curve numbers for other agricultural lands[1]

Cover description		Curve numbers for hydrologic soil group—			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing.[2]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element.[3]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	[4]30	48	65	73
Woods—grass combination (orchard or tree farm).[5]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods.[6]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	[4]30	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

[1] Average runoff condition, and $I_a = 0.2S$.

[2] *Poor:* <50% ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: >75% ground cover and lightly or only occasionally grazed.

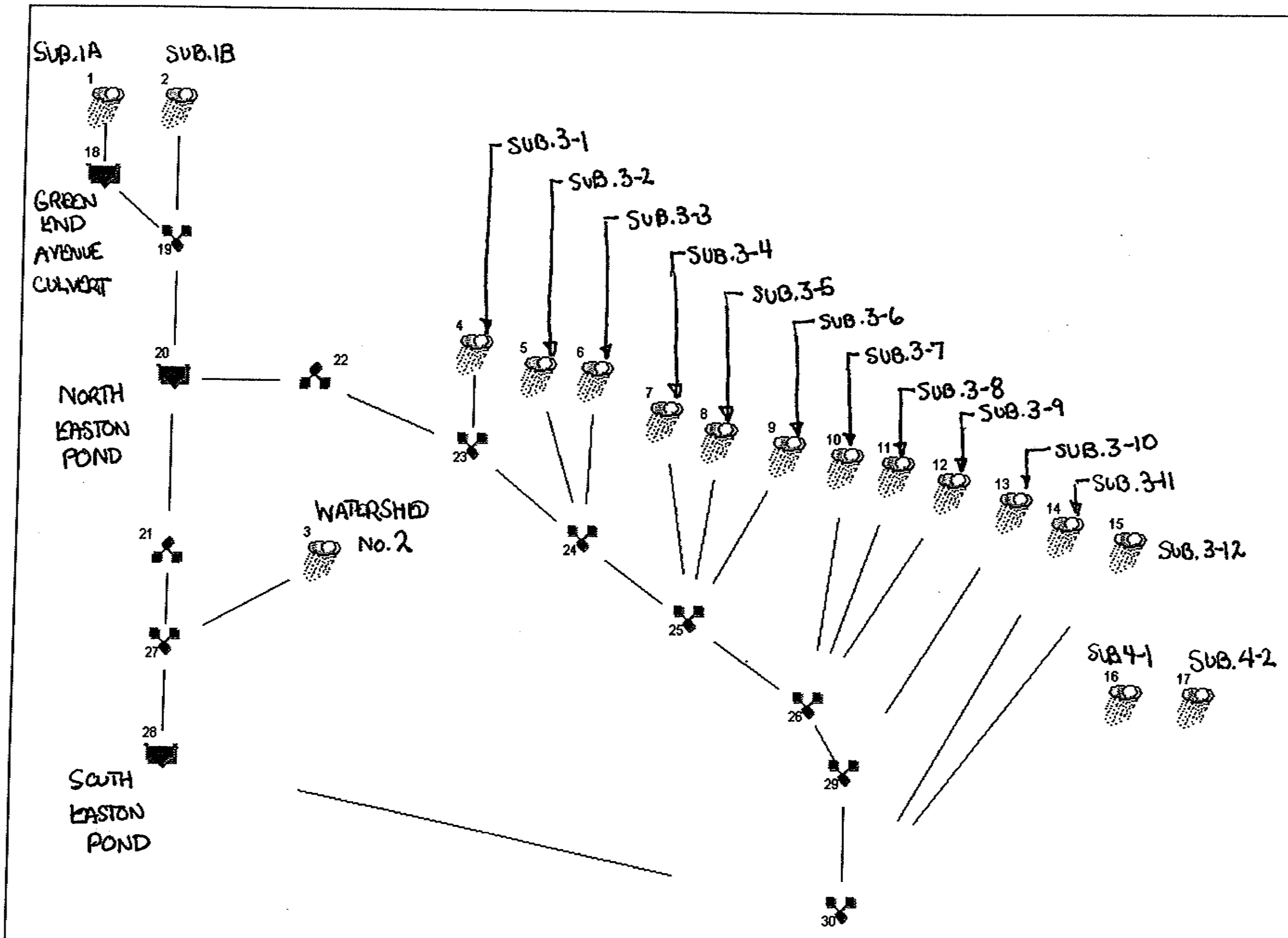
[3] *Poor:* <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

[4] Actual curve number is less than 30; use CN = 30 for runoff computations.

[5] CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

[6] *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

- **TR-20 Analysis Output Summary Reports**



Hydraflow Hydrographs Diagram	Project: Existing Conditions.gpw	01-02-2007

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	78.18	1	936	1,769,046	----	------	------	Subwatershed 1A
2	SCS Runoff	73.99	1	768	617,660	----	------	------	Subwatershed 1B
3	SCS Runoff	148.61	1	724	470,942	----	------	------	Subwatershed 2
4	SCS Runoff	3.86	1	743	23,335	----	------	------	Subwatershed 3-1
5	SCS Runoff	41.11	1	762	312,299	----	------	------	Subwatershed 3-2
6	SCS Runoff	26.11	1	743	143,354	----	------	------	Subwatershed 3-3
7	SCS Runoff	9.44	1	744	53,061	----	------	------	Subwatershed 3-4
8	SCS Runoff	2.19	1	746	14,266	----	------	------	Subwatershed 3-5
9	SCS Runoff	4.16	1	739	24,399	----	------	------	Subwatershed 3-6
10	SCS Runoff	0.21	1	727	1,195	----	------	------	Subwatershed 3-7
11	SCS Runoff	0.33	1	727	1,784	----	------	------	Subwatershed 3-8
12	SCS Runoff	0.52	1	730	2,810	----	------	------	Subwatershed 3-9
13	SCS Runoff	5.23	1	725	16,256	----	------	------	Subwatershed 3-10
14	SCS Runoff	6.70	1	725	20,612	----	------	------	Subwatershed 3-11
15	SCS Runoff	16.21	1	765	131,967	----	------	------	Subwatershed 3-12
16	SCS Runoff	24.18	1	739	126,492	----	------	------	Subwatershed 4-1 (Sampling Point S11)
17	SCS Runoff	0.67	1	725	2,074	----	------	------	Subwatershed 4-2 (Sampling Point S9)
18	Reservoir	78.18	1	937	1,544,530	1	9.93	229,004	Green End Culvert
19	Combine	91.61	1	919	2,162,189	2, 18	------	------	Total Flow to Green End Pond
20	Reservoir	10.84	1	1440	119,562	19	10.69	2,042,630	Green End Pond
21	Diversion1	10.84	1	1440	119,562	20	------	------	Primary Outflow
22	Diversion2	0.00	1	1343	0	20	------	------	Secondary Outflow
23	Combine	3.86	1	743	23,335	4, 22	------	------	Moat Sampling Point 4
24	Combine	65.68	1	753	478,987	5, 6, 23	------	------	Combined Flow Hydrograph
25	Combine	79.36	1	751	570,714	7, 8, 9, 24	------	------	Combined Flow Hydrograph
26	Combine	79.87	1	751	576,502	10, 11, 12, 25	------	------	Moat Sampling Point 5
27	Combine	148.61	1	724	590,504	3, 21,	------	------	Total Flow to Easton Pond
28	Reservoir	0.00	1	0	0	27	8.10	590,504	Easton Pond
29	Combine	81.06	1	750	592,757	13, 26,	------	------	Moat Sampling Point 1
30	Combine	96.35	1	752	745,336	14, 15, 28, 29	------	------	Total Flow to Memorial Blvd Culvert

Proj. file: Existing Conditions.gpw	Return Period: 1 yr	Run date: 01-02-2007

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	692.00	1	896	13,753,640	----	------	------	Subwatershed 1A
2	SCS Runoff	481.50	1	762	3,713,481	----	------	------	Subwatershed 1B
3	SCS Runoff	474.76	1	724	1,607,855	----	------	------	Subwatershed 2
4	SCS Runoff	42.25	1	736	197,117	----	------	------	Subwatershed 3-1
5	SCS Runoff	255.57	1	756	1,819,115	----	------	------	Subwatershed 3-2
6	SCS Runoff	135.11	1	741	730,106	----	------	------	Subwatershed 3-3
7	SCS Runoff	61.85	1	740	322,184	----	------	------	Subwatershed 3-4
8	SCS Runoff	26.51	1	738	128,043	----	------	------	Subwatershed 3-5
9	SCS Runoff	51.54	1	733	218,810	----	------	------	Subwatershed 3-6
10	SCS Runoff	4.07	1	725	12,582	----	------	------	Subwatershed 3-7
11	SCS Runoff	5.97	1	725	18,467	----	------	------	Subwatershed 3-8
12	SCS Runoff	7.94	1	727	27,241	----	------	------	Subwatershed 3-9
13	SCS Runoff	25.06	1	724	78,873	----	------	------	Subwatershed 3-10
14	SCS Runoff	25.98	1	724	83,981	----	------	------	Subwatershed 3-11
15	SCS Runoff	119.65	1	758	866,721	----	------	------	Subwatershed 3-12
16	SCS Runoff	180.20	1	736	839,123	----	------	------	Subwatershed 4-1 (Sampling Point S11)
17	SCS Runoff	3.20	1	724	10,065	----	------	------	Subwatershed 4-2 (Sampling Point S9)
18	Reservoir	668.74	1	929	13,527,800	1	12.15	585,424	Green End Culvert
19	Combine	729.03	1	919	17,241,270	2, 18	------	------	Total Flow to Green End Pond
20	Reservoir	575.30	1	1026	13,184,410	19	11.68	6,945,977	Green End Pond
21	Diversion1	372.09	1	1026	8,974,525	20	------	------	Primary Outflow
22	Diversion2	203.21	1	1026	4,209,876	20	------	------	Secondary Outflow
23	Combine	205.11	1	1025	4,406,989	4, 22	------	------	Moat Sampling Point 4
24	Combine	395.31	1	750	6,956,209	5, 6, 23	------	------	Combined Flow Hydrograph
25	Combine	506.38	1	744	7,625,251	7, 8, 9, 24	------	------	Combined Flow Hydrograph
26	Combine	513.05	1	744	7,683,538	10, 11, 12, 25	------	------	Moat Sampling Point 5
27	Combine	474.76	1	724	10,582,380	3, 21,	------	------	Total Flow to Easton Pond
28	Reservoir	64.84	1	1440	934,406	27	9.64	9,646,454	Easton Pond
29	Combine	520.50	1	744	7,762,413	13, 26,	------	------	Moat Sampling Point 1
30	Combine	627.35	1	747	9,647,521	14, 15, 28, 29	------	------	Total Flow to Memorial Blvd Culvert

Proj. file: Existing Conditions.gpw

Return Period: 2 yr

Run date: 01-02-2007

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	994.47	1	894	19,669,890	----	------	------	Subwatershed 1A
2	SCS Runoff	664.26	1	761	5,152,705	----	------	------	Subwatershed 1B
3	SCS Runoff	605.86	1	724	2,078,814	----	------	------	Subwatershed 2
4	SCS Runoff	61.12	1	736	284,510	----	------	------	Subwatershed 3-1
5	SCS Runoff	350.89	1	756	2,514,386	----	------	------	Subwatershed 3-2
6	SCS Runoff	181.63	1	741	992,450	----	------	------	Subwatershed 3-3
7	SCS Runoff	85.34	1	740	447,590	----	------	------	Subwatershed 3-4
8	SCS Runoff	38.69	1	737	186,022	----	------	------	Subwatershed 3-5
9	SCS Runoff	75.13	1	732	317,861	----	------	------	Subwatershed 3-6
10	SCS Runoff	6.04	1	725	18,582	----	------	------	Subwatershed 3-7
11	SCS Runoff	8.85	1	725	27,227	----	------	------	Subwatershed 3-8
12	SCS Runoff	11.68	1	727	39,896	----	------	------	Subwatershed 3-9
13	SCS Runoff	33.40	1	724	106,562	----	------	------	Subwatershed 3-10
14	SCS Runoff	33.80	1	724	110,989	----	------	------	Subwatershed 3-11
15	SCS Runoff	167.19	1	757	1,215,519	----	------	------	Subwatershed 3-12
16	SCS Runoff	251.63	1	736	1,178,215	----	------	------	Subwatershed 4-1 (Sampling Point S11)
17	SCS Runoff	4.26	1	724	13,598	----	------	------	Subwatershed 4-2 (Sampling Point S9)
18	Reservoir	886.63	1	960	19,443,530	1	15.35	2,034,313	Green End Culvert
19	Combine	1001.03	1	772	24,596,220	2, 18	------	------	Total Flow to Green End Pond
20	Reservoir	793.19	1	1033	19,894,540	19	11.91	8,091,054	Green End Pond
21	Diversion1	499.17	1	1033	13,017,040	20	------	------	Primary Outflow
22	Diversion2	294.01	1	1033	6,877,507	20	------	------	Secondary Outflow
23	Combine	296.51	1	1032	7,162,011	4, 22	------	------	Moat Sampling Point 4
24	Combine	540.87	1	750	10,668,850	5, 6, 23	------	------	Combined Flow Hydrograph
25	Combine	699.60	1	744	11,620,330	7, 8, 9, 24	------	------	Combined Flow Hydrograph
26	Combine	709.42	1	743	11,706,040	10, 11, 12, 25	------	------	Moat Sampling Point 5
27	Combine	605.87	1	724	15,095,850	3, 21,	------	------	Total Flow to Easton Pond
28	Reservoir	176.28	1	1428	2,965,269	27	10.06	12,133,290	Easton Pond
29	Combine	719.69	1	743	11,812,590	13, 26,	------	------	Moat Sampling Point 1
30	Combine	867.29	1	746	16,104,370	14, 15, 28, 29	------	------	Total Flow to Memorial Blvd Culvert

Proj. file: Existing Conditions.gpw	Return Period: 5 yr	Run date: 01-02-2007

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	1201.45	1	893	23,754,350	----	------	------	Subwatershed 1A
2	SCS Runoff	787.00	1	761	6,133,831	----	------	------	Subwatershed 1B
3	SCS Runoff	692.93	1	724	2,393,314	----	------	------	Subwatershed 2
4	SCS Runoff	73.98	1	736	345,088	----	------	------	Subwatershed 3-1
5	SCS Runoff	414.71	1	756	2,987,642	----	------	------	Subwatershed 3-2
6	SCS Runoff	212.57	1	741	1,169,932	----	------	------	Subwatershed 3-3
7	SCS Runoff	101.09	1	740	533,122	----	------	------	Subwatershed 3-4
8	SCS Runoff	47.04	1	737	226,328	----	------	------	Subwatershed 3-5
9	SCS Runoff	91.33	1	732	386,718	----	------	------	Subwatershed 3-6
10	SCS Runoff	7.40	1	725	22,785	----	------	------	Subwatershed 3-7
11	SCS Runoff	10.84	1	725	33,357	----	------	------	Subwatershed 3-8
12	SCS Runoff	14.25	1	727	48,725	----	------	------	Subwatershed 3-9
13	SCS Runoff	38.93	1	724	125,255	----	------	------	Subwatershed 3-10
14	SCS Runoff	38.98	1	724	129,105	----	------	------	Subwatershed 3-11
15	SCS Runoff	199.27	1	757	1,454,321	----	------	------	Subwatershed 3-12
16	SCS Runoff	299.86	1	735	1,410,487	----	------	------	Subwatershed 4-1 (Sampling Point S11)
17	SCS Runoff	4.97	1	724	15,984	----	------	------	Subwatershed 4-2 (Sampling Point S9)
18	Reservoir	1177.39	1	914	23,527,580	1	15.57	2,158,423	Green End Culvert
19	Combine	1274.58	1	913	29,661,430	2, 18	------	------	Total Flow to Green End Pond
20	Reservoir	1007.54	1	1001	24,608,280	19	12.11	9,153,380	Green End Pond
21	Diversion1	623.20	1	1001	15,801,520	20	------	------	Primary Outflow
22	Diversion2	384.34	1	1001	8,806,737	20	------	------	Secondary Outflow
23	Combine	387.61	1	1001	9,151,825	4, 22	------	------	Moat Sampling Point 4
24	Combine	638.48	1	749	13,309,400	5, 6, 23	------	------	Combined Flow Hydrograph
25	Combine	829.73	1	743	14,455,560	7, 8, 9, 24	------	------	Combined Flow Hydrograph
26	Combine	841.61	1	743	14,560,440	10, 11, 12, 25	------	------	Moat Sampling Point 5
27	Combine	693.21	1	724	18,194,850	3, 21,	------	------	Total Flow to Easton Pond
28	Reservoir	242.54	1	1389	4,973,249	27	10.25	13,290,240	Easton Pond
29	Combine	853.63	1	742	14,685,700	13, 26,	------	------	Moat Sampling Point 1
30	Combine	1028.75	1	745	21,242,380	14, 15, 28, 29	------	------	Total Flow to Memorial Blvd Culvert

Proj. file: Existing Conditions.gpw	Return Period: 10 yr	Run date: 01-02-2007

Hydraflow Hydrographs by Intelisolve

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	1481.31	1	891	29,319,660	----	------	------	Subwatershed 1A
2	SCS Runoff	950.77	1	761	7,459,894	----	------	------	Subwatershed 1B
3	SCS Runoff	808.73	1	724	2,813,059	----	------	------	Subwatershed 2
4	SCS Runoff	91.32	1	736	427,847	----	------	------	Subwatershed 3-1
5	SCS Runoff	499.76	1	756	3,626,676	----	------	------	Subwatershed 3-2
6	SCS Runoff	253.67	1	741	1,408,662	----	------	------	Subwatershed 3-3
7	SCS Runoff	122.08	1	740	648,759	----	------	------	Subwatershed 3-4
8	SCS Runoff	58.31	1	737	281,498	----	------	------	Subwatershed 3-5
9	SCS Runoff	113.21	1	732	480,963	----	------	------	Subwatershed 3-6
10	SCS Runoff	9.25	1	725	28,565	----	------	------	Subwatershed 3-7
11	SCS Runoff	13.53	1	725	41,786	----	------	------	Subwatershed 3-8
12	SCS Runoff	17.73	1	727	60,840	----	------	------	Subwatershed 3-9
13	SCS Runoff	46.28	1	724	150,368	----	------	------	Subwatershed 3-10
14	SCS Runoff	45.86	1	724	153,347	----	------	------	Subwatershed 3-11
15	SCS Runoff	242.20	1	757	1,777,963	----	------	------	Subwatershed 3-12
16	SCS Runoff	364.40	1	735	1,725,377	----	------	------	Subwatershed 4-1 (Sampling Point S11)
17	SCS Runoff	5.91	1	724	19,188	----	------	------	Subwatershed 4-2 (Sampling Point S9)
18	Reservoir	1478.29	1	897	29,091,120	1	15.73	2,250,453	Green End Culvert
19	Combine	1603.93	1	894	36,551,020	2, 18	------	------	Total Flow to Green End Pond
20	Reservoir	1297.85	1	985	30,882,300	19	12.37	10,519,530	Green End Pond
21	Diversion1	790.20	1	985	19,475,150	20	------	------	Primary Outflow
22	Diversion2	507.64	1	985	11,407,150	20	------	------	Secondary Outflow
23	Combine	511.78	1	985	11,835,000	4, 22	------	------	Moat Sampling Point 4
24	Combine	777.27	1	750	16,870,320	5, 6, 23	------	------	Combined Flow Hydrograph
25	Combine	1006.83	1	743	18,281,540	7, 8, 9, 24	------	------	Combined Flow Hydrograph
26	Combine	1021.36	1	743	18,412,740	10, 11, 12, 25	------	------	Moat Sampling Point 5
27	Combine	815.42	1	724	22,288,210	3, 21,	------	------	Total Flow to Easton Pond
28	Reservoir	360.17	1	1243	8,058,744	27	10.55	15,079,820	Easton Pond
29	Combine	1035.39	1	742	18,563,110	13, 26,	------	------	Moat Sampling Point 1
30	Combine	1249.59	1	745	28,553,160	14, 15, 28, 29	------	------	Total Flow to Memorial Blvd Culvert

Proj. file: Existing Conditions.gpw	Return Period: 25 yr	Run date: 01-02-2007

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	1763.78	1	890	34,984,260	----	------	------	Subwatershed 1A
2	SCS Runoff	1114.27	1	761	8,800,543	----	------	------	Subwatershed 1B
3	SCS Runoff	924.30	1	724	3,233,116	----	------	------	Subwatershed 2
4	SCS Runoff	108.82	1	735	512,269	----	------	------	Subwatershed 3-1
5	SCS Runoff	584.61	1	756	4,272,221	----	------	------	Subwatershed 3-2
6	SCS Runoff	294.57	1	741	1,649,068	----	------	------	Subwatershed 3-3
7	SCS Runoff	143.03	1	740	765,697	----	------	------	Subwatershed 3-4
8	SCS Runoff	69.66	1	737	337,869	----	------	------	Subwatershed 3-5
9	SCS Runoff	135.25	1	732	577,257	----	------	------	Subwatershed 3-6
10	SCS Runoff	11.12	1	725	34,495	----	------	------	Subwatershed 3-7
11	SCS Runoff	16.24	1	725	50,429	----	------	------	Subwatershed 3-8
12	SCS Runoff	21.23	1	727	73,243	----	------	------	Subwatershed 3-9
13	SCS Runoff	53.58	1	724	175,630	----	------	------	Subwatershed 3-10
14	SCS Runoff	52.70	1	724	177,656	----	------	------	Subwatershed 3-11
15	SCS Runoff	285.13	1	757	2,105,903	----	------	------	Subwatershed 3-12
16	SCS Runoff	428.91	1	735	2,044,536	----	------	------	Subwatershed 4-1 (Sampling Point S11)
17	SCS Runoff	6.84	1	724	22,412	----	------	------	Subwatershed 4-2 (Sampling Point S9)
18	Reservoir	1761.44	1	895	33,874,600	1	15.86	2,326,863	Green End Culvert
19	Combine	1908.17	1	892	42,675,130	2, 18	------	------	Total Flow to Green End Pond
20	Reservoir	1593.41	1	974	37,503,230	19	12.62	11,804,810	Green End Pond
21	Diversion1	959.37	1	974	23,334,810	20	------	------	Primary Outflow
22	Diversion2	634.04	1	974	14,168,470	20	------	------	Secondary Outflow
23	Combine	639.12	1	973	14,680,720	4, 22	------	------	Moat Sampling Point 4
24	Combine	935.44	1	751	20,602,040	5, 6, 23	------	------	Combined Flow Hydrograph
25	Combine	1197.08	1	744	22,282,840	7, 8, 9, 24	------	------	Combined Flow Hydrograph
26	Combine	1213.55	1	743	22,440,980	10, 11, 12, 25	------	------	Moat Sampling Point 5
27	Combine	983.37	1	972	26,567,910	3, 21,	------	------	Total Flow to Easton Pond
28	Reservoir	487.20	1	1207	11,475,620	27	10.83	16,788,670	Easton Pond
29	Combine	1229.67	1	743	22,616,650	13, 26,	------	------	Moat Sampling Point 1
30	Combine	1485.82	1	746	36,375,810	14, 15, 28, 29	------	------	Total Flow to Memorial Blvd Culvert

Proj. file: Existing Conditions.gpw	Return Period: 50 yr	Run date: 01-02-2007

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	1976.64	1	890	39,281,420	----	------	------	Subwatershed 1A
2	SCS Runoff	1236.60	1	761	9,813,013	----	------	------	Subwatershed 1B
3	SCS Runoff	1010.87	1	724	3,548,300	----	------	------	Subwatershed 2
4	SCS Runoff	121.99	1	735	576,405	----	------	------	Subwatershed 3-1
5	SCS Runoff	648.06	1	756	4,759,506	----	------	------	Subwatershed 3-2
6	SCS Runoff	325.13	1	741	1,830,170	----	------	------	Subwatershed 3-3
7	SCS Runoff	158.70	1	740	854,024	----	------	------	Subwatershed 3-4
8	SCS Runoff	78.21	1	737	380,740	----	------	------	Subwatershed 3-5
9	SCS Runoff	151.83	1	732	650,489	----	------	------	Subwatershed 3-6
10	SCS Runoff	12.52	1	725	39,018	----	------	------	Subwatershed 3-7
11	SCS Runoff	18.29	1	725	57,019	----	------	------	Subwatershed 3-8
12	SCS Runoff	23.87	1	727	82,688	----	------	------	Subwatershed 3-9
13	SCS Runoff	59.03	1	724	194,648	----	------	------	Subwatershed 3-10
14	SCS Runoff	57.81	1	724	195,920	----	------	------	Subwatershed 3-11
15	SCS Runoff	317.29	1	757	2,353,942	----	------	------	Subwatershed 3-12
16	SCS Runoff	477.21	1	735	2,285,971	----	------	------	Subwatershed 4-1 (Sampling Point S11)
17	SCS Runoff	7.53	1	724	24,839	----	------	------	Subwatershed 4-2 (Sampling Point S9)
18	Reservoir	1973.92	1	895	38,164,730	1	15.95	2,379,525	Green End Culvert
19	Combine	2135.76	1	892	47,977,770	2, 18	------	------	Total Flow to Green End Pond
20	Reservoir	1815.56	1	967	42,632,190	19	12.79	12,718,130	Green End Pond
21	Diversion1	1086.13	1	967	26,318,000	20	------	------	Primary Outflow
22	Diversion2	729.44	1	967	16,314,170	20	------	------	Secondary Outflow
23	Combine	735.30	1	966	16,890,570	4, 22	------	------	Moat Sampling Point 4
24	Combine	1062.57	1	751	23,480,250	5, 6, 23	------	------	Combined Flow Hydrograph
25	Combine	1348.93	1	744	25,365,500	7, 8, 9, 24	------	------	Combined Flow Hydrograph
26	Combine	1367.33	1	743	25,544,230	10, 11, 12, 25	------	------	Moat Sampling Point 5
27	Combine	1113.07	1	964	29,866,290	3, 21,	------	------	Total Flow to Easton Pond
28	Reservoir	585.25	1	1185	14,173,150	27	11.04	17,999,240	Easton Pond
29	Combine	1385.04	1	743	25,738,880	13, 26,	------	------	Moat Sampling Point 1
30	Combine	1671.73	1	747	42,461,900	14, 15, 28, 29	------	------	Total Flow to Memorial Blvd Culvert

Proj. file: Existing Conditions.gpw	Return Period: 100 yr	Run date: 01-02-2007

- **Pond Storage and Spillway Data**

Reservoir Report

Reservoir No. 1 - Pond North of Green End

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	5.70	28,640	0	0
4.60	10.30	79,656	249,081	249,081
6.30	12.00	253,526	283,205	532,286
8.30	14.00	473,025	726,551	1,258,837
10.30	16.00	674,723	1,147,748	2,406,585

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 94.0	0.0	0.0	0.0
Span in	= 144.0	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 5.70	0.00	0.00	0.00
Length ft	= 50.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 650.00	0.00	0.00	0.00
Crest El. ft	= 15.25	0.00	0.00	0.00
Weir Coeff.	= 2.70	3.33	0.00	0.00
Weir Type	= Ciplti	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 10.25 ft

Stage / Storage / Discharge Table

Note: All outflows have been analyzed under inlet and outlet control.

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	5.70	0.00	---	---	---	0.00	---	---	---	---	0.00
4.60	249,081	10.30	403.09	---	---	---	0.00	---	---	---	---	403.09
6.30	532,286	12.00	646.06	---	---	---	0.00	---	---	---	---	646.06
8.30	1,258,837	14.00	410.25	---	---	---	0.00	---	---	---	---	410.25
10.30	2,406,585	16.00	943.20	---	---	---	1139.91	---	---	---	---	2083.10

Reservoir Report

Reservoir No. 2 - North Easton Pond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	10.28	4,813,950	0	0
1.72	12.00	5,133,773	8,555,042	8,555,042
3.72	14.00	5,412,295	10,546,070	19,101,110
3.97	14.25	5,418,404	1,353,838	20,454,950

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 0.0	0.0	0.0	0.0
Span in	= 0.0	0.0	0.0	0.0
No. Barrels	= 0	0	0	0
Invert El. ft	= 0.00	0.00	0.00	0.00
Length ft	= 0.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 125.00	100.00	0.00	0.00
Crest El. ft	= 10.61	10.85	0.00	0.00
Weir Coeff.	= 2.70	2.70	0.00	0.00
Weir Type	= Rect	Rect	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	10.28	---	---	---	---	0.00	0.00	---	---	---	0.00
1.72	8,555,042	12.00	---	---	---	---	553.09	332.97	---	---	---	886.06
3.72	19,101,110	14.00	---	---	---	---	2106.56	1509.49	---	---	---	3616.05
3.97	20,454,950	14.25	---	---	---	---	2343.83	1692.71	---	---	---	4036.54

Reservoir Report

Reservoir No. 3 - South Easton Pond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	8.00	5,836,033	0	0
1.00	9.00	5,876,517	5,856,275	5,856,275
2.00	10.00	5,977,181	5,926,849	11,783,120
4.00	12.00	6,021,416	11,998,600	23,781,720

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 0.0	0.0	0.0	0.0
Span in	= 0.0	0.0	0.0	0.0
No. Barrels	= 0	0	0	0
Invert El. ft	= 0.00	0.00	0.00	0.00
Length ft	= 0.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .000	.000	.000	.000
Orif. Coeff.	= 0.00	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 15.00	80.00	0.00	0.00
Crest El. ft	= 8.48	9.48	0.00	0.00
Weir Coeff.	= 2.70	2.70	0.00	0.00
Weir Type	= Rect	Rect	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Stage / Storage / Discharge Table

Note: All outflows have been analyzed under inlet and outlet control.

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	8.00	---	---	---	---	0.00	0.00	---	---	---	0.00
1.00	5,856,275	9.00	---	---	---	---	15.19	0.00	---	---	---	15.19
2.00	11,783,120	10.00	---	---	---	---	75.90	81.00	---	---	---	156.89
4.00	23,781,720	12.00	---	---	---	---	267.47	864.08	---	---	---	1131.55

FUSS & O'NEILL
Disciplines to Deliver

PREPARED BY	DATE	CHECKED BY	DATE	PROJECT
SA	11/02/06			20060901.

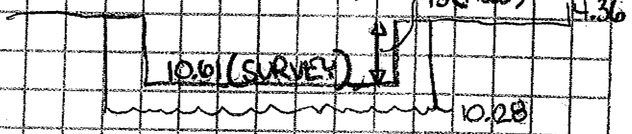
SHEET N
1 of

DETENTION BASIN DESIGN REPORT

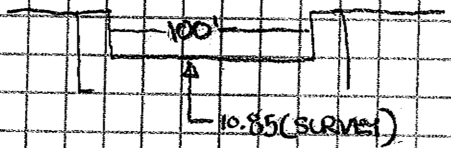
NO. EASTON POND

ELEV.	AREA
10.28 (NORMAL W/S)	4813950 SF
10.50	[illegible] SF
11.00	[illegible] SF
12.00	5,133,773 SF
13.00	[illegible]
14.00	5,412,295 SF
14.25	5,418,404 SF

PRIMARY SPILLWAY



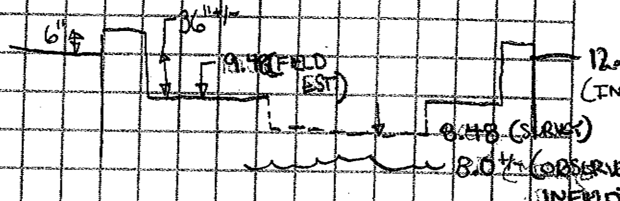
SECONDARY SPILLWAY



SO. EASTON POND

ELEV.	AREA
8.0 +/- (NORMAL WS)	5,836,033 SF
9.0	5876517 SF
10.0	5,977,181 SF
12.0	6021416 SF

SPILLWAY

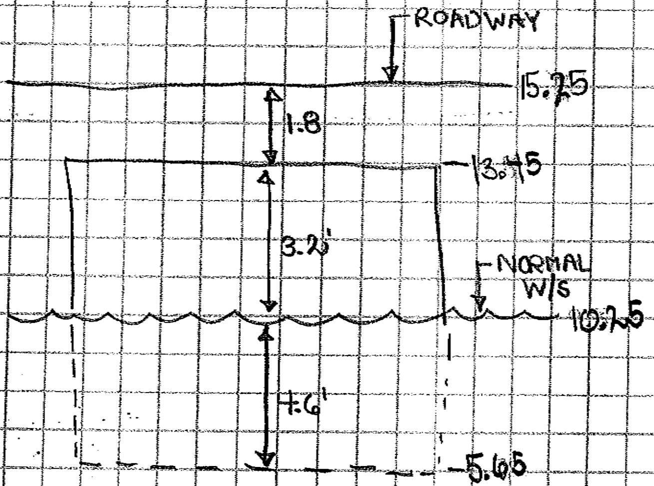


WETLAND UPSTREAM OF GREEN END AVENUE

ELEV.	AREA
5.70	28,640 SF
10.30	79,656 SF
12.00	253,526 SF
14.00	473,025 SF
16.00	674,723 SF

PREPARED BY: SA
DATE: 11/02/06
CHECKED BY:
DATE:
PROJECT NO: 20060901.
SHEET NO: 2 of 2

GREEN END CULVERT ANALYSIS



UPSTREAM SIDE OF CULVERT

GREEN END U/S WATER ELEV.
PER MIDDLETOWN FIS

100YR EL= 14.7 U/S BRIDGE
50YR EL= 14.3 U/S BRIDGE
10YR EL= 12.8 U/S BRIDGE

- **Supporting Documentation for Analysis**

Pre Development CN Number Calculations
Easton Pond
Newport, Rhode Island

Watershed No.	Cover Description	Condition	Soil Group	CN No.	Area (S.F.)	%Total Area	Composite CN
Subwatershed 1A	Woods	Good	C	70	448313	0.47	0.33
	Cropland	Good	C	85	15041547	15.93	13.54
	Cropland	Good	D	89	30137	0.03	0.03
	Pasture	Good	C	74	1915077	2.03	1.50
	Pasture	Good	D	80	205699	0.22	0.17
	Orchards	Good	C	72	9203220	9.75	7.02
	Open Space	Good	C	74	66470	0.07	0.05
	Recreational	Good	C	74	1193395	1.26	0.94
	Brush	Good	C	65	3313542	3.51	2.28
	Commercial	Good	C	94	14636294	15.50	14.57
	Commercial	Good	D	95	17837	0.02	0.02
	Cemeteries	Good	C	74	414752	0.44	0.33
	Residential Dist. (>2 Acre Lot)	Good	C	77	116209	0.12	0.09
	Residential Dist. (1 - 2 Acre Lot)	Good	C	78	38983	0.04	0.03
	Residential Dist. (1/4 - 1 Acre Lot)	Good	C	81	5425862	5.75	4.66
	Residential Dist. (1/8-1/4 Acre Lot)	Good	D	89.5	632601.0	0.67	0.60
	Residential Dist. (1/8-1/4 Acre Lot)	Good	C	86.5	13931540.0	14.76	12.76
	Residential Dist. (<1/8 Acre Lot)	Good	C	90	6789658	7.19	6.47
	Airport	Good	C	91	5047789	5.35	4.87
	Institutional	Good	C	91	2675892	2.83	2.58
	Industrial	Good	C	91	1535188	1.63	1.48
	Industrial	Good	D	93	32721	0.03	0.03
	Wetland	Good	C	78	11025986	11.68	9.11
	Wetland	Good	D	78	594853	0.63	0.49
	Water	N/A	N/A	98	79656	0.08	0.08
Totals:					***94413221.0***	***100.0***	***84.04***

Pre Development CN Number Calculations

Easton Pond

Newport, Rhode Island

Watershed No.	Cover Description	Condition	Soil Group	CN No.	Area (S.F.)	%Total Area	Composite CN
Subwatershed 1B	Cropland	Good	C	85	1336582	6.32	5.37
	Open Space	Good	C	74	228613	1.08	0.80
	Recreational	Good	C	74	0	0.00	0.00
	Brush	Good	C	65	1939721	9.17	5.96
	Commercial	Good	C	94	467291	2.21	2.08
	Residential Dist. (>2 Acre Lot)	Good	C	77	101836	0.48	0.37
	Residential Dist. (1/4 - 1 Acre Lot)	Good	C	81	1192088	5.64	4.57
	Residential Dist. (1/8-1/4 Acre Lot)	Good	C	86.5	4529419.0	21.41	18.52
	Residential Dist. (<1/8 Acre Lot)	Good	C	90	186646	0.88	0.79
	Institutional	Good	C	91	340929	1.61	1.47
	Industrial	Good	C	91	5052860	23.89	21.74
	Wetland	Good	C	78	961611	4.55	3.55
	Green End Pond	N/A	N/A	98	4813950	22.76	22.30
Totals:					***21151546.0***	***100.0***	***87.52***

Watershed No.	Cover Description	Condition	Soil Group	CN No.	Area (S.F.)	%Total Area	Composite CN
Subwatershed 2	South Easton Pond	N/A	N/A	98	5869763.0	95.77	93.86
	Open Space	Good	C	74	259122.0	4.23	3.13
Totals:					***6128885.0***	***100.0***	***96.99***

Watershed No.	Cover Description	Condition	Soil Group	CN No.	Area (S.F.)	%Total Area	Composite CN
Subwatershed 3-1	Residential Dist. (1/8-1/4 Acre Lot)	Good	C	86.5	667741.0	48.15	41.65
	Residential Dist. (<1/8-Acre Lot)	Good	C	90	203681.0	14.69	13.22
	Open Space	Good	C	74	161030.0	11.61	8.59
	Recreational	Good	C	74	354336.0	25.55	18.91
Totals:					***1386788.0***	***100.0***	***82.37***

Pre Development CN Number Calculations
Easton Pond
Newport, Rhode Island

Watershed No.	Cover Description	Condition	Soil Group	CN No.	Area (S.F.)	%Total Area	Composite CN
Subwatershed 3-2	Residential Dist. (1/8-1/4 Acre Lot)	Good	C	86.5	5356051.0	52.98	45.83
	Residential Dist. (<1/8-Acre Lot)	Good	C	90	3718597.0	36.78	33.10
	Institutional		C	91	443040.0	4.38	3.99
	Commercial		C	94	234120.0	2.32	2.18
	Cropland	Good	C	85	29025.0	0.29	0.24
	Newly Graded		C	91	159811.0	1.58	1.44
	Recreational	Good	C	74	169120.0	1.67	1.24
Totals:					***10109764.0***	***100.0***	***88.02***

Watershed No.	Cover Description	Condition	Soil Group	CN No.	Area (S.F.)	%Total Area	Composite CN
Subwatershed 3-3	Residential Dist. (<1/8-Acre Lot)	Good	C	90	3033130.0	82.35	74.12
	Institutional		C	91	611282.0	16.60	15.10
	Commercial		C	94	38769.0	1.05	0.99
Totals:					***3683181.0***	***100.0***	***90.21***

Pre Development CN Number Calculations
Easton Pond
Newport, Rhode Island

Watershed No.	Cover Description	Condition	Soil Group	CN No.	Area (S.F.)	%Total Area	Composite CN
Subwatershed 3-4	Residential Dist. (1/4-1 Acre Lot)	Good	C	81	210476.0	11.48	9.30
	Residential Dist. (1/8-1/4 Acre Lot)	Good	C	86.5	854265.0	46.59	40.30
	Residential Dist. (<1/8-Acre Lot)	Good	C	90	768869.0	41.93	37.74
Totals:					***1833610.0***	***100.0***	***87.34***

Watershed No.	Cover Description	Condition	Soil Group	CN No.	Area (S.F.)	%Total Area	Composite CN
Subwatershed 3-5	Residential Dist. (1/4-1 Acre Lot)	Good	C	81	814976.0	88.43	71.63
	Residential Dist. (1/8-1/4 Acre Lot)	Good	C	86.5	106634.0	11.57	10.01
Totals:					***921610.0***	***100.0***	***81.64***

Watershed No.	Cover Description	Condition	Soil Group	CN No.	Area (S.F.)	%Total Area	Composite CN
Subwatershed 3-6	Residential Dist. (1/4-1 Acre Lot)	Good	C	81	1452587.0	91.14	73.83
	Residential Dist. (1/8-1/4 Acre Lot)	Good	C	86.5	92906.0	5.83	5.04
	Institutional	Good	C	91	48226.0	3.03	2.75
Totals:					***1593719.0***	***100.0***	***81.62***

Watershed No.	Cover Description	Condition	Soil Group	CN No.	Area (S.F.)	%Total Area	Composite CN
Subwatershed 3-7	Open Space	Good	C	74	18853.0	20.04	14.83
	Residential Dist. (1/4-1 Acre Lot)	Good	C	81	75229.0	79.96	64.77
Totals:					***94082.0***	***100.0***	***79.60***

Watershed No.	Cover Description	Condition	Soil Group	CN No.	Area (S.F.)	%Total Area	Composite CN
Subwatershed 3-8	Open Space	Good	C	74	22890.0	16.62	12.30
	Residential Dist. (1/4-1 Acre Lot)	Good	C	81	114828.0	83.38	67.54
Totals:					***137718.0***	***100.0***	***79.84***

Pre Development CN Number Calculations
Easton Pond
Newport, Rhode Island

Watershed No.	Cover Description	Condition	Soil Group	CN No.	Area (S.F.)	%Total Area	Composite CN
Subwatershed 3-9	Open Space	Good	C	74	12858.0	6.28	4.65
	Residential Dist. (1/4-1 Acre Lot)	Good	C	81	191874.0	93.72	75.91
Totals:					***204732.0***	***100.0***	***80.56***
Subwatershed 3-10	Institutional	Good	C	91	375591.0	100.00	91.00
Totals:					***375591.0***	***100.0***	***91.00***

Watershed No.	Cover Description	Condition	Soil Group	CN No.	Area (S.F.)	%Total Area	Composite CN
Subwatershed 3-11	Commercial	Good	C	94	357571.0	100.00	94.00
Totals:					***357571.0***	***100.0***	***94.00***

Watershed No.	Cover Description	Condition	Soil Group	CN No.	Area (S.F.)	%Total Area	Composite CN
Subwatershed 3-12	Residential Dist. (1/8-1/4 Acre Lot)	Good	C	86.5	3690361.0	71.21	61.60
	Commercial	Good	C	94	502125.0	9.69	9.11
	Residential Dist. (1/8-1/4 Acre Lot)	Good	C	86.5	70341.0	1.36	1.17
	Residential Dist. (1/4-1 Acre Lot)	Good	C	81	47739.0	0.92	0.75
	Wetland	Good	C	78	129818	2.50	1.95
	Cropland	Good	C	85	20904.0	0.40	0.34
	Institutional	Good	C	91	254049.0	4.90	4.46
	Recreational	Good	C	74	467030.0	9.01	6.67
Totals:					***5182367.0***	***100.0***	***86.05***

Pre Development CN Number Calculations
Easton Pond
Newport, Rhode Island

Watershed No.	Cover Description	Condition	Soil Group	CN No.	Area (S.F.)	%Total Area	Composite CN
Subwatershed 4-1	Residential Dist. (1/8-1/4 Acre Lot)	Good	C	86.5	4030616.0	79.13	68.44
	Commercial	Good	C	94	49083.0	0.96	0.91
	Institutional	Good	C	91	552804.0	10.85	9.88
	Recreational	Good	C	74	461446.0	9.06	6.70
Totals:					***5093949.0***	***100.0***	***85.93***

Subwatershed 4-2	Industrial	Good	C	91	48000.0	100.00	91.00
Totals:					***48000.0***	***100.0***	***91.00***

APPENDIX D

ANALYTICAL LABORATORY SAMPLING REPORTS

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Microbiology

Client Sample ID: S9-02
BAL Sample ID: B609124-01 **Matrix:** Aqueous **Sampled:** 09/29/06 12:20

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: B3-01
BAL Sample ID: B609124-02 **Matrix:** Aqueous **Sampled:** 09/29/06 11:05

Analyte	Result	Units	Analyzed	Method
Enterococci	**670**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: M2-01
BAL Sample ID: B609124-03 **Matrix:** Aqueous **Sampled:** 09/29/06 10:25

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: B2-02
BAL Sample ID: B609124-04 **Matrix:** Aqueous **Sampled:** 09/29/06 12:30

Analyte	Result	Units	Analyzed	Method
Enterococci	**280**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: B1-01
BAL Sample ID: B609124-05 **Matrix:** Aqueous **Sampled:** 09/29/06 09:20

Analyte	Result	Units	Analyzed	Method
Enterococci	**30**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: B4-01
BAL Sample ID: B609124-06 **Matrix:** Aqueous **Sampled:** 09/29/06 10:35

Analyte	Result	Units	Analyzed	Method
Enterococci	**1600**	/100 ml	09/29/06 15:30	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Microbiology

Client Sample ID: B1-02
BAL Sample ID: B609124-07 **Matrix:** Aqueous **Sampled:** 09/29/06 12:25

Analyte	Result	Units	Analyzed	Method
Enterococci	**130**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: B2-01
BAL Sample ID: B609124-08 **Matrix:** Aqueous **Sampled:** 09/29/06 09:35

Analyte	Result	Units	Analyzed	Method
Enterococci	**370**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S11-01
BAL Sample ID: B609124-09 **Matrix:** Aqueous **Sampled:** 09/29/06 10:40

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: M4-01
BAL Sample ID: B609124-10 **Matrix:** Aqueous **Sampled:** 09/29/06 11:45

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: M5-01
BAL Sample ID: B609124-11 **Matrix:** Aqueous **Sampled:** 09/29/06 11:00

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: M1-01
BAL Sample ID: B609124-12 **Matrix:** Aqueous **Sampled:** 09/29/06 10:45

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Microbiology

Client Sample ID: S10-01
BAL Sample ID: B609124-13 **Matrix:** Aqueous **Sampled:** 09/29/06 10:30

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: M3-01
BAL Sample ID: B609124-14 **Matrix:** Aqueous **Sampled:** 09/29/06 09:50

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S14-01
BAL Sample ID: B609124-15 **Matrix:** Aqueous **Sampled:** 09/29/06 11:50

Analyte	Result	Units	Analyzed	Method
Enterococci	**980**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S12-01
BAL Sample ID: B609124-16 **Matrix:** Aqueous **Sampled:** 09/29/06 11:40

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: P1-01
BAL Sample ID: B609124-17 **Matrix:** Aqueous **Sampled:** 09/29/06 10:15

Analyte	Result	Units	Analyzed	Method
Enterococci	**68**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S15-01
BAL Sample ID: B609124-18 **Matrix:** Aqueous **Sampled:** 09/29/06 11:55

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Microbiology

Client Sample ID: S13-01
BAL Sample ID: B609124-19 **Matrix:** Aqueous **Sampled:** 09/29/06 11:45

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S1-01
BAL Sample ID: B609124-20 **Matrix:** Aqueous **Sampled:** 09/29/06 11:45

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: P2-01
BAL Sample ID: B609124-21 **Matrix:** Aqueous **Sampled:** 09/29/06 12:00

Analyte	Result	Units	Analyzed	Method
Enterococci	**240**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S3-01
BAL Sample ID: B609124-22 **Matrix:** Aqueous **Sampled:** 09/29/06 11:25

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S8-01
BAL Sample ID: B609124-23 **Matrix:** Aqueous **Sampled:** 09/29/06 10:05

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S6-01
BAL Sample ID: B609124-24 **Matrix:** Aqueous **Sampled:** 09/29/06 10:30

Analyte	Result	Units	Analyzed	Method
Enterococci	**1000**	/100 ml	09/29/06 15:30	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Microbiology

Client Sample ID: S2-01
BAL Sample ID: B609124-25 **Matrix:** Aqueous **Sampled:** 09/29/06 11:35

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S7-01
BAL Sample ID: B609124-26 **Matrix:** Aqueous **Sampled:** 09/29/06 09:50

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S5-01
BAL Sample ID: B609124-27 **Matrix:** Aqueous **Sampled:** 09/29/06 10:40

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: M4-02
BAL Sample ID: B609124-28 **Matrix:** Aqueous **Sampled:** 09/29/06 13:30

Analyte	Result	Units	Analyzed	Method
Enterococci	**2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: P3-01
BAL Sample ID: B609124-29 **Matrix:** Aqueous **Sampled:** 09/29/06 12:20

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: M5-02
BAL Sample ID: B609124-30 **Matrix:** Aqueous **Sampled:** 09/29/06 13:19

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Microbiology

Client Sample ID: M2-02
BAL Sample ID: B609124-31 **Matrix:** Aqueous **Sampled:** 09/29/06 12:55

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: B3-02
BAL Sample ID: B609124-32 **Matrix:** Aqueous **Sampled:** 09/29/06 12:57

Analyte	Result	Units	Analyzed	Method
Enterococci	> **25000**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: B4-02
BAL Sample ID: B609124-33 **Matrix:** Aqueous **Sampled:** 09/29/06 13:07

Analyte	Result	Units	Analyzed	Method
Enterococci	**390**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S11-02
BAL Sample ID: B609124-34 **Matrix:** Aqueous **Sampled:** 09/29/06 13:15

Analyte	Result	Units	Analyzed	Method
Enterococci	**170**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S10-02
BAL Sample ID: B609124-35 **Matrix:** Aqueous **Sampled:** 09/29/06 12:40

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: P3-01
BAL Sample ID: B609124-36 **Matrix:** Aqueous **Sampled:** 09/29/06 12:20

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Microbiology

Client Sample ID: M1-02
BAL Sample ID: B609124-37 **Matrix:** Aqueous **Sampled:** 09/29/06 12:45

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: P1-02
BAL Sample ID: B609124-38 **Matrix:** Aqueous **Sampled:** 09/29/06 12:15

Analyte	Result	Units	Analyzed	Method
Enterococci	**39**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: M3-02
BAL Sample ID: B609124-39 **Matrix:** Aqueous **Sampled:** 09/29/06 12:15

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: P3-02
BAL Sample ID: B609124-40 **Matrix:** Aqueous **Sampled:** 09/29/06 14:15

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S3-02
BAL Sample ID: B609124-41 **Matrix:** Aqueous **Sampled:** 09/29/06 13:50

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S2-02
BAL Sample ID: B609124-42 **Matrix:** Aqueous **Sampled:** 09/29/06 13:45

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Microbiology

Client Sample ID: P2-02
BAL Sample ID: B609124-43 **Matrix:** Aqueous **Sampled:** 09/29/06 14:05

Analyte	Result	Units	Analyzed	Method
Enterococci	**1100**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S1-02
BAL Sample ID: B609124-44 **Matrix:** Aqueous **Sampled:** 09/29/06 13:40

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S5-02
BAL Sample ID: B609124-45 **Matrix:** Aqueous **Sampled:** 09/29/06 13:25

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S6-02
BAL Sample ID: B609124-46 **Matrix:** Aqueous **Sampled:** 09/29/06 13:15

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S7-02
BAL Sample ID: B609124-47 **Matrix:** Aqueous **Sampled:** 09/29/06 13:00

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S8-02
BAL Sample ID: B609124-48 **Matrix:** Aqueous **Sampled:** 09/29/06 12:55

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Notes and Definitions

>	Greater than.
MF	Membrane Filtration
MPN	Most Probable Number
TNTC	Too Numerous to Count
dry	Sample results reported on a dry weight basis

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B609124

CHAIN-OF-CUSTODY RECORD

10600

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☒ Standard (____ days) *Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. NO.:
Sampler's Signature: Amy E Hunt Date: 9/29/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other X Stormwater

Analysis Request

Containers

Item No.	Transfer Check 1	Transfer Check 2	Transfer Check 3	Transfer Check 4	Sample Number	Source Code	Date Sampled	Time Sampled			Enterococcus						Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	Plastic - As is, [ ] 250 ml [✓] 500 [ ] 1000 ml	Plastic - H_2SO_4, [ ] 250 ml [ ] 500 ml	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
1					S9-02	X	9/29/06	1220			↓													↓					
2					B3-01	SW	↓	1105			↓													↓					
3					M2-01	SW	↓	1025			↓													↓					
4					B2-02	SW	↓	1230			↓													↓					
5					B1-01	SW	↓	920			↓													↓					
6					B4-01	SW	↓	1035			↓													↓					
7					B1-02	SW	↓	1225			↓													↓					
8					B2-01	SW	↓	935			↓													↓					
9					S11-01	X	↓	1040			↓													↓					
10					M4-01	SW	↓	1145			↓													↓					

Transfer Number	Relinquished By	Accepted By	Date	Time
1		James [illegible]	092906	1420
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:
B locations are saltwater samples

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☐ 24 Madison Avenue Extension, Albany, NY 12203
☒ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ______

B609124

CHAIN-OF-CUSTODY RECORD 10601

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☒ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. No.:
Sampler's Signature:
Date: 9/29/06

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Bottom Sediment
W=Waste
A=Air
X=Other ______

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Enterococci								Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic - As is, [ ] 250 ml [ ] 500] 1000 ml	Plastic - H₂SO₄, [ ] 250 ml [ ] 500 ml	Plastic - HNO₃, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
11					MS-01	SW	9-29	1100																					
12					M1-01	SW		1045																					
13					S10-01	X		1030																					
14					M3-01	SW		950																					
15					S14-01	X		1150																					
16					S12-01	X		1140																					
17					P1-01	SW		1015																					
18					S15-01	X		1155																					
19					S13-01	X		1145																					
20					S1-01	X		1145																					

Transfer Number	Relinquished By	Accepted By	Date	Time
1		James	092906	1426
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

B SAMPLES ARE SEAWATER

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☐ Other ______

B609124

CHAIN-OF-CUSTODY RECORD 10602

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☒ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. NO.:
Sampler's Signature: Date: 9/29/06

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Bottom Sediment
W=Waste
A=Air
X=Other stormwater

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request: Enterococcus								Containers: Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	[✓ Plastic] As is, [ ] 250 ml [X] 500] 1000 ml	Plastic - H_2SO_4, [ ] 250 ml [ ] 500 ml	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
21					P2-01	SW	9/29/06	1200	1															✓					
22					S3-01	X		1125	1															✓					
23					S8-01	X	↓	1005	1															✓					
24					S6-01	↓		1030	1															✓					
25					S2-01			1135	1															✓					
26					S7-01			950	1															✓					
27					S5-01	↓		1040	1															✓					
28					M4-02	SW		1330	1															✓					
29					P3-01	↓		1220	1															✓					
30					M5-02	↓	↓	1349	1															✓					

Transfer Number	Relinquished By	Accepted By	Date	Time
1			092906	1426
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

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☒ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ____________

CHAIN-OF-CUSTODY RECORD 10603

B609124

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☒ Standard (____ days) *Surcharge Applies

PROJECT NAME: EastonsBeach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. NO.:
Sampler's Signature:
Date: 9/29/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other Storm water

Analysis Request

Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Enterococci								Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( )oz	Glass Soil Container ( )oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( )ml, [ ] As is [ ] H2SO4	Plastic - As is, [ ] 250 ml [X] 500 [ ] 1000 ml	Plastic - H2SO4, [ ] 250 ml [ ] 500 ml	Plastic - HNO3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
31					M2-02	SW	9/29/06	1255	✓															✓					
32					B3-02	SW	↓	1257	✓															✓					
33					B4-02	SW		1307																✓					
34					S11-02	X		1315																✓					
35					S10-02	X		1240																✓					
36					P3-01	SW		1220																✓					
37					M102	SW		1245																✓					
38					P1-02	SW		1215																✓					
39					M3-02	SW		1215																✓					
40																								✓					

Transfer Number	Relinquished By	Accepted By	Date	Time
1			092906	1426
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:
B samples are saltwater

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☒ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ______

B609124

CHAIN-OF-CUSTODY RECORD 10607

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☐ Standard (____ days) *Surcharge Applies

PROJECT NAME: EASTON'S BEACH
PROJECT LOCATION: NEWPORT RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: AMY HUNT
INVOICE TO: AMY HUNT
P.O. NO.: Walter Mahoney
Sampler's Signature:
Date: 9-29-06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other STORMWATER

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	ENTROCOCCI								Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H2SO4	Plastic - As is, [ ] 250 ml [ ] 500] 1000 ml	Plastic - H2SO4, [ ] 250 ml [ ] 500 ml	Plastic - HNO3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
40					P3-02	S~~X~~W	9/29/06	1415	1																				
41					S3-02	X	9/29/06	1350	1																				
42					S2-02	X		1345	1																				
43					P2-02	SW		1405	1																				
44					S1-02	X		1340	1																				
45					S5-02	X		1325	1																				
46					S6-02	X		1315	1																				
47					S7-02	X		1300	1																				
48					S9-02	X		1255	1																				

Transfer Number	Relinquished By	Accepted By	Date	Time
1			092906	1430
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:
B SAMPLES ARE SEAWATER

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

Amy Hunt
Fuss & O'Neill
275 Promenade Street Suite 350
Providence. RI 02908

RE: Newport-Wet Weather

Dear Amy Hunt:

We appreciate this opportunity to provide you with our analytical services. BAL Laboratory is committed to providing the highest quality service. Our dedication to each client includes responsiveness to emergencies, dependability, well-written reports and superior client services.

Enclosed is your data report for **Work Order Number B609126.** The invoice for this project is included with this report unless other arrangements have previously been made with the laboratory. Samples will be disposed of thirty days after the final report has been mailed. If you have any questions or concerns, please feel free to call our Customer Service Department. We value our continued relationship and look forward to hearing from you in the future.

Sincerely,

BAL Laboratory

Darlene Capuano

Darlene Capuano
Laboratory Director

RI Laboratory License Number: A36
MA Laboratory License Number: M RI-M01

enclosure

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The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609126
Date Received: 9/29/2006 6:00:00PM

Microbiology

Client Sample ID: M3-03
BAL Sample ID: B609126-01 **Matrix:** Aqueous **Sampled:** 09/29/06 15:25

Analyte	Result	Units	Analyzed	Method
Enterococci	**44**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: P1-03
BAL Sample ID: B609126-02 **Matrix:** Aqueous **Sampled:** 09/29/06 15:35

Analyte	Result	Units	Analyzed	Method
Enterococci	**2**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: M4-03
BAL Sample ID: B609126-03 **Matrix:** Aqueous **Sampled:** 09/29/06 16:10

Analyte	Result	Units	Analyzed	Method
Enterococci	**70**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: M5-03
BAL Sample ID: B609126-04 **Matrix:** Aqueous **Sampled:** 09/29/06 16:00

Analyte	Result	Units	Analyzed	Method
Enterococci	**130**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: M1-03
BAL Sample ID: B609126-05 **Matrix:** Aqueous **Sampled:** 09/29/06 15:45

Analyte	Result	Units	Analyzed	Method
Enterococci	**120**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: B3-03
BAL Sample ID: B609126-06 **Matrix:** Aqueous **Sampled:** 09/29/06 16:35

Analyte	Result	Units	Analyzed	Method
Enterococci	**41**	/100 ml	09/29/06 18:20	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609126
Date Received: 9/29/2006 6:00:00PM

Microbiology

Client Sample ID: S11-03
BAL Sample ID: B609126-07 **Matrix:** Aqueous **Sampled:** 09/29/06 16:20

Analyte	Result	Units	Analyzed	Method
Enterococci	**30**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: M2-03
BAL Sample ID: B609126-08 **Matrix:** Aqueous **Sampled:** 09/29/06 15:54

Analyte	Result	Units	Analyzed	Method
Enterococci	**210**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: B2-03
BAL Sample ID: B609126-09 **Matrix:** Aqueous **Sampled:** 09/29/06 15:40

Analyte	Result	Units	Analyzed	Method
Enterococci	< **10**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: B1-03
BAL Sample ID: B609126-10 **Matrix:** Aqueous **Sampled:** 09/29/06 15:30

Analyte	Result	Units	Analyzed	Method
Enterococci	< **10**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: B4-03
BAL Sample ID: B609126-11 **Matrix:** Aqueous **Sampled:** 09/29/06 16:10

Analyte	Result	Units	Analyzed	Method
Enterococci	**86**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: P2-03
BAL Sample ID: B609126-12 **Matrix:** Aqueous **Sampled:** 09/29/06 10:40

Analyte	Result	Units	Analyzed	Method
Enterococci	**2**	/100 ml	09/29/06 18:20	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609126
Date Received: 9/29/2006 6:00:00PM

Microbiology

Client Sample ID: S1-03
BAL Sample ID: B609126-13 **Matrix:** Aqueous **Sampled:** 09/29/06 16:15

Analyte	Result	Units	Analyzed	Method
Enterococci	**550**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: S3-03
BAL Sample ID: B609126-14 **Matrix:** Aqueous **Sampled:** 09/29/06 16:25

Analyte	Result	Units	Analyzed	Method
Enterococci	**29**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: P3-03
BAL Sample ID: B609126-15 **Matrix:** Aqueous **Sampled:** 09/29/06 16:55

Analyte	Result	Units	Analyzed	Method
Enterococci	**4**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: S2-03
BAL Sample ID: B609126-16 **Matrix:** Aqueous **Sampled:** 09/29/06 16:20

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: S7-03
BAL Sample ID: B609126-17 **Matrix:** Aqueous **Sampled:** 09/29/06 15:35

Analyte	Result	Units	Analyzed	Method
Enterococci	**460**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: S6-03
BAL Sample ID: B609126-18 **Matrix:** Aqueous **Sampled:** 09/29/06 15:40

Analyte	Result	Units	Analyzed	Method
Enterococci	**410**	/100 ml	09/29/06 18:20	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609126
Date Received: 9/29/2006 6:00:00PM

Microbiology

Client Sample ID: S5-03
BAL Sample ID: B609126-19 **Matrix:** Aqueous **Sampled:** 09/29/06 16:00

Analyte	Result	Units	Analyzed	Method
Enterococci	**920**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: S8-03
BAL Sample ID: B609126-20 **Matrix:** Aqueous **Sampled:** 09/29/06 15:30

Analyte	Result	Units	Analyzed	Method
Enterococci	**34**	/100 ml	09/29/06 18:20	IDEXX Enterolert

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609126
Date Received: 9/29/2006 6:00:00PM

Notes and Definitions

>	Greater than.
<	Less than the Method Detection Limit.
MF	Membrane Filtration
MPN	Most Probable Number
TNTC	Too Numerous to Count
dry	Sample results reported on a dry weight basis

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☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ____________

CHAIN-OF-CUSTODY RECORD

10608

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☐ Standard (____ days) *Surcharge Applies

PROJECT NAME	PROJECT LOCATION	PROJECT NUMBER	LABORATORY
EASTON'S BEACH	NEWPORT RI	20060901.A10	~~NORTHEAST~~ BAL

REPORT TO: AMY HUNT

INVOICE TO: AMY HUNT B609126

P.O. NO.:

Sampler's Signature: Walter Mahoney Date: 9-29-06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other STORMWATER

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request: Entrococci								Containers: Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H_2SO_4 [ ] 250 ml [ ] 500 ml	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
40	✓				M3-03	X	9/29	1525	1																			X	
41	✓				P1-03	X	|	1535	1																			X	
42	✓				M4-03	X	|	1610	1																			X	
43	✓				M5-03	X	|	1600	1																			X	
44					M1-03	X		1545	1																			X	

Transfer Number	Relinquished By	Accepted By	Date	Time
1			9/29/06	1800
2				
3				
4				

Reporting and Detection Limit Requirements: ENTROCOCCI

Additional Comments:

B SAMPLES ARE SEAWATER

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☐ 24 Madison Avenue Extension, Albany, NY 12203

☒ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ____________

CHAIN-OF-CUSTODY RECORD 10613

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☒ Standard (____ days) *Surcharge Applies

Project Name	Project Location	Project Number	Laboratory
Easton Beach	Newport, RI	20060901.A10	BAL

Report To: Amy Hunt

Invoice To: Amy Hunt B609126

P.O. No.:

Sampler's Signature: Date: 9/29/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other stormwater

Analysis Request

Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled				Enterococcos					Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic - As is, [ ] 250 ml ☒ 500 [ ] 1000 ml	Plastic - H₂SO₄, [ ] 250 ml [ ] 500 ml	Plastic - HNO₃, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
45					B3-03	SW	9/29/06	1635				↓												↓					
46					S11-03	X	↓	1620																					
47					M2-03	SW		1554																					
48					B2-03	SW		1540																					
49					B1-03	SW		1530																					
50					B4-03	SW		1610																					
51					P2-03	SW		1040																					
52					S1-03	X		1615																					
53					S3-03	X		1625																					
54					P3-03	SW		1655																					

Transfer Number	Relinquished By	Accepted By	Date	Time
1		James Grogan	9/29/06	1800
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:
all "B" samples are saltwater

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☒ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other

CHAIN-OF-CUSTODY RECORD 10609

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☐ Standard (____ days) *Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt B609126
P.O. No.:
Sampler's Signature: Amy E Hunt
Date:

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Bottom Sediment
W=Waste
A=Air
X=Other Stormwater

Item No.	Transfer Check				Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request								Containers: Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic - As is, [ ] 250 ml [X] 500 [ ] 1000 ml	Plastic - H₂SO₄, [ ] 250 ml [ ] 500 ml	Plastic - HNO₃, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
	1	2	3	4							Enterococcus																		
55					S2-03	X	9/29/06	1620			↓													↓					
56					S7-03	↓	↓	1535																					
57					S6-03			1540																					
58					S5-03			1600																					
59					S8-03			1530																					

Transfer Number	Relinquished By	Accepted By	Date	Time
1	Amy E Hunt	Jamie Gregory	9/29/06	1800
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

Amy Hunt
Fuss & O'Neill
275 Promenade Street Suite 350
Providence. RI 02908

RE: Newport-Wet Weather

Dear Amy Hunt:

We appreciate this opportunity to provide you with our analytical services. BAL Laboratory is committed to providing the highest quality service. Our dedication to each client includes responsiveness to emergencies, dependability, well-written reports and superior client services.

Enclosed is your data report for **Work Order Number B609127.** The invoice for this project is included with this report unless other arrangements have previously been made with the laboratory. Samples will be disposed of thirty days after the final report has been mailed. If you have any questions or concerns, please feel free to call our Customer Service Department. We value our continued relationship and look forward to hearing from you in the future.

Sincerely,

BAL Laboratory

Darlene Capuano

Darlene Capuano
Laboratory Director

RI Laboratory License Number: A36
MA Laboratory License Number: M RI-M01

enclosure

Industrial Microbiology - Environmental Investigation - Biological and Specialty Analyses of Water and Wastes - Pollution Tracking and Source Determination - Monitoring Programs - Trend Assessments - Seafood Analyses - Drinking Water Quality - Biosolids and Compost Testing - Biofilter Assessment - Bioaerosol Monitoring - Corrosion Analysis

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609127
Date Received: 9/29/2006 9:37:00PM

Microbiology

Client Sample ID: M5-04
BAL Sample ID: B609127-01 **Matrix:** Aqueous **Sampled:** 09/29/06 18:50

Analyte	Result	Units	Analyzed	Method
Enterococci	**870**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: P1-04
BAL Sample ID: B609127-02 **Matrix:** Aqueous **Sampled:** 09/29/06 18:15

Analyte	Result	Units	Analyzed	Method
Enterococci	**17**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: M1-04
BAL Sample ID: B609127-03 **Matrix:** Aqueous **Sampled:** 09/29/06 18:30

Analyte	Result	Units	Analyzed	Method
Enterococci	**1700**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: M3-04
BAL Sample ID: B609127-04 **Matrix:** Aqueous **Sampled:** 09/29/06 18:10

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: M2-04
BAL Sample ID: B609127-05 **Matrix:** Aqueous **Sampled:** 09/29/06 18:35

Analyte	Result	Units	Analyzed	Method
Enterococci	**1400**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: M4-04
BAL Sample ID: B609127-06 **Matrix:** Aqueous **Sampled:** 09/29/06 19:10

Analyte	Result	Units	Analyzed	Method
Enterococci	**2400**	/100 ml	09/29/06 21:45	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609127
Date Received: 9/29/2006 9:37:00PM

Microbiology

Client Sample ID: B4-04
BAL Sample ID: B609127-07 **Matrix:** Aqueous **Sampled:** 09/29/06 19:09

Analyte	Result	Units	Analyzed	Method
Enterococci	**63**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: B3-04
BAL Sample ID: B609127-08 **Matrix:** Aqueous **Sampled:** 09/29/06 18:48

Analyte	Result	Units	Analyzed	Method
Enterococci	**61**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: S11-04
BAL Sample ID: B609127-09 **Matrix:** Aqueous **Sampled:** 09/29/06 19:19

Analyte	Result	Units	Analyzed	Method
Enterococci	**1**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: B1-04
BAL Sample ID: B609127-10 **Matrix:** Aqueous **Sampled:** 09/29/06 18:09

Analyte	Result	Units	Analyzed	Method
Enterococci	**20**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: S5-04
BAL Sample ID: B609127-11 **Matrix:** Aqueous **Sampled:** 09/29/06 18:55

Analyte	Result	Units	Analyzed	Method
Enterococci	**5**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: P3-04
BAL Sample ID: B609127-12 **Matrix:** Aqueous **Sampled:** 09/29/06 19:50

Analyte	Result	Units	Analyzed	Method
Enterococci	**6**	/100 ml	09/29/06 21:45	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609127
Date Received: 9/29/2006 9:37:00PM

Microbiology

Client Sample ID: S3-04
BAL Sample ID: B609127-13 **Matrix:** Aqueous **Sampled:** 09/29/06 19:25

Analyte	Result	Units	Analyzed	Method
Enterococci	**37**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: S6-04
BAL Sample ID: B609127-14 **Matrix:** Aqueous **Sampled:** 09/29/06 18:40

Analyte	Result	Units	Analyzed	Method
Enterococci	**98**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: S8-04
BAL Sample ID: B609127-15 **Matrix:** Aqueous **Sampled:** 09/29/06 18:15

Analyte	Result	Units	Analyzed	Method
Enterococci	**130**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: S7-04
BAL Sample ID: B609127-16 **Matrix:** Aqueous **Sampled:** 09/29/06 18:20

Analyte	Result	Units	Analyzed	Method
Enterococci	**2400**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: S1-04
BAL Sample ID: B609127-17 **Matrix:** Aqueous **Sampled:** 09/29/06 19:10

Analyte	Result	Units	Analyzed	Method
Enterococci	**290**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: B2-04
BAL Sample ID: B609127-18 **Matrix:** Aqueous **Sampled:** 09/29/06 18:21

Analyte	Result	Units	Analyzed	Method
Enterococci	**86**	/100 ml	09/29/06 21:45	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609127
Date Received: 9/29/2006 9:37:00PM

Microbiology

Client Sample ID: P2-04
BAL Sample ID: B609127-19 **Matrix:** Aqueous **Sampled:** 09/29/06 20:05

Analyte	Result	Units	Analyzed	Method
Enterococci	**27**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: S204
BAL Sample ID: B609127-20 **Matrix:** Aqueous **Sampled:** 09/29/06 19:20

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 21:45	IDEXX Enterolert

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☐ Other ______

CHAIN-OF-CUSTODY RECORD 10617

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other _____ (days)
☐ 2 Days* ☑ Standard (____ days) *Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. NO.:
Sampler's Signature:
Date: 9/29/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other stormwater

Analysis Request

Containers

060912

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Enterococcus								Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic - As is, [ ] 250 ml [ ] 500] 1000 ml	Plastic - H₂SO₄, [ ] 250 ml [ ] 500 ml	Plastic - HNO₃, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	[✓ Bacteria Bottle]	Comments
		1			M5-04	X	9/29/06	1850	✓																			1	
		2			P1-04	SW		1815	✓																			1	
		3			M1-04	X		1830	✓																			1	
		4			M3-04	X		1810	✓																			1	
		5			M2-04	X		1835	✓																			1	
		6			M4-04	X		1910	✓																			1	
		7			B4-04	SW		1909	✓																			1	
		8			B3-04	SW		1848	✓																			1	
		9			S11-04	X		1919	✓																			1	
		10			B104	SW	↓	1809	✓																			1	

Transfer Number	Relinquished By	Accepted By	Date	Time
1		J Ventura 2137	9/29/06	2130
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:
"B" samples are saltwater

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☐ 24 Madison Avenue Extension, Albany, NY 12203
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☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other

CHAIN-OF-CUSTODY RECORD 10618

Turnaround

☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☑ Standard (____ days) *Surcharge Applies

PROJECT NAME: Easton's Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. No.:

Sampler's Signature: Date: 9/29/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other storm water

Analysis Request

Containers

Item No.	Transfer Check B600912	Sample Number	Source Code	Date Sampled	Time Sampled	Entero coccus								Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H_2SO_4, [ ] 250 ml [ ] 500 ml	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	[✓ Bacteria Bottle]	Comments
	11	S5-04	X	9/29/06	1855	✓																			✓	
	12	P3-04	SW		1950	✓																			✓	
	13	S3-04	X		1925	✓																			✓	
	14	S6-04	X		1840	✓																			✓	
	15	S8-04	X		1815	✓																			✓	
	16	S7-04	X		1820	✓																			✓	
	17	S1-04	X		1910	✓																			✓	
	18	B2-04	SW		1821	✓																			✓	
	19	P2-04	SW		2005	✓																			✓	
	20	S2-04	X	↓	1920	✓																			✓	

Transfer Number	Relinquished By	Accepted By	Date	Time
1		2137	9/29/06	~~0930~~ 2130
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

File 20060901A10/
Sampling Results

Source Molecular Corporation

4989 SW 74th Court, Miami, FL 33155 USA
Tel: (1) 786-268-8363, Fax: (1) 786-513-2733, Email: info@sourcemolecular.com

FILE COPY

Fuss & O'Neill
Attention: Mr. Dean E. Audet
275 Promenade St., Suite 350
Providence, RI 02908

October 10, 2006

Reference: Human Fecal Pollution Toolbox Results and Invoice

Dean,

Please find enclosed your results and invoice for the following Human Fecal Pollution Toolbox samples (service requested written next to your reference):

SM Number	Client Reference
SM 11957	M2-03 (Human Enterococcus "Quantification" ID)
SM 11958	B3-03 (Human Enterococcus "Quantification" ID)

Should you have any questions regarding the results, please do not hesitate to contact us.

Regards,

Thierry Sam Tamers
Director

OCT 16 2006
FUSS & O'NEILL
PROVIDENCE, RI

SOURCE MOLECULAR CORPORATION

4989 SW 74th Court, Miami, FL 33155 USA
Tel: (1) 786-268-8363, Fax: (1) 786-513-2733, Email: info@sourcemolecular.com

Human Enterococcus "Quantification" ID™

Detection and Quantification of the *Enterococcus faecium* esp Human Gene Biomarker for Human Fecal Contamination by Real-Time Quantitative Polymerase Chain Reaction (qPCR) DNA Analytical Technology

Submitter: Fuss & O'Neill
Submitter #'s: M2-03 and B3-03
Source Molecular #'s: SM 11957 and SM 11958
Samples Received: October 03, 2006
Date Reported: October 10, 2006

SM #	Client #	Entero-cocci (CFU/100 mL)***	Total *E. faecium* Quantified*	Total *E. faecium* esp Human Biomarker Quantified*	DNA Analytical Results
SM 11957	M2-03	157	6.1×10^7	BDL**	Negative **
SM 11958	B3-03	7	1.3×10^6	BDL**	Negative **

* After 24 hours of incubation at 41°C. Total is copy no./ml of extract. See laboratory comments.
** Detection limit is < 10,000 copy no./ml of DNA extract.
*** EPA Method 1600: Membrane Filter Test Method for Enterococci In Water (1997).

SOURCE MOLECULAR CORPORATION
4989 SW 74th Court, Miami, FL 33155 USA
Tel: (1) 786-268-8363, Fax: (1) 786-513-2733, Email: info@sourcemolecular.com

Laboratory Comments
Submitter: Fuss & O'Neill
Report Date: October 10, 2006

The submitted water samples were filtered and incubated at 41°C for 24 hours. **Please note that the *E. faecium* numbers given in the table on the next page are after cultivation.** Afterwards, the filters were eluted in a buffer. The buffer was centrifuged and DNA was extracted from the resultant pellet. qPCR (i.e.: real-time quantitative PCR) targeting total *E. faecium* and the *E. faecium* esp human gene biomaker was performed on the DNA extract.

All reagents, chemicals and apparatuses were verified and inspected beforehand to ensure that no false negatives or positives could be generated. In that regard, positive and negative controls were run to attest the integrity of the analysis. All inspections and controls tested negative for possible extraneous contaminates, including PCR inhibitors.

All the samples in this report tested negative (i.e. below the detection limit) for the *Enterococcus faecium* human gene biomarker. It is important to note that a negative result does not mean that the sample does not definitely have human contamination. In order to strengthen the result, a negative sample should be analyzed further for human fecal contamination with other DNA analytical tests such as the Human Bacteroidetes ID^{TM} and Human Fecal Virus ID^{TM} services. On the other hand, one can infer the presence of animal sources of fecal pollution since generic forms of *Enterococcus faecium* were found present in the negative samples.

DNA Analytical Method Explanation

200 ml (sample M2-03) and 400 ml (sample B3-03) of water were filtered through 0.45 micron membrane filters and placed on mEI agar. The samples were incubated for 24 hours at 41°C. Each filter was removed, placed in buffer and vortexed vigorously. Once the buffer was spun to pellet the bacteria, the supernatant was removed and the pellet was resuspended in a small volume of water. DNA extraction was prepared using the Qiagen DNA extraction kit, as per manufacturer's instructions.

2.5 micro-liter aliquots of purified DNA extraction were used directly as template for subsequent qPCR reactions. All assays were run on an ABI 7300 under the following thermal cycling conditions: 50°C for 2 minutes and 95°C for 10 minutes followed by 40 cycles of 95°C for 10 seconds and 57°C for 1 minute. Default data collection parameters were employed. The Taqman master mix supplied by Applied *Biosystems was used with the forward and reverse primers added to a final concentration of* 900nM and the probe added to a final concentration of 0.125uM with a 25ul final total reaction volume.

DNA Analytical Theory Explanation

Enterococci are a subgroup of Fecal *Streptococci* and are characterized by their ability to grow in 6.5% sodium chloride, at low and elevated temperatures (10°C and 45°C), and at elevated pH (9.5). These microorganisms have been used as indicators of fecal pollution for many years and have been especially valuable in the marine environment and recreational waters as indicators of potential health risks and swimming-related gastroenteritis.[1]

Enterococci are benign bacteria when they reside in their normal habitat such as the gastrointestinal tracts of human or animals. Outside of their normal habitat, *Enterococci* are pathogenic causing urinary tract and wound infections, and life-threatening diseases such as bacteraemia, endocarditis, and meningitis. *Enterococci* easily colonize open wounds and skin ulcers.

Compounding their pathogenesis, *Enterococci* are also some of the most antibiotic resistant bacteria, particularly from human sources. Studies have shown that certain strains of *Enterococci* are resistant to expensive and potent antibiotics such as vancomycin. This is particularly worrisome for the medical community since these antibiotics are given as a last resort to fight severe bacterial infections.

Several intrinsic features of the *Enterococcus* genus allow it to survive for extended periods of time, leading to its extended survivability and diffusion. For example, *Enterococci* have been shown to survive for 30 minutes at 60°C and persist in the presence of detergents. As such, the inherent ruggedness of *Enterococcus* confers it a strong tolerance to many classes of antibiotics.

The Human Enterococcus "Quantification" ID™ service is designed around the principle that certain strains of the *Enterococcus* genus are specific to humans.[2,3,4] These *Enterococci* can be used as indicators of human fecal contamination. Strains of *Enterococcus faecium*, *Enterococcus faecalis* and yellow-pigmented *Enterococci* have been shown to be from human sources.[2,3,4] Within these *Enterococcus spp.* are genes associated with *Enterococci* that are specific to humans.[5] The Human Enterococcus "Quantification" ID™ service targets the esp human gene biomarker in *Enterococcus faecium*.[6]

One of the advantages of the Human Enterococcus "Quantification" ID™ service is that the entire population of *Enterococci* of the selected portion of the water sample is screened. As such, this method avoids the randomness effect of selecting isolates off a petri dish.

Accuracy of the results is possible because the method uses PCR DNA technology. PCR allows quantities of DNA to be amplified into large number of small copies of DNA sequences. This is accomplished with small pieces of DNA called primers that are complementary and specific to the genomes to be detected.

Through a heating process called thermal cycling, the double stranded DNA is denatured and inserted with complementary primers to create exact copies of the DNA fragment desired. This process is repeated rapidly many times ensuring an exponential progression in the number of copied DNA. If the primers are successful in finding a site on the DNA fragment that is specific to the genome to be studied, then billions of copies of the DNA fragment will be available for analysis.

Real-time quantitative PCR (qPCR) adds a variant to the PCR step by inserting of a fluorescent probe within the primer set. This fluorescent probe serves as a molecular beacon for the quantification step. During each PCR cycle, real-time quantification PCR monitors the fluorescence emitted during the reaction. This is done in "real-time" during the first PCR cycles as a way to quantify the targeted gene.

The Human Enterococcus "Quantification" ID™ service uses real-time quantification PCR to simultaneously confirm and quantify total *Enterococcus faecium* and the esp human gene biomaker in *E. faecium*. This PCR technology avoids the cumbersome process of distinguishing DNA bands on a gel electrophoresis apparatus. The results are presented on a computer screen and printout thus avoiding ambiguities in interpretation.

Once each targeted gene is quantified, a relative percentage can be calculated. As such, it has been hypothesized that relative levels of human pollution can be interpreted by the proportion of the esp human gene biomaker found in *E. faecium* relative to the total population of *E. faecium* in the water sample.[6] Nonetheless this data should serve only as a preliminary indicator of relative human pollution in the water sample. Furthermore, the context of the sample should be taken into account when interpreting the relative percentage provided. To strengthen the validity of the results, the Human Enterococcus "Quantification" ID™ service should also be combined with other DNA analytical services such as the Human Bacteroidetes ID™ and Human Fecal Virus ID™ services.

[1] Scott, Troy M., Rose, Joan B., Jenkins, Tracie M., Farrah, Samuel R., Lukasik, Jerzy **Microbial Source Tracking: Current Methodology and Future Directions.** Appl. Environ. Microbiol. (2002) 68: 5796-5803.

[2] Wheeler, A.L., P.G. Hartel, D.G. Godfrey, J.L. Hill, and Segars W.I. 2002. **Potential of *Enterococcus faecalis* as a human fecal indicator for microbial source tracking.** J Environ Qual. 31(4):1286-93.

[3] Bahirathan ML, Puente L, Seyfried P. 1998. **Use of yellow-pigmented enterococci as a specific indicator of human and nonhuman sources of faecal pollution.** Can J Microbiol 44:1066-1071.

[4] Quednau, M., Ahrne, S., Molin, G. **Genomic Relationships between Enterococcus faecium Strains from Different Sources and with Different Antibiotic Resistance Profiles Evaluated by Restriction Endonuclease Analysis of Total Chromosomal DNA Using EcoRI and PvuII.** Appl. Environ. Microbiol. 1999 65: 1777-1780.

[5] Hammerum, A.M., and L.B. Jensen. 2002. **Prevalence of esp, encoding the enterococcal surface protein, in *Enterococcus faecalis* and *Enterococcus faecium* isolates from hospital patients, poultry, and pigs in Denmark.** J. Clin. Microbiol. 40: 4396.

[6] Scott, T.M., T.M. Jenkins, J. Lukasik, and J.B. Rose. 2005. **Potential Use of a Host Associated Molecular Marker in *Enterococcus faecium* as an Index of Human Fecal Pollution.** Environ. Sci. Technol. 39: 283-287.

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Moat Study

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REPORT OF ANALYTICAL RESULTS

NETLAB Case Number R0929-16

Prepared for:

Attn: Amy Hunt
Fuss & O'Neill
275 Promenade St., Suite 350
Providence, RI 02908

Report Date: October 4, 2006

Reviewed by:

Richard Warila

Richard Warila
Laboratory Director

Lab # RI010

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Total # of Pages: 22

STATEMENTS/CERTIFICATIONS REQUIRED BY THE NATIONAL ENVIRONMENTAL LABORATORY APPROVAL CONFERENCE (NELAC)

New England Testing Laboratory is certified under the National Environmental Laboratory Approval Program (NELAP). This certification requires the following statements and certifications be included in our report.

This report shall not be reproduced, except in full, without written approval of the laboratory.

New England Testing certifies that the test results contained within this report meet all NELAC requirements except as detailed in the Case Narrative section of this report.

SAMPLES SUBMITTED and REQUEST FOR ANALYSIS:

The samples listed in Table I were submitted to New England Testing Laboratory on September 29, 2006 and September 30, 2006. The group of samples appearing in this report was assigned an internal identification number (case number) for laboratory information management purposes. The client's designations for the individual samples, along with our case number, are used to identify the samples in this report. The case number for this sample submission is R0929-16.

Custody records are included in this report.

Site: Easton's Beach, Newport, RI

TABLE I, Samples Submitted

Sample ID	Date Sampled	Matrix	Analysis Requested
M2-02	9/29/06	Stormwater	Table II
S11-02	9/29/06	Stormwater	Table II
S10-02	9/29/06	Stormwater	Table II
P3-01	9/29/06	Stormwater	Table II
M1-02	9/29/06	Stormwater	Table II
P1-02	9/29/06	Stormwater	Table II
M3-02	9/29/06	Stormwater	Table II
M5-01	9/29/06	Stormwater	Table II
M1-01	9/29/06	Stormwater	Table II
S10-01	9/29/06	Stormwater	Table II
P2-01	9/29/06	Stormwater	Table II
S3-01	9/29/06	Stormwater	Table II
S8-01	9/29/06	Stormwater	Table II
S6-01	9/29/06	Stormwater	Table II
S2-01	9/29/06	Stormwater	Table II
S7-01	9/29/06	Stormwater	Table II
S5-01	9/29/06	Stormwater	Table II
M4-02	9/29/06	Stormwater	Table II
M5-02	9/29/06	Stormwater	Table II
S9-02	9/29/06	Stormwater	Table II
M2-01	9/29/06	Stormwater	Table II
S11-01	9/29/06	Stormwater	Table II
M4-01	9/29/06	Stormwater	Table II
M3-01	9/29/06	Stormwater	Table II
P1-01	9/29/06	Stormwater	Table II
S1-01	9/29/06	Stormwater	Table II
P3-02	9/29/06	Stormwater	Table II
S3-02	9/29/06	Stormwater	Table II
S2-02	9/29/06	Stormwater	Table II
P2-02	9/29/06	Stormwater	Table II
S1-02	9/29/06	Stormwater	Table II
S5-02	9/29/06	Stormwater	Table II
S6-02	9/29/06	Stormwater	Table II
S7-02	9/29/06	Stormwater	Table II
S8-02	9/29/06	Stormwater	Table II

Table I continued on next page

TABLE I (continued), Samples Submitted

Sample ID	Date Sampled	Matrix	Analysis Requested
M1-03	9/29/06	Stormwater	Table II
M3-03	9/29/06	Stormwater	Table II
M5-03	9/29/06	Stormwater	Table II
M4-03	9/29/06	Stormwater	Table II
P1-03	9/29/06	Stormwater	Table II
S8-03	9/29/06	Stormwater	Table II
S11-03	9/29/06	Stormwater	Table II
M2-03	9/29/06	Stormwater	Table II
P2-03	9/29/06	Stormwater	Table II
S1-03	9/29/06	Stormwater	Table II
S3-03	9/29/06	Stormwater	Table II
P3-03	9/29/06	Stormwater	Table II
S2-03	9/29/06	Stormwater	Table II
S7-03	9/29/06	Stormwater	Table II
S6-03	9/29/06	Stormwater	Table II
S5-03	9/29/06	Stormwater	Table II
S11-04	9/29/06	Stormwater	Table II
M2-04	9/29/06	Stormwater	Table II
M1-04	9/29/06	Stormwater	Table II
P1-04	9/29/06	Stormwater	Table II
M4-04	9/29/06	Stormwater	Table II
M5-04	9/29/06	Stormwater	Table II
M3-04	9/29/06	Stormwater	Table II
P2-04	9/29/06	Stormwater	Table II
S3-04	9/29/06	Stormwater	Table II
P3-04	9/29/06	Stormwater	Table II
S8-04	9/29/06	Stormwater	Table II
S7-04	9/29/06	Stormwater	Table II
S6-04	9/29/06	Stormwater	Table II
S2-04	9/29/06	Stormwater	Table II
S1-04	9/29/06	Stormwater	Table II
S5-04	9/29/06	Stormwater	Table II

TABLE II, Analysis and Methods

ANALYSIS	DETERMINATIVE METHOD
Ammonia	350.3
Surfactants as MBAS	5540C

These methods are documented in:

40 CFR 136, *Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act*, Office of Federal Register National Archives and Records Administration.

Sample Results

Surfactants as MBAS

Sample	Result	Reporting Limit	Date Analyzed	Units
M2-02	0.41	0.03	9/29/06	mg/L
S11-02	0.17	0.03	9/29/06	mg/L
S10-02	0.66	0.03	9/29/06	mg/L
P3-01	0.07	0.03	9/29/06	mg/L
M1-02	0.06	0.03	9/29/06	mg/L
P1-02	N.D.	0.03	9/29/06	mg/L
M3-02	0.18	0.03	9/29/06	mg/L
M5-01	0.08	0.03	9/29/06	mg/L
M1-01	0.06	0.03	9/29/06	mg/L
S10-01	0.25	0.03	9/29/06	mg/L
P2-01	0.04	0.03	9/29/06	mg/L
S3-01	N.D.	0.03	9/29/06	mg/L
S8-01	0.09	0.03	9/29/06	mg/L
S6-01	N.D.	0.03	9/29/06	mg/L
S2-01	0.03	0.03	9/29/06	mg/L
S7-01	N.D.	0.03	9/29/06	mg/L
S5-01	N.D.	0.03	9/29/06	mg/L
M4-02	N.D.	0.03	9/29/06	mg/L
M5-02	N.D.	0.03	9/29/06	mg/L
S9-02	0.03	0.03	9/29/06	mg/L
M2-01	N.D.	0.03	9/29/06	mg/L
S11-01	0.11	0.03	9/29/06	mg/L
M4-01	0.09	0.03	9/29/06	mg/L
M3-01	0.09	0.03	9/29/06	mg/L

Surfactants as MBAS

Sample	Result	Reporting Limit	Date Analyzed	Units
P1-01	N.D.	0.03	9/29/06	mg/L
S1-01	N.D.	0.03	9/29/06	mg/L
P3-02	N.D.	0.03	9/30/06	mg/L
S3-02	0.06	0.03	9/30/06	mg/L
S2-02	0.05	0.03	9/30/06	mg/L
P2-02	N.D.	0.03	9/30/06	mg/L
S1-02	N.D.	0.03	9/30/06	mg/L
S5-02	0.05	0.03	9/30/06	mg/L
S6-02	0.04	0.03	9/30/06	mg/L
S7-02	0.07	0.03	9/30/06	mg/L
S8-02	N.D.	0.03	9/30/06	mg/L
M1-03	N.D.	0.03	9/30/06	mg/L
M3-03	0.06	0.03	9/30/06	mg/L
M5-03	0.05	0.03	9/30/06	mg/L
M4-03	0.03	0.03	9/30/06	mg/L
P1-03	N.D.	0.03	9/30/06	mg/L
S8-03	0.08	0.03	9/30/06	mg/L
S11-03	0.12	0.03	9/30/06	mg/L
M2-03	N.D.	0.03	9/30/06	mg/L
P2-03	0.07	0.03	9/30/06	mg/L
S1-03	0.10	0.03	9/30/06	mg/L
S3-03	N.D.	0.03	9/30/06	mg/L
P3-03	N.D.	0.03	9/30/06	mg/L
S2-03	0.04	0.03	9/30/06	mg/L
S7-03	N.D.	0.03	9/30/06	mg/L
S6-03	N.D.	0.03	9/30/06	mg/L
S5-03	N.D.	0.03	9/30/06	mg/L

Surfactants as MBAS

Sample	Result	Reporting Limit	Date Analyzed	Units
S11-04	0.04	0.03	9/30/06	mg/L
M2-04	N.D.	0.03	9/30/06	mg/L
M1-04	0.03	0.03	9/30/06	mg/L
P1-04	0.03	0.03	9/30/06	mg/L
M4-04	0.04	0.03	9/30/06	mg/L
M5-04	0.03	0.03	9/30/06	mg/L
M3-04	0.15	0.03	9/30/06	mg/L
P2-04	0.03	0.03	9/30/06	mg/L
S3-04	0.06	0.03	9/30/06	mg/L
P3-04	0.06	0.03	9/30/06	mg/L
S8-04	N.D.	0.03	9/30/06	mg/L
S7-04	0.03	0.03	9/30/06	mg/L
S6-04	0.06	0.03	9/30/06	mg/L
S2-04	0.06	0.03	9/30/06	mg/L
S1-04	0.06	0.03	9/30/06	mg/L
S5-04	0.06	0.03	9/30/06	mg/L

Ammonia (N)

Sample	Result	Reporting Limit	Date Analyzed	Units
M2-02	0.11	0.10	10/4/06	mg/L
S11-02	0.22	0.10	10/4/06	mg/L
S10-02	0.24	0.10	10/4/06	mg/L
P3-01	N.D.	0.10	10/4/06	mg/L
M1-02	N.D.	0.10	10/4/06	mg/L
P1-02	N.D.	0.10	10/4/06	mg/L
M3-02	N.D.	0.10	10/4/06	mg/L
M5-01	N.D.	0.10	10/4/06	mg/L
M1-01	N.D.	0.10	10/4/06	mg/L
S10-01	0.63	0.10	10/4/06	mg/L
P2-01	N.D.	0.10	10/4/06	mg/L
S3-01	0.18	0.10	10/4/06	mg/L
S8-01	0.13	0.10	10/4/06	mg/L
S6-01	0.19	0.10	10/4/06	mg/L
S2-01	0.16	0.10	10/4/06	mg/L
S7-01	0.23	0.10	10/4/06	mg/L
S5-01	0.13	0.10	10/4/06	mg/L
M4-02	0.19	0.10	10/4/06	mg/L
M5-02	0.14	0.10	10/4/06	mg/L
S9-02	0.23	0.10	10/4/06	mg/L
M2-01	0.13	0.10	10/4/06	mg/L
S11-01	0.13	0.10	10/4/06	mg/L
M4-01	0.22	0.10	10/4/06	mg/L
M3-01	0.24	0.10	10/4/06	mg/L

Ammonia (N)

Sample	Result	Reporting Limit	Date Analyzed	Units
P1-01	N.D.	0.10	10/4/06	mg/L
S1-01	0.11	0.10	10/4/06	mg/L
P3-02	N.D.	0.10	10/4/06	mg/L
S3-02	0.17	0.10	10/4/06	mg/L
S2-02	0.17	0.10	10/4/06	mg/L
P2-02	N.D.	0.10	10/4/06	mg/L
S1-02	0.14	0.10	10/4/06	mg/L
S5-02	0.17	0.10	10/4/06	mg/L
S6-02	0.20	0.10	10/4/06	mg/L
S7-02	N.D.	0.10	10/4/06	mg/L
S8-02	N.D.	0.10	10/4/06	mg/L
M1-03	N.D.	0.10	10/4/06	mg/L
M3-03	N.D.	0.10	10/4/06	mg/L
M5-03	0.11	0.10	10/4/06	mg/L
M4-03	0.12	0.10	10/4/06	mg/L
P1-03	N.D.	0.10	10/4/06	mg/L
S8-03	0.12	0.10	10/4/06	mg/L
S11-03	N.D.	0.10	10/4/06	mg/L
M2-03	N.D.	0.10	10/4/06	mg/L
P2-03	N.D.	0.10	10/4/06	mg/L
S1-03	0.13	0.10	10/4/06	mg/L
S3-03	N.D.	0.10	10/4/06	mg/L
P3-03	N.D.	0.10	10/4/06	mg/L
S2-03	0.11	0.10	10/4/06	mg/L
S7-03	0.11	0.10	10/4/06	mg/L
S6-03	N.D.	0.10	10/4/06	mg/L
S5-03	N.D.	0.10	10/4/06	mg/L

Ammonia (N)

Sample	Result	Reporting Limit	Date Analyzed	Units
S11-04	N.D.	0.10	10/4/06	mg/L
M2-04	N.D.	0.10	10/4/06	mg/L
M1-04	N.D.	0.10	10/4/06	mg/L
P1-04	N.D.	0.10	10/4/06	mg/L
M4-04	0.14	0.10	10/4/06	mg/L
M5-04	N.D.	0.10	10/4/06	mg/L
M3-04	0.27	0.10	10/4/06	mg/L
P2-04	N.D.	0.10	10/4/06	mg/L
S3-04	N.D.	0.10	10/4/06	mg/L
P3-04	N.D.	0.10	10/4/06	mg/L
S8-04	N.D.	0.10	10/4/06	mg/L
S7-04	0.11	0.10	10/4/06	mg/L
S6-04	N.D.	0.10	10/4/06	mg/L
S2-04	N.D.	0.10	10/4/06	mg/L
S1-04	N.D.	0.10	10/4/06	mg/L
S5-04	N.D.	0.10	10/4/06	mg/L

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R0929-16 (1)

CHAIN-OF-CUSTODY RECORD 10604

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ____ (days)
☐ 2 Days* ☐ Standard (____ days) *Surcharge Applies

PROJECT NAME: EASTONS BEACH
PROJECT LOCATION: NEWPORT RI
PROJECT NUMBER: 2006091.A10
LABORATORY: NE
REPORT TO: AMY HUNT
INVOICE TO: AMY HUNT
P.O. NO.:
Sampler's Signature: Walter Mahoney Date: 9/29/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other STORMWATER

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Surfactants	Ammonia							Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H2SO4	Plastic - As is, [ ] 250 ml [ ] 500 [ ] (1000 ml)	Plastic - H2SO4, [ ] 250 ml [ ] (500 ml) 4oz	Plastic - HNO3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
1					M2-02	SW	9/29/06	1255																✓	✓				
2					S11-02	X		1315																✓	✓				
3					S10-02	X		1240																✓	✓				
4					P3-01	SW		1220																✓	✓				
5					M1-02	SW		1245																✓	✓				
6					P1-02	SW		1215																✓	✓				
7					M3-02	SW		1215																✓	✓				
8					M5-01	SW		1100																✓	✓				
9					M1-01	SW		1045																✓	✓				
10					S10-01	X	↓	1030																✓	✓				

Transfer Number	Relinquished By	Accepted By	Date	Time
1			9/29	200
2				
3				
4			9/29	3:38

Reporting and Detection Limit Requirements:

Additional Comments:

4°C on ice

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R0929-16 (2)

● 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ______

CHAIN-OF-CUSTODY RECORD 10605

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ____ (days)
☐ 2 Days* ● Standard (____ days) *Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: North East
REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. NO.:
Sampler's Signature: Date: 9/25/06

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Bottom Sediment
W=Waste
A=Air
X=Other Storm Water

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Surfactants	Ammonia							Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic - As is, [ ] 250 ml [ ] 500 (1000 ml) 4oz or 500ml	Plastic (H_2SO_4) ~~250~~ ml [ ] 500 ml	Plastic - HNO₃, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
11					P2-01	SW	9/25/06	1200	4	1														✓	✓				
12					S3-01	X		1125	4	1														✓	✓				
13					S8-01	X		1005	1	1														✓	✓				
14					S6-01	X		1030	1	1														✓	✓				
15					S2-01	X		1135	1	1														✓	✓				
16					S7-01	X		950	1	1														✓	✓				
17					S5-01	X		1040	1	1														✓	✓				
18					M4-02	SW		1330	1	1														✓	✓				
19					P3-01	SW		1220	1	1														✓	✓				
20					M5-02	SW		1319	1	1														✓	✓				

Transfer Number	Relinquished By	Accepted By	Date	Time
1			9/29	206
2				
3				
4			9/29	3:38

Reporting and Detection Limit Requirements:

Additional Comments:
~~3~~4°C on ice
P3-01 submitted as item #4

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☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other

R0929-16 (3)

CHAIN-OF-CUSTODY RECORD 10606

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☑ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: Northeast

REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. NO.:
Sampler's Signature:
Date: 9/29/06

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Bottom Sediment
W=Waste
A=Air
X=Other Stormwater

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request		AH ~~Enterococcus~~	Surfactants	Ammonia				Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H$_2$SO$_4$	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H$_2$SO$_4$, [ ] 250 ml [ ] 500 ml or 40c	Plastic - HNO$_3$, 250 ml	Plastic - NaOH, 250 ml [ ] Filtered	Bacteria Bottle	Comments
21					S9-02	X	9/29/06	1220			↓	↓	↓											/	/				
22					M2-01	SW		1025			↓	↓	↓											/	/				
23					S11-01	X		1040			↓	↓	↓											/	/				
24					M4-01	SW		1145			↓	↓	↓											/	/				
25					M3-01	SW		950				↓	↓											/	/				
26					P1-01	SW		1015				↓	↓											/	/				
27					S1-01	X		1145				↓	↓											/	/				

Transfer Number	Relinquished By	Accepted By	Date	Time
1		Erik Dias	9/29	2:00
2				
3				
4		Jill VCS	9/29	3:38

Reporting and Detection Limit Requirements:

Additional Comments: Sent Results to Amy Hunt
4°C on ice

R0929-16 (4)

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☒ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other

CHAIN-OF-CUSTODY RECORD 10611

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☒ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: Easton's Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: NorthEast
REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. NO.:
Sampler's Signature:
Date: 9/29/06

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Bottom Sediment
W=Waste
A=Air
X=Other

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Surfactant	Ammonia							Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H$_2$SO$_4$	[✓ Plastic] - As is, [ ] 250 ml [ ] 500 [✓ 1000 ml]	[✓ Plastic] H$_2$SO$_4$, [✓] 250 ml [ ] 500 ml	Plastic - HNO$_3$, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
37	✓				B3-02	SW	9/29/06	1415	1	1														✓	✓				
38	✓				S3-02	X	↓	1350	1	1														✓	✓				
39	✓				B2-02	X		1345	1	1														✓	✓				
40	✓				P2-02	SW		1405	1	1														✓	✓				
41	✓				S1-02	X		1340	1	1														✓	✓				
42	✓				S5-02	X		1325	1	1														✓	✓				
43	✓				S6-02	X		1315	1	1														✓	✓				
44	✓				S7-02	X		1300	1	1														✓	✓				
45	✓				S8-02	X	↓	1255	1	1														✓	✓				

Transfer Number	Relinquished By	Accepted By	Date	Time
1			9/29/06	2125
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

R0929-16 (5)

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☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ______

CHAIN-OF-CUSTODY RECORD 10612

Turnaround
☐ 1 Day* ☒ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☐ Standard (____ days) *Surcharge Applies

PROJECT NAME: EASTON'S BEACH
PROJECT LOCATION: NEWPORT RI
PROJECT NUMBER: 2006090.A10
LABORATORY: Northeast

REPORT TO: AMY HUNT
INVOICE TO: AMY HUNT
P.O. NO.:

Sampler's Signature: Walter Mahoney Date: 9/29/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other STORMWATER

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	SURFACTANTS	AMMONIA							Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	Plastic, As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic, H_2SO_4, 250 ml [ ] 500 ml	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
46					M1-03	X	9/29	1545	X	X														✓	✓				
47					M3-03	X		1525	X	X														✓	✓				
48					M5-03	X		1600	X	X														✓	✓				
49					M4-03	X		1610	X	X														✓	✓				
50					P1-03	X		1535	X	X														✓	✓				
51					S8-03	X		1530	X	X																			

Transfer Number	Relinquished By	Accepted By	Date	Time
1			9/29/06	2125
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

R092916 (6)

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■ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ____

CHAIN-OF-CUSTODY RECORD 10614

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ____ (days)
☐ 2 Days* ■ Standard (____ days) *Surcharge Applies

PROJECT NAME: Easton's Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901. A10
LABORATORY: North East
REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. NO.:
Sampler's Signature: Date: 9/29/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other Stormwater

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Surfactant	Ammonia							Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H2SO4	[✓ Plastic] - As is, [ ] 250 ml [ ] 500 [✓ 1000] ml	[✓ Plastic] - [✓ H2SO4], [ ] 250 ml [ ] 500 ml 4oz or 500ml	Plastic - HNO3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
~~46~~ 51					~~S~~- S11-03	X	9/29/06	1620	1	1														✓	✓				
52					S12-03	SW	↓	1554	1	1														✓	✓				
53					P2-03	X	↓	1040	↓	↓														↓	↓				
54					S1-03	↓	↓	1615	↓	↓														↓	↓				
55					S3-03	↓	↓	1625	↓	↓														↓	↓				
56					P3-03	↓	↓	1655	↓	↓														↓	↓				
57					S2-03	↓	↓	1620	↓	↓														↓	↓				
58					S7-03	↓	↓	1535	↓	↓														↓	↓				
59					S6-03	↓	↓	1540	↓	↓														↓	↓				
60					S5-03	↓	↓	1600	↓	↓														↓	↓				

Transfer Number	Relinquished By	Accepted By	Date	Time
1		Erik Rosi	9/29/06	2125
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

R0929-16 (7)

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☐ Other ______

CHAIN-OF-CUSTODY RECORD 10615

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ____ (days)
☐ 2 Days* ☑ Standard (____ days) *Surcharge Applies

PROJECT NAME: Easton's Beach

PROJECT LOCATION: Newport, RI

PROJECT NUMBER: 20060901.A10

LABORATORY: Northeast

REPORT TO: Amy Hunt

INVOICE TO: Amy Hunt

P.O. NO.:

Sampler's Signature:

Date: 9/29/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other Stormwater

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request: Surfactant	Ammonia							Containers: Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	[✓ Plastic] As is, [ ] 250 ml [ ] 500 [✓ 1000] ml	[✓ Plastic] H₂SO₄, [✓] 250 ml [ ] 500 ml	Plastic - HNO₃, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
61	✓				S11-04	X	9/29/06	1919	✓	✓														1	1				
62	✓				M2-04	X		1835	✓	✓														1	1				
63	✓				M1-04	X		1830	✓	✓														1	1				
64	✓				P1-04	SW		1815	✓	✓														1	1				
65	✓				M4-04	X		1910	✓	✓														1	1				
66	✓				M5-04	X		1850	✓	✓														1	1				
67	✓				M3-04	X		1810	✓	✓														1	1				
68	✓				P2-04	X		2035																1	1				
69	✓				S3-04	X		1925																1	1				
70	✓				P3-04	X	↓	1950																1	1				

Transfer Number	Relinquished By	Accepted By	Date	Time
1		Erik Diaz	9/29/06	2125
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

R0929-16 (8)

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☐ Other ______

CHAIN-OF-CUSTODY RECORD 10616

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☑ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: Easton's Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: Northeast
REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. NO.:
Sampler's Signature:
Date: 9/29/06

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Bottom Sediment
W=Waste
A=Air
X=Other Stormwater

Item No.	Transfer Check				Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request: Surfactant	Ammonia							Containers: Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H$_2$SO$_4$	[✓ Plastic] As is, [ ] 250 ml [ ] 500 [ ] [✓ 1000] ml	[✓ Plastic] - H$_2$SO$_4$, ☒ 250 ml [ ] 500 ml	Plastic - HNO$_3$, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
	1	2	3	4																									
71	✓				S8-04	X	9/29/06	1815	✓	✓														✓	✓				
72	✓				S7-04			1820	✓	✓														✓	✓				
73	✓				S6-04			1840	✓	✓														✓	✓				
74	✓				S2-04			1920	✓	✓														✓	✓				
75	✓				S1-04			1910	✓	✓														✓	✓				
76	✓				S5-04			1855	✓	✓														✓	✓				

Transfer Number	Relinquished By	Accepted By	Date	Time
1		Erik Diaz	9/29/06	2125
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

20060901.A10 1A

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

Amy Hunt
Fuss & O'Neill
275 Promenade Street Suite 350
Providence. RI 02908

RE: Newport-Wet Weather

Dear Amv Hunt:

We appreciate this opportunity to provide you with our analytical services. BAL Laboratory is committed to providing the highest quality service. Our dedication to each client includes responsiveness to emergencies, dependability, well-written reports and superior client services.

Enclosed is your data report for **Work Order Number B610056.** The invoice for this project is included with this report unless other arrangements have previously been made with the laboratory. Samples will be disposed of thirty days after the final report has been mailed. If you have any questions or concerns, please feel free to call our Customer Service Department. We value our continued relationship and look forward to hearing from you in the future.

Sincerely,

BAL Laboratory

Darlene Capuano

Darlene Capuano
Laboratory Director

RI Laboratory License Number: A36
MA Laboratory License Number: M RI-M01

enclosure

Industrial Microbiology - Environmental Investigation - Biological and Specialty Analyses of Water and Wastes - Pollution Tracking and Source Determination - Monitoring Programs - Trend Assessments - Seafood Analyses - Drinking Water Quality - Biosolids and Compost Testing - Biofilter Assessment - Bioaerosol Monitoring - Corrosion Analysis

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610056
Date Received: 10/12/2006 3:10:00AM

Microbiology

Client Sample ID: B1-02E
BAL Sample ID: B610056-01 **Matrix:** Aqueous **Sampled:** 10/12/06 00:16

Analyte	Result	Units	Analyzed	Method
Enterococci	**240**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: B2-02E
BAL Sample ID: B610056-02 **Matrix:** Aqueous **Sampled:** 10/12/06 00:25

Analyte	Result	Units	Analyzed	Method
Enterococci	**1100**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: B3-02E
BAL Sample ID: B610056-03 **Matrix:** Aqueous **Sampled:** 10/12/06 00:40

Analyte	Result	Units	Analyzed	Method
Enterococci	**6500**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: B4-02E
BAL Sample ID: B610056-04 **Matrix:** Aqueous **Sampled:** 10/12/06 00:49

Analyte	Result	Units	Analyzed	Method
Enterococci	**1000**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: M1-02E
BAL Sample ID: B610056-05 **Matrix:** Aqueous **Sampled:** 10/12/06 00:30

Analyte	Result	Units	Analyzed	Method
Enterococci	**6500**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: M2-02E
BAL Sample ID: B610056-06 **Matrix:** Aqueous **Sampled:** 10/12/06 00:35

Analyte	Result	Units	Analyzed	Method
Enterococci	**550**	/100 ml	10/12/06 03:25	IDEXX Enterolert

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610056
Date Received: 10/12/2006 3:10:00AM

Microbiology

Client Sample ID: M3-02E
BAL Sample ID: B610056-07 **Matrix:** Aqueous **Sampled:** 10/12/06 00:00

Analyte	Result	Units	Analyzed	Method
Enterococci	**2500** ?	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: M4-02E
BAL Sample ID: B610056-08 **Matrix:** Aqueous **Sampled:** 10/12/06 01:15

Analyte	Result	Units	Analyzed	Method
Enterococci	**780**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: M5-02E
BAL Sample ID: B610056-09 **Matrix:** Aqueous **Sampled:** 10/12/06 00:55

Analyte	Result	Units	Analyzed	Method
Enterococci	**2000** ?	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: P1-02E
BAL Sample ID: B610056-10 **Matrix:** Aqueous **Sampled:** 10/12/06 00:10

Analyte	Result	Units	Analyzed	Method
Enterococci	**12** ?	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: P2-02E
BAL Sample ID: B610056-11 **Matrix:** Aqueous **Sampled:** 10/12/06 01:20

Analyte	Result	Units	Analyzed	Method
Enterococci	**56** ✓	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: P3-02E
BAL Sample ID: B610056-12 **Matrix:** Aqueous **Sampled:** 10/12/06 01:30

Analyte	Result	Units	Analyzed	Method
Enterococci	**1100** ✓	/100 ml	10/12/06 03:25	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610056
Date Received: 10/12/2006 3:10:00AM

Microbiology

Client Sample ID: S1-02E
BAL Sample ID: B610056-13 **Matrix:** Aqueous **Sampled:** 10/12/06 00:55

Analyte	Result	Units	Analyzed	Method
Enterococci	**20000** ✓	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: S2-02E
BAL Sample ID: B610056-14 **Matrix:** Aqueous **Sampled:** 10/12/06 01:05

Analyte	Result	Units	Analyzed	Method
Enterococci	**17000** ✓	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: S3-02E
BAL Sample ID: B610056-15 **Matrix:** Aqueous **Sampled:** 10/12/06 01:10

Analyte	Result	Units	Analyzed	Method
Enterococci	**1500** ✓	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: S5-02E
BAL Sample ID: B610056-16 **Matrix:** Aqueous **Sampled:** 10/12/06 00:40

Analyte	Result	Units	Analyzed	Method
Enterococci	**49** ✓	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: S6-02E
BAL Sample ID: B610056-17 **Matrix:** Aqueous **Sampled:** 10/12/06 00:25

Analyte	Result	Units	Analyzed	Method
Enterococci	**120** ✓	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: S7-02E
BAL Sample ID: B610056-18 **Matrix:** Aqueous **Sampled:** 10/12/06 00:15

Analyte	Result	Units	Analyzed	Method
Enterococci	**570** ✓	/100 ml	10/12/06 03:25	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610056
Date Received: 10/12/2006 3:10:00AM

Microbiology

Client Sample ID: S8-02E
BAL Sample ID: B610056-19 **Matrix:** Aqueous **Sampled:** 10/12/06 00:05

Analyte	Result	Units	Analyzed	Method
Enterococci	**10000** ✓	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: S9-02E
BAL Sample ID: B610056-20 **Matrix:** Aqueous **Sampled:** 10/12/06 00:10

Analyte	Result	Units	Analyzed	Method
Enterococci	**4**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: S10-02E
BAL Sample ID: B610056-21 **Matrix:** Aqueous **Sampled:** 10/12/06 00:23

Analyte	Result	Units	Analyzed	Method
Enterococci	**1**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: S11-02E
BAL Sample ID: B610056-22 **Matrix:** Aqueous **Sampled:** 10/12/06 00:54

Analyte	Result	Units	Analyzed	Method
Enterococci	**2**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: MB1-02E
BAL Sample ID: B610056-23 **Matrix:** Aqueous **Sampled:** 10/12/06 00:45

Analyte	Result	Units	Analyzed	Method
Enterococci	**64**	/100 ml	10/12/06 03:25	IDEXX Enterolert

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610056
Date Received: 10/12/2006 3:10:00AM

Notes and Definitions

MF	Membrane Filtration
MPN	Most Probable Number
TNTC	Too Numerous to Count
dry	Sample results reported on a dry weight basis

20060901.A10 1A

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

Amy Hunt
Fuss & O'Neill
275 Promenade Street Suite 350
Providence. RI 02908

RE: Newport-Wet Weather

Dear Amy Hunt:

We appreciate this opportunity to provide you with our analytical services. BAL Laboratory is committed to providing the highest quality service. Our dedication to each client includes responsiveness to emergencies, dependability, well-written reports and superior client services.

Enclosed is your data report for **Work Order Number B610056.** The invoice for this project is included with this report unless other arrangements have previously been made with the laboratory. Samples will be disposed of thirty days after the final report has been mailed. If you have any questions or concerns, please feel free to call our Customer Service Department. We value our continued relationship and look forward to hearing from you in the future.

Sincerely,

BAL Laboratory

Darlene Capuano

Darlene Capuano
Laboratory Director

RI Laboratory License Number: A36
MA Laboratory License Number: M RI-M01

enclosure

Industrial Microbiology - Environmental Investigation - Biological and Specialty Analyses of Water and Wastes - Pollution Tracking and Source Determination - Monitoring Programs - Trend Assessments - Seafood Analyses - Drinking Water Quality - Biosolids and Compost Testing - Biofilter Assessment - Bioaerosol Monitoring - Corrosion Analysis

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BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610056
Date Received: 10/12/2006 3:10:00AM

Microbiology

Client Sample ID: B1-02E
BAL Sample ID: B610056-01 **Matrix:** Aqueous **Sampled:** 10/12/06 00:16

Analyte	Result	Units	Analyzed	Method
Enterococci	**240**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: B2-02E
BAL Sample ID: B610056-02 **Matrix:** Aqueous **Sampled:** 10/12/06 00:25

Analyte	Result	Units	Analyzed	Method
Enterococci	**1100**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: B3-02E
BAL Sample ID: B610056-03 **Matrix:** Aqueous **Sampled:** 10/12/06 00:40

Analyte	Result	Units	Analyzed	Method
Enterococci	**6500**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: B4-02E
BAL Sample ID: B610056-04 **Matrix:** Aqueous **Sampled:** 10/12/06 00:49

Analyte	Result	Units	Analyzed	Method
Enterococci	**1000**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: M1-02E
BAL Sample ID: B610056-05 **Matrix:** Aqueous **Sampled:** 10/12/06 00:30

Analyte	Result	Units	Analyzed	Method
Enterococci	**6500**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: M2-02E
BAL Sample ID: B610056-06 **Matrix:** Aqueous **Sampled:** 10/12/06 00:35

Analyte	Result	Units	Analyzed	Method
Enterococci	**550**	/100 ml	10/12/06 03:25	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610056
Date Received: 10/12/2006 3:10:00AM

Microbiology

Client Sample ID: M3-02E
BAL Sample ID: B610056-07 **Matrix:** Aqueous **Sampled:** 10/12/06 00:00

Analyte	Result		Units	Analyzed	Method
Enterococci	**2500**	?	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: M4-02E
BAL Sample ID: B610056-08 **Matrix:** Aqueous **Sampled:** 10/12/06 01:15

Analyte	Result		Units	Analyzed	Method
Enterococci	**780**		/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: M5-02E
BAL Sample ID: B610056-09 **Matrix:** Aqueous **Sampled:** 10/12/06 00:55

Analyte	Result		Units	Analyzed	Method
Enterococci	**2000**	?	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: P1-02E
BAL Sample ID: B610056-10 **Matrix:** Aqueous **Sampled:** 10/12/06 00:10

Analyte	Result		Units	Analyzed	Method
Enterococci	**12**	?	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: P2-02E
BAL Sample ID: B610056-11 **Matrix:** Aqueous **Sampled:** 10/12/06 01:20

Analyte	Result		Units	Analyzed	Method
Enterococci	**56**	✓	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: P3-02E
BAL Sample ID: B610056-12 **Matrix:** Aqueous **Sampled:** 10/12/06 01:30

Analyte	Result		Units	Analyzed	Method
Enterococci	**1100**	✓	/100 ml	10/12/06 03:25	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610056
Date Received: 10/12/2006 3:10:00AM

Microbiology

Client Sample ID: S1-02E
BAL Sample ID: B610056-13 **Matrix:** Aqueous **Sampled:** 10/12/06 00:55

Analyte	Result ✓	Units	Analyzed	Method
Enterococci	**20000**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: S2-02E
BAL Sample ID: B610056-14 **Matrix:** Aqueous **Sampled:** 10/12/06 01:05

Analyte	Result ✓	Units	Analyzed	Method
Enterococci	**17000**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: S3-02E
BAL Sample ID: B610056-15 **Matrix:** Aqueous **Sampled:** 10/12/06 01:10

Analyte	Result ✓	Units	Analyzed	Method
Enterococci	**1500**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: S5-02E
BAL Sample ID: B610056-16 **Matrix:** Aqueous **Sampled:** 10/12/06 00:40

Analyte	Result ✓	Units	Analyzed	Method
Enterococci	**49**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: S6-02E
BAL Sample ID: B610056-17 **Matrix:** Aqueous **Sampled:** 10/12/06 00:25

Analyte	Result ✓	Units	Analyzed	Method
Enterococci	**120**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: S7-02E
BAL Sample ID: B610056-18 **Matrix:** Aqueous **Sampled:** 10/12/06 00:15

Analyte	Result ✓	Units	Analyzed	Method
Enterococci	**570**	/100 ml	10/12/06 03:25	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610056
Date Received: 10/12/2006 3:10:00AM

Microbiology

Client Sample ID: S8-02E
BAL Sample ID: B610056-19 **Matrix:** Aqueous **Sampled:** 10/12/06 00:05

Analyte	Result	Units	Analyzed	Method
Enterococci	**10000** ✓	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: S9-02E
BAL Sample ID: B610056-20 **Matrix:** Aqueous **Sampled:** 10/12/06 00:10

Analyte	Result	Units	Analyzed	Method
Enterococci	**4**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: S10-02E
BAL Sample ID: B610056-21 **Matrix:** Aqueous **Sampled:** 10/12/06 00:23

Analyte	Result	Units	Analyzed	Method
Enterococci	**1**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: S11-02E
BAL Sample ID: B610056-22 **Matrix:** Aqueous **Sampled:** 10/12/06 00:54

Analyte	Result	Units	Analyzed	Method
Enterococci	**2**	/100 ml	10/12/06 03:25	IDEXX Enterolert

Client Sample ID: MB1-02E
BAL Sample ID: B610056-23 **Matrix:** Aqueous **Sampled:** 10/12/06 00:45

Analyte	Result	Units	Analyzed	Method
Enterococci	**64**	/100 ml	10/12/06 03:25	IDEXX Enterolert

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610056
Date Received: 10/12/2006 3:10:00AM

Notes and Definitions

MF	Membrane Filtration
MPN	Most Probable Number
TNTC	Too Numerous to Count
dry	Sample results reported on a dry weight basis

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☒ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ______

CHAIN-OF-CUSTODY RECORD 10786

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☒ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: Easton's Beach
PROJECT LOCATION: Newport RI
PROJECT NUMBER: 2006 0901. A10
LABORATORY: BAL

REPORT TO: Amy Hunt Fuss and O'Neill
INVOICE TO: Amy Hunt - Fuss and O'Neill
P.O. No.:
Sampler's Signature:
Date: 10/12/06

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Bottom Sediment
W=Waste
A=Air
X=Other outfall

B610056

Analysis Request / Containers

	Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Enterococcus								Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	Plastic - As is, [ ] 250 [ ] 500 [ ] 1000 ml	Plastic - H_2SO_4, [ ] 250 ml [ ] 500 ml	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
1	26	✓				B1-02E	SW	10/12/06	0016	✓																			✓	
2	27	✓				B2-02E			0025	✓																			✓	
3	28	✓				B3-02E			0040	✓																			✓	
4	29	✓				B4-02E			0048	✓																			✓	
5	30	✓				M1-02E			0030	✓																			✓	
6	31	✓				M2-02E			0035	✓																			✓	
7	32	✓				M3-02E			0100	✓																			✓	
8	33	✓				M4-02E			0115	✓																			✓	
9	34	✓				M5-02E			0055	✓																			✓	
10	35	✓				P1-02E	↓	↓	1240	✓	- 0010 Q																		✓	

Transfer Number	Relinquished By	Accepted By	Date	Time
1			10/12/06	1510
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:
B1, B2, B3, B4 are Saltwater
M1, M2, M3, M4, M5 Are potentially Brackish
All other Samples are Fresh water

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☐ 24 Madison Avenue Extension, Albany, NY 12203
☑ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ______

CHAIN-OF-CUSTODY RECORD 10787

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☑ Standard (____ days) *Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: Amy Hunt - Fuss and O'neill
INVOICE TO: Amy Hunt - Fuss and O'neill
P.O. NO.:
Sampler's Signature: Date: 10/12/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other Outfall

B6100056

Analysis Request | Containers

	Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	ENTEROCOCCUS								Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H₂SO₄, [ ] 250 ml [ ] 500 ml	Plastic - HNO₃, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
11	36	✓				82-02E	SW	10/12/06	0120	✓																		✓	
12	37	✓				83-02E	SW		0130	✓																		✓	
13	38	✓				S1-02E	X		0055	✓																		✓	
14	39	✓				S2-02E			0105	✓																		✓	
15	40	✓				S3-02E			0110	✓																		✓	
16	41	✓				S5-02E			0040	✓																		✓	
17	42	✓				S6-02E			0025	✓																		✓	
18	43	✓				S7-02E			0015	✓																		✓	
19	44	✓				S8-02E			0005	✓																		✓	
20	45	✓				S9-02E			0010	✓																		✓	

Transfer Number	Relinquished By	Accepted By	Date	Time
1		J Ventura	10/12/06	1510
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

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☐ 78 Interstate Drive, West Springfield, MA 01089
☐ 610 Lynndale Court, Suite E, Greenville, NC 27858
☐ 24 Madison Avenue Extension, Albany, NY 12203
☒ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ____________

CHAIN-OF-CUSTODY RECORD 10788

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☒ Standard (_____ days) *Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: Amy Hunt - Fuss and O'Neill
INVOICE TO: Amy Hunt - Fuss and O'Neill
P.O. NO.:
Sampler's Signature: Andre Tahel Date: 10/12/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other outfall

B610056

	Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request: ENTEROCOCCUS								Containers: Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H_2SO_4, [ ] 250 ml [ ] 500 ml	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
21	46	✓				S10-02E	X	10/12/06	1223	✓	-0023 Cn																		✓	
22	47	✓				S11-02E	↓	↓	0054	✓																			✓	
23	48	✓				MB1-02E	↓	↓	1245	✓	-0045 Cn																		✓	

Transfer Number	Relinquished By	Accepted By	Date	Time
1	Andre Tahel	J Ventura	10/12/06	1510
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

Amy Hunt
Fuss & O'Neill
275 Promenade Street Suite 350
Providence. RI 02908

RE: Newport-Wet Weather

Dear Amy Hunt:

We appreciate this opportunity to provide you with our analytical services. BAL Laboratory is committed to providing the highest quality service. Our dedication to each client includes responsiveness to emergencies, dependability, well-written reports and superior client services.

Enclosed is your data report for **Work Order Number B610055.** The invoice for this project is included with this report unless other arrangements have previously been made with the laboratory. Samples will be disposed of thirty days after the final report has been mailed. If you have any questions or concerns, please feel free to call our Customer Service Department. We value our continued relationship and look forward to hearing from you in the future.

Sincerely,

BAL Laboratory
Darlene Capuano
Darlene Capuano
Laboratory Director

RI Laboratory License Number: A36
MA Laboratory License Number: M RI-M01

enclosure

Industrial Microbiology - Environmental Investigation - Biological and Specialty Analyses of Water and Wastes - Pollution Tracking and Source Determination - Monitoring Programs - Trend Assessments - Seafood Analyses - Drinking Water Quality - Biosolids and Compost Testing - Biofilter Assessment - Bioaerosol Monitoring - Corrosion Analysis

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BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610055
Date Received: 10/12/2006 11:40:00PM

Microbiology

Client Sample ID: B1-01E
BAL Sample ID: B610055-01 **Matrix:** Aqueous **Sampled:** 10/11/06 21:12

Analyte	Result	Units	Analyzed	Method
Enterococci	**97**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: B2-01E
BAL Sample ID: B610055-02 **Matrix:** Aqueous **Sampled:** 10/11/06 21:29

Analyte	Result	Units	Analyzed	Method
Enterococci	**120**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: B3-01E
BAL Sample ID: B610055-03 **Matrix:** Aqueous **Sampled:** 10/11/06 21:45

Analyte	Result	Units	Analyzed	Method
Enterococci	**310**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: B4-01E
BAL Sample ID: B610055-04 **Matrix:** Aqueous **Sampled:** 10/11/06 21:59

Analyte	Result	Units	Analyzed	Method
Enterococci	**58**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: M1-01E
BAL Sample ID: B610055-05 **Matrix:** Aqueous **Sampled:** 10/11/06 21:35

Analyte	Result	Units	Analyzed	Method
Enterococci	**240**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: M2-01E
BAL Sample ID: B610055-06 **Matrix:** Aqueous **Sampled:** 10/11/06 21:42

Analyte	Result	Units	Analyzed	Method
Enterococci	**2400**	/100 ml	10/12/06 00:00	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610055
Date Received: 10/12/2006 11:40:00PM

Microbiology

Client Sample ID: M3-01E
BAL Sample ID: B610055-07 **Matrix:** Aqueous **Sampled:** 10/11/06 21:00

Analyte	Result ?	Units	Analyzed	Method
Enterococci	**1200**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: M4-01E
BAL Sample ID: B610055-08 **Matrix:** Aqueous **Sampled:** 10/11/06 22:30 ok

Analyte	Result ?	Units	Analyzed	Method
Enterococci	**24000**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: M5-01E
BAL Sample ID: B610055-09 **Matrix:** Aqueous **Sampled:** 10/11/06 22:00

Analyte	Result ?	Units	Analyzed	Method
Enterococci	**370**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: P1-01E
BAL Sample ID: B610055-10 **Matrix:** Aqueous **Sampled:** 10/11/06 21:17

Analyte	Result ?	Units	Analyzed	Method
Enterococci	**10**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: P2-01E
BAL Sample ID: B610055-11 **Matrix:** Aqueous **Sampled:** 10/11/06 22:15

Analyte	Result ✓	Units	Analyzed	Method
Enterococci	**41**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: P3-01E
BAL Sample ID: B610055-12 **Matrix:** Aqueous **Sampled:** 10/11/06 22:30

Analyte	Result ✓	Units	Analyzed	Method
Enterococci	**27**	/100 ml	10/12/06 00:00	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610055
Date Received: 10/12/2006 11:40:00PM

Microbiology

Client Sample ID: S1-01E
BAL Sample ID: B610055-13 **Matrix:** Aqueous **Sampled:** 10/11/06 21:50

Analyte	Result	Units	Analyzed	Method
Enterococci	**340** ✓	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: S2-01E
BAL Sample ID: B610055-14 **Matrix:** Aqueous **Sampled:** 10/11/06 21:55

Analyte	Result	Units	Analyzed	Method
Enterococci	**580** ✓	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: S3-01E
BAL Sample ID: B610055-15 **Matrix:** Aqueous **Sampled:** 10/11/06 22:00

Analyte	Result	Units	Analyzed	Method
Enterococci	**920** ✓	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: S5-01E
BAL Sample ID: B610055-16 **Matrix:** Aqueous **Sampled:** 10/11/06 21:40

Analyte	Result	Units	Analyzed	Method
Enterococci	**770** ✓	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: S6-01E
BAL Sample ID: B610055-17 **Matrix:** Aqueous **Sampled:** 10/11/06 21:30

Analyte	Result	Units	Analyzed	Method
Enterococci	**920** ✓	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: S7-01E
BAL Sample ID: B610055-18 **Matrix:** Aqueous **Sampled:** 10/11/06 21:20

Analyte	Result	Units	Analyzed	Method
Enterococci	**1300** ✓	/100 ml	10/12/06 00:00	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610055
Date Received: 10/12/2006 11:40:00PM

Microbiology

Client Sample ID: S8-01E
BAL Sample ID: B610055-19 **Matrix:** Aqueous **Sampled:** 10/11/06 21:10

Analyte	Result ✓	Units	Analyzed	Method
Enterococci	**2900**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: S9-01E
BAL Sample ID: B610055-20 **Matrix:** Aqueous **Sampled:** 10/11/06 21:12

Analyte	Result	Units	Analyzed	Method
Enterococci	**20000**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: S10-01E
BAL Sample ID: B610055-21 **Matrix:** Aqueous **Sampled:** 10/11/06 21:30

Analyte	Result ?	Units	Analyzed	Method
Enterococci	**6100**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: S11-01E
BAL Sample ID: B610055-22 **Matrix:** Aqueous **Sampled:** 10/11/06 22:05

Analyte	Result	Units	Analyzed	Method
Enterococci	**6500**	/100 ml	10/12/06 00:00	IDEXX Enterolert

MB1-01

Client Sample ID: M[illegible]01
BAL Sample ID: B610055-23 **Matrix:** Aqueous **Sampled:** 10/11/06 21:45

Analyte	Result	Units	Analyzed	Method
Enterococci	**2400**	/100 ml	10/12/06 00:00	IDEXX Enterolert

spoke to
lab. on
10/26 And
they will
fix report
and resend.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610055
Date Received: 10/12/2006 11:40:00PM

Notes and Definitions

MF	Membrane Filtration
MPN	Most Probable Number
TNTC	Too Numerous to Count
dry	Sample results reported on a dry weight basis

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☒ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ______

CHAIN-OF-CUSTODY RECORD 10630

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ____ (days)
☐ 2 Days* ☒ Standard (____ days) *Surcharge Applies

PROJECT NAME: Easton's Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: Amy Hunt - Fuss and O'Neill
INVOICE TO: Amy Hunt - Fuss and O'Neill
P.O. No.:
Sampler's Signature: Date: 10/1/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other outfalls B610055

Item No.	Transfer Check				Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request								Containers												Comments
	1	2	3	4					Enterococcus								Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H₂SO₄, [ ] 250 ml [ ] 500 ml	Plastic - HNO₃, [ ] 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	[✓ Bacteria Bottle]	
1	✓				B1-001 E	SW	10/1/06	2112	✓																			✓	
2	✓				B2-001 E	SW	10/1/06	2129	✓																			✓	
3	✓				B3-001 E	SW	10/1/06	2145	✓																			✓	
4	✓				B4-001 E	SW	10/1/06	21:59	✓																			✓	
5	✓				M1-001 E	SW	10/1/06	2135	✓																			✓	
6	✓				M2-001 E	SW	10/1/06	2142	✓																			✓	
7	✓				M3-001 E	SW	10/1/06	2100	✓																			✓	
8	✓				M4-001 E	SW	10/1/06	2230	✓																			✓	
9	✓				M5-001 E	SW	10/1/06	2200	✓																			✓	
10	✓				P1-001 E	SW	10/1/06	2117	✓																			✓	

Transfer Number	Relinquished By	Accepted By	Date	Time
1		James Grogan	10/1/06	1140
2				
3	James Grogan	James Grogan	10/2/06	1230
4				

Reporting and Detection Limit Requirements:

Additional Comments:
B1, B2, B3, B4 are salt water
All other samples are freshwater
M1, M2, M3, M4, M5 are potentially Brackish

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☐ 24 Madison Avenue Extension, Albany, NY 12203
☒ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ____________

CHAIN-OF-CUSTODY RECORD 10631

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☒ Standard (____ days) *Surcharge Applies

Project Name	Project Location	Project Number	Laboratory
Easton's Beach	Newport, RI	20060901.A10	BAL

Report To: Amy Hunt - Fuss and O'Neill
Invoice To: Amy Hunt - Fuss and O'Neill
P.O. No.:
Sampler's Signature: Date: 10/11/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other Outfall B610055

Analysis Request
Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Enterococcus								Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic - As is, [ ] 250 ml [ ] 500] 1000 ml	Plastic - H₂SO₄, [ ] 250 ml [ ] 500 ml	Plastic - HNO₃, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	[✓ Bacteria Bottle]	Comments
11	✓				P2-01E	SW	10/11/06	2215	✓																			✓	
12	✓				P3-01E	SW	10/11/06	2230	✓																			✓	
13	✓				S1-01E	X	10/11/06	2150	✓																			✓	
14	✓				S2-01E	X	10/11/06	2155	✓																			✓	
15	✓				S3-01E	X	10/11/06	2200	✓																			✓	
~~16~~					~~S4~~	~~X~~																						~~✓~~	
16 ~~17~~	✓				S5-01E	X	10/11/06	2140	✓																			✓	
17 ~~18~~	✓				S6-01E	X	10/11/06	2130	✓																			✓	
18 ~~19~~	✓				S7-01E	X	10/11/06	2120	✓																			✓	
19 ~~20~~	✓				S8-01E	X	10/11/06	2110	✓																			✓	

Transfer Number	Relinquished By	Accepted By	Date	Time
1			10/11/06	1140
2			10/12/06	1230
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

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☐ 24 Madison Avenue Extension, Albany, NY 12203
☒ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ________________

CHAIN-OF-CUSTODY RECORD

10632

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☒ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

Project Name	Project Location	Project Number	Laboratory
Easton's Beach	Newport, RI	20060901.A10	BAL

Report To: Amy Hunt - Fuss and O'Neill
Invoice To: Amy Hunt - Fuss and O'Neill
P.O. No.:
Sampler's Signature: Date: 10/11/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other Outfall B610055

Item No.	Transfer Check 1	Transfer Check 2	Transfer Check 3	Transfer Check 4	Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request: Entrococcus								Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H₂SO₄, [ ] 250 ml [ ] 500 ml	Plastic - HNO₃, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	[✓ Bacteria Bottle]	Comments
20 ~~21~~	✓				S9 - 01E	X	10/11/06	2112	✓																			✓	
21 ~~22~~	✓				S10 - ~~0~~01E	X	10/11/06	2130	✓																			✓	
22 ~~23~~	✓				S11 - 01E	X	10/11/06	2205	✓																			✓	
~~24~~					~~S12 - 01E~~	~~X~~																						✓	
23 ~~25~~	✓				ABt001	X	10/11/06	2145	✓																			✓	

Transfer Number	Relinquished By	Accepted By	Date	Time
1			101106	1140
2	James Grogan	James Grogan	101206	1230
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

20060901.A10

FILE COPY

Amy Hunt
Fuss & O'Neill
275 Promenade Street Suite 350
Providence. RI 02908

OCT 3 0 2006

RE: Newport-Wet Weather

Dear Amy Hunt:

We appreciate this opportunity to provide you with our analytical services. BAL Laboratory is committed to providing the highest quality service. Our dedication to each client includes responsiveness to emergencies, dependability, well-written reports and superior client services.

Enclosed is your data report for **Work Order Number B610055.** The invoice for this project is included with this report unless other arrangements have previously been made with the laboratory. Samples will be disposed of thirty days after the final report has been mailed. If you have any questions or concerns, please feel free to call our Customer Service Department. We value our continued relationship and look forward to hearing from you in the future.

Sincerely,

BAL Laboratory
Darlene Capuano
Darlene Capuano
Laboratory Director

RI Laboratory License Number: A36
MA Laboratory License Number: M RI-M01

enclosure

Corrected Report
sample # 23 name
change (client ID)

Industrial Microbiology - Environmental Investigation - Biological and Specialty Analyses of Water and Wastes - Pollution Tracking and Source Determination - Monitoring Programs - Trend Assessments - Seafood Analyses - Drinking Water Quality - Biosolids and Compost Testing - Biofilter Assessment - Bioaerosol Monitoring - Corrosion Analysis

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610055
Date Received: 10/12/2006 11:40:00PM

Microbiology

Client Sample ID: B1-01E
BAL Sample ID: B610055-01 **Matrix:** Aqueous **Sampled:** 10/11/06 21:12

Analyte	Result	Units	Analyzed	Method
Enterococci	**97**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: B2-01E
BAL Sample ID: B610055-02 **Matrix:** Aqueous **Sampled:** 10/11/06 21:29

Analyte	Result	Units	Analyzed	Method
Enterococci	**120**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: B3-01E
BAL Sample ID: B610055-03 **Matrix:** Aqueous **Sampled:** 10/11/06 21:45

Analyte	Result	Units	Analyzed	Method
Enterococci	**310**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: B4-01E
BAL Sample ID: B610055-04 **Matrix:** Aqueous **Sampled:** 10/11/06 21:59

Analyte	Result	Units	Analyzed	Method
Enterococci	**58**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: M1-01E
BAL Sample ID: B610055-05 **Matrix:** Aqueous **Sampled:** 10/11/06 21:35

Analyte	Result	Units	Analyzed	Method
Enterococci	**240**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: M2-01E
BAL Sample ID: B610055-06 **Matrix:** Aqueous **Sampled:** 10/11/06 21:42

Analyte	Result	Units	Analyzed	Method
Enterococci	**2400**	/100 ml	10/12/06 00:00	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610055
Date Received: 10/12/2006 11:40:00PM

Microbiology

Client Sample ID: M3-01E
BAL Sample ID: B610055-07 **Matrix:** Aqueous **Sampled:** 10/11/06 21:00

Analyte	Result	Units	Analyzed	Method
Enterococci	**1200**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: M4-01E
BAL Sample ID: B610055-08 **Matrix:** Aqueous **Sampled:** 10/11/06 22:30

Analyte	Result	Units	Analyzed	Method
Enterococci	**24000**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: M5-01E
BAL Sample ID: B610055-09 **Matrix:** Aqueous **Sampled:** 10/11/06 22:00

Analyte	Result	Units	Analyzed	Method
Enterococci	**370**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: P1-01E
BAL Sample ID: B610055-10 **Matrix:** Aqueous **Sampled:** 10/11/06 21:17

Analyte	Result	Units	Analyzed	Method
Enterococci	**10**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: P2-01E
BAL Sample ID: B610055-11 **Matrix:** Aqueous **Sampled:** 10/11/06 22:15

Analyte	Result	Units	Analyzed	Method
Enterococci	**41**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: P3-01E
BAL Sample ID: B610055-12 **Matrix:** Aqueous **Sampled:** 10/11/06 22:30

Analyte	Result	Units	Analyzed	Method
Enterococci	**27**	/100 ml	10/12/06 00:00	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610055
Date Received: 10/12/2006 11:40:00PM

Microbiology

Client Sample ID: S1-01E
BAL Sample ID: B610055-13 **Matrix:** Aqueous **Sampled:** 10/11/06 21:50

Analyte	Result	Units	Analyzed	Method
Enterococci	**340**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: S2-01E
BAL Sample ID: B610055-14 **Matrix:** Aqueous **Sampled:** 10/11/06 21:55

Analyte	Result	Units	Analyzed	Method
Enterococci	**580**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: S3-01E
BAL Sample ID: B610055-15 **Matrix:** Aqueous **Sampled:** 10/11/06 22:00

Analyte	Result	Units	Analyzed	Method
Enterococci	**920**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: S5-01E
BAL Sample ID: B610055-16 **Matrix:** Aqueous **Sampled:** 10/11/06 21:40

Analyte	Result	Units	Analyzed	Method
Enterococci	**770**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: S6-01E
BAL Sample ID: B610055-17 **Matrix:** Aqueous **Sampled:** 10/11/06 21:30

Analyte	Result	Units	Analyzed	Method
Enterococci	**920**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: S7-01E
BAL Sample ID: B610055-18 **Matrix:** Aqueous **Sampled:** 10/11/06 21:20

Analyte	Result	Units	Analyzed	Method
Enterococci	**1300**	/100 ml	10/12/06 00:00	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610055
Date Received: 10/12/2006 11:40:00PM

Microbiology

Client Sample ID: S8-01E
BAL Sample ID: B610055-19 **Matrix:** Aqueous **Sampled:** 10/11/06 21:10

Analyte	Result	Units	Analyzed	Method
Enterococci	**2900**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: S9-01E
BAL Sample ID: B610055-20 **Matrix:** Aqueous **Sampled:** 10/11/06 21:12

Analyte	Result	Units	Analyzed	Method
Enterococci	**20000**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: S10-01E
BAL Sample ID: B610055-21 **Matrix:** Aqueous **Sampled:** 10/11/06 21:30

Analyte	Result	Units	Analyzed	Method
Enterococci	**6100**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: S11-01E
BAL Sample ID: B610055-22 **Matrix:** Aqueous **Sampled:** 10/11/06 22:05

Analyte	Result	Units	Analyzed	Method
Enterococci	**6500**	/100 ml	10/12/06 00:00	IDEXX Enterolert

Client Sample ID: MB1-01
BAL Sample ID: B610055-23 **Matrix:** Aqueous **Sampled:** 10/11/06 21:45

Analyte	Result	Units	Analyzed	Method
Enterococci	**2400**	/100 ml	10/12/06 00:00	IDEXX Enterolert

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B610055
Date Received: 10/12/2006 11:40:00PM

Notes and Definitions

MF	Membrane Filtration
MPN	Most Probable Number
TNTC	Too Numerous to Count
dry	Sample results reported on a dry weight basis

Source Molecular Corporation

4989 SW 74th Court, Miami, FL 33155 USA
Tel: (1) 786-268-8363, Fax: (1) 786-513-2733, Email: info@sourcemolecular.com

OCT 30 2006

Fuss & O'Neill
Attention: Mr. Dean E. Audet
275 Promenade St., Suite 350
Providence, RI 02908

October 25, 2006

Reference: Human Fecal Pollution Toolbox Results and Invoice

Dean,

Please find enclosed your results and invoice for the following Human Fecal Pollution Toolbox samples (service requested written next to your reference):

SM Number	Client Reference
SM 12012	M2-01E (Human Enterococcus "Quantification" ID)
SM 12013	S11-01E (Human Enterococcus "Quantification" ID)

Should you have any questions regarding the results, please do not hesitate to contact us.

Regards,

Thierry Sam Tamers
Director

SOURCE MOLECULAR CORPORATION
4989 SW 74th Court, Miami, FL 33155 USA
Tel: (1) 786-268-8363, Fax: (1) 786-513-2733, Email: info@sourcemolecular.com

Human Enterococcus "Quantification" ID™

Detection and Quantification of the *Enterococcus faecium* esp Human Gene Biomarker for Human Fecal Contamination by Real-Time Quantitative Polymerase Chain Reaction (qPCR) DNA Analytical Technology

Submitter: Fuss & O'Neill
Submitter #'s: M2-01E and S11-01E
Source Molecular #'s: SM 12012 and SM 12013
Samples Received: October 13, 2006
Date Reported: October 25, 2006

SM #	Client #	Entero-cocci (CFU/100 mL)***	Total *E. faecium* Quantified*	Total *E. faecium* esp Human Biomarker Quantified*	DNA Analytical Results
SM 12012	M2-01E	468	4.2 X 10^8	7.5 X 10^4	Human Gene Biomarker Detected
SM 12013	S11-01E	590	1.7 X 10^8	1.0 X 10^5	Human Gene Biomarker Detected

* After 24 hours of incubation at 41°C. Total is copy no./ml of extract. See laboratory comments.
** Detection limit is < 5,000 copy no./ml of DNA extract.
*** EPA Method 1600: Membrane Filter Test Method for Enterococci in Water (1997).

SOURCE MOLECULAR CORPORATION
4989 SW 74th Court, Miami, FL 33155 USA
Tel: (1) 786-268-8363, Fax: (1) 786-513-2733, Email: info@sourcemolecular.com

Laboratory Comments
Submitter: Fuss & O'Neill
Report Date: October 25, 2006

The submitted water samples were filtered and incubated at 41°C for 24 hours. **Please note that the *E. faecium* numbers given in the table on the next page are after cultivation.** Afterwards, the filters were eluted in a buffer. The buffer was centrifuged and DNA was extracted from the resultant pellet. qPCR (i.e.: real-time quantitative PCR) targeting total *E. faecium* and the *E. faecium* esp human gene biomaker was performed on the DNA extract.

All reagents, chemicals and apparatuses were verified and inspected beforehand to ensure that no false negatives or positives could be generated. In that regard, positive and negative controls were run to attest the integrity of the analysis. All inspections and controls tested negative for possible extraneous contaminates, including PCR inhibitors.

Preliminary Interpretation of Positive Result

Samples M2-01E (SM 12012) and S11-01E (SM 12013) tested positive for the *Enterococcus faceium* esp human gene biomarker suggesting that human fecal contamination is present in these water samples. Using real-time quantitative PCR DNA analytical technology (qPCR), the *E. faecium* with the esp human gene marker was quantified and compared to the total *E. faecium* population. The *E. faecium* with the esp human gene marker was found in 0.02% (M2-01E) and 0.06% (S11-01E) respectively of the total *E. faecium* population from each sample.

Internal tests in our laboratory have shown that the human esp marker can be present in 1% to 3.5% in the *E. faecium* population of a raw sewage sample in North America. Diluted samples, such as stormwater runoff have also shown to have similar ratios (i.e. internal tests) if raw sewage is an important source of the contamination. For combined sewer overflows (CSO), the ratios from internal laboratory tests indicate a 10-fold dilution; therefore if one is monitoring CSO's, one should take into account this dilution factor. Consequently, it is important to take into account the context of the sample when interpreting the percentage provided.

Our preliminary interpretation suggests that human fecal sources of contamination are a minor component of the positive samples if the client is monitoring for raw sewage input. Using our internal raw sewage ratios, the human fecal pollution would seem to be less than 5% of the overall fecal pollution of each sample. On the other hand, if the client is monitoring CSO's, our internal CSO ratios suggest that 20 to 30% of the fecal contamination is coming from CSO's for sample M2-01E and 30 to 50% for S11-01E.

The client is encouraged to submit additional samples from this site to get a better understanding of the human fecal pollution contribution. **Furthermore, a baseline of raw sewage samples from the surrounding wastewater facilities and/or septic systems would help gain a better understanding of the percentage of the esp human marker present within the local pollution.** A more precise interpretation would be available to the client with the submittal of such baseline samples. The client is also encouraged to conduct other DNA analytical tests such as the Human Bacteroidetes "Quantification" ID^{TM} service to further confirm the positive results.

DNA Analytical Method Explanation

100 ml (M2-01E) and 75 ml (S11-01E) of water was filtered through 0.45 micron membrane filters and placed on mEI agar. The samples were incubated for 24 hours at 41°C. The filter were removed, placed in buffer and vortexed vigorously. Once the buffer was spun to pellet the bacteria, the supernatant was removed and the pellet was resuspended in a small volume of water. DNA extraction was prepared using the Qiagen DNA extraction kit, as per manufacturer's instructions.

2.5 micro-liter aliquots of purified DNA extraction were used directly as template for subsequent qPCR reactions. All assays were run on an ABI 7300 under the following thermal cycling conditions: 50°C for 2 minutes and 95°C for 10 minutes followed by 40 cycles of 95°C for 10 seconds and 57°C for 1 minute. Default data collection parameters were employed. The Taqman master mix supplied by Applied Biosystems was used with the forward and reverse primers added to a final concentration of 900nM and the probe added to a final concentration of 0.125uM with a 25ul final total reaction volume.

DNA Analytical Theory Explanation

Enterococci are a subgroup of Fecal *Streptococci* and are characterized by their ability to grow in 6.5% sodium chloride, at low and elevated temperatures (10°C and 45°C), and at elevated pH (9.5). These microorganisms have been used as indicators of fecal pollution for many years and have been especially valuable in the marine environment and recreational waters as indicators of potential health risks and swimming-related gastroenteritis.[1]

Enterococci are benign bacteria when they reside in their normal habitat such as the gastrointestinal tracts of human or animals. Outside of their normal habitat, *Enterococci* are pathogenic causing urinary tract and wound infections, and life-threatening diseases such as bacteraemia, endocarditis, and meningitis. *Enterococci* easily colonize open wounds and skin ulcers.

Compounding their pathogenesis, *Enterococci* are also some of the most antibiotic resistant bacteria, particularly from human sources. Studies have shown that certain strains of *Enterococci* are resistant to expensive and potent antibiotics such as vancomycin. This is particularly worrisome for the medical community since these antibiotics are given as a last resort to fight severe bacterial infections.

Several intrinsic features of the *Enterococcus* genus allow it to survive for extended periods of time, leading to its extended survivability and diffusion. For example, *Enterococci* have been shown to survive for 30 minutes at 60°C and persist in the presence of detergents. As such, the inherent ruggedness of *Enterococcus* confers it a strong tolerance to many classes of antibiotics.

The Human Enterococcus "Quantification" ID™ service is designed around the principle that certain strains of the *Enterococcus* genus are specific to humans.[2,3,4] These *Enterococci* can be used as indicators of human fecal contamination. Strains of *Enterococcus faecium*, *Enterococcus faecalis* and yellow-pigmented *Enterococci* have been shown to be from human sources.[2,3,4] Within these *Enterococcus spp.* are genes associated with *Enterococci* that are specific to humans.[5] The Human Enterococcus "Quantification" ID™ service targets the esp human gene biomarker in *Enterococcus faecium*.[6]

One of the advantages of the Human Enterococcus "Quantification" ID™ service is that the entire population of *Enterococci* of the selected portion of the water sample is screened. As such, this method avoids the randomness effect of selecting isolates off a petri dish.

Accuracy of the results is possible because the method uses PCR DNA technology. PCR allows quantities of DNA to be amplified into large number of small copies of DNA sequences. This is accomplished with small pieces of DNA called primers that are complementary and specific to the genomes to be detected.

Through a heating process called thermal cycling, the double stranded DNA is denatured and inserted with complementary primers to create exact copies of the DNA fragment desired. This process is repeated rapidly many times ensuring an exponential progression in the number of copied DNA. If the primers are successful in finding a site on the DNA fragment that is specific to the genome to be studied, then billions of copies of the DNA fragment will be available for analysis.

Real-time quantitative PCR (qPCR) adds a variant to the PCR step by inserting of a fluorescent probe within the primer set. This fluorescent probe serves as a molecular beacon for the quantification step. During each PCR cycle, real-time quantification PCR monitors the fluorescence emitted during the reaction. This is done in "real-time" during the first PCR cycles as a way to quantify the targeted gene.

The Human Enterococcus "Quantification" ID™ service uses real-time quantification PCR to simultaneously confirm and quantify total *Enterococcus faecium* and the esp human gene biomaker in *E. faecium.* This PCR technology avoids the cumbersome process of distinguishing DNA bands on a gel electrophoresis apparatus. The results are presented on a computer screen and printout thus avoiding ambiguities in interpretation.

Once each targeted gene is quantified, a relative percentage can be calculated. As such, it has been hypothesized that relative levels of human pollution can be interpreted by the proportion of the esp human gene biomaker found in *E. faecium* relative to the total population of *E. faecium* in the water sample.[6] Nonetheless this data should serve only as a preliminary indicator of relative human pollution in the water sample. Furthermore, the context of the sample should be taken into account when interpreting the relative percentage provided. To strengthen the validity of the results, the Human Enterococcus "Quantification" ID™ service should also be combined with other DNA analytical services such as the Human Bacteroidetes "Quantification" ID™ and Human Fecal Virus ID™ services.

[1] Scott, Troy M., Rose, Joan B., Jenkins, Tracie M., Farrah, Samuel R., Lukasik, Jerzy **Microbial Source Tracking: Current Methodology and Future Directions.** Appl. Environ. Microbiol. (2002) 68: 5796-5803.

[2] Wheeler, A.L., P.G. Hartel, D.G. Godfrey, J.L. Hill, and Segars W.I. 2002. **Potential of *Enterococcus faecalis* as a human fecal indicator for microbial source tracking.** J Environ Qual. 31(4):1286-93.

[3] Bahirathan ML, Puente L, Seyfried P. 1998. **Use of yellow-pigmented enterococci as a specific indicator of human and nonhuman sources of faecal pollution.** Can J Microbiol 44:1066-1071.

[4] Quednau, M., Ahrne, S., Molin, G. **Genomic Relationships between Enterococcus faecium Strains from Different Sources and with Different Antibiotic Resistance Profiles Evaluated by Restriction Endonuclease Analysis of Total Chromosomal DNA Using EcoRI and PvuII.** Appl. Environ. Microbiol. 1999 65: 1777-1780.

[5] Hammerum, A.M., and L.B. Jensen. 2002. **Prevalence of esp, encoding the enterococcal surface protein, in *Enterococcus faecalis* and *Enterococcus faecium* isolates from hospital patients, poultry, and pigs in Denmark.** J. Clin. Microbiol. 40: 4396.

[6] Scott, T.M., T.M. Jenkins, J. Lukasik, and J.B. Rose. 2005. **Potential Use of a Host Associated Molecular Marker in *Enterococcus faecium* as an Index of Human Fecal Pollution.** Environ. Sci. Technol. 39: 283-287.

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It is agreed that in the event of breach of any warranty or breach of contract, or negligence of the Source Molecular Corporation, as well as its agents or representatives, the liability of the Source Molecular Corporation shall be limited to the repayment, to the purchaser (submitter), of the individual analysis price paid by him/her to the Source Molecular Corporation. The Source Molecular Corporation shall not be liable for any damages, either direct or consequential. The Source Molecular Corporation provides analytical services on a PRIME CONTRACT BASIS ONLY. Terms are available upon request.

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

20060901.A10
Moat Study.

FILE COPY

RECEIVED
OCT - 5 2006
FUSS & O'NEILL
PROVIDENCE, RI

Amy Hunt
Fuss & O'Neill
275 Promenade Street   Suite 350
Providence. RI 02908

RE: Newport-Wet Weather

Dear Amy Hunt:

We appreciate this opportunity to provide you with our analytical services. BAL Laboratory is committed to providing the highest quality service. Our dedication to each client includes responsiveness to emergencies, dependability, well-written reports and superior client services.

Enclosed is your data report for **Work Order Number B609124.** The invoice for this project is included with this report unless other arrangements have previously been made with the laboratory. Samples will be disposed of thirty days after the final report has been mailed. If you have any questions or concerns, please feel free to call our Customer Service Department. We value our continued relationship and look forward to hearing from you in the future.

Sincerely,

BAL Laboratory

Darlene Capuano

Darlene Capuano
Laboratory Director

RI Laboratory License Number: A36
MA Laboratory License Number: M RI-M01

enclosure

Industrial Microbiology - Environmental Investigation - Biological and Specialty Analyses of Water and Wastes - Pollution Tracking and Source Determination - Monitoring Programs - Trend Assessments - Seafood Analyses - Drinking Water Quality - Biosolids and Compost Testing - Biofilter Assessment - Bioaerosol Monitoring - Corrosion Analysis

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Microbiology

Client Sample ID: S9-02
BAL Sample ID: B609124-01 **Matrix:** Aqueous **Sampled:** 09/29/06 12:20

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: B3-01
BAL Sample ID: B609124-02 **Matrix:** Aqueous **Sampled:** 09/29/06 11:05

Analyte	Result	Units	Analyzed	Method
Enterococci	**670**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: M2-01
BAL Sample ID: B609124-03 **Matrix:** Aqueous **Sampled:** 09/29/06 10:25

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: B2-02
BAL Sample ID: B609124-04 **Matrix:** Aqueous **Sampled:** 09/29/06 12:30

Analyte	Result	Units	Analyzed	Method
Enterococci	**280**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: B1-01
BAL Sample ID: B609124-05 **Matrix:** Aqueous **Sampled:** 09/29/06 09:20

Analyte	Result	Units	Analyzed	Method
Enterococci	**30**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: B4-01
BAL Sample ID: B609124-06 **Matrix:** Aqueous **Sampled:** 09/29/06 10:35

Analyte	Result	Units	Analyzed	Method
Enterococci	**1600**	/100 ml	09/29/06 15:30	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Microbiology

Client Sample ID: B1-02
BAL Sample ID: B609124-07 **Matrix:** Aqueous **Sampled:** 09/29/06 12:25

Analyte	Result	Units	Analyzed	Method
Enterococci	**130**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: B2-01
BAL Sample ID: B609124-08 **Matrix:** Aqueous **Sampled:** 09/29/06 09:35

Analyte	Result	Units	Analyzed	Method
Enterococci	**370**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S11-01
BAL Sample ID: B609124-09 **Matrix:** Aqueous **Sampled:** 09/29/06 10:40

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: M4-01
BAL Sample ID: B609124-10 **Matrix:** Aqueous **Sampled:** 09/29/06 11:45

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: M5-01
BAL Sample ID: B609124-11 **Matrix:** Aqueous **Sampled:** 09/29/06 11:00

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: M1-01
BAL Sample ID: B609124-12 **Matrix:** Aqueous **Sampled:** 09/29/06 10:45

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Microbiology

Client Sample ID: S10-01
BAL Sample ID: B609124-13 **Matrix:** Aqueous **Sampled:** 09/29/06 10:30

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: M3-01
BAL Sample ID: B609124-14 **Matrix:** Aqueous **Sampled:** 09/29/06 09:50

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S14-01
BAL Sample ID: B609124-15 **Matrix:** Aqueous **Sampled:** 09/29/06 11:50

Analyte	Result	Units	Analyzed	Method
Enterococci	**980**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S12-01
BAL Sample ID: B609124-16 **Matrix:** Aqueous **Sampled:** 09/29/06 11:40

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: P1-01
BAL Sample ID: B609124-17 **Matrix:** Aqueous **Sampled:** 09/29/06 10:15

Analyte	Result	Units	Analyzed	Method
Enterococci	**68**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S15-01
BAL Sample ID: B609124-18 **Matrix:** Aqueous **Sampled:** 09/29/06 11:55

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Microbiology

Client Sample ID: S13-01
BAL Sample ID: B609124-19 **Matrix:** Aqueous **Sampled:** 09/29/06 11:45

Analyte		Result	Units	Analyzed	Method
Enterococci	>	**2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S1-01
BAL Sample ID: B609124-20 **Matrix:** Aqueous **Sampled:** 09/29/06 11:45

Analyte		Result	Units	Analyzed	Method
Enterococci	>	**2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: P2-01
BAL Sample ID: B609124-21 **Matrix:** Aqueous **Sampled:** 09/29/06 12:00

Analyte		Result	Units	Analyzed	Method
Enterococci		**240**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S3-01
BAL Sample ID: B609124-22 **Matrix:** Aqueous **Sampled:** 09/29/06 11:25

Analyte		Result	Units	Analyzed	Method
Enterococci	>	**2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S8-01
BAL Sample ID: B609124-23 **Matrix:** Aqueous **Sampled:** 09/29/06 10:05

Analyte		Result	Units	Analyzed	Method
Enterococci	>	**2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S6-01
BAL Sample ID: B609124-24 **Matrix:** Aqueous **Sampled:** 09/29/06 10:30

Analyte		Result	Units	Analyzed	Method
Enterococci		**1000**	/100 ml	09/29/06 15:30	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Microbiology

Client Sample ID: S2-01
BAL Sample ID: B609124-25 **Matrix:** Aqueous **Sampled:** 09/29/06 11:35

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S7-01
BAL Sample ID: B609124-26 **Matrix:** Aqueous **Sampled:** 09/29/06 09:50

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S5-01
BAL Sample ID: B609124-27 **Matrix:** Aqueous **Sampled:** 09/29/06 10:40

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: M4-02
BAL Sample ID: B609124-28 **Matrix:** Aqueous **Sampled:** 09/29/06 13:30

Analyte	Result	Units	Analyzed	Method
Enterococci	**2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: P3-01
BAL Sample ID: B609124-29 **Matrix:** Aqueous **Sampled:** 09/29/06 12:20

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: M5-02
BAL Sample ID: B609124-30 **Matrix:** Aqueous **Sampled:** 09/29/06 13:19

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Microbiology

Client Sample ID: M2-02
BAL Sample ID: B609124-31 **Matrix:** Aqueous **Sampled:** 09/29/06 12:55

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: B3-02
BAL Sample ID: B609124-32 **Matrix:** Aqueous **Sampled:** 09/29/06 12:57

Analyte	Result	Units	Analyzed	Method
Enterococci	> **25000**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: B4-02
BAL Sample ID: B609124-33 **Matrix:** Aqueous **Sampled:** 09/29/06 13:07

Analyte	Result	Units	Analyzed	Method
Enterococci	**390**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S11-02
BAL Sample ID: B609124-34 **Matrix:** Aqueous **Sampled:** 09/29/06 13:15

Analyte	Result	Units	Analyzed	Method
Enterococci	**170**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S10-02
BAL Sample ID: B609124-35 **Matrix:** Aqueous **Sampled:** 09/29/06 12:40

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: P3-01
BAL Sample ID: B609124-36 **Matrix:** Aqueous **Sampled:** 09/29/06 12:20

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Microbiology

Client Sample ID: M1-02
BAL Sample ID: B609124-37 **Matrix:** Aqueous **Sampled:** 09/29/06 12:45

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: P1-02
BAL Sample ID: B609124-38 **Matrix:** Aqueous **Sampled:** 09/29/06 12:15

Analyte	Result	Units	Analyzed	Method
Enterococci	**39**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: M3-02
BAL Sample ID: B609124-39 **Matrix:** Aqueous **Sampled:** 09/29/06 12:15

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: P3-02
BAL Sample ID: B609124-40 **Matrix:** Aqueous **Sampled:** 09/29/06 14:15

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S3-02
BAL Sample ID: B609124-41 **Matrix:** Aqueous **Sampled:** 09/29/06 13:50

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S2-02
BAL Sample ID: B609124-42 **Matrix:** Aqueous **Sampled:** 09/29/06 13:45

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Microbiology

Client Sample ID: P2-02
BAL Sample ID: B609124-43 **Matrix:** Aqueous **Sampled:** 09/29/06 14:05

Analyte	Result	Units	Analyzed	Method
Enterococci	**1100**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S1-02
BAL Sample ID: B609124-44 **Matrix:** Aqueous **Sampled:** 09/29/06 13:40

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S5-02
BAL Sample ID: B609124-45 **Matrix:** Aqueous **Sampled:** 09/29/06 13:25

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S6-02
BAL Sample ID: B609124-46 **Matrix:** Aqueous **Sampled:** 09/29/06 13:15

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S7-02
BAL Sample ID: B609124-47 **Matrix:** Aqueous **Sampled:** 09/29/06 13:00

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

Client Sample ID: S8-02
BAL Sample ID: B609124-48 **Matrix:** Aqueous **Sampled:** 09/29/06 12:55

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 15:30	IDEXX Enterolert

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609124
Date Received: 9/29/2006 3:20:00PM

Notes and Definitions

>	Greater than.
MF	Membrane Filtration
MPN	Most Probable Number
TNTC	Too Numerous to Count
dry	Sample results reported on a dry weight basis

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☒ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ______

B609124

CHAIN-OF-CUSTODY RECORD

10600

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☒ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. NO.:
Sampler's Signature: Amy E Hunt Date: 9/29/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other X Stormwater

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request: Enterococcus	Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic - As is, [ ] 250 ml [✓] 500 [ ] 1000 ml	Plastic - H_2SO_4, [ ] 250 ml [ ] 500 ml	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
1					S9-02	X	9/29/06	1220														
2					B3-01	SW		1105														
3					N2-01	SW		1025														
4					B2-02	SW		1230														
5					B1-01	SW		920														
6					B4-01	SW		1035														
7					B1-02	SW		1225														
8					B2-01	SW		935														
9					S11-01	X		1040														
10					M4-01	SW	↓	1145	↓								↓					

Transfer Number	Relinquished By	Accepted By	Date	Time
1			092906	1420
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:
B locations are Saltwater samples

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☐ 24 Madison Avenue Extension, Albany, NY 12203
☒ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other

B609124

CHAIN-OF-CUSTODY RECORD

10601

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☒ Standard (____ days) *Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. NO.:
Sampler's Signature:
Date: 9/29/06

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Bottom Sediment
W=Waste
A=Air
X=Other

Analysis Request

Containers

Item No.	Transfer Check				Sample Number	Source Code	Date Sampled	Time Sampled	Enterococci								Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H_2SO_4, [ ] 250 ml [ ] 500 ml	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
	1	2	3	4																									
11					M5-01	SW	9-29	1100																					
12					M1-01	SW		1045																					
13					S10-01	X		1030																					
14					M3-01	SW		950																					
15					S14-01	X		1150																					
16					S12-01	X		1140																					
17					P1-01	SW		1015																					
18					S15-01	X		1155																					
19					S13-01	X		1145																					
20					S1-01	X		1145																					

Transfer Number	Relinquished By	Accepted By	Date	Time
1			092906	1426
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

B SAMPLES ARE SEAWATER

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☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ____________

B609124

CHAIN-OF-CUSTODY RECORD 10602

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☒ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. NO.:
Sampler's Signature: Date: 9/29/06

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Bottom Sediment
W=Waste
A=Air
X=Other stormwater

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Enterococcus								Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Continer ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic As is, [ ] 250 ml [✗ 500] 1000 ml	Plastic - H₂SO₄, [ ] 250 ml [ ] 500 ml	Plastic - HNO₃, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
21					P2-01	SW	9/29/06	1200	1															✓					
22					S3-01	X	↓	1125	1															✓					
23					S8-01	X		1005	1															✓					
24					S6-01	↓		1030	1															✓					
25					S2-01			1135	1															✓					
26					S7-01			950	1															✓					
27					S5-01	↓		1040	1															✓					
28					M4-02	SW		1330	1															✓					
29					P3-01	↓		1220	1															✓					
30					M5-02	↓	↓	1349	1															✓					

Transfer Number	Relinquished By	Accepted By	Date	Time
1			092906	1426
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

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☐ 610 Lynndale Court, Suite E, Greenville, NC 27858
☐ 24 Madison Avenue Extension, Albany, NY 12203
☒ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ______

B609124

CHAIN-OF-CUSTODY RECORD · 10603

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☒ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. No.:
Sampler's Signature:
Date: 9/29/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other Storm water

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Enterococci								Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic - As is, [ ] 250 ml [X] 500] 1000 ml	Plastic - H₂SO₄, [ ] 250 ml [ ] 500 ml	Plastic - HNO₃, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
31					M2-02	SW	9/29/06	1255	✓															✓					
32					B3-02	SW		1257	✓															✓					
33					B4-02	SW		1307																✓					
34					S11-02	X		1315																✓					
35					S10-02	X		1240																✓					
36					P3-01	SW		1220																✓					
37					M1-02	SW		1245																✓					
38					P1-02	SW		1215																✓					
39					M3-02	SW		1215																✓					
40																								✓					

Transfer Number	Relinquished By	Accepted By	Date	Time
1			092906	1426
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:
B samples are saltwater

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☐ 24 Madison Avenue Extension, Albany, NY 12203
☒ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ______

B609124

CHAIN-OF-CUSTODY RECORD 10607

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☐ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: EASTON'S BEACH
PROJECT LOCATION: NEWPORT RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: AMY HUNT
INVOICE TO: AMY HUNT
P.O. No.: Walter Mahoney
Sampler's Signature:
Date: 9-29-06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other STORMWATER

Analysis Request

Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	ENTROCOCCI								Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H_2SO_4, [ ] 250 ml [ ] 500 ml	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
40					P3-02	SW	9/29/06	1415	1																				
41					S3-02	X	9/29/06	1350	1																				
42					S2-02	X		1345	1																				
43					P2-02	SW		1405	1																				
44					S1-02	X		1340	1																				
45					S5-02	X		1325	1																				
46					S6-02	X		1315	1																				
47					S7-02	X		1300	1																				
48					S8-02	X		1255	1																				

Transfer Number	Relinquished By	Accepted By	Date	Time
1			092906	1430
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

B SAMPLES ARE SEAWATER

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

Amy Hunt
Fuss & O'Neill
275 Promenade Street Suite 350
Providence. RI 02908

RE: Newport-Wet Weather

Dear Amv Hunt:

We appreciate this opportunity to provide you with our analytical services. BAL Laboratory is committed to providing the highest quality service. Our dedication to each client includes responsiveness to emergencies, dependability, well-written reports and superior client services.

Enclosed is your data report for **Work Order Number B609126.** The invoice for this project is included with this report unless other arrangements have previously been made with the laboratory. Samples will be disposed of thirty days after the final report has been mailed. If you have any questions or concerns, please feel free to call our Customer Service Department. We value our continued relationship and look forward to hearing from you in the future.

Sincerely,

BAL Laboratory

Darlene Capuano

Darlene Capuano
Laboratory Director

RI Laboratory License Number: A36
MA Laboratory License Number: M RI-M01

enclosure

Industrial Microbiology - Environmental Investigation - Biological and Specialty Analyses of Water and Wastes - Pollution Tracking and Source Determination - Monitoring Programs - Trend Assessments - Seafood Analyses - Drinking Water Quality - Biosolids and Compost Testing - Biofilter Assessment - Bioaerosol Monitoring - Corrosion Analysis

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BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609126
Date Received: 9/29/2006 6:00:00PM

Microbiology

Client Sample ID: M3-03
BAL Sample ID: B609126-01 **Matrix:** Aqueous **Sampled:** 09/29/06 15:25

Analyte	Result	Units	Analyzed	Method
Enterococci	**44**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: P1-03
BAL Sample ID: B609126-02 **Matrix:** Aqueous **Sampled:** 09/29/06 15:35

Analyte	Result	Units	Analyzed	Method
Enterococci	**2**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: M4-03
BAL Sample ID: B609126-03 **Matrix:** Aqueous **Sampled:** 09/29/06 16:10

Analyte	Result	Units	Analyzed	Method
Enterococci	**70**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: M5-03
BAL Sample ID: B609126-04 **Matrix:** Aqueous **Sampled:** 09/29/06 16:00

Analyte	Result	Units	Analyzed	Method
Enterococci	**130**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: M1-03
BAL Sample ID: B609126-05 **Matrix:** Aqueous **Sampled:** 09/29/06 15:45

Analyte	Result	Units	Analyzed	Method
Enterococci	**120**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: B3-03
BAL Sample ID: B609126-06 **Matrix:** Aqueous **Sampled:** 09/29/06 16:35

Analyte	Result	Units	Analyzed	Method
Enterococci	**41**	/100 ml	09/29/06 18:20	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609126
Date Received: 9/29/2006 6:00:00PM

Microbiology

Client Sample ID: S11-03
BAL Sample ID: B609126-07 **Matrix:** Aqueous **Sampled:** 09/29/06 16:20

Analyte		Result	Units	Analyzed	Method
Enterococci		**30**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: M2-03
BAL Sample ID: B609126-08 **Matrix:** Aqueous **Sampled:** 09/29/06 15:54

Analyte		Result	Units	Analyzed	Method
Enterococci		**210**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: B2-03
BAL Sample ID: B609126-09 **Matrix:** Aqueous **Sampled:** 09/29/06 15:40

Analyte		Result	Units	Analyzed	Method
Enterococci	<	**10**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: B1-03
BAL Sample ID: B609126-10 **Matrix:** Aqueous **Sampled:** 09/29/06 15:30

Analyte		Result	Units	Analyzed	Method
Enterococci	<	**10**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: B4-03
BAL Sample ID: B609126-11 **Matrix:** Aqueous **Sampled:** 09/29/06 16:10

Analyte		Result	Units	Analyzed	Method
Enterococci		**86**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: P2-03
BAL Sample ID: B609126-12 **Matrix:** Aqueous **Sampled:** 09/29/06 10:40

Analyte		Result	Units	Analyzed	Method
Enterococci		**2**	/100 ml	09/29/06 18:20	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609126
Date Received: 9/29/2006 6:00:00PM

Microbiology

Client Sample ID: S1-03
BAL Sample ID: B609126-13 **Matrix:** Aqueous **Sampled:** 09/29/06 16:15

Analyte	Result	Units	Analyzed	Method
Enterococci	**550**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: S3-03
BAL Sample ID: B609126-14 **Matrix:** Aqueous **Sampled:** 09/29/06 16:25

Analyte	Result	Units	Analyzed	Method
Enterococci	**29**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: P3-03
BAL Sample ID: B609126-15 **Matrix:** Aqueous **Sampled:** 09/29/06 16:55

Analyte	Result	Units	Analyzed	Method
Enterococci	**4**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: S2-03
BAL Sample ID: B609126-16 **Matrix:** Aqueous **Sampled:** 09/29/06 16:20

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: S7-03
BAL Sample ID: B609126-17 **Matrix:** Aqueous **Sampled:** 09/29/06 15:35

Analyte	Result	Units	Analyzed	Method
Enterococci	**460**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: S6-03
BAL Sample ID: B609126-18 **Matrix:** Aqueous **Sampled:** 09/29/06 15:40

Analyte	Result	Units	Analyzed	Method
Enterococci	**410**	/100 ml	09/29/06 18:20	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609126
Date Received: 9/29/2006 6:00:00PM

Microbiology

Client Sample ID: S5-03
BAL Sample ID: B609126-19 **Matrix:** Aqueous **Sampled:** 09/29/06 16:00

Analyte	Result	Units	Analyzed	Method
Enterococci	**920**	/100 ml	09/29/06 18:20	IDEXX Enterolert

Client Sample ID: S8-03
BAL Sample ID: B609126-20 **Matrix:** Aqueous **Sampled:** 09/29/06 15:30

Analyte	Result	Units	Analyzed	Method
Enterococci	**34**	/100 ml	09/29/06 18:20	IDEXX Enterolert

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609126
Date Received: 9/29/2006 6:00:00PM

Notes and Definitions

>	Greater than.
<	Less than the Method Detection Limit.
MF	Membrane Filtration
MPN	Most Probable Number
TNTC	Too Numerous to Count
dry	Sample results reported on a dry weight basis

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☐ Other ______

CHAIN-OF-CUSTODY RECORD 10608

Turnaround

☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☐ Standard (____ days) *Surcharge Applies

PROJECT NAME: EASTON'S BEACH

PROJECT LOCATION: NEWPORT RI

PROJECT NUMBER: 20060901.A10

LABORATORY: ~~NORTHEAST~~ BAL

REPORT TO: AMY HUNT

INVOICE TO: AMY HUNT B609126

P.O. NO.:

Sampler's Signature: Walter Mahoney Date: 9-29-06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other STORMWATER

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Entrococci								Soil VOA Vial [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H_2SO_4, [ ] 250 ml [ ] 500 ml	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
40	✓				M3-03	X	9/29	1525	1																			X	
41	✓				P1-03	X	|	1535	1																			X	
42	✓				M4-03	X	|	1610	1																			X	
43	✓				M5-03	X	|	1600	1																			X	
4 ~~45~~					M1-03	X	|	1545	1																			X	
																												X	

Transfer Number	Relinquished By	Accepted By	Date	Time
1		James Lyon	9/29/06	1800
2				
3				
4				

Reporting and Detection Limit Requirements: ENTROCOCCI

Additional Comments:

B SAMPLES ARE SEAWATER

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☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ________

CHAIN-OF-CUSTODY RECORD 10613

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☒ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: Easton Beach

PROJECT LOCATION: Newport, RI

PROJECT NUMBER: 20060901.A10

LABORATORY: BAL

REPORT TO: Amy Hunt

INVOICE TO: Amy Hunt B609126

P.O. No.:

Sampler's Signature: Amy E Hunt Date: 9/29/06

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Bottom Sediment
W=Waste
A=Air
X=Other stormwater

Analysis Request

Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled				Enterococcus					Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	Plastic - As is, [ ] 250 ml [X] 500 [ ] 1000 ml	Plastic - H_2SO_4, [ ] 250 ml [ ] 500 ml	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
45					B3-03	SW	9/29/06	1635				↓												↓					
46					S11-03	X	↓	1620																					
47					M2-03	SW		1554																					
48					B2-03	SW		1540																					
49					B1-03	SW		1530																					
50					B4-03	SW		1610																					
51					P2-03	SW		1040																					
52					S1-03	X		1615																					
53					S3-03	X		1625																					
54					P3-03	SW		1655																					

Transfer Number	Relinquished By	Accepted By	Date	Time
1	Amy E Hunt	James Grogan	9/29/06	1800
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments: all "B" samples are saltwater

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☐ 24 Madison Avenue Extension, Albany, NY 12203
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☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ______

CHAIN-OF-CUSTODY RECORD 10609

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☐ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt B609126
P.O. No.:
Sampler's Signature: Amy E Hunt Date:

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other Stormwater

Item No.	Transfer Check 1	Transfer Check 2	Transfer Check 3	Transfer Check 4	Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request		Enterococcus						Containers: Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic - As is, [ ] 250 ml [X] 500 [ ] 1000 ml	Plastic - H₂SO₄, [ ] 250 ml [ ] 500 ml	Plastic - HNO₃, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
55					S2-03	X	9/29/06	1620			↓													↓					
56					S7-03	↓	↓	1535			↓													↓					
57					S6-03	↓	↓	1540			↓													↓					
58					S5-03	↓	↓	1600			↓													↓					
59					S8-03	↓	↓	1530			↓													↓					

Transfer Number	Relinquished By	Accepted By	Date	Time
1	Amy E Hunt		9/29/06	1800
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

Amy Hunt
Fuss & O'Neill
275 Promenade Street Suite 350
Providence. RI 02908

RE: Newport-Wet Weather

Dear Amy Hunt:

We appreciate this opportunity to provide you with our analytical services. BAL Laboratory is committed to providing the highest quality service. Our dedication to each client includes responsiveness to emergencies, dependability, well-written reports and superior client services.

Enclosed is your data report for **Work Order Number B609127.** The invoice for this project is included with this report unless other arrangements have previously been made with the laboratory. Samples will be disposed of thirty days after the final report has been mailed. If you have any questions or concerns, please feel free to call our Customer Service Department. We value our continued relationship and look forward to hearing from you in the future.

Sincerely,

BAL Laboratory

Darlene Capuano

Darlene Capuano
Laboratory Director

RI Laboratory License Number: A36
MA Laboratory License Number: M RI-M01

enclosure

Industrial Microbiology - Environmental Investigation - Biological and Specialty Analyses of Water and Wastes - Pollution Tracking and Source Determination - Monitoring Programs - Trend Assessments - Seafood Analyses - Drinking Water Quality - Biosolids and Compost Testing - Biofilter Assessment - Bioaerosol Monitoring - Corrosion Analysis

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BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609127
Date Received: 9/29/2006 9:37:00PM

Microbiology

Client Sample ID: M5-04
BAL Sample ID: B609127-01 **Matrix:** Aqueous **Sampled:** 09/29/06 18:50

Analyte	Result	Units	Analyzed	Method
Enterococci	**870**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: P1-04
BAL Sample ID: B609127-02 **Matrix:** Aqueous **Sampled:** 09/29/06 18:15

Analyte	Result	Units	Analyzed	Method
Enterococci	**17**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: M1-04
BAL Sample ID: B609127-03 **Matrix:** Aqueous **Sampled:** 09/29/06 18:30

Analyte	Result	Units	Analyzed	Method
Enterococci	**1700**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: M3-04
BAL Sample ID: B609127-04 **Matrix:** Aqueous **Sampled:** 09/29/06 18:10

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: M2-04
BAL Sample ID: B609127-05 **Matrix:** Aqueous **Sampled:** 09/29/06 18:35

Analyte	Result	Units	Analyzed	Method
Enterococci	**1400**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: M4-04
BAL Sample ID: B609127-06 **Matrix:** Aqueous **Sampled:** 09/29/06 19:10

Analyte	Result	Units	Analyzed	Method
Enterococci	**2400**	/100 ml	09/29/06 21:45	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609127
Date Received: 9/29/2006 9:37:00PM

Microbiology

Client Sample ID: B4-04
BAL Sample ID: B609127-07 **Matrix:** Aqueous **Sampled:** 09/29/06 19:09

Analyte	Result	Units	Analyzed	Method
Enterococci	**63**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: B3-04
BAL Sample ID: B609127-08 **Matrix:** Aqueous **Sampled:** 09/29/06 18:48

Analyte	Result	Units	Analyzed	Method
Enterococci	**61**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: S11-04
BAL Sample ID: B609127-09 **Matrix:** Aqueous **Sampled:** 09/29/06 19:19

Analyte	Result	Units	Analyzed	Method
Enterococci	**1**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: B1-04
BAL Sample ID: B609127-10 **Matrix:** Aqueous **Sampled:** 09/29/06 18:09

Analyte	Result	Units	Analyzed	Method
Enterococci	**20**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: S5-04
BAL Sample ID: B609127-11 **Matrix:** Aqueous **Sampled:** 09/29/06 18:55

Analyte	Result	Units	Analyzed	Method
Enterococci	**5**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: P3-04
BAL Sample ID: B609127-12 **Matrix:** Aqueous **Sampled:** 09/29/06 19:50

Analyte	Result	Units	Analyzed	Method
Enterococci	**6**	/100 ml	09/29/06 21:45	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609127
Date Received: 9/29/2006 9:37:00PM

Microbiology

Client Sample ID: S3-04
BAL Sample ID: B609127-13 **Matrix:** Aqueous **Sampled:** 09/29/06 19:25

Analyte	Result	Units	Analyzed	Method
Enterococci	**37**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: S6-04
BAL Sample ID: B609127-14 **Matrix:** Aqueous **Sampled:** 09/29/06 18:40

Analyte	Result	Units	Analyzed	Method
Enterococci	**98**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: S8-04
BAL Sample ID: B609127-15 **Matrix:** Aqueous **Sampled:** 09/29/06 18:15

Analyte	Result	Units	Analyzed	Method
Enterococci	**130**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: S7-04
BAL Sample ID: B609127-16 **Matrix:** Aqueous **Sampled:** 09/29/06 18:20

Analyte	Result	Units	Analyzed	Method
Enterococci	**2400**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: S1-04
BAL Sample ID: B609127-17 **Matrix:** Aqueous **Sampled:** 09/29/06 19:10

Analyte	Result	Units	Analyzed	Method
Enterococci	**290**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: B2-04
BAL Sample ID: B609127-18 **Matrix:** Aqueous **Sampled:** 09/29/06 18:21

Analyte	Result	Units	Analyzed	Method
Enterococci	**86**	/100 ml	09/29/06 21:45	IDEXX Enterolert

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client: Fuss & O'Neill
Client Project ID: Newport-Wet Weather

Work Order Number: B609127
Date Received: 9/29/2006 9:37:00PM

Microbiology

Client Sample ID: P2-04
BAL Sample ID: B609127-19 **Matrix:** Aqueous **Sampled:** 09/29/06 20:05

Analyte	Result	Units	Analyzed	Method
Enterococci	**27**	/100 ml	09/29/06 21:45	IDEXX Enterolert

Client Sample ID: S204
BAL Sample ID: B609127-20 **Matrix:** Aqueous **Sampled:** 09/29/06 19:20

Analyte	Result	Units	Analyzed	Method
Enterococci	> **2400**	/100 ml	09/29/06 21:45	IDEXX Enterolert

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☑ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ____________

CHAIN-OF-CUSTODY RECORD 10617

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☑ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A/O
LABORATORY: BAL

REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. NO.:
Sampler's Signature: Bn Korf
Date: 9/29/06

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Bottom Sediment
W=Waste
A=Air
X=Other stormwater

2006912

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Enterococcus								Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic - As is, [ ] 250 ml [ ] 500] 1000 ml	Plastic - H₂SO₄, [ ] 250 ml [ ] 500 ml	Plastic - HNO₃, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
		1			M5-04	X	9/29/06	1850	✓																			1	
		2			P1-04	SW		1815	✓																			1	
		3			M1-04	X		1830	✓																			1	
		4			M3-04	X		1810	✓																			1	
		5			M2-04	X		1835	✓																			1	
		6			M4-04	X		1910	✓																			1	
		7			B4-04	SW		1909	✓																			1	
		8			B3-04	SW		1848	✓																			1	
		9			S11-04	X		1919	✓																			1	
		10			B1-04	SW	↓	1809	✓																			1	

Transfer Number	Relinquished By	Accepted By	Date	Time
1	Bn Korf	Ventura 2137	9/29/06	2130
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:
"B" samples are saltwater

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☐ 24 Madison Avenue Extension, Albany, NY 12203
☑ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ____________

CHAIN-OF-CUSTODY RECORD 10618

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☑ Standard (____ days) *Surcharge Applies

PROJECT NAME: Easton's Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: BAL

REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. No.:

Sampler's Signature: Date: 9/29/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other stormwater

Item No.	Transfer Check	Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request								Containers												Comments
B1009127						Enterococcus								Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H_2SO_4, [ ] 250 ml [ ] 500 ml	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	[✓ Bacteria Bottle]	
	11	S5-04	X	9/29/06	1855	✓																			✓	
	12	P3-04	SW		1950	✓																			✓	
	13	S3-04	X		1925	✓																			✓	
	14	S6-04	X		1840	✓																			✓	
	15	S8-04	X		1815	✓																			✓	
	16	S7-04	X		1820	✓																			✓	
	17	S1-04	X		1910	✓																			✓	
	18	B2-04	SW		1821	✓																			✓	
	19	P2-04	SW		2005	✓																			✓	
	20	S2-04	X		1920	✓																			✓	

Transfer Number	Relinquished By	Accepted By	Date	Time
1		2137	9/29/06	~~2030~~ 2130
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

File 20060901 A01/
Sampling Results

Source Molecular Corporation
4989 SW 74th Court, Miami, FL 33155 USA
Tel: (1) 786-268-8363, Fax: (1) 786-513-2733, Email: info@sourcemolecular.com

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Fuss & O'Neill
Attention: Mr. Dean E. Audet
275 Promenade St., Suite 350
Providence, RI 02908

October 10, 2006

Reference: Human Fecal Pollution Toolbox Results and Invoice

Dean,

Please find enclosed your results and invoice for the following Human Fecal Pollution Toolbox samples (service requested written next to your reference):

SM Number	Client Reference
SM 11957	M2-03 (Human Enterococcus "Quantification" ID)
SM 11958	B3-03 (Human Enterococcus "Quantification" ID)

Should you have any questions regarding the results, please do not hesitate to contact us.

Regards,

TSTa

Thierry Sam Tamers
Director

OCT 16 2006

SOURCE MOLECULAR CORPORATION
4989 SW 74th Court, Miami, FL 33155 USA
Tel: (1) 786-268-8363, Fax: (1) 786-513-2733, Email: info@sourcemolecular.com

Human Enterococcus "Quantification" ID^{TM}

Detection and Quantification of the *Enterococcus faecium* esp Human Gene Biomarker for Human Fecal Contamination by Real-Time Quantitative Polymerase Chain Reaction (qPCR) DNA Analytical Technology

Submitter: Fuss & O'Neill
Submitter #'s: M2-03 and B3-03
Source Molecular #'s: SM 11957 and SM 11958
Samples Received: October 03, 2006
Date Reported: October 10, 2006

SM #	Client #	Enterococci (CFU/100 mL)***	Total *E. faecium* Quantified*	Total *E. faecium* esp Human Biomarker Quantified*	DNA Analytical Results
SM 11957	M2-03	157	$6.1 X 10^7$	BDL**	Negative **
SM 11958	B3-03	7	$1.3 X 10^6$	BDL**	Negative **

* After 24 hours of incubation at 41°C. Total is copy no./ml of extract. See laboratory comments.
** Detection limit is < 10,000 copy no./ml of DNA extract.
*** EPA Method 1600: Membrane Filter Test Method for Enterococci In Water (1997).

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Laboratory Comments
Submitter: Fuss & O'Neill
Report Date: October 10, 2006

The submitted water samples were filtered and incubated at 41°C for 24 hours. **Please note that the *E. faecium* numbers given in the table on the next page are after cultivation.** Afterwards, the filters were eluted in a buffer. The buffer was centrifuged and DNA was extracted from the resultant pellet. qPCR (i.e.: real-time quantitative PCR) targeting total *E. faecium* and the *E. faecium* esp human gene biomaker was performed on the DNA extract.

All reagents, chemicals and apparatuses were verified and inspected beforehand to ensure that no false negatives or positives could be generated. In that regard, positive and negative controls were run to attest the integrity of the analysis. All inspections and controls tested negative for possible extraneous contaminates, including PCR inhibitors.

All the samples in this report tested negative (i.e. below the detection limit) for the *Enterococcus faecium* human gene biomarker. It is important to note that a negative result does not mean that the sample does not definitely have human contamination. In order to strengthen the result, a negative sample should be analyzed further for human fecal contamination with other DNA analytical tests such as the Human Bacteroidetes ID^{TM} and Human Fecal Virus ID^{TM} services. On the other hand, one can infer the presence of animal sources of fecal pollution since generic forms of *Enterococcus faecium* were found present in the negative samples.

DNA Analytical Method Explanation

200 ml (sample M2-03) and 400 ml (sample B3-03) of water were filtered through 0.45 micron membrane filters and placed on mEI agar. The samples were incubated for 24 hours at 41°C. Each filter was removed, placed in buffer and vortexed vigorously. Once the buffer was spun to pellet the bacteria, the supernatant was removed and the pellet was resuspended in a small volume of water. DNA extraction was prepared using the Qiagen DNA extraction kit, as per manufacturer's instructions.

2.5 micro-liter aliquots of purified DNA extraction were used directly as template for subsequent qPCR reactions. All assays were run on an ABI 7300 under the following thermal cycling conditions: 50°C for 2 minutes and 95°C for 10 minutes followed by 40 cycles of 95°C for 10 seconds and 57°C for 1 minute. Default data collection parameters were employed. The Taqman master mix supplied by Applied Biosystems was used with the forward and reverse primers added to a final concentration of 900nM and the probe added to a final concentration of 0.125uM with a 25ul final total reaction volume.

DNA Analytical Theory Explanation

Enterococci are a subgroup of Fecal *Streptococci* and are characterized by their ability to grow in 6.5% sodium chloride, at low and elevated temperatures (10°C and 45°C), and at elevated pH (9.5). These microorganisms have been used as indicators of fecal pollution for many years and have been especially valuable in the marine environment and recreational waters as indicators of potential health risks and swimming-related gastroenteritis.[1]

Enterococci are benign bacteria when they reside in their normal habitat such as the gastrointestinal tracts of human or animals. Outside of their normal habitat, *Enterococci* are pathogenic causing urinary tract and wound infections, and life-threatening diseases such as bacteraemia, endocarditis, and meningitis. *Enterococci* easily colonize open wounds and skin ulcers.

Compounding their pathogenesis, *Enterococci* are also some of the most antibiotic resistant bacteria, particularly from human sources. Studies have shown that certain strains of *Enterococci* are resistant to expensive and potent antibiotics such as vancomycin. This is particularly worrisome for the medical community since these antibiotics are given as a last resort to fight severe bacterial infections.

Several intrinsic features of the *Enterococcus* genus allow it to survive for extended periods of time, leading to its extended survivability and diffusion. For example, *Enterococci* have been shown to survive for 30 minutes at 60°C and persist in the presence of detergents. As such, the inherent ruggedness of *Enterococcus* confers it a strong tolerance to many classes of antibiotics.

The Human Enterococcus "Quantification" ID™ service is designed around the principle that certain strains of the *Enterococcus* genus are specific to humans.[2,3,4] These *Enterococci* can be used as indicators of human fecal contamination. Strains of *Enterococcus faecium*, *Enterococcus faecalis* and yellow-pigmented *Enterococci* have been shown to be from human sources.[2,3,4] Within these *Enterococcus spp.* are genes associated with *Enterococci* that are specific to humans.[5] The Human Enterococcus "Quantification" ID™ service targets the esp human gene biomarker in *Enterococcus faecium*.[6]

One of the advantages of the Human Enterococcus "Quantification" ID™ service is that the entire population of *Enterococci* of the selected portion of the water sample is screened. As such, this method avoids the randomness effect of selecting isolates off a petri dish.

Accuracy of the results is possible because the method uses PCR DNA technology. PCR allows quantities of DNA to be amplified into large number of small copies of DNA sequences. This is accomplished with small pieces of DNA called primers that are complementary and specific to the genomes to be detected.

Through a heating process called thermal cycling, the double stranded DNA is denatured and inserted with complementary primers to create exact copies of the DNA fragment desired. This process is repeated rapidly many times ensuring an exponential progression in the number of copied DNA. If the primers are successful in finding a site on the DNA fragment that is specific to the genome to be studied, then billions of copies of the DNA fragment will be available for analysis.

Real-time quantitative PCR (qPCR) adds a variant to the PCR step by inserting of a fluorescent probe within the primer set. This fluorescent probe serves as a molecular beacon for the quantification step. During each PCR cycle, real-time quantification PCR monitors the fluorescence emitted during the reaction. This is done in "real-time" during the first PCR cycles as a way to quantify the targeted gene.

The Human Enterococcus "Quantification" ID™ service uses real-time quantification PCR to simultaneously confirm and quantify total *Enterococcus faecium* and the esp human gene biomaker in *E. faecium*. This PCR technology avoids the cumbersome process of distinguishing DNA bands on a gel electrophoresis apparatus. The results are presented on a computer screen and printout thus avoiding ambiguities in interpretation.

Once each targeted gene is quantified, a relative percentage can be calculated. As such, it has been hypothesized that relative levels of human pollution can be interpreted by the proportion of the esp human gene biomaker found in *E. faecium* relative to the total population of *E. faecium* in the water sample.[6] Nonetheless this data should serve only as a preliminary indicator of relative human pollution in the water sample. Furthermore, the context of the sample should be taken into account when interpreting the relative percentage provided. To strengthen the validity of the results, the Human Enterococcus "Quantification" ID™ service should also be combined with other DNA analytical services such as the Human Bacteroidetes ID™ and Human Fecal Virus ID™ services.

[1] *Scott, Troy M., Rose, Joan B., Jenkins, Tracie M., Farrah, Samuel R., Lukasik, Jerzy* **Microbial Source Tracking: Current Methodology and Future Directions.** Appl. Environ. Microbiol. (2002) 68: 5796-5803.

[2] Wheeler, A.L., P.G. Hartel, D.G. Godfrey, J.L. Hill, and Segars W.I. 2002. **Potential of *Enterococcus faecalis* as a human fecal indicator for microbial source tracking.** J Environ Qual. 31(4):1286-93.

[3] Bahirathan ML, Puente L, Seyfried P. 1998. **Use of yellow-pigmented enterococci as a specific indicator of human and nonhuman sources of faecal pollution.** Can J Microbiol 44:1066-1071.

[4] Quednau, M., Ahrne, S., Molin, G. **Genomic Relationships between Enterococcus faecium Strains from Different Sources and with Different Antibiotic Resistance Profiles Evaluated by Restriction Endonuclease Analysis of Total Chromosomal DNA Using EcoRI and PvuII.** Appl. Environ. Microbiol. 1999 65: 1777-1780.

[5] Hammerum, A.M., and L.B. Jensen. 2002. **Prevalence of esp, encoding the enterococcal surface protein, in *Enterococcus faecalis* and *Enterococcus faecium* isolates from hospital patients, poultry, and pigs in Denmark.** J. Clin. Microbiol. 40: 4396.

[6] Scott, T.M., T.M. Jenkins, J. Lukasik, and J.B. Rose. 2005. **Potential Use of a Host Associated Molecular Marker in *Enterococcus faecium* as an Index of Human Fecal Pollution.** Environ. Sci. Technol. 39: 283-287.

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[illegible]
Moat Study

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REPORT OF ANALYTICAL RESULTS

NETLAB Case Number R0929-16

Prepared for:

Attn: Amy Hunt
Fuss & O'Neill
275 Promenade St., Suite 350
Providence, RI 02908

Report Date: October 4, 2006

Reviewed by:

Richard Warila

Richard Warila
Laboratory Director

Lab # RI010

NEW ENGLAND TESTING LABORATORY, INC.
1254 Douglas Avenue, North Providence, Rhode Island 02904-5392
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Total # of Pages: 22

STATEMENTS/CERTIFICATIONS REQUIRED BY THE NATIONAL ENVIRONMENTAL LABORATORY APPROVAL CONFERENCE (NELAC)

New England Testing Laboratory is certified under the National Environmental Laboratory Approval Program (NELAP). This certification requires the following statements and certifications be included in our report.

This report shall not be reproduced, except in full, without written approval of the laboratory.

New England Testing certifies that the test results contained within this report meet all NELAC requirements except as detailed in the Case Narrative section of this report.

SAMPLES SUBMITTED and REQUEST FOR ANALYSIS:

The samples listed in Table I were submitted to New England Testing Laboratory on September 29, 2006 and September 30, 2006. The group of samples appearing in this report was assigned an internal identification number (case number) for laboratory information management purposes. The client's designations for the individual samples, along with our case number, are used to identify the samples in this report. The case number for this sample submission is R0929-16.

Custody records are included in this report.

Site: Easton's Beach, Newport, RI

TABLE I, Samples Submitted

Sample ID	Date Sampled	Matrix	Analysis Requested
M2-02	9/29/06	Stormwater	Table II
S11-02	9/29/06	Stormwater	Table II
S10-02	9/29/06	Stormwater	Table II
P3-01	9/29/06	Stormwater	Table II
M1-02	9/29/06	Stormwater	Table II
P1-02	9/29/06	Stormwater	Table II
M3-02	9/29/06	Stormwater	Table II
M5-01	9/29/06	Stormwater	Table II
M1-01	9/29/06	Stormwater	Table II
S10-01	9/29/06	Stormwater	Table II
P2-01	9/29/06	Stormwater	Table II
S3-01	9/29/06	Stormwater	Table II
S8-01	9/29/06	Stormwater	Table II
S6-01	9/29/06	Stormwater	Table II
S2-01	9/29/06	Stormwater	Table II
S7-01	9/29/06	Stormwater	Table II
S5-01	9/29/06	Stormwater	Table II
M4-02	9/29/06	Stormwater	Table II
M5-02	9/29/06	Stormwater	Table II
S9-02	9/29/06	Stormwater	Table II
M2-01	9/29/06	Stormwater	Table II
S11-01	9/29/06	Stormwater	Table II
M4-01	9/29/06	Stormwater	Table II
M3-01	9/29/06	Stormwater	Table II
P1-01	9/29/06	Stormwater	Table II
S1-01	9/29/06	Stormwater	Table II
P3-02	9/29/06	Stormwater	Table II
S3-02	9/29/06	Stormwater	Table II
S2-02	9/29/06	Stormwater	Table II
P2-02	9/29/06	Stormwater	Table II
S1-02	9/29/06	Stormwater	Table II
S5-02	9/29/06	Stormwater	Table II
S6-02	9/29/06	Stormwater	Table II
S7-02	9/29/06	Stormwater	Table II
S8-02	9/29/06	Stormwater	Table II

Table I continued on next page

TABLE I (continued), Samples Submitted

Sample ID	Date Sampled	Matrix	Analysis Requested
M1-03	9/29/06	Stormwater	Table II
M3-03	9/29/06	Stormwater	Table II
M5-03	9/29/06	Stormwater	Table II
M4-03	9/29/06	Stormwater	Table II
P1-03	9/29/06	Stormwater	Table II
S8-03	9/29/06	Stormwater	Table II
S11-03	9/29/06	Stormwater	Table II
M2-03	9/29/06	Stormwater	Table II
P2-03	9/29/06	Stormwater	Table II
S1-03	9/29/06	Stormwater	Table II
S3-03	9/29/06	Stormwater	Table II
P3-03	9/29/06	Stormwater	Table II
S2-03	9/29/06	Stormwater	Table II
S7-03	9/29/06	Stormwater	Table II
S6-03	9/29/06	Stormwater	Table II
S5-03	9/29/06	Stormwater	Table II
S11-04	9/29/06	Stormwater	Table II
M2-04	9/29/06	Stormwater	Table II
M1-04	9/29/06	Stormwater	Table II
P1-04	9/29/06	Stormwater	Table II
M4-04	9/29/06	Stormwater	Table II
M5-04	9/29/06	Stormwater	Table II
M3-04	9/29/06	Stormwater	Table II
P2-04	9/29/06	Stormwater	Table II
S3-04	9/29/06	Stormwater	Table II
P3-04	9/29/06	Stormwater	Table II
S8-04	9/29/06	Stormwater	Table II
S7-04	9/29/06	Stormwater	Table II
S6-04	9/29/06	Stormwater	Table II
S2-04	9/29/06	Stormwater	Table II
S1-04	9/29/06	Stormwater	Table II
S5-04	9/29/06	Stormwater	Table II

TABLE II, Analysis and Methods

ANALYSIS	DETERMINATIVE METHOD
Ammonia	350.3
Surfactants as MBAS	5540C

These methods are documented in:

40 CFR 136, *Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act*, Office of Federal Register National Archives and Records Administration.

Sample Results

Surfactants as MBAS

Sample	Result	Reporting Limit	Date Analyzed	Units
M2-02	0.41	0.03	9/29/06	mg/L
S11-02	0.17	0.03	9/29/06	mg/L
S10-02	0.66	0.03	9/29/06	mg/L
P3-01	0.07	0.03	9/29/06	mg/L
M1-02	0.06	0.03	9/29/06	mg/L
P1-02	N.D.	0.03	9/29/06	mg/L
M3-02	0.18	0.03	9/29/06	mg/L
M5-01	0.08	0.03	9/29/06	mg/L
M1-01	0.06	0.03	9/29/06	mg/L
S10-01	0.25	0.03	9/29/06	mg/L
P2-01	0.04	0.03	9/29/06	mg/L
S3-01	N.D.	0.03	9/29/06	mg/L
S8-01	0.09	0.03	9/29/06	mg/L
S6-01	N.D.	0.03	9/29/06	mg/L
S2-01	0.03	0.03	9/29/06	mg/L
S7-01	N.D.	0.03	9/29/06	mg/L
S5-01	N.D.	0.03	9/29/06	mg/L
M4-02	N.D.	0.03	9/29/06	mg/L
M5-02	N.D.	0.03	9/29/06	mg/L
S9-02	0.03	0.03	9/29/06	mg/L
M2-01	N.D.	0.03	9/29/06	mg/L
S11-01	0.11	0.03	9/29/06	mg/L
M4-01	0.09	0.03	9/29/06	mg/L
M3-01	0.09	0.03	9/29/06	mg/L

Surfactants as MBAS

Sample	Result	Reporting Limit	Date Analyzed	Units
P1-01	N.D.	0.03	9/29/06	mg/L
S1-01	N.D.	0.03	9/29/06	mg/L
P3-02	N.D.	0.03	9/30/06	mg/L
S3-02	0.06	0.03	9/30/06	mg/L
S2-02	0.05	0.03	9/30/06	mg/L
P2-02	N.D.	0.03	9/30/06	mg/L
S1-02	N.D.	0.03	9/30/06	mg/L
S5-02	0.05	0.03	9/30/06	mg/L
S6-02	0.04	0.03	9/30/06	mg/L
S7-02	0.07	0.03	9/30/06	mg/L
S8-02	N.D.	0.03	9/30/06	mg/L
M1-03	N.D.	0.03	9/30/06	mg/L
M3-03	0.06	0.03	9/30/06	mg/L
M5-03	0.05	0.03	9/30/06	mg/L
M4-03	0.03	0.03	9/30/06	mg/L
P1-03	N.D.	0.03	9/30/06	mg/L
S8-03	0.08	0.03	9/30/06	mg/L
S11-03	0.12	0.03	9/30/06	mg/L
M2-03	N.D.	0.03	9/30/06	mg/L
P2-03	0.07	0.03	9/30/06	mg/L
S1-03	0.10	0.03	9/30/06	mg/L
S3-03	N.D.	0.03	9/30/06	mg/L
P3-03	N.D.	0.03	9/30/06	mg/L
S2-03	0.04	0.03	9/30/06	mg/L
S7-03	N.D.	0.03	9/30/06	mg/L
S6-03	N.D.	0.03	9/30/06	mg/L
S5-03	N.D.	0.03	9/30/06	mg/L

Surfactants as MBAS

Sample	Result	Reporting Limit	Date Analyzed	Units
S11-04	0.04	0.03	9/30/06	mg/L
M2-04	N.D.	0.03	9/30/06	mg/L
M1-04	0.03	0.03	9/30/06	mg/L
P1-04	0.03	0.03	9/30/06	mg/L
M4-04	0.04	0.03	9/30/06	mg/L
M5-04	0.03	0.03	9/30/06	mg/L
M3-04	0.15	0.03	9/30/06	mg/L
P2-04	0.03	0.03	9/30/06	mg/L
S3-04	0.06	0.03	9/30/06	mg/L
P3-04	0.06	0.03	9/30/06	mg/L
S8-04	N.D.	0.03	9/30/06	mg/L
S7-04	0.03	0.03	9/30/06	mg/L
S6-04	0.06	0.03	9/30/06	mg/L
S2-04	0.06	0.03	9/30/06	mg/L
S1-04	0.06	0.03	9/30/06	mg/L
S5-04	0.06	0.03	9/30/06	mg/L

Ammonia (N)

Sample	Result	Reporting Limit	Date Analyzed	Units
M2-02	0.11	0.10	10/4/06	mg/L
S11-02	0.22	0.10	10/4/06	mg/L
S10-02	0.24	0.10	10/4/06	mg/L
P3-01	N.D.	0.10	10/4/06	mg/L
M1-02	N.D.	0.10	10/4/06	mg/L
P1-02	N.D.	0.10	10/4/06	mg/L
M3-02	N.D.	0.10	10/4/06	mg/L
M5-01	N.D.	0.10	10/4/06	mg/L
M1-01	N.D.	0.10	10/4/06	mg/L
S10-01	0.63	0.10	10/4/06	mg/L
P2-01	N.D.	0.10	10/4/06	mg/L
S3-01	0.18	0.10	10/4/06	mg/L
S8-01	0.13	0.10	10/4/06	mg/L
S6-01	0.19	0.10	10/4/06	mg/L
S2-01	0.16	0.10	10/4/06	mg/L
S7-01	0.23	0.10	10/4/06	mg/L
S5-01	0.13	0.10	10/4/06	mg/L
M4-02	0.19	0.10	10/4/06	mg/L
M5-02	0.14	0.10	10/4/06	mg/L
S9-02	0.23	0.10	10/4/06	mg/L
M2-01	0.13	0.10	10/4/06	mg/L
S11-01	0.13	0.10	10/4/06	mg/L
M4-01	0.22	0.10	10/4/06	mg/L
M3-01	0.24	0.10	10/4/06	mg/L

Ammonia (N)

Sample	Result	Reporting Limit	Date Analyzed	Units
P1-01	N.D.	0.10	10/4/06	mg/L
S1-01	0.11	0.10	10/4/06	mg/L
P3-02	N.D.	0.10	10/4/06	mg/L
S3-02	0.17	0.10	10/4/06	mg/L
S2-02	0.17	0.10	10/4/06	mg/L
P2-02	N.D.	0.10	10/4/06	mg/L
S1-02	0.14	0.10	10/4/06	mg/L
S5-02	0.17	0.10	10/4/06	mg/L
S6-02	0.20	0.10	10/4/06	mg/L
S7-02	N.D.	0.10	10/4/06	mg/L
S8-02	N.D.	0.10	10/4/06	mg/L
M1-03	N.D.	0.10	10/4/06	mg/L
M3-03	N.D.	0.10	10/4/06	mg/L
M5-03	0.11	0.10	10/4/06	mg/L
M4-03	0.12	0.10	10/4/06	mg/L
P1-03	N.D.	0.10	10/4/06	mg/L
S8-03	0.12	0.10	10/4/06	mg/L
S11-03	N.D.	0.10	10/4/06	mg/L
M2-03	N.D.	0.10	10/4/06	mg/L
P2-03	N.D.	0.10	10/4/06	mg/L
S1-03	0.13	0.10	10/4/06	mg/L
S3-03	N.D.	0.10	10/4/06	mg/L
P3-03	N.D.	0.10	10/4/06	mg/L
S2-03	0.11	0.10	10/4/06	mg/L
S7-03	0.11	0.10	10/4/06	mg/L
S6-03	N.D.	0.10	10/4/06	mg/L
S5-03	N.D.	0.10	10/4/06	mg/L

Ammonia (N)

Sample	Result	Reporting Limit	Date Analyzed	Units
S11-04	N.D.	0.10	10/4/06	mg/L
M2-04	N.D.	0.10	10/4/06	mg/L
M1-04	N.D.	0.10	10/4/06	mg/L
P1-04	N.D.	0.10	10/4/06	mg/L
M4-04	0.14	0.10	10/4/06	mg/L
M5-04	N.D.	0.10	10/4/06	mg/L
M3-04	0.27	0.10	10/4/06	mg/L
P2-04	N.D.	0.10	10/4/06	mg/L
S3-04	N.D.	0.10	10/4/06	mg/L
P3-04	N.D.	0.10	10/4/06	mg/L
S8-04	N.D.	0.10	10/4/06	mg/L
S7-04	0.11	0.10	10/4/06	mg/L
S6-04	N.D.	0.10	10/4/06	mg/L
S2-04	N.D.	0.10	10/4/06	mg/L
S1-04	N.D.	0.10	10/4/06	mg/L
S5-04	N.D.	0.10	10/4/06	mg/L

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R0929-16 (1)

CHAIN-OF-CUSTODY RECORD 10604

*Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☐ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: EASTONS BEACH
PROJECT LOCATION: NEWPORT RI
PROJECT NUMBER: 2006091.A10
LABORATORY: NE

REPORT TO: AMY HUNT
INVOICE TO: AMY HUNT
P.O. NO.:

Sampler's Signature: Walter Mahoney Date: 9/29/06

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Bottom Sediment
W=Waste
A=Air
X=Other STORMWATER

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request: Surfactants	Ammonia							Containers: Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H_2SO_4, [ ] 250 ml [ ] 500 ml 4oz	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
1					M2-02	SW	9/29/06	1255																✓	✓				
2					S11-02	X	↓	1315																✓	✓				
3					S10-02	X	↓	1240																✓	✓				
4					P3-01	SW	↓	1220																✓	✓				
5					M1-02	SW	↓	1245																✓	✓				
6					P1-02	SW	↓	1215																✓	✓				
7					M3-02	SW	↓	1215																✓	✓				
8					M5-01	SW	↓	1100																✓	✓				
9					M1-01	SW	↓	1045																✓	✓				
10					S10-01	X	↓	1030																✓	✓				

Transfer Number	Relinquished By	Accepted By	Date	Time
1			9/29	260
2				
3				
4			9/29	3:38

Reporting and Detection Limit Requirements:

Additional Comments:

4°C on ice

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R0929-16 (2)
● 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ______

CHAIN-OF-CUSTODY RECORD 10605

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ● Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: North East
REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. NO.:
Sampler's Signature:
Date: 9/25/06

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Bottom Sediment
W=Waste
A=Air
X=Other Storm Water

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request: Surfactants	Ammonia							Containers: Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H_2SO_4 ~~[ ] 250~~ ml [ ] 500 ml 4oz or 500ml	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
11					P2-01	SW	9/25/06	1200	4	1														✓	✓				
12					S3-01	X		1125	4	1														✓	✓				
13					S8-01	X		1005	1	1														✓	✓				
14					S6-01	X		1030	1	1														✓	✓				
15					S2-01	X		1135	1	1														✓	✓				
16					S7-01	X		950	1	1														✓	✓				
17					S5-01	X		1040	1	1														✓	✓				
18					M4-02	SW		1330	1	1														✓	✓				
19					P3-01	SW		1220	1	1														✓	✓				
20					M5-02	SW		1319	1	1														✓	✓				

Transfer Number	Relinquished By	Accepted By	Date	Time
1			9/29	206
2				
3				
4			9/29	3:38

Reporting and Detection Limit Requirements:

Additional Comments:
~~4~~4°C on ice
P3-01 submitted as item #4

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☐ Other

R0929-16 (3)

CHAIN-OF-CUSTODY RECORD 10606

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☒ Standard (____ days) *Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: Northeast

REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. NO.:
Sampler's Signature:
Date: 9/29/04

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Bottom Sediment
W=Waste
A=Air
X=Other Stormwater

Item No.	Transfer Check				Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request								Containers												Comments
	1	2	3	4							Add ~~Entero~~	Surfactants	Ammonia				Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H_2SO_4, [ ] 250 ml [ ] 500 ml or 4oz	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	
21					S9-02	X	9/29/04	1220			✓	✓	✓											✓	✓				
22					M2-01	SW		1025			✓	✓	✓											✓	✓				
23					S11-01	X		1040			✓	✓	✓											✓	✓				
24					M4-01	SW		1145			✓	✓	✓											✓	✓				
25					M3-01	SW		950			✓	✓	✓											✓	✓				
26					P1-01	SW		1015			✓	✓	✓											✓	✓				
27					S7-01	X		1145			✓	✓	✓											✓	✓				
												✓	✓																
												✓	✓																
												✓	✓																

Transfer Number	Relinquished By	Accepted By	Date	Time
1		Erik Dias	9/29	2:00
2				
3				
4		Jill Vos	9/29	3:38

Reporting and Detection Limit Requirements:

Additional Comments: Sent Results To Amy Hunt
4°C on ice

R0929-16 (4)

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CHAIN-OF-CUSTODY RECORD 10611

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ● Standard (____ days) ☐ Other ____ (days)
*Surcharge Applies

PROJECT NAME: Easton's Beach

PROJECT LOCATION: Newport, RI

PROJECT NUMBER: 20060901.A10

LABORATORY: NorthEast

REPORT TO: Amy Hunt

INVOICE TO: Amy Hunt

P.O. No.:

Sampler's Signature:

Date: 9/29/06

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Bottom Sediment
W=Waste
A=Air
X=Other ______

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Surfactant	Ammonia							Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H2SO4	[✓ Plastic] - As is, [ ] 250 ml [ ] 500 [✓ 1000 ml]	[✓ Plastic] H2SO4, [X] 250 ml [ ] 500 ml	Plastic - HNO3, 250 ml [ ] 500 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
37	✓				P3-02	SW	9/29/06	1415	1	1														✓	✓				
38	✓				S3-02	X	↓	1350	1	1														✓	✓				
39	✓				S2-02	X		1345	1	1														✓	✓				
40	✓				P2-02	SW		1405	1	1														✓	✓				
41	✓				S1-02	X		1340	1	1														✓	✓				
42	✓				S5-02	X		1325	1	1														✓	✓				
43	✓				S6-02	X		1315	1	1														✓	✓				
44	✓				S7-02	X		1300	1	1														✓	✓				
45	✓				S8-02	X	↓	1255	1	1														✓	✓				

Transfer Number	Relinquished By	Accepted By	Date	Time
1			9/29/06	2125
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

R0929-16 (S)

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☐ Other

CHAIN-OF-CUSTODY RECORD 10612

Turnaround

☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☒ Standard (____ days) *Surcharge Applies

PROJECT NAME: EASTON'S BEACH
PROJECT LOCATION: NEWPORT RI
PROJECT NUMBER: 2006090.A10
LABORATORY: Northeast

REPORT TO: AMY HUNT
INVOICE TO: AMY HUNT
P.O. NO.:

Sampler's Signature: Walter Mahoney Date: 9/29/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other STORMWATER

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request: SURFACTANTS	AMMONIA							Containers: Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic H_2SO_4, ▨ 250 ml [ ] 500 ml	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
46					M1-03	X	9/29	1545	X	X														✓	✓				
47					M3-03	X	↓	1525	X	X														✓	✓				
48					M5-03	X		1600	X	X														✓	✓				
49					M4-03	X		1610	X	X														✓	✓				
50					P1-03	X		1535	X	X														✓	✓				
51					S8-03	X		1530	X	X																			

Transfer Number	Relinquished By	Accepted By	Date	Time
1			9/29/06	2125
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

R092916 (6)

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☐ 24 Madison Avenue Extension, Albany, NY 12203
■ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other ____________

CHAIN-OF-CUSTODY RECORD 10614

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ■ Standard (____ days) *Surcharge Applies

PROJECT NAME: Easton's Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901. A10
LABORATORY: North East

REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. NO.:
Sampler's Signature: Date: 9/29/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other Stormwater

Item No.	Transfer Check				Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request								Containers												
	1	2	3	4					Surfactant	Ammonia							Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	[✓ Plastic] - As is, [ ] 250 ml [ ] 500 [✓ 1000 ml]	[✓ Plastic] - [✓ H_2SO_4], [ ] 250 ml [ ] 500 ml 4oz or 500ml	Plastic - HNO_3, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
~~46~~ 51					~~S~~- S11-03	X	9/29/06	1620	1	1														✓	✓				
52					42-03	SW	↓	1554	1	1														✓	✓				
53					P2-03	X		1040																					
54					S1-03			1615																					
55					S3-03			1625																					
56					P3-03			1655																					
57					S2-03			1620																					
58					S7-03			1535																					
59					S6-03			1540																					
60					S5-03	↓	↓	1600	↓	↓														↓	↓				

Transfer Number	Relinquished By	Accepted By	Date	Time
1		Erik Rios	9/29/06	2125
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

R0929-16 (7)

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☐ 610 Lynndale Court, Suite E, Greenville, NC 27858
☐ 24 Madison Avenue Extension, Albany, NY 12203
☑ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other

CHAIN-OF-CUSTODY RECORD 10615

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ____ (days)
☐ 2 Days* ☑ Standard (____ days) *Surcharge Applies

Project Name: Eastons Beach
Project Location: Newport, RI
Project Number: 20060901.A10
Laboratory: Northeast

Report To: Amy Hunt
Invoice To: Amy Hunt
P.O. No.:

Sampler's Signature: Date: 9/29/06

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Bottom Sediment A=Air
X=Other Stormwater

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Surfactant	Ammonia							Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	(2) Plastic, As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	(2) Plastic, H₂SO₄, [✓] 250 ml [ ] 500 ml	Plastic - HNO₃, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
61	✓				~~10~~ S11-04	X	9/29/06	1919	✓	✓														1	1				
62	✓				M2-04	X	↓	1835	✓	✓														1	1				
63	✓				M1-04	X		1830	✓	✓														1	1				
64	✓				P1-04	SW		1815	✓	✓														1	1				
65	✓				M4-04	X		1910	✓	✓														1	1				
66	✓				M5-04	X		1850	✓	✓														1	1				
67	✓				M3-04	X		1810	✓	✓														1	1				
68	✓				P2-04	X		2005																1	1				
69	✓				S3-04	X		1925																1	1				
70	✓				P3-04	X	↓	1950																1	1				

Transfer Number	Relinquished By	Accepted By	Date	Time
1		Erik Diniz	9/29/06	2125
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

BAL Laboratory

The Microbiology Division of Thielsch Engineering, Inc.

20060901.A10
Moat Study.

FILE COPY

RECEIVED
OCT - 5 2006
FUSS & O'NEILL
PROVIDENCE, RI

Amy Hunt
Fuss & O'Neill
275 Promenade Street Suite 350
Providence. RI 02908

RE: Newport-Wet Weather

Dear Amy Hunt:

We appreciate this opportunity to provide you with our analytical services. BAL Laboratory is committed to providing the highest quality service. Our dedication to each client includes responsiveness to emergencies, dependability, well-written reports and superior client services.

Enclosed is your data report for **Work Order Number B609124.** The invoice for this project is included with this report unless other arrangements have previously been made with the laboratory. Samples will be disposed of thirty days after the final report has been mailed. If you have any questions or concerns, please feel free to call our Customer Service Department. We value our continued relationship and look forward to hearing from you in the future.

Sincerely,

BAL Laboratory

Darlene Capuano

Darlene Capuano
Laboratory Director

RI Laboratory License Number: A36
MA Laboratory License Number: M RI-M01

enclosure

Industrial Microbiology - Environmental Investigation - Biological and Specialty Analyses of Water and Wastes - Pollution Tracking and Source Determination - Monitoring Programs - Trend Assessments - Seafood Analyses - Drinking Water Quality - Biosolids and Compost Testing - Biofilter Assessment - Bioaerosol Monitoring - Corrosion Analysis

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☐ 24 Madison Avenue Extension, Albany, NY 12203

☑ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601
☐ Other

CHAIN-OF-CUSTODY RECORD 10616

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☑ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: Eastons Beach
PROJECT LOCATION: Newport, RI
PROJECT NUMBER: 20060901.A10
LABORATORY: Northeast
REPORT TO: Amy Hunt
INVOICE TO: Amy Hunt
P.O. No.:
Sampler's Signature:
Date: 9/29/06

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Bottom Sediment
W=Waste
A=Air
X=Other Stormwater

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Surfactant	Ammonia							Soil VOA Vial, [ ] methanol [ ] sodium bisulfate	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	[✓ Plastic] As is, [ ] 250 ml [ ] 500 [✓ 1000] ml	[✓ Plastic] - H₂SO₄, [X] 250 ml [ ] 500 ml	Plastic - HNO₃, 250 ml [ ] Filtered	Plastic - NaOH, 250 ml	Bacteria Bottle	Comments
71	✓				S8-04	X	9/29/06	1815	✓	✓														✓	✓				
72	✓				S7-04	↓	↓	1820	✓	✓														✓	✓				
73	✓				S6-04	↓	↓	1840	✓	✓														✓	✓				
74	✓				S2-04	↓	↓	1920	✓	✓														✓	✓				
75	✓				S1-04	↓	↓	1910	✓	✓														✓	✓				
76	✓				S5-04	↓	↓	1855	✓	✓														✓	✓				

Transfer Number	Relinquished By	Accepted By	Date	Time
1		Erik Diaz	9/29/06	2125
2				
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

APPENDIX E

PRODUCT DATA FOR SLOPE PROTECTION

Solving **Slope Protection** Problems

Geoweb® Cellular Confinement System

Presto®

Leaders In Advanced Geotechnology™

Slope Protection

An Engineered Framework for Slope Protection

The Presto Geoweb® Cellular Confinement System

Product innovation has always been the key to success for Presto since the company's first involvement in developing cellular confinement technology back in the late '70s. Working in cooperation with the U.S. Army Corps of Engineers, Presto developed the Geoweb® cellular confinement system.

The Geoweb system is an engineered, expandable, polyethylene, honeycomb-like cellular structure that dramatically improves the performance of infill materials. The system is utilized in the areas of slope protection, channel protection, load support and earth retention.

Today, the Presto Geoweb system is the only fully-engineered cellular confinement system available, and Presto Geosystems® materials lead the way in advanced research, testing, field evaluation and geocell product innovations. Successful installations of the Geoweb system can be found worldwide, and the network of Presto Geosystems distributors spans the globe.

ISO-Certified Quality

Extensive research and testing by academic and independent laboratories, ISO 9002 certification, and over fifteen years of in-ground performance tell the story: The Geoweb system provides proven quality and reliability.

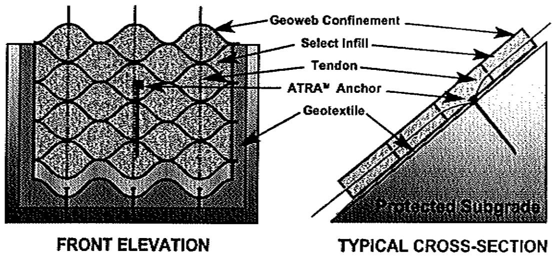
Presto's commitment to quality begins with manufacturing and continues through final installation. Our quality management system is certified to ISO 9002 and materials are specifically engineered in accordance with established geosynthetic industry guidelines. All phases of manufacturing are monitored through Statistical Process Control which documents each step in the production process. Geoweb sections are warranted by Presto against manufacturing defects. Copies of Presto's warranty are available from Presto or an authorized Presto Geosystems distributor.

Advanced Product Development

Engineering advancements are on-going at Presto Geosystems and lead to improved cellular confinement systems. Geoweb system advancements include the introduction of both perforated and non-perforated textured Geoweb cells, the use of integral, high-strength tendons and the ATRA™ Anchoring System. The Geoweb system is also available in a variety of colors for better blending with the surrounding project site environment.

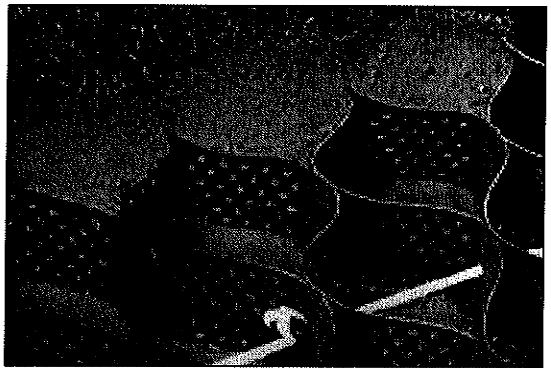
The Geoweb system's unique seam weld pattern is designed to provide maximum strength. The Geoweb system meets and exceeds the rigorous seam strength tests established by the U.S. Army Corps of Engineers. The Geoweb system's long-term seam strength is designed for project longevity.

Geoweb® Slope Protection System - The Key Components



The complete Geoweb® cellular confinement system application will include some or all of the following:

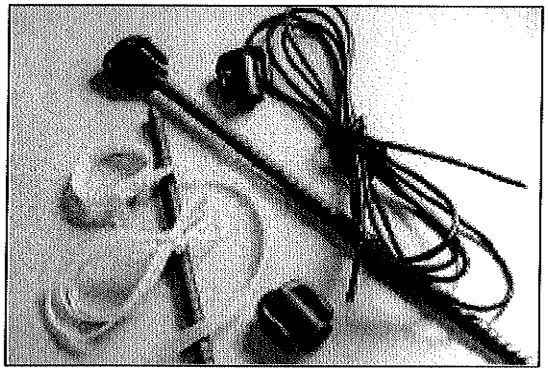
- Geoweb sections
- Cell infill materials
- Integral high-strength polymeric tendons
- ATRA™ Anchors
- ATRA® Clips
- Erosion Control Blankets
- Geotextiles
- Geocomposite drainage materials
- Geogrids and geotextile reinforcement
- Geomembrane
- Fasteners



Integral Polymeric Tendons

Polymeric tendons can be used to anchor Geoweb sections to embankments and slopes, and are incorporated into the Geoweb system through pre-drilled holes. Tendons are particularly useful when a geomembrane underlayer or naturally hard soil/rock prevents anchoring with stakes. In this case, tendons are secured by an anchoring system at the top of the slope.

Standard tendons are high-strength polyester and polypropylene, available in various ultimate tensile strengths to meet specific requirements. Polyethylene-coated polyester tendons are available to enhance overall durability. Spacing and quantity of individual tendons within each Geoweb section are determined through engineering analysis methods available through Presto.



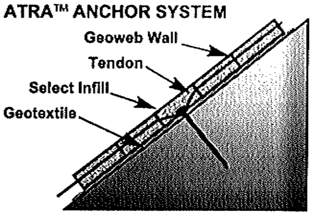
The ATRA™ Anchoring System

Presto's high-strength polyethylene ATRA® Clip provides time and material cost savings during Geoweb system installation. The ATRA® Clip inserted on the end of a rebar stake forms the ATRA™ Anchor, providing an in-line, easier to drive anchoring system. Tendons and an ATRA™ Anchor array provide anchoring for slope protection systems that resist sliding and/or uplift forces.

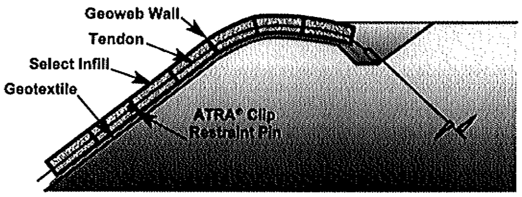
The ATRA® Clip used as a restraint pin connects to tendons at specific load-transfer points replacing the need for dowels or other less-secure load-transfer mechanisms.

The Geoweb slope protection system can also be secured with an engineered array of surface anchors designed to meet soil conditions. Anchor details are determined through analysis methods available from Presto or its authorized distributors.

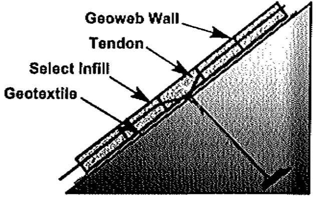
ATRA™ ANCHOR SYSTEM



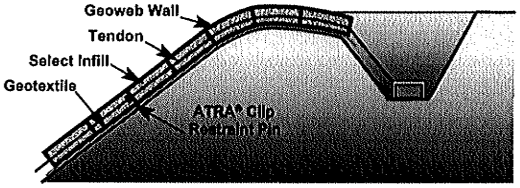
HELICAL CREST ANCHORAGE



DUCKBILL® SURFACE ANCHORAGE*

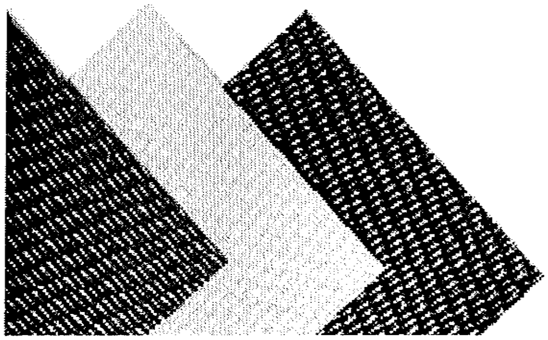


DEADMAN CREST ANCHORAGE



Color Options

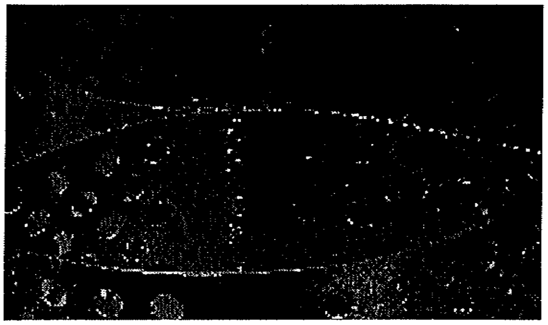
The Geoweb® system can be provided in a variety of colors to meet desired aesthetic requirements. The system is available in natural colors of black, green or tan. Coloring pigments contain no heavy metals and the polyethylene is ultraviolet light stabilized with carbon black or Hindered-Amine Light Stabilizer (HALS) to increase system durability.



Versatile Cell Wall Options

The Presto Geoweb® Cellular Confinement System is available in two distinct cell wall types: perforated and non-perforated. Both have an engineered textured pattern of indentations that increase friction between the cell wall and infill material.

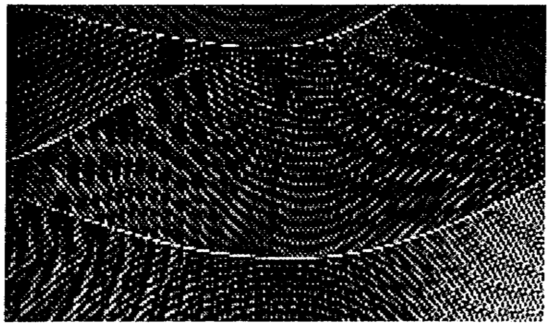
The perforated Geoweb cell wall provides increased frictional interlock with aggregates and concrete, and better root lock-up with vegetated systems. The perforations allow lateral drainage through the system, thereby enhancing performance of the Geoweb system in saturated conditions. The textured surface works particularly well with finer grain infill.

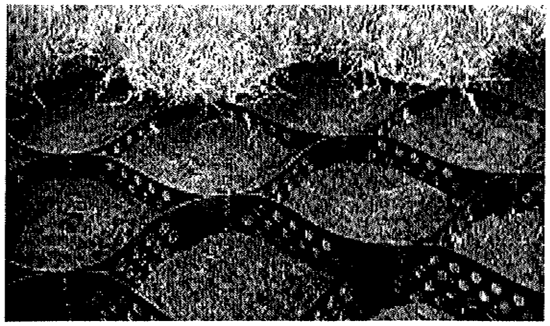


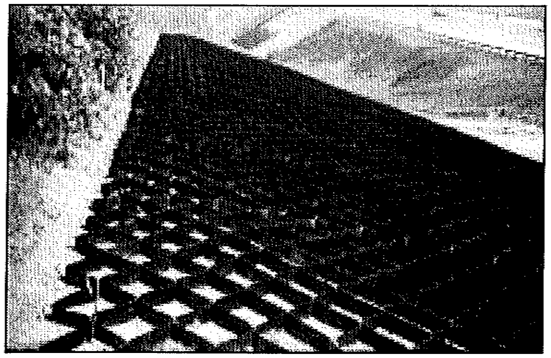
Size Options

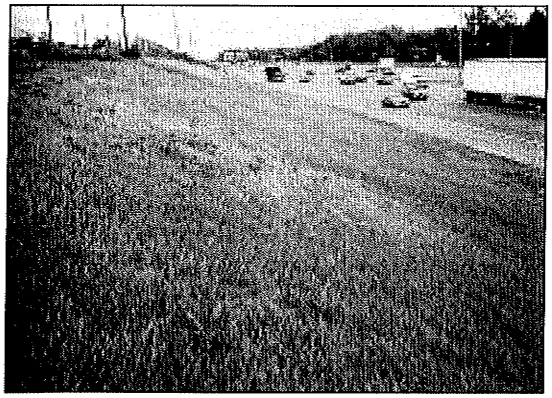
Geoweb® cellular confinement sections are available in various lengths, cell depths and cell sizes addressing the specific needs of the design. The slope angle and the infill material's characteristics directly influence the choice of the cell size and depth as well as choice of vegetation. Shrubs and small trees can easily be planted within sections having larger cells.

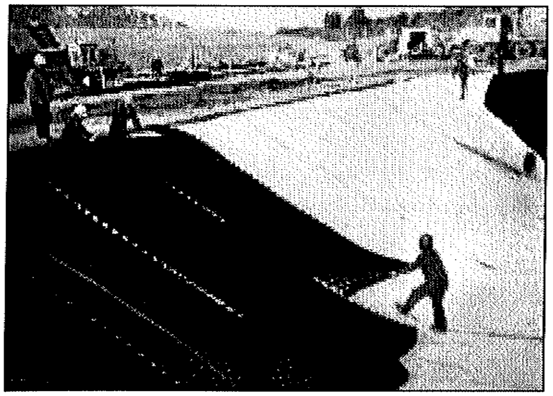
Contact Presto or it's authorized distributors for recommendations on product application and details.











Slope Protection Solutions

The Presto Geoweb® system can be used in many slope protection applications meeting a wide range of performance and aesthetic requirements. The three-dimensional system confines the determined infill material to resist anticipated hydraulic flows, inhibit erosion and minimize the downward migration of embankment materials. Single or multi-layered slope protection systems provide solutions for a wide range of structural and run-off problems.

A variety of infill materials can be used with the Geoweb system. The choice of infill materials is based upon the demands of the specific project/problem. Infill materials include:

- Topsoil with various selected vegetation
- Aggregates from sand and gravel to larger rock or stone
- Concrete of various strengths and surface finishes
- Combinations of the above to meet special conditions

In slope protection applications, the Geoweb system minimizes the downward migration of embankment materials by functioning as small check-dams in the upper soil layer. On vegetated slopes it increases erosion resistance by encapsulating and interlocking with the vegetative root zone. It helps prevent rills and gullies from forming, particularly in areas of concentrated flow over erosive soils.

The Geoweb cellular confinement system offers a broad range of surface protection treatments for all slopes. The system is designed for flexibility and can be combined with a variety of simple, yet positive anchoring techniques to allow the application of both vegetated and hard surfacing materials on steep slopes. The Geoweb system also provides a means of fully-vegetating slope surfaces that otherwise could not support plant life.

The Geoweb system provides long-term stability and effectiveness of slope cover materials. Some examples of Geoweb system slope surface stabilization include:

- Embankment slopes
- Containment dikes and levees
- Abutment protection
- Landfill lining and covers
- Dam faces and spillways
- Shoreline revetments
- Cut slopes
- Detention ponds & lagoons

Geomembrane Protection

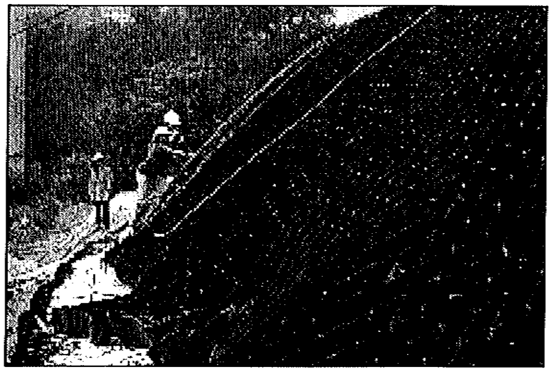
The Geoweb system, with a variety of infills, provides protection to geomembranes in lagoon, detention pond, storm water containment basin, dike, temporary dam and landfill cover applications.

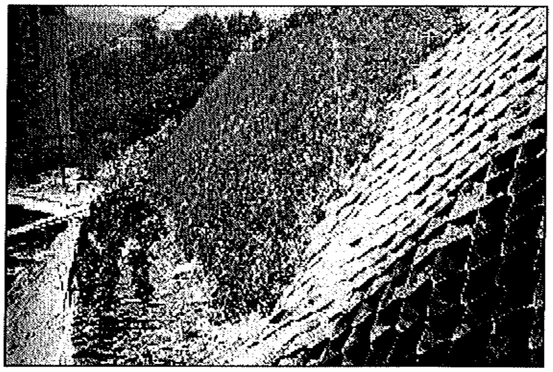
The inclusion of internal tendons and ATRA® Clip load transfer pins provides a structural support system that maintains the integrity of the impervious liner or cover. The system directly protects the geomembrane from accidental puncturing, vandalism and natural degradation, and indirectly prevents soil contamination and erosion.

Vegetated Slopes

Well-established vegetation is recognized as an effective and attractive form of protection for slopes which are exposed to mild or moderate surface erosion. Cellular confinement with the Geoweb system confines and reinforces the vegetative mat. The cells increase the vegetation's natural resistance to erosive forces and protect the root zone from loss of soil particles.

The Geoweb cell walls, which contain the topsoil infill, form a series of check-dams extending throughout the protected slope. A predetermined depth of topsoil and the developing vegetative root mass is confined, protected and interlocked with the individual perforated cell. Rill development, produced when concentrated flow cuts into the soil, is prevented since flow is continuously redirected to the surface. The vegetated Geoweb system is ideal when project aesthetics are an important consideration.



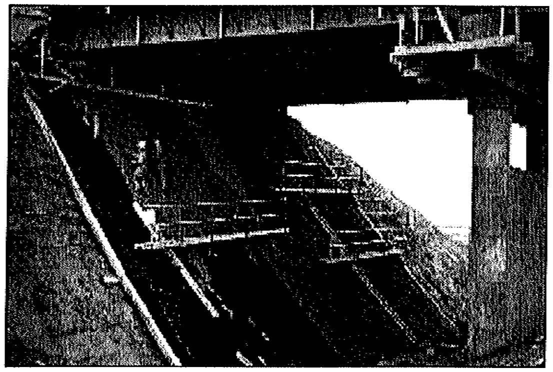


Slope Armoring: Concrete Protection

Poured concrete provides hard, durable protection of slopes that are exposed to severe hydraulic or mechanical stresses. The Geoweb system can eliminate the need for complicated structural elements and expensive, time-consuming construction techniques. Concrete quantities and costs can be controlled with the Geoweb system because of the defined section thickness. Infilling the Geoweb cells with ready-mixed concrete produces a durable, erosion-resistant slope cover of uniform thickness which retains flexibility and the ability to conform to minor subgrade movement. Special compacted granular bedding layers, necessary with conventional poured concrete slabs, can be omitted. The Geoweb system helps prevent uncontrolled cracking of the concrete and reduces the chances of piping or undermining.

The quality, surface finish and thickness of the concrete can be selected to meet specific design needs.

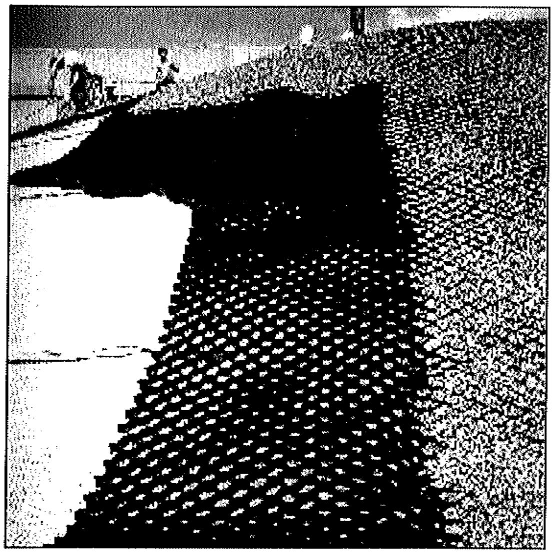
Concrete infill with the perforated Geoweb system offers greater rigidity than the non-perforated system.

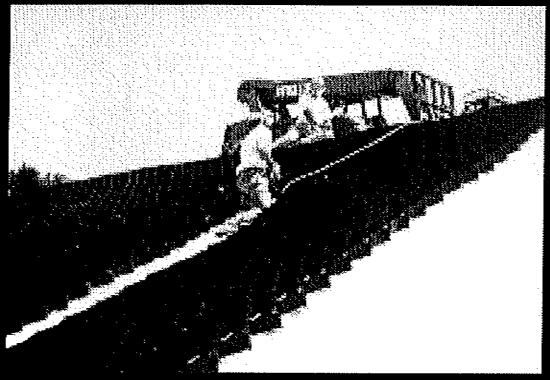


Non-Vegetated Slopes

The Geoweb system also provides effective slope protection by improving the erosion resistance of granular materials such as sand, gravel and larger rock or stone. Confinement of these aggregates within Geoweb cells permits their use on steeper slopes than would otherwise be possible. Hydraulic energy is dissipated and down-slope migration of individual particles, caused by gravity and hydraulic traction, is minimized. A wide range of slope geometry can be accommodated by selecting the appropriate cell size and cell depth for the aggregate in question.

In slope protection applications, the perforated Geoweb system is generally recommended over the non-perforated system with most infill materials.





Easy Installation

The Geoweb system is designed with ease of installation in mind. Geoweb sections collapse into lightweight, compact bundles for easy shipment. During installation, sections remain flexible and easy to handle.

Tools & Services

- General Overview - Product data, basic engineering concepts and theory for general application of the Geoweb system.
- Application Overview - Illustrative project examples using the Geoweb system.
- Case Histories - Project specific design, construction and performance information for the Geoweb system in all application areas.
- Design Package:
  - SPECMaker Specification Development Tool - A CD tool used to develop complete material and construction specifications.
  - System Components Guideline - A set of tables relating to application-specific system components.
  - Presto & CSI - format Material Specifications - Comprehensive guide specification and product description of the Geoweb system.
  - Request for Project Evaluation - A product checklist to insure all relevant data is collected for detailed engineering design of the Geoweb system.
  - Technical Overview - An in-depth discourse centered around the theory and application of theory for solving problems with the Geoweb system.
  - AutoCAD Drawings - Drawings in DWG format and paper copy providing all the engineering details needed for plans with the Geoweb system.
- Construction Package:
  - SPECMaker Specification Development Tool - A CD tool used to develop complete material and construction specifications.
  - Installation Guideline - An illustrated set of installation procedures and construction tips for each application.
- Videos - Product application and construction techniques videos available in multiple languages.
- Technical Resources Library CD - All application documents, AutoCAD drawings, SPECMaker™ software, clip art library, Power Point presentations, video clips and more.
- Project Evaluation Service - Available through authorized distributors for all applications.

For more information, call the Presto Technical Assistance Line at (800) 548-3424 or (920) 738-1118.

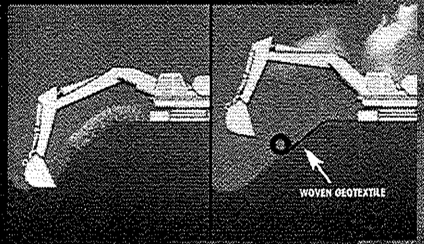
Leaders in Advanced Geotechnology™

PRESTO PRODUCTS COMPANY
Geosystems® Products
P.O. Box 2399, Appleton, WI, USA 54912-2399
☎ **1-800-548-3424 or 920-738-1118**
Fax: 920-738-1222
Email: info@prestogeo.com www.prestogeo.com

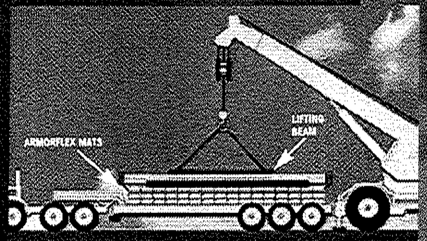
Printed in the U.S.A. 2000

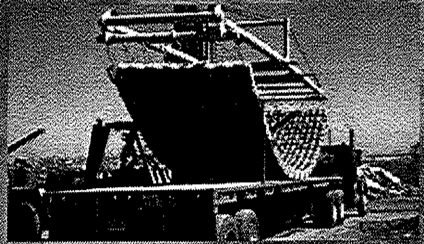
ARMORFLEX® INSTALLATION

- ArmorFlex arrives on-site as a system of factory-assembled mats. ArmorFlex is placed on a site specific geotextile which has been placed on a prepared subgrade using conventional construction equipment.
- Mats are supplied on 42-foot trailers, up to 1600 square feet per truck.
- Mats can be handled with a spreader bar which is provided by Armortec with the initial load.
- Permanent anchorage can be achieved by connecting the mat cables to patented anchors such as "Helix" or "Duckbill".
- Mats subject to wave attack should be blinded with a sand/gravel mixture. Above normal waterline mats may be topsoiled and seeded to give a "green" effect.
- Proper toe trench requires a minimum of 2 rows of block buried below predicated soil depth.
- Mats subject to wave attack are required to have a bedding layer of crushed stone or gravel.

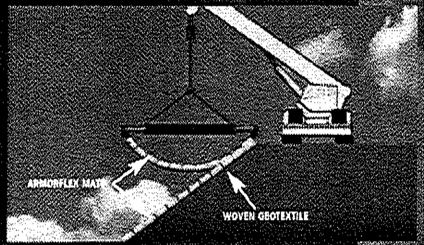


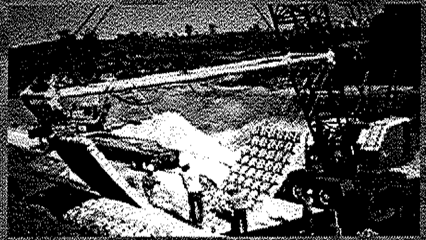
SITE PREPARATION



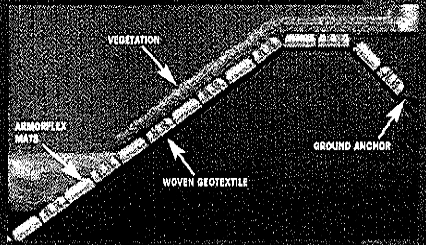


DELIVERY & UNLOADING





INSTALLING & LIFTING DEVICE



BACKFILL & VEGETATION

OTHER ARMORTEC™ BROCHURES

ARMORLOC · A-JACKS COASTAL
A-JACKS STREAMBANK & SCOUR
ARMORTEC MULTI-PRODUCT
ARMORFLEX HAND PLACED · ARMORWEDGE
ARMORFLEX OS · DITCHLOK

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EARTH STABILIZATION SOLUTIONS INC

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Erosion Control Solutions
A CONTECH COMPANY

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West Chester, OH 45069

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www.armortec.com
www.armortecsoftware.com

AAF06

ARMORFLEX®

ARTICULATING CONCRETE BLOCK REVETMENT SYSTEM

APPLICATIONS

CHANNEL LINING
RIVERBANK PROTECTION
DRAINAGE DITCH LINING
PIPELINE PROTECTION
BOAT RAMPS
RESERVOIR SLOPE PROTECTION
LAKE SHORELINE PROTECTION
BRIDGE ABUTMENT PROTECTION
DIKES AND LEVY PROTECTION
DAM CRESTS AND SPILLWAYS
WEIRS AND OVERFLOW CHANNELS

ARMORTEC
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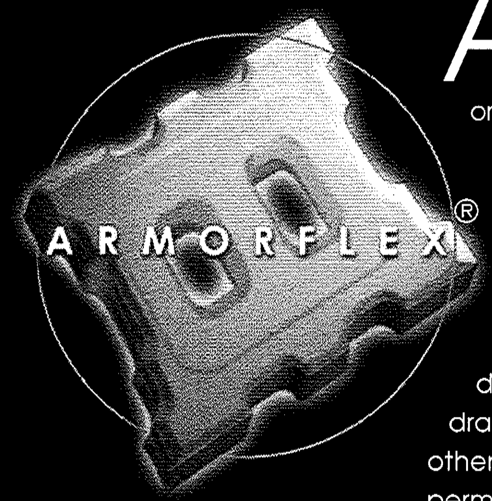
EROSION CONTROL SOLUTIONS



ArmorFlex is a flexible, interlocking matrix of concrete blocks of uniform size, shape and weight connected by a series of cables which pass longitudinally through preformed ducts in each block. ArmorFlex is installed over site specific filter fabric on a prepared surface. ArmorFlex revetment systems combine the favorable aspects of lightweight blankets and meshes, such as porosity, flexibility, vegetation encouragement and habitat enhancement with nonerodible, self-weight and high tractive force resistance of a rigid lining.

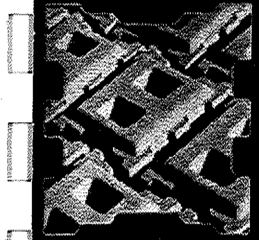
ArmorFlex has proven to be an aesthetic and functional alternative to dumped stone riprap, gabions, structural concrete and other heavy-duty, durable erosion protection systems. ArmorFlex is easy to install, therefore, can dramatically reduce overall project costs. More specifically, when compared to other systems, life-cycle costs have been reduced because ArmorFlex is a permanent system and saves on subsequent maintenance expenses.

FEATURES

- STABILITY
- FLEXIBILITY
- PERFORMANCE
- COST EFFECTIVE
- VEGETATION
- PERMEABILITY
- EASY TO INSTALL

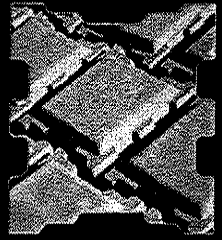
BLOCK STYLES

OPEN CELL



20% OPEN

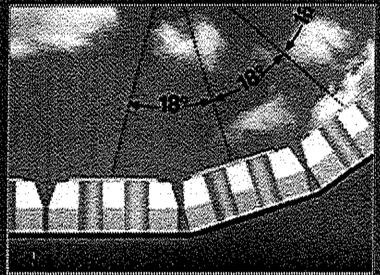
CLOSED CELL



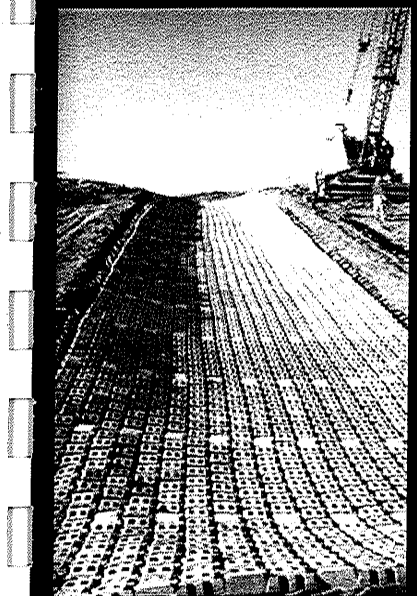
10% OPEN

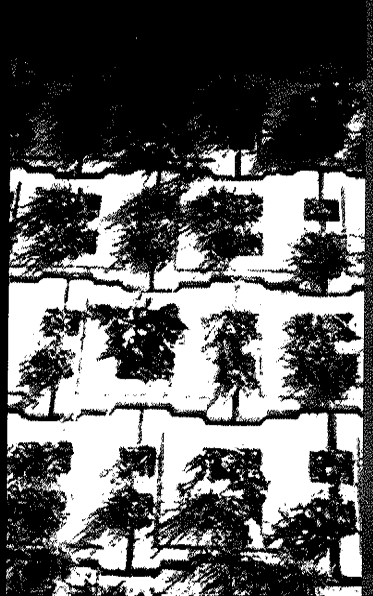
When placed on a site specific filter fabric, the permeability of the revetment system relieves hydrostatic pressure in the subgrade. The system's capability for soil retention prevents leaching of subsoils throughout the installation.

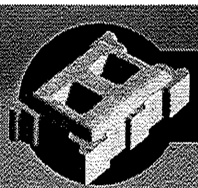
FLEXIBILITY



ArmorFlex blocks are interconnected by flexible cables, providing articulation between adjacent blocks. Block walls are designed with beveled side walls to allow for flexibility in all directions.



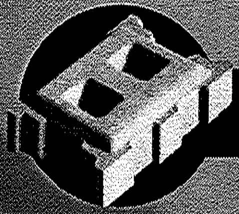




CONCRETE BLOCK "S" CLASS

Example: from chart right

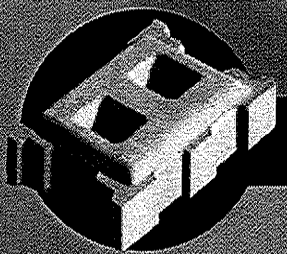
Class 30S
Open Cell
Block Weight 31-36 lbs.
Open Area 20%



STANDARD CLASS CONCRETE BLOCK

Example: from chart right

Class 40
Open Cell
Block Weight 62-71 lbs.
Open Area 20%



CONCRETE BLOCK "L" CLASS

Example: from chart right

Class 40L
Closed Cell
Block Weight 90-106 lbs.
Open Area 20%

ARMORFLEX® BLOCK SPECIFICATIONS

Concrete Block Class	Open/ Closed Cell	Nominal Dimensions			Gross Area/ (sq. ft.)	Block Weight		Open Area %
		L	W	H		lbs.	lbs./sq. ft.	
30s	Open	13.0	11.6	4.75	0.98	31-36	32-37	20
50s	Open	13.0	11.6	6.00	0.98	45-52	45-53	20
40	Open	17.4	15.5	4.75	1.77	62-71	35-40	20
50	Open	17.4	15.5	6.00	1.77	81-94	46-53	20
60	Open	17.4	15.5	7.50	1.77	99-113	56-64	20
70	Open	17.4	15.5	9.00	1.77	120-138	68-78	20
40L	Open	17.4	23.6	4.75	2.58	90-106	35-41	20
50L	Open	17.4	23.6	6.00	2.58	116-134	45-52	20
60L	Open	17.4	23.6	7.50	2.58	144-168	56-65	20
70L	Open	17.4	23.6	9.00	2.58	173-201	67-78	20
45s	Closed	13.0	11.6	4.75	0.98	39-45	40-45	10
55s	Closed	13.0	11.6	6.00	0.98	53-61	54-62	10
45	Closed	17.4	15.5	4.75	1.77	78-89	43-50	10
55	Closed	17.4	15.5	6.00	1.77	94-108	53-61	10
75	Closed	17.4	15.5	7.50	1.77	120-138	68-78	10
85	Closed	17.4	15.5	9.00	1.77	145-167	82-98	10
45L	Closed	17.4	23.6	4.75	2.58	108-126	42-49	10
55L	Closed	17.4	23.6	6.00	2.58	139-163	54-63	10
75L	Closed	17.4	23.6	7.50	2.58	173-201	67-78	10
85L	Closed	17.4	23.6	9.00	2.58	209-243	81-94	10

MINIMUM PHYSICAL REQUIREMENTS

- Compressive Strength of 4,000 psi
- Max. Absorption of 12 lbs / ft^3
- Specific wt. of 130 - 150 lbs /ft^3

RESEARCH AND DESIGN

Since 1980, ArmorTec has initiated and participated in a wide range of research projects to evaluate the performance of ArmorFlex, including the following:

- Tetratech model tests - California, U.S.A.
- Wave Attack Tests, Report No. M1910 - Delft Hydraulics Laboratory, 1982
- "Large-Scale model study of ArmorFlex slope protection" Tekmarine, Inc., May, 1984
- "Design for Reinforced Grass Waterways," - CIRIA Report 116, 1987
- "Minimizing Embankment Damage During Overtopping Flows," FHWA Report-RD-88-181 prepared by Simons, Li and Associates, Inc, November 1988
- "Hydraulic Stability of Articulated Concrete Block Revetment Systems During Overtopping Flow," FHWA Report-RD-89-199 prepared by Simons, Li and Associates, Inc., July 1989
- ArmorFlex Overtopping Test, prepared by Ayers Associates, Inc.

RESEARCH PROVEN PERFORMANCE

Armortec has carried out extensive research into wave and open channel flow conditions on ArmorFlex in the United Sates and the Netherlands. Design manuals and computer programs are available to assist in the proper ArmorFlex block selection for your hydraulic conditions. Design recommendations can thus be made on the basis of specific research data and sound engineering principles.

WL | delft hydraulics

Dam Overtopping Tests

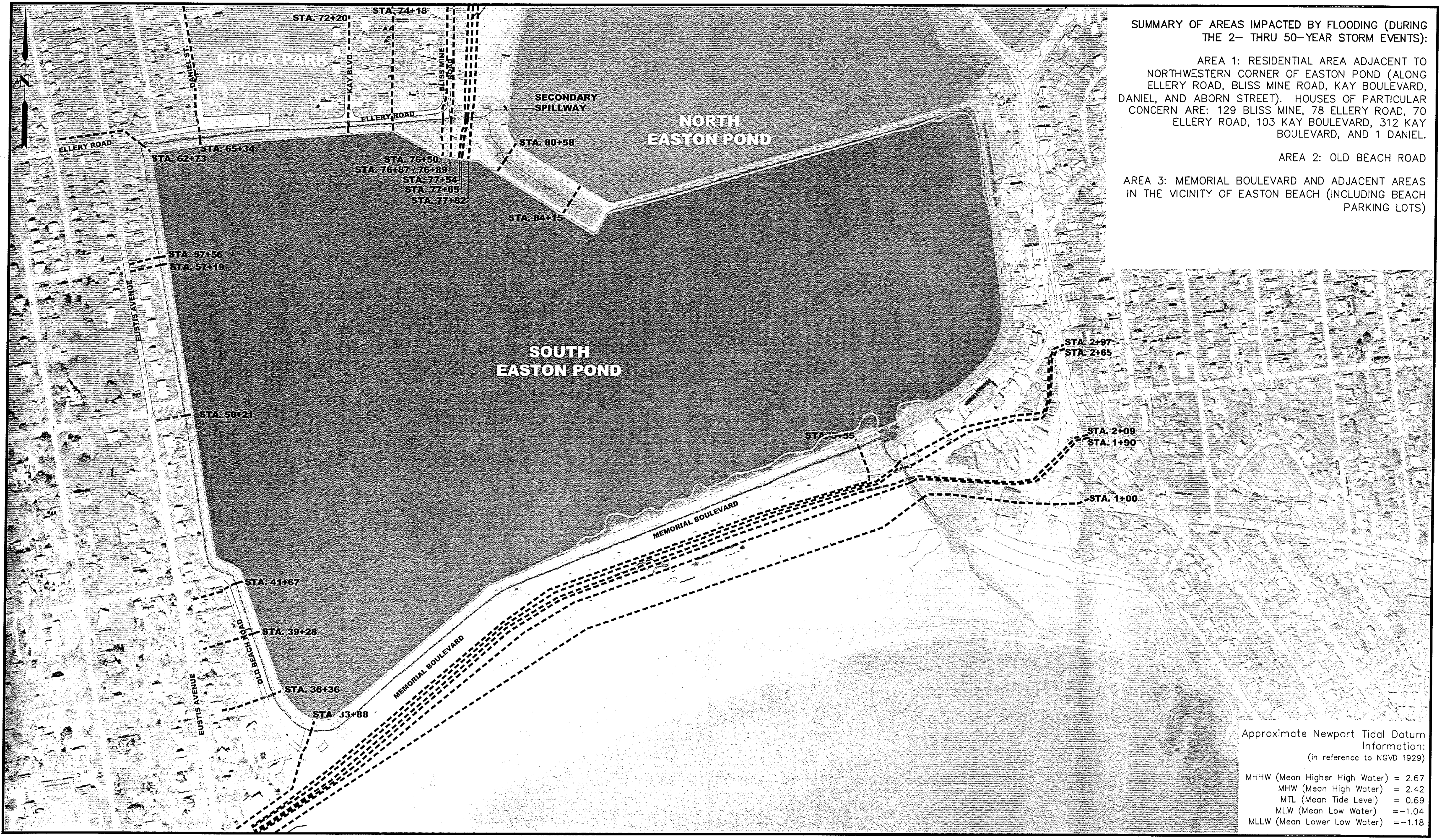
APPENDIX F

HEC-RAS ANALYSIS

Appendix F
HEC-RAS Analyses

I. Cross-Section Location Map

File Path: F:\Dwg\P2006\0901\A10\Plan\DRAINAGE\TM2 Figures\Pre-Development Flooding Conditions.dwg, Layout: 24x36-L_RI Thu, Mar 29, 2007 - 5:21 PM User:



SUMMARY OF AREAS IMPACTED BY FLOODING (DURING THE 2– THRU 50–YEAR STORM EVENTS):

AREA 1: RESIDENTIAL AREA ADJACENT TO NORTHWESTERN CORNER OF EASTON POND (ALONG ELLERY ROAD, BLISS MINE ROAD, KAY BOULEVARD, DANIEL, AND ABORN STREET). HOUSES OF PARTICULAR CONCERN ARE: 129 BLISS MINE, 78 ELLERY ROAD, 70 ELLERY ROAD, 103 KAY BOULEVARD, 312 KAY BOULEVARD, AND 1 DANIEL.

AREA 2: OLD BEACH ROAD

AREA 3: MEMORIAL BOULEVARD AND ADJACENT AREAS IN THE VICINITY OF EASTON BEACH (INCLUDING BEACH PARKING LOTS)

Approximate Newport Tidal Datum Information:
(in reference to NGVD 1929)

MHHW (Mean Higher High Water) = 2.67
MHW (Mean High Water) = 2.42
MTL (Mean Tide Level) = 0.69
MLW (Mean Low Water) =−1.04
MLLW (Mean Lower Low Water) =−1.18

No.	DATE	DESCRIPTION	BY
1.			

REVISIONS

PROJ. MANAGER:
CHIEF DESIGNER:
REVIEWED BY: DATE

SCALE:
HORZ.: 1" = 400'
VERT.:
DATUM:
HORZ.:
VERT.:
0 200 400
GRAPHIC SCALE

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CITY OF NEWPORT
CROSS-SECTION LOCATION MAP
EASTON POND DAM & MOAT STUDY
NEWPORT RHODE ISLAND

PROJ. No.: 20060901.A10
DATE: MARCH 2007

FLOOD
XCS-1

UCS: MS VIEW: LMAN: CTB:

II. Summary of Peak Flows Used in Analyses

I. Steady-Flow Peak Discharge Rates Used in Analyses (Previously Computed as Part of Our Hydrologic Analysis)

Cross-Section Location	Cross-Section Description	Peak Flow Rates (cfs)[a]				
		2-Year Storm	5-Year Storm	10-Year Storm	25-Year Storm	50-Year Storm
Sta. 77+82	Downstream of North Easton Pond Secondary Spillway	150.1	240.7	300.9	364.3	459.6
Sta. 65+34	Downstream of Daniel Street Culvert	151.4	242.6	303.0	366.8	462.7
Sta. 62+71	Downstream of 3-36" Culverts at Northwestern Corner of Moat	278.5	383.6	454.3	548.5	642.5
Sta. 62+57	Downstream of 48" Culvert at Northwestern Corner of Moat	395.3	540.9	638.5	768.6	898.4
Sta. 50+21	Downstream of Catherine Street Culvert	473.1	650.1	768.9	927.5	1085.9
Sta. 33+88	Southwestern Corner of Moat at Old Beach Road/Memorial Boulevard Intersection	513.1	709.4	841.6	1018.3	1195.2
Sta. 02+65	Immediately Upstream of Memorial Boulevard Culvert	627.4	867.3	1028.8	1244.7	1460.6

Note:

a. "cfs" refers to cubic feet per second.

II. Upstream and Downstream Water Surface Boundary Elevations used in Analyses

Downstream Elevation Used for All Storm Events
Mean Higher High Water – Elev. 2.67 Feet (from NOAAWebsite)

Upstream Elevation Used (Water Surface Elevation of North Easton Pond as Determined from Our Hydrologic Analysis)
2-Year Storm – 11.52 Feet
5-Year Storm – 11.77 Feet
10-Year Storm – 11.92 Feet
25-Year Storm – 12.07 Feet
50-Year Storm – 12.27 Feet

III. Baseline Hydraulic Model

- **Water Surface Elevation Summary Table**
- **Computed Water Surface Profile**
- **Manning's Coefficient Values Used in Analysis**
- **Cross-Section Geometry Input Data Used in Analysis**

- **Water Surface Elevation Summary Table**

BASELINE HYDRAULIC
MODELRESULTS
PAGE 1 OF 6

HEC-RAS Plan: Base River: Moat Reach: Moat

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	8415	2-Year	0.01	6.70	12.09	6.72	12.09	0.000000	0.00	3496.63	1938.92	0.00
Moat	8415	5-Year	0.01	6.70	12.58	6.72	12.58	0.000000	0.00	4444.59	1940.38	0.00
Moat	8415	10-Year	0.01	6.70	12.76	6.72	12.76	0.000000	0.00	4789.10	1940.92	0.00
Moat	8415	25-Year	0.01	6.70	12.88	6.72	12.88	0.000000	0.00	5026.91	1941.28	0.00
Moat	8415	50-Year	0.01	6.70	12.97	6.72	12.97	0.000000	0.00	5211.00	1941.57	0.00
Moat	8236.5*	2-Year	0.01	6.70	12.09	6.72	12.09	0.000000	0.00	3496.63	1938.92	0.00
Moat	8236.5*	5-Year	0.01	6.70	12.58	6.72	12.58	0.000000	0.00	4444.59	1940.38	0.00
Moat	8236.5*	10-Year	0.01	6.70	12.76	6.72	12.76	0.000000	0.00	4789.10	1940.92	0.00
Moat	8236.5*	25-Year	0.01	6.70	12.88	6.72	12.88	0.000000	0.00	5026.91	1941.28	0.00
Moat	8236.5*	50-Year	0.01	6.70	12.97	6.72	12.97	0.000000	0.00	5211.00	1941.57	0.00
Moat	8058	2-Year	0.01	6.70	12.09	6.72	12.09	0.000000	0.00	3496.63	1938.92	0.00
Moat	8058	5-Year	0.01	6.70	12.58	6.72	12.58	0.000000	0.00	4444.59	1940.38	0.00
Moat	8058	10-Year	0.01	6.70	12.76	6.72	12.76	0.000000	0.00	4789.10	1940.92	0.00
Moat	8058	25-Year	0.01	6.70	12.88	6.72	12.88	0.000000	0.00	5026.91	1941.28	0.00
Moat	8058	50-Year	0.01	6.70	12.97	6.72	12.97	0.000000	0.00	5211.00	1941.57	0.00
Moat	7920.*	2-Year	0.01	6.70	12.09	6.72	12.09	0.000000	0.00	3455.37	2005.02	0.00
Moat	7920.*	5-Year	0.01	6.70	12.58	6.72	12.58	0.000000	0.00	4440.54	2024.94	0.00
Moat	7920.*	10-Year	0.01	6.70	12.76	6.72	12.76	0.000000	0.00	4800.60	2031.54	0.00
Moat	7920.*	25-Year	0.01	6.70	12.88	6.72	12.88	0.000000	0.00	5049.76	2036.10	0.00
Moat	7920.*	50-Year	0.01	6.70	12.97	6.72	12.97	0.000000	0.00	5243.00	2039.63	0.00
Moat	7782	2-Year	150.11	6.70	12.09	8.50	12.09	0.000000	0.02	3945.39	2140.48	0.00
Moat	7782	5-Year	240.74	6.70	12.58	8.68	12.58	0.000000	0.03	4995.78	2158.13	0.00
Moat	7782	10-Year	300.86	6.70	12.76	8.76	12.76	0.000000	0.03	5379.43	2164.55	0.00
Moat	7782	25-Year	364.30	6.70	12.88	8.84	12.88	0.000001	0.04	5644.83	2168.97	0.00
Moat	7782	50-Year	459.58	6.70	12.97	8.94	12.97	0.000001	0.05	5850.56	2172.40	0.00
Moat	7765	2-Year	150.11	7.87	12.09	8.68	12.09	0.000000	0.02	4501.04	2471.94	0.00
Moat	7765	5-Year	240.74	7.87	12.58	8.85	12.58	0.000000	0.02	5713.17	2488.54	0.00
Moat	7765	10-Year	300.86	7.87	12.76	8.93	12.76	0.000000	0.03	6155.43	2494.57	0.00
Moat	7765	25-Year	364.30	7.87	12.88	9.02	12.88	0.000000	0.03	6461.25	2498.73	0.00
Moat	7765	50-Year	459.58	7.87	12.97	9.13	12.97	0.000001	0.04	6698.22	2501.95	0.00
Moat	7754	2-Year	150.11	7.87	12.09	8.57	12.09	0.000000	0.02	4618.67	2481.31	0.00
Moat	7754	5-Year	240.74	7.87	12.58	8.77	12.58	0.000000	0.03	5835.24	2497.38	0.00
Moat	7754	10-Year	300.86	7.87	12.76	8.84	12.76	0.000000	0.03	6279.05	2503.21	0.00
Moat	7754	25-Year	364.30	7.87	12.88	8.91	12.88	0.000000	0.03	6585.92	2507.24	0.00
Moat	7754	50-Year	459.58	7.87	12.97	9.00	12.97	0.000001	0.04	6823.69	2510.36	0.00
Moat	7689	2-Year	150.11	6.48	12.09	8.23	12.09	0.000000	0.02	4775.03	2508.04	0.00
Moat	7689	5-Year	240.74	6.48	12.58	8.39	12.58	0.000000	0.02	6004.29	2522.59	0.00
Moat	7689	10-Year	300.86	6.48	12.76	8.48	12.76	0.000000	0.03	6452.52	2527.87	0.00
Moat	7689	25-Year	364.30	6.48	12.88	8.56	12.88	0.000000	0.03	6762.37	2531.52	0.00
Moat	7689	50-Year	459.58	6.48	12.97	8.68	12.97	0.000001	0.04	7002.41	2534.34	0.00
Moat	7687	2-Year	150.11	6.48	12.09	8.23	12.09	0.000000	0.02	4775.12	2508.14	0.00
Moat	7687	5-Year	240.74	6.48	12.58	8.38	12.58	0.000000	0.02	6004.43	2522.69	0.00
Moat	7687	10-Year	300.86	6.48	12.76	8.48	12.76	0.000000	0.03	6452.68	2527.97	0.00
Moat	7687	25-Year	364.30	6.48	12.88	8.56	12.88	0.000000	0.03	6762.54	2531.62	0.00
Moat	7687	50-Year	459.58	6.48	12.97	8.67	12.97	0.000001	0.04	7002.58	2534.44	0.00
Moat	7650	2-Year	150.11	5.79	12.09	8.57	12.09	0.000000	0.03	4777.16	2515.80	0.00
Moat	7650	5-Year	240.74	5.79	12.58	8.70	12.58	0.000000	0.03	6010.48	2531.45	0.00
Moat	7650	10-Year	300.86	5.79	12.76	8.75	12.76	0.000000	0.04	6460.31	2537.13	0.00
Moat	7650	25-Year	364.30	5.79	12.88	8.80	12.88	0.000000	0.04	6771.30	2541.05	0.00
Moat	7650	50-Year	459.58	5.79	12.97	8.88	12.97	0.000001	0.05	7012.24	2544.09	0.00
Moat	7534.*	2-Year	150.11	5.63	12.09	7.78	12.09	0.000000	0.03	4202.35	2374.00	0.00
Moat	7534.*	5-Year	240.74	5.63	12.58	8.53	12.58	0.000000	0.04	5366.77	2391.36	0.00
Moat	7534.*	10-Year	300.86	5.63	12.76	8.66	12.76	0.000000	0.05	5791.77	2397.66	0.00
Moat	7534.*	25-Year	364.30	5.63	12.88	8.75	12.88	0.000000	0.05	6085.68	2402.01	0.00
Moat	7534.*	50-Year	459.58	5.63	12.97	8.87	12.97	0.000001	0.06	6313.40	2405.38	0.01
Moat	7418	2-Year	150.11	5.47	12.09	7.65	12.09	0.000000	0.07	3755.26	2218.95	0.01
Moat	7418	5-Year	240.74	5.47	12.58	8.71	12.58	0.000000	0.08	4844.51	2238.83	0.01
Moat	7418	10-Year	300.86	5.47	12.76	8.91	12.76	0.000000	0.09	5242.49	2246.05	0.01
Moat	7418	25-Year	364.30	5.47	12.88	9.05	12.88	0.000001	0.10	5517.84	2251.03	0.01
Moat	7418	50-Year	459.58	5.47	12.97	9.23	12.97	0.000001	0.12	5731.21	2254.88	0.01
Moat	7220	2-Year	150.11	6.02	12.09	8.28	12.09	0.000000	0.07	3750.87	2220.43	0.01
Moat	7220	5-Year	240.74	6.02	12.58	8.86	12.58	0.000000	0.08	4840.81	2240.31	0.01
Moat	7220	10-Year	300.86	6.02	12.76	9.01	12.76	0.000000	0.09	5239.03	2247.53	0.01
Moat	7220	25-Year	364.30	6.02	12.88	9.13	12.88	0.000001	0.10	5514.51	2252.51	0.01

BASELINE
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HEC-RAS Plan: Base River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	7220	50-Year	459.58	6.02	12.97	9.31	12.97	0.000001	0.12	5727.93	2256.36	0.01
Moat	7048.5*	2-Year	150.11	5.97	12.09	8.07	12.09	0.000000	0.07	3757.02	2236.85	0.01
Moat	7048.5*	5-Year	240.74	5.97	12.58	8.59	12.58	0.000000	0.08	4855.78	2259.92	0.01
Moat	7048.5*	10-Year	300.86	5.97	12.75	8.93	12.76	0.000000	0.09	5257.54	2268.15	0.01
Moat	7048.5*	25-Year	364.30	5.97	12.88	9.25	12.88	0.000001	0.10	5535.55	2273.83	0.01
Moat	7048.5*	50-Year	459.58	5.97	12.97	9.45	12.97	0.000001	0.12	5750.93	2278.22	0.01
Moat	6877.*	2-Year	150.11	5.92	12.09	7.87	12.09	0.000000	0.07	3753.40	2251.14	0.01
Moat	6877.*	5-Year	240.74	5.92	12.58	8.39	12.58	0.000000	0.08	4859.98	2277.81	0.01
Moat	6877.*	10-Year	300.86	5.92	12.75	8.66	12.75	0.000000	0.09	5265.00	2287.17	0.01
Moat	6877.*	25-Year	364.30	5.92	12.88	8.90	12.88	0.000001	0.10	5545.34	2293.57	0.01
Moat	6877.*	50-Year	459.58	5.92	12.97	9.33	12.97	0.000001	0.12	5762.52	2298.51	0.01
Moat	6705.5*	2-Year	150.11	5.87	12.09	7.69	12.09	0.000000	0.07	3740.30	2263.41	0.01
Moat	6705.5*	5-Year	240.74	5.87	12.58	8.21	12.58	0.000000	0.08	4853.87	2294.19	0.01
Moat	6705.5*	10-Year	300.86	5.87	12.75	8.48	12.75	0.000000	0.09	5261.91	2305.25	0.01
Moat	6705.5*	25-Year	364.30	5.87	12.88	8.72	12.88	0.000001	0.10	5544.47	2312.39	0.01
Moat	6705.5*	50-Year	459.58	5.87	12.97	9.04	12.97	0.000001	0.12	5763.37	2317.91	0.01
Moat	6534	2-Year	151.40	5.82	12.09	7.51	12.09	0.000000	0.07	3718.70	2272.85	0.01
Moat	6534	5-Year	242.55	5.82	12.58	8.04	12.58	0.000000	0.08	4837.89	2307.78	0.01
Moat	6534	10-Year	302.99	5.82	12.75	8.30	12.75	0.000000	0.09	5248.45	2320.46	0.01
Moat	6534	25-Year	366.84	5.82	12.88	8.54	12.88	0.000001	0.10	5532.92	2329.10	0.01
Moat	6534	50-Year	462.72	5.82	12.97	8.86	12.97	0.000001	0.12	5753.34	2335.21	0.01
Moat	6405.5*	2-Year	151.40	5.57	12.09	8.34	12.09	0.000000	0.06	3552.20	2198.05	0.01
Moat	6405.5*	5-Year	242.55	5.57	12.58	8.83	12.58	0.000000	0.07	4632.91	2225.19	0.01
Moat	6405.5*	10-Year	302.99	5.57	12.75	9.07	12.75	0.000000	0.08	5028.56	2235.19	0.01
Moat	6405.5*	25-Year	366.84	5.57	12.88	9.32	12.88	0.000001	0.09	5302.45	2242.09	0.01
Moat	6405.5*	50-Year	462.72	5.57	12.97	9.64	12.97	0.000001	0.11	5514.54	2247.42	0.01
Moat	6277	2-Year	151.40	5.32	12.08	7.33	12.09	0.000097	0.81	203.65	2133.66	0.09
Moat	6277	5-Year	242.55	5.32	12.58	8.04	12.58	0.000000	0.06	4499.98	2162.77	0.01
Moat	6277	10-Year	302.99	5.32	12.75	8.58	12.75	0.000001	0.07	4884.27	2169.84	0.01
Moat	6277	25-Year	366.84	5.32	12.88	9.42	12.88	0.000001	0.08	5150.01	2174.72	0.01
Moat	6277	50-Year	462.72	5.32	12.97	9.88	12.97	0.000001	0.10	5355.59	2178.49	0.01
Moat	6276		Bridge									
Moat	6271	2-Year	278.46	5.32	12.08	8.39	12.11	0.000331	1.49	203.31	2133.53	0.17
Moat	6271	5-Year	383.63	5.32	12.58	9.50	12.58	0.000001	0.10	4499.98	2162.77	0.01
Moat	6271	10-Year	454.27	5.32	12.75	9.82	12.75	0.000001	0.11	4884.26	2169.84	0.01
Moat	6271	25-Year	548.49	5.32	12.88	10.33	12.88	0.000001	0.12	5150.00	2174.72	0.01
Moat	6271	50-Year	642.52	5.32	12.97	10.65	12.97	0.000002	0.13	5355.57	2178.49	0.01
Moat	6257	2-Year	395.31	4.71	12.04	9.12	12.10	0.000480	1.99	216.39	2131.79	0.22
Moat	6257	5-Year	540.87	4.71	12.58	9.73	12.58	0.000002	0.15	4517.00	2162.76	0.02
Moat	6257	10-Year	638.48	4.71	12.75	10.05	12.75	0.000002	0.16	4901.24	2169.84	0.02
Moat	6257	25-Year	768.61	4.71	12.88	10.42	12.88	0.000003	0.18	5166.87	2174.71	0.02
Moat	6257	50-Year	898.43	4.71	12.97	11.00	12.97	0.000003	0.20	5372.32	2178.48	0.02
Moat	6090.33*	2-Year	395.31	4.82	11.95	9.08	12.01	0.000532	2.12	190.94	2671.57	0.23
Moat	6090.33*	5-Year	540.87	4.82	12.58	9.66	12.58	0.000001	0.12	5677.38	2701.12	0.01
Moat	6090.33*	10-Year	638.48	4.82	12.75	9.95	12.75	0.000001	0.13	6157.03	2707.57	0.01
Moat	6090.33*	25-Year	768.61	4.82	12.88	10.30	12.88	0.000002	0.15	6488.27	2712.01	0.01
Moat	6090.33*	50-Year	898.43	4.82	12.97	10.65	12.97	0.000002	0.17	6744.28	2715.43	0.02
Moat	5923.66*	2-Year	395.31	4.92	11.85	9.01	11.92	0.000569	2.21	179.12	3209.43	0.24
Moat	5923.66*	5-Year	540.87	4.92	12.58	9.55	12.58	0.000001	0.10	6849.82	3241.73	0.01
Moat	5923.66*	10-Year	638.48	4.92	12.75	9.84	12.75	0.000001	0.11	7425.24	3247.22	0.01
Moat	5923.66*	25-Year	768.61	4.92	12.88	10.18	12.88	0.000001	0.12	7822.30	3251.00	0.01
Moat	5923.66*	50-Year	898.43	4.92	12.97	10.52	12.97	0.000001	0.14	8129.02	3253.92	0.01
Moat	5757	2-Year	395.31	5.03	11.74	8.87	11.83	0.000569	2.30	171.63	3766.69	0.24
Moat	5757	5-Year	540.87	5.03	12.58	9.46	12.58	0.000001	0.09	8032.77	3786.65	0.01
Moat	5757	10-Year	638.48	5.03	12.75	9.78	12.75	0.000001	0.09	8704.67	3790.51	0.01
Moat	5757	25-Year	768.61	5.03	12.88	10.13	12.88	0.000001	0.11	9167.97	3793.16	0.01
Moat	5757	50-Year	898.43	5.03	12.97	10.44	12.97	0.000001	0.12	9525.67	3795.21	0.01
Moat	5756	2-Year	395.31	5.03	11.72	9.17	11.82	0.001001	2.54	155.61	3766.34	0.28
Moat	5756	5-Year	540.87	5.03	12.58	9.78	12.58	0.000001	0.08	8017.97	3786.65	0.01
Moat	5756	10-Year	638.48	5.03	12.75	10.10	12.75	0.000001	0.08	8689.88	3790.51	0.01
Moat	5756	25-Year	768.61	5.03	12.88	10.45	12.88	0.000001	0.09	9153.17	3793.16	0.01
Moat	5756	50-Year	898.43	5.03	12.97	10.84	12.97	0.000001	0.10	9510.87	3795.21	0.01

BASELINE

HEC-RAS Plan: Base River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	5720	2-Year	395.31	4.80	11.70	9.24	11.79	0.000925	2.36	167.82	3775.42	0.27
Moat	5720	5-Year	540.87	4.80	12.58	9.75	12.58	0.000001	0.07	8041.69	3798.63	0.01
Moat	5720	10-Year	638.48	4.80	12.75	10.02	12.75	0.000001	0.08	8715.62	3801.38	0.01
Moat	5720	25-Year	768.61	4.80	12.88	10.36	12.88	0.000001	0.09	9180.17	3803.28	0.01
Moat	5720	50-Year	898.43	4.80	12.97	10.67	12.97	0.000001	0.09	9538.78	3804.74	0.01
Moat	5719	2-Year	395.31	4.80	11.70	9.14	11.78	0.000653	2.26	174.61	3775.50	0.25
Moat	5719	5-Year	540.87	4.80	12.49	9.63	12.57	0.000614	2.30	235.29	3796.98	0.25
Moat	5719	10-Year	638.48	4.80	12.75	9.91	12.75	0.000001	0.08	8722.14	3801.38	0.01
Moat	5719	25-Year	768.61	4.80	12.88	10.23	12.88	0.000001	0.09	9186.69	3803.28	0.01
Moat	5719	50-Year	898.43	4.80	12.97	10.54	12.97	0.000001	0.10	9545.30	3804.74	0.01
Moat	5544.5*	2-Year	395.31	4.73	11.57	8.93	11.66	0.000716	2.45	161.67	3766.85	0.27
Moat	5544.5*	5-Year	540.87	4.73	12.36	9.45	12.45	0.000678	2.51	215.50	3784.62	0.26
Moat	5544.5*	10-Year	638.48	4.73	12.75	9.74	12.75	0.000001	0.08	8710.35	3795.76	0.01
Moat	5544.5*	25-Year	768.61	4.73	12.88	10.09	12.88	0.000001	0.09	9174.11	3797.61	0.01
Moat	5544.5*	50-Year	898.43	4.73	12.97	10.39	12.97	0.000001	0.10	9532.05	3799.03	0.01
Moat	5370.*	2-Year	395.31	4.66	11.43	8.68	11.53	0.000746	2.61	151.40	3758.24	0.27
Moat	5370.*	5-Year	540.87	4.66	12.21	9.24	12.33	0.000754	2.72	198.67	3775.15	0.28
Moat	5370.*	10-Year	638.48	4.66	12.62	9.55	12.74	0.000798	2.81	227.48	3786.07	0.29
Moat	5370.*	25-Year	768.61	4.66	12.88	9.92	12.88	0.000001	0.09	9162.96	3792.10	0.01
Moat	5370.*	50-Year	898.43	4.66	12.97	10.24	12.97	0.000001	0.10	9520.28	3793.50	0.01
Moat	5195.5*	2-Year	395.31	4.60	11.29	8.40	11.40	0.000729	2.74	144.27	3750.08	0.27
Moat	5195.5*	5-Year	540.87	4.60	12.06	8.99	12.19	0.000821	2.93	184.53	3766.62	0.29
Moat	5195.5*	10-Year	638.48	4.60	12.45	9.33	12.59	0.000867	3.06	208.87	3774.22	0.30
Moat	5195.5*	25-Year	768.61	4.60	12.88	9.71	12.88	0.000001	0.10	9153.48	3786.85	0.01
Moat	5195.5*	50-Year	898.43	4.60	12.97	10.06	12.97	0.000001	0.11	9510.16	3788.21	0.01
Moat	5021	2-Year	473.06	4.53	11.05	8.44	11.24	0.001091	3.48	136.05	3742.98	0.33
Moat	5021	5-Year	650.09	4.53	11.76	9.11	11.99	0.001331	3.90	166.83	3755.16	0.37
Moat	5021	10-Year	768.87	4.53	12.11	9.49	12.38	0.001518	4.16	184.94	3762.35	0.40
Moat	5021	25-Year	927.54	4.53	12.54	9.94	12.84	0.001689	4.42	209.78	3770.43	0.42
Moat	5021	50-Year	1085.94	4.53	12.97	10.33	12.97	0.000002	0.13	9500.97	3783.09	0.01
Moat	4850.2*	2-Year	473.06	4.36	10.85	8.47	11.04	0.001214	3.50	135.22	3745.36	0.35
Moat	4850.2*	5-Year	650.09	4.36	11.53	9.09	11.76	0.001405	3.89	167.28	3757.36	0.38
Moat	4850.2*	10-Year	768.87	4.36	11.84	9.44	12.11	0.001590	4.17	184.40	3763.96	0.41
Moat	4850.2*	25-Year	927.54	4.36	12.24	9.86	12.55	0.001774	4.46	207.98	3771.96	0.43
Moat	4850.2*	50-Year	1085.94	4.36	12.59	10.23	12.93	0.001979	4.69	231.54	3781.11	0.46
Moat	4679.4*	2-Year	473.06	4.19	10.64	8.41	10.83	0.001252	3.49	135.37	3744.06	0.36
Moat	4679.4*	5-Year	650.09	4.19	11.28	8.98	11.51	0.001482	3.91	166.42	3757.62	0.39
Moat	4679.4*	10-Year	768.87	4.19	11.55	9.32	11.83	0.001704	4.23	181.86	3763.82	0.42
Moat	4679.4*	25-Year	927.54	4.19	11.91	9.76	12.23	0.001929	4.56	203.29	3771.91	0.45
Moat	4679.4*	50-Year	1085.94	4.19	12.21	10.14	12.58	0.002157	4.86	223.66	3779.43	0.48
Moat	4508.6*	2-Year	473.06	4.02	10.42	8.28	10.61	0.001325	3.54	133.55	45.82	0.37
Moat	4508.6*	5-Year	650.09	4.02	11.00	8.87	11.25	0.001626	3.99	163.02	3756.81	0.41
Moat	4508.6*	10-Year	768.87	4.02	11.22	9.20	11.52	0.001919	4.38	175.60	3761.71	0.44
Moat	4508.6*	25-Year	927.54	4.02	11.51	9.60	11.87	0.002240	4.80	193.29	3768.26	0.48
Moat	4508.6*	50-Year	1085.94	4.02	11.76	9.95	12.18	0.002504	5.19	209.51	3779.17	0.51
Moat	4337.8*	2-Year	473.06	3.85	10.16	8.13	10.37	0.001522	3.66	129.35	47.22	0.39
Moat	4337.8*	5-Year	650.09	3.85	10.68	8.71	10.95	0.001885	4.17	156.00	3761.94	0.44
Moat	4337.8*	10-Year	768.87	3.85	10.81	9.03	11.16	0.002323	4.69	166.29	3790.79	0.49
Moat	4337.8*	25-Year	927.54	3.85	11.04	9.43	11.45	0.002604	5.19	187.95	3803.80	0.52
Moat	4337.8*	50-Year	1085.94	3.85	11.23	9.86	11.71	0.002873	5.63	208.33	3814.91	0.55
Moat	4167	2-Year	473.06	3.68	9.87	7.96	10.09	0.001759	3.77	137.95	118.92	0.41
Moat	4167	5-Year	650.09	3.68	10.48	8.56	10.65	0.001296	3.64	218.39	3838.15	0.37
Moat	4167	10-Year	768.87	3.68	10.58	8.96	10.80	0.001556	4.06	232.65	3839.95	0.40
Moat	4167	25-Year	927.54	3.68	10.82	9.48	11.06	0.001606	4.29	266.69	3844.17	0.41
Moat	4167	50-Year	1085.94	3.68	11.02	10.21	11.28	0.001694	4.55	294.87	3847.59	0.43
Moat	4047.5*	2-Year	473.06	3.79	9.81	7.69	9.92	0.000765	2.82	203.90	132.88	0.28
Moat	4047.5*	5-Year	650.09	3.79	10.43	8.31	10.53	0.000614	2.80	291.28	147.21	0.26
Moat	4047.5*	10-Year	768.87	3.79	10.51	8.62	10.64	0.000766	3.17	304.34	3848.12	0.29
Moat	4047.5*	25-Year	927.54	3.79	10.75	9.24	10.89	0.000835	3.42	339.32	3852.64	0.31
Moat	4047.5*	50-Year	1085.94	3.79	10.94	9.52	11.10	0.000921	3.68	367.82	3855.93	0.32
Moat	3928	2-Year	473.06	3.90	9.79	7.35	9.84	0.000351	2.11	280.39	142.97	0.20
Moat	3928	5-Year	650.09	3.90	10.40	7.83	10.46	0.000317	2.19	373.96	156.73	0.19
Moat	3928	10-Year	768.87	3.90	10.48	8.21	10.56	0.000405	2.50	386.71	3857.85	0.22
Moat	3928	25-Year	927.54	3.90	10.71	8.59	10.80	0.000461	2.75	423.06	3861.90	0.23

BASELINE

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HEC-RAS Plan: Base River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	3928	50-Year	1085.94	3.90	10.89	8.84	11.00	0.000525	3.00	452.37	3865.11	0.25
Moat	3782.*	2-Year	473.06	3.53	9.72	7.17	9.79	0.000396	2.21	265.90	148.14	0.21
Moat	3782.*	5-Year	650.09	3.53	10.35	7.71	10.41	0.000346	2.26	365.27	165.91	0.20
Moat	3782.*	10-Year	768.87	3.53	10.41	8.00	10.50	0.000449	2.60	376.00	167.24	0.23
Moat	3782.*	25-Year	927.54	3.53	10.63	8.44	10.73	0.000511	2.85	413.05	3868.84	0.24
Moat	3782.*	50-Year	1085.94	3.53	10.80	8.87	10.92	0.000582	3.11	442.40	3872.20	0.26
Moat	3636	2-Year	473.06	3.16	9.65	6.97	9.72	0.000458	2.31	248.47	152.03	0.22
Moat	3636	5-Year	650.09	3.16	10.29	7.52	10.36	0.000382	2.33	356.64	178.13	0.21
Moat	3638	10-Year	768.87	3.16	10.33	7.84	10.43	0.000506	2.69	364.60	178.67	0.24
Moat	3636	25-Year	927.54	3.16	10.54	8.21	10.65	0.000572	2.95	402.23	3881.59	0.26
Moat	3636	50-Year	1085.94	3.16	10.70	8.58	10.83	0.000654	3.21	430.95	3884.30	0.27
Moat	3512.*	2-Year	473.06	3.12	9.62		9.67	0.000352	1.93	281.47	164.68	0.19
Moat	3512.*	5-Year	650.09	3.12	10.26		10.31	0.000297	1.99	397.53	195.97	0.18
Moat	3512.*	10-Year	768.87	3.12	10.29		10.36	0.000399	2.31	404.15	197.60	0.21
Moat	3512.*	25-Year	927.54	3.12	10.49		10.58	0.000460	2.57	445.00	207.39	0.23
Moat	3512.*	50-Year	1085.94	3.12	10.64		10.75	0.000535	2.83	476.43	214.62	0.25
Moat	3388	2-Year	513.05	3.09	9.56		9.62	0.000397	1.94	280.14	186.94	0.20
Moat	3388	5-Year	709.42	3.09	10.21		10.27	0.000333	2.02	407.44	220.35	0.19
Moat	3388	10-Year	841.61	3.09	10.23		10.31	0.000460	2.38	410.80	221.02	0.23
Moat	3388	25-Year	1018.25	3.09	10.42		10.52	0.000535	2.65	453.67	229.42	0.25
Moat	3388	50-Year	1195.20	3.09	10.55		10.67	0.000629	2.93	484.91	235.36	0.27
Moat	3199.13*	2-Year	513.05	3.07	9.50	6.77	9.55	0.000364	1.81	323.48	225.50	0.19
Moat	3199.13*	5-Year	709.42	3.07	10.17	7.20	10.21	0.000265	1.77	491.57	273.72	0.17
Moat	3199.13*	10-Year	841.61	3.07	10.17	7.47	10.23	0.000375	2.10	490.64	273.51	0.20
Moat	3199.13*	25-Year	1018.25	3.07	10.35	7.77	10.42	0.000431	2.33	541.41	284.91	0.22
Moat	3199.13*	50-Year	1195.20	3.07	10.47	8.05	10.56	0.000509	2.59	576.71	292.57	0.24
Moat	3010.26*	2-Year	513.05	3.04	9.43	6.75	9.48	0.000364	1.77	338.98	264.73	0.19
Moat	3010.26*	5-Year	709.42	3.04	10.13	7.19	10.16	0.000236	1.65	546.80	330.41	0.16
Moat	3010.26*	10-Year	841.61	3.04	10.10	7.45	10.16	0.000343	1.98	539.30	328.49	0.19
Moat	3010.26*	25-Year	1018.25	3.04	10.28	7.75	10.34	0.000392	2.19	597.55	343.14	0.21
Moat	3010.26*	50-Year	1195.20	3.04	10.39	8.02	10.46	0.000465	2.43	635.68	352.29	0.23
Moat	2821.4*	2-Year	513.05	3.02	9.35	6.73	9.40	0.000433	1.90	269.76	302.77	0.21
Moat	2821.4*	5-Year	709.42	3.02	10.09	7.16	10.12	0.000208	1.53	607.88	393.37	0.15
Moat	2821.4*	10-Year	841.61	3.02	10.05	7.42	10.09	0.000312	1.86	591.54	388.76	0.18
Moat	2821.4*	25-Year	1018.25	3.02	10.21	7.72	10.27	0.000355	2.05	657.63	406.87	0.20
Moat	2821.4*	50-Year	1195.20	3.02	10.31	7.99	10.37	0.000424	2.28	697.80	416.82	0.22
Moat	2632.53*	2-Year	513.05	2.99	9.27	6.70	9.32	0.000422	1.89	271.81	335.85	0.21
Moat	2632.53*	5-Year	709.42	2.99	10.06	7.13	10.08	0.000181	1.42	677.00	462.16	0.14
Moat	2632.53*	10-Year	841.61	2.99	10.00	7.39	10.03	0.000282	1.74	649.43	454.16	0.17
Moat	2632.53*	25-Year	1018.25	2.99	10.16	7.69	10.20	0.000318	1.91	723.62	474.71	0.19
Moat	2632.53*	50-Year	1195.20	2.99	10.24	7.94	10.30	0.000383	2.13	764.87	485.53	0.21
Moat	2443.66*	2-Year	513.05	2.97	9.19	6.67	9.24	0.000425	1.87	274.06	372.83	0.21
Moat	2443.66*	5-Year	709.42	2.97	10.03	7.11	10.05	0.000157	1.31	753.03	538.87	0.13
Moat	2443.66*	10-Year	841.61	2.97	9.95	7.36	9.98	0.000254	1.64	711.52	526.93	0.17
Moat	2443.66*	25-Year	1018.25	2.97	10.10	7.65	10.14	0.000285	1.79	794.57	550.57	0.18
Moat	2443.66*	50-Year	1195.20	2.97	10.18	7.91	10.22	0.000347	2.00	836.14	562.03	0.20
Moat	2254.8*	2-Year	513.05	2.94	9.11	6.63	9.16	0.000429	1.86	276.37	413.31	0.21
Moat	2254.8*	5-Year	709.42	2.94	10.00	7.07	10.02	0.000134	1.20	842.58	623.47	0.12
Moat	2254.8*	10-Year	841.61	2.94	9.91	7.31	9.93	0.000223	1.52	784.50	606.02	0.16
Moat	2254.8*	25-Year	1018.25	2.94	10.06	7.60	10.09	0.000250	1.66	877.10	633.61	0.17
Moat	2254.8*	50-Year	1195.20	2.94	10.12	7.85	10.16	0.000308	1.86	918.11	645.45	0.18
Moat	2065.93*	2-Year	513.05	2.92	9.03	6.58	9.08	0.000434	1.84	278.35	454.74	0.21
Moat	2065.93*	5-Year	709.42	2.92	9.98	7.02	9.99	0.000112	1.09	946.14	721.45	0.11
Moat	2065.93*	10-Year	841.61	2.92	9.87	7.27	9.89	0.000195	1.41	868.27	697.26	0.14
Moat	2065.93*	25-Year	1018.25	2.92	10.02	7.55	10.04	0.000217	1.53	971.97	729.29	0.15
Moat	2065.93*	50-Year	1195.20	2.92	10.07	7.81	10.10	0.000271	1.73	1011.85	741.24	0.17
Moat	1877.06*	2-Year	513.05	2.89	8.94	6.53	9.00	0.000439	1.83	280.43	496.25	0.21
Moat	1877.06*	5-Year	709.42	2.89	9.96	6.97	9.97	0.000093	0.99	1068.27	832.57	0.10
Moat	1877.06*	10-Year	841.61	2.89	9.84	7.22	9.86	0.000166	1.29	967.44	800.09	0.13
Moat	1877.06*	25-Year	1018.25	2.89	9.98	7.50	10.00	0.000185	1.40	1083.73	837.44	0.14
Moat	1877.06*	50-Year	1195.20	2.89	10.03	7.75	10.05	0.000234	1.59	1121.84	849.32	0.16
Moat	1688.2*	2-Year	513.05	2.87	8.86	6.47	8.91	0.000445	1.82	282.38	542.74	0.21
Moat	1688.2*	5-Year	709.42	2.87	9.95	6.92	9.96	0.000075	0.89	1216.47	964.73	0.09

BASELINE

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HEC-RAS Plan: Base River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	1688.2*	10-Year	841.61	2.87	9.82	7.17	9.83	0.000139	1.18	1088.60	922.45	0.12
Moat	1688.2*	25-Year	1018.25	2.87	9.95	7.45	9.97	0.000154	1.27	1220.16	965.92	0.13
Moat	1688.2*	50-Year	1195.20	2.87	9.99	7.69	10.01	0.000197	1.45	1256.24	977.51	0.15
Moat	1499.33*	2-Year	513.05	2.84	8.78	6.41	8.83	0.000453	1.81	283.89	596.08	0.21
Moat	1499.33*	5-Year	709.42	2.84	9.94	6.86	9.95	0.000060	0.79	1395.34	1119.16	0.08
Moat	1499.33*	10-Year	841.61	2.84	9.79	7.11	9.80	0.000113	1.06	1236.32	1065.03	0.11
Moat	1499.33*	25-Year	1018.25	2.84	9.93	7.39	9.94	0.000125	1.15	1385.93	1116.03	0.12
Moat	1499.33*	50-Year	1195.20	2.84	9.96	7.64	9.98	0.000162	1.31	1419.77	1127.25	0.13
Moat	1310.46*	2-Year	513.05	2.82	8.69	6.36	8.74	0.000460	1.80	285.46	659.51	0.21
Moat	1310.46*	5-Year	709.42	2.82	9.93	6.80	9.93	0.000046	0.70	1619.83	1310.90	0.07
Moat	1310.46*	10-Year	841.61	2.82	9.70	7.05	9.76	0.000387	2.00	420.96	1208.35	0.20
Moat	1310.46*	25-Year	1018.25	2.82	9.91	7.33	9.92	0.000098	1.02	1595.89	1302.75	0.10
Moat	1310.46*	50-Year	1195.20	2.82	9.94	7.58	9.95	0.000129	1.17	1627.78	1313.59	0.12
Moat	1121.6*	2-Year	513.05	2.79	8.60	6.28	8.65	0.000471	1.79	286.40	729.87	0.21
Moat	1121.6*	5-Year	709.42	2.79	9.92	6.73	9.93	0.000035	0.61	1897.55	1544.40	0.06
Moat	1121.6*	10-Year	841.61	2.79	9.63	6.98	9.69	0.000376	1.97	427.51	1382.96	0.20
Moat	1121.6*	25-Year	1018.25	2.79	9.80	7.26	9.88	0.000468	2.25	452.19	1478.44	0.23
Moat	1121.6*	50-Year	1195.20	2.79	9.92	7.52	9.93	0.000100	1.03	1887.81	1541.01	0.10
Moat	932.733*	2-Year	513.05	2.77	8.51	6.23	8.56	0.000483	1.79	287.27	819.90	0.22
Moat	932.733*	5-Year	709.42	2.77	9.92	6.67	9.92	0.000025	0.52	2264.20	1846.02	0.05
Moat	932.733*	10-Year	841.61	2.77	9.56	6.92	9.62	0.000367	1.94	434.77	1605.93	0.20
Moat	932.733*	25-Year	1018.25	2.77	9.71	7.20	9.79	0.000462	2.23	457.33	1709.67	0.22
Moat	932.733*	50-Year	1195.20	2.77	9.78	7.45	9.88	0.000598	2.56	466.71	1752.39	0.26
Moat	743.866*	2-Year	513.05	2.74	8.42	6.15	8.47	0.000497	1.78	287.56	873.66	0.22
Moat	743.866*	5-Year	709.42	2.74	9.88	6.60	9.91	0.000175	1.42	500.46	2216.50	0.14
Moat	743.866*	10-Year	841.61	2.74	9.49	6.85	9.55	0.000358	1.90	442.12	1895.89	0.20
Moat	743.866*	25-Year	1018.25	2.74	9.63	7.13	9.70	0.000458	2.20	462.38	2008.31	0.22
Moat	743.866*	50-Year	1195.20	2.74	9.66	7.38	9.76	0.000609	2.56	467.67	2037.45	0.26
Moat	0555	2-Year	520.50	2.72	8.32	6.10	8.37	0.000530	1.81	286.81	783.34	0.22
Moat	0555	5-Year	719.69	2.72	9.85	6.55	9.88	0.000169	1.40	514.89	2732.52	0.14
Moat	0555	10-Year	853.63	2.72	9.43	6.80	9.48	0.000359	1.90	449.60	2292.47	0.20
Moat	0555	25-Year	1032.96	2.72	9.54	7.09	9.62	0.000468	2.21	467.12	2411.93	0.22
Moat	0555	50-Year	1212.14	2.72	9.54	7.33	9.65	0.000644	2.59	467.31	2413.19	0.26
Moat	426.*	2-Year	520.50	2.83	8.12	6.18	8.26	0.001023	3.05	170.79	61.36	0.32
Moat	426.*	5-Year	719.69	2.83	9.75	6.68	9.83	0.000478	2.24	321.62	2638.48	0.23
Moat	426.*	10-Year	853.63	2.83	9.23	6.94	9.38	0.001233	3.21	266.32	2079.35	0.35
Moat	426.*	25-Year	1032.96	2.83	9.26	7.27	9.48	0.001739	3.83	269.43	2110.82	0.42
Moat	426.*	50-Year	1212.14	2.83	9.09	7.55	9.45	0.002965	4.81	252.13	1935.69	0.54
Moat	0297	2-Year	528.38	2.93	7.54	6.21	7.99	0.003079	5.41	97.71	31.18	0.54
Moat	0297	5-Year	730.06	2.93	9.80	6.82	9.80	0.000011	0.28	3908.61	3350.72	0.03
Moat	0297	10-Year	865.90	2.93	9.26	7.19	9.28	0.000201	1.65	921.13	2726.14	0.14
Moat	0297	25-Year	1047.32	2.93	9.32	8.46	9.34	0.000265	1.89	957.64	2788.19	0.17
Moat	0297	50-Year	1228.64	2.93	9.16	8.54	9.21	0.000507	2.59	849.42	2606.35	0.23
Moat	0265	2-Year	627.35	0.28	7.57	4.61	7.87	0.001709	4.41	142.34	38.32	0.40
Moat	0265	5-Year	867.29	0.28	9.80	5.65	9.80	0.000020	0.43	3851.55	3986.67	0.04
Moat	0265	10-Year	1028.75	0.28	8.98	6.25	9.24	0.002141	4.38	339.59	2878.63	0.45
Moat	0265	25-Year	1244.74	0.28	9.32	6.85	9.33	0.000291	1.45	1976.40	3754.95	0.16
Moat	0265	50-Year	1460.57	0.28	9.10	9.10	9.18	0.001544	3.14	1168.42	3650.56	0.37
Moat	264		Bridge									
Moat	0209	2-Year	627.35	1.78	4.24	5.37	7.89	0.046704	15.33	40.91	22.84	2.02
Moat	0209	5-Year	867.29	1.78	7.02		7.86	0.004389	7.36	117.86	32.37	0.68
Moat	0209	10-Year	1028.75	1.78	7.39		8.36	0.004708	7.92	129.92	33.58	0.71
Moat	0209	25-Year	1244.74	1.78	7.85		8.98	0.004998	8.53	145.88	35.11	0.74
Moat	0209	50-Year	1460.57	1.78	9.00		9.00	0.000062	1.11	3421.43	3328.86	0.09
Moat	0190	2-Year	627.35	1.78	6.28	5.64	6.96	0.005374	6.60	95.09	36.13	0.72
Moat	0190	5-Year	867.29	1.78	6.96		7.76	0.005199	7.20	120.42	38.86	0.72
Moat	0190	10-Year	1028.75	1.78	7.36	6.59	8.24	0.005136	7.55	136.31	40.48	0.72
Moat	0190	25-Year	1244.74	1.78	7.87	7.01	8.84	0.004975	7.89	157.68	42.56	0.72
Moat	0190	50-Year	1460.57	1.78	8.98	7.41	9.00	0.000380	1.92	1849.28	3312.11	0.20
Moat	0100	2-Year	627.35	1.78	5.06	5.06	6.25	0.010591	8.72	71.93	30.99	1.01
Moat	0100	5-Year	867.29	1.78	5.67	5.67	7.07	0.010064	9.48	91.53	33.28	1.01
Moat	0100	10-Year	1028.75	1.78	6.05	6.05	7.56	0.009715	9.86	104.31	34.64	1.00
Moat	0100	25-Year	1244.74	1.78	6.49	6.49	8.17	0.009449	10.39	119.85	35.85	1.00

BASELINE

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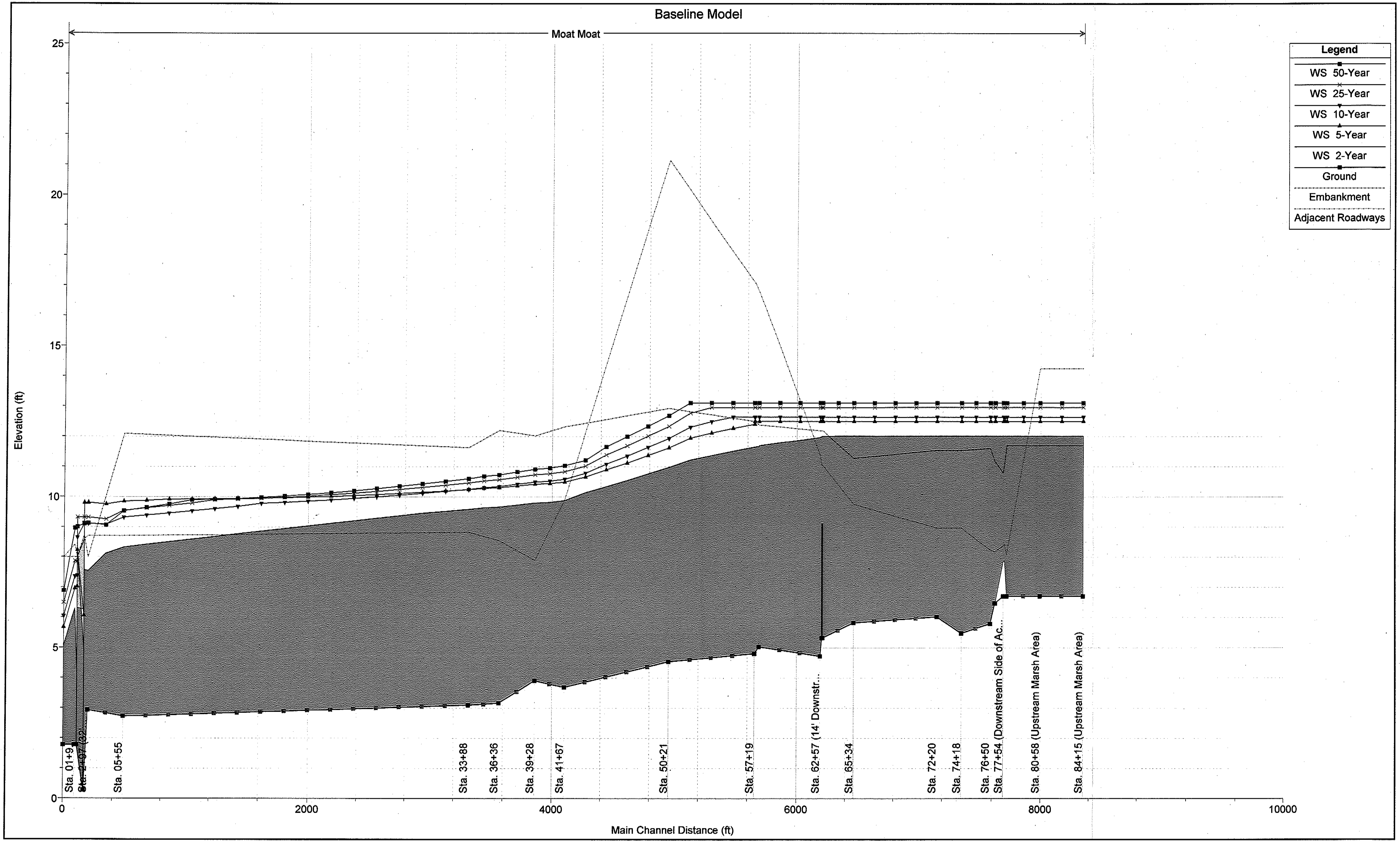
HEC-RAS Plan: Base River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	0100	50-Year	1460.57	1.78	6.89	6.89	8.72	0.009330	10.88	134.30	36.94	1.01

- **Computed Water Surface Profiles**


Baseline Model
Moat Moat
Legend
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Embankment
Adjacent Roadways
Elevation (ft)
25
20
15
10
5
0
Main Channel Distance (ft)
0
2000
4000
6000
8000
10000
Sta. 01+9
Sta. 2+07 (92)
Sta. 05+55
Sta. 33+88
Sta. 36+36
Sta. 39+28
Sta. 41+67
Sta. 50+21
Sta. 57+19
Sta. 62+57 (14' Downstr...
Sta. 65+34
Sta. 72+20
Sta. 74+18
Sta. 76+50
Sta. 77+54 (Downstream Side of Ac...
Sta. 80+58 (Upstream Marsh Area)
Sta. 84+15 (Upstream Marsh Area)

- **Manning's Coefficient Values Used in Analysis**

Table 3.1 (Continued)
Manning's 'n' Values

Type of Channel and Description	Minimum	Normal	Maximum
C. *Excavated or Dredged Channels*			
1. **Earth, straight and uniform**			
a. Clean, recently completed	0.016	0.018	0.020
b. Clean, after weathering	0.018	0.022	0.025
c. Gravel, uniform section, clean	0.022	0.025	0.030
d. With short grass, few weeds	0.022	0.027	0.033
2. **Earth, winding and sluggish**			
a. No vegetation	0.023	0.025	0.030
b. Grass, some weeds	0.025	0.030	0.033
c. Dense weeds or aquatic plants in deep channels	0.030	0.035	0.040
d. Earth bottom and rubble side	0.028	0.030	0.035
e. Stony bottom and weedy banks	0.025	0.035	0.040
f. Cobble bottom and clean sides	0.030	0.040	0.050
3. **Dragline-excavated or dredged**			
a. No vegetation	0.025	0.028	0.033
b. Light brush on banks	0.035	0.050	0.060
4. **Rock cuts**			
a. Smooth and uniform	0.025	0.035	0.040
b. Jagged and irregular	0.035	0.040	0.050
5. **Channels not maintained, weeds and brush**			
a. Clean bottom, brush on sides	0.040	0.050	0.080
b. Same as above, highest stage of flow	0.045	0.070	0.110
c. Dense weeds, high as flow depth	0.050	0.080	0.120
d. Dense brush, high stage	0.080	0.100	0.140

Other sources that include pictures of selected streams as a guide to n value determination are available (Fasken, 1963; Barnes, 1967; and Hicks and Mason, 1991). In general, these references provide color photos with tables of calibrated n values for a range of flows.

Although there are many factors that affect the selection of the n value for the channel, some of the most important factors are the type and size of materials that compose the bed and banks of a channel, and the shape of the channel. Cowan (1956) developed a procedure for estimating the effects of these factors to determine the value of Manning's n of a channel. In Cowan's procedure, the value of n is computed by the following equation:

- **Cross-Section Geometry Input Data Used in Analysis**

```
Geom Title=Baseline Moat Geometry
Program Version=4.00
Viewing Rectangle=-53.99 , 775.76 , 712.96 ,-347.42

River Reach=Moat            ,Moat
Reach XY= 34
     376.5744559     523.8894616     323.8505155      556.663803
     310.3132875     573.7634593     308.1758305     580.1758305
     301.7634593     584.4507446     296.7760596     585.8757159
     202.0154639     580.1758305     169.9536082     576.6134021
     125.0670103     575.9009164      58.8058419     568.0635739
      21.7565865     563.0761741      18.9066438      556.663803
      77.3304696      221.083047      83.7428408     213.2457045
      97.9925544     208.9707904     100.8424971     203.2709049
     130.7668958     114.9226804     137.1792669     102.0979381
     150.7164948      87.8482245     164.2537228      81.4358534
     178.5034364      80.7233677     193.4656357      87.8482245
     225.5274914     119.1975945     317.4381443     193.2961054
     328.8379152     199.7084765     618.1071019      319.406071
     628.7943872     322.2560137     630.9318442     320.1185567
     630.9318442     315.1311569     638.7691867     305.1563574
     646.6065292     300.8814433     649.4564719     291.6191294
     675.1059565     259.5572738677.069002694223257.132188094238
Rch Text X Y=121.5045819,568.7760596
Reverse River Text= 0

Type RM Length L Ch R = 1 ,8415    ,178.5,178.5,178.5
BEGIN DESCRIPTION:
Sta. 84+15 (Upstream Marsh Area)
END DESCRIPTION:
Node Last Edited Time=Mar/06/2007 11:35:26
#Sta/Elev= 9
   -1873      12 -1869.1   10.47   -67.1   10.47   -63.1    11.7   -52.1    11.7
   -42.1     6.7   49.75     6.7    72.4   14.25    88.6   14.25
#Mann= 3 , 0 , 0
   -1873     .03       0   -52.1     .08       0    72.4     .03       0
#XS Ineff= 2 , 0
       0   -52.1    11.7               0
Permanent Ineff=
       F       F
Bank Sta=-52.1,72.4
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,8236.5* ,178.5,178.5,178.5
Node Last Edited Time=Mar/30/2007 08:08:17
#Sta/Elev= 9
   -1873      12 -1869.1   10.47   -67.1   10.47   -63.1    11.7   -52.1    11.7
   -42.1     6.7   49.75     6.7    72.4   14.25    88.6   14.25
#Mann= 3 , 0 , 0
   -1873     .03       0   -52.1     .08       0    72.4     .03       0
#XS Ineff= 2 , 0
           -52.1    11.7
Permanent Ineff=
       F       F
Bank Sta=-52.1,72.4
XS Rating Curve= 0 ,0
```

```
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,8058     ,138,138,138
BEGIN DESCRIPTION:
Sta. 80+58 (Upstream Marsh Area)
END DESCRIPTION:
Node Last Edited Time=Mar/06/2007 11:35:32
#Sta/Elev= 9
   -1873      12 -1869.1   10.47   -67.1   10.47   -63.1    11.7   -52.1    11.7
   -42.1     6.7   49.75     6.7    72.4   14.25    88.6   14.25
#Mann= 3 , 0 , 0
   -1873     .03       0   -52.1     .08       0    72.4     .03       0
#XS Ineff= 2 , 0
       0   -52.1    11.7             0
Permanent Ineff=
       F       F
Bank Sta=-52.1,72.4
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,7920.*  ,138,138,138
Node Last Edited Time=Mar/30/2007 08:08:17
#Sta/Elev= 20
   -1873      12-1869.23   10.52-1868.96   10.47 -129.27   10.47 -129.23   10.48
 -126.16   11.58 -125.37    11.7 -114.75    11.7 -103.29   10.43  -79.06    9.73
     -57    8.61   -21.1    7.45   -20.2     6.7   29.73     6.7   31.48    7.69
   51.65   11.16   69.43    11.4   92.68   11.67   134.7   12.12  320.95   17.12
#Mann= 5 , 1 , 0
   -1873     .03       0 -114.75     .08       0  -97.42     .08       0
   51.65     .03       0  320.95     .03       0
#XS Ineff= 2 , 0
         -120.25    11.7
Permanent Ineff=
       F       F
Bank Sta=-114.75,51.65
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,7782     ,17,17,17
BEGIN DESCRIPTION:
Sta. 77+82
END DESCRIPTION:
Node Last Edited Time=Mar/30/2007 08:01:59
#Sta/Elev= 17
   -1873      12 -1869.1   10.47  -191.4   10.47  -188.4    11.7  -177.4    11.7
  -155.7    9.76  -109.8    9.64     -68    8.57       0    8.16     1.7     6.7
     9.7     6.7    11.4    8.08    30.9    8.08    65.4    8.54   110.5    9.09
     192      10   553.3      20
#Mann= 3 ,-1 , 0
   -1873     .03       0  -155.7     .08       0    30.9     .03       0
#XS Ineff= 2 , 0
       0  -188.4    11.7             0
Permanent Ineff=
       F       F
Bank Sta=-177.4,30.9
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1
```

```
Type RM Length L Ch R = 1 ,7765     ,11,11,11
BEGIN DESCRIPTION:
Sta. 77+65 (Upstream Side of Access Path)
END DESCRIPTION:
Node Last Edited Time=Mar/30/2007 08:02:38
#Sta/Elev= 19
 -2190.5      12-2186.78   10.47 -186.78   10.47  -185.7   11.12  -174.6   11.01
  -155.3    9.66  -112.6    9.13   -70.5    8.58   -42.4    8.53    -6.6    7.64
    -4.9     6.7     3.1     6.7     4.8    7.64    21.9    8.57    34.5    8.44
    62.4     8.6    94.4    9.27   210.5      10   550.1      20
#Mann= 3 ,-1 , 0
 -2190.5     .03       0  -185.7     .08       0     4.8     .03       0
#XS Ineff= 2 , 0
       0  -185.7   11.12               0
Permanent Ineff=
       F       F
#Block Obstruct= 2 , 0
       0                     -20       0    7.87
Bank Sta=-185.7,34.5
XS Rating Curve= 0 ,0
Exp/Cntr=0.5,0.3

Type RM Length L Ch R = 1 ,7754     ,65,65,65
BEGIN DESCRIPTION:
Sta. 77+54 (Downstream Side of Access Path)
END DESCRIPTION:
Node Last Edited Time=Mar/30/2007 08:03:12
#Sta/Elev= 18
-2190.22      12 -2186.5   10.47  -186.5   10.47  -174.1   10.79  -157.4    9.09
  -102.8    8.64   -55.7    8.62   -40.5    8.45    -6.6    7.87    -4.9     6.7
     3.1     6.7     4.8    7.87    22.5    8.38    51.4    8.22    80.5    8.42
   118.4    9.13   222.4      10   551.2      20
#Mann= 3 ,-1 , 0
-2190.22     .03       0  -157.4     .08       0    22.5     .03       0
#XS Ineff= 2 , 0
       0  -174.1   10.79               0
Permanent Ineff=
       F       F
#Block Obstruct= 2 , 0
       0                     -20       0    7.87
Bank Sta=-174.1,22.5
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,7689     ,2,2,2
BEGIN DESCRIPTION:
Sta. 76+89 (Upstream Side of Minor Wall)
END DESCRIPTION:
Node Last Edited Time=Mar/30/2007 08:03:24
#Sta/Elev= 17
-2175.85      12-2172.23   10.47 -172.23   10.47    -171   11.17    -160   10.92
  -148.9    9.04   -88.8    8.99   -10.7     7.7  -10.69    6.64    -1.7    6.47
    7.25    6.61    7.26     7.7    40.1     7.7    82.6    8.18     129    8.72
     270      10   567.7      20
#Mann= 5 ,-1 , 0
-2175.85     .03       0    -171     .03       0    -160     .08       0
```

```
   -10.7     .08       0    7.26     .03       0
#XS Ineff= 2 , 0
       0    -171   11.17                0
Permanent Ineff=
       F       F
#Block Obstruct= 2 , 0
       0      -1     7.7       1       0     7.7
Bank Sta=-171,82.6
XS Rating Curve= 0 ,0
Exp/Cntr=0.5,0.3

Type RM Length L Ch R = 1 ,7687    ,37,37,37
BEGIN DESCRIPTION:
Sta. 76+87 (Downstream Side of Minor Wall)
END DESCRIPTION:
Node Last Edited Time=Mar/30/2007 08:03:33
#Sta/Elev= 17
-2175.95      12-2172.23   10.47 -172.23   10.47    -171   11.17    -160   10.92
  -148.9    9.04   -88.8    8.99   -10.7     7.7  -10.69    6.63    -1.7    6.47
    7.25     6.6    7.26     7.7    40.1     7.7    82.6    8.18     129    8.72
     270      10   567.7      20
#Mann= 5 ,-1 , 0
-2175.95     .03       0    -171     .03       0    -160     .08       0
   -10.7     .08       0    7.26     .03       0
#XS Ineff= 2 , 0
       0    -171   11.17                0
Permanent Ineff=
       F       F
#Block Obstruct= 2 , 0
       0      -1     7.7       1       0     7.7
Bank Sta=-171,82.6
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,7650    ,116,116,116
BEGIN DESCRIPTION:
Sta. 76+50
END DESCRIPTION:
Node Last Edited Time=Mar/06/2007 10:28:51
#Sta/Elev= 17
-2173.01      12-2171.77   10.47 -171.77   10.47 -169.22   11.61 -158.19   11.05
  -152.6    8.98  -118.9    8.95      -5    8.19    -3.1    6.26       0    5.79
     4.9    6.26     6.8    8.19    20.2    8.73   34.11    8.25   129.8    8.47
   275.9      10   596.1      20
#Mann= 5 ,-1 , 0
-2173.01     .03       0 -169.22     .03       0 -158.19     .08       0
      -5     .03       0     4.9     .03       0
#XS Ineff= 2 , 0
       0 -169.22   11.61                0
Permanent Ineff=
       F       F
Bank Sta=-169.22,34.11
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,7418    ,198,198,198
BEGIN DESCRIPTION:
```

```
Sta. 74+18
END DESCRIPTION:
Node Last Edited Time=Mar/06/2007 10:29:00
#Sta/Elev= 21
-2031.36      12-2027.64   10.47  -27.64   10.47   -26.9    11.5   -22.5   11.54
   -17.5    11.2   -10.5    8.06    -4.7    7.89    -3.4    5.94    -1.1    5.47
     1.8    5.47     5.3    5.94     7.2    7.89    24.3    8.97    24.8    8.97
   24.81    8.35    53.4    8.64    80.4     9.4   116.7    10.3   143.7   11.01
   509.4      20
#Mann= 3 , 0 , 0
-2031.36     .03       0   -22.5     .03       0    24.3     .03       0
#XS Ineff= 2 , 0
       0   -22.5   11.54                   0
Permanent Ineff=
       F       F
Bank Sta=-22.5,24.3
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,7220    ,171.5,171.5,171.5
BEGIN DESCRIPTION:
Sta. 72+20
END DESCRIPTION:
Node Last Edited Time=Mar/06/2007 10:29:07
#Sta/Elev= 21
-2032.84      12-2029.12   10.47  -29.12   10.47   -26.9    11.5   -22.5   11.54
   -17.5    11.2   -10.5    8.06    -4.7    7.42    -3.4    6.54    -1.1    6.12
     1.8    6.02     5.3    6.57     7.2    8.03    24.3    8.97    24.8    8.97
   24.81    8.35    53.4    8.64    80.4     9.4   116.7    10.3   143.7   11.01
   509.4      20
#Mann= 3 , 0 , 0
-2032.84     .03       0   -22.5     .03       0    24.3     .03       0
#XS Ineff= 2 , 0
       0   -22.5   11.54                   0
Permanent Ineff=
       F       F
Bank Sta=-22.5,24.3
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,6534    ,128.5,128.5,128.5
BEGIN DESCRIPTION:
Sta. 65+34
END DESCRIPTION:
Node Last Edited Time=Mar/06/2007 10:29:15
#Sta/Elev= 20
-2036.09      12-2032.37   10.47  -32.37   10.47   -30.9   11.25   -23.1   11.28
   -13.6    8.01   -10.4    7.58    -9.1    6.52       0    5.82     8.7    6.68
      10    7.69    22.4    9.63    33.4    9.76    47.8   10.21    82.1    10.4
   123.8   10.61   162.2   11.01   224.7   11.92   291.9   12.86   753.8      20
#Mann= 3 , 0 , 0
-2036.09     .03       0   -23.1     .03       0    33.4     .03       0
#XS Ineff= 2 , 0
       0   -23.1   11.28                   0
Permanent Ineff=
       F       F
Bank Sta=-23.1,33.4
```

```
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,6405.5* ,128.5,128.5,128.5
Node Last Edited Time=Mar/30/2007 08:08:17
#Sta/Elev= 33
-2043.16       12-2039.44   10.47     -41   10.47  -37.88    11.1  -36.89   11.56
  -36.41    11.69   -28.6   11.73  -16.84    9.06  -12.92     8.5  -12.88    8.49
  -11.27     7.91   -8.47    7.73   -5.28    7.53   -4.11    7.11   -3.35    7.08
   -3.35     5.85       0    5.57    2.95    5.57    2.96    7.82   11.86    8.57
   13.19     9.12   16.09    9.44   25.89   10.26   37.15   10.41   48.02   10.75
    51.8    10.81   64.82   10.79   73.93    10.9  105.42   11.27  134.42   11.72
  181.62    12.57  232.37   13.47   581.2      20
#Mann= 3 , 0 , 0
-2043.16      .03       0   -28.6     .03       0   37.15     .03       0
#XS Ineff= 2 , 0
            -28.6  11.735
Permanent Ineff=
       F       F
Bank Sta=-28.6,37.15
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,6277    ,6,6,6
BEGIN DESCRIPTION:
Sta. 62+77 (Upstream Side of Ped. Bridge)
END DESCRIPTION:
Node Last Edited Time=Mar/06/2007 10:29:22
#Sta/Elev= 19
-2050.23       12-2046.51   10.47  -46.51   10.47   -42.4   12.13   -34.1   12.19
   -15.4     9.41   -10.1    9.11    -6.3    8.92    -4.9    8.14      -4    8.14
   -3.99     5.67       0    5.32     5.9    5.32    5.91    9.82   19.35   10.75
    40.9    11.05    50.8   11.38    59.6   11.25   408.6      20
#Mann= 3 , 0 , 0
-2050.23      .03       0   -34.1     .03       0    40.9     .03       0
#XS Ineff= 2 , 0
       0    -34.1   12.19               0
Permanent Ineff=
       F       F
Bank Sta=-34.1,40.9
XS Rating Curve= 0 ,0
Exp/Cntr=0.5,0.3

Type RM Length L Ch R = 3 ,6276    ,,,
BEGIN DESCRIPTION:
Pedestrian Bridge at Ellery Road
END DESCRIPTION:
Node Last Edited Time=Jan/09/2007 11:40:23
Bridge Culvert--1,0,-1,-1, 0
Deck Dist Width WeirC Skew NumUp NumDn MinLoCord MaxHiCord MaxSubmerge Is_Ogee
1,4.99,2.6,0, 7, 7, 9.11, , 0.95, 0, 0,0,,
     -20    -10.1   -4.91    -4.9     5.9    5.91      20
    9.11     9.11    9.85    9.85    9.82    9.82    9.82
       0        0       0    8.14    8.14       0       0
     -20    -10.1   -4.91    -4.9     5.9    5.91      20
    9.11     9.11    9.34    9.34    9.82    9.82    9.82
       0        0       0    8.14    8.14       0       0
```

```
BR Coef=-1 , 0 , 0 ,, 0 ,,,0.8,-1,,0,
WSPro=,,,, 1 ,,,, 0 ,,,, 0 ,,,,-1 ,-1 ,-1 , 0 , 0 , 0 , 0 , 0
BC Design=,, 0 ,, 0 ,,,,,,
BC Use User HTab Curves=0
BC User HTab FreeFlow(D)= 0

Type RM Length L Ch R = 1 ,6271    ,14,14,14
BEGIN DESCRIPTION:
Sta. 62+71 (Downstream Side of Ped. Bridge)
END DESCRIPTION:
Node Last Edited Time=Mar/06/2007 10:29:29
#Sta/Elev= 19
-2050.23       12-2046.51   10.47  -46.51   10.47   -42.4   12.13   -34.1   12.19
   -15.4    9.41   -10.1    9.11    -6.3    8.92    -4.9    8.14      -4    8.14
   -3.99    5.67       0    5.32     5.9    5.32    5.91    9.82   19.35   10.75
    40.9   11.05    50.8   11.38    59.6   11.25   408.6      20
#Mann= 3 , 0 , 0
-2050.23     .03       0   -34.1     .03       0    40.9     .03       0
#XS Ineff= 2 , 0
       0   -34.1   12.19                   0
Permanent Ineff=
       F       F
Bank Sta=-34.1,40.9
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,6257    ,166.67,166.67,166.67
BEGIN DESCRIPTION:
Sta. 62+57 (14' Downstream of Ped. Bridge)
END DESCRIPTION:
Node Last Edited Time=Mar/30/2007 08:04:22
#Sta/Elev= 16
-2050.23       12-2046.51   10.47  -46.51   10.47   -42.4   12.13   -34.1   12.19
   -14.5    9.46    -7.2     8.3      -5     6.2       0    4.71       5     6.2
       7     8.2   19.35   10.75    40.9   11.05    50.8   11.38    59.6   11.25
   408.6      20
#Mann= 3 ,-1 , 0
-2050.23     .03       0   -34.1     .03       0    40.9     .03       0
#XS Ineff= 2 , 0
       0   -34.1   12.19                   0
Permanent Ineff=
       F       F
Bank Sta=-34.1,50.8
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,5757    ,1,1,1
BEGIN DESCRIPTION:
Sta. 57+57
END DESCRIPTION:
Node Last Edited Time=Mar/30/2007 08:04:55
#Sta/Elev= 15
-3737.38       12-3733.66   10.47  -33.66   10.47   -28.8   12.38   -23.5   12.21
   -13.6    8.39    -8.8    7.69    -7.9    7.69    -5.7    5.61       0    5.03
     3.7    6.09    5.34    6.82    7.36    8.61    43.7   12.32   140.6   16.78
#Mann= 3 ,-1 , 0
-3737.38     .03       0   -23.5     .03       0    43.7     .03       0
```

```
#XS Ineff= 2 , 0
       0   -28.8   12.38               0
Permanent Ineff=
       F       F
Bank Sta=-28.8,140.6
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,5756    ,36,36,36
BEGIN DESCRIPTION:
Sta. 57+56
END DESCRIPTION:
Node Last Edited Time=Mar/30/2007 08:05:29
#Sta/Elev= 19
-3737.38      12-3733.66   10.47  -33.66   10.47   -28.8   12.38   -23.5   12.21
   -13.6    8.39    -8.8    7.69    -7.9    7.69    -7.8   10.77    -5.8   10.77
    -5.7    5.61       0    5.03     3.7    6.09    5.34    6.82    5.35   10.77
    7.35   10.77    7.36    8.61    43.7   12.32   140.6   16.78
#Mann= 3 ,-1 , 0
-3737.38     .03       0   -23.5     .03       0    43.7     .03       0
#XS Ineff= 2 , 0
       0   -28.8   12.38               0
Permanent Ineff=
       F       F
Bank Sta=-28.8,140.6
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,5720    ,1,1,1
BEGIN DESCRIPTION:
Sta. 57+20
END DESCRIPTION:
Node Last Edited Time=Mar/30/2007 08:05:50
#Sta/Elev= 21
-3738.64      12-3734.92   10.47  -34.92   10.47   -29.7    12.5   -24.2   12.16
   -14.4    8.71   -8.01    7.91      -8   10.77      -7   10.77   -6.99    7.91
    -5.6    7.27    -4.7     4.8       0     4.8    4.19    7.17     4.2   10.77
     5.2   10.77    5.21    7.17     6.3    8.25    25.3   10.34    67.8   13.08
   138.7   17.09
#Mann= 3 ,-1 , 0
-3738.64     .03       0   -24.2     .03       0    67.8     .03       0
#XS Ineff= 2 , 0
       0   -29.7    12.5               0
Permanent Ineff=
       F       F
Bank Sta=-29.7,138.7
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,5719    ,174.5,174.5,174.5
BEGIN DESCRIPTION:
Sta. 57+19
END DESCRIPTION:
Node Last Edited Time=Mar/30/2007 08:06:13
#Sta/Elev= 17
-3738.64      12-3734.92   10.47  -34.92   10.47   -29.7    12.5   -24.2   12.16
   -14.4    8.71   -8.01    7.91   -6.99    7.91    -5.6    7.27    -4.7     4.8
```

```
       0     4.8    4.19    7.17    5.21    7.17     6.3    8.25    25.3   10.34
    67.8   13.08   138.7   17.09
#Mann= 3 ,-1 , 0
-3738.64     .03       0   -29.7     .03       0    67.8     .03       0
#XS Ineff= 2 , 0
       0   -29.7    12.5               0
Permanent Ineff=
       F       F
Bank Sta=-29.7,138.7
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,5021    ,170.8,170.8,170.6
BEGIN DESCRIPTION:
Sta. 50+21
END DESCRIPTION:
Node Last Edited Time=Mar/30/2007 08:06:29
#Sta/Elev= 15
-3737.03      12-3733.31   10.47  -33.31   10.47   -26.8   12.93   -21.6   12.72
   -10.5    7.08      -6    7.08    -4.5    4.95       0    4.53     5.3    4.84
     8.3    8.17    23.1   11.35    65.2   14.32   105.1   19.52  129.35   21.14
#Mann= 3 ,-1 , 0
-3737.03     .03       0   -26.8     .03       0    65.2     .03       0
#XS Ineff= 2 , 0
       0   -26.8   12.93               0
Permanent Ineff=
       F       F
Bank Sta=-26.8,129.35
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,4167    ,121.5,121.5,121.5
BEGIN DESCRIPTION:
Sta. 41+67
END DESCRIPTION:
Node Last Edited Time=Mar/06/2007 10:30:26
#Sta/Elev= 19
   -3739      12-3735.28   10.47  -35.28   10.47  -30.69   12.29  -24.55   12.32
  -18.55    10.1   -9.16     7.4   -5.42    6.83   -3.32    4.37       0    3.68
     5.1    4.81     8.1    5.68    16.9    8.77      30    9.89      31    9.85
    43.7    9.75    56.9    9.39   113.9      10     212      20
#Mann= 3 , 0 , 0
   -3739     .03       0  -24.55     .03       0      30     .03       0
#XS Ineff= 2 , 0
       0  -24.55   12.32               0
Permanent Ineff=
       F       F
Bank Sta=-24.55,30
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,3928    ,146,146,146
BEGIN DESCRIPTION:
Sta. 39+28
END DESCRIPTION:
Node Last Edited Time=Mar/06/2007 10:30:37
#Sta/Elev= 20
```

```
-3743.83      12-3740.11   10.47  -40.11   10.47  -36.48   11.97   -28.3   12.02
   -24.1    10.2   -18.3    7.51   -12.6    6.41   -10.1    6.17    -6.9    4.08
       0     3.9     5.4    4.38     6.6    6.11    12.7    6.64    24.5    7.89
    25.5    7.86    35.7     8.3    45.7    7.84   127.9      10   233.8      20
#Mann= 3 , 0 , 0
-3743.83     .03       0   -28.3     .03       0    24.5     .03       0
#XS Ineff= 2 , 0
       0   -28.3   12.02               0
Permanent Ineff=
       F       F
Bank Sta=-28.3,24.5
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,3636    ,124,124,124
BEGIN DESCRIPTION:
Sta. 36+36
END DESCRIPTION:
Node Last Edited Time=Mar/07/2007 07:40:50
#Sta/Elev= 20
-3747.24      12-3743.52   10.47  -43.52   10.47   -39.2    12.2   -32.7   12.14
     -27    9.86   -19.1    6.65    -9.4    5.74    -8.2    3.99       0    3.16
     5.3     4.2     5.9    5.68     8.6    6.39    12.3     7.2    26.4    8.55
    27.4    8.51    37.3    8.97    49.2    8.42  147.23      10   244.6      20
#Mann= 3 , 0 , 0
-3747.24     .03       0   -39.2     .03       0    26.4     .03       0
#XS Ineff= 2 , 0
       0   -39.2    12.2               0
Permanent Ineff=
       F       F
Bank Sta=-39.2,26.4
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,3512.*  ,124,124,124
Node Last Edited Time=Mar/30/2007 08:08:17
#Sta/Elev= 35
-1896.57   11.82-1894.71   11.05  -44.71   11.05  -42.55   11.91   -39.4   11.85
  -35.49   10.94  -33.84   10.26  -29.31    8.46  -26.98    7.52  -20.73    6.23
  -10.48    5.59   -10.2    5.46   -9.36    4.54    -8.9     4.2       0    3.12
    2.74    3.76     4.3    4.81    11.2    5.64   11.41    5.66   12.71    6.47
   18.52    7.15   23.57    7.69   26.49    7.93   36.08    8.47   50.21    8.78
   56.85    8.69   57.21    8.49    58.5     8.5   65.96    8.75   74.13     8.9
   74.85    8.92   94.51     8.9  117.59    9.32  256.42   12.32  417.25      20
#Mann= 5 , 1 , 0
-1896.57     .03       0  -42.55     .03       0   33.04     .03       0
   56.85     .03       0  417.25     .03       0
Bank Sta=-42.55,56.85
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,3388    ,188.87,188.87,188.87
BEGIN DESCRIPTION:
Sta. 33+88
END DESCRIPTION:
Node Last Edited Time=Mar/30/2007 08:07:05
#Sta/Elev= 19
```

```
   -45.9   11.63   -42.5   11.52   -36.5    8.99   -29.1    6.06   -11.3    5.42
   -10.1    4.47       0    3.09     4.2    4.11     6.6    6.06    17.2    7.09
    36.2    8.47    55.4    9.32    77.1     9.3    87.3    8.83    87.8    8.43
     100    8.78   111.4    8.85     172      10   589.9      20
#Mann= 2 ,-1 , 0
   -45.9     .03       0    55.4     .03       0
#XS Ineff= 2 , 0
       0                    55.4       0    9.32
Permanent Ineff=
       F       T
Bank Sta=-45.9,87.3
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,0555    ,145,145,145
BEGIN DESCRIPTION:
Sta. 05+55
END DESCRIPTION:
Node Last Edited Time=Mar/14/2007 13:18:36
#Sta/Elev= 20
   -39.9   11.91   -35.8   12.09   -27.2    8.98   -19.4    5.48    -7.4    4.58
      -6    2.72    6.84     2.9    7.98    4.14    15.3    5.54    42.2    6.51
    65.2    7.11   102.6    7.89   115.8    8.36   129.8    9.93   140.7     9.3
   141.2     8.7   141.7     8.4  1031.1    8.21  2863.7      10  3413.4      20
#Mann= 3 , 0 , 0
   -39.9     .03       0   -35.8     .03       0   141.2     .03       0
#XS Ineff= 2 , 0
       0                   129.8       0    9.93
Permanent Ineff=
       F       F
Bank Sta=-35.8,141.2
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,0297    ,32,32,32
BEGIN DESCRIPTION:
Sta. 2+97 (32' Upstream of Memorial Culvert)
END DESCRIPTION:
Node Last Edited Time=Mar/30/2007 08:07:24
#Sta/Elev= 21
   -1163      14    -837      12    -701      10    -575       8    -323       8
     -19       8     -16       8     -11    7.75    -8.2    7.26    -7.3    2.93
    12.1       4    17.3       6    21.3    7.51    23.2       8    24.4    9.22
    31.3     9.8    67.4     9.2    67.9     8.7    1031    8.21    2863      10
    3409      20
#Mann= 3 ,-1 , 0
   -1163     .03       0     -16     .03       0    67.4     .03       0
#XS Ineff= 2 , 0
       0                    31.3       0     9.8
Permanent Ineff=
       F       F
Bank Sta=-16,67.9
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,0265    ,56,56,56
BEGIN DESCRIPTION:
```

```
Sta. 2+65 (Upstream Side of Memorial Avenue Culvert)
END DESCRIPTION:
Node Last Edited Time=Mar/30/2007 08:07:38
#Sta/Elev= 18
   -1035      14    -836      12    -665      10    -551    8.72     -85    8.72
   -49.6    8.72   -21.5    9.06     -11       6   -6.02    5.26      -6     .28
       4     .28      11       4      16       6      21    7.38      29    9.06
      49     9.1    2871     8.6    3416      10
#Mann= 3 ,-1 , 0
   -1035     .03       0   -49.6     .03       0      49     .03       0
#XS Ineff= 2 , 0
       0                      49       0     9.1
Permanent Ineff=
       F       F
Bank Sta=-49.6,2871
XS Rating Curve= 0 ,0
Exp/Cntr=0.5,0.3

Type RM Length L Ch R = 3 ,264      ,,,
BEGIN DESCRIPTION:
Memorial Boulevard Bridge
END DESCRIPTION:
Node Last Edited Time=Mar/06/2007 09:26:49
Bridge Culvert--1,0,-1,-1, 0
Deck Dist Width WeirC Skew NumUp NumDn MinLoCord MaxHiCord MaxSubmerge Is_Ogee
1,54.99,2.6,0, 8, 9, 8.99, , 0.95, 0, 0,0,,
   -21.5   -5.75   -5.74    5.35    5.36      21   21.01      29
   12.26   12.26   12.26   12.26   12.26   12.26    9.26    9.01
       0       0    6.26    6.26       0       0       0       0
  -34.61   -34.6  -20.61   -20.6    -5.6   -5.59     4.7    4.71   19.04
    9.12   10.24   10.36   12.31   12.31   12.31   12.31   12.31   12.31
       0       0       0       0       0    6.31    6.31       0       0
BR Coef=-1 , 0 , 0 ,, 0 ,,,0.8,-1,,0,
WSPro=,,,, 1 ,,,, 0 ,,,, 0 ,,,,-1 ,-1 ,-1 , 0 , 0 , 0 , 0 , 0
BC Design=,, 0 ,, 0 ,,,,,,
BC Use User HTab Curves=0
BC User HTab FreeFlow(D)= 0

Type RM Length L Ch R = 1 ,0209    ,19,19,19
BEGIN DESCRIPTION:
Sta. 2+09 (Downstream Side of Memorial Avenue Culvert)
END DESCRIPTION:
Node Last Edited Time=Mar/06/2007 07:04:26
#Sta/Elev= 17
    -894      14    -834      12    -733      10    -571      10    -358       8
    -227       8   -19.6       8     -15       6     -10       4      -6    1.78
       4    1.78      12       4      14       6      16       8    2862       8
    2867      10    3415      20
#Mann= 3 , 0 , 0
    -894     .03       0   -19.6     .03       0      16     .03       0
Bank Sta=-19.6,16
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,0190    ,90,90,90
BEGIN DESCRIPTION:
Sta. 01+90
```

```
END DESCRIPTION:
Node Last Edited Time=Mar/30/2007 08:07:56
#Sta/Elev= 20
    -895      14    -835      12    -733      10    -571      10    -358       8
     -29       8     -22       6    -7.5       4      -6    1.78       4    1.78
      11       4      13       6    15.6    10.8    18.7   10.64      26    8.41
      34    8.39      55    8.53    2858    8.53    2863      10    3407      20
#Mann= 3 ,-1 , 0
    -895     .03       0     -29     .03       0      55     .03       0
Bank Sta=-29,26
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Type RM Length L Ch R = 1 ,0100    ,100,100,100
BEGIN DESCRIPTION:
Sta. 1+00 (Downstream Limit of Study)
END DESCRIPTION:
Node Last Edited Time=Jan/09/2007 13:38:16
#Sta/Elev= 19
    -765      14    -714      12    -612      10    -422      10    -320       8
     -23       8     -20       6     -15       4      -6    1.78       4    1.78
      12       4    14.5       6      17       8      19      10      29      10
      34       8    3440       8    3445      10    3477      20
#Mann= 3 , 0 , 0
    -765     .03       0     -23     .03       0      34     .03       0
Bank Sta=-23,34
XS Rating Curve= 0 ,0
Exp/Cntr=0.3,0.1

Storage Area=Easton Beach    ,833.2559701,-27.0950122
Storage Area Surface Line= 6
775.076958762887 348.56824742268
680.335103092784240.465360824742
488.422113402062 -324.3418556701
1078.73675257732-325.55649484536
1078.73675257732344.924329896907
773.862319587629347.353608247423
Storage Area Type= 1
Storage Area Area=1
Storage Area Min Elev=2.67
Storage Area Vol Elev= 2
    2.67       0    3.67   1E+20

Stream Node=Moat            ,Moat            , 100 , 0.986329573124133
,Downstream Limit of Study

Chan Stop Cuts=-1

CM Alternative=Alternative #1
CM River Reach=Moat            ,Moat
 CM RS=7650    ,5.75,232,232,232,0,Channel Modification,5.75,,,
 CM RS=7418    ,5.63,198,198,198,0,Channel Modification,5.63,,,

CM Template=Channel Modification,False, 0 , 1
 CM #Left= 0
 CM #Right= 0
 CM Simple Trapezoid=2,10,2,0.03
```

```
Use User Specified Reach Order=0
User Specified Reach Order=Moat            ,Moat
GIS Ratio Cuts To Invert=-1
```

IV. Hydraulic Models for Long-Term Alternatives

- **Water Surface Elevation Summary Tables**
- **Computed Water Surface Profiles**
- **Manning Coefficient Values Used in Analyses**

- **Water Surface Elevation Summary Tables**

FLOOD LONG-TERM ALTERNATIVE 1 (FLOOD LTA-1)

LTA-1 HYDRAULIC
MODEL RESULTS
PAGE 1 OF 6

HEC-RAS Plan: Alternative River: Moat Reach: Moat

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	8415	2-Year	0.01	6.70	11.80	6.72	11.80	0.000000	0.00	2932.05	1937.53	0.00
Moat	8415	5-Year	0.01	6.70	12.38	6.72	12.38	0.000000	0.00	4068.82	1939.80	0.00
Moat	8415	10-Year	0.01	6.70	12.64	6.72	12.64	0.000000	0.00	4568.41	1940.58	0.00
Moat	8415	25-Year	0.01	6.70	12.79	6.72	12.79	0.000000	0.00	4865.00	1941.03	0.00
Moat	8415	50-Year	0.01	6.70	12.93	6.72	12.93	0.000000	0.00	5123.33	1941.43	0.00
Moat	8236.5*	2-Year	0.01	6.70	11.80	6.72	11.80	0.000000	0.00	2932.05	1937.53	0.00
Moat	8236.5*	5-Year	0.01	6.70	12.38	6.72	12.38	0.000000	0.00	4068.82	1939.80	0.00
Moat	8236.5*	10-Year	0.01	6.70	12.64	6.72	12.64	0.000000	0.00	4568.41	1940.58	0.00
Moat	8236.5*	25-Year	0.01	6.70	12.79	6.72	12.79	0.000000	0.00	4865.00	1941.03	0.00
Moat	8236.5*	50-Year	0.01	6.70	12.93	6.72	12.93	0.000000	0.00	5123.33	1941.43	0.00
Moat	8058	2-Year	0.01	6.70	11.80	6.72	11.80	0.000000	0.00	2932.05	1937.53	0.00
Moat	8058	5-Year	0.01	6.70	12.38	6.72	12.38	0.000000	0.00	4068.82	1939.80	0.00
Moat	8058	10-Year	0.01	6.70	12.64	6.72	12.64	0.000000	0.00	4568.41	1940.58	0.00
Moat	8058	25-Year	0.01	6.70	12.79	6.72	12.79	0.000000	0.00	4865.00	1941.03	0.00
Moat	8058	50-Year	0.01	6.70	12.93	6.72	12.93	0.000000	0.00	5123.33	1941.43	0.00
Moat	7920.*	2-Year	0.01	6.70	11.80	6.72	11.80	0.000000	0.00	2889.99	1977.10	0.00
Moat	7920.*	5-Year	0.01	6.70	12.38	6.72	12.38	0.000000	0.00	4063.53	2017.54	0.00
Moat	7920.*	10-Year	0.01	6.70	12.64	6.72	12.64	0.000000	0.00	4584.27	2027.13	0.00
Moat	7920.*	25-Year	0.01	6.70	12.79	6.72	12.79	0.000000	0.00	4894.49	2032.82	0.00
Moat	7920.*	50-Year	0.01	6.70	12.93	6.72	12.93	0.000000	0.00	5165.34	2037.78	0.00
Moat	7782	2-Year	150.11	6.70	11.80	8.51	11.80	0.000001	0.03	3323.46	2129.44	0.00
Moat	7782	5-Year	240.74	6.70	12.38	8.70	12.38	0.000001	0.03	4578.42	2151.14	0.00
Moat	7782	10-Year	300.86	6.70	12.64	8.78	12.64	0.000001	0.04	5133.49	2160.44	0.00
Moat	7782	25-Year	364.30	6.70	12.79	8.86	12.79	0.000001	0.04	5464.03	2165.96	0.00
Moat	7782	50-Year	459.58	6.70	12.93	8.97	12.93	0.000001	0.05	5752.48	2170.77	0.00
Moat	7765	2-Year	150.11	6.70	11.80	8.38	11.80	0.000000	0.03	3795.75	2461.56	0.00
Moat	7765	5-Year	240.74	6.70	12.38	8.69	12.38	0.000000	0.03	5245.06	2481.96	0.00
Moat	7765	10-Year	300.86	6.70	12.64	8.76	12.64	0.000000	0.04	5885.24	2490.71	0.00
Moat	7765	25-Year	364.30	6.70	12.79	8.84	12.79	0.000000	0.04	6266.23	2495.90	0.00
Moat	7765	50-Year	459.58	6.70	12.93	8.94	12.93	0.000001	0.05	6598.58	2500.41	0.00
Moat	7764		Culvert									
Moat	7754	2-Year	150.11	6.69	11.80	8.57	11.80	0.000000	0.04	3898.45	2471.21	0.00
Moat	7754	5-Year	240.74	6.69	12.38	8.72	12.38	0.000000	0.04	5336.03	2490.75	0.00
Moat	7754	10-Year	300.86	6.69	12.64	8.77	12.64	0.000000	0.05	5996.68	2499.46	0.00
Moat	7754	25-Year	364.30	6.69	12.79	8.82	12.79	0.000000	0.05	6378.83	2504.48	0.00
Moat	7754	50-Year	459.58	6.69	12.91	8.90	12.91	0.000001	0.06	6674.50	2508.36	0.01
Moat	7689	2-Year	150.11	6.60	11.80	8.09	11.80	0.000000	0.06	4052.65	2498.86	0.01
Moat	7689	5-Year	240.74	6.60	12.38	8.24	12.38	0.000000	0.06	5505.74	2516.59	0.01
Moat	7689	10-Year	300.86	6.60	12.64	8.33	12.64	0.000000	0.07	6173.11	2524.47	0.01
Moat	7689	25-Year	364.30	6.60	12.79	8.41	12.79	0.000000	0.08	6559.04	2529.02	0.01
Moat	7689	50-Year	459.58	6.60	12.91	8.53	12.91	0.000000	0.09	6857.56	2532.53	0.01
Moat	7687	2-Year	150.11	6.60	11.80	8.09	11.80	0.000000	0.06	4052.65	2498.86	0.01
Moat	7687	5-Year	240.74	6.60	12.38	8.24	12.38	0.000000	0.06	5505.73	2516.59	0.01
Moat	7687	10-Year	300.86	6.60	12.64	8.33	12.64	0.000000	0.07	6173.11	2524.47	0.01
Moat	7687	25-Year	364.30	6.60	12.79	8.41	12.79	0.000000	0.08	6559.04	2529.02	0.01
Moat	7687	50-Year	459.58	6.60	12.91	8.53	12.91	0.000000	0.09	6857.56	2532.53	0.01
Moat	7650	2-Year	150.11	6.55	11.80	8.43	11.80	0.000000	0.05	4020.14	2506.28	0.01
Moat	7650	5-Year	240.74	6.55	12.38	8.80	12.38	0.000000	0.06	5477.75	2525.00	0.01
Moat	7650	10-Year	300.86	6.55	12.64	8.85	12.64	0.000000	0.07	6147.42	2533.48	0.01
Moat	7650	25-Year	364.30	6.55	12.79	8.90	12.79	0.000000	0.07	6534.75	2538.37	0.01
Moat	7650	50-Year	459.58	6.55	12.91	8.98	12.91	0.000000	0.09	6834.38	2542.14	0.01
Moat	7534.*	2-Year	150.11	6.41	11.80	8.21	11.80	0.000000	0.07	3487.49	2363.38	0.01
Moat	7534.*	5-Year	240.74	6.41	12.38	8.68	12.38	0.000000	0.07	4862.93	2384.21	0.01
Moat	7534.*	10-Year	300.86	6.41	12.64	8.85	12.64	0.000000	0.08	5495.44	2393.61	0.01
Moat	7534.*	25-Year	364.30	6.41	12.79	8.89	12.79	0.000000	0.08	5861.42	2399.03	0.01
Moat	7534.*	50-Year	459.58	6.41	12.91	9.02	12.91	0.000001	0.10	6144.58	2403.22	0.01
Moat	7418	2-Year	150.11	6.26	11.80	7.95	11.80	0.000001	0.08	3106.02	2206.57	0.01
Moat	7418	5-Year	240.74	6.26	12.38	8.61	12.38	0.000000	0.09	4391.60	2230.63	0.01
Moat	7418	10-Year	300.86	6.26	12.64	8.89	12.64	0.000001	0.09	4983.63	2241.40	0.01
Moat	7418	25-Year	364.30	6.26	12.79	9.09	12.79	0.000001	0.10	5326.39	2247.62	0.01
Moat	7418	50-Year	459.58	6.26	12.91	9.27	12.91	0.000001	0.12	5591.67	2252.41	0.01
Moat	7220	2-Year	150.11	5.39	11.80	7.01	11.80	0.000001	0.09	3129.13	2208.05	0.01
Moat	7220	5-Year	240.74	5.39	12.38	7.54	12.38	0.000000	0.09	4415.61	2232.11	0.01

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HEC-RAS Plan: Alternative River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	7220	10-Year	300.86	5.39	12.64	7.85	12.64	0.000000	0.10	5008.01	2242.88	0.01
Moat	7220	25-Year	364.30	5.39	12.79	8.18	12.79	0.000001	0.11	5350.96	2249.09	0.01
Moat	7220	50-Year	459.58	5.39	12.91	8.62	12.91	0.000001	0.13	5616.32	2253.89	0.01
Moat	7048.5*	2-Year	150.11	5.32	11.80	6.96	11.80	0.000001	0.09	3127.96	2222.50	0.01
Moat	7048.5*	5-Year	240.74	5.32	12.38	7.50	12.38	0.000000	0.09	4423.97	2250.47	0.01
Moat	7048.5*	10-Year	300.86	5.32	12.64	7.81	12.64	0.000000	0.10	5021.45	2262.86	0.01
Moat	7048.5*	25-Year	364.30	5.32	12.79	8.10	12.79	0.000001	0.11	5367.48	2269.94	0.01
Moat	7048.5*	50-Year	459.58	5.32	12.91	8.54	12.91	0.000001	0.13	5635.26	2275.40	0.01
Moat	6877.*	2-Year	150.11	5.26	11.80	6.91	11.80	0.000001	0.09	3117.08	2234.69	0.01
Moat	6877.*	5-Year	240.74	5.26	12.38	7.46	12.38	0.000000	0.09	4421.39	2266.81	0.01
Moat	6877.*	10-Year	300.86	5.26	12.64	7.78	12.64	0.000000	0.10	5023.46	2281.19	0.01
Moat	6877.*	25-Year	364.30	5.26	12.79	8.08	12.79	0.000001	0.11	5372.32	2289.18	0.01
Moat	6877.*	50-Year	459.58	5.26	12.91	8.49	12.91	0.000001	0.13	5642.32	2295.34	0.01
Moat	6705.5*	2-Year	150.11	5.19	11.80	6.86	11.80	0.000001	0.09	3096.72	2244.50	0.01
Moat	6705.5*	5-Year	240.74	5.19	12.38	7.41	12.38	0.000000	0.09	4408.16	2281.50	0.01
Moat	6705.5*	10-Year	300.86	5.19	12.64	7.75	12.64	0.000001	0.10	5014.40	2298.17	0.01
Moat	6705.5*	25-Year	364.30	5.19	12.79	8.06	12.79	0.000001	0.11	5365.94	2307.49	0.01
Moat	6705.5*	50-Year	459.58	5.19	12.91	8.46	12.91	0.000001	0.13	5638.06	2314.36	0.01
Moat	6534	2-Year	151.40	5.12	11.80	6.83	11.80	0.000001	0.09	3068.37	2251.80	0.01
Moat	6534	5-Year	242.55	5.12	12.38	7.37	12.38	0.000001	0.09	4385.33	2293.37	0.01
Moat	6534	10-Year	302.99	5.12	12.64	7.70	12.64	0.000001	0.10	4995.01	2312.30	0.01
Moat	6534	25-Year	366.84	5.12	12.79	8.06	12.79	0.000001	0.11	5348.77	2323.21	0.01
Moat	6534	50-Year	462.72	5.12	12.91	8.43	12.91	0.000001	0.13	5622.73	2331.28	0.01
Moat	6405.5*	2-Year	151.40	5.07	11.80	7.01	11.80	0.000001	0.08	2923.10	2181.31	0.01
Moat	6405.5*	5-Year	242.55	5.07	12.38	7.79	12.38	0.000001	0.08	4196.75	2213.99	0.01
Moat	6405.5*	10-Year	302.99	5.07	12.64	8.26	12.64	0.000001	0.09	4784.84	2228.75	0.01
Moat	6405.5*	25-Year	366.84	5.07	12.79	8.66	12.79	0.000001	0.10	5125.65	2237.36	0.01
Moat	6405.5*	50-Year	462.72	5.07	12.91	9.10	12.91	0.000001	0.12	5389.34	2243.99	0.01
Moat	6277	2-Year	151.40	5.02	11.78	6.97	11.79	0.000147	0.94	171.89	2118.58	0.11
Moat	6277	5-Year	242.55	5.02	12.38	7.69	12.38	0.000001	0.07	4068.29	2154.73	0.01
Moat	6277	10-Year	302.99	5.02	12.64	8.20	12.64	0.000001	0.07	4640.14	2165.29	0.01
Moat	6277	25-Year	366.84	5.02	12.79	8.66	12.79	0.000001	0.08	4971.04	2171.37	0.01
Moat	6277	50-Year	462.72	5.02	12.91	9.66	12.91	0.000001	0.10	5226.78	2176.06	0.01
Moat	6276		Bridge									
Moat	6271	2-Year	278.46	5.02	11.78	7.93	11.82	0.000501	1.72	171.48	2118.33	0.21
Moat	6271	5-Year	383.63	5.02	12.38	8.76	12.38	0.000002	0.11	4068.42	2154.73	0.01
Moat	6271	10-Year	454.27	5.02	12.64	9.61	12.64	0.000001	0.11	4640.27	2165.29	0.01
Moat	6271	25-Year	548.49	5.02	12.79	10.13	12.79	0.000002	0.12	4971.17	2171.37	0.01
Moat	6271	50-Year	642.52	5.02	12.91	10.51	12.91	0.000002	0.14	5226.90	2176.08	0.01
Moat	6257	2-Year	395.31	5.01	11.76	7.99	11.81	0.000407	1.90	214.56	2117.21	0.21
Moat	6257	5-Year	540.87	5.01	12.38	8.54	12.38	0.000003	0.18	4113.06	2154.72	0.02
Moat	6257	10-Year	638.48	5.01	12.64	8.87	12.64	0.000003	0.18	4684.90	2165.28	0.02
Moat	6257	25-Year	768.61	5.01	12.79	9.27	12.79	0.000003	0.20	5015.69	2171.36	0.02
Moat	6257	50-Year	898.43	5.01	12.91	9.66	12.91	0.000004	0.22	5271.31	2176.05	0.02
Moat	6090.33*	2-Year	395.31	4.95	11.70	7.94	11.76	0.000300	1.98	199.68	2643.63	0.20
Moat	6090.33*	5-Year	540.87	4.95	12.38	8.49	12.38	0.000002	0.16	5150.91	2672.90	0.02
Moat	6090.33*	10-Year	638.48	4.95	12.64	8.80	12.64	0.000002	0.15	5859.65	2680.14	0.02
Moat	6090.33*	25-Year	768.61	4.95	12.79	9.19	12.79	0.000002	0.17	6268.71	2683.87	0.02
Moat	6090.33*	50-Year	898.43	4.95	12.91	9.54	12.91	0.000002	0.18	6584.38	2686.74	0.02
Moat	5923.66*	2-Year	395.31	4.88	11.65	7.86	11.71	0.000283	1.94	203.74	3200.67	0.18
Moat	5923.66*	5-Year	540.87	4.88	12.37	8.44	12.38	0.000001	0.14	6228.17	3224.33	0.01
Moat	5923.66*	10-Year	638.48	4.88	12.64	8.78	12.64	0.000001	0.13	7082.83	3230.72	0.01
Moat	5923.66*	25-Year	768.61	4.88	12.79	9.16	12.79	0.000001	0.15	7575.79	3234.40	0.01
Moat	5923.66*	50-Year	898.43	4.88	12.91	9.50	12.91	0.000002	0.16	7956.07	3237.24	0.02
Moat	5757	2-Year	395.31	4.82	11.60	7.81	11.66	0.000327	1.96	201.57	3765.48	0.19
Moat	5757	5-Year	540.87	4.82	12.29	8.36	12.37	0.000366	2.20	245.86	3777.88	0.21
Moat	5757	10-Year	638.48	4.82	12.64	8.68	12.64	0.000001	0.11	8310.57	3788.02	0.01
Moat	5757	25-Year	768.61	4.82	12.79	9.11	12.79	0.000001	0.12	8888.41	3791.34	0.01
Moat	5757	50-Year	898.43	4.82	12.91	9.47	12.91	0.000001	0.13	9334.04	3793.89	0.01
Moat	5756	2-Year	395.31	4.82	11.59	7.80	11.65	0.000377	2.06	192.07	3764.48	0.20
Moat	5756	5-Year	540.87	4.82	12.28	8.35	12.37	0.000420	2.29	235.93	3777.52	0.22
Moat	5756	10-Year	638.48	4.82	12.64	8.68	12.64	0.000001	0.11	8301.16	3788.02	0.01
Moat	5756	25-Year	768.61	4.82	12.79	9.09	12.79	0.000001	0.12	8879.00	3791.34	0.01

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HEC-RAS Plan: Alternative River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	5756	50-Year	898.43	4.82	12.91	9.52	12.91	0.000001	0.13	9324.63	3793.89	0.01
Moat	5720	2-Year	395.31	4.80	11.58	7.80	11.64	0.000343	1.90	207.56	3772.70	0.19
Moat	5720	5-Year	540.87	4.80	12.28	8.33	12.35	0.000384	2.09	258.87	3789.88	0.21
Moat	5720	10-Year	638.48	4.80	12.64	8.64	12.64	0.000001	0.10	8328.65	3799.61	0.01
Moat	5720	25-Year	768.61	4.80	12.79	9.01	12.79	0.000001	0.11	8908.17	3801.97	0.01
Moat	5720	50-Year	898.43	4.80	12.91	9.33	12.91	0.000001	0.12	9354.98	3803.80	0.01
Moat	5719	2-Year	395.31	4.80	11.54	9.14	11.64	0.000764	2.41	163.88	3771.82	0.27
Moat	5719	5-Year	540.87	4.80	12.25	9.63	12.34	0.000739	2.52	214.97	3788.71	0.27
Moat	5719	10-Year	638.48	4.80	12.64	9.91	12.64	0.000001	0.09	8287.50	3799.61	0.01
Moat	5719	25-Year	768.61	4.80	12.79	10.23	12.79	0.000001	0.10	8867.02	3801.97	0.01
Moat	5719	50-Year	898.43	4.80	12.91	10.54	12.91	0.000001	0.11	9313.83	3803.80	0.01
Moat	5544.5*	2-Year	395.31	4.73	11.39	8.92	11.49	0.000837	2.62	151.05	3762.70	0.29
Moat	5544.5*	5-Year	540.87	4.73	12.09	9.45	12.20	0.000844	2.76	195.88	3778.33	0.29
Moat	5544.5*	10-Year	638.48	4.73	12.50	9.74	12.63	0.000856	2.81	227.24	3789.80	0.30
Moat	5544.5*	25-Year	768.61	4.73	12.79	10.08	12.79	0.000001	0.10	8854.99	3796.30	0.01
Moat	5544.5*	50-Year	898.43	4.73	12.91	10.39	12.91	0.000001	0.11	9301.02	3798.08	0.01
Moat	5370.*	2-Year	395.31	4.66	11.22	8.68	11.34	0.000865	2.80	141.12	3753.78	0.29
Moat	5370.*	5-Year	540.87	4.66	11.90	9.23	12.05	0.000957	3.02	179.13	3768.87	0.31
Moat	5370.*	10-Year	638.48	4.66	12.32	9.54	12.47	0.000963	3.10	206.10	3777.33	0.32
Moat	5370.*	25-Year	768.61	4.66	12.79	9.91	12.79	0.000001	0.10	8844.49	3790.91	0.01
Moat	5370.*	50-Year	898.43	4.66	12.91	10.24	12.91	0.000001	0.11	9289.78	3792.65	0.01
Moat	5195.5*	2-Year	395.31	4.60	11.06	8.40	11.19	0.000834	2.94	134.52	3745.46	0.29
Moat	5195.5*	5-Year	540.87	4.60	11.70	8.99	11.87	0.001042	3.28	164.98	3759.08	0.33
Moat	5195.5*	10-Year	638.48	4.60	12.10	9.33	12.28	0.001101	3.40	187.62	3767.58	0.34
Moat	5195.5*	25-Year	768.61	4.60	12.58	9.72	12.77	0.001141	3.53	217.75	3776.76	0.35
Moat	5195.5*	50-Year	898.43	4.60	12.91	10.06	12.91	0.000001	0.11	9279.76	3787.32	0.01
Moat	5021	2-Year	473.06	4.53	10.78	8.44	11.00	0.001351	3.77	125.36	3739.78	0.37
Moat	5021	5-Year	650.09	4.53	11.32	9.12	11.62	0.001684	4.42	146.92	3746.09	0.42
Moat	5021	10-Year	768.87	4.53	11.66	9.49	12.01	0.001968	4.75	162.03	3753.02	0.45
Moat	5021	25-Year	927.54	4.53	12.07	9.94	12.47	0.002264	5.08	182.70	3761.57	0.48
Moat	5021	50-Year	1085.94	4.53	12.42	10.33	12.86	0.002508	5.37	202.22	3768.07	0.51
Moat	4850.2*	2-Year	473.06	4.36	10.57	8.23	10.77	0.001285	3.58	132.18	3741.10	0.36
Moat	4850.2*	5-Year	650.09	4.36	11.04	8.85	11.32	0.001752	4.22	154.19	3752.74	0.42
Moat	4850.2*	10-Year	768.87	4.36	11.34	9.21	11.66	0.001977	4.53	169.80	3758.80	0.45
Moat	4850.2*	25-Year	927.54	4.36	11.71	9.63	12.08	0.002201	4.86	190.70	3766.21	0.48
Moat	4850.2*	50-Year	1085.94	4.36	12.02	10.01	12.43	0.002416	5.18	209.53	3772.31	0.50
Moat	4679.4*	2-Year	473.06	4.19	10.38	7.96	10.55	0.001142	3.28	144.31	49.91	0.34
Moat	4679.4*	5-Year	650.09	4.19	10.79	8.55	11.03	0.001550	3.93	165.45	3755.25	0.40
Moat	4679.4*	10-Year	768.87	4.19	11.05	8.89	11.33	0.001753	4.26	180.39	3760.88	0.43
Moat	4679.4*	25-Year	927.54	4.19	11.38	9.35	11.72	0.001947	4.63	200.41	3767.21	0.46
Moat	4679.4*	50-Year	1085.94	4.19	11.66	9.75	12.04	0.002051	4.98	218.24	3772.56	0.48
Moat	4508.6*	2-Year	473.06	4.02	10.24	7.64	10.38	0.000812	2.98	158.51	52.94	0.30
Moat	4508.6*	5-Year	650.09	4.02	10.59	8.26	10.80	0.001112	3.66	177.45	3755.60	0.36
Moat	4508.6*	10-Year	768.87	4.02	10.82	8.62	11.07	0.001268	4.03	190.82	3759.09	0.39
Moat	4508.6*	25-Year	927.54	4.02	11.12	9.03	11.42	0.001440	4.45	208.52	3763.48	0.42
Moat	4508.6*	50-Year	1085.94	4.02	11.36	9.38	11.73	0.001621	4.85	223.81	3767.13	0.45
Moat	4337.8*	2-Year	473.06	3.85	10.13	7.30	10.26	0.000613	2.84	166.67	50.40	0.28
Moat	4337.8*	5-Year	650.09	3.85	10.42	7.93	10.62	0.000924	3.58	181.63	52.63	0.34
Moat	4337.8*	10-Year	768.87	3.85	10.62	8.26	10.87	0.001111	4.00	192.23	3754.07	0.37
Moat	4337.8*	25-Year	927.54	3.85	10.87	8.66	11.19	0.001346	4.50	206.01	3757.27	0.41
Moat	4337.8*	50-Year	1085.94	3.85	11.06	9.01	11.45	0.001611	5.01	216.79	3759.71	0.45
Moat	4167	2-Year	473.06	3.68	10.02	6.97	10.14	0.000732	2.87	186.00	132.33	0.28
Moat	4167	5-Year	650.09	3.68	10.27	7.59	10.45	0.000999	3.49	220.28	135.60	0.33
Moat	4167	10-Year	768.87	3.68	10.47	7.96	10.66	0.001096	3.76	246.72	138.02	0.35
Moat	4167	25-Year	927.54	3.68	10.72	8.39	10.94	0.001167	4.02	282.63	3842.49	0.36
Moat	4167	50-Year	1085.94	3.68	10.92	8.78	11.16	0.001277	4.32	310.12	3845.87	0.38
Moat	4047.5*	2-Year	473.06	3.56	9.99	6.87	10.06	0.000415	2.32	249.33	139.72	0.21
Moat	4047.5*	5-Year	650.09	3.56	10.23	7.51	10.34	0.000580	2.85	283.89	144.24	0.26
Moat	4047.5*	10-Year	768.87	3.56	10.42	7.86	10.54	0.000650	3.09	311.25	147.08	0.27
Moat	4047.5*	25-Year	927.54	3.56	10.67	8.27	10.81	0.000710	3.34	348.66	3851.19	0.29
Moat	4047.5*	50-Year	1085.94	3.56	10.85	8.62	11.02	0.000797	3.62	376.67	3854.50	0.31
Moat	3928	2-Year	473.06	3.44	9.97	6.82	10.01	0.000236	1.87	320.16	150.36	0.16
Moat	3928	5-Year	650.09	3.44	10.21	7.43	10.27	0.000340	2.32	356.12	154.19	0.20

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HEC-RAS Plan: Alternative River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	3928	10-Year	768.87	3.44	10.39	7.74	10.47	0.000389	2.53	384.65	156.56	0.21
Moat	3928	25-Year	927.54	3.44	10.64	8.21	10.73	0.000438	2.77	423.77	3860.56	0.23
Moat	3928	50-Year	1085.94	3.44	10.82	8.61	10.92	0.000502	3.02	452.64	3863.74	0.25
Moat	3782.*	2-Year	473.06	3.30	9.93	6.66	9.98	0.000245	1.90	313.72	157.31	0.17
Moat	3782.*	5-Year	650.09	3.30	10.15	7.22	10.22	0.000359	2.37	348.36	161.78	0.20
Moat	3782.*	10-Year	768.87	3.30	10.32	7.54	10.41	0.000414	2.60	376.97	165.38	0.22
Moat	3782.*	25-Year	927.54	3.30	10.56	7.91	10.66	0.000467	2.84	417.09	3867.25	0.24
Moat	3782.*	50-Year	1085.94	3.30	10.73	8.28	10.85	0.000538	3.10	445.99	3870.80	0.25
Moat	3636	2-Year	473.06	3.16	9.89	6.54	9.94	0.000254	1.92	305.95	167.59	0.17
Moat	3636	5-Year	650.09	3.16	10.09	7.04	10.17	0.000382	2.42	339.85	175.65	0.21
Moat	3636	10-Year	768.87	3.16	10.25	7.34	10.35	0.000440	2.66	369.20	177.69	0.23
Moat	3636	25-Year	927.54	3.16	10.49	7.72	10.59	0.000494	2.89	410.68	3880.60	0.24
Moat	3636	50-Year	1085.94	3.16	10.64	8.04	10.77	0.000572	3.17	439.04	3883.28	0.26
Moat	3512.*	2-Year	473.06	3.11	9.88		9.91	0.000173	1.51	355.85	176.31	0.15
Moat	3512.*	5-Year	650.09	3.11	10.07		10.12	0.000266	1.92	389.80	185.46	0.18
Moat	3512.*	10-Year	768.87	3.11	10.23		10.29	0.000313	2.13	420.33	193.33	0.20
Moat	3512.*	25-Year	927.54	3.11	10.45		10.53	0.000361	2.35	465.31	204.35	0.21
Moat	3512.*	50-Year	1085.94	3.11	10.60		10.70	0.000426	2.60	496.40	211.63	0.23
Moat	3388	2-Year	513.05	3.06	9.85		9.89	0.000231	1.57	348.06	202.56	0.17
Moat	3388	5-Year	709.42	3.06	10.02		10.08	0.000361	2.01	381.37	211.71	0.21
Moat	3388	10-Year	841.61	3.06	10.17		10.25	0.000423	2.22	414.25	218.46	0.23
Moat	3388	25-Year	1018.25	3.06	10.39		10.48	0.000480	2.45	463.00	228.10	0.25
Moat	3388	50-Year	1195.20	3.06	10.53		10.63	0.000566	2.71	494.62	234.14	0.27
Moat	3199.13*	2-Year	513.05	2.98	9.81	6.38	9.84	0.000197	1.43	404.98	238.67	0.16
Moat	3199.13*	5-Year	709.42	2.98	9.96	6.80	10.01	0.000309	1.84	441.74	249.52	0.20
Moat	3199.13*	10-Year	841.61	2.98	10.11	7.07	10.17	0.000362	2.03	478.39	258.78	0.21
Moat	3199.13*	25-Year	1018.25	2.98	10.32	7.42	10.39	0.000407	2.23	534.47	272.34	0.23
Moat	3199.13*	50-Year	1195.20	2.98	10.44	7.73	10.53	0.000483	2.48	568.80	280.31	0.25
Moat	3010.26*	2-Year	513.06	2.91	9.78	6.34	9.81	0.000184	1.38	434.30	279.44	0.15
Moat	3010.26*	5-Year	709.42	2.91	9.91	6.76	9.95	0.000293	1.78	471.51	290.75	0.19
Moat	3010.26*	10-Year	841.61	2.91	10.05	7.03	10.10	0.000343	1.96	511.64	302.48	0.21
Moat	3010.26*	25-Year	1018.25	2.91	10.25	7.39	10.31	0.000383	2.14	575.26	320.19	0.22
Moat	3010.26*	50-Year	1195.20	2.91	10.36	7.71	10.44	0.000458	2.38	611.31	329.81	0.24
Moat	2821.4*	2-Year	513.05	2.83	9.75	6.25	9.77	0.000169	1.32	467.50	322.52	0.15
Moat	2821.4*	5-Year	709.42	2.83	9.86	6.71	9.90	0.000275	1.71	504.03	335.18	0.19
Moat	2821.4*	10-Year	841.61	2.83	9.99	7.00	10.03	0.000323	1.89	547.42	349.61	0.20
Moat	2821.4*	25-Year	1018.25	2.83	10.18	7.36	10.24	0.000358	2.06	618.97	372.20	0.21
Moat	2821.4*	50-Year	1195.20	2.83	10.28	7.67	10.35	0.000432	2.29	655.86	383.33	0.23
Moat	2632.53*	2-Year	513.05	2.75	9.72	6.16	9.74	0.000155	1.26	505.15	372.62	0.14
Moat	2632.53*	5-Year	709.42	2.75	9.81	6.67	9.85	0.000257	1.65	540.17	386.16	0.18
Moat	2632.53*	10-Year	841.61	2.75	9.93	6.96	9.97	0.000302	1.82	586.98	403.55	0.19
Moat	2632.53*	25-Year	1018.25	2.75	10.12	7.33	10.17	0.000332	1.97	667.59	431.86	0.20
Moat	2632.53*	50-Year	1195.20	2.75	10.21	7.64	10.27	0.000405	2.21	704.56	444.24	0.22
Moat	2443.66*	2-Year	513.05	2.68	9.69	6.08	9.71	0.000140	1.20	547.09	429.34	0.13
Moat	2443.66*	5-Year	709.42	2.68	9.77	6.60	9.80	0.000238	1.58	579.46	443.20	0.17
Moat	2443.66*	10-Year	841.61	2.68	9.88	6.93	9.92	0.000281	1.75	629.69	463.89	0.19
Moat	2443.66*	25-Year	1018.25	2.68	10.07	7.29	10.11	0.000307	1.89	720.44	499.09	0.20
Moat	2443.66*	50-Year	1195.20	2.68	10.14	7.61	10.19	0.000379	2.12	756.41	512.38	0.22
Moat	2254.8*	2-Year	513.05	2.60	9.67	6.00	9.69	0.000125	1.14	598.58	498.16	0.13
Moat	2254.8*	5-Year	709.42	2.60	9.73	6.53	9.76	0.000217	1.51	627.43	511.52	0.16
Moat	2254.8*	10-Year	841.61	2.60	9.83	6.89	9.87	0.000257	1.67	681.60	535.71	0.18
Moat	2254.8*	25-Year	1018.25	2.60	10.02	7.26	10.05	0.000278	1.79	784.59	578.92	0.19
Moat	2254.8*	50-Year	1195.20	2.60	10.07	7.56	10.12	0.000348	2.03	818.66	590.71	0.21
Moat	2065.93*	2-Year	513.05	2.52	9.65	5.92	9.66	0.000110	1.07	660.36	581.46	0.12
Moat	2065.93*	5-Year	709.42	2.52	9.69	6.45	9.72	0.000195	1.43	684.62	593.73	0.16
Moat	2065.93*	10-Year	841.61	2.52	9.79	6.83	9.82	0.000232	1.59	743.45	622.48	0.17
Moat	2065.93*	25-Year	1018.25	2.52	9.97	7.21	10.00	0.000247	1.69	861.18	667.16	0.18
Moat	2065.93*	50-Year	1195.20	2.52	10.02	7.52	10.06	0.000314	1.92	891.97	677.67	0.20
Moat	1877.06*	2-Year	513.05	2.45	9.61	5.85	9.64	0.000172	1.37	375.62	679.54	0.14
Moat	1877.06*	5-Year	709.42	2.45	9.61	6.38	9.67	0.000328	1.89	376.07	680.85	0.19
Moat	1877.06*	10-Year	841.61	2.45	9.75	6.77	9.78	0.000203	1.49	821.44	720.60	0.16
Moat	1877.06*	25-Year	1018.25	2.45	9.93	7.17	9.96	0.000213	1.57	955.98	769.99	0.16
Moat	1877.06*	50-Year	1195.20	2.45	9.96	7.47	10.00	0.000277	1.80	982.42	779.33	0.19

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HEC-RAS Plan: Alternative River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	1688.2*	2-Year	513.05	2.37	9.58	5.77	9.61	0.000161	1.33	387.15	790.48	0.14
Moat	1688.2*	5-Year	709.42	2.37	9.55	6.31	9.61	0.000317	1.85	383.77	781.36	0.19
Moat	1688.2*	10-Year	841.61	2.37	9.72	6.72	9.74	0.000173	1.38	919.19	836.95	0.15
Moat	1688.2*	25-Year	1018.25	2.37	9.90	7.11	9.92	0.000180	1.45	1074.58	895.09	0.15
Moat	1688.2*	50-Year	1195.20	2.37	9.92	7.42	9.95	0.000237	1.67	1095.73	902.72	0.17
Moat	1499.33*	2-Year	513.05	2.29	9.55	5.69	9.58	0.000151	1.28	399.35	916.46	0.13
Moat	1499.33*	5-Year	709.42	2.29	9.49	6.24	9.55	0.000306	1.81	391.90	893.77	0.19
Moat	1499.33*	10-Year	841.61	2.29	9.62	6.66	9.69	0.000377	2.06	409.41	947.05	0.21
Moat	1499.33*	25-Year	1018.25	2.29	9.87	7.06	9.89	0.000147	1.31	1226.23	1043.41	0.14
Moat	1499.33*	50-Year	1195.20	2.29	9.88	7.36	9.91	0.000196	1.52	1241.18	1048.91	0.16
Moat	1310.46*	2-Year	513.05	2.22	9.52	5.62	9.55	0.000141	1.25	411.69	1070.69	0.13
Moat	1310.46*	5-Year	709.42	2.22	9.44	6.17	9.49	0.000295	1.77	399.95	1030.03	0.19
Moat	1310.48*	10-Year	841.61	2.22	9.55	6.61	9.62	0.000368	2.02	416.09	1085.92	0.21
Moat	1310.46*	25-Year	1018.25	2.22	9.85	7.01	9.86	0.000116	1.18	1417.92	1226.00	0.12
Moat	1310.46*	50-Year	1195.20	2.22	9.86	7.31	9.87	0.000158	1.37	1425.94	1229.00	0.14
Moat	1121.6*	2-Year	513.05	2.14	9.50	5.55	9.52	0.000131	1.21	424.99	1263.83	0.12
Moat	1121.6*	5-Year	709.42	2.14	9.39	6.09	9.43	0.000282	1.74	408.79	1199.27	0.18
Moat	1121.6*	10-Year	841.61	2.14	9.49	6.56	9.55	0.000356	1.99	423.39	1257.44	0.21
Moat	1121.6*	25-Year	1018.25	2.14	9.74	6.95	9.82	0.000404	2.21	460.58	1405.22	0.22
Moat	1121.6*	50-Year	1195.20	2.14	9.83	7.25	9.85	0.000120	1.21	1673.94	1455.67	0.12
Moat	932.733*	2-Year	513.05	2.06	9.48	5.48	9.50	0.000121	1.17	438.58	1518.03	0.12
Moat	932.733*	5-Year	709.42	2.06	9.34	6.03	9.38	0.000268	1.70	417.90	1421.49	0.18
Moat	932.733*	10-Year	841.61	2.06	9.42	6.51	9.48	0.000345	1.95	430.68	1481.29	0.20
Moat	932.733*	25-Year	1018.25	2.06	9.67	6.89	9.74	0.000394	2.18	467.56	1652.21	0.22
Moat	932.733*	50-Year	1195.20	2.06	9.70	7.18	9.80	0.000528	2.53	471.62	1670.93	0.25
Moat	743.866*	2-Year	513.05	1.99	9.45	5.41	9.47	0.000112	1.13	452.56	1846.88	0.12
Moat	743.866*	5-Year	709.42	1.99	9.29	5.97	9.33	0.000254	1.66	427.58	1706.76	0.17
Moat	743.866*	10-Year	841.61	1.99	9.36	6.46	9.42	0.000332	1.92	438.33	1767.26	0.20
Moat	743.866*	25-Year	1018.25	1.99	9.60	6.84	9.67	0.000384	2.15	474.29	1967.29	0.22
Moat	743.866*	50-Year	1195.20	1.99	9.60	7.12	9.70	0.000529	2.52	474.27	1967.21	0.25
Moat	0555	2-Year	520.50	1.91	9.43	5.37	9.45	0.000118	1.11	466.94	2298.81	0.11
Moat	0555	5-Year	719.69	1.91	9.24	5.94	9.28	0.000274	1.65	437.34	2095.68	0.17
Moat	0555	10-Year	853.63	1.91	9.29	6.44	9.35	0.000364	1.91	445.77	2153.22	0.20
Moat	0555	25-Year	1032.96	1.91	9.52	6.80	9.59	0.000425	2.15	480.40	2390.63	0.22
Moat	0555	50-Year	1212.14	1.91	9.49	7.08	9.59	0.000604	2.55	475.32	2356.01	0.26
Moat	426.*	2-Year	520.50	1.86	9.37	5.70	9.42	0.000349	1.79	290.93	2236.33	0.19
Moat	426.*	5-Year	719.69	1.86	9.09	6.27	9.21	0.000940	2.75	261.59	1937.64	0.30
Moat	426.*	10-Year	853.63	1.86	9.08	6.54	9.25	0.001332	3.27	261.03	1931.92	0.36
Moat	426.*	25-Year	1032.96	1.86	9.26	6.89	9.47	0.001572	3.70	279.12	2115.23	0.40
Moat	426.*	50-Year	1212.14	1.86	9.08	7.23	9.40	0.002765	4.69	258.66	1907.89	0.52
Moat	0297	2-Year	528.38	1.80	9.39	5.61	9.39	0.000054	0.89	1023.19	2888.24	0.07
Moat	0297	5-Year	730.06	1.80	9.11	6.20	9.13	0.000180	1.59	833.61	2551.24	0.13
Moat	0297	10-Year	865.90	1.80	9.11	6.55	9.14	0.000252	1.88	835.46	2554.25	0.16
Moat	0297	25-Year	1047.32	1.80	9.32	6.98	9.34	0.000243	1.87	975.24	2787.26	0.16
Moat	0297	50-Year	1228.64	1.80	9.12	7.43	9.17	0.000496	2.64	842.26	2565.30	0.22
Moat	0265	2-Year	627.35	1.78	9.39	5.66	9.39	0.000054	0.29	2226.63	3788.48	0.07
Moat	0265	5-Year	867.29	1.78	9.11	6.41	9.11	0.000568	0.78	1172.60	3652.97	0.25
Moat	0265	10-Year	1028.75	1.78	9.11	6.86	9.12	0.000788	0.92	1179.65	3653.89	0.29
Moat	0265	25-Year	1244.74	1.78	9.32	7.38	9.33	0.000297	0.65	1976.48	3756.76	0.16
Moat	0265	50-Year	1460.57	1.78	9.11	7.85	9.14	0.001500	1.28	1208.12	3657.62	0.39
Moat	264		Bridge									
Moat	0209	2-Year	627.35	1.78	4.24	5.37	7.89	0.046704	15.33	40.91	22.84	2.02
Moat	0209	5-Year	867.29	1.78	4.95	6.05	8.43	0.032632	14.97	57.93	25.32	1.74
Moat	0209	10-Year	1028.75	1.78	7.39		8.36	0.004692	7.91	130.08	33.59	0.71
Moat	0209	25-Year	1244.74	1.78	7.85		8.98	0.004998	8.53	145.88	35.11	0.74
Moat	0209	50-Year	1460.57	1.78	9.00		9.00	0.000063	1.12	3413.30	3328.60	0.09
Moat	0190	2-Year	627.35	1.78	6.28	5.64	6.96	0.005374	6.60	95.09	36.13	0.72
Moat	0190	5-Year	867.29	1.78	6.96	6.24	7.76	0.005199	7.20	120.42	38.86	0.72
Moat	0190	10-Year	1028.75	1.78	7.36		8.24	0.005112	7.53	136.53	40.50	0.72
Moat	0190	25-Year	1244.74	1.78	7.87	7.01	8.84	0.004975	7.89	157.68	42.56	0.72
Moat	0190	50-Year	1460.57	1.78	8.96	7.41	9.00	0.000361	2.41	1793.07	3310.18	0.20
Moat	0100	2-Year	627.35	1.78	5.06	5.06	6.25	0.010591	8.72	71.93	30.99	1.01
Moat	0100	5-Year	867.29	1.78	5.67	5.67	7.07	0.010064	9.48	91.53	33.28	1.01

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HEC-RAS Plan: Alternative River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	0100	10-Year	1028.75	1.78	6.05	6.05	7.56	0.009724	9.87	104.28	34.64	1.00
Moat	0100	25-Year	1244.74	1.78	6.49	6.49	8.17	0.009449	10.39	119.85	35.85	1.00
Moat	0100	50-Year	1460.57	1.78	6.89	6.89	8.72	0.009330	10.88	134.30	36.94	1.01

FLOOD LONG-TERM ALTERNATIVE 2 (FLOOD LTA-2)

LTA-2 HYDRAULIC
MODEL RESULTS
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HEC-RAS Plan: Alt2 River: Moat Reach: Moat

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Moat	8415	2-Year	0.01	6.70	11.70	6.72	11.70	0.000000	0.00	2751.92	1937.01	0.00
Moat	8415	5-Year	0.01	6.70	12.30	6.72	12.30	0.000000	0.00	3908.73	1939.56	0.00
Moat	8415	10-Year	0.01	6.70	12.56	6.72	12.56	0.000000	0.00	4402.55	1940.32	0.00
Moat	8415	25-Year	0.01	6.70	12.81	6.72	12.81	0.000000	0.00	4893.85	1941.08	0.00
Moat	8415	50-Year	0.01	6.70	13.07	6.72	13.07	0.000000	0.00	5393.56	1941.85	0.00
Moat	8236.5*	2-Year	0.01	6.70	11.70	6.72	11.70	0.000000	0.00	2751.92	1937.01	0.00
Moat	8236.5*	5-Year	0.01	6.70	12.30	6.72	12.30	0.000000	0.00	3908.73	1939.56	0.00
Moat	8236.5*	10-Year	0.01	6.70	12.56	6.72	12.56	0.000000	0.00	4402.55	1940.32	0.00
Moat	8236.5*	25-Year	0.01	6.70	12.81	6.72	12.81	0.000000	0.00	4893.85	1941.08	0.00
Moat	8236.5*	50-Year	0.01	6.70	13.07	6.72	13.07	0.000000	0.00	5393.56	1941.85	0.00
Moat	8058	2-Year	0.01	6.70	11.70	6.72	11.70	0.000000	0.00	2751.92	1937.01	0.00
Moat	8058	5-Year	0.01	6.70	12.30	6.72	12.30	0.000000	0.00	3908.73	1939.56	0.00
Moat	8058	10-Year	0.01	6.70	12.56	6.72	12.56	0.000000	0.00	4402.55	1940.32	0.00
Moat	8058	25-Year	0.01	6.70	12.81	6.72	12.81	0.000000	0.00	4893.85	1941.08	0.00
Moat	8058	50-Year	0.01	6.70	13.07	6.72	13.07	0.000000	0.00	5393.56	1941.85	0.00
Moat	7920.*	2-Year	0.01	6.39	11.70	6.41	11.70	0.000000	0.00	2725.98	1968.18	0.00
Moat	7920.*	5-Year	0.01	6.39	12.30	6.41	12.30	0.000000	0.00	3916.55	2014.46	0.00
Moat	7920.*	10-Year	0.01	6.39	12.56	6.41	12.56	0.000000	0.00	4430.54	2023.95	0.00
Moat	7920.*	25-Year	0.01	6.39	12.81	6.41	12.81	0.000000	0.00	4944.11	2033.38	0.00
Moat	7920.*	50-Year	0.01	6.39	13.07	6.41	13.07	0.000000	0.00	5468.72	2042.96	0.00
Moat	7782	2-Year	150.11	6.09	11.70	7.79	11.70	0.000000	0.07	3144.74	2125.84	0.01
Moat	7782	5-Year	240.74	6.09	12.30	8.50	12.30	0.000000	0.07	4420.12	2148.15	0.01
Moat	7782	10-Year	300.86	6.09	12.56	8.61	12.56	0.000000	0.08	4968.08	2157.35	0.01
Moat	7782	25-Year	364.30	6.09	12.81	8.70	12.81	0.000000	0.09	5515.36	2166.50	0.01
Moat	7782	50-Year	459.58	6.09	13.07	8.81	13.07	0.000001	0.10	6074.13	2175.79	0.01
Moat	7765	2-Year	150.11	6.06	11.70	7.76	11.70	0.000000	0.06	3571.64	2458.18	0.01
Moat	7765	5-Year	240.74	6.06	12.30	8.65	12.30	0.000000	0.07	5044.95	2479.16	0.01
Moat	7765	10-Year	300.86	6.06	12.56	8.75	12.56	0.000000	0.07	5677.09	2487.80	0.01
Moat	7765	25-Year	364.30	6.06	12.81	8.83	12.81	0.000000	0.08	6307.96	2496.40	0.01
Moat	7765	50-Year	459.58	6.06	13.07	8.94	13.07	0.000000	0.09	6951.57	2505.14	0.01
Moat	7764		Culvert									
Moat	7754	2-Year	150.11	6.03	11.70	7.73	11.70	0.000000	0.04	3683.26	2467.87	0.00
Moat	7754	5-Year	240.74	6.03	12.29	8.56	12.29	0.000000	0.04	5151.81	2488.08	0.00
Moat	7754	10-Year	300.86	6.03	12.55	8.70	12.55	0.000000	0.04	5786.95	2496.46	0.00
Moat	7754	25-Year	364.30	6.03	12.81	8.76	12.81	0.000000	0.04	6434.09	2504.96	0.00
Moat	7754	50-Year	459.58	6.03	13.04	8.84	13.04	0.000001	0.05	7024.41	2512.70	0.00
Moat	7689	2-Year	150.11	5.89	11.70	7.59	11.70	0.000000	0.05	3826.47	2495.82	0.00
Moat	7689	5-Year	240.74	5.89	12.29	8.15	12.29	0.000000	0.05	5311.04	2514.17	0.00
Moat	7689	10-Year	300.86	5.89	12.55	8.24	12.55	0.000000	0.05	5952.72	2521.76	0.00
Moat	7689	25-Year	364.30	5.89	12.81	8.34	12.81	0.000000	0.05	6606.30	2529.46	0.00
Moat	7689	50-Year	459.58	5.89	13.04	8.45	13.04	0.000000	0.06	7202.29	2536.46	0.01
Moat	7687	2-Year	150.11	5.88	11.70	7.57	11.70	0.000000	0.05	3813.05	2495.90	0.00
Moat	7687	5-Year	240.74	5.88	12.29	8.24	12.29	0.000000	0.05	5297.68	2514.27	0.00
Moat	7687	10-Year	300.86	5.88	12.55	8.33	12.55	0.000000	0.05	5939.39	2521.86	0.00
Moat	7687	25-Year	364.30	5.88	12.81	8.43	12.81	0.000000	0.05	6593.00	2529.56	0.00
Moat	7687	50-Year	459.58	5.88	13.04	8.55	13.04	0.000000	0.06	7189.01	2536.56	0.01
Moat	7650	2-Year	150.11	5.79	11.70	7.48	11.70	0.000000	0.04	3847.16	2503.18	0.00
Moat	7650	5-Year	240.74	5.79	12.29	8.29	12.29	0.000000	0.04	5336.29	2522.39	0.00
Moat	7650	10-Year	300.86	5.79	12.55	8.45	12.55	0.000000	0.04	5980.13	2530.55	0.00
Moat	7650	25-Year	364.30	5.79	12.81	8.57	12.81	0.000000	0.04	6636.06	2538.84	0.00
Moat	7650	50-Year	459.58	5.79	13.04	8.73	13.04	0.000000	0.05	7234.32	2546.37	0.00
Moat	7534.*	2-Year	150.11	5.72	11.70	7.46	11.70	0.000001	0.06	3299.26	2360.19	0.01
Moat	7534.*	5-Year	240.74	5.72	12.29	7.91	12.29	0.000000	0.06	4704.33	2381.60	0.01
Moat	7534.*	10-Year	300.86	5.72	12.55	8.15	12.55	0.000000	0.06	5312.40	2390.65	0.01
Moat	7534.*	25-Year	364.30	5.72	12.81	8.34	12.81	0.000000	0.07	5932.24	2399.84	0.01
Moat	7534.*	50-Year	459.58	5.72	13.04	8.59	13.04	0.000001	0.08	6497.85	2408.20	0.01
Moat	7418	2-Year	150.11	5.66	11.70	7.35	11.70	0.000001	0.09	2912.97	2202.97	0.01
Moat	7418	5-Year	240.74	5.66	12.29	7.98	12.29	0.000001	0.09	4226.03	2227.92	0.01
Moat	7418	10-Year	300.86	5.66	12.55	8.30	12.55	0.000001	0.09	4795.09	2238.29	0.01
Moat	7418	25-Year	364.30	5.66	12.81	8.57	12.81	0.000001	0.10	5375.67	2248.81	0.01
Moat	7418	50-Year	459.58	5.66	13.04	9.03	13.04	0.000001	0.11	5905.86	2258.38	0.01
Moat	7220	2-Year	150.11	5.56	11.70	7.26	11.70	0.000001	0.09	2916.07	2203.96	0.01
Moat	7220	5-Year	240.74	5.56	12.29	7.87	12.29	0.000001	0.09	4229.73	2228.80	0.01

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HEC-RAS Plan: Alt2 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	7220	10-Year	300.86	5.56	12.55	8.19	12.55	0.000001	0.10	4799.00	2239.16	0.01
Moat	7220	25-Year	364.30	5.56	12.81	8.47	12.81	0.000001	0.10	5379.81	2249.69	0.01
Moat	7220	50-Year	459.58	5.56	13.04	8.81	13.04	0.000001	0.11	5910.16	2259.26	0.01
Moat	7048.5*	2-Year	150.11	5.47	11.70	7.17	11.70	0.000001	0.09	2913.88	2217.78	0.01
Moat	7048.5*	5-Year	240.74	5.47	12.29	7.75	12.29	0.000001	0.09	4236.96	2246.61	0.01
Moat	7048.5*	10-Year	300.86	5.47	12.55	8.09	12.55	0.000001	0.10	4810.99	2258.62	0.01
Moat	7048.5*	25-Year	364.30	5.47	12.81	8.38	12.81	0.000001	0.10	5397.01	2270.62	0.01
Moat	7048.5*	50-Year	459.58	5.47	13.04	8.78	13.04	0.000001	0.11	5932.40	2281.53	0.01
Moat	6877.*	2-Year	150.11	5.38	11.70	7.08	11.70	0.000001	0.09	2902.44	2229.29	0.01
Moat	6877.*	5-Year	240.74	5.38	12.29	7.63	12.29	0.000001	0.09	4233.67	2262.37	0.01
Moat	6877.*	10-Year	300.86	5.38	12.55	7.98	12.55	0.000001	0.10	4811.94	2276.28	0.01
Moat	6877.*	25-Year	364.30	5.38	12.81	8.29	12.81	0.000001	0.10	5402.76	2289.95	0.01
Moat	6877.*	50-Year	459.58	5.38	13.04	8.66	13.04	0.000001	0.11	5942.82	2302.25	0.01
Moat	6705.5*	2-Year	150.11	5.28	11.70	6.98	11.70	0.000001	0.10	2882.10	2238.40	0.01
Moat	6705.5*	5-Year	240.74	5.28	12.29	7.53	12.29	0.000001	0.09	4220.22	2276.36	0.01
Moat	6705.5*	10-Year	300.86	5.28	12.55	7.88	12.55	0.000001	0.10	4802.32	2292.41	0.01
Moat	6705.5*	25-Year	364.30	5.28	12.81	8.20	12.81	0.000001	0.10	5397.63	2308.35	0.01
Moat	6705.5*	50-Year	459.58	5.28	13.04	8.57	13.04	0.000001	0.11	5942.15	2322.07	0.01
Moat	6534	2-Year	151.40	5.19	11.70	6.89	11.70	0.000001	0.10	2853.93	2245.06	0.01
Moat	6534	5-Year	242.55	5.19	12.29	7.45	12.29	0.000001	0.09	4197.32	2287.55	0.01
Moat	6534	10-Year	302.99	5.19	12.55	7.80	12.55	0.000001	0.10	4782.54	2305.76	0.01
Moat	6534	25-Year	366.84	5.19	12.81	8.12	12.81	0.000001	0.10	5381.60	2324.26	0.01
Moat	6534	50-Year	462.72	5.19	13.04	8.49	13.04	0.000001	0.11	5930.07	2339.83	0.01
Moat	6405.5*	2-Year	151.40	5.11	11.69	7.12	11.70	0.000058	0.70	253.89	2167.89	0.07
Moat	6405.5*	5-Year	242.55	5.11	12.29	7.85	12.29	0.000001	0.08	4020.87	2209.46	0.01
Moat	6405.5*	10-Year	302.99	5.11	12.55	8.22	12.55	0.000001	0.09	4585.67	2223.61	0.01
Moat	6405.5*	25-Year	366.84	5.11	12.81	8.60	12.81	0.000001	0.09	5162.96	2238.19	0.01
Moat	6405.5*	50-Year	462.72	5.11	13.04	9.01	13.04	0.000001	0.10	5690.85	2251.45	0.01
Moat	6277	2-Year	151.40	5.04	11.68	6.96	11.69	0.000120	0.92	172.35	2113.18	0.11
Moat	6277	5-Year	242.55	5.04	12.29	7.67	12.29	0.000001	0.08	3904.72	2151.47	0.01
Moat	6277	10-Year	302.99	5.04	12.55	8.22	12.55	0.000001	0.08	4454.23	2161.64	0.01
Moat	6277	25-Year	366.84	5.04	12.81	8.83	12.81	0.000001	0.09	5014.94	2171.96	0.01
Moat	6277	50-Year	462.72	5.04	13.04	9.62	13.04	0.000001	0.10	5526.76	2181.34	0.01
Moat	6276		Bridge									
Moat	6271	2-Year	278.46	5.01	11.67	7.90	11.71	0.000413	1.70	171.65	2112.82	0.20
Moat	6271	5-Year	383.63	5.01	12.29	9.17	12.29	0.000002	0.12	3904.77	2151.47	0.01
Moat	6271	10-Year	454.27	5.01	12.55	9.58	12.55	0.000002	0.12	4454.27	2161.64	0.01
Moat	6271	25-Year	548.49	5.01	12.81	9.91	12.81	0.000002	0.13	5014.98	2171.96	0.01
Moat	6271	50-Year	642.52	5.01	13.04	10.19	13.04	0.000002	0.13	5526.81	2181.34	0.01
Moat	6257	2-Year	395.31	5.04	11.64	8.02	11.70	0.000573	2.01	200.88	2111.01	0.23
Moat	6257	5-Year	540.87	5.04	12.29	8.58	12.29	0.000003	0.18	3936.66	2151.46	0.02
Moat	6257	10-Year	638.48	5.04	12.55	8.90	12.55	0.000003	0.18	4486.15	2161.63	0.02
Moat	6257	25-Year	768.61	5.04	12.81	9.30	12.81	0.000003	0.19	5046.79	2171.95	0.02
Moat	6257	50-Year	898.43	5.04	13.04	9.68	13.04	0.000003	0.19	5558.55	2181.33	0.02
Moat	6090.33*	2-Year	395.31	4.95	11.55	7.91	11.62	0.000471	2.04	193.37	2629.85	0.20
Moat	6090.33*	5-Year	540.87	4.95	12.29	8.43	12.29	0.000002	0.13	4935.82	2670.43	0.01
Moat	6090.33*	10-Year	638.48	4.95	12.55	8.74	12.55	0.000002	0.13	5617.33	2677.91	0.01
Moat	6090.33*	25-Year	768.61	4.95	12.81	9.12	12.81	0.000002	0.13	6311.09	2684.23	0.01
Moat	6090.33*	50-Year	898.43	4.95	13.04	9.47	13.04	0.000002	0.13	6942.90	2689.97	0.01
Moat	5923.66*	2-Year	395.31	4.85	11.49	7.82	11.54	0.000369	1.94	203.79	3198.29	0.18
Moat	5923.66*	5-Year	540.87	4.85	12.21	8.34	12.29	0.000481	2.16	250.14	3218.61	0.21
Moat	5923.66*	10-Year	638.48	4.85	12.55	8.64	12.55	0.000001	0.11	6796.57	3228.51	0.01
Moat	5923.66*	25-Year	768.61	4.85	12.81	9.00	12.81	0.000001	0.11	7632.82	3234.76	0.01
Moat	5923.66*	50-Year	898.43	4.85	13.04	9.33	13.04	0.000001	0.12	8394.10	3240.43	0.01
Moat	5757	2-Year	395.31	4.76	11.43	7.77	11.49	0.000314	1.88	209.90	3764.42	0.18
Moat	5757	5-Year	540.87	4.76	12.15	8.29	12.22	0.000348	2.12	254.81	3773.94	0.19
Moat	5757	10-Year	638.48	4.76	12.55	8.58	12.55	0.000001	0.11	7982.30	3786.03	0.01
Moat	5757	25-Year	768.61	4.76	12.81	8.93	12.81	0.000001	0.11	8962.76	3791.65	0.01
Moat	5757	50-Year	898.43	4.76	13.04	9.24	13.04	0.000001	0.11	9854.93	3796.76	0.01
Moat	5756	2-Year	395.31	4.76	11.41	7.74	11.48	0.000448	2.12	186.30	3762.03	0.21
Moat	5756	5-Year	540.87	4.76	12.13	8.30	12.21	0.000486	2.35	230.10	3773.28	0.22
Moat	5756	10-Year	638.48	4.76	12.55	8.62	12.55	0.000001	0.10	7958.71	3786.03	0.01
Moat	5756	25-Year	768.61	4.76	12.81	9.08	12.81	0.000001	0.10	8939.18	3791.65	0.01

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HEC-RAS Plan: Alt2 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	5756	50-Year	898.43	4.76	13.04	9.48	13.04	0.000001	0.10	9831.35	3796.76	0.01
Moat	5720	2-Year	395.31	4.74	11.40	7.71	11.47	0.000458	2.06	192.12	3768.46	0.21
Moat	5720	5-Year	540.87	4.74	12.12	8.34	12.19	0.000496	2.23	242.49	3784.89	0.22
Moat	5720	10-Year	638.48	4.74	12.55	8.69	12.55	0.000001	0.10	7977.01	3798.19	0.01
Moat	5720	25-Year	768.61	4.74	12.81	9.07	12.81	0.000001	0.10	8960.41	3802.20	0.01
Moat	5720	50-Year	898.43	4.74	13.04	9.41	13.04	0.000001	0.10	9854.89	3805.85	0.01
Moat	5719	2-Year	395.31	4.74	11.40	7.71	11.47	0.000458	2.06	192.09	3768.45	0.21
Moat	5719	5-Year	540.87	4.74	12.12	8.34	12.19	0.000496	2.23	242.45	3784.88	0.22
Moat	5719	10-Year	638.48	4.74	12.55	8.69	12.55	0.000001	0.10	7977.00	3798.19	0.01
Moat	5719	25-Year	768.61	4.74	12.81	9.07	12.81	0.000001	0.10	8960.41	3802.20	0.01
Moat	5719	50-Year	898.43	4.74	13.04	9.41	13.04	0.000001	0.10	9854.88	3805.85	0.01
Moat	5544.5*	2-Year	395.31	4.65	11.31	7.63	11.38	0.000522	2.19	180.63	3760.67	0.22
Moat	5544.5*	5-Year	540.87	4.65	12.01	8.23	12.10	0.000599	2.41	224.61	3776.63	0.24
Moat	5544.5*	10-Year	638.48	4.65	12.44	8.57	12.54	0.000636	2.49	256.38	3787.66	0.24
Moat	5544.5*	25-Year	768.61	4.65	12.81	8.97	12.81	0.000001	0.10	8944.88	3796.54	0.01
Moat	5544.5*	50-Year	898.43	4.65	13.04	9.32	13.04	0.000001	0.10	9838.01	3800.11	0.01
Moat	5370.*	2-Year	395.31	4.55	11.20	7.53	11.29	0.000535	2.31	171.47	3753.21	0.22
Moat	5370.*	5-Year	540.87	4.55	11.88	8.11	11.99	0.000664	2.59	208.93	3768.24	0.25
Moat	5370.*	10-Year	638.48	4.55	12.31	8.45	12.42	0.000701	2.70	236.42	3776.92	0.26
Moat	5370.*	25-Year	768.61	4.55	12.81	8.86	12.81	0.000001	0.10	8931.18	3791.09	0.01
Moat	5370.*	50-Year	898.43	4.55	13.04	9.23	13.04	0.000001	0.10	9823.02	3794.57	0.01
Moat	5195.5*	2-Year	395.31	4.46	11.10	7.44	11.19	0.000526	2.40	164.48	3746.12	0.22
Moat	5195.5*	5-Year	540.87	4.46	11.75	8.01	11.86	0.000714	2.77	195.31	3759.87	0.26
Moat	5195.5*	10-Year	638.48	4.46	12.16	8.34	12.29	0.000786	2.92	218.65	3768.41	0.27
Moat	5195.5*	25-Year	768.61	4.46	12.64	8.76	12.79	0.000869	3.07	250.13	3779.18	0.29
Moat	5195.5*	50-Year	898.43	4.46	13.04	9.13	13.04	0.000001	0.10	9809.25	3789.21	0.01
Moat	5021	2-Year	473.06	4.37	10.93	7.65	11.08	0.000764	3.03	156.30	3742.12	0.27
Moat	5021	5-Year	650.09	4.37	11.50	8.28	11.71	0.001030	3.61	179.84	3749.69	0.32
Moat	5021	10-Year	768.87	4.37	11.87	8.66	12.11	0.001224	3.90	197.25	3757.48	0.35
Moat	5021	25-Year	927.54	4.37	12.31	9.12	12.58	0.001426	4.20	220.96	3766.07	0.38
Moat	5021	50-Year	1085.94	4.37	12.71	9.53	13.01	0.001571	4.43	244.99	3773.51	0.40
Moat	4850.2*	2-Year	473.06	4.28	10.79	7.56	10.93	0.000970	3.00	157.89	3746.49	0.28
Moat	4850.2*	5-Year	650.09	4.28	11.31	8.20	11.50	0.001364	3.55	182.89	3756.55	0.33
Moat	4850.2*	10-Year	768.87	4.28	11.64	8.58	11.87	0.001556	3.82	201.16	3763.13	0.36
Moat	4850.2*	25-Year	927.54	4.28	12.05	9.02	12.31	0.001758	4.12	225.36	3770.99	0.38
Moat	4850.2*	50-Year	1085.94	4.28	12.41	9.42	12.71	0.001944	4.36	249.33	3778.28	0.40
Moat	4679.4*	2-Year	473.06	4.18	10.63	7.48	10.76	0.001005	2.90	163.14	3748.74	0.28
Moat	4679.4*	5-Year	650.09	4.18	11.08	8.10	11.26	0.001381	3.48	186.68	3757.87	0.33
Moat	4679.4*	10-Year	768.87	4.18	11.38	8.47	11.60	0.001564	3.77	203.87	3763.32	0.36
Moat	4679.4*	25-Year	927.54	4.18	11.75	8.90	12.01	0.001765	4.10	226.28	3770.14	0.38
Moat	4679.4*	50-Year	1085.94	4.18	12.08	9.34	12.37	0.001967	4.38	247.69	3776.90	0.40
Moat	4508.6*	2-Year	473.06	4.09	10.47	7.38	10.59	0.000944	2.83	167.45	50.58	0.27
Moat	4508.6*	5-Year	650.09	4.09	10.85	8.00	11.03	0.001336	3.47	187.30	3754.96	0.33
Moat	4508.6*	10-Year	768.87	4.09	11.11	8.40	11.33	0.001548	3.81	201.89	3759.57	0.36
Moat	4508.6*	25-Year	927.54	4.09	11.43	8.86	11.70	0.001796	4.20	220.69	3765.13	0.39
Moat	4508.6*	50-Year	1085.94	4.09	11.71	9.25	12.03	0.002052	4.56	237.93	3770.41	0.42
Moat	4337.8*	2-Year	473.06	3.99	10.30	7.29	10.43	0.000914	2.87	165.12	48.95	0.27
Moat	4337.8*	5-Year	650.09	3.99	10.59	7.92	10.80	0.001404	3.62	179.80	3752.12	0.34
Moat	4337.8*	10-Year	768.87	3.99	10.80	8.27	11.05	0.001695	4.03	190.93	3755.68	0.38
Moat	4337.8*	25-Year	927.54	3.99	11.05	8.69	11.37	0.002075	4.53	204.85	3759.95	0.42
Moat	4337.8*	50-Year	1085.94	3.99	11.25	9.06	11.64	0.002493	5.02	216.30	3763.46	0.47
Moat	4167	2-Year	473.06	3.90	10.17	7.19	10.28	0.000785	2.77	198.59	134.31	0.27
Moat	4167	5-Year	650.09	3.90	10.42	7.81	10.58	0.001053	3.35	232.55	137.44	0.32
Moat	4167	10-Year	768.87	3.90	10.62	8.17	10.80	0.001125	3.57	260.89	3840.76	0.33
Moat	4167	25-Year	927.54	3.90	10.88	8.60	11.07	0.001193	3.82	296.53	3845.16	0.34
Moat	4167	50-Year	1085.94	3.90	11.07	9.07	11.28	0.001298	4.09	324.41	3848.53	0.36
Moat	4047.5*	2-Year	473.06	3.84	10.13	7.14	10.19	0.000465	2.18	263.20	142.45	0.20
Moat	4047.5*	5-Year	650.09	3.84	10.37	7.73	10.46	0.000650	2.67	297.03	146.46	0.24
Moat	4047.5*	10-Year	768.87	3.84	10.56	8.13	10.67	0.000711	2.87	326.42	3849.13	0.25
Moat	4047.5*	25-Year	927.54	3.84	10.81	8.56	10.93	0.000777	3.09	363.39	3853.74	0.27
Moat	4047.5*	50-Year	1085.94	3.84	10.99	9.24	11.13	0.000868	3.34	391.66	3856.98	0.28
Moat	3928	2-Year	473.06	3.77	10.11	7.12	10.15	0.000238	1.76	334.65	152.97	0.16
Moat	3928	5-Year	650.09	3.77	10.33	7.65	10.39	0.000346	2.19	369.10	155.83	0.19

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HEC-RAS Plan: All2 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	3928	10-Year	768.87	3.77	10.53	7.96	10.60	0.000390	2.38	399.61	3858.61	0.20
Moat	3928	25-Year	927.54	3.77	10.77	8.47	10.85	0.000441	2.61	437.93	3862.87	0.22
Moat	3928	50-Year	1085.94	3.77	10.94	8.74	11.04	0.000506	2.85	466.81	3866.02	0.23
Moat	3782.*	2-Year	473.06	3.69	10.07	6.99	10.11	0.000291	1.79	324.08	160.13	0.16
Moat	3782.*	5-Year	650.09	3.69	10.27	7.56	10.33	0.000429	2.24	357.10	164.32	0.20
Moat	3782.*	10-Year	768.87	3.69	10.46	7.87	10.53	0.000482	2.43	388.19	168.17	0.21
Moat	3782.*	25-Year	927.54	3.69	10.69	8.23	10.78	0.000540	2.65	427.71	3870.00	0.22
Moat	3782.*	50-Year	1085.94	3.69	10.86	8.79	10.96	0.000618	2.89	456.64	3873.31	0.24
Moat	3636	2-Year	473.06	3.61	10.02	6.89	10.07	0.000299	1.91	311.30	174.80	0.17
Moat	3636	5-Year	650.09	3.61	10.20	7.42	10.27	0.000447	2.39	342.68	176.98	0.21
Moat	3636	10-Year	768.87	3.61	10.37	7.76	10.46	0.000499	2.59	374.53	179.17	0.23
Moat	3636	25-Year	927.54	3.61	10.60	8.13	10.70	0.000557	2.82	414.75	3882.52	0.24
Moat	3636	50-Year	1085.94	3.61	10.75	8.46	10.87	0.000641	3.08	442.74	3885.15	0.26
Moat	3512.*	2-Year	473.06	3.55	10.00	6.76	10.03	0.000228	1.50	356.85	182.03	0.15
Moat	3512.*	5-Year	650.09	3.55	10.16	7.19	10.21	0.000350	1.92	387.67	190.13	0.19
Moat	3512.*	10-Year	768.87	3.55	10.34	7.45	10.40	0.000397	2.11	421.38	198.60	0.20
Moat	3512.*	25-Year	927.54	3.55	10.55	7.76	10.63	0.000449	2.33	465.57	209.17	0.22
Moat	3512.*	50-Year	1085.94	3.55	10.70	8.08	10.79	0.000524	2.58	496.39	216.23	0.23
Moat	3388	2-Year	513.05	3.48	9.96		10.00	0.000224	1.54	357.58	208.93	0.17
Moat	3388	5-Year	709.42	3.48	10.11		10.17	0.000361	1.99	388.00	215.73	0.21
Moat	3388	10-Year	841.61	3.48	10.27		10.35	0.000419	2.19	424.19	223.02	0.23
Moat	3388	25-Year	1018.25	3.48	10.48		10.57	0.000483	2.42	471.47	232.19	0.24
Moat	3388	50-Year	1195.20	3.48	10.61		10.72	0.000575	2.69	502.32	237.99	0.27
Moat	3199.13*	2-Year	513.05	3.38	9.93	6.62	9.95	0.000243	1.37	421.33	246.92	0.15
Moat	3199.13*	5-Year	709.42	3.38	10.05	7.07	10.09	0.000386	1.78	452.14	254.79	0.19
Moat	3199.13*	10-Year	841.61	3.38	10.21	7.35	10.26	0.000432	1.95	493.01	264.88	0.20
Moat	3199.13*	25-Year	1018.25	3.38	10.41	7.67	10.47	0.000481	2.15	547.22	277.69	0.22
Moat	3199.13*	50-Year	1195.20	3.38	10.52	7.95	10.60	0.000567	2.39	580.28	285.22	0.24
Moat	3010.26*	2-Year	513.05	3.27	9.89	6.54	9.91	0.000220	1.31	454.63	288.20	0.14
Moat	3010.26*	5-Year	709.42	3.27	9.98	7.01	10.02	0.000361	1.71	482.94	296.57	0.18
Moat	3010.28*	10-Year	841.61	3.27	10.13	7.28	10.18	0.000404	1.88	528.28	309.52	0.20
Moat	3010.26*	25-Year	1018.25	3.27	10.32	7.60	10.38	0.000447	2.06	589.47	326.18	0.21
Moat	3010.26*	50-Year	1195.20	3.27	10.43	7.89	10.50	0.000534	2.30	623.13	334.99	0.23
Moat	2821.4*	2-Year	513.05	3.17	9.85	6.47	9.87	0.000198	1.24	491.99	333.43	0.14
Moat	2821.4*	5-Year	709.42	3.17	9.92	6.94	9.96	0.000337	1.65	516.00	341.60	0.18
Moat	2821.4*	10-Year	841.61	3.17	10.06	7.22	10.10	0.000377	1.80	565.87	357.96	0.19
Moat	2821.4*	25-Year	1018.25	3.17	10.25	7.54	10.30	0.000415	1.97	634.37	379.29	0.20
Moat	2821.4*	50-Year	1195.20	3.17	10.33	7.82	10.40	0.000503	2.21	667.35	389.15	0.22
Moat	2632.53*	2-Year	513.05	3.07	9.81	6.39	9.83	0.000177	1.18	534.32	385.61	0.13
Moat	2632.53*	5-Year	709.42	3.07	9.86	6.88	9.89	0.000313	1.58	552.19	392.33	0.17
Moat	2632.53*	10-Year	841.61	3.07	10.00	7.15	10.03	0.000350	1.72	606.83	412.18	0.18
Moat	2632.53*	25-Year	1018.25	3.07	10.18	7.48	10.22	0.000383	1.88	683.45	438.51	0.19
Moat	2632.53*	50-Year	1195.20	3.07	10.25	7.76	10.30	0.000473	2.12	714.20	448.65	0.22
Moat	2443.66*	2-Year	513.05	2.97	9.78	6.31	9.80	0.000157	1.11	581.34	445.07	0.12
Moat	2443.66*	5-Year	709.42	2.97	9.81	6.81	9.84	0.000289	1.52	590.85	449.03	0.17
Moat	2443.66*	10-Year	841.61	2.97	9.94	7.09	9.97	0.000323	1.65	650.58	473.12	0.18
Moat	2443.66*	25-Year	1018.25	2.97	10.11	7.42	10.15	0.000352	1.79	736.27	505.68	0.19
Moat	2443.66*	50-Year	1195.20	2.97	10.16	7.70	10.21	0.000445	2.04	763.01	515.42	0.21
Moat	2254.8*	2-Year	513.05	2.86	9.76	6.20	9.77	0.000137	1.04	638.74	517.01	0.11
Moat	2254.8*	5-Year	709.42	2.86	9.76	6.74	9.78	0.000263	1.45	637.52	516.46	0.16
Moat	2254.8*	10-Year	841.61	2.86	9.88	7.03	9.91	0.000294	1.58	703.24	545.24	0.17
Moat	2254.8*	25-Year	1018.25	2.86	10.05	7.35	10.08	0.000318	1.70	799.80	584.54	0.18
Moat	2254.8*	50-Year	1195.20	2.86	10.09	7.64	10.13	0.000412	1.95	820.56	591.33	0.20
Moat	2065.93*	2-Year	513.05	2.76	9.74	6.11	9.75	0.000118	0.97	708.40	606.96	0.11
Moat	2065.93*	5-Year	709.42	2.76	9.71	6.67	9.73	0.000236	1.37	693.51	599.56	0.15
Moat	2065.93*	10-Year	841.61	2.76	9.83	6.95	9.86	0.000265	1.49	766.74	635.10	0.16
Moat	2065.93*	25-Year	1018.25	2.76	10.00	7.28	10.03	0.000281	1.60	876.63	673.64	0.17
Moat	2065.93*	50-Year	1195.20	2.76	10.02	7.57	10.06	0.000375	1.85	888.91	677.81	0.19
Moat	1877.06*	2-Year	513.05	2.66	9.72	6.02	9.73	0.000099	0.90	795.34	711.64	0.10
Moat	1877.06*	5-Year	709.42	2.66	9.67	6.59	9.69	0.000207	1.29	763.40	699.26	0.14
Moat	1877.06*	10-Year	841.61	2.66	9.79	6.89	9.81	0.000230	1.40	845.21	730.56	0.15
Moat	1877.06*	25-Year	1018.25	2.66	9.95	7.22	9.98	0.000242	1.49	970.04	775.91	0.15
Moat	1877.06*	50-Year	1195.20	2.66	9.95	7.50	9.99	0.000333	1.74	971.03	776.25	0.18

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HEC-RAS Plan: Alt2 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	1688.2*	2-Year	513.05	2.56	9.70	5.92	9.71	0.000080	0.82	902.34	828.76	0.09
Moat	1688.2*	5-Year	709.42	2.56	9.59	6.52	9.64	0.000364	1.83	388.12	790.27	0.19
Moat	1688.2*	10-Year	841.61	2.56	9.75	6.82	9.77	0.000196	1.29	941.96	844.14	0.14
Moat	1688.2*	25-Year	1018.25	2.56	9.91	7.14	9.93	0.000204	1.37	1084.95	897.50	0.14
Moat	1688.2*	50-Year	1195.20	2.56	9.90	7.43	9.93	0.000290	1.62	1071.74	892.70	0.17
Moat	1499.33*	2-Year	513.05	2.45	9.66	5.83	9.69	0.000158	1.23	415.85	963.75	0.12
Moat	1499.33*	5-Year	709.42	2.45	9.52	6.44	9.57	0.000353	1.79	396.16	903.91	0.19
Moat	1499.33*	10-Year	841.61	2.45	9.65	6.74	9.71	0.000433	2.04	413.47	956.61	0.21
Moat	1499.33*	25-Year	1018.25	2.45	9.88	7.07	9.90	0.000166	1.24	1234.72	1047.83	0.13
Moat	1499.33*	50-Year	1195.20	2.45	9.85	7.37	9.87	0.000243	1.49	1204.22	1036.56	0.15
Moat	1310.46*	2-Year	513.05	2.35	9.64	5.74	9.66	0.000147	1.20	429.18	1125.63	0.12
Moat	1310.46*	5-Year	709.42	2.35	9.45	6.36	9.50	0.000344	1.76	403.70	1037.44	0.18
Moat	1310.46*	10-Year	841.61	2.35	9.57	6.66	9.63	0.000428	2.01	419.37	1091.69	0.21
Moat	1310.46*	25-Year	1018.25	2.35	9.86	7.00	9.87	0.000129	1.10	1428.61	1229.72	0.11
Moat	1310.46*	50-Year	1195.20	2.35	9.67	7.29	9.79	0.000769	2.75	434.40	1143.64	0.28
Moat	1121.6*	2-Year	513.05	2.25	9.61	5.65	9.63	0.000138	1.16	443.13	1328.18	0.12
Moat	1121.6*	5-Year	709.42	2.25	9.39	6.28	9.44	0.000335	1.72	411.51	1202.31	0.18
Moat	1121.6*	10-Year	841.61	2.25	9.49	6.59	9.55	0.000424	1.98	425.28	1257.19	0.20
Moat	1121.6*	25-Year	1018.25	2.25	9.74	6.93	9.82	0.000471	2.20	462.86	1406.49	0.22
Moat	1121.6*	50-Year	1195.20	2.25	9.52	7.22	9.64	0.000824	2.78	429.99	1275.93	0.28
Moat	932.733*	2-Year	513.05	2.15	9.59	5.57	9.60	0.000129	1.12	457.00	1590.13	0.11
Moat	932.733*	5-Year	709.42	2.15	9.33	6.21	9.38	0.000323	1.69	419.11	1413.14	0.18
Moat	932.733*	10-Year	841.61	2.15	9.41	6.52	9.47	0.000419	1.95	430.57	1466.99	0.20
Moat	932.733*	25-Year	1018.25	2.15	9.66	6.87	9.73	0.000472	2.18	467.76	1640.08	0.22
Moat	932.733*	50-Year	1195.20	2.15	9.35	7.16	9.48	0.000896	2.83	422.21	1427.72	0.30
Moat	743.866*	2-Year	513.05	2.04	9.56	5.46	9.58	0.000119	1.09	471.65	1938.24	0.11
Moat	743.866*	5-Year	709.42	2.04	9.27	6.13	9.32	0.000305	1.66	427.87	1693.65	0.17
Moat	743.866*	10-Year	841.61	2.04	9.33	6.43	9.39	0.000404	1.93	436.69	1743.31	0.20
Moat	743.866*	25-Year	1018.25	2.04	9.57	6.79	9.64	0.000466	2.15	472.70	1944.07	0.22
Moat	743.866*	50-Year	1195.20	2.04	9.17	7.08	9.30	0.000969	2.90	412.47	1607.79	0.31
Moat	0555	2-Year	520.50	1.94	9.54	5.40	9.56	0.000108	1.07	486.48	2412.87	0.11
Moat	0555	5-Year	719.69	1.94	9.22	6.08	9.26	0.000286	1.65	436.86	2073.20	0.17
Moat	0555	10-Year	853.63	1.94	9.26	6.39	9.31	0.000386	1.93	442.88	2114.36	0.20
Moat	0555	25-Year	1032.96	1.94	9.48	6.75	9.55	0.000450	2.16	477.30	2350.38	0.22
Moat	0555	50-Year	121.14	1.94	9.21	3.43	9.21	0.000008	0.28	435.68	2065.13	0.03
Moat	426.*	2-Year	520.50	1.87	9.50	5.29	9.54	0.000284	1.59	326.48	2369.31	0.16
Moat	426.*	5-Year	719.69	1.87	9.10	5.82	9.19	0.000848	2.53	284.51	1945.42	0.27
Moat	426.*	10-Year	853.63	1.87	9.08	6.12	9.23	0.001209	3.01	283.35	1933.75	0.32
Moat	426.*	25-Year	1032.96	1.87	9.27	6.49	9.45	0.001433	3.42	302.47	2125.33	0.35
Moat	426.*	50-Year	121.14	1.87	9.21	3.37	9.21	0.000021	0.41	296.10	2061.61	0.04
Moat	0297	2-Year	528.38	1.80	9.51	5.22	9.51	0.000040	0.80	1129.31	3010.52	0.06
Moat	0297	5-Year	730.06	1.80	9.11	5.83	9.13	0.000155	1.57	857.67	2556.28	0.13
Moat	0297	10-Year	865.90	1.80	9.11	6.19	9.14	0.000220	1.87	854.77	2551.57	0.15
Moat	0297	25-Year	1047.32	1.80	9.32	6.63	9.34	0.000216	1.87	996.76	2788.21	0.15
Moat	0297	50-Year	1228.64	1.80	9.12	7.04	9.17	0.000436	2.63	860.06	2560.17	0.21
Moat	0265	2-Year	627.35	1.79	9.51	5.57	9.51	0.000027	0.24	2706.32	3847.35	0.05
Moat	0265	5-Year	867.29	1.79	9.11	6.26	9.12	0.000380	0.78	1208.53	3656.39	0.24
Moat	0265	10-Year	1028.75	1.79	9.11	6.68	9.12	0.000550	0.94	1192.11	3654.24	0.29
Moat	0265	25-Year	1244.74	1.79	9.32	7.16	9.33	0.000245	0.66	1996.14	3758.02	0.16
Moat	0265	50-Year	1460.57	1.79	9.12	7.61	9.14	0.001052	1.30	1224.10	3658.42	0.40
Moat	264		Bridge									
Moat	0209	2-Year	627.35	1.78	6.68		7.21	0.003746	5.87	106.91	31.23	0.56
Moat	0209	5-Year	867.29	1.78	7.38		8.08	0.004101	6.68	129.82	33.57	0.60
Moat	0209	10-Year	1028.75	1.78	7.80		8.59	0.004285	7.14	144.11	34.94	0.62
Moat	0209	25-Year	1244.74	1.78	7.86		8.99	0.006025	8.52	146.16	35.14	0.74
Moat	0209	50-Year	1460.57	1.78	8.96		8.97	0.000072	1.08	3295.70	3324.74	0.08
Moat	0190	2-Year	627.35	1.78	6.60		7.13	0.004512	5.87	106.83	37.42	0.61
Moat	0190	5-Year	867.29	1.78	7.33		7.97	0.004331	6.41	135.29	40.38	0.62
Moat	0190	10-Year	1028.75	1.78	7.77		8.47	0.004252	6.71	153.24	42.14	0.62
Moat	0190	25-Year	1244.74	1.78	7.81	7.01	8.81	0.006021	8.03	155.02	42.31	0.74
Moat	0190	50-Year	1460.57	1.78	8.91		8.95	0.000481	2.59	1620.73	3304.26	0.22
Moat	0100	2-Year	627.35	1.78	6.33	5.07	6.80	0.002766	5.49	114.20	35.41	0.54
Moat	0100	5-Year	867.29	1.78	7.05	5.67	7.64	0.002907	6.19	140.14	37.37	0.56

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HEC-RAS Plan: Alt2 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	0100	10-Year	1028.75	1.78	7.46	6.05	8.14	0.002995	6.59	156.05	38.53	0.58
Moat	0100	25-Year	1244.74	1.78	8.39	6.49	8.43	0.000381	2.57	1645.38	3765.29	0.21
Moat	0100	50-Year	1460.57	1.78	8.92	6.88	8.93	0.000059	1.05	3659.34	3795.66	0.08
Moat	0000	2-Year	627.35	1.78	5.06	5.06	6.25	0.010591	8.72	71.93	30.99	1.01
Moat	0000	5-Year	867.29	1.78	5.67	5.67	7.07	0.010060	9.47	91.54	33.28	1.01
Moat	0000	10-Year	1028.75	1.78	6.05	6.05	7.56	0.009715	9.86	104.31	34.64	1.00
Moat	0000	25-Year	1244.74	1.78	6.49	6.49	8.17	0.009449	10.39	119.85	35.85	1.00
Moat	0000	50-Year	1460.57	1.78	6.89	6.89	8.72	0.009330	10.88	134.30	36.94	1.01

FLOOD LONG-TERM ALTERNATIVE 3 (FLOOD LTA-3)

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MODEL RESULTS
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HEC-RAS Plan: Alt3 River: Moat Reach: Moat

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Moat	8415	2-Year	0.01	6.70	12.00	6.72	12.00	0.000000	0.00	3332.62	1938.66	0.00
Moat	8415	5-Year	0.01	6.70	12.48	6.72	12.48	0.000000	0.00	4248.48	1940.08	0.00
Moat	8415	10-Year	0.01	6.70	12.63	6.72	12.63	0.000000	0.00	4555.15	1940.55	0.00
Moat	8415	25-Year	0.01	6.70	12.96	6.72	12.96	0.000000	0.00	5184.02	1941.53	0.00
Moat	8415	50-Year	0.01	6.70	13.11	6.72	13.11	0.000000	0.00	5473.85	1941.97	0.00
Moat	8236.5*	2-Year	0.01	6.70	12.00	6.72	12.00	0.000000	0.00	3332.62	1938.66	0.00
Moat	8236.5*	5-Year	0.01	6.70	12.48	6.72	12.48	0.000000	0.00	4248.48	1940.08	0.00
Moat	8236.5*	10-Year	0.01	6.70	12.63	6.72	12.63	0.000000	0.00	4555.15	1940.55	0.00
Moat	8236.5*	25-Year	0.01	6.70	12.96	6.72	12.96	0.000000	0.00	5184.02	1941.53	0.00
Moat	8236.5*	50-Year	0.01	6.70	13.11	6.72	13.11	0.000000	0.00	5473.85	1941.97	0.00
Moat	8058	2-Year	0.01	6.70	12.00	6.72	12.00	0.000000	0.00	3332.62	1938.66	0.00
Moat	8058	5-Year	0.01	6.70	12.48	6.72	12.48	0.000000	0.00	4248.48	1940.08	0.00
Moat	8058	10-Year	0.01	6.70	12.63	6.72	12.63	0.000000	0.00	4555.15	1940.55	0.00
Moat	8058	25-Year	0.01	6.70	12.96	6.72	12.96	0.000000	0.00	5184.02	1941.53	0.00
Moat	8058	50-Year	0.01	6.70	13.11	6.72	13.11	0.000000	0.00	5473.85	1941.97	0.00
Moat	7920.*	2-Year	0.01	6.70	12.00	6.72	12.00	0.000000	0.00	3300.66	1996.91	0.00
Moat	7920.*	5-Year	0.01	6.70	12.48	6.72	12.48	0.000000	0.00	4250.53	2020.99	0.00
Moat	7920.*	10-Year	0.01	6.70	12.63	6.72	12.63	0.000000	0.00	4570.42	2026.88	0.00
Moat	7920.*	25-Year	0.01	6.70	12.96	6.72	12.96	0.000000	0.00	5229.05	2038.94	0.00
Moat	7920.*	50-Year	0.01	6.70	13.11	6.72	13.11	0.000000	0.00	5533.80	2044.50	0.00
Moat	7782	2-Year	150.11	6.70	12.00	8.51	12.00	0.000000	0.03	3764.43	2137.42	0.00
Moat	7782	5-Year	240.74	6.70	12.48	8.70	12.48	0.000000	0.03	4777.80	2154.48	0.00
Moat	7782	10-Year	300.86	6.70	12.63	8.78	12.63	0.000001	0.04	5118.73	2160.19	0.00
Moat	7782	25-Year	364.30	6.70	12.96	8.86	12.96	0.000001	0.04	5820.48	2171.90	0.00
Moat	7782	50-Year	459.58	6.70	13.11	8.97	13.11	0.000001	0.04	6144.98	2177.29	0.00
Moat	7765	2-Year	150.11	7.87	12.00	8.66	12.00	0.000000	0.03	4292.04	2469.07	0.00
Moat	7765	5-Year	240.74	7.87	12.48	8.78	12.48	0.000000	0.03	5461.78	2485.11	0.00
Moat	7765	10-Year	300.86	7.87	12.63	8.86	12.63	0.000000	0.04	5854.93	2490.47	0.00
Moat	7765	25-Year	364.30	7.87	12.96	8.93	12.96	0.000000	0.04	6663.58	2501.48	0.00
Moat	7765	50-Year	459.58	7.87	13.11	9.03	13.11	0.000001	0.04	7037.25	2506.54	0.00
Moat	7754	2-Year	150.11	7.87	12.00	8.58	12.00	0.000000	0.02	4408.86	2478.53	0.00
Moat	7754	5-Year	240.74	7.87	12.48	8.80	12.48	0.000000	0.03	5582.95	2494.05	0.00
Moat	7754	10-Year	300.86	7.87	12.63	8.87	12.63	0.000000	0.03	5977.50	2499.25	0.00
Moat	7754	25-Year	364.30	7.87	12.96	8.95	12.96	0.000000	0.03	6788.94	2509.90	0.00
Moat	7754	50-Year	459.58	7.87	13.11	9.04	13.11	0.000000	0.04	7163.85	2514.81	0.00
Moat	7689	2-Year	150.11	6.48	12.00	8.18	12.00	0.000000	0.03	4562.95	2505.52	0.00
Moat	7689	5-Year	240.74	6.48	12.48	8.33	12.48	0.000000	0.04	5749.44	2519.58	0.00
Moat	7689	10-Year	300.86	6.48	12.63	8.41	12.63	0.000000	0.05	6147.97	2524.28	0.00
Moat	7689	25-Year	364.30	6.48	12.96	8.49	12.96	0.000000	0.05	6967.36	2533.93	0.00
Moat	7689	50-Year	459.58	6.48	13.11	8.59	13.11	0.000000	0.06	7345.80	2538.37	0.00
Moat	7687	2-Year	150.11	6.48	12.00	8.18	12.00	0.000000	0.03	4563.03	2505.62	0.00
Moat	7687	5-Year	240.74	6.48	12.48	8.33	12.48	0.000000	0.04	5749.56	2519.68	0.00
Moat	7687	10-Year	300.86	6.48	12.63	8.41	12.63	0.000000	0.05	6148.11	2524.38	0.00
Moat	7687	25-Year	364.30	6.48	12.96	8.49	12.96	0.000000	0.05	6967.53	2534.03	0.00
Moat	7687	50-Year	459.58	6.48	13.11	8.59	13.11	0.000000	0.06	7345.99	2538.47	0.00
Moat	7650	2-Year	150.11	5.79	12.00	8.57	12.00	0.000000	0.03	4584.43	2513.09	0.00
Moat	7650	5-Year	240.74	5.79	12.48	8.73	12.48	0.000000	0.03	5754.73	2528.21	0.00
Moat	7650	10-Year	300.86	5.79	12.63	8.75	12.63	0.000000	0.04	6154.65	2533.27	0.00
Moat	7650	25-Year	364.30	5.79	12.96	8.80	12.96	0.000000	0.04	6977.07	2543.65	0.00
Moat	7650	50-Year	459.58	5.79	13.11	8.88	13.11	0.000000	0.05	7356.97	2548.42	0.00
Moat	7534.*	2-Year	150.11	5.63	12.00	7.79	12.00	0.000000	0.04	4001.62	2371.00	0.00
Moat	7534.*	5-Year	240.74	5.63	12.48	8.45	12.48	0.000000	0.04	5125.19	2387.77	0.00
Moat	7534.*	10-Year	300.86	5.63	12.63	8.62	12.63	0.000000	0.05	5502.94	2393.38	0.00
Moat	7534.*	25-Year	364.30	5.63	12.96	8.73	12.96	0.000000	0.05	6280.21	2404.89	0.00
Moat	7534.*	50-Year	459.58	5.63	13.11	8.87	13.11	0.000001	0.06	6639.41	2410.18	0.00
Moat	7418	2-Year	150.11	5.47	12.00	7.65	12.00	0.000000	0.07	3567.65	2215.51	0.01
Moat	7418	5-Year	240.74	5.47	12.48	8.54	12.48	0.000000	0.08	4618.36	2234.72	0.01
Moat	7418	10-Year	300.86	5.47	12.63	8.80	12.63	0.000001	0.09	4971.95	2241.14	0.01
Moat	7418	25-Year	364.30	5.47	12.96	9.05	12.96	0.000000	0.09	5700.19	2254.32	0.01
Moat	7418	50-Year	459.58	5.47	13.11	9.23	13.11	0.000001	0.11	6036.93	2260.39	0.01
Moat	7220	2-Year	150.11	6.02	12.00	8.28	12.00	0.000000	0.07	3583.10	2216.99	0.01
Moat	7220	5-Year	240.74	6.02	12.48	8.77	12.48	0.000000	0.08	4614.49	2236.19	0.01
Moat	7220	10-Year	300.86	6.02	12.63	9.01	12.63	0.000001	0.09	4968.28	2242.62	0.01
Moat	7220	25-Year	364.30	6.02	12.96	9.14	12.96	0.000000	0.09	5897.00	2255.80	0.01

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HEC-RAS Plan: Alt3 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	7220	50-Year	459.58	6.02	13.11	9.30	13.11	0.000001	0.11	6033.89	2261.87	0.01
Moat	7048.5*	2-Year	150.11	5.97	12.00	8.07	12.00	0.000000	0.07	3567.87	2232.84	0.01
Moat	7048.5*	5-Year	240.74	5.97	12.48	8.59	12.48	0.000000	0.08	4627.48	2255.23	0.01
Moat	7048.5*	10-Year	300.86	5.97	12.63	8.93	12.63	0.000001	0.09	4984.31	2262.56	0.01
Moat	7048.5*	25-Year	364.30	5.97	12.96	9.25	12.96	0.000000	0.09	5719.80	2277.58	0.01
Moat	7048.5*	50-Year	459.58	5.97	13.11	9.45	13.11	0.000001	0.11	6059.95	2284.50	0.01
Moat	6877.*	2-Year	150.11	5.92	12.00	7.87	12.00	0.000000	0.07	3563.04	2246.52	0.01
Moat	6877.*	5-Year	240.74	5.92	12.48	8.39	12.48	0.000000	0.08	4629.89	2272.29	0.01
Moat	6877.*	10-Year	300.86	5.92	12.63	8.66	12.63	0.000001	0.09	4989.48	2280.86	0.01
Moat	6877.*	25-Year	364.30	5.92	12.96	8.90	12.96	0.000000	0.10	5731.23	2297.80	0.01
Moat	6877.*	50-Year	459.58	5.92	13.11	9.33	13.11	0.000001	0.11	6074.40	2305.60	0.01
Moat	6705.5*	2-Year	150.11	5.87	12.00	7.69	12.00	0.000000	0.07	3548.90	2258.08	0.01
Moat	6705.5*	5-Year	240.74	5.87	12.48	8.21	12.48	0.000000	0.08	4622.14	2287.82	0.01
Moat	6705.5*	10-Year	300.86	5.87	12.63	8.48	12.63	0.000001	0.09	4984.25	2297.76	0.01
Moat	6705.5*	25-Year	364.30	5.87	12.96	8.72	12.96	0.000000	0.10	5731.93	2317.11	0.01
Moat	6705.5*	50-Year	459.58	5.87	13.11	9.04	13.11	0.000001	0.11	6077.98	2325.81	0.01
Moat	6534	2-Year	151.40	5.82	12.00	7.51	12.00	0.000000	0.08	3526.52	2266.79	0.01
Moat	6534	5-Year	242.55	5.82	12.48	8.04	12.48	0.000000	0.09	4604.80	2300.55	0.01
Moat	6534	10-Year	302.99	5.82	12.63	8.30	12.63	0.000001	0.10	4968.99	2311.84	0.01
Moat	6534	25-Year	366.84	5.82	12.96	8.54	12.96	0.000000	0.10	5721.78	2334.34	0.01
Moat	6534	50-Year	462.72	5.82	13.11	8.86	13.11	0.000001	0.11	6070.41	2343.98	0.01
Moat	6405.5*	2-Year	151.40	5.57	12.00	8.34	12.00	0.000000	0.07	3366.27	2193.35	0.01
Moat	6405.5*	5-Year	242.55	5.57	12.48	8.83	12.48	0.000000	0.08	4408.08	2219.57	0.01
Moat	6405.5*	10-Year	302.99	5.57	12.63	9.07	12.63	0.000001	0.09	4759.25	2228.39	0.01
Moat	6405.5*	25-Year	366.84	5.57	12.96	9.32	12.96	0.000001	0.09	5484.25	2246.66	0.01
Moat	6405.5*	50-Year	462.72	5.57	13.11	9.64	13.11	0.000001	0.10	5819.67	2255.06	0.01
Moat	6277	2-Year	151.40	5.32	11.99	7.33	12.00	0.000111	0.85	193.01	2129.43	0.10
Moat	6277	5-Year	242.55	5.32	12.48	8.04	12.48	0.000001	0.07	4281.37	2158.73	0.01
Moat	6277	10-Year	302.99	5.32	12.63	8.58	12.63	0.000001	0.07	4622.70	2165.03	0.01
Moat	6277	25-Year	386.84	5.32	12.96	9.42	12.96	0.000001	0.08	5326.32	2177.95	0.01
Moat	6277	50-Year	462.72	5.32	13.11	9.88	13.11	0.000001	0.09	5651.26	2183.90	0.01
Moat	6276		Bridge									
Moat	6271	2-Year	278.46	5.32	11.99	8.40	12.03	0.000378	1.57	192.61	2129.26	0.18
Moat	6271	5-Year	383.63	5.32	12.48	9.50	12.48	0.000001	0.10	4281.36	2158.73	0.01
Moat	6271	10-Year	454.27	5.32	12.63	9.82	12.63	0.000001	0.11	4622.69	2165.03	0.01
Moat	6271	25-Year	548.49	5.32	12.96	10.33	12.96	0.000001	0.12	5326.31	2177.95	0.01
Moat	6271	50-Year	642.52	5.32	13.11	10.65	13.11	0.000001	0.13	5651.25	2183.90	0.01
Moat	6257	2-Year	395.31	4.71	11.95	9.12	12.02	0.000540	2.03	205.72	2127.35	0.24
Moat	6257	5-Year	540.87	4.71	12.48	9.73	12.48	0.000003	0.16	4298.35	2158.72	0.02
Moat	6257	10-Year	638.48	4.71	12.63	10.05	12.63	0.000003	0.17	4639.62	2165.02	0.02
Moat	6257	25-Year	768.61	4.71	12.96	10.42	12.96	0.000003	0.17	5343.21	2177.94	0.02
Moat	6257	50-Year	898.43	4.71	13.11	11.00	13.11	0.000003	0.19	5668.06	2183.89	0.02
Moat	6090.33*	2-Year	395.31	4.82	11.86	8.91	11.93	0.000465	2.21	179.23	2650.62	0.25
Moat	6090.33*	5-Year	540.87	4.82	12.48	9.50	12.48	0.000002	0.14	5387.71	2675.64	0.02
Moat	6090.33*	10-Year	638.48	4.82	12.63	9.81	12.63	0.000002	0.14	5810.39	2679.91	0.02
Moat	6090.33*	25-Year	768.61	4.82	12.96	10.15	12.96	0.000002	0.14	6680.11	2687.87	0.02
Moat	6090.33*	50-Year	898.43	4.82	13.11	10.45	13.11	0.000002	0.15	7080.70	2693.26	0.02
Moat	5923.66*	2-Year	395.31	4.92	11.78	8.94	11.85	0.000464	2.23	176.89	3204.20	0.23
Moat	5923.66*	5-Year	540.87	4.92	12.48	9.43	12.48	0.000001	0.12	6517.92	3226.28	0.01
Moat	5923.66*	10-Year	638.48	4.92	12.63	9.74	12.63	0.000001	0.12	7027.43	3230.12	0.01
Moat	5923.66*	25-Year	768.61	4.92	12.96	10.08	12.96	0.000001	0.12	8075.51	3238.01	0.01
Moat	5923.66*	50-Year	898.43	4.92	13.11	10.38	13.11	0.000001	0.13	8557.96	3241.63	0.01
Moat	5757	2-Year	395.31	5.03	11.68	8.87	11.76	0.000604	2.36	167.69	3765.55	0.25
Moat	5757	5-Year	540.87	5.03	12.48	9.47	12.48	0.000001	0.09	7649.35	3784.45	0.01
Moat	5757	10-Year	638.48	5.03	12.63	9.78	12.63	0.000001	0.10	8246.90	3787.88	0.01
Moat	5757	25-Year	768.61	5.03	12.96	10.13	12.96	0.000001	0.10	9475.66	3794.92	0.01
Moat	5757	50-Year	898.43	5.03	13.11	10.44	13.11	0.000001	0.11	10040.95	3798.16	0.01
Moat	5756	2-Year	395.31	5.03	11.66	9.18	11.76	0.001076	2.61	151.59	3765.17	0.29
Moat	5756	5-Year	540.87	5.03	12.48	9.78	12.48	0.000001	0.08	7634.56	3784.45	0.01
Moat	5756	10-Year	638.48	5.03	12.63	10.09	12.63	0.000001	0.09	8232.10	3787.88	0.01
Moat	5756	25-Year	768.61	5.03	12.96	10.45	12.96	0.000001	0.09	9460.86	3794.92	0.01
Moat	5756	50-Year	898.43	5.03	13.11	10.84	13.11	0.000001	0.09	10026.16	3798.16	0.01

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HEC-RAS Plan: Alt3 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	5720	2-Year	395.31	4.80	11.63	9.24	11.72	0.000998	2.42	163.02	3773.78	0.28
Moat	5720	5-Year	540.87	4.80	12.37	9.75	12.47	0.000854	2.47	218.81	3793.02	0.27
Moat	5720	10-Year	638.48	4.80	12.63	10.02	12.63	0.000001	0.08	8256.46	3799.51	0.01
Moat	5720	25-Year	768.61	4.80	12.96	10.36	12.96	0.000001	0.08	9488.67	3804.54	0.01
Moat	5720	50-Year	898.43	4.80	13.11	10.67	13.11	0.000001	0.09	10055.32	3806.90	0.01
Moat	5719	2-Year	395.31	4.80	11.63	9.14	11.72	0.000700	2.33	169.83	3773.88	0.26
Moat	5719	5-Year	540.87	4.80	12.37	9.63	12.46	0.000671	2.40	225.60	3793.13	0.26
Moat	5719	10-Year	638.48	4.80	12.63	9.91	12.63	0.000001	0.09	8262.98	3799.51	0.01
Moat	5719	25-Year	768.61	4.80	12.96	10.23	12.96	0.000001	0.09	9495.19	3804.54	0.01
Moat	5719	50-Year	898.43	4.80	13.11	10.54	13.11	0.000001	0.09	10061.84	3806.90	0.01
Moat	5544.5*	2-Year	395.31	4.73	11.49	8.92	11.59	0.000764	2.52	157.08	3765.02	0.27
Moat	5544.5*	5-Year	540.87	4.73	12.23	9.45	12.34	0.000744	2.62	206.38	3781.36	0.27
Moat	5544.5*	10-Year	638.48	4.73	12.63	9.74	12.63	0.000001	0.09	8251.93	3793.89	0.01
Moat	5544.5*	25-Year	768.61	4.73	12.96	10.08	12.96	0.000001	0.09	9482.35	3798.80	0.01
Moat	5544.5*	50-Year	898.43	4.73	13.11	10.39	13.11	0.000001	0.10	10048.07	3801.05	0.01
Moat	5370.*	2-Year	395.31	4.66	11.34	8.68	11.45	0.000793	2.69	147.07	3756.37	0.28
Moat	5370.*	5-Year	540.87	4.66	12.07	9.23	12.20	0.000837	2.85	189.83	3772.45	0.29
Moat	5370.*	10-Year	638.48	4.66	12.49	9.54	12.62	0.000851	2.93	217.97	3781.24	0.30
Moat	5370.*	25-Year	768.61	4.66	12.96	9.91	12.96	0.000001	0.09	9471.09	3793.36	0.01
Moat	5370.*	50-Year	898.43	4.66	13.11	10.24	13.11	0.000001	0.10	10035.93	3795.57	0.01
Moat	5195.5*	2-Year	395.31	4.60	11.19	8.40	11.31	0.000768	2.82	140.14	3748.02	0.28
Moat	5195.5*	5-Year	540.87	4.60	11.90	8.99	12.04	0.000913	3.08	175.66	3763.33	0.31
Moat	5195.5*	10-Year	638.48	4.60	12.30	9.33	12.46	0.000959	3.20	199.63	3771.34	0.32
Moat	5195.5*	25-Year	768.61	4.60	12.77	9.72	12.94	0.001055	3.33	231.14	3783.98	0.33
Moat	5195.5*	50-Year	898.43	4.60	13.11	10.06	13.11	0.000001	0.10	10025.03	3790.17	0.01
Moat	5021	2-Year	473.06	4.53	10.94	8.44	11.14	0.001192	3.60	131.52	3741.64	0.35
Moat	5021	5-Year	650.09	4.53	11.56	9.12	11.83	0.001479	4.12	157.67	3751.02	0.39
Moat	5021	10-Year	768.87	4.53	11.92	9.49	12.22	0.001699	4.40	174.90	3758.59	0.42
Moat	5021	25-Year	927.54	4.53	12.33	9.94	12.67	0.001933	4.71	197.07	3766.42	0.45
Moat	5021	50-Year	1085.94	4.53	12.68	10.33	13.07	0.002113	4.97	218.68	3773.11	0.47
Moat	4850.2*	2-Year	473.06	4.36	10.71	8.51	10.91	0.001434	3.62	130.70	3745.70	0.38
Moat	4850.2*	5-Year	650.09	4.36	11.30	9.11	11.55	0.001712	4.07	159.73	3757.94	0.42
Moat	4850.2*	10-Year	768.87	4.36	11.63	9.46	11.91	0.001849	4.32	178.02	3764.32	0.43
Moat	4850.2*	25-Year	927.54	4.36	12.00	9.87	12.33	0.002012	4.62	200.68	3771.57	0.46
Moat	4850.2*	50-Year	1085.94	4.36	12.33	10.29	12.70	0.002157	4.89	222.19	3777.44	0.48
Moat	4679.4*	2-Year	473.06	4.19	10.48	8.44	10.67	0.001427	3.49	135.44	3747.74	0.37
Moat	4679.4*	5-Year	650.09	4.19	11.02	9.05	11.26	0.001643	3.95	164.51	3758.81	0.41
Moat	4679.4*	10-Year	768.87	4.19	11.33	9.41	11.60	0.001766	4.22	182.27	3764.38	0.43
Moat	4679.4*	25-Year	927.54	4.19	11.68	9.80	12.00	0.001871	4.55	203.93	3770.74	0.45
Moat	4679.4*	50-Year	1085.94	4.19	11.98	10.14	12.35	0.001935	4.84	224.27	3776.44	0.47
Moat	4508.6*	2-Year	473.06	4.02	10.26	8.33	10.44	0.001229	3.39	139.43	50.25	0.36
Moat	4508.6*	5-Year	650.09	4.02	10.77	8.85	11.01	0.001381	3.91	166.29	3755.21	0.40
Moat	4508.6*	10-Year	768.87	4.02	11.05	9.16	11.33	0.001488	4.22	182.03	3759.27	0.42
Moat	4508.6*	25-Year	927.54	4.02	11.36	9.51	11.70	0.001645	4.63	200.37	3763.78	0.44
Moat	4508.6*	50-Year	1085.94	4.02	11.64	9.84	12.03	0.001820	5.00	217.05	3768.67	0.47
Moat	4337.8*	2-Year	473.06	3.85	10.04	8.07	10.24	0.001122	3.51	134.87	45.50	0.36
Moat	4337.8*	5-Year	650.09	3.85	10.49	8.60	10.76	0.001434	4.15	158.47	3750.09	0.42
Moat	4337.8*	10-Year	768.87	3.85	10.73	8.91	11.06	0.001640	4.55	169.04	3754.26	0.45
Moat	4337.8*	25-Year	927.54	3.85	10.99	9.28	11.38	0.001949	5.07	182.84	3758.59	0.50
Moat	4337.8*	50-Year	1085.94	3.85	11.18	9.61	11.67	0.002298	5.59	194.24	3762.16	0.54
Moat	4167	2-Year	473.06	3.68	9.71	7.97	9.97	0.002141	4.13	114.59	86.08	0.46
Moat	4167	5-Year	650.09	3.68	10.22	8.56	10.48	0.001920	4.22	183.88	134.96	0.44
Moat	4167	10-Year	768.87	3.68	10.50	8.96	10.74	0.001744	4.24	221.97	3838.61	0.43
Moat	4167	25-Year	927.54	3.68	10.78	9.44	11.03	0.001697	4.39	261.05	3843.47	0.42
Moat	4167	50-Year	1085.94	3.68	10.99	10.21	11.26	0.001745	4.60	291.57	3847.19	0.43
Moat	4047.5*	2-Year	473.06	3.79	9.62	7.69	9.76	0.001001	3.11	180.02	122.65	0.32
Moat	4047.5*	5-Year	650.09	3.79	10.15	8.31	10.29	0.000890	3.22	251.25	142.80	0.31
Moat	4047.5*	10-Year	768.87	3.79	10.43	8.62	10.57	0.000854	3.30	291.86	147.26	0.31
Moat	4047.5*	25-Year	927.54	3.79	10.70	9.24	10.85	0.000880	3.49	332.71	3851.87	0.32
Moat	4047.5*	50-Year	1085.94	3.79	10.91	9.52	11.08	0.000948	3.72	363.92	3855.48	0.33
Moat	3928	2-Year	473.06	3.90	9.59	7.35	9.66	0.000446	2.31	253.42	135.17	0.22
Moat	3928	5-Year	650.09	3.90	10.12	7.90	10.19	0.000444	2.50	329.81	153.07	0.22
Moat	3928	10-Year	768.87	3.90	10.40	8.20	10.48	0.000447	2.60	372.93	156.65	0.23
Moat	3928	25-Year	927.54	3.90	10.67	8.60	10.76	0.000484	2.80	415.74	3861.09	0.24

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HEC-RAS Plan: Alt3 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	3928.	50-Year	1085.94	3.90	10.87	8.84	10.97	0.000540	3.03	448.04	3864.64	0.25
Moat	3782.*	2-Year	473.06	3.53	9.51	7.17	9.59	0.000521	2.45	235.26	137.43	0.24
Moat	3782.*	5-Year	650.09	3.53	10.04	7.70	10.12	0.000504	2.61	314.59	159.50	0.24
Moat	3782.*	10-Year	768.87	3.53	10.32	8.00	10.41	0.000502	2.71	359.93	165.25	0.24
Moat	3782.*	25-Year	927.54	3.53	10.58	8.44	10.68	0.000541	2.92	404.36	3867.77	0.25
Moat	3782.*	50-Year	1085.94	3.53	10.77	8.86	10.89	0.000601	3.15	437.22	3871.81	0.27
Moat	3636	2-Year	473.06	3.16	9.41	6.98	9.51	0.000627	2.60	213.54	136.41	0.26
Moat	3636	5-Year	650.09	3.16	9.94	7.52	10.04	0.000599	2.77	295.28	170.75	0.26
Moat	3636	10-Year	768.87	3.16	10.22	7.84	10.33	0.000581	2.84	345.05	177.33	0.25
Moat	3636	25-Year	927.54	3.16	10.49	8.21	10.60	0.000613	3.02	391.79	3880.60	0.26
Moat	3636	50-Year	1085.94	3.16	10.67	8.58	10.80	0.000680	3.26	424.66	3883.71	0.28
Moat	3512.*	2-Year	473.06	3.12	9.37	6.74	9.43	0.000401	2.02	253.36	151.58	0.22
Moat	3512.*	5-Year	650.09	3.12	9.90	7.21	9.97	0.000393	2.17	341.14	177.60	0.22
Moat	3512.*	10-Year	768.87	3.12	10.19	7.48	10.26	0.000397	2.27	393.13	191.35	0.22
Moat	3512.*	25-Year	927.54	3.12	10.44	7.79	10.53	0.000435	2.47	443.71	203.82	0.23
Moat	3512.*	50-Year	1085.94	3.12	10.62	8.09	10.72	0.000495	2.70	479.91	212.30	0.25
Moat	3388	2-Year	513.05	3.09	9.30		9.37	0.000556	2.16	237.28	151.27	0.24
Moat	3388	5-Year	709.42	3.09	9.84		9.91	0.000535	2.29	329.31	201.81	0.26
Moat	3388	10-Year	841.61	3.09	10.12		10.20	0.000527	2.38	386.32	216.07	0.26
Moat	3388	25-Year	1018.25	3.09	10.37		10.46	0.000567	2.57	441.70	227.11	0.26
Moat	3388	50-Year	1195.20	3.09	10.53		10.64	0.000644	2.81	479.28	234.30	0.28
Moat	3199.13*	2-Year	513.05	3.07	9.19	6.70	9.27	0.000568	2.16	237.47	163.04	0.24
Moat	3199.13*	5-Year	709.42	3.07	9.75	7.14	9.82	0.000466	2.12	377.38	233.70	0.24
Moat	3199.13*	10-Year	841.61	3.07	10.04	7.41	10.11	0.000442	2.17	447.75	254.34	0.23
Moat	3199.13*	25-Year	1018.25	3.07	10.29	7.72	10.36	0.000470	2.32	512.32	270.14	0.24
Moat	3199.13*	50-Year	1195.20	3.07	10.44	8.00	10.53	0.000535	2.54	554.17	279.91	0.26
Moat	3010.26*	2-Year	513.05	3.04	9.09	6.62	9.16	0.000578	2.16	237.59	173.21	0.24
Moat	3010.26*	5-Year	709.42	3.04	9.67	7.05	9.73	0.000452	2.08	393.85	267.30	0.24
Moat	3010.26*	10-Year	841.61	3.04	9.96	7.32	10.02	0.000415	2.09	477.09	295.26	0.23
Moat	3010.26*	25-Year	1018.25	3.04	10.21	7.63	10.27	0.000435	2.23	551.47	316.34	0.23
Moat	3010.26*	50-Year	1195.20	3.04	10.35	7.91	10.43	0.000498	2.44	597.01	328.58	0.25
Moat	2821.4*	2-Year	513.05	3.02	8.98	6.51	9.05	0.000591	2.16	237.47	180.66	0.24
Moat	2821.4*	5-Year	709.42	3.02	9.58	6.97	9.64	0.000437	2.04	409.99	301.78	0.24
Moat	2821.4*	10-Year	841.61	3.02	9.89	7.23	9.95	0.000389	2.03	507.80	338.64	0.22
Moat	2821.4*	25-Year	1018.25	3.02	10.13	7.55	10.19	0.000402	2.14	592.85	366.13	0.22
Moat	2821.4*	50-Year	1195.20	3.02	10.26	7.83	10.33	0.000462	2.34	641.61	381.00	0.24
Moat	2632.53*	2-Year	513.05	2.99	8.86	6.36	8.94	0.000603	2.16	237.50	184.64	0.25
Moat	2632.53*	5-Year	709.42	2.99	9.51	6.87	9.56	0.000423	2.01	425.80	339.89	0.23
Moat	2632.53*	10-Year	841.61	2.99	9.82	7.14	9.87	0.000362	1.95	541.18	387.66	0.21
Moat	2632.53*	25-Year	1018.25	2.99	10.06	7.46	10.12	0.000368	2.05	638.70	422.95	0.21
Moat	2632.53*	50-Year	1195.20	2.99	10.18	7.74	10.25	0.000426	2.25	690.56	440.57	0.23
Moat	2443.66*	2-Year	513.05	2.97	8.75	6.21	8.82	0.000617	2.16	237.13	182.07	0.25
Moat	2443.66*	5-Year	709.42	2.97	9.39	6.75	9.47	0.000542	2.30	308.87	367.38	0.25
Moat	2443.66*	10-Year	841.61	2.97	9.76	7.04	9.81	0.000336	1.89	575.89	441.62	0.21
Moat	2443.66*	25-Year	1018.25	2.97	10.00	7.37	10.05	0.000337	1.97	687.68	486.61	0.21
Moat	2443.66*	50-Year	1195.20	2.97	10.11	7.65	10.17	0.000393	2.16	742.33	507.16	0.22
Moat	2254.8*	2-Year	513.05	2.94	8.63	6.05	8.70	0.000630	2.17	236.58	150.92	0.25
Moat	2254.8*	5-Year	709.42	2.94	9.29	6.61	9.37	0.000540	2.27	312.15	398.38	0.25
Moat	2254.8*	10-Year	841.61	2.94	9.70	6.90	9.74	0.000309	1.82	617.24	505.45	0.20
Moat	2254.8*	25-Year	1018.25	2.94	9.94	7.26	9.99	0.000304	1.87	746.52	562.08	0.20
Moat	2254.8*	50-Year	1195.20	2.94	10.04	7.55	10.09	0.000357	2.06	804.11	584.97	0.21
Moat	2065.93*	2-Year	513.05	2.92	8.51	5.91	8.58	0.000646	2.17	235.93	126.15	0.25
Moat	2065.93*	5-Year	709.42	2.92	9.19	6.47	9.26	0.000536	2.25	315.57	429.65	0.25
Moat	2065.93*	10-Year	841.61	2.92	9.65	6.77	9.69	0.000280	1.74	666.02	581.17	0.19
Moat	2065.93*	25-Year	1018.25	2.92	9.89	7.14	9.93	0.000269	1.77	816.97	649.59	0.19
Moat	2065.93*	50-Year	1195.20	2.92	9.98	7.45	10.03	0.000318	1.95	877.41	670.60	0.20
Moat	1877.06*	2-Year	513.05	2.89	8.39	5.77	8.46	0.000662	2.18	235.14	103.64	0.26
Moat	1877.06*	5-Year	709.42	2.89	9.09	6.33	9.16	0.000531	2.22	319.14	467.03	0.25
Moat	1877.06*	10-Year	841.61	2.89	9.54	6.64	9.62	0.000451	2.23	376.90	652.27	0.23
Moat	1877.06*	25-Year	1018.25	2.89	9.85	7.00	9.88	0.000233	1.66	904.24	748.02	0.17
Moat	1877.06*	50-Year	1195.20	2.89	9.93	7.32	9.97	0.000276	1.83	967.67	770.87	0.19
Moat	1688.2*	2-Year	513.05	2.87	8.26	5.64	8.33	0.000680	2.20	233.71	104.17	0.26
Moat	1688.2*	5-Year	709.42	2.87	8.99	6.21	9.06	0.000528	2.20	322.04	505.66	0.25

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HEC-RAS Plan: Alt3 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	1688.2*	10-Year	841.61	2.87	9.46	6.51	9.53	0.000438	2.19	383.90	746.61	0.23
Moat	1688.2*	25-Year	1018.25	2.87	9.81	6.87	9.84	0.000197	1.53	1013.01	868.05	0.16
Moat	1688.2*	50-Year	1195.20	2.87	9.89	7.20	9.92	0.000235	1.70	1080.30	892.81	0.17
Moat	1499.33*	2-Year	513.05	2.84	8.13	5.51	8.20	0.000696	2.21	232.59	104.83	0.26
Moat	1499.33*	5-Year	709.42	2.84	8.89	6.08	8.96	0.000519	2.18	325.61	555.56	0.25
Moat	1499.33*	10-Year	841.61	2.84	9.38	6.37	9.45	0.000421	2.15	391.78	844.42	0.22
Moat	1499.33*	25-Year	1018.25	2.84	9.70	6.73	9.78	0.000448	2.34	435.13	976.03	0.23
Moat	1499.33*	50-Year	1195.20	2.84	9.85	7.07	9.88	0.000193	1.55	1225.17	1037.37	0.16
Moat	1310.46*	2-Year	513.05	2.82	7.99	5.40	8.07	0.000716	2.22	230.78	104.95	0.26
Moat	1310.46*	5-Year	709.42	2.82	8.79	5.96	8.87	0.000511	2.16	329.16	612.35	0.24
Moat	1310.46*	10-Year	841.61	2.82	9.30	6.26	9.37	0.000405	2.11	399.47	962.44	0.22
Moat	1310.46*	25-Year	1018.25	2.82	9.61	6.61	9.70	0.000433	2.30	443.45	1114.88	0.23
Moat	1310.46*	50-Year	1195.20	2.82	9.83	6.95	9.85	0.000154	1.40	1408.80	1215.58	0.14
Moat	1121.6*	2-Year	513.05	2.79	7.85	5.28	7.93	0.000735	2.24	228.77	104.65	0.27
Moat	1121.6*	5-Year	709.42	2.79	8.70	5.84	8.77	0.000501	2.13	333.13	697.34	0.24
Moat	1121.6*	10-Year	841.61	2.79	9.23	6.14	9.30	0.000389	2.07	407.32	1107.64	0.22
Moat	1121.6*	25-Year	1018.25	2.79	9.54	6.48	9.61	0.000418	2.25	451.79	1285.23	0.23
Moat	1121.6*	50-Year	1195.20	2.79	9.69	6.81	9.79	0.000496	2.52	474.32	1374.80	0.25
Moat	932.733*	2-Year	513.05	2.77	7.71	5.19	7.79	0.000763	2.27	226.15	104.48	0.27
Moat	932.733*	5-Year	709.42	2.77	8.61	5.74	8.68	0.000490	2.10	337.44	918.66	0.24
Moat	932.733*	10-Year	841.61	2.77	9.16	6.02	9.22	0.000371	2.02	415.78	1299.69	0.21
Moat	932.733*	25-Year	1018.25	2.77	9.46	6.37	9.54	0.000402	2.21	460.14	1507.41	0.22
Moat	932.733*	50-Year	1195.20	2.77	9.60	6.68	9.70	0.000485	2.48	480.98	1604.00	0.24
Moat	743.866*	2-Year	513.05	2.74	7.56	5.09	7.64	0.000792	2.30	223.33	104.08	0.28
Moat	743.866*	5-Year	709.42	2.74	8.52	5.63	8.58	0.000475	2.07	343.00	1067.42	0.23
Moat	743.866*	10-Year	841.61	2.74	9.09	5.91	9.15	0.000350	1.98	425.74	1544.50	0.20
Moat	743.866*	25-Year	1018.25	2.74	9.39	6.25	9.46	0.000383	2.17	469.75	1791.22	0.22
Moat	743.866*	50-Year	1195.20	2.74	9.51	6.55	9.60	0.000470	2.45	488.37	1895.12	0.24
Moat	0555	2-Year	520.50	2.72	7.40	5.02	7.49	0.000862	2.38	218.49	102.69	0.29
Moat	0555	5-Year	719.69	2.72	8.42	5.56	8.49	0.000543	2.07	346.98	1248.09	0.23
Moat	0555	10-Year	853.63	2.72	9.02	5.84	9.08	0.000383	1.96	434.87	1873.26	0.20
Moat	0555	25-Year	1032.96	2.72	9.31	6.17	9.39	0.000421	2.16	478.37	2172.57	0.21
Moat	0555	50-Year	1212.14	2.72	9.42	6.46	9.51	0.000525	2.45	494.31	2282.20	0.24
Moat	426.*	2-Year	520.50	2.31	7.15	4.67	7.33	0.001212	3.44	151.36	48.47	0.34
Moat	426.*	5-Year	719.69	2.31	8.18	5.29	8.37	0.001109	3.51	205.21	60.57	0.34
Moat	426.*	10-Year	853.63	2.31	8.80	5.77	8.98	0.001452	3.34	255.73	1637.41	0.37
Moat	426.*	25-Year	1032.96	2.31	9.06	6.20	9.27	0.001547	3.66	282.12	1906.59	0.39
Moat	426.*	50-Year	1212.14	2.31	9.07	6.59	9.36	0.002094	4.27	283.62	1921.63	0.46
Moat	0297	2-Year	520.50	1.89	6.92	4.21	7.15	0.001250	3.83	135.91	32.75	0.33
Moat	0297	5-Year	719.69	1.89	7.91	4.77	8.18	0.001338	4.21	170.87	38.56	0.35
Moat	0297	10-Year	853.63	1.89	8.79	5.11	8.85	0.000355	2.40	669.06	2208.92	0.19
Moat	0297	25-Year	1032.96	1.89	9.10	5.55	9.14	0.000281	2.20	867.93	2537.58	0.17
Moat	0297	50-Year	1212.14	1.89	9.13	6.17	9.18	0.000363	2.51	890.71	2574.62	0.19
Moat	0265	2-Year	528.38	1.79	6.94	3.83	7.09	0.000746	3.08	171.28	40.26	0.26
Moat	0265	5-Year	730.06	1.79	7.94	4.32	8.12	0.000773	3.43	213.06	43.68	0.27
Moat	0265	10-Year	865.90	1.79	8.62	4.63	8.82	0.000767	3.54	244.73	194.12	0.28
Moat	0265	25-Year	1047.32	1.79	8.87	5.01	9.10	0.001166	3.93	333.68	2203.49	0.34
Moat	0265	50-Year	1460.57	1.79	8.53	5.80	9.10	0.002295	6.08	240.23	47.69	0.48
Moat	264		Culvert									
Moat	0209	2-Year	528.38	1.78	6.76		6.89	0.000494	2.87	184.40	42.77	0.24
Moat	0209	5-Year	730.06	1.78	7.52		7.70	0.000574	3.35	217.73	44.53	0.27
Moat	0209	10-Year	865.90	1.78	7.98		8.19	0.000618	3.64	238.24	45.57	0.28
Moat	0209	25-Year	1047.32	1.78	8.73		8.74	0.000058	1.21	2630.85	3299.97	0.09
Moat	0209	50-Year	1460.57	1.78	8.99		9.00	0.000052	1.18	3491.86	3328.29	0.08
Moat	0190	2-Year	528.38	1.78	6.40	5.31	6.84	0.003348	5.31	99.45	36.62	0.57
Moat	0190	5-Year	730.06	1.78	7.14	5.92	7.64	0.003131	5.73	127.48	39.59	0.56
Moat	0190	10-Year	865.90	1.78	7.58	6.26	8.13	0.003030	5.96	145.38	41.38	0.56
Moat	0190	25-Year	1047.32	1.78	8.20	6.64	8.69	0.002422	5.76	240.46	393.68	0.51
Moat	0190	50-Year	1460.57	1.78	8.96	7.41	9.00	0.000363	2.42	1790.33	3310.09	0.20
Moat	0100	2-Year	827.35	1.78	5.06	5.06	6.25	0.010591	8.72	71.93	30.99	1.01
Moat	0100	5-Year	867.29	1.78	5.67	5.67	7.07	0.010060	9.47	91.54	33.28	1.01
Moat	0100	10-Year	1028.75	1.78	6.05	6.05	7.56	0.009715	9.86	104.31	34.64	1.00
Moat	0100	25-Year	1244.74	1.78	6.49	6.49	8.17	0.009449	10.39	119.85	35.85	1.00

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HEC-RAS Plan: Alt3 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	0100	50-Year	1460.57	1.78	6.90	6.90	8.72	0.009243	10.84	134.73	36.97	1.00

FLOOD LONG-TERM ALTERNATIVE 4 (FLOOD LTA-4)

LTA-4 HYDRAULIC
MODEL RESULTS

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HEC-RAS Plan: Alternate4 River: Moat Reach: Moat

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	8415	2-Year	0.01	6.70	11.97	6.72	11.97	0.000000	0.00	3273.33	1938.51	0.00
Moat	8415	5-Year	0.01	6.70	12.46	6.72	12.46	0.000000	0.00	4225.63	1940.05	0.00
Moat	8415	10-Year	0.01	6.70	12.62	6.72	12.62	0.000000	0.00	4522.12	1940.50	0.00
Moat	8415	25-Year	0.01	6.70	12.94	6.72	12.94	0.000000	0.00	5155.39	1941.48	0.00
Moat	8415	50-Year	0.01	6.70	13.09	6.72	13.09	0.000000	0.00	5447.71	1941.93	0.00
Moat	8236.5*	2-Year	0.01	6.70	11.97	6.72	11.97	0.000000	0.00	3273.33	1938.51	0.00
Moat	8236.5*	5-Year	0.01	6.70	12.46	6.72	12.46	0.000000	0.00	4225.63	1940.05	0.00
Moat	8236.5*	10-Year	0.01	6.70	12.62	6.72	12.62	0.000000	0.00	4522.12	1940.50	0.00
Moat	8236.5*	25-Year	0.01	6.70	12.94	6.72	12.94	0.000000	0.00	5155.39	1941.48	0.00
Moat	8236.5*	50-Year	0.01	6.70	13.09	6.72	13.09	0.000000	0.00	5447.71	1941.93	0.00
Moat	8058	2-Year	0.01	6.70	11.97	6.72	11.97	0.000000	0.00	3273.33	1938.51	0.00
Moat	8058	5-Year	0.01	6.70	12.46	6.72	12.46	0.000000	0.00	4225.63	1940.05	0.00
Moat	8058	10-Year	0.01	6.70	12.62	6.72	12.62	0.000000	0.00	4522.12	1940.50	0.00
Moat	8058	25-Year	0.01	6.70	12.94	6.72	12.94	0.000000	0.00	5155.39	1941.48	0.00
Moat	8058	50-Year	0.01	6.70	13.09	6.72	13.09	0.000000	0.00	5447.71	1941.93	0.00
Moat	7920.*	2-Year	0.01	6.70	11.97	6.72	11.97	0.000000	0.00	3239.63	1993.99	0.00
Moat	7920.*	5-Year	0.01	6.70	12.46	6.72	12.46	0.000000	0.00	4226.74	2020.55	0.00
Moat	7920.*	10-Year	0.01	6.70	12.62	6.72	12.62	0.000000	0.00	4535.92	2026.24	0.00
Moat	7920.*	25-Year	0.01	6.70	12.94	6.72	12.94	0.000000	0.00	5198.99	2038.39	0.00
Moat	7920.*	50-Year	0.01	6.70	13.09	6.72	13.09	0.000000	0.00	5506.29	2044.00	0.00
Moat	7782	2-Year	150.11	6.70	11.97	8.51	11.97	0.000000	0.03	3699.07	2136.25	0.00
Moat	7782	5-Year	240.74	6.70	12.46	8.70	12.46	0.000000	0.03	4752.44	2154.06	0.00
Moat	7782	10-Year	300.86	6.70	12.62	8.78	12.62	0.000001	0.04	5081.96	2159.58	0.00
Moat	7782	25-Year	364.30	6.70	12.94	8.86	12.94	0.000001	0.04	5788.46	2171.36	0.00
Moat	7782	50-Year	459.58	6.70	13.09	8.97	13.09	0.000001	0.04	6115.68	2176.80	0.00
Moat	7765	2-Year	150.11	7.87	11.97	8.66	11.97	0.000000	0.03	4216.53	2467.97	0.00
Moat	7765	5-Year	240.74	7.87	12.46	8.78	12.46	0.000000	0.03	5432.52	2484.71	0.00
Moat	7765	10-Year	300.86	7.87	12.62	8.86	12.62	0.000000	0.04	5812.54	2489.90	0.00
Moat	7765	25-Year	364.30	7.87	12.94	8.93	12.94	0.000000	0.04	6626.70	2500.98	0.00
Moat	7765	50-Year	459.58	7.87	13.09	9.03	13.09	0.000001	0.04	7003.51	2506.09	0.00
Moat	7754	2-Year	150.11	7.87	11.97	8.58	11.97	0.000000	0.02	4333.07	2477.46	0.00
Moat	7754	5-Year	240.74	7.87	12.46	8.80	12.46	0.000000	0.03	5553.59	2493.67	0.00
Moat	7754	10-Year	300.86	7.87	12.62	8.87	12.62	0.000000	0.03	5934.96	2498.69	0.00
Moat	7754	25-Year	364.30	7.87	12.94	8.95	12.94	0.000000	0.03	6751.93	2509.42	0.00
Moat	7754	50-Year	459.58	7.87	13.09	9.04	13.09	0.000001	0.04	7130.00	2514.37	0.00
Moat	7689	2-Year	150.11	6.48	11.97	8.18	11.97	0.000000	0.03	4486.33	2504.55	0.00
Moat	7689	5-Year	240.74	6.48	12.46	8.33	12.46	0.000000	0.04	5719.77	2519.23	0.00
Moat	7689	10-Year	300.86	6.48	12.62	8.41	12.62	0.000000	0.05	6105.00	2523.78	0.00
Moat	7689	25-Year	364.30	6.48	12.94	8.49	12.94	0.000000	0.05	6929.99	2533.49	0.00
Moat	7689	50-Year	459.58	6.48	13.09	8.59	13.09	0.000000	0.06	7311.64	2537.97	0.00
Moat	7687	2-Year	150.11	6.48	11.97	8.18	11.97	0.000000	0.03	4486.41	2504.65	0.00
Moat	7687	5-Year	240.74	6.48	12.46	8.33	12.46	0.000000	0.04	5719.90	2519.33	0.00
Moat	7687	10-Year	300.86	6.48	12.62	8.41	12.62	0.000000	0.05	6105.14	2523.88	0.00
Moat	7687	25-Year	364.30	6.48	12.94	8.49	12.94	0.000000	0.05	6930.17	2533.59	0.00
Moat	7687	50-Year	459.58	6.48	13.09	8.59	13.09	0.000000	0.06	7311.82	2538.07	0.00
Moat	7650	2-Year	150.11	5.79	11.97	8.57	11.97	0.000000	0.03	4487.57	2512.09	0.00
Moat	7650	5-Year	240.74	5.79	12.46	8.73	12.46	0.000000	0.03	5724.96	2527.83	0.00
Moat	7650	10-Year	300.86	5.79	12.62	8.75	12.62	0.000000	0.04	6111.53	2532.73	0.00
Moat	7650	25-Year	364.30	5.79	12.94	8.80	12.94	0.000000	0.04	6939.56	2543.17	0.00
Moat	7650	50-Year	459.58	5.79	13.09	8.88	13.09	0.000000	0.05	7322.67	2547.99	0.00
Moat	7534.*	2-Year	150.11	5.63	11.97	7.79	11.97	0.000000	0.04	3929.10	2369.88	0.00
Moat	7534.*	5-Year	240.74	5.63	12.46	8.45	12.46	0.000000	0.04	5097.08	2387.35	0.00
Moat	7534.*	10-Year	300.86	5.63	12.62	8.62	12.62	0.000000	0.05	5462.19	2392.78	0.00
Moat	7534.*	25-Year	364.30	5.63	12.94	8.73	12.94	0.000000	0.05	6244.75	2404.36	0.00
Moat	7534.*	50-Year	459.58	5.63	13.09	8.87	13.09	0.000001	0.06	6606.97	2409.71	0.01
Moat	7418	2-Year	150.11	5.47	11.97	7.65	11.97	0.000000	0.07	3499.89	2214.20	0.01
Moat	7418	5-Year	240.74	5.47	12.46	8.54	12.46	0.000000	0.08	4592.04	2234.24	0.01
Moat	7418	10-Year	300.86	5.47	12.62	8.80	12.62	0.000001	0.09	4933.80	2240.45	0.01
Moat	7418	25-Year	364.30	5.47	12.94	9.05	12.94	0.000000	0.09	5666.94	2253.72	0.01
Moat	7418	50-Year	459.58	5.47	13.09	9.23	13.09	0.000001	0.11	6006.50	2259.84	0.01
Moat	7220	2-Year	150.11	6.02	11.97	8.28	11.97	0.000000	0.07	3495.28	2215.68	0.01
Moat	7220	5-Year	240.74	6.02	12.46	8.77	12.46	0.000000	0.08	4588.16	2235.71	0.01
Moat	7220	10-Year	300.86	6.02	12.62	9.01	12.62	0.000001	0.09	4930.09	2241.93	0.01
Moat	7220	25-Year	364.30	6.02	12.94	9.14	12.94	0.000000	0.09	5663.73	2255.20	0.01

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HEC-RAS Plan: Alternate4 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	7220	50-Year	459.58	6.02	13.09	9.30	13.09	0.000001	0.11	6003.44	2261.32	0.01
Moat	7048.5*	2-Year	150.11	5.97	11.97	8.07	11.97	0.000000	0.07	3499.56	2231.32	0.01
Moat	7048.5*	5-Year	240.74	5.97	12.46	8.59	12.46	0.000000	0.08	4600.92	2254.67	0.01
Moat	7048.5*	10-Year	300.86	5.97	12.62	8.93	12.62	0.000001	0.09	4945.78	2261.77	0.01
Moat	7048.5*	25-Year	364.30	5.97	12.94	9.25	12.94	0.000000	0.09	5686.21	2276.90	0.01
Moat	7048.5*	50-Year	459.58	5.97	13.09	9.45	13.09	0.000001	0.11	6029.19	2283.88	0.01
Moat	6877.*	2-Year	150.11	5.92	11.97	7.87	11.97	0.000000	0.07	3494.31	2244.79	0.01
Moat	6877.*	5-Year	240.74	5.92	12.46	8.39	12.46	0.000000	0.08	4603.13	2271.65	0.01
Moat	6877.*	10-Year	300.86	5.92	12.62	8.66	12.62	0.000001	0.09	4950.64	2279.97	0.01
Moat	6877.*	25-Year	364.30	5.92	12.94	8.90	12.94	0.000000	0.10	5697.33	2297.03	0.01
Moat	6877.*	50-Year	459.58	5.92	13.09	9.33	13.09	0.000001	0.11	6043.35	2304.90	0.01
Moat	6705.5*	2-Year	150.11	5.87	11.97	7.69	11.97	0.000000	0.08	3479.81	2256.09	0.01
Moat	6705.5*	5-Year	240.74	5.87	12.46	8.21	12.46	0.000000	0.08	4595.19	2287.08	0.01
Moat	6705.5*	10-Year	300.86	5.87	12.62	8.48	12.62	0.000001	0.10	4945.11	2296.69	0.01
Moat	6705.5*	25-Year	364.30	5.87	12.94	8.72	12.94	0.000000	0.10	5697.74	2316.25	0.01
Moat	6705.5*	50-Year	459.58	5.87	13.09	9.04	13.09	0.000001	0.11	6046.66	2325.03	0.01
Moat	6534	2-Year	151.40	5.82	11.97	7.51	11.97	0.000000	0.08	3457.16	2264.54	0.01
Moat	6534	5-Year	242.55	5.82	12.46	8.04	12.46	0.000000	0.09	4577.70	2299.71	0.01
Moat	6534	10-Year	302.99	5.82	12.62	8.30	12.62	0.000001	0.10	4929.61	2310.62	0.01
Moat	6534	25-Year	366.84	5.82	12.94	8.54	12.94	0.000001	0.10	5687.33	2333.38	0.01
Moat	6534	50-Year	462.72	5.82	13.09	8.86	13.09	0.000001	0.11	6038.83	2343.11	0.01
Moat	6405.5*	2-Year	151.40	5.57	11.97	8.34	11.97	0.000000	0.07	3299.14	2191.58	0.01
Moat	6405.5*	5-Year	242.55	5.57	12.46	8.83	12.46	0.000000	0.08	4381.93	2218.91	0.01
Moat	6405.5*	10-Year	302.99	5.57	12.62	9.07	12.62	0.000001	0.09	4721.29	2227.43	0.01
Moat	6405.5*	25-Year	366.84	5.57	12.94	9.32	12.94	0.000001	0.09	5451.10	2245.83	0.01
Moat	6405.5*	50-Year	462.72	5.57	13.09	9.64	13.09	0.000001	0.10	5789.29	2254.30	0.01
Moat	6277	2-Year	151.40	5.32	11.96	7.33	11.97	0.000117	0.87	189.25	2127.83	0.10
Moat	6277	5-Year	242.55	5.32	12.46	8.04	12.46	0.000001	0.07	4255.93	2158.26	0.01
Moat	6277	10-Year	302.99	5.32	12.62	8.58	12.62	0.000001	0.08	4585.81	2164.35	0.01
Moat	6277	25-Year	366.84	5.32	12.94	9.42	12.94	0.000001	0.08	5294.17	2177.36	0.01
Moat	6277	50-Year	462.72	5.32	13.09	9.88	13.09	0.000001	0.09	5621.83	2183.36	0.01
Moat	6276		Bridge									
Moat	6271	2-Year	278.46	5.32	11.96	8.39	12.00	0.000397	1.59	188.82	2127.65	0.19
Moat	6271	5-Year	383.63	5.32	12.46	9.50	12.46	0.000001	0.10	4255.92	2158.26	0.01
Moat	6271	10-Year	454.27	5.32	12.62	9.82	12.62	0.000001	0.11	4585.80	2164.35	0.01
Moat	6271	25-Year	548.49	5.32	12.94	10.33	12.94	0.000001	0.12	5294.17	2177.36	0.01
Moat	6271	50-Year	642.52	5.32	13.09	10.65	13.09	0.000001	0.13	5621.82	2183.36	0.01
Moat	6257	2-Year	395.31	4.71	11.92	9.12	11.99	0.000566	2.06	201.84	2125.66	0.24
Moat	6257	5-Year	540.87	4.71	12.46	9.73	12.46	0.000003	0.16	4272.91	2158.25	0.02
Moat	6257	10-Year	638.48	4.71	12.62	10.05	12.62	0.000003	0.17	4602.72	2164.34	0.02
Moat	6257	25-Year	768.61	4.71	12.94	10.42	12.94	0.000003	0.17	5311.06	2177.36	0.02
Moat	6257	50-Year	898.43	4.71	13.09	11.00	13.09	0.000003	0.19	5638.63	2183.35	0.02
Moat	6090.33*	2-Year	395.31	4.82	11.82	8.91	11.90	0.000479	2.24	176.67	2648.92	0.25
Moat	6090.33*	5-Year	540.87	4.82	12.46	9.50	12.46	0.000002	0.14	5356.16	2675.28	0.02
Moat	6090.33*	10-Year	638.48	4.82	12.62	9.81	12.62	0.000002	0.15	5764.70	2679.49	0.02
Moat	6090.33*	25-Year	768.61	4.82	12.94	10.15	12.94	0.000002	0.14	6640.42	2687.51	0.02
Moat	6090.33*	50-Year	898.43	4.82	13.09	10.45	13.09	0.000002	0.15	7044.39	2691.51	0.02
Moat	5923.66*	2-Year	395.31	4.92	11.74	8.94	11.82	0.000482	2.26	174.53	3203.31	0.24
Moat	5923.66*	5-Year	540.87	4.92	12.46	9.43	12.46	0.000001	0.12	6479.86	3226.00	0.01
Moat	5923.66*	10-Year	638.48	4.92	12.62	9.74	12.62	0.000001	0.13	6972.33	3229.71	0.01
Moat	5923.66*	25-Year	768.61	4.92	12.94	10.08	12.94	0.000001	0.12	8027.68	3237.65	0.01
Moat	5923.66*	50-Year	898.43	4.92	13.09	10.38	13.09	0.000001	0.13	8514.23	3241.30	0.01
Moat	5757	2-Year	395.31	5.03	11.64	8.87	11.73	0.000627	2.39	165.19	3764.82	0.25
Moat	5757	5-Year	540.87	5.03	12.46	9.47	12.46	0.000001	0.09	7604.70	3784.20	0.01
Moat	5757	10-Year	638.48	5.03	12.62	9.78	12.62	0.000001	0.10	8182.27	3787.51	0.01
Moat	5757	25-Year	768.61	5.03	12.94	10.13	12.94	0.000001	0.10	9419.58	3794.60	0.01
Moat	5757	50-Year	898.43	5.03	13.09	10.44	13.09	0.000001	0.11	9989.71	3797.87	0.01
Moat	5756	2-Year	395.31	5.03	11.61	9.18	11.72	0.001128	2.65	149.03	3764.42	0.29
Moat	5756	5-Year	540.87	5.03	12.46	9.78	12.46	0.000001	0.08	7589.90	3784.20	0.01
Moat	5756	10-Year	638.48	5.03	12.62	10.09	12.62	0.000001	0.09	8167.47	3787.51	0.01
Moat	5756	25-Year	768.61	5.03	12.94	10.45	12.94	0.000001	0.09	9404.79	3794.60	0.01
Moat	5756	50-Year	898.43	5.03	13.09	10.84	13.09	0.000001	0.10	9974.91	3797.87	0.01

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HEC-RAS Plan: Alternate4 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Moat	5720	2-Year	395.31	4.80	11.58	9.24	11.68	0.001049	2.47	159.98	3772.73	0.28
Moat	5720	5-Year	540.87	4.80	12.36	9.75	12.45	0.000865	2.48	217.73	3792.58	0.27
Moat	5720	10-Year	638.48	4.80	12.62	10.02	12.62	0.000001	0.08	8191.63	3799.24	0.01
Moat	5720	25-Year	768.61	4.80	12.94	10.36	12.94	0.000001	0.08	9432.46	3804.31	0.01
Moat	5720	50-Year	898.43	4.80	13.09	10.67	13.09	0.000001	0.09	10003.95	3806.66	0.01
Moat	5719	2-Year	395.31	4.80	11.59	9.14	11.68	0.000731	2.37	166.80	3772.83	0.27
Moat	5719	5-Year	540.87	4.80	12.36	9.63	12.45	0.000677	2.41	224.52	3792.69	0.26
Moat	5719	10-Year	638.48	4.80	12.62	9.91	12.62	0.000001	0.09	8198.15	3799.24	0.01
Moat	5719	25-Year	768.61	4.80	12.94	10.23	12.94	0.000001	0.09	9438.98	3804.31	0.01
Moat	5719	50-Year	898.43	4.80	13.09	10.54	13.09	0.000001	0.10	10010.47	3806.66	0.01
Moat	5544.5*	2-Year	395.31	4.73	11.44	8.92	11.54	0.000800	2.57	154.02	3763.85	0.28
Moat	5544.5*	5-Year	540.87	4.73	12.22	9.45	12.33	0.000753	2.63	205.33	3781.03	0.28
Moat	5544.5*	10-Year	638.48	4.73	12.62	9.74	12.62	0.000001	0.09	8187.18	3793.63	0.01
Moat	5544.5*	25-Year	768.61	4.73	12.94	10.08	12.94	0.000001	0.09	9426.21	3798.58	0.01
Moat	5544.5*	50-Year	898.43	4.73	13.09	10.39	13.09	0.000001	0.10	9996.78	3800.85	0.01
Moat	5370.*	2-Year	395.31	4.66	11.28	8.68	11.40	0.000829	2.74	144.04	3755.06	0.29
Moat	5370.*	5-Year	540.87	4.66	12.06	9.23	12.18	0.000848	2.87	188.77	3772.13	0.29
Moat	5370.*	10-Year	638.48	4.66	12.47	9.54	12.60	0.000859	2.95	216.61	3780.55	0.30
Moat	5370.*	25-Year	768.61	4.66	12.94	9.91	12.94	0.000001	0.09	9415.02	3793.14	0.01
Moat	5370.*	50-Year	898.43	4.66	13.09	10.24	13.09	0.000001	0.10	9984.70	3795.37	0.01
Moat	5195.5*	2-Year	395.31	4.60	11.13	8.40	11.25	0.000798	2.88	137.30	3746.61	0.28
Moat	5195.5*	5-Year	540.87	4.60	11.88	8.99	12.03	0.000924	3.10	174.61	3762.92	0.31
Moat	5195.5*	10-Year	638.48	4.60	12.28	9.33	12.44	0.000974	3.22	198.29	3770.92	0.32
Moat	5195.5*	25-Year	768.61	4.60	12.75	9.72	12.92	0.001063	3.34	229.89	3783.31	0.33
Moat	5195.5*	50-Year	898.43	4.60	13.09	10.06	13.09	0.000001	0.10	9973.86	3789.97	0.01
Moat	5021	2-Year	473.06	4.53	10.86	8.44	11.07	0.001267	3.68	128.46	3740.72	0.36
Moat	5021	5-Year	650.09	4.53	11.54	9.12	11.81	0.001496	4.15	156.61	3750.53	0.39
Moat	5021	10-Year	768.87	4.53	11.89	9.49	12.20	0.001727	4.43	173.47	3757.99	0.42
Moat	5021	25-Year	927.54	4.53	12.31	9.94	12.65	0.001961	4.74	195.77	3766.00	0.45
Moat	5021	50-Year	1085.94	4.53	12.67	10.33	13.05	0.002137	4.99	217.54	3772.78	0.47
Moat	4850.2*	2-Year	473.06	4.36	10.61	8.51	10.83	0.001546	3.75	126.25	3742.77	0.39
Moat	4850.2*	5-Year	650.09	4.36	11.27	9.11	11.53	0.001752	4.11	158.16	3757.37	0.42
Moat	4850.2*	10-Year	768.87	4.36	11.59	9.46	11.89	0.001903	4.37	175.93	3763.61	0.44
Moat	4850.2*	25-Year	927.54	4.36	11.97	9.87	12.31	0.002059	4.67	198.78	3770.98	0.46
Moat	4850.2*	50-Year	1085.94	4.36	12.30	10.29	12.68	0.002189	4.92	220.58	3776.85	0.48
Moat	4679.4*	2-Year	473.06	4.19	10.35	8.44	10.56	0.001610	3.66	129.13	48.72	0.40
Moat	4679.4*	5-Year	650.09	4.19	10.98	9.05	11.23	0.001700	4.00	162.34	3758.02	0.41
Moat	4679.4*	10-Year	768.87	4.19	11.28	9.41	11.56	0.001841	4.29	179.36	3763.50	0.44
Moat	4679.4*	25-Year	927.54	4.19	11.63	9.80	11.96	0.001952	4.61	201.19	3769.96	0.46
Moat	4679.4*	50-Year	1085.94	4.19	11.95	10.14	12.32	0.001989	4.89	222.07	3775.82	0.47
Moat	4508.6*	2-Year	473.06	4.02	10.09	8.33	10.29	0.001483	3.61	131.08	48.63	0.39
Moat	4508.6*	5-Year	650.09	4.02	10.72	8.85	10.96	0.001450	3.98	163.52	3754.46	0.40
Moat	4508.6*	10-Year	768.87	4.02	10.98	9.16	11.27	0.001579	4.31	178.29	3758.33	0.43
Moat	4508.6*	25-Year	927.54	4.02	11.30	9.51	11.65	0.001734	4.72	196.72	3762.90	0.46
Moat	4508.6*	50-Year	1085.94	4.02	11.59	9.84	11.99	0.001886	5.07	214.11	3767.77	0.48
Moat	4337.8*	2-Year	473.06	3.85	9.82	8.07	10.05	0.001381	3.79	124.96	43.91	0.40
Moat	4337.8*	5-Year	650.09	3.85	10.43	8.60	10.71	0.001518	4.25	153.06	49.98	0.43
Moat	4337.8*	10-Year	768.87	3.85	10.64	8.91	10.98	0.001773	4.69	164.04	3752.63	0.47
Moat	4337.8*	25-Year	927.54	3.85	10.89	9.28	11.31	0.002102	5.22	177.54	3756.95	0.51
Moat	4337.8*	50-Year	1085.94	3.85	11.10	9.61	11.61	0.002437	5.72	189.70	3760.76	0.56
Moat	4167	2-Year	473.06	3.68	9.35	7.97	9.70	0.002903	4.75	99.62	39.66	0.53
Moat	4167	5-Year	650.09	3.68	10.05	8.56	10.37	0.002528	4.68	160.92	132.78	0.50
Moat	4167	10-Year	768.87	3.68	10.32	8.96	10.63	0.002308	4.71	196.86	136.16	0.49
Moat	4167	25-Year	927.54	3.68	10.61	9.44	10.92	0.002171	4.82	236.65	3840.45	0.48
Moat	4167	50-Year	1085.94	3.68	10.86	10.21	11.17	0.002096	4.93	271.81	3844.79	0.47
Moat	4047.5*	2-Year	473.06	3.79	9.12	7.69	9.37	0.002108	4.06	125.49	95.15	0.46
Moat	4047.5*	5-Year	650.09	3.79	9.95	8.30	10.13	0.001180	3.59	223.29	139.12	0.35
Moat	4047.5*	10-Year	768.87	3.79	10.22	8.62	10.40	0.001127	3.67	261.59	144.13	0.35
Moat	4047.5*	25-Year	927.54	3.79	10.51	9.24	10.69	0.001123	3.83	303.45	3848.00	0.35
Moat	4047.5*	50-Year	1085.94	3.79	10.75	9.52	10.95	0.001137	3.99	340.22	3852.75	0.36
Moat	3928	2-Year	473.06	3.90	9.05	7.35	9.17	0.000922	3.02	185.72	113.26	0.31
Moat	3928	5-Year	650.09	3.90	9.91	7.83	10.01	0.000570	2.75	298.61	148.01	0.25
Moat	3928	10-Year	768.87	3.90	10.18	8.10	10.28	0.000576	2.87	339.31	153.86	0.25
Moat	3928	25-Year	927.54	3.90	10.46	8.59	10.57	0.000604	3.05	383.25	157.50	0.26

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HEC-RAS Plan: Alternate4 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	3928	50-Year	1085.94	3.90	10.70	8.84	10.83	0.000638	3.23	421.69	3861.75	0.27
Moat	3782.*	2-Year	473.06	3.53	8.84	7.17	9.01	0.001303	3.41	154.24	103.92	0.36
Moat	3782.*	5-Year	650.09	3.53	9.80	7.71	9.91	0.000678	2.93	277.61	152.04	0.27
Moat	3782.*	10-Year	768.87	3.53	10.07	8.00	10.19	0.000676	3.04	319.82	160.17	0.28
Moat	3782.*	25-Year	927.54	3.53	10.35	8.34	10.48	0.000704	3.23	365.19	165.90	0.28
Moat	3782.*	50-Year	1085.94	3.53	10.58	8.86	10.73	0.000738	3.41	405.03	3867.88	0.29
Moat	3636	2-Year	473.06	3.16	8.54	6.97	8.77	0.001953	3.85	123.05	62.18	0.43
Moat	3636	5-Year	650.09	3.16	9.66	7.52	9.80	0.000852	3.16	250.18	152.76	0.30
Moat	3636	10-Year	768.87	3.16	9.93	7.84	10.07	0.000849	3.29	293.48	170.06	0.30
Moat	3636	25-Year	927.54	3.16	10.21	8.20	10.36	0.000863	3.46	342.09	177.12	0.31
Moat	3636	50-Year	1085.94	3.16	10.44	8.53	10.61	0.000883	3.61	384.18	180.01	0.32
Moat	3512.*	2-Year	473.06	3.12	8.39	6.74	8.55	0.001413	3.23	146.30	63.74	0.38
Moat	3512.*	5-Year	650.09	3.12	9.61	7.21	9.70	0.000561	2.48	290.99	163.24	0.26
Moat	3512.*	10-Year	768.87	3.12	9.88	7.48	9.98	0.000568	2.60	336.34	176.27	0.26
Moat	3512.*	25-Year	927.54	3.12	10.15	7.79	10.26	0.000602	2.79	386.04	189.53	0.27
Moat	3512.*	50-Year	1085.94	3.12	10.38	8.09	10.50	0.000639	2.97	430.88	200.74	0.28
Moat	3388	2-Year	227.05	3.09	8.39		8.42	0.000261	1.38	163.96	70.16	0.16
Moat	3388	5-Year	423.42	3.09	9.60		9.64	0.000259	1.53	286.16	188.82	0.18
Moat	3388	10-Year	555.61	3.09	9.86		9.91	0.000319	1.77	333.69	203.08	0.20
Moat	3388	25-Year	732.25	3.09	10.12		10.18	0.000398	2.07	386.85	216.18	0.22
Moat	3388	50-Year	909.20	3.09	10.34		10.42	0.000467	2.32	435.70	225.94	0.24
Moat	3199.13*	2-Year	227.05	3.07	8.35	5.80	8.37	0.000263	1.38	164.81	71.78	0.16
Moat	3199.13*	5-Year	423.42	3.07	9.56	6.51	9.59	0.000224	1.42	331.45	218.31	0.17
Moat	3199.13*	10-Year	555.61	3.07	9.81	6.84	9.85	0.000270	1.62	388.84	238.37	0.18
Moat	3199.13*	25-Year	732.25	3.07	10.06	7.23	10.11	0.000332	1.87	451.04	255.76	0.20
Moat	3199.13*	50-Year	909.20	3.07	10.27	7.57	10.33	0.000388	2.10	506.71	269.37	0.22
Moat	3010.26*	2-Year	227.05	3.04	8.30	5.74	8.32	0.000266	1.37	165.81	73.48	0.16
Moat	3010.26*	5-Year	423.42	3.04	9.52	6.47	9.55	0.000211	1.37	350.82	251.06	0.16
Moat	3010.26*	10-Year	555.61	3.04	9.76	6.81	9.80	0.000253	1.56	415.30	277.81	0.18
Moat	3010.26*	25-Year	732.25	3.04	10.00	7.20	10.05	0.000309	1.80	484.90	298.89	0.19
Moat	3010.26*	50-Year	909.20	3.04	10.21	7.53	10.26	0.000359	2.01	547.43	316.50	0.21
Moat	2821.4*	2-Year	227.05	3.02	8.25	5.68	8.27	0.000270	1.36	166.85	75.76	0.16
Moat	2821.4*	5-Year	423.42	3.02	9.48	6.44	9.51	0.000197	1.32	372.54	287.11	0.16
Moat	2821.4*	10-Year	555.61	3.02	9.72	6.78	9.75	0.000234	1.50	444.58	319.19	0.17
Moat	2821.4*	25-Year	732.25	3.02	9.95	7.17	9.99	0.000286	1.73	521.73	345.64	0.19
Moat	2821.4*	50-Year	909.20	3.02	10.15	7.49	10.19	0.000331	1.92	591.37	367.87	0.20
Moat	2632.53*	2-Year	227.05	2.99	8.19	5.62	8.22	0.000274	1.35	168.08	78.08	0.16
Moat	2632.53*	5-Year	423.42	2.99	9.43	6.39	9.47	0.000232	1.46	289.06	326.43	0.16
Moat	2632.53*	10-Year	555.61	2.99	9.68	6.74	9.71	0.000216	1.44	477.15	366.63	0.16
Moat	2632.53*	25-Year	732.25	2.99	9.90	7.12	9.94	0.000262	1.65	562.84	399.45	0.18
Moat	2632.53*	50-Year	909.20	2.99	10.09	7.45	10.13	0.000303	1.83	640.52	427.02	0.19
Moat	2443.66*	2-Year	227.05	2.97	8.14	5.56	8.17	0.000276	1.34	169.47	80.28	0.16
Moat	2443.66*	5-Year	423.42	2.97	9.39	6.34	9.42	0.000223	1.43	296.11	369.09	0.16
Moat	2443.66*	10-Year	555.61	2.97	9.64	6.69	9.67	0.000198	1.38	512.53	419.67	0.16
Moat	2443.66*	25-Year	732.25	2.97	9.86	7.09	9.89	0.000240	1.58	607.61	460.05	0.17
Moat	2443.66*	50-Year	909.20	2.97	10.04	7.41	10.08	0.000276	1.75	694.17	493.95	0.18
Moat	2254.8*	2-Year	227.05	2.94	8.09	5.50	8.12	0.000280	1.33	170.93	82.89	0.16
Moat	2254.8*	5-Year	423.42	2.94	9.35	6.28	9.38	0.000212	1.39	303.95	417.64	0.15
Moat	2254.8*	10-Year	555.61	2.94	9.61	6.65	9.63	0.000179	1.32	555.74	483.65	0.15
Moat	2254.8*	25-Year	732.25	2.94	9.82	7.04	9.85	0.000216	1.50	662.18	532.64	0.16
Moat	2254.8*	50-Year	909.20	2.94	9.99	7.37	10.03	0.000247	1.65	759.46	573.75	0.17
Moat	2065.93*	2-Year	227.05	2.92	8.04	5.45	8.06	0.000283	1.32	172.59	85.62	0.16
Moat	2065.93*	5-Year	423.42	2.92	9.31	6.23	9.34	0.000202	1.36	312.24	472.96	0.15
Moat	2065.93*	10-Year	555.61	2.92	9.55	6.60	9.59	0.000265	1.63	341.17	550.94	0.17
Moat	2065.93*	25-Year	732.25	2.92	9.78	7.00	9.81	0.000191	1.41	727.52	620.75	0.15
Moat	2065.93*	50-Year	909.20	2.92	9.95	7.32	9.98	0.000217	1.55	837.70	663.31	0.16
Moat	1877.06*	2-Year	227.05	2.89	7.98	5.39	8.01	0.000284	1.30	174.51	88.48	0.16
Moat	1877.06*	5-Year	423.42	2.89	9.28	6.18	9.30	0.000191	1.32	321.25	544.76	0.15
Moat	1877.06*	10-Year	555.61	2.89	9.50	6.55	9.54	0.000253	1.59	349.70	636.19	0.17
Moat	1877.06*	25-Year	732.25	2.89	9.75	6.95	9.77	0.000165	1.32	809.77	720.89	0.14
Moat	1877.06*	50-Year	909.20	2.89	9.92	7.28	9.94	0.000185	1.44	934.48	766.76	0.15
Moat	1688.2*	2-Year	227.05	2.87	7.93	5.34	7.96	0.000286	1.29	176.29	91.26	0.16
Moat	1688.2*	5-Year	423.42	2.87	9.24	6.14	9.27	0.000180	1.28	330.24	639.29	0.14

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HEC-RAS Plan: Alternate4 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	1688.2*	10-Year	555.61	2.87	9.45	6.50	9.49	0.000242	1.55	358.12	745.79	0.17
Moat	1688.2*	25-Year	732.25	2.87	9.73	6.91	9.74	0.000139	1.21	912.52	839.37	0.13
Moat	1688.2*	50-Year	909.20	2.87	9.89	7.23	9.91	0.000155	1.32	1055.23	892.77	0.14
Moat	1499.33*	2-Year	227.05	2.84	7.88	5.28	7.90	0.000285	1.27	178.86	94.45	0.16
Moat	1499.33*	5-Year	423.42	2.84	9.21	6.09	9.24	0.000169	1.24	340.30	772.65	0.14
Moat	1499.33*	10-Year	555.61	2.84	9.41	6.46	9.45	0.000230	1.51	367.52	858.11	0.16
Moat	1499.33*	25-Year	732.25	2.84	9.65	6.85	9.70	0.000308	1.83	400.05	957.12	0.19
Moat	1499.33*	50-Year	909.20	2.84	9.87	7.18	9.88	0.000124	1.19	1209.70	1042.17	0.12
Moat	1310.46*	2-Year	227.05	2.82	7.82	5.23	7.85	0.000286	1.25	181.31	97.83	0.16
Moat	1310.46*	5-Year	423.42	2.82	9.18	6.04	9.20	0.000158	1.21	350.28	903.45	0.13
Moat	1310.46*	10-Year	555.61	2.82	9.37	6.41	9.40	0.000218	1.47	376.78	995.47	0.16
Moat	1310.46*	25-Year	732.25	2.82	9.59	6.80	9.64	0.000297	1.79	408.26	1104.57	0.19
Moat	1310.46*	50-Year	909.20	2.82	9.85	7.13	9.86	0.000097	1.06	1404.67	1226.07	0.11
Moat	1121.6*	2-Year	227.05	2.79	7.77	5.18	7.79	0.000285	1.23	184.12	101.38	0.16
Moat	1121.6*	5-Year	423.42	2.79	9.15	5.99	9.17	0.000147	1.17	360.79	1064.80	0.13
Moat	1121.6*	10-Year	555.61	2.79	9.33	6.36	9.36	0.000207	1.44	386.32	1166.53	0.16
Moat	1121.6*	25-Year	732.25	2.79	9.54	6.75	9.59	0.000286	1.76	416.62	1287.27	0.18
Moat	1121.6*	50-Year	909.20	2.79	9.84	7.08	9.84	0.000073	0.92	1663.05	1456.99	0.10
Moat	932.733*	2-Year	227.05	2.77	7.72	5.12	7.74	0.000284	1.21	186.94	105.03	0.16
Moat	932.733*	5-Year	423.42	2.77	9.13	5.96	9.15	0.000137	1.14	371.53	1278.01	0.13
Moat	932.733*	10-Year	555.61	2.77	9.29	6.32	9.32	0.000196	1.40	395.85	1391.72	0.15
Moat	932.733*	25-Year	732.25	2.77	9.49	6.70	9.53	0.000276	1.72	424.58	1526.16	0.18
Moat	932.733*	50-Year	909.20	2.77	9.75	7.02	9.81	0.000324	1.96	464.35	1710.08	0.20
Moat	743.866*	2-Year	227.05	2.74	7.66	5.06	7.69	0.000280	1.19	190.47	109.04	0.16
Moat	743.866*	5-Year	423.42	2.74	9.10	5.91	9.12	0.000127	1.10	383.50	1552.72	0.12
Moat	743.866*	10-Year	555.61	2.74	9.26	6.27	9.29	0.000183	1.37	406.63	1682.00	0.15
Moat	743.866*	25-Year	732.25	2.74	9.44	6.65	9.48	0.000263	1.69	433.52	1833.01	0.18
Moat	743.866*	50-Year	909.20	2.74	9.69	6.97	9.75	0.000313	1.92	472.64	2049.29	0.19
Moat	0555	2-Year	234.50	2.72	7.61	5.04	7.63	0.000297	1.21	193.80	113.30	0.16
Moat	0555	5-Year	433.69	2.72	9.08	5.90	9.10	0.000137	1.10	395.37	1929.04	0.12
Moat	0555	10-Year	567.63	2.72	9.22	6.26	9.25	0.000199	1.36	417.18	2079.17	0.14
Moat	0555	25-Year	746.96	2.72	9.39	6.64	9.43	0.000289	1.69	441.96	2249.16	0.18
Moat	0555	50-Year	926.14	2.72	9.63	6.95	9.69	0.000345	1.93	479.92	2507.51	0.19
Moat	426.*	2-Year	234.50	2.31	7.54	4.68	7.58	0.000379	1.72	136.43	53.62	0.19
Moat	426.*	5-Year	433.69	2.31	9.01	5.68	9.06	0.000435	1.79	242.90	1856.71	0.20
Moat	426.*	10-Year	567.63	2.31	9.12	6.11	9.20	0.000643	2.23	254.26	1971.98	0.25
Moat	426.*	25-Year	746.96	2.31	9.23	6.64	9.35	0.000971	2.82	265.34	2084.20	0.31
Moat	426.*	50-Year	926.14	2.31	9.43	7.00	9.59	0.001166	3.23	286.47	2300.20	0.34
Moat	0297	2-Year	242.38	1.89	7.44	4.31	7.52	0.000466	2.21	109.60	30.36	0.21
Moat	0297	5-Year	444.06	1.89	9.02	5.17	9.03	0.000083	1.06	770.13	2452.99	0.09
Moat	0297	10-Year	579.90	1.89	9.14	5.65	9.15	0.000109	1.23	849.87	2583.09	0.10
Moat	0297	25-Year	761.32	1.89	9.26	6.23	9.28	0.000146	1.44	933.72	2722.38	0.12
Moat	0297	50-Year	942.64	1.89	9.49	6.74	9.50	0.000147	1.44	1090.61	2986.60	0.12
Moat	275	2-Year	242.38	1.79	7.44	4.26	7.51	0.000483	2.12	114.18	37.19	0.21
Moat	275	5-Year	444.06	1.79	8.95	5.21	9.02	0.000565	2.15	301.75	2723.09	0.23
Moat	275	10-Year	579.90	1.79	9.14	5.86	9.14	0.000212	0.47	1289.13	3669.34	0.14
Moat	275	25-Year	761.32	1.79	9.27	6.47	9.27	0.000159	0.45	1759.13	3730.11	0.11
Moat	275	50-Year	942.64	1.79	9.50	6.97	9.50	0.000075	0.37	2628.90	3840.03	0.08
Moat	0265	2-Year	341.35	1.79	7.33	4.76	7.47	0.001052	3.10	110.12	36.35	0.31
Moat	0265	5-Year	581.29	1.79	8.82	5.87	8.98	0.001079	3.23	226.79	1919.32	0.33
Moat	0265	10-Year	742.75	1.79	8.77	6.42	9.05	0.001749	4.30	195.22	1570.73	0.42
Moat	0265	25-Year	958.74	1.79	8.54	7.01	9.10	0.003182	5.97	160.47	46.28	0.57
Moat	0265	50-Year	1174.57	1.79	7.76	7.53	9.09	0.008761	9.28	126.54	39.82	0.92
Moat	264		Culvert									
Moat	0209	2-Year	341.35	1.78	5.40		5.81	0.003573	5.16	66.20	26.90	0.58
Moat	0209	5-Year	581.29	1.78	6.24		6.89	0.004325	6.46	89.96	29.79	0.66
Moat	0209	10-Year	742.75	1.78	6.69		7.49	0.004708	7.16	103.80	31.28	0.69
Moat	0209	25-Year	958.74	1.78	7.24		8.21	0.005041	7.89	121.48	33.09	0.73
Moat	0209	50-Year	1174.57	1.78	7.73		8.85	0.005298	8.51	138.00	34.70	0.75
Moat	199	2-Year	341.35	1.78	5.34		5.78	0.003819	5.28	64.68	26.70	0.60
Moat	199	5-Year	581.29	1.78	6.16		6.84	0.004671	6.64	87.56	29.52	0.68
Moat	199	10-Year	742.75	1.78	6.59		7.44	0.005131	7.38	100.69	30.95	0.72
Moat	199	25-Year	958.74	1.78	7.10		8.15	0.005607	8.20	116.96	32.64	0.76

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HEC-RAS Plan: Alternate4 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Moat	199	50-Year	1174.57	1.78	7.56		8.79	0.005972	8.88	132.20	34.15	0.80
Moat	0190	2-Year	341.35	1.78	5.25	4.58	5.73	0.005095	5.57	61.25	28.83	0.67
Moat	0190	5-Year	581.29	1.78	6.14	5.49	6.79	0.005417	6.46	89.98	35.56	0.72
Moat	0190	10-Year	742.75	1.78	6.62	5.95	7.36	0.005284	6.91	107.50	37.49	0.72
Moat	0190	25-Year	958.74	1.78	7.19	6.44	8.04	0.005145	7.39	129.65	39.81	0.72
Moat	0190	50-Year	1174.57	1.78	7.71	6.88	8.65	0.005027	7.79	150.79	41.90	0.72
Moat	0100	2-Year	341.35	1.78	4.19	4.19	5.04	0.011561	7.38	46.28	27.71	1.01
Moat	0100	5-Year	581.29	1.78	4.94	4.94	6.07	0.010698	8.54	68.04	30.52	1.01
Moat	0100	10-Year	742.75	1.78	5.37	5.37	6.66	0.010321	9.11	81.51	32.13	1.01
Moat	0100	25-Year	958.74	1.78	5.89	5.89	7.35	0.009901	9.71	98.70	34.08	1.01
Moat	0100	50-Year	1174.57	1.78	6.35	6.35	7.98	0.009510	10.22	114.96	35.47	1.00

FLOOD LONG-TERM ALTERNATIVE 5 (FLOOD LTA-5)

LTA-5A HYDRAULIC
MODEL IMPROVEMENTS
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HEC-RAS Plan: Alt5A River: Moat Reach: Moat

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	8415	2-Year	0.01	6.70	11.97	6.72	11.97	0.000000	0.00	3264.17	1938.48	0.00
Moat	8415	5-Year	0.01	6.70	12.45	6.72	12.45	0.000000	0.00	4206.24	1940.02	0.00
Moat	8415	10-Year	0.01	6.70	12.61	6.72	12.61	0.000000	0.00	4505.95	1940.48	0.00
Moat	8415	25-Year	0.01	6.70	12.93	6.72	12.93	0.000000	0.00	5134.08	1941.45	0.00
Moat	8415	50-Year	0.01	6.70	13.09	6.72	13.09	0.000000	0.00	5440.98	1941.92	0.00
Moat	8236.5*	2-Year	0.01	6.70	11.97	6.72	11.97	0.000000	0.00	3264.17	1938.48	0.00
Moat	8236.5*	5-Year	0.01	6.70	12.45	6.72	12.45	0.000000	0.00	4206.24	1940.02	0.00
Moat	8236.5*	10-Year	0.01	6.70	12.61	6.72	12.61	0.000000	0.00	4505.95	1940.48	0.00
Moat	8236.5*	25-Year	0.01	6.70	12.93	6.72	12.93	0.000000	0.00	5134.08	1941.45	0.00
Moat	8236.5*	50-Year	0.01	6.70	13.09	6.72	13.09	0.000000	0.00	5440.98	1941.92	0.00
Moat	8058	2-Year	0.01	6.70	11.97	6.72	11.97	0.000000	0.00	3264.17	1938.48	0.00
Moat	8058	5-Year	0.01	6.70	12.45	6.72	12.45	0.000000	0.00	4206.24	1940.02	0.00
Moat	8058	10-Year	0.01	6.70	12.61	6.72	12.61	0.000000	0.00	4505.95	1940.48	0.00
Moat	8058	25-Year	0.01	6.70	12.93	6.72	12.93	0.000000	0.00	5134.08	1941.45	0.00
Moat	8058	50-Year	0.01	6.70	13.09	6.72	13.09	0.000000	0.00	5440.98	1941.92	0.00
Moat	7920.*	2-Year	0.01	6.70	11.97	6.72	11.97	0.000000	0.00	3230.21	1993.54	0.00
Moat	7920.*	5-Year	0.01	6.70	12.45	6.72	12.45	0.000000	0.00	4206.54	2020.18	0.00
Moat	7920.*	10-Year	0.01	6.70	12.61	6.72	12.61	0.000000	0.00	4519.05	2025.93	0.00
Moat	7920.*	25-Year	0.01	6.70	12.93	6.72	12.93	0.000000	0.00	5176.62	2037.99	0.00
Moat	7920.*	50-Year	0.01	6.70	13.09	6.72	13.09	0.000000	0.00	5499.21	2043.87	0.00
Moat	7782	2-Year	150.11	6.70	11.97	8.51	11.97	0.000000	0.03	3688.98	2136.07	0.00
Moat	7782	5-Year	240.74	6.70	12.45	8.70	12.45	0.000000	0.03	4730.90	2153.70	0.00
Moat	7782	10-Year	300.86	6.70	12.61	8.78	12.61	0.000001	0.04	5063.98	2159.28	0.00
Moat	7782	25-Year	364.30	6.70	12.93	8.86	12.93	0.000001	0.04	5764.63	2170.97	0.00
Moat	7782	50-Year	459.58	6.70	13.09	8.97	13.09	0.000001	0.04	6108.13	2176.68	0.00
Moat	7765	2-Year	150.11	7.87	11.97	8.66	11.97	0.000000	0.03	4204.87	2467.80	0.00
Moat	7765	5-Year	240.74	7.87	12.45	8.78	12.45	0.000000	0.03	5407.68	2484.37	0.00
Moat	7765	10-Year	300.86	7.87	12.61	8.86	12.61	0.000000	0.04	5791.81	2489.61	0.00
Moat	7765	25-Year	364.30	7.87	12.93	8.93	12.93	0.000000	0.04	6599.25	2500.60	0.00
Moat	7765	50-Year	459.58	7.87	13.09	9.03	13.09	0.000001	0.04	6994.82	2505.97	0.00
Moat	7754	2-Year	150.11	7.87	11.97	8.58	11.97	0.000000	0.02	4321.36	2477.29	0.00
Moat	7754	5-Year	240.74	7.87	12.45	8.80	12.45	0.000000	0.03	5528.65	2493.34	0.00
Moat	7754	10-Year	300.86	7.87	12.61	8.87	12.61	0.000000	0.03	5914.15	2498.42	0.00
Moat	7754	25-Year	364.30	7.87	12.93	8.95	12.93	0.000000	0.03	6724.39	2509.06	0.00
Moat	7754	50-Year	459.58	7.87	13.09	9.04	13.09	0.000001	0.04	7121.28	2514.25	0.00
Moat	7689	2-Year	150.11	6.48	11.97	8.18	11.97	0.000000	0.03	4474.49	2504.40	0.00
Moat	7689	5-Year	240.74	6.48	12.45	8.33	12.45	0.000000	0.04	5694.58	2518.93	0.00
Moat	7689	10-Year	300.86	6.48	12.61	8.41	12.61	0.000000	0.05	6083.98	2523.53	0.00
Moat	7689	25-Year	364.30	6.48	12.93	8.49	12.93	0.000000	0.05	6902.19	2533.16	0.00
Moat	7689	50-Year	459.58	6.48	13.09	8.59	13.09	0.000000	0.06	7302.84	2537.87	0.00
Moat	7687	2-Year	150.11	6.48	11.97	8.18	11.97	0.000000	0.03	4474.57	2504.50	0.00
Moat	7687	5-Year	240.74	6.48	12.45	8.33	12.45	0.000000	0.04	5694.71	2519.03	0.00
Moat	7687	10-Year	300.86	6.48	12.61	8.41	12.61	0.000000	0.05	6084.12	2523.63	0.00
Moat	7687	25-Year	364.30	6.48	12.93	8.49	12.93	0.000000	0.05	6902.36	2533.26	0.00
Moat	7687	50-Year	459.58	6.48	13.09	8.59	13.09	0.000000	0.06	7303.02	2537.97	0.00
Moat	7650	2-Year	150.11	5.79	11.97	8.57	11.97	0.000000	0.03	4475.70	2511.94	0.00
Moat	7650	5-Year	240.74	5.79	12.45	8.73	12.45	0.000000	0.03	5699.69	2527.51	0.00
Moat	7650	10-Year	300.86	5.79	12.61	8.75	12.61	0.000000	0.04	6090.43	2532.46	0.00
Moat	7650	25-Year	364.30	5.79	12.93	8.80	12.93	0.000000	0.04	6911.65	2542.82	0.00
Moat	7650	50-Year	459.58	5.79	13.09	8.88	13.09	0.000000	0.05	7313.84	2547.88	0.00
Moat	7534.*	2-Year	150.11	5.63	11.97	7.79	11.97	0.000000	0.04	3917.90	2369.71	0.00
Moat	7534.*	5-Year	240.74	5.63	12.45	8.45	12.45	0.000000	0.04	5073.20	2387.00	0.00
Moat	7534.*	10-Year	300.86	5.63	12.61	8.62	12.61	0.000000	0.05	5442.26	2392.48	0.00
Moat	7534.*	25-Year	364.30	5.63	12.93	8.73	12.93	0.000000	0.05	6218.36	2403.97	0.00
Moat	7534.*	50-Year	459.58	5.63	13.09	8.87	13.09	0.000001	0.06	6598.62	2409.58	0.01
Moat	7418	2-Year	150.11	5.47	11.97	7.65	11.97	0.000000	0.07	3489.42	2214.00	0.01
Moat	7418	5-Year	240.74	5.47	12.45	8.54	12.45	0.000000	0.08	4569.70	2233.83	0.01
Moat	7418	10-Year	300.86	5.47	12.61	8.80	12.61	0.000001	0.09	4915.13	2240.11	0.01
Moat	7418	25-Year	364.30	5.47	12.93	9.05	12.93	0.000000	0.09	5642.20	2253.28	0.01
Moat	7418	50-Year	459.58	5.47	13.09	9.23	13.09	0.000001	0.11	5998.66	2259.70	0.01
Moat	7220	2-Year	150.11	6.02	11.97	8.28	11.97	0.000000	0.07	3484.81	2215.47	0.01
Moat	7220	5-Year	240.74	6.02	12.45	8.77	12.45	0.000000	0.08	4565.79	2235.31	0.01
Moat	7220	10-Year	300.86	6.02	12.61	9.01	12.61	0.000001	0.09	4911.41	2241.59	0.01
Moat	7220	25-Year	364.30	6.02	12.93	9.14	12.93	0.000000	0.09	5638.97	2254.75	0.01

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HEC-RAS Plan: Alt5A River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	7220	50-Year	459.58	6.02	13.09	9.30	13.09	0.000001	0.11	5995.60	2261.18	0.01
Moat	7048.5*	2-Year	150.11	5.97	11.97	8.07	11.97	0.000000	0.07	3489.01	2231.09	0.01
Moat	7048.5*	5-Year	240.74	5.97	12.45	8.59	12.45	0.000000	0.08	4578.36	2254.20	0.01
Moat	7048.5*	10-Year	300.86	5.97	12.61	8.93	12.61	0.000001	0.09	4926.93	2261.38	0.01
Moat	7048.5*	25-Year	364.30	5.97	12.93	9.25	12.93	0.000000	0.10	5661.21	2276.39	0.01
Moat	7048.5*	50-Year	459.58	5.97	13.09	9.45	13.09	0.000001	0.11	6021.27	2283.71	0.01
Moat	6877.*	2-Year	150.11	5.92	11.97	7.87	11.97	0.000000	0.07	3483.69	2244.52	0.01
Moat	6877.*	5-Year	240.74	5.92	12.45	8.39	12.45	0.000000	0.08	4580.40	2271.10	0.01
Moat	6877.*	10-Year	300.86	5.92	12.61	8.66	12.61	0.000001	0.10	4931.63	2279.53	0.01
Moat	6877.*	25-Year	364.30	5.92	12.93	8.90	12.93	0.000000	0.10	5672.11	2296.46	0.01
Moat	6877.*	50-Year	459.58	5.92	13.09	9.33	13.09	0.000001	0.11	6035.35	2304.71	0.01
Moat	6705.5*	2-Year	150.11	5.87	11.97	7.69	11.97	0.000000	0.08	3469.15	2255.78	0.01
Moat	6705.5*	5-Year	240.74	5.87	12.45	8.21	12.45	0.000000	0.08	4572.30	2286.45	0.01
Moat	6705.5*	10-Year	300.86	5.87	12.61	8.48	12.61	0.000001	0.10	4925.97	2296.17	0.01
Moat	6705.5*	25-Year	364.30	5.87	12.93	8.72	12.93	0.000000	0.10	5672.31	2315.61	0.01
Moat	6705.5*	50-Year	459.58	5.87	13.09	9.04	13.09	0.000001	0.11	6038.59	2324.82	0.01
Moat	6534	2-Year	151.40	5.82	11.97	7.51	11.97	0.000000	0.08	3446.45	2264.19	0.01
Moat	6534	5-Year	242.55	5.82	12.45	8.04	12.45	0.000000	0.09	4554.68	2298.99	0.01
Moat	6534	10-Year	302.99	5.82	12.61	8.30	12.61	0.000001	0.10	4910.35	2310.02	0.01
Moat	6534	25-Year	366.84	5.82	12.93	8.54	12.93	0.000001	0.10	5661.71	2332.67	0.01
Moat	6534	50-Year	462.72	5.82	13.09	8.86	13.09	0.000001	0.11	6030.70	2342.88	0.01
Moat	6405.5*	2-Year	151.40	5.57	11.97	8.34	11.97	0.000000	0.07	3288.77	2191.31	0.01
Moat	6405.5*	5-Year	242.55	5.57	12.45	8.83	12.45	0.000000	0.08	4359.72	2218.36	0.01
Moat	6405.5*	10-Year	302.99	5.57	12.61	9.07	12.61	0.000001	0.09	4702.71	2228.96	0.01
Moat	6405.5*	25-Year	366.84	5.57	12.93	9.32	12.93	0.000001	0.09	5428.43	2245.21	0.01
Moat	6405.5*	50-Year	462.72	5.57	13.09	9.64	13.09	0.000001	0.10	5781.46	2254.11	0.01
Moat	6277	2-Year	151.40	5.32	11.96	7.33	11.97	0.000118	0.87	188.67	2127.58	0.10
Moat	6277	5-Year	242.55	5.32	12.45	8.04	12.45	0.000001	0.07	4234.32	2157.86	0.01
Moat	6277	10-Year	302.99	5.32	12.61	8.58	12.61	0.000001	0.08	4567.76	2164.02	0.01
Moat	6277	25-Year	366.84	5.32	12.93	9.42	12.93	0.000001	0.08	5270.25	2176.93	0.01
Moat	6277	50-Year	462.72	5.32	13.09	9.88	13.09	0.000001	0.09	5814.25	2183.22	0.01
Moat	6276		Bridge									
Moat	6271	2-Year	278.46	5.32	11.95	8.40	11.99	0.000400	1.60	188.24	2127.40	0.19
Moat	6271	5-Year	383.63	5.32	12.45	9.50	12.45	0.000001	0.10	4234.31	2157.86	0.01
Moat	6271	10-Year	454.27	5.32	12.61	9.82	12.61	0.000001	0.11	4567.75	2164.02	0.01
Moat	6271	25-Year	548.49	5.32	12.93	10.33	12.93	0.000001	0.12	5270.24	2176.93	0.01
Moat	6271	50-Year	642.52	5.32	13.09	10.65	13.09	0.000001	0.13	5614.24	2183.22	0.01
Moat	6257	2-Year	395.31	4.71	11.92	9.11	11.98	0.000570	2.06	201.25	2125.40	0.24
Moat	6257	5-Year	540.87	4.71	12.45	9.73	12.45	0.000003	0.16	4251.30	2157.86	0.02
Moat	6257	10-Year	638.48	4.71	12.61	10.05	12.61	0.000003	0.17	4584.67	2164.01	0.02
Moat	6257	25-Year	768.61	4.71	12.93	10.42	12.93	0.000003	0.17	5287.14	2176.92	0.02
Moat	6257	50-Year	898.43	4.71	13.09	11.00	13.09	0.000003	0.19	5831.05	2183.21	0.02
Moat	6090.33*	2-Year	395.31	4.82	11.81	8.91	11.89	0.000481	2.24	176.27	2648.66	0.25
Moat	6090.33*	5-Year	540.87	4.82	12.45	9.50	12.45	0.000002	0.14	5329.35	2674.97	0.02
Moat	6090.33*	10-Year	638.48	4.82	12.61	9.81	12.61	0.000002	0.15	5742.34	2679.28	0.02
Moat	6090.33*	25-Year	768.61	4.82	12.93	10.15	12.93	0.000002	0.14	6610.87	2687.24	0.02
Moat	6090.33*	50-Year	898.43	4.82	13.09	10.45	13.09	0.000002	0.15	7035.05	2691.12	0.02
Moat	5923.66*	2-Year	395.31	4.92	11.73	8.94	11.81	0.000484	2.27	174.17	3203.18	0.24
Moat	5923.66*	5-Year	540.87	4.92	12.45	9.43	12.45	0.000001	0.12	6447.53	3225.75	0.01
Moat	5923.66*	10-Year	638.48	4.92	12.61	9.74	12.61	0.000001	0.13	6945.38	3229.50	0.01
Moat	5923.66*	25-Year	768.61	4.92	12.93	10.08	12.93	0.000001	0.12	7992.08	3237.38	0.01
Moat	5923.66*	50-Year	898.43	4.92	13.09	10.38	13.09	0.000001	0.13	8502.98	3241.22	0.01
Moat	5757	2-Year	395.31	5.03	11.63	8.87	11.72	0.000631	2.40	164.80	3764.70	0.25
Moat	5757	5-Year	540.87	5.03	12.45	9.47	12.45	0.000001	0.10	7566.76	3783.98	0.01
Moat	5757	10-Year	638.48	5.03	12.61	9.78	12.61	0.000001	0.10	8150.64	3787.33	0.01
Moat	5757	25-Year	768.61	5.03	12.93	10.13	12.93	0.000001	0.10	9377.85	3794.36	0.01
Moat	5757	50-Year	898.43	5.03	13.09	10.44	13.09	0.000001	0.11	9976.51	3797.79	0.01
Moat	5756	2-Year	395.31	5.03	11.61	9.18	11.72	0.001136	2.66	148.64	3764.30	0.29
Moat	5756	5-Year	540.87	5.03	12.45	9.78	12.45	0.000001	0.08	7551.97	3783.98	0.01
Moat	5756	10-Year	638.48	5.03	12.61	10.09	12.61	0.000001	0.09	8135.85	3787.33	0.01
Moat	5756	25-Year	768.61	5.03	12.93	10.45	12.93	0.000001	0.09	9363.05	3794.38	0.01
Moat	5756	50-Year	898.43	5.03	13.09	10.84	13.09	0.000001	0.10	9961.72	3797.79	0.01

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HEC-RAS Plan: Alt5A River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	5720	2-Year	395.31	4.80	11.58	9.24	11.67	0.001057	2.48	159.51	3772.57	0.28
Moat	5720	5-Year	540.87	4.80	12.35	9.75	12.44	0.000875	2.49	216.81	3792.21	0.27
Moat	5720	10-Year	638.48	4.80	12.61	10.02	12.61	0.000001	0.08	8159.91	3799.11	0.01
Moat	5720	25-Year	768.61	4.80	12.93	10.36	12.93	0.000001	0.08	9390.61	3804.14	0.01
Moat	5720	50-Year	898.43	4.80	13.09	10.67	13.09	0.000001	0.09	9990.73	3806.60	0.01
Moat	5719	2-Year	395.31	4.80	11.58	9.14	11.67	0.000736	2.38	166.33	3772.67	0.27
Moat	5719	5-Year	540.87	4.80	12.35	9.63	12.44	0.000683	2.42	223.61	3792.32	0.26
Moat	5719	10-Year	638.48	4.80	12.61	9.91	12.61	0.000001	0.09	8168.43	3799.11	0.01
Moat	5719	25-Year	768.61	4.80	12.93	10.23	12.93	0.000001	0.09	9397.13	3804.14	0.01
Moat	5719	50-Year	898.43	4.80	13.09	10.54	13.09	0.000001	0.10	9997.25	3806.60	0.01
Moat	5544.5*	2-Year	395.31	4.73	11.43	8.92	11.53	0.000806	2.57	153.54	3763.66	0.28
Moat	5544.5*	5-Year	540.87	4.73	12.21	9.45	12.31	0.000760	2.65	204.44	3780.76	0.28
Moat	5544.5*	10-Year	638.48	4.73	12.61	9.74	12.61	0.000001	0.09	8155.49	3793.46	0.01
Moat	5544.5*	25-Year	768.61	4.73	12.93	10.08	12.93	0.000001	0.09	9384.42	3798.41	0.01
Moat	5544.5*	50-Year	898.43	4.73	13.09	10.39	13.09	0.000001	0.10	9983.57	3800.80	0.01
Moat	5370.*	2-Year	395.31	4.66	11.27	8.68	11.39	0.000834	2.75	143.57	3754.86	0.29
Moat	5370.*	5-Year	540.87	4.66	12.04	9.23	12.17	0.000858	2.88	187.87	3771.85	0.30
Moat	5370.*	10-Year	638.48	4.66	12.46	9.54	12.59	0.000864	2.96	215.87	3780.22	0.30
Moat	5370.*	25-Year	768.61	4.66	12.93	9.91	12.93	0.000001	0.09	9373.28	3792.98	0.01
Moat	5370.*	50-Year	898.43	4.66	13.09	10.24	13.09	0.000001	0.10	9971.51	3795.32	0.01
Moat	5195.5*	2-Year	395.31	4.60	11.11	8.40	11.24	0.000803	2.89	136.85	3746.40	0.29
Moat	5195.5*	5-Year	540.87	4.60	11.86	8.99	12.01	0.000935	3.11	173.71	3762.57	0.31
Moat	5195.5*	10-Year	638.48	4.60	12.27	9.33	12.43	0.000982	3.23	197.55	3770.70	0.32
Moat	5195.5*	25-Year	768.61	4.60	12.74	9.72	12.91	0.001069	3.36	228.97	3782.82	0.33
Moat	5195.5*	50-Year	898.43	4.60	13.09	10.06	13.09	0.000001	0.10	9960.69	3789.92	0.01
Moat	5021	2-Year	473.06	4.53	10.85	8.44	11.06	0.001280	3.70	127.97	3740.58	0.36
Moat	5021	5-Year	650.09	4.53	11.52	9.12	11.79	0.001512	4.18	155.71	3750.10	0.39
Moat	5021	10-Year	768.87	4.53	11.88	9.49	12.19	0.001742	4.45	172.68	3757.66	0.42
Moat	5021	25-Year	927.54	4.53	12.29	9.94	12.64	0.001981	4.76	194.81	3765.68	0.45
Moat	5021	50-Year	1085.94	4.53	12.66	10.33	13.05	0.002144	5.00	217.25	3772.69	0.48
Moat	4850.2*	2-Year	473.06	4.36	10.60	8.51	10.82	0.001565	3.77	125.54	3742.29	0.39
Moat	4850.2*	5-Year	650.09	4.36	11.24	9.11	11.51	0.001787	4.15	156.82	3756.88	0.42
Moat	4850.2*	10-Year	768.87	4.36	11.57	9.46	11.87	0.001933	4.40	174.76	3763.22	0.44
Moat	4850.2*	25-Year	927.54	4.36	11.95	9.87	12.29	0.002095	4.70	197.36	3770.54	0.47
Moat	4850.2*	50-Year	1085.94	4.36	12.30	10.29	12.68	0.002197	4.93	220.16	3778.70	0.48
Moat	4679.4*	2-Year	473.06	4.19	10.33	8.44	10.54	0.001643	3.69	128.10	48.48	0.40
Moat	4679.4*	5-Year	650.09	4.19	10.95	9.05	11.20	0.001751	4.05	160.46	3757.34	0.42
Moat	4679.4*	10-Year	768.87	4.19	11.25	9.41	11.54	0.001885	4.33	177.72	3763.05	0.44
Moat	4679.4*	25-Year	927.54	4.19	11.60	9.80	11.94	0.002017	4.66	199.11	3769.36	0.46
Moat	4679.4*	50-Year	1085.94	4.19	11.94	10.14	12.32	0.002003	4.90	221.50	3775.66	0.48
Moat	4508.6*	2-Year	473.06	4.02	10.06	8.33	10.27	0.001533	3.65	129.68	48.35	0.39
Moat	4508.6*	5-Year	650.09	4.02	10.67	8.85	10.93	0.001515	4.04	161.08	3753.80	0.41
Moat	4508.6*	10-Year	768.87	4.02	10.94	9.16	11.24	0.001636	4.37	176.11	3757.77	0.44
Moat	4508.6*	25-Year	927.54	4.02	11.25	9.51	11.61	0.001808	4.78	193.85	3762.20	0.46
Moat	4508.6*	50-Year	1085.94	4.02	11.58	9.84	11.98	0.001904	5.09	213.34	3767.55	0.48
Moat	4337.8*	2-Year	473.06	3.85	9.78	8.07	10.01	0.001435	3.84	123.20	43.62	0.40
Moat	4337.8*	5-Year	650.09	3.85	10.38	8.60	10.66	0.001601	4.33	149.99	49.22	0.44
Moat	4337.8*	10-Year	768.87	3.85	10.58	8.91	10.94	0.001859	4.77	161.09	3751.65	0.48
Moat	4337.8*	25-Year	927.54	3.85	10.81	9.28	11.26	0.002237	5.35	173.31	3755.62	0.53
Moat	4337.8*	50-Year	1085.94	3.85	11.08	9.61	11.60	0.002476	5.76	188.47	3760.37	0.56
Moat	4167	2-Year	473.06	3.68	9.28	7.97	9.65	0.003083	4.89	96.81	38.56	0.54
Moat	4167	5-Year	650.09	3.68	9.75	8.56	10.23	0.003902	5.58	116.44	92.00	0.62
Moat	4167	10-Year	768.87	3.68	10.05	8.96	10.50	0.003565	5.55	160.26	132.71	0.60
Moat	4167	25-Year	927.54	3.68	10.42	9.44	10.81	0.002887	5.37	210.24	137.39	0.55
Moat	4167	50-Year	1085.94	3.68	10.81	10.21	11.14	0.002218	5.04	265.90	3844.07	0.49
Moat	4047.5*	2-Year	473.06	3.79	9.00	7.69	9.29	0.002536	4.32	114.22	84.76	0.50
Moat	4047.5*	5-Year	650.09	3.79	9.54	8.31	9.83	0.002126	4.46	170.31	118.24	0.47
Moat	4047.5*	10-Year	768.87	3.79	9.87	8.62	10.14	0.001848	4.43	212.46	136.36	0.44
Moat	4047.5*	25-Year	927.54	3.79	10.28	9.24	10.52	0.001521	4.30	269.68	145.17	0.41
Moat	4047.5*	50-Year	1085.94	3.79	10.71	9.52	10.91	0.001204	4.08	332.96	3851.90	0.37
Moat	3928	2-Year	473.06	3.90	8.90	7.35	9.05	0.001144	3.27	169.04	107.17	0.34
Moat	3928	5-Year	650.09	3.90	9.47	7.90	9.62	0.000987	3.37	236.98	130.19	0.33
Moat	3928	10-Year	768.87	3.90	9.81	8.20	9.95	0.000904	3.40	283.29	143.79	0.32
Moat	3928	25-Year	927.54	3.90	10.22	8.60	10.36	0.000802	3.40	344.90	154.32	0.30

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HEC-RAS Plan: Alt5A River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	3928	50-Year	1085.94	3.90	10.65	8.84	10.78	0.000673	3.30	413.52	3860.84	0.28
Moat	3782.*	2-Year	473.06	3.53	8.61	7.17	8.83	0.001805	3.82	131.93	91.38	0.42
Moat	3782.*	5-Year	650.09	3.53	9.23	7.70	9.44	0.001425	3.85	198.93	123.54	0.39
Moat	3782.*	10-Year	768.87	3.53	9.60	7.99	9.80	0.001222	3.81	248.18	142.04	0.36
Moat	3782.*	25-Year	927.54	3.53	10.05	8.44	10.22	0.001013	3.71	316.17	159.71	0.34
Moat	3782.*	50-Year	1085.94	3.53	10.52	8.86	10.67	0.000789	3.50	394.82	3866.21	0.30
Moat	3636	2-Year	473.06	3.16	8.19	6.97	8.50	0.002834	4.46	106.01	45.52	0.52
Moat	3636	5-Year	650.09	3.16	8.79	7.52	9.15	0.002724	4.80	136.42	88.62	0.52
Moat	3636	10-Year	768.87	3.16	9.26	7.84	9.56	0.002025	4.54	193.50	126.58	0.46
Moat	3636	25-Year	927.54	3.16	9.80	8.20	10.04	0.001462	4.23	271.26	161.41	0.40
Moat	3636	50-Year	1085.94	3.16	10.37	8.53	10.54	0.000988	3.74	370.60	179.08	0.33
Moat	3512.*	2-Year	473.06	3.12	7.91	6.74	8.16	0.002407	4.01	118.05	54.16	0.48
Moat	3512.*	5-Year	650.09	3.12	8.55	7.21	8.82	0.002138	4.13	157.38	72.55	0.48
Moat	3512.*	10-Year	768.87	3.12	9.08	7.48	9.32	0.001581	3.90	197.27	135.38	0.43
Moat	3512.*	25-Year	927.54	3.12	9.70	7.79	9.87	0.001027	3.40	305.29	167.46	0.35
Moat	3512.*	50-Year	1085.94	3.12	10.30	8.09	10.43	0.000699	3.07	414.75	196.78	0.29
Moat	3388	2-Year	513.05	3.09	7.00		7.61	0.008156	6.28	81.73	47.69	0.85
Moat	3388	5-Year	709.42	3.09	8.08		8.46	0.003662	4.97	142.65	65.02	0.59
Moat	3388	10-Year	841.61	3.09	8.77		9.07	0.002484	4.39	191.58	90.99	0.50
Moat	3388	25-Year	1018.25	3.09	9.44		9.69	0.001833	3.99	259.37	180.25	0.49
Moat	3388	50-Year	1195.20	3.09	10.16		10.32	0.001012	3.32	394.93	217.82	0.35
Moat	3305	2-Year	513.05	3.00	6.96	5.08	7.25	0.001656	4.32	118.85	30.03	0.38
Moat	3305	5-Year	709.42	3.00	7.90	5.58	8.26	0.001661	4.82	147.05	30.04	0.38
Moat	3305	10-Year	841.61	3.00	8.48	5.89	8.89	0.001669	5.11	164.57	30.04	0.39
Moat	3305	25-Year	1018.25	3.00	9.02	6.28	9.51	0.001850	5.63	180.76	30.04	0.40
Moat	3305	50-Year	1195.20	3.00	9.60	6.65	10.17	0.001943	6.03	198.25	30.04	0.41
Moat	3304		Culvert									
Moat	3032	2-Year	513.05	2.75	4.83	4.83	5.88	0.012335	8.22	62.41	30.02	1.00
Moat	3032	5-Year	709.42	2.75	5.33	5.33	6.63	0.011940	9.16	77.44	30.02	1.01
Moat	3032	10-Year	841.61	2.75	5.64	5.64	7.10	0.011760	9.70	86.80	30.02	1.00
Moat	3032	25-Year	1018.25	2.75	6.03	6.03	7.69	0.011599	10.33	98.58	30.03	1.00
Moat	3032	50-Year	1195.20	2.75	6.40	6.40	8.25	0.011511	10.90	109.63	30.03	1.01
Moat	3022	2-Year	513.05	2.67	4.70	4.82	5.73	0.015841	8.85	168.77	3474.39	1.18
Moat	3022	5-Year	709.42	2.67	4.71	4.83	6.41	0.027304	11.65	190.11	3474.46	1.55
Moat	3022	10-Year	841.61	2.67	4.72	4.85	6.85	0.035349	13.28	206.69	3474.51	1.76
Moat	3022	25-Year	1018.25	2.67	4.72	4.89	7.38	0.046158	15.21	228.82	3474.59	2.02
Moat	3022	50-Year	1195.20	2.67	4.73	4.91	7.90	0.057263	16.98	248.78	3474.65	2.25

LTA-5B HYDRAULIC
MODEL RESULTS

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HEC-RAS Plan: Alt5B River: Moat Reach: Moat

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	3388	2-Year	25.06	3.09	6.16	4.12	6.16	0.000093	0.54	46.22	36.93	0.09
Moat	3388	5-Year	33.40	3.09	6.52	4.24	6.53	0.000078	0.55	60.58	41.62	0.08
Moat	3388	10-Year	38.93	3.09	6.89	4.31	6.89	0.000056	0.51	76.70	46.32	0.07
Moat	3388	25-Year	46.28	3.09	7.88	4.40	7.88	0.000020	0.36	130.18	61.82	0.04
Moat	3388	50-Year	53.58	3.09	9.08	4.48	9.08	0.000007	0.25	217.80	128.66	0.03
Moat	3199.13*	2-Year	25.06	3.07	6.14	4.14	6.14	0.000095	0.55	45.64	36.59	0.09
Moat	3199.13*	5-Year	33.40	3.07	6.51	4.26	6.51	0.000080	0.55	60.22	41.83	0.08
Moat	3199.13*	10-Year	38.93	3.07	6.88	4.33	6.88	0.000056	0.51	76.63	46.70	0.07
Moat	3199.13*	25-Year	46.28	3.07	7.88	4.42	7.88	0.000020	0.35	131.54	63.43	0.04
Moat	3199.13*	50-Year	53.58	3.07	9.08	4.50	9.08	0.000007	0.24	222.68	148.83	0.03
Moat	3010.26*	2-Year	25.06	3.04	6.12	4.14	6.13	0.000093	0.55	45.48	35.66	0.09
Moat	3010.26*	5-Year	33.40	3.04	6.49	4.26	6.50	0.000081	0.58	60.07	41.91	0.08
Moat	3010.28*	10-Year	38.93	3.04	6.87	4.34	6.87	0.000057	0.51	76.81	47.27	0.07
Moat	3010.26*	25-Year	46.28	3.04	7.88	4.43	7.88	0.000019	0.35	133.36	65.17	0.04
Moat	3010.28*	50-Year	53.58	3.04	9.08	4.51	9.08	0.000007	0.23	228.39	171.88	0.03
Moat	2821.4*	2-Year	25.06	3.02	6.10	4.13	6.11	0.000089	0.55	45.81	35.28	0.08
Moat	2821.4*	5-Year	33.40	3.02	6.48	4.26	6.48	0.000080	0.55	60.28	42.22	0.08
Moat	2821.4*	10-Year	38.93	3.02	6.86	4.34	6.86	0.000056	0.50	77.41	47.92	0.07
Moat	2821.4*	25-Year	46.28	3.02	7.87	4.43	7.87	0.000019	0.34	135.70	67.14	0.04
Moat	2821.4*	50-Year	53.58	3.02	9.08	4.51	9.08	0.000007	0.23	235.69	211.88	0.03
Moat	2632.53*	2-Year	25.06	2.99	6.09	4.12	6.09	0.000085	0.54	46.40	35.21	0.08
Moat	2632.53*	5-Year	33.40	2.99	6.46	4.25	6.47	0.000078	0.55	60.77	41.97	0.08
Moat	2632.53*	10-Year	38.93	2.99	6.85	4.33	6.85	0.000056	0.50	78.32	49.07	0.07
Moat	2632.53*	25-Year	46.28	2.99	7.87	4.42	7.87	0.000018	0.33	138.72	69.32	0.04
Moat	2632.53*	50-Year	53.58	2.99	9.08	4.50	9.08	0.000006	0.22	244.35	246.21	0.03
Moat	2443.66*	2-Year	25.06	2.97	6.07	4.09	6.08	0.000081	0.53	47.15	35.25	0.08
Moat	2443.66*	5-Year	33.40	2.97	6.45	4.23	6.45	0.000074	0.54	61.52	41.87	0.08
Moat	2443.66*	10-Year	38.93	2.97	6.84	4.31	6.84	0.000055	0.49	79.42	50.16	0.07
Moat	2443.66*	25-Year	46.28	2.97	7.86	4.40	7.87	0.000018	0.33	141.96	71.79	0.04
Moat	2443.66*	50-Year	53.58	2.97	9.08	4.49	9.08	0.000006	0.21	253.62	282.33	0.02
Moat	2254.8*	2-Year	25.06	2.94	6.06	4.04	6.06	0.000076	0.52	48.20	35.41	0.08
Moat	2254.8*	5-Year	33.40	2.94	6.43	4.19	6.44	0.000071	0.53	62.71	42.34	0.08
Moat	2254.8*	10-Year	38.93	2.94	6.83	4.27	6.83	0.000053	0.48	81.07	51.61	0.07
Moat	2254.8*	25-Year	46.28	2.94	7.86	4.38	7.86	0.000017	0.32	146.18	74.89	0.04
Moat	2254.8*	50-Year	53.58	2.94	9.08	4.46	9.08	0.000005	0.20	264.34	327.98	0.02
Moat	2065.93*	2-Year	25.06	2.92	6.04	3.99	6.05	0.000070	0.51	49.43	35.61	0.08
Moat	2065.93*	5-Year	33.40	2.92	6.42	4.15	6.43	0.000067	0.52	64.15	42.98	0.08
Moat	2065.93*	10-Year	38.93	2.92	6.82	4.24	6.82	0.000050	0.47	82.99	52.63	0.07
Moat	2065.93*	25-Year	46.28	2.92	7.86	4.34	7.86	0.000016	0.31	150.81	78.73	0.04
Moat	2065.93*	50-Year	53.58	2.92	9.08	4.43	9.08	0.000005	0.19	275.77	384.80	0.02
Moat	1877.06*	2-Year	25.06	2.89	6.03	3.91	6.03	0.000064	0.49	50.99	35.84	0.07
Moat	1877.06*	5-Year	33.40	2.89	6.41	4.07	6.41	0.000063	0.51	66.03	44.02	0.07
Moat	1877.08*	10-Year	38.93	2.89	6.81	4.17	6.81	0.000047	0.46	85.55	54.04	0.06
Moat	1877.06*	25-Year	46.28	2.89	7.86	4.28	7.86	0.000016	0.30	156.42	82.79	0.04
Moat	1877.06*	50-Year	53.58	2.89	9.07	4.39	9.07	0.000004	0.19	288.28	462.23	0.02
Moat	1688.2*	2-Year	25.06	2.87	6.02	3.85	6.02	0.000059	0.48	52.65	36.65	0.07
Moat	1688.2*	5-Year	33.40	2.87	6.40	4.00	6.40	0.000059	0.49	68.13	45.42	0.07
Moat	1688.2*	10-Year	38.93	2.87	6.80	4.08	6.80	0.000044	0.44	88.43	55.81	0.06
Moat	1688.2*	25-Year	46.28	2.87	7.85	4.22	7.85	0.000015	0.28	162.84	87.54	0.04
Moat	1688.2*	50-Year	53.58	2.87	9.07	4.32	9.07	0.000004	0.18	301.62	550.36	0.02
Moat	1499.33*	2-Year	25.06	2.84	6.01	3.78	6.01	0.000055	0.46	54.60	37.84	0.07
Moat	1499.33*	5-Year	33.40	2.84	6.39	3.92	6.39	0.000055	0.47	70.65	47.21	0.07
Moat	1499.33*	10-Year	38.93	2.84	6.79	4.02	6.79	0.000041	0.42	91.85	57.78	0.06
Moat	1499.33*	25-Year	46.28	2.84	7.85	4.11	7.85	0.000014	0.27	170.03	92.62	0.04
Moat	1499.33*	50-Year	53.58	2.84	9.07	4.19	9.07	0.000003	0.17	315.47	679.02	0.02
Moat	1310.46*	2-Year	25.06	2.82	6.00	3.71	6.00	0.000050	0.44	56.85	39.33	0.06
Moat	1310.46*	5-Year	33.40	2.82	6.38	3.85	6.38	0.000051	0.45	73.52	49.03	0.07
Moat	1310.46*	10-Year	38.93	2.82	6.78	3.91	6.79	0.000037	0.41	95.85	59.91	0.06
Moat	1310.46*	25-Year	46.28	2.82	7.85	4.00	7.85	0.000013	0.26	178.27	98.22	0.03
Moat	1310.46*	50-Year	53.58	2.82	9.07	4.08	9.07	0.000003	0.16	329.92	852.35	0.02
Moat	1121.6*	2-Year	25.06	2.79	5.99	3.63	5.99	0.000046	0.42	59.33	41.02	0.06
Moat	1121.6*	5-Year	33.40	2.79	6.37	3.74	6.37	0.000047	0.44	76.77	51.28	0.06
Moat	1121.6*	10-Year	38.93	2.79	6.78	3.80	6.78	0.000034	0.39	100.03	62.52	0.05
Moat	1121.6*	25-Year	46.28	2.79	7.85	3.88	7.85	0.000012	0.25	187.58	104.21	0.03

LTA-5B HYDRAULIC
MODEL RESULTS
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HEC-RAS Plan: Alt5B River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	1121.6*	50-Year	53.58	2.79	9.07	3.96	9.07	0.000003	0.16	345.26	1019.26	0.02
Moat	932.733*	2-Year	25.06	2.77	5.98	3.52	5.98	0.000042	0.40	62.11	42.86	0.06
Moat	932.733*	5-Year	33.40	2.77	6.36	3.62	6.36	0.000043	0.42	80.34	53.54	0.06
Moat	932.733*	10-Year	38.93	2.77	6.77	3.69	6.77	0.000031	0.37	104.75	65.74	0.05
Moat	932.733*	25-Year	46.28	2.77	7.84	3.77	7.84	0.000011	0.23	197.85	110.72	0.03
Moat	932.733*	50-Year	53.58	2.77	9.07	3.85	9.07	0.000002	0.15	360.96	1240.30	0.02
Moat	743.866*	2-Year	25.06	2.74	5.97	3.41	5.98	0.000038	0.38	65.37	45.24	0.06
Moat	743.866*	5-Year	33.40	2.74	6.35	3.52	6.36	0.000038	0.40	84.56	56.28	0.06
Moat	743.866*	10-Year	38.93	2.74	6.77	3.58	6.77	0.000028	0.35	110.40	69.79	0.05
Moat	743.866*	25-Year	46.28	2.74	7.84	3.65	7.84	0.000009	0.22	209.81	118.22	0.03
Moat	743.866*	50-Year	53.58	2.74	9.07	3.74	9.07	0.000002	0.14	378.16	1526.05	0.02
Moat	0555	2-Year	126.05	2.72	5.84	4.22	5.90	0.001056	2.00	63.05	43.83	0.29
Moat	0555	5-Year	175.60	2.72	6.20	4.58	6.27	0.001196	2.18	80.72	54.58	0.32
Moat	0555	10-Year	228.27	2.72	6.62	4.99	6.69	0.001074	2.14	106.64	68.49	0.30
Moat	0555	25-Year	338.22	2.72	7.77	5.50	7.81	0.000490	1.58	213.87	121.32	0.21
Moat	0555	50-Year	462.98	2.72	9.04	5.95	9.06	0.000162	1.19	390.62	1886.86	0.13
Moat	426.*	2-Year	126.05	2.83	5.59	4.66	5.70	0.001872	2.62	48.15	33.74	0.39
Moat	426.*	5-Year	175.60	2.83	5.91	5.02	6.05	0.001991	2.96	59.26	36.09	0.41
Moat	426.*	10-Year	228.27	2.83	6.35	5.25	6.49	0.001780	2.98	76.61	42.83	0.39
Moat	426.*	25-Year	338.22	2.83	7.63	5.63	7.72	0.000731	2.39	141.77	57.17	0.27
Moat	426.*	50-Year	462.98	2.83	8.96	6.00	9.02	0.000516	1.94	238.66	1800.62	0.22
Moat	0297	2-Year	126.05	2.93	4.56	4.56	5.07	0.014163	5.76	21.88	21.19	1.00
Moat	0297	5-Year	175.60	2.93	5.06	4.82	5.50	0.007814	5.33	32.97	22.61	0.78
Moat	0297	10-Year	228.27	2.93	5.78	5.08	6.11	0.003799	4.57	49.98	24.63	0.57
Moat	0297	25-Year	338.22	2.93	7.35	5.54	7.56	0.001444	3.67	92.09	29.60	0.37
Moat	0297	50-Year	462.98	2.93	8.96	5.99	8.97	0.000114	1.19	718.25	2391.98	0.11
Moat	0265	2-Year	126.05	0.28	4.65	1.89	4.71	0.000483	2.04	61.75	18.63	0.20
Moat	0265	5-Year	175.60	0.28	5.26	2.27	5.35	0.000586	2.38	73.71	20.19	0.22
Moat	0265	10-Year	228.27	0.28	5.89	2.62	6.00	0.000713	2.58	88.31	26.02	0.25
Moat	0265	25-Year	338.22	0.28	7.40	3.26	7.50	0.000554	2.49	135.97	36.93	0.23
Moat	0265	50-Year	462.98	0.28	8.89	3.88	8.96	0.000468	2.16	288.79	2341.72	0.21
Moat	264		Bridge									
Moat	0209	2-Year	126.05	1.78	4.17		4.33	0.002111	3.20	39.36	22.60	0.43
Moat	0209	5-Year	175.60	1.78	4.57		4.77	0.002217	3.61	48.61	23.99	0.45
Moat	0209	10-Year	228.27	1.78	4.90		5.15	0.002387	4.02	56.85	25.17	0.47
Moat	0209	25-Year	338.22	1.78	3.45	4.34	6.48	0.060258	13.96	24.22	19.02	2.18
Moat	0209	50-Year	462.98	1.78	3.71	4.82	7.56	0.065233	15.73	29.42	20.45	2.31
Moat	0190	2-Year	126.05	1.78	4.04	3.31	4.28	0.003329	3.89	32.38	18.83	0.52
Moat	0190	5-Year	175.60	1.78	4.40		4.71	0.003947	4.41	39.79	21.83	0.58
Moat	0190	10-Year	228.27	1.78	4.72	3.96	5.08	0.004426	4.86	47.01	24.41	0.62
Moat	0190	25-Year	338.22	1.78	5.24	4.56	5.72	0.005072	5.55	60.92	28.73	0.67
Moat	0190	50-Year	462.98	1.78	5.73	5.08	6.31	0.005397	6.09	76.06	32.79	0.70
Moat	0100	2-Year	126.05	1.78	3.19	3.19	3.71	0.013336	5.82	21.68	20.78	1.00
Moat	0100	5-Year	175.60	1.78	3.47	3.47	4.09	0.012808	6.30	27.87	22.95	1.01
Moat	0100	10-Year	228.27	1.78	3.73	3.73	4.43	0.012335	6.69	34.13	24.95	1.01
Moat	0100	25-Year	338.22	1.78	4.18	4.18	5.02	0.011638	7.37	45.89	27.66	1.01
Moat	0100	50-Year	462.98	1.78	4.59	4.59	5.59	0.011056	8.03	57.65	29.21	1.01

FLOOD LONG-TERM ALTERNATIVE 6 (FLOOD LTA-6)

LTA-6 HYDRAULIC
MODEL RESULTS
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HEC-RAS Plan: Alt6 River: Moat Reach: Moat

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	8415	2-Year	0.01	6.70	10.84	6.72	10.84	0.000000	0.00	422.96	1916.68	0.00
Moat	8415	5-Year	0.01	6.70	11.46	6.72	11.46	0.000000	0.00	493.60	1923.37	0.00
Moat	8415	10-Year	0.01	6.70	11.85	6.72	11.85	0.000000	0.00	3023.77	1937.79	0.00
Moat	8415	25-Year	0.01	6.70	12.32	6.72	12.32	0.000000	0.00	3938.57	1939.60	0.00
Moat	8415	50-Year	0.01	6.70	12.57	6.72	12.57	0.000000	0.00	4438.51	1940.37	0.00
Moat	8236.5*	2-Year	0.01	6.70	10.84	6.72	10.84	0.000000	0.00	422.96	1916.68	0.00
Moat	8236.5*	5-Year	0.01	6.70	11.46	6.72	11.46	0.000000	0.00	493.60	1923.37	0.00
Moat	8236.5*	10-Year	0.01	6.70	11.85	6.72	11.85	0.000000	0.00	3023.77	1937.79	0.00
Moat	8236.5*	25-Year	0.01	6.70	12.32	6.72	12.32	0.000000	0.00	3938.57	1939.60	0.00
Moat	8236.5*	50-Year	0.01	6.70	12.57	6.72	12.57	0.000000	0.00	4438.51	1940.37	0.00
Moat	8058	2-Year	0.01	6.70	10.84	6.72	10.84	0.000000	0.00	422.96	1916.68	0.00
Moat	8058	5-Year	0.01	6.70	11.46	6.72	11.46	0.000000	0.00	493.60	1923.37	0.00
Moat	8058	10-Year	0.01	6.70	11.85	6.72	11.85	0.000000	0.00	3023.77	1937.79	0.00
Moat	8058	25-Year	0.01	6.70	12.32	6.72	12.32	0.000000	0.00	3938.57	1939.60	0.00
Moat	8058	50-Year	0.01	6.70	12.57	6.72	12.57	0.000000	0.00	4438.51	1940.37	0.00
Moat	7920.*	2-Year	0.01	6.39	10.84	6.41	10.84	0.000000	0.00	421.41	1898.42	0.00
Moat	7920.*	5-Year	0.01	6.39	11.46	6.41	11.46	0.000000	0.00	524.35	1932.10	0.00
Moat	7920.*	10-Year	0.01	6.39	11.85	6.41	11.85	0.000000	0.00	3003.09	1981.64	0.00
Moat	7920.*	25-Year	0.01	6.39	12.32	6.41	12.32	0.000000	0.00	3947.54	2015.04	0.00
Moat	7920.*	50-Year	0.01	6.39	12.57	6.41	12.57	0.000000	0.00	4468.06	2024.64	0.00
Moat	7782	2-Year	150.11	6.09	10.84	7.79	10.84	0.000005	0.26	713.31	2069.54	0.03
Moat	7782	5-Year	240.74	6.09	11.46	8.50	11.46	0.000005	0.30	963.70	2101.91	0.03
Moat	7782	10-Year	300.86	6.09	11.84	8.62	11.85	0.000001	0.15	3443.03	2131.26	0.02
Moat	7782	25-Year	364.30	6.09	12.32	8.71	12.32	0.000001	0.14	4452.93	2148.71	0.01
Moat	7782	50-Year	459.58	6.09	12.57	8.83	12.57	0.000001	0.15	5007.79	2158.02	0.01
Moat	7765	2-Year	150.11	6.06	10.84	7.76	10.84	0.000005	0.25	720.97	2412.58	0.03
Moat	7765	5-Year	240.74	6.06	11.46	8.65	11.46	0.000001	0.15	2963.47	2449.16	0.02
Moat	7765	10-Year	300.86	6.06	11.84	8.75	11.85	0.000001	0.13	3916.51	2463.28	0.01
Moat	7765	25-Year	364.30	6.06	12.32	8.83	12.32	0.000001	0.12	5082.83	2479.68	0.01
Moat	7765	50-Year	459.58	6.06	12.57	8.95	12.57	0.000001	0.13	5722.91	2488.43	0.01
Moat	7764		Culvert									
Moat	7754	2-Year	150.11	6.03	10.83	7.73	10.83	0.000004	0.15	1535.25	2436.94	0.02
Moat	7754	5-Year	240.74	6.03	11.44	8.55	11.44	0.000002	0.11	3040.75	2458.68	0.01
Moat	7754	10-Year	300.86	6.03	11.84	8.73	11.84	0.000001	0.10	4033.47	2472.87	0.01
Moat	7754	25-Year	364.30	6.03	12.31	8.80	12.31	0.000001	0.08	5188.28	2488.56	0.01
Moat	7754	50-Year	459.58	6.03	12.57	8.89	12.57	0.000001	0.09	5843.56	2497.20	0.01
Moat	7689	2-Year	150.11	5.89	10.83	7.59	10.83	0.000004	0.18	942.04	2455.50	0.02
Moat	7689	5-Year	240.74	5.89	11.44	8.15	11.44	0.000001	0.11	3176.38	2487.44	0.01
Moat	7689	10-Year	300.86	5.89	11.84	8.24	11.84	0.000001	0.10	4180.51	2500.38	0.01
Moat	7689	25-Year	364.30	5.89	12.31	8.33	12.31	0.000001	0.09	5347.83	2514.60	0.01
Moat	7689	50-Year	459.58	5.89	12.57	8.44	12.57	0.000001	0.10	6009.84	2522.43	0.01
Moat	7687	2-Year	150.11	5.88	10.83	8.11	10.83	0.000004	0.18	924.57	2455.52	0.02
Moat	7687	5-Year	240.74	5.88	11.44	8.28	11.44	0.000001	0.11	3158.94	2487.50	0.01
Moat	7687	10-Year	300.86	5.88	11.84	8.36	11.84	0.000001	0.10	4163.10	2500.47	0.01
Moat	7687	25-Year	364.30	5.88	12.31	8.45	12.31	0.000001	0.09	5330.47	2514.70	0.01
Moat	7687	50-Year	459.58	5.88	12.57	8.57	12.57	0.000001	0.09	5992.51	2522.53	0.01
Moat	7650	2-Year	150.11	5.79	10.83	7.48	10.83	0.000004	0.17	960.37	2461.01	0.02
Moat	7650	5-Year	240.74	5.79	11.44	8.29	11.44	0.000005	0.20	1251.02	2490.87	0.02
Moat	7650	10-Year	300.86	5.79	11.84	8.45	11.84	0.000001	0.09	4202.20	2507.83	0.01
Moat	7650	25-Year	364.30	5.79	12.31	8.57	12.31	0.000001	0.08	5373.16	2522.86	0.01
Moat	7650	50-Year	459.58	5.79	12.57	8.74	12.57	0.000001	0.09	6037.42	2531.28	0.01
Moat	7534.*	2-Year	150.11	5.72	10.82	7.46	10.83	0.000011	0.33	545.73	2297.03	0.04
Moat	7534.*	5-Year	240.74	5.72	11.44	7.91	11.44	0.000012	0.40	740.30	2343.56	0.04
Moat	7534.*	10-Year	300.86	5.72	11.84	8.15	11.84	0.000001	0.14	3633.78	2365.39	0.01
Moat	7534.*	25-Year	364.30	5.72	12.31	8.34	12.31	0.000001	0.13	4738.98	2382.12	0.01
Moat	7534.*	50-Year	459.58	5.72	12.57	8.59	12.57	0.000001	0.14	5366.33	2391.46	0.01
Moat	7418	2-Year	150.11	5.66	10.82	7.35	10.82	0.000028	0.73	292.04	2154.23	0.07
Moat	7418	5-Year	240.74	5.66	11.43	7.98	11.44	0.000038	0.87	393.84	2185.03	0.08
Moat	7418	10-Year	300.86	5.66	11.84	8.30	11.84	0.000002	0.21	3224.96	2209.13	0.02
Moat	7418	25-Year	364.30	5.66	12.31	8.57	12.31	0.000001	0.17	4258.26	2228.51	0.01
Moat	7418	50-Year	459.58	5.66	12.57	9.02	12.57	0.000001	0.18	4845.39	2239.20	0.02
Moat	7220	2-Year	150.11	5.56	10.81	7.26	10.82	0.000027	0.73	293.86	2154.36	0.07
Moat	7220	5-Year	240.74	5.56	11.42	7.87	11.43	0.000037	0.87	395.15	2185.59	0.08

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HEC-RAS Plan: Alt6 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	7220	10-Year	300.86	5.56	11.84	8.19	11.84	0.000002	0.21	3227.65	2210.05	0.02
Moat	7220	25-Year	364.30	5.56	12.31	8.47	12.31	0.000001	0.17	4261.70	2229.38	0.01
Moat	7220	50-Year	459.58	5.56	12.57	8.81	12.57	0.000001	0.19	4849.03	2240.07	0.02
Moat	7048.5*	2-Year	150.11	5.47	10.81	7.17	10.81	0.000025	0.78	279.89	2163.07	0.08
Moat	7048.5*	5-Year	240.74	5.47	11.41	7.75	11.42	0.000031	0.95	387.59	2198.48	0.09
Moat	7048.5*	10-Year	300.86	5.47	11.84	8.09	11.84	0.000002	0.25	3226.90	2224.80	0.02
Moat	7048.5*	25-Year	364.30	5.47	12.31	8.38	12.31	0.000001	0.21	4268.89	2247.28	0.02
Moat	7048.5*	50-Year	459.58	5.47	12.57	8.77	12.57	0.000001	0.22	4861.12	2259.65	0.02
Moat	6877.*	2-Year	150.11	5.38	10.80	7.08	10.81	0.000029	0.82	259.18	2168.44	0.08
Moat	6877.*	5-Year	240.74	5.38	11.42	7.63	11.42	0.000003	0.31	2275.34	2213.42	0.03
Moat	6877.*	10-Year	300.86	5.38	11.84	7.98	11.84	0.000002	0.25	3216.73	2237.31	0.02
Moat	6877.*	25-Year	364.30	5.38	12.31	8.29	12.31	0.000001	0.21	4265.60	2263.14	0.02
Moat	6877.*	50-Year	459.58	5.38	12.57	8.66	12.57	0.000001	0.22	4862.24	2277.48	0.02
Moat	6705.5*	2-Year	150.11	5.28	10.79	6.98	10.80	0.000035	0.86	232.12	2170.73	0.09
Moat	6705.5*	5-Year	240.74	5.28	11.42	7.53	11.42	0.000003	0.30	2251.68	2220.63	0.03
Moat	6705.5*	10-Year	300.86	5.28	11.84	7.88	11.84	0.000002	0.24	3197.31	2247.50	0.02
Moat	6705.5*	25-Year	364.30	5.28	12.31	8.20	12.31	0.000001	0.20	4252.13	2277.25	0.02
Moat	6705.5*	50-Year	459.58	5.28	12.57	8.57	12.57	0.000001	0.22	4852.73	2293.80	0.02
Moat	6534	2-Year	151.40	5.19	10.78	6.89	10.79	0.000057	0.90	200.72	2163.42	0.09
Moat	6534	5-Year	242.55	5.19	11.42	7.45	11.42	0.000004	0.26	2220.98	2224.92	0.02
Moat	6534	10-Year	302.99	5.19	11.84	7.80	11.84	0.000002	0.21	3169.74	2255.04	0.02
Moat	6534	25-Year	366.84	5.19	12.31	8.12	12.31	0.000001	0.17	4229.19	2288.54	0.01
Moat	6534	50-Year	462.72	5.19	12.57	8.49	12.57	0.000001	0.18	4833.03	2307.33	0.01
Moat	6405.5*	2-Year	151.40	5.11	10.77	7.12	10.78	0.000100	1.12	137.07	2073.84	0.13
Moat	6405.5*	5-Year	242.55	5.11	11.39	7.85	11.41	0.000104	1.34	207.83	2144.49	0.14
Moat	6405.5*	10-Year	302.99	5.11	11.84	8.22	11.84	0.000002	0.22	3026.50	2183.94	0.02
Moat	6405.5*	25-Year	366.84	5.11	12.31	8.60	12.31	0.000001	0.18	4051.42	2210.23	0.02
Moat	6405.5*	50-Year	462:72	5.11	12.57	9.01	12.57	0.000001	0.20	4634.12	2224.82	0.02
Moat	6277	2-Year	151.40	5.04	10.74	6.96	10.77	0.000073	1.51	100.21	2044.91	0.18
Moat	6277	5-Year	242.55	5.04	11.35	7.67	11.40	0.000116	1.76	139.89	2093.49	0.22
Moat	6277	10-Year	302.99	5.04	11.79	8.22	11.84	0.000121	1.77	184.63	2118.94	0.20
Moat	6277	25-Year	366.84	5.04	12.31	8.83	12.31	0.000001	0.19	3934.25	2152.02	0.02
Moat	6277	50-Year	462.72	5.04	12.57	9.62	12.57	0.000001	0.20	4501.11	2162.50	0.02
Moat	6276		Bridge									
Moat	6271	2-Year	278.46	5.01	10.70	7.90	10.83	0.000256	2.82	98.76	2044.33	0.33
Moat	6271	5-Year	383.63	5.01	11.32	9.17	11.44	0.000301	2.82	137.35	2089.04	0.35
Moat	6271	10-Year	454.27	5.01	11.77	9.57	11.88	0.000279	2.67	182.35	2117.87	0.31
Moat	6271	25-Year	548.49	5.01	12.31	9.91	12.31	0.000003	0.29	3934.29	2152.02	0.03
Moat	6271	50-Year	642.52	5.01	12.57	10.19	12.57	0.000003	0.28	4501.13	2162.50	0.03
Moat	6257	2-Year	395.31	5.04	10.67	8.02	10.82	0.000551	3.03	130.40	2043.34	0.30
Moat	6257	5-Year	540.87	5.04	11.25	8.58	11.42	0.001225	3.29	164.64	2078.76	0.39
Moat	6257	10-Year	638.48	5.04	11.70	8.90	11.86	0.001010	3.17	207.52	2114.24	0.36
Moat	6257	25-Year	768.61	5.04	12.31	9.30	12.31	0.000006	0.29	3965.87	2152.01	0.03
Moat	6257	50-Year	898.43	5.04	12.57	9.68	12.57	0.000006	0.28	4532.65	2162.49	0.03
Moat	6090.33*	2-Year	395.31	4.95	10.64	7.91	10.75	0.000230	2.71	145.86	2608.12	0.27
Moat	6090.33*	5-Year	540.87	4.95	11.17	8.43	11.33	0.000301	3.14	172.46	2617.81	0.30
Moat	6090.33*	10-Year	638.48	4.95	11.59	8.74	11.75	0.000421	3.26	195.64	2633.83	0.33
Moat	6090.33*	25-Year	768.61	4.95	12.12	9.12	12.29	0.000578	3.27	234.81	2663.39	0.34
Moat	6090.33*	50-Year	898.43	4.95	12.57	9.47	12.57	0.000004	0.25	5674.22	2678.43	0.03
Moat	5923.66*	2-Year	395.31	4.85	10.61	7.82	10.71	0.000257	2.53	156.32	3172.54	0.25
Moat	5923.66*	5-Year	540.87	4.85	11.14	8.34	11.27	0.000314	2.94	184.14	3193.27	0.28
Moat	5923.66*	10-Year	638.48	4.85	11.54	8.64	11.69	0.000324	3.09	206.82	3199.04	0.29
Moat	5923.66*	25-Year	768.61	4.85	12.05	9.00	12.21	0.000366	3.22	238.43	3211.90	0.30
Moat	5923.66*	50-Year	898.43	4.85	12.57	9.33	12.57	0.000002	0.24	6864.56	3229.02	0.02
Moat	5757	2-Year	395.31	4.76	10.56	7.77	10.65	0.000386	2.45	161.19	3752.36	0.25
Moat	5757	5-Year	540.87	4.76	11.08	8.29	11.20	0.000490	2.86	189.31	3759.52	0.28
Moat	5757	10-Year	638.48	4.76	11.48	8.58	11.62	0.000515	3.00	212.59	3765.04	0.28
Moat	5757	25-Year	768.61	4.76	11.98	8.93	12.13	0.000531	3.15	244.01	3772.01	0.29
Moat	5757	50-Year	898.43	4.76	12.57	9.24	12.57	0.000002	0.18	8061.56	3786.49	0.02
Moat	5756	2-Year	395.31	4.76	10.52	7.74	10.65	0.000536	2.83	139.66	3747.60	0.29
Moat	5756	5-Year	540.87	4.76	11.03	8.30	11.20	0.000700	3.27	165.22	3755.85	0.33
Moat	5756	10-Year	638.48	4.76	11.43	8.62	11.61	0.000737	3.41	187.25	3762.30	0.33
Moat	5756	25-Year	768.61	4.76	11.94	9.08	12.13	0.000756	3.53	217.78	3770.49	0.34

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HEC-RAS Plan: Alt6 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	5756	50-Year	898.43	4.76	12.57	9.48	12.57	0.000002	0.17	8037.98	3786.49	0.02
Moat	5720	2-Year	395.31	4.74	10.51	7.71	10.63	0.000501	2.77	142.46	3747.60	0.28
Moat	5720	5-Year	540.87	4.74	11.01	8.34	11.17	0.000727	3.21	168.65	3759.36	0.33
Moat	5720	10-Year	638.48	4.74	11.41	8.69	11.58	0.000795	3.31	192.69	3768.67	0.34
Moat	5720	25-Year	768.61	4.74	11.92	9.07	12.10	0.000823	3.38	227.69	3780.58	0.34
Moat	5720	50-Year	898.43	4.74	12.57	9.41	12.57	0.000002	0.16	8056.41	3798.51	0.02
Moat	5719	2-Year	395.31	4.74	10.51	7.71	10.63	0.000501	2.78	142.43	3747.59	0.28
Moat	5719	5-Year	540.87	4.74	11.01	8.34	11.17	0.000727	3.21	168.60	3759.34	0.33
Moat	5719	10-Year	638.48	4.74	11.41	8.69	11.58	0.000795	3.31	192.64	3768.65	0.34
Moat	5719	25-Year	768.61	4.74	11.92	9.07	12.10	0.000823	3.38	227.63	3780.56	0.34
Moat	5719	50-Year	898.43	4.74	12.37	9.41	12.55	0.000868	3.42	262.80	3792.97	0.34
Moat	5544.5*	2-Year	395.31	4.65	10.43	7.63	10.56	0.000322	2.87	137.79	42.56	0.28
Moat	5544.5*	5-Year	540.87	4.65	10.88	8.23	11.06	0.000504	3.42	158.30	3751.02	0.33
Moat	5544.5*	10-Year	638.48	4.65	11.26	8.57	11.46	0.000610	3.59	177.82	3759.52	0.35
Moat	5544.5*	25-Year	768.61	4.65	11.75	8.97	11.96	0.000693	3.71	207.29	3770.72	0.36
Moat	5544.5*	50-Year	898.43	4.65	12.18	9.32	12.41	0.000739	3.79	237.08	3780.23	0.37
Moat	5370.*	2-Year	395.31	4.55	10.37	7.53	10.50	0.000309	2.93	134.89	40.05	0.28
Moat	5370.*	5-Year	540.87	4.55	10.78	8.11	10.98	0.000440	3.56	152.12	3744.45	0.33
Moat	5370.*	10-Year	638.48	4.55	11.13	8.45	11.35	0.000564	3.81	167.61	3751.46	0.36
Moat	5370.*	25-Year	768.61	4.55	11.59	8.86	11.84	0.000705	4.01	191.54	3761.65	0.38
Moat	5370.*	50-Year	898.43	4.55	12.00	9.23	12.27	0.000801	4.15	216.30	3770.87	0.40
Moat	5195.5*	2-Year	395.31	4.46	10.31	7.44	10.45	0.000298	2.98	132.45	37.93	0.28
Moat	5195.5*	5-Year	540.87	4.46	10.69	8.01	10.90	0.000436	3.67	147.41	3741.19	0.34
Moat	5195.5*	10-Year	638.48	4.46	11.01	8.34	11.26	0.000498	3.98	160.48	3744.80	0.36
Moat	5195.5*	25-Year	768.61	4.46	11.43	8.76	11.71	0.000660	4.29	179.10	3752.94	0.39
Moat	5195.5*	50-Year	898.43	4.46	11.80	9.13	12.12	0.000816	4.53	198.46	3761.14	0.42
Moat	5021	2-Year	473.06	4.37	10.15	7.65	10.36	0.000638	3.74	126.64	35.53	0.35
Moat	5021	5-Year	650.09	4.37	10.42	8.28	10.77	0.001019	4.76	136.51	36.99	0.44
Moat	5021	10-Year	768.87	4.37	10.67	8.66	11.10	0.001225	5.27	146.01	3739.36	0.48
Moat	5021	25-Year	927.54	4.37	10.98	9.12	11.51	0.001486	5.87	158.10	3742.59	0.52
Moat	5021	50-Year	1085.94	4.37	11.23	9.53	11.88	0.001759	6.45	168.44	3745.24	0.56
Moat	4850.2*	2-Year	473.06	4.28	10.08	7.56	10.28	0.000335	3.66	129.16	36.44	0.34
Moat	4850.2*	5-Year	650.09	4.28	10.30	8.20	10.65	0.000536	4.73	137.53	38.25	0.44
Moat	4850.2*	10-Year	768.87	4.28	10.52	8.58	10.95	0.000652	5.25	146.40	3738.75	0.49
Moat	4850.2*	25-Year	927.54	4.28	10.80	9.02	11.33	0.000795	5.86	158.32	3746.76	0.55
Moat	4850.2*	50-Year	1085.94	4.28	11.02	9.42	11.66	0.000941	6.44	168.62	3750.97	0.61
Moat	4679.4*	2-Year	473.06	4.18	10.04	7.48	10.23	0.000275	3.49	135.72	43.03	0.35
Moat	4679.4*	5-Year	650.09	4.18	10.24	8.10	10.55	0.000445	4.49	144.71	45.39	0.44
Moat	4679.4*	10-Year	768.87	4.18	10.46	8.47	10.84	0.000528	4.97	154.71	47.88	0.49
Moat	4679.4*	25-Year	927.54	4.18	10.72	8.90	11.19	0.000629	5.53	167.74	3750.60	0.54
Moat	4679.4*	50-Year	1085.94	4.18	10.93	9.34	11.50	0.000737	6.08	178.53	3754.81	0.59
Moat	4508.6*	2-Year	473.06	4.09	10.01	7.38	10.18	0.000213	3.25	145.53	46.33	0.32
Moat	4508.6*	5-Year	650.09	4.09	10.20	8.00	10.48	0.000345	4.21	154.37	48.09	0.41
Moat	4508.6*	10-Year	768.87	4.09	10.41	8.40	10.75	0.000409	4.67	164.49	50.03	0.45
Moat	4508.6*	25-Year	927.54	4.09	10.66	8.86	11.08	0.000498	5.23	177.38	3751.96	0.50
Moat	4508.6*	50-Year	1085.94	4.09	10.85	9.25	11.37	0.000615	5.79	187.50	3755.02	0.55
Moat	4337.8*	2-Year	473.06	3.99	9.98	7.29	10.14	0.000237	3.15	149.96	45.31	0.31
Moat	4337.8*	5-Year	650.09	3.99	10.14	7.92	10.41	0.000420	4.13	157.42	47.14	0.40
Moat	4337.8*	10-Year	768.87	3.99	10.33	8.27	10.66	0.000541	4.62	166.57	49.28	0.44
Moat	4337.8*	25-Year	927.54	3.99	10.56	8.69	10.98	0.000710	5.21	178.07	3751.54	0.50
Moat	4337.8*	50-Year	1085.94	3.99	10.71	9.06	11.24	0.000904	5.83	186.20	3754.18	0.55
Moat	4167	2-Year	473.06	3.90	9.92	7.19	10.07	0.000652	3.17	165.64	124.56	0.32
Moat	4167	5-Year	650.09	3.90	10.04	7.81	10.30	0.001055	4.11	181.78	132.75	0.41
Moat	4167	10-Year	768.87	3.90	10.23	8.17	10.52	0.001164	4.45	206.99	135.09	0.43
Moat	4167	25-Year	927.54	3.90	10.47	8.60	10.79	0.001265	4.80	239.28	138.05	0.45
Moat	4167	50-Year	1085.94	3.90	10.63	9.07	11.01	0.001431	5.22	261.69	3840.86	0.48
Moat	4047.5*	2-Year	473.06	3.84	9.92	7.14	10.02	0.000175	2.63	233.53	138.53	0.25
Moat	4047.5*	5-Year	650.09	3.84	10.05	7.73	10.21	0.000285	3.43	250.94	140.84	0.32
Moat	4047.5*	10-Year	768.87	3.84	10.23	8.13	10.43	0.000325	3.77	277.17	144.26	0.34
Moat	4047.5*	25-Year	927.54	3.84	10.46	8.56	10.69	0.000369	4.16	310.39	147.60	0.37
Moat	4047.5*	50-Year	1085.94	3.84	10.61	9.05	10.89	0.000433	4.60	332.82	3849.98	0.40
Moat	3928	2-Year	473.06	3.77	9.93	7.12	9.98	0.000193	2.04	307.51	148.77	0.18
Moat	3928	5-Year	650.09	3.77	10.06	7.65	10.15	0.000316	2.65	327.60	152.38	0.23

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HEC-RAS Plan: Alt6 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	3928	10-Year	768.87	3.77	10.25	7.95	10.36	0.000359	2.89	356.78	154.81	0.25
Moat	3928	25-Year	927.54	3.77	10.49	8.42	10.61	0.000409	3.17	393.52	3857.93	0.27
Moat	3928	50-Year	1085.94	3.77	10.65	8.71	10.79	0.000478	3.49	418.93	3860.77	0.29
Moat	3782.*	2-Year	473.06	3.69	9.89	6.99	9.96	0.000102	2.21	296.53	156.54	0.20
Moat	3782.*	5-Year	650.09	3.69	10.00	7.56	10.12	0.000172	2.92	313.01	158.69	0.26
Moat	3782.*	10-Year	768.87	3.69	10.17	7.87	10.31	0.000199	3.23	341.19	162.31	0.29
Moat	3782.*	25-Year	927.54	3.69	10.39	8.23	10.56	0.000233	3.60	376.83	166.77	0.31
Moat	3782.*	50-Year	1085.94	3.69	10.53	8.63	10.73	0.000280	4.02	399.32	3866.20	0.34
Moat	3636	2-Year	473.06	3.61	9.88	6.89	9.94	0.000235	2.11	287.31	166.67	0.20
Moat	3636	5-Year	650.09	3.61	9.97	7.42	10.08	0.000399	2.79	303.08	172.67	0.25
Moat	3636	10-Year	768.87	3.61	10.15	7.76	10.27	0.000453	3.04	333.71	176.36	0.27
Moat	3636	25-Year	927.54	3.61	10.36	8.13	10.50	0.000512	3.32	372.42	179.02	0.29
Moat	3636	50-Year	1085.94	3.61	10.50	8.46	10.66	0.000605	3.67	396.17	3880.76	0.32
Moat	3512.*	2-Year	473.06	3.55	9.87	6.76	9.91	0.000161	1.63	333.92	175.87	0.17
Moat	3512.*	5-Year	650.09	3.55	9.96	7.20	10.02	0.000272	2.16	349.41	180.12	0.22
Moat	3512.*	10-Year	768.87	3.55	10.13	7.45	10.21	0.000309	2.38	381.04	188.49	0.23
Moat	3512.*	25-Year	927.54	3.55	10.34	7.76	10.44	0.000351	2.64	422.36	198.90	0.25
Moat	3512.*	50-Year	1085.94	3.55	10.47	8.08	10.59	0.000418	2.94	447.87	205.05	0.28
Moat	3388	2-Year	513.05	3.48	9.85		9.89	0.000083	1.64	336.00	202.79	0.18
Moat	3388	5-Year	709.42	3.48	9.93		10.00	0.000148	2.20	349.95	206.78	0.24
Moat	3388	10-Year	841.61	3.48	10.09		10.18	0.000179	2.43	383.82	214.88	0.26
Moat	3388	25-Year	1018.25	3.48	10.29		10.40	0.000218	2.69	428.73	223.92	0.28
Moat	3388	50-Year	1195.20	3.48	10.41		10.55	0.000271	3.02	454.66	228.97	0.31
Moat	3199.13*	2-Year	513.05	3.38	9.84	6.62	9.87	0.000195	1.46	399.75	240.53	0.16
Moat	3199.13*	5-Year	709.42	3.38	9.90	7.07	9.95	0.000341	1.96	414.45	245.24	0.22
Moat	3199.13*	10-Year	841.61	3.38	10.06	7.34	10.12	0.000379	2.15	454.98	255.63	0.23
Moat	3199.13*	25-Year	1018.25	3.38	10.28	7.67	10.34	0.000419	2.36	507.83	268.57	0.24
Moat	3199.13*	50-Year	1195.20	3.38	10.37	7.95	10.47	0.000500	2.64	537.21	275.51	0.27
Moat	3010.26*	2-Year	513.05	3.27	9.80	6.54	9.83	0.000178	1.40	432.14	281.56	0.16
Moat	3010.26*	5-Year	709.42	3.27	9.84	7.01	9.89	0.000323	1.90	441.76	284.51	0.21
Moat	3010.26*	10-Year	841.61	3.27	9.99	7.28	10.05	0.000357	2.07	487.19	298.02	0.22
Moat	3010.26*	25-Year	1018.25	3.27	10.19	7.60	10.26	0.000393	2.27	547.21	315.00	0.24
Moat	3010.26*	50-Year	1195.20	3.27	10.28	7.89	10.37	0.000475	2.55	577.03	323.10	0.26
Moat	2821.4*	2-Year	513.05	3.17	9.77	6.47	9.80	0.000161	1.33	468.77	325.48	0.15
Moat	2821.4*	5-Year	709.42	3.17	9.78	6.94	9.83	0.000303	1.83	471.28	326.36	0.20
Moat	2821.4*	10-Year	841.61	3.17	9.93	7.22	9.99	0.000335	2.00	521.67	343.50	0.22
Moat	2821.4*	25-Year	1018.25	3.17	10.12	7.54	10.19	0.000366	2.18	589.23	365.22	0.23
Moat	2821.4*	50-Year	1195.20	3.17	10.20	7.82	10.28	0.000449	2.46	618.26	374.17	0.25
Moat	2632.53*	2-Year	513.05	3.07	9.75	6.40	9.77	0.000144	1.26	509.85	376.75	0.14
Moat	2632.53*	5-Year	709.42	3.07	9.73	6.88	9.77	0.000285	1.76	503.00	374.07	0.20
Moat	2632.53*	10-Year	841.61	3.07	9.87	7.16	9.92	0.000314	1.92	558.94	395.40	0.21
Moat	2632.53*	25-Year	1018.25	3.07	10.06	7.48	10.12	0.000341	2.09	635.11	422.71	0.22
Moat	2632.53*	50-Year	1195.20	3.07	10.12	7.76	10.20	0.000426	2.37	662.10	431.97	0.25
Moat	2443.66*	2-Year	513.05	2.97	9.72	6.31	9.74	0.000129	1.20	555.94	435.00	0.13
Moat	2443.66*	5-Year	709.42	2.97	9.68	6.81	9.72	0.000266	1.70	537.08	426.83	0.19
Moat	2443.66*	10-Year	841.61	2.97	9.82	7.09	9.87	0.000293	1.85	599.01	453.12	0.20
Moat	2443.66*	25-Year	1018.25	2.97	10.00	7.42	10.05	0.000316	2.00	684.77	487.19	0.21
Moat	2443.66*	50-Year	1195.20	2.97	10.05	7.70	10.12	0.000403	2.29	708.01	496.03	0.24
Moat	2254.8*	2-Year	513.05	2.86	9.70	6.20	9.72	0.000113	1.13	611.81	505.78	0.12
Moat	2254.8*	5-Year	709.42	2.86	9.63	6.74	9.67	0.000245	1.63	577.78	489.80	0.18
Moat	2254.8*	10-Year	841.61	2.86	9.77	7.02	9.81	0.000269	1.77	646.88	521.74	0.19
Moat	2254.8*	25-Year	1018.25	2.86	9.95	7.34	10.00	0.000288	1.91	744.22	563.68	0.20
Moat	2254.8*	50-Year	1195.20	2.86	9.98	7.64	10.04	0.000376	2.19	761.89	570.97	0.23
Moat	2065.93*	2-Year	513.05	2.76	9.68	6.11	9.70	0.000098	1.05	679.02	591.82	0.12
Moat	2065.93*	5-Year	709.42	2.76	9.55	6.66	9.62	0.000300	2.02	351.97	552.48	0.21
Moat	2065.93*	10-Year	841.61	2.76	9.73	6.96	9.76	0.000244	1.68	703.69	604.08	0.18
Moat	2065.93*	25-Year	1018.25	2.76	9.90	7.28	9.94	0.000258	1.80	815.25	651.80	0.19
Moat	2065.93*	50-Year	1195.20	2.76	9.92	7.57	9.97	0.000346	2.09	825.08	655.26	0.22
Moat	1877.06*	2-Year	513.05	2.66	9.67	6.02	9.68	0.000084	0.98	763.06	698.45	0.11
Moat	1877.06*	5-Year	709.42	2.66	9.50	6.59	9.56	0.000291	1.97	360.70	636.21	0.21
Moat	1877.06*	10-Year	841.61	2.66	9.62	6.88	9.70	0.000356	2.23	376.79	685.54	0.23
Moat	1877.06*	25-Year	1018.25	2.66	9.86	7.21	9.89	0.000226	1.69	902.68	751.16	0.18
Moat	1877.06*	50-Year	1195.20	2.66	9.86	7.50	9.91	0.000312	1.98	902.17	750.97	0.21

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HEC-RAS Plan: Alt6 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	1688.2*	2-Year	513.05	2.56	9.63	5.92	9.66	0.000119	1.30	394.72	809.88	0.13
Moat	1688.2*	5-Year	709.42	2.56	9.45	6.52	9.50	0.000283	1.92	369.82	743.19	0.20
Moat	1688.2*	10-Year	841.61	2.56	9.56	6.81	9.63	0.000349	2.19	384.83	783.72	0.23
Moat	1688.2*	25-Year	1018.25	2.56	9.83	7.15	9.85	0.000193	1.56	1012.06	872.17	0.16
Moat	1688.2*	50-Year	1195.20	2.56	9.81	7.43	9.85	0.000274	1.85	998.48	867.11	0.19
Moat	1499.33*	2-Year	513.05	2.45	9.61	5.83	9.64	0.000112	1.25	409.17	942.98	0.13
Moat	1499.33*	5-Year	709.42	2.45	9.40	6.44	9.45	0.000273	1.87	379.37	852.20	0.20
Moat	1499.33*	10-Year	841.61	2.45	9.50	6.74	9.57	0.000342	2.14	393.14	894.18	0.22
Moat	1499.33*	25-Year	1018.25	2.45	9.80	7.08	9.82	0.000159	1.42	1152.44	1015.46	0.15
Moat	1499.33*	50-Year	1195.20	2.45	9.64	7.36	9.77	0.000591	2.90	412.18	952.11	0.29
Moat	1310.46*	2-Year	513.05	2.35	9.59	5.74	9.62	0.000104	1.21	423.74	1105.70	0.12
Moat	1310.46*	5-Year	709.42	2.35	9.35	6.36	9.40	0.000265	1.82	388.81	984.57	0.19
Moat	1310.46*	10-Year	841.61	2.35	9.43	6.66	9.50	0.000336	2.10	401.16	1027.46	0.22
Moat	1310.46*	25-Year	1018.25	2.35	9.68	7.00	9.77	0.000373	2.33	436.33	1149.25	0.23
Moat	1310.46*	50-Year	1195.20	2.35	9.52	7.29	9.65	0.000614	2.89	413.58	1070.53	0.30
Moat	1121.6*	2-Year	513.05	2.25	9.58	5.65	9.60	0.000099	1.17	438.23	1309.15	0.12
Moat	1121.6*	5-Year	709.42	2.25	9.30	6.28	9.35	0.000259	1.78	397.94	1148.47	0.19
Moat	1121.6*	10-Year	841.61	2.25	9.37	6.59	9.44	0.000334	2.06	408.68	1191.29	0.22
Moat	1121.6*	25-Year	1018.25	2.25	9.62	6.93	9.70	0.000373	2.29	443.88	1331.59	0.23
Moat	1121.6*	50-Year	1195.20	2.25	9.40	7.23	9.53	0.000651	2.89	412.97	1208.53	0.30
Moat	932.733*	2-Year	513.05	2.15	9.56	5.56	9.58	0.000093	1.13	453.13	1576.21	0.11
Moat	932.733*	5-Year	709.42	2.15	9.25	6.20	9.30	0.000244	1.74	407.65	1363.77	0.18
Moat	932.733*	10-Year	841.61	2.15	9.31	6.52	9.38	0.000323	2.02	416.40	1405.02	0.21
Moat	932.733*	25-Year	1018.25	2.15	9.55	6.87	9.63	0.000369	2.26	451.28	1567.62	0.23
Moat	932.733*	50-Year	1195.20	2.15	9.28	7.16	9.41	0.000677	2.91	410.99	1379.55	0.31
Moat	743.866*	2-Year	513.05	2.04	9.54	5.47	9.56	0.000085	1.09	468.66	1922.40	0.11
Moat	743.866*	5-Year	709.42	2.04	9.21	6.13	9.25	0.000229	1.70	418.41	1641.64	0.18
Moat	743.866*	10-Year	841.61	2.04	9.26	6.44	9.32	0.000308	1.98	425.08	1678.75	0.21
Moat	743.866*	25-Year	1018.25	2.04	9.48	6.79	9.56	0.000357	2.22	459.01	1868.92	0.22
Moat	743.866*	50-Year	1195.20	2.04	9.14	7.08	9.28	0.000699	2.92	408.69	1587.37	0.31
Moat	0555	2-Year	520.50	1.94	9.53	5.40	9.55	0.000093	1.07	484.29	2397.98	0.11
Moat	0555	5-Year	719.69	1.94	9.17	6.08	9.21	0.000256	1.68	428.96	2018.97	0.18
Moat	0555	10-Year	853.63	1.94	9.19	6.39	9.25	0.000350	1.97	433.24	2048.39	0.21
Moat	0555	25-Year	1032.96	1.94	9.41	6.75	9.48	0.000412	2.22	465.88	2272.27	0.22
Moat	0555	50-Year	121.14	1.94	9.20	3.43	9.20	0.000007	0.28	433.81	2052.29	0.03
Moat	426.*	2-Year	520.50	1.87	9.49	5.29	9.53	0.000092	1.60	325.98	2364.28	0.16
Moat	426.*	5-Year	719.69	1.87	9.07	5.82	9.17	0.000285	2.56	281.54	1915.61	0.27
Moat	426.*	10-Year	853.63	1.87	9.05	6.12	9.20	0.000407	3.05	280.03	1900.53	0.33
Moat	426.*	25-Year	1032.96	1.87	9.23	6.49	9.42	0.000484	3.46	298.54	2086.02	0.36
Moat	426.*	50-Year	121.14	1.87	9.19	3.37	9.20	0.000007	0.41	294.88	2049.37	0.04
Moat	0297	2-Year	528.38	1.80	9.51	5.22	9.51	0.000032	0.97	1128.04	3008.41	0.08
Moat	0297	5-Year	730.06	1.80	9.09	5.83	9.12	0.000119	1.89	845.54	2536.54	0.15
Moat	0297	10-Year	865.90	1.80	9.09	6.19	9.13	0.000169	2.25	843.64	2533.44	0.18
Moat	0297	25-Year	1047.32	1.80	9.30	6.63	9.34	0.000174	2.29	981.90	2763.00	0.18
Moat	0297	50-Year	1228.64	1.80	9.08	7.04	9.17	0.000346	3.21	837.12	2522.82	0.26
Moat	0265	2-Year	627.35	1.79	9.51	5.57	9.51	0.000017	0.25	2705.88	3847.30	0.05
Moat	0265	5-Year	867.29	1.79	9.10	6.26	9.11	0.000136	0.86	1177.39	3652.31	0.27
Moat	0265	10-Year	1028.75	1.79	9.11	6.68	9.12	0.000190	1.01	1183.25	3653.08	0.32
Moat	0265	25-Year	1244.74	1.79	9.31	7.16	9.32	0.000127	0.71	1958.91	3753.27	0.17
Moat	0265	50-Year	1460.57	1.79	9.11	7.61	9.14	0.000374	1.40	1207.76	3656.29	0.43
Moat	264		Bridge									
Moat	0209	2-Year	627.35	1.78	6.64		7.19	0.003112	5.93	105.73	31.11	0.57
Moat	0209	5-Year	867.29	1.78	7.35		8.05	0.003445	6.75	128.56	33.44	0.61
Moat	0209	10-Year	1028.75	1.78	7.76		8.57	0.003628	7.21	142.72	34.81	0.63
Moat	0209	25-Year	1244.74	1.78	7.83		8.97	0.005071	8.58	145.12	35.04	0.74
Moat	0209	50-Year	1460.57	1.78	8.96		8.97	0.000069	1.17	3304.49	3325.03	0.09
Moat	0190	2-Year	627.35	1.78	6.57		7.12	0.003937	5.92	105.89	37.32	0.62
Moat	0190	5-Year	867.29	1.78	7.31		7.95	0.003809	6.46	134.29	40.28	0.62
Moat	0190	10-Year	1028.75	1.78	7.74		8.45	0.003761	6.76	152.13	42.03	0.63
Moat	0190	25-Year	1244.74	1.78	7.80	7.01	8.81	0.005238	8.04	154.84	42.29	0.74
Moat	0190	50-Year	1460.57	1.78	8.90		8.95	0.000467	2.73	1606.93	3303.78	0.23
Moat	0100	2-Year	627.35	1.78	6.33	5.07	6.80	0.002766	5.49	114.20	35.41	0.54
Moat	0100	5-Year	867.29	1.78	7.05	5.67	7.64	0.002907	6.19	140.14	37.37	0.56

LTA-6

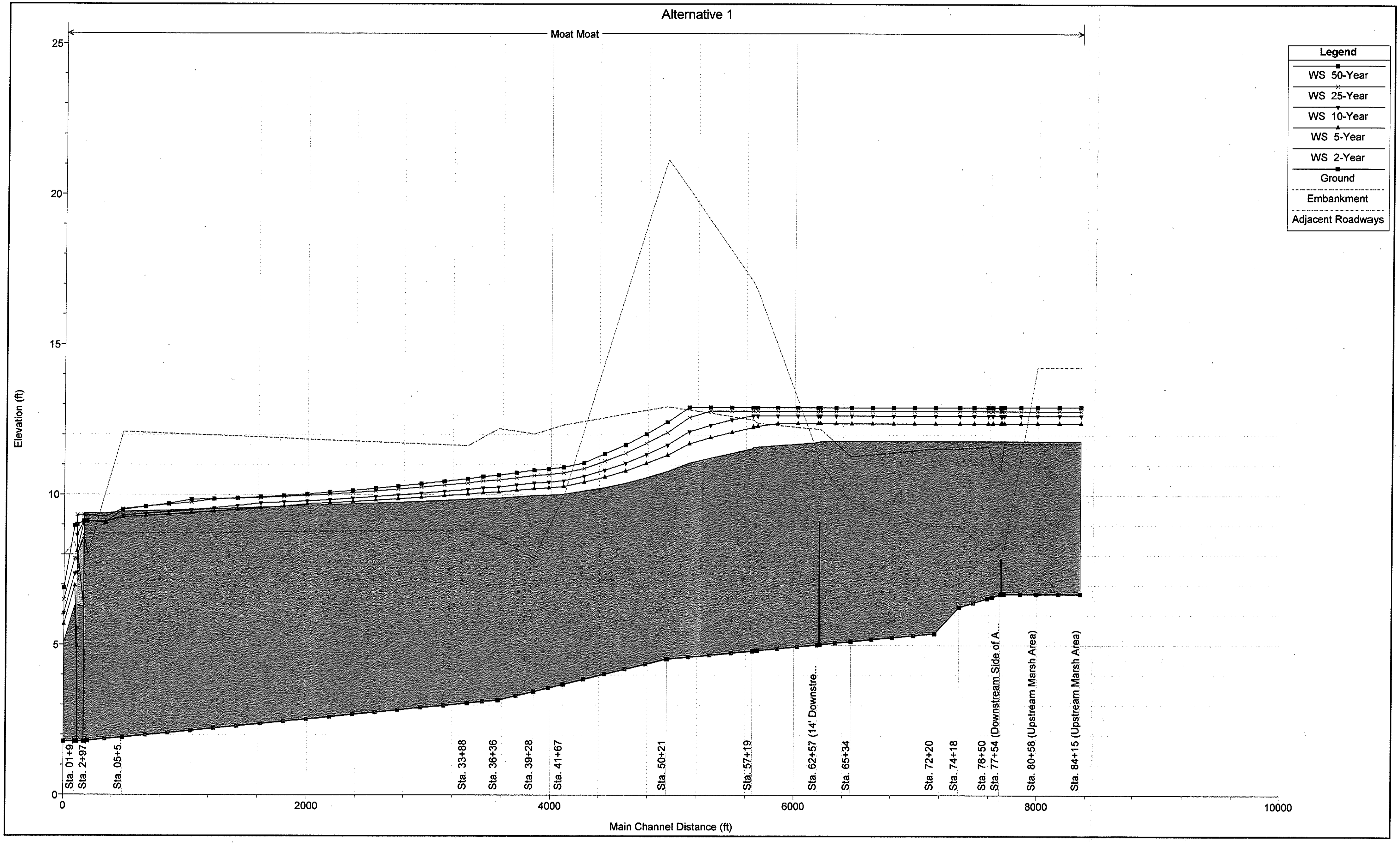
PAGE 6 OF 6

HEC-RAS Plan: Alt6 River: Moat Reach: Moat (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Moat	0100	10-Year	1028.75	1.78	7.46	6.05	8.14	0.002995	6.59	156.05	38.53	0.58
Moat	0100	25-Year	1244.74	1.78	8.39	6.49	8.43	0.000381	2.57	1645.38	3765.29	0.21
Moat	0100	50-Year	1460.57	1.78	8.92	6.88	8.93	0.000059	1.05	3659.34	3795.66	0.08
Moat	0000	2-Year	627.35	1.78	5.06	5.06	6.25	0.010591	8.72	71.93	30.99	1.01
Moat	0000	5-Year	867.29	1.78	5.67	5.67	7.07	0.010060	9.47	91.54	33.28	1.01
Moat	0000	10-Year	1028.75	1.78	6.05	6.05	7.56	0.009715	9.86	104.31	34.64	1.00
Moat	0000	25-Year	1244.74	1.78	6.49	6.49	8.17	0.009449	10.39	119.85	35.85	1.00
Moat	0000	50-Year	1460.57	1.78	6.89	6.89	8.72	0.009330	10.88	134.30	36.94	1.01

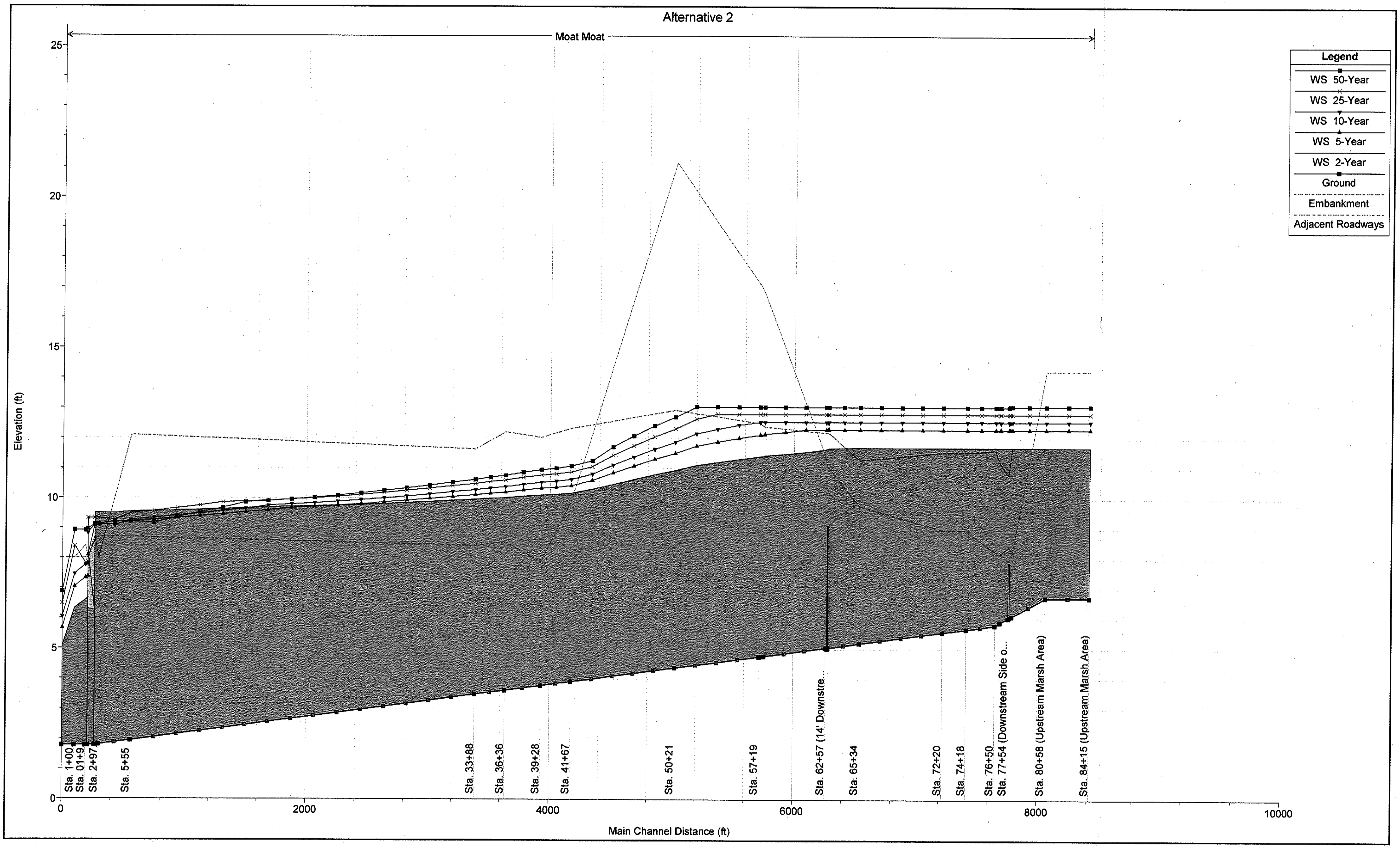
- **Computed Water Surface Profiles**

LTA-1



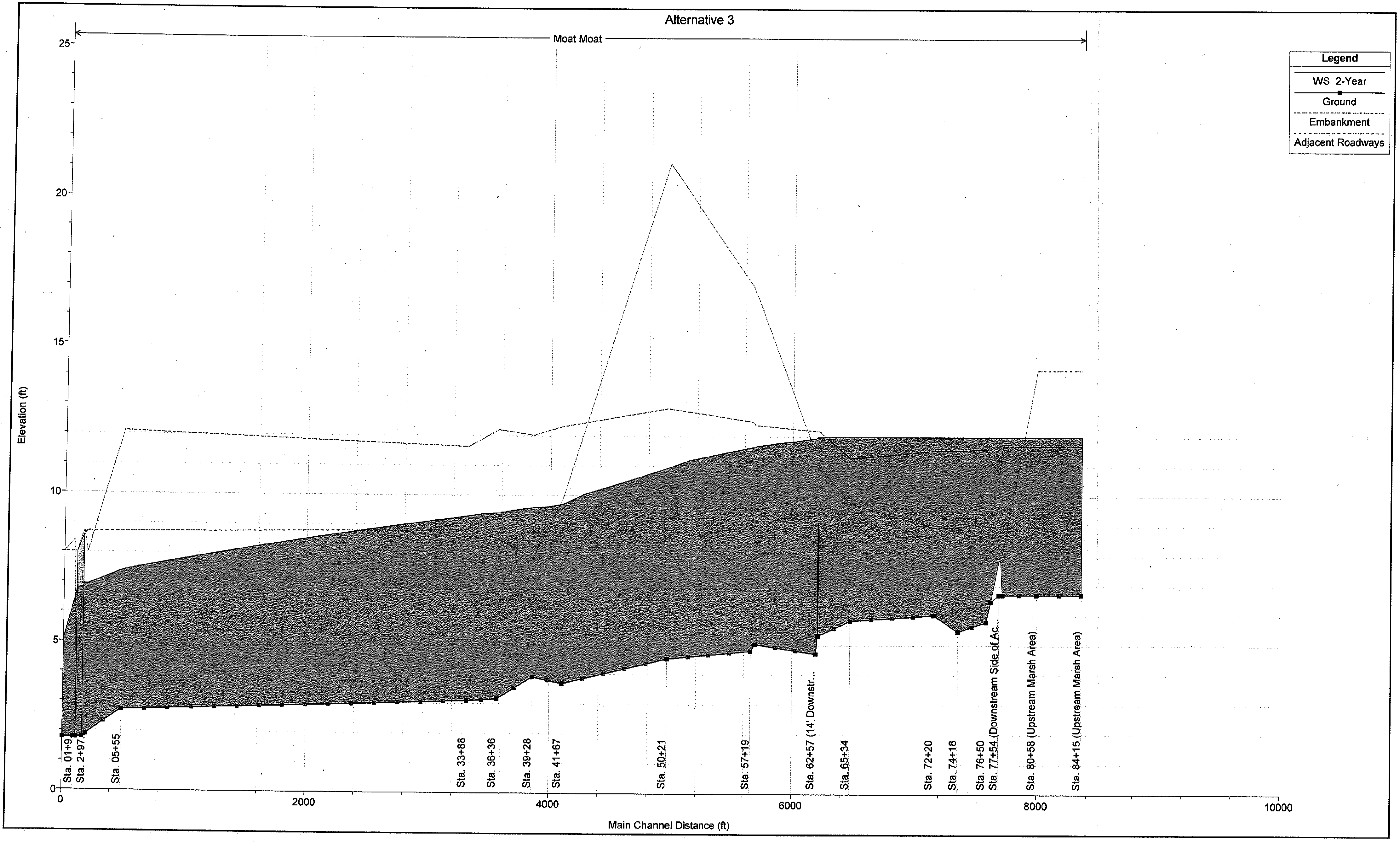
Alternative 1
Moat Moat
Legend
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Embankment
Adjacent Roadways
Elevation (ft)
25
20
15
10
5
0
Main Channel Distance (ft)
0
2000
4000
6000
8000
10000
Sta. 01+9
Sta. 2+97
Sta. 05+5..
Sta. 33+88
Sta. 36+36
Sta. 39+28
Sta. 41+67
Sta. 50+21
Sta. 57+19
Sta. 62+57 (14' Downstre...
Sta. 65+34
Sta. 72+20
Sta. 74+18
Sta. 76+50
Sta. 77+54 (Downstream Side of A...
Sta. 80+58 (Upstream Marsh Area)
Sta. 84+15 (Upstream Marsh Area)

LTA-2

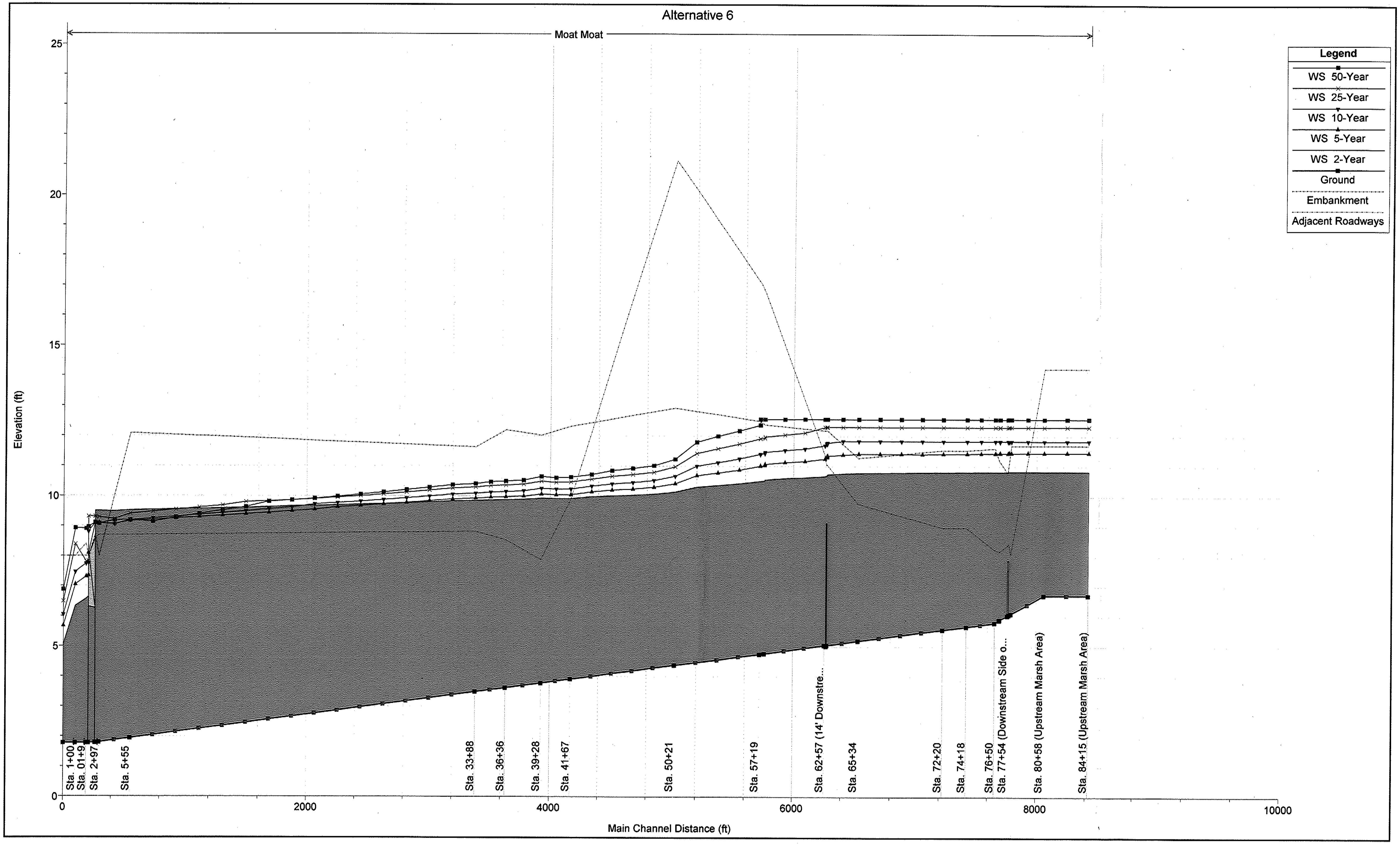


Alternative 2
Moat Moat
Legend
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Embankment
Adjacent Roadways
Elevation (ft)
25
20
15
10
5
0
Main Channel Distance (ft)
0
2000
4000
6000
8000
10000
Sta. 1+00
Sta. 01+9
Sta. 2+97
Sta. 5+55
Sta. 33+88
Sta. 36+36
Sta. 39+28
Sta. 41+67
Sta. 50+21
Sta. 57+19
Sta. 62+57 (14' Downstre...
Sta. 65+34
Sta. 72+20
Sta. 74+18
Sta. 76+50
Sta. 77+54 (Downstream Side o...
Sta. 80+58 (Upstream Marsh Area)
Sta. 84+15 (Upstream Marsh Area)

LTA-3


Alternative 3
Moat Moat
Legend
WS 2-Year
Ground
Embankment
Adjacent Roadways
Elevation (ft)
25
20
15
10
5
0
Main Channel Distance (ft)
0
2000
4000
6000
8000
10000
Sta. 01+9
Sta. 2+97
Sta. 05+55
Sta. 33+88
Sta. 36+36
Sta. 39+28
Sta. 41+67
Sta. 50+21
Sta. 57+19
Sta. 62+57 (14' Downstr...
Sta. 65+34
Sta. 72+20
Sta. 74+18
Sta. 76+50
Sta. 77+54 (Downstream Side of Ac...
Sta. 80+58 (Upstream Marsh Area)
Sta. 84+15 (Upstream Marsh Area)

LTA-6


Alternative 6
Moat Moat
Legend
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Embankment
Adjacent Roadways
Elevation (ft)
0
5
10
15
20
25
Main Channel Distance (ft)
0
2000
4000
6000
8000
10000
Sta. 1+00
Sta. 01+9
Sta. 2+97
Sta. 5+55
Sta. 33+88
Sta. 36+36
Sta. 39+28
Sta. 41+67
Sta. 50+21
Sta. 57+19
Sta. 62+57 (14' Downstre...
Sta. 65+34
Sta. 72+20
Sta. 74+18
Sta. 76+50
Sta. 77+54 (Downstream Side o...
Sta. 80+58 (Upstream Marsh Area)
Sta. 84+15 (Upstream Marsh Area)

APPENDIX G

PHOTOGRAPHS OF MOAT AND OVERBANK AREAS AT VARIOUS CROSS-SECTIO

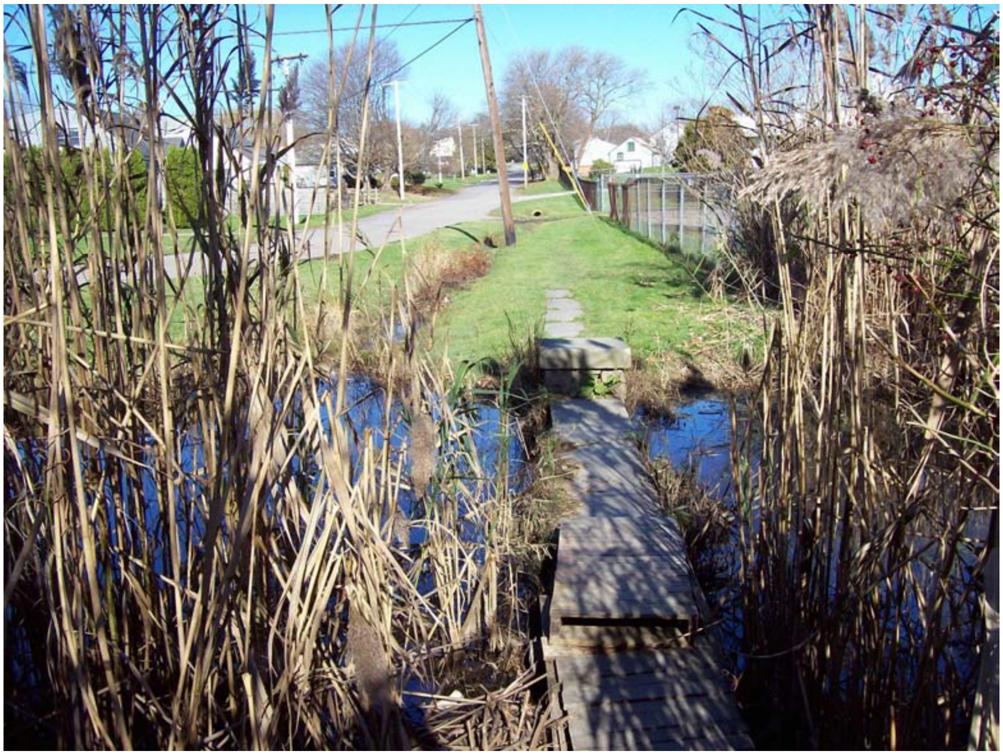
Sta. 84+15: Photo of Pond Embankment and Low-Lying, Marsh Area Storage
(View of Left Overbank Area Looking in Downstream Direction)

Sta. 80+58: Photo of Embankment and Low-Lying, Marsh Area
(Looking in Upstream Direction)

Sta. 80+58: Photo of Embankment and Low-Lying, Marsh Area
(Looking in Downstream Direction)

Sta. 77+82: Photo of Moat Right Overbank Area
(Adjacent to Water Treatment Facility)

Sta. 77+54 and 77+65: Photo of Access Path at Treatment Facility that Bisects Moat (Downstream of No. Easton Pond Secondary Spillway)



Sta. 76+87: Photo of Minor Wall that Bisects Moat
(Adjacent to Bliss Mine Road / Ellery Road Intersection)

Sta. 72+20: Photo of Moat and Left Overbank Area along Ellery Road
(Looking in Upstream Direction)

Sta. 65+34: Photo of Moat and Left Overbank Area along Ellery Road
(Looking in Upstream Direction)

Sta. 65+34: Photo of Moat and Left Overbank Area along Ellery Road
(Looking in Downstream Direction)

Sta. 62+77: Photo of Moat Upstream of Pedestrian Bridge
(Looking in Upstream Direction along Ellery Road)

Sta. 62+77: Photo of Moat Just Upstream of Pedestrian Bridge
(View of 3-36 " Stormwater Outlets Upstream of Bridge)

Sta. 62+57: Photo of Moat and Adjacent Pond Embankment
(Looking in Downstream Direction)

Sta. 57+57: Photo of Moat and Adjacent Pond Embankment
(Looking in Upstream Direction)

Sta. 57+19: Photo of Moat and Overbank Areas
(Looking in Upstream Direction)

Sta. 50+21: Photo of Moat and Adjacent Pond Embankment
(Looking in Upstream Direction)

Sta. 50+21: Photo of Moat and Overbank Areas
(Looking in Downstream Direction)

Sta. 41+67: Photo of Moat along Old Beach Road
(Looking in Upstream Direction)

Sta. 41+67: Photo of Moat along Old Beach Road
(Looking in Downstream Direction)

Sta. 36+36: Photo of Moat along Old Beach Road
(Looking in Upstream Direction)

Sta. 36+36: Photo of Moat along Old Beach Road
(Looking in Downstream Direction)

Downstream of Sta. 33+88: Photo of Moat Along Memorial Boulevard
(Looking in Downstream Direction)

Downstream of Sta. 33+88: Photo of Moat Along Memorial Boulevard
(Looking in Downstream Direction)

Sta. 5+55: Photo of Moat along Memorial Boulevard at Confluence with Spillway Channel from South Easton Pond (Looking in Downstream Direction)

Sta. 2+97: Photo of Upstream Side of Memorial Avenue Culvert (Looking in Downstream Direction)

Sta. 1+00: Photo of Moat at Easton Beach
(Looking in Downstream Direction)