



DITCH ANALYSIS

PID : 95358 **Date :** 04/24/2015 **Project :** LOR-82-Drainage Study **Location :** Columbia Station, OH

Description : Open Ditch RT Side (South) from Columbia Airport to Plum Creek (2:1 Slopes)

Designer : SJD

Rainfall Area : A

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
548+95	550+27	R	132.00	2.00	2.00	2.00	0.0035	0.29	0.29	0.61	0.18	Seed	3.29	5	0.030	18.15	0.97	0.05	0.58	0.24	2.97
												Seed	3.75	10	0.040	18.52	0.85	0.07	0.66	0.30	3.20
550+27	550+89	R	62.00	2.00	2.00	2.00	0.0035	0.38	0.67	0.65	0.42	Seed	3.03	5	0.030	21.09	1.25	0.08	1.28	0.37	3.49
												Seed	3.46	10	0.040	21.24	1.06	0.10	1.47	0.47	3.88
550+89	554+00	R	311.00	2.00	2.00	2.00	0.0035	3.99	4.66	0.57	2.70	Seed	2.48	5	0.030	29.28	1.99	0.19	6.69	0.89	5.56
												Seed	2.81	10	0.040	29.77	1.67	0.24	7.57	1.09	6.35
554+00	554+76	R	76.00	2.00	2.00	2.00	0.0035	3.05	7.71	0.59	4.50	Seed	2.45	5	0.030	29.83	2.27	0.25	11.02	1.13	6.54
												Seed	2.77	10	0.040	30.43	1.90	0.30	12.44	1.38	7.51
554+76	557+16	R	240.00	2.00	2.00	2.00	0.0035	1.71	9.42	0.56	5.46	Seed	2.36	5	0.030	31.50	2.37	0.27	12.89	1.22	6.89
												Seed	2.65	10	0.040	32.44	1.97	0.32	14.47	1.48	7.91
557+16	561+12	R	396.00	2.00	2.00	2.00	0.0035	1.37	10.79	0.55	6.21	Seed	2.23	5	0.030	34.20	2.42	0.28	13.88	1.27	7.06
												Seed	2.49	10	0.040	35.67	2.01	0.33	15.45	1.52	8.10
561+12	563+32	R	220.00	2.00	2.00	2.00	0.0035	6.20	16.99	0.51	9.37	Seed	1.65	5	0.030	51.72	2.48	0.29	15.43	1.33	7.33



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STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
												Seed	1.91	10	0.040	52.00	2.08	0.36	17.87	1.63	8.52
563+32	565+47	R	215.00	2.00	2.00	2.00	0.0035	2.14	19.13	0.62	10.70	Seed	1.61	5	0.030	53.11	2.56	0.31	17.25	1.40	7.61
												Seed	1.86	10	0.040	53.66	2.14	0.37	19.93	1.71	8.86
565+47	566+15	R	68.00	2.00	2.00	2.00	0.0035	2.01	21.14	0.52	11.74	Seed	1.60	5	0.030	53.54	2.61	0.32	18.82	1.46	7.85
												Seed	1.85	10	0.040	54.18	2.19	0.39	21.73	1.78	9.13
566+15	568+54	L	239.00	2.00	2.00	2.00	0.0035	0.69	21.83	0.51	12.09	Seed	1.57	5	0.030	55.06	2.62	0.32	18.96	1.47	7.87
												Seed	1.81	10	0.040	55.98	2.19	0.39	21.84	1.79	9.15
568+54	570+49	R	195.00	2.00	2.00	2.00	0.0035	2.94	24.77	0.51	13.59	Seed	1.54	5	0.030	56.26	2.69	0.34	20.94	1.54	8.14
												Seed	1.77	10	0.040	57.42	2.25	0.41	24.09	1.87	9.47
570+49	572+50	R	201.00	2.00	2.00	2.00	0.0035	1.05	25.82	0.56	14.18	Seed	1.51	5	0.030	57.49	2.71	0.34	21.47	1.55	8.21
												Seed	1.74	10	0.040	58.90	2.26	0.41	24.67	1.89	9.55
572+50	575+65	R	315.00	2.00	2.00	2.00	0.0025	22.85	48.67	0.50	25.61	Seed	1.26	5	0.030	71.97	2.65	0.31	32.21	2.02	10.07
												Seed	1.49	10	0.040	72.34	2.23	0.39	38.13	2.47	11.87
575+65	578+05	R	240.00	2.00	2.00	2.00	0.0025	2.19	50.86	0.56	26.83	Seed	1.24	5	0.030	73.47	2.67	0.32	33.16	2.04	10.17
												Seed	1.46	10	0.040	74.12	2.24	0.39	39.22	2.50	11.99
578+05	579+59	R	154.00	2.00	2.00	2.00	0.0025	2.51	53.37	0.60	28.34	Seed	1.22	5	0.030	74.42	2.70	0.33	34.65	2.08	10.34
												Seed	1.44	10	0.040	75.25	2.27	0.40	40.94	2.55	12.18
579+59	581+04	R	145.00	2.00	2.00	2.00	0.0025	0.95	54.32	0.59	28.90	Seed	1.21	5	0.030	75.31	2.70	0.33	34.97	2.09	10.37
												Seed	1.43	10	0.040	76.31	2.27	0.40	41.30	2.56	12.22
581+04	581+99	R	95.00	2.00	2.00	2.00	0.0025	1.23	55.55	0.55	29.58	Seed	1.20	5	0.030	75.89	2.71	0.33	35.56	2.11	10.43



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STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
												Seed	1.42	10	0.040	77.00	2.28	0.40	41.97	2.57	12.29
581+99	583+65	R	166.00	2.00	2.00	2.00	0.0025	1.56	57.11	0.57	30.47	Seed	1.19	5	0.030	76.90	2.73	0.33	36.21	2.13	10.50
												Seed	1.40	10	0.040	78.20	2.29	0.40	42.72	2.59	12.37
583+65	584+63	R	98.00	2.00	2.00	2.00	0.0025	2.82	59.93	0.60	32.16	Seed	1.18	5	0.030	77.49	2.76	0.34	37.98	2.17	10.68
												Seed	1.39	10	0.040	78.91	2.32	0.41	44.78	2.65	12.59
584+63	586+21	R	158.00	2.00	2.00	2.00	0.0025	2.05	61.98	0.59	33.37	Seed	1.17	5	0.030	78.44	2.78	0.34	38.99	2.20	10.78
												Seed	1.38	10	0.040	80.03	2.33	0.42	45.96	2.68	12.71
586+21	587+62	R	141.00	2.00	2.00	2.00	0.0025	1.04	63.02	0.65	34.04	Seed	1.16	5	0.030	79.28	2.79	0.34	39.42	2.21	10.83
												Seed	1.36	10	0.040	81.03	2.34	0.42	46.44	2.69	12.76
587+62	589+11	R	149.00	2.00	2.00	2.00	0.0025	0.77	63.79	0.70	34.58	Seed	1.15	5	0.030	80.17	2.79	0.35	39.66	2.21	10.85
												Seed	1.35	10	0.040	82.09	2.34	0.42	46.70	2.70	12.78
589+11	589+95	R	84.00	2.00	2.00	2.00	0.0025	1.27	65.06	0.62	35.37	Seed	1.14	5	0.030	80.67	2.80	0.35	40.35	2.23	10.92
												Seed	1.34	10	0.040	82.68	2.35	0.42	47.50	2.72	12.86
589+95	590+50	R	55.00	2.00	2.00	2.00	0.0025	0.24	65.30	0.80	35.56	Seed	1.14	5	0.030	81.00	2.80	0.35	40.43	2.23	10.93
												Seed	1.34	10	0.040	83.07	2.36	0.42	47.58	2.72	12.87
590+50	591+28	R	78.00	2.00	2.00	2.00	0.0030	2.88	68.18	0.63	37.38	Seed	1.13	5	0.030	81.42	3.03	0.41	42.29	2.19	10.75
												Jute Mat	1.13	5	0.040	81.53	2.45	0.46	42.25	2.48	11.92
												Temp. Mat	1.13	5	0.040	81.53	2.45	0.46	42.25	2.48	11.92
												Temp. Mat	1.33	10	0.040	83.58	2.55	0.50	49.77	2.66	12.65
591+28	592+18	R	90.00	2.00	2.00	2.00	0.0030	0.05	68.23	0.90	37.42	Seed	1.12	5	0.030	82.02	3.03	0.41	42.08	2.18	10.73



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STATION BEGIN	STATION END		SIDE (ft.)	LENGTH (ft.)	RADIUS (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
													Jute Mat	1.12	5	0.040	82.14	2.44	0.46	42.03	2.47	11.90
													Temp. Mat	1.12	5	0.040	82.14	2.44	0.46	42.03	2.47	11.90
													Temp. Mat	1.32	10	0.040	84.17	2.55	0.50	49.56	2.66	12.63
592+18	594+07	R	189.00	2.00	2.00	2.00	0.0030	0.44	68.67	0.84	37.79		Seed	1.11	5	0.030	83.18	3.03	0.41	41.98	2.18	10.72
													Jute Mat	1.11	5	0.040	83.42	2.44	0.46	41.87	2.47	11.88
													Temp. Mat	1.11	5	0.040	83.42	2.44	0.46	41.87	2.47	11.88
													Temp. Mat	1.31	10	0.040	85.40	2.55	0.50	49.49	2.66	12.63
594+07	595+38	R	131.00	2.00	2.00	2.00	0.0030	2.93	71.60	0.59	39.52		Seed	1.10	5	0.030	84.14	3.06	0.41	43.46	2.21	10.85
													Jute Mat	1.10	5	0.040	84.31	2.46	0.47	43.39	2.51	12.04
													Temp. Mat	1.10	5	0.040	84.31	2.46	0.47	43.39	2.51	12.04
													Temp. Mat	1.30	10	0.040	86.25	2.57	0.51	51.35	2.70	12.80
595+38	596+90	R	152.00	2.00	2.00	2.00	0.0030	0.96	72.56	0.60	40.10		Seed	1.09	5	0.030	85.14	3.06	0.42	43.65	2.22	10.87
													Jute Mat	1.09	5	0.040	85.33	2.47	0.47	43.56	2.51	12.05
													Temp. Mat	1.09	5	0.040	85.33	2.47	0.47	43.56	2.51	12.05
													Temp. Mat	1.29	10	0.040	87.23	2.57	0.51	51.64	2.71	12.83
596+90	598+16	R	126.00	2.00	2.00	2.00	0.0030	0.82	73.38	0.74	40.70		Seed	1.08	5	0.030	86.02	3.06	0.42	43.91	2.22	10.89
													Jute Mat	1.08	5	0.040	86.18	2.47	0.47	43.84	2.52	12.08
													Temp. Mat	1.08	5	0.040	86.18	2.47	0.47	43.84	2.52	12.08
													Temp. Mat	1.28	10	0.040	88.04	2.58	0.51	52.04	2.72	12.86
598+16	598+58	R	42.00	2.00	2.00	2.00	0.0030	0.66	74.04	0.70	41.16		Seed	1.07	5	0.030	86.41	3.07	0.42	44.23	2.23	10.92



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STATION BEGIN	STATION END		SIDE (ft.)	LENGTH WIDTH (ft.)	RADIUS SLOPE (ft./ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
													Jute Mat	1.07	5	0.040	86.46	2.48	0.47	44.21	2.53	12.12
													Temp. Mat	1.07	5	0.040	86.46	2.48	0.47	44.21	2.53	12.12
													Temp. Mat	1.28	10	0.040	88.32	2.58	0.51	52.51	2.73	12.90
598+58	600+02	R	144.00	2.00	2.00	2.00	0.0031	0.17	74.21	0.69	41.28		Seed	1.07	5	0.030	87.24	3.10	0.43	43.99	2.21	10.84
													Jute Mat	1.06	5	0.040	87.42	2.50	0.48	43.91	2.50	12.02
													Temp. Mat	1.06	5	0.040	87.42	2.50	0.48	43.91	2.50	12.02
													Temp. Mat	1.27	10	0.040	89.23	2.61	0.52	52.23	2.70	12.80