Town of Hamilton Beach Project





Robert Santos: Project Manager/Hydraulic Engineer Bader AlSulaiman: Geotechnical Engineer Yantao Liu: Structural Engineer

Cristhian A. De La Paz Olea: Transportation Engineer



Site Location







- Improve parking lot organization
- ADA compliant





- Provide more shade at the beach
- Provide a restroom facility





 Provide a safe travel path by foot to Capt'N Pete's Dairy Dock, LLC (Ice Cream Shop)







• Incorporate sustainable components in the new designs





Development Advantages

- Promote & Target
 - Social growth
 - Economic Growth
 - Environmental Aspects
 - Ease of accessibility
 - Pleasurable Experience



Topographic Survey & Base Map

- 2 Separate Surveys
- Total size: 2 Acres
- Approximate # of Points: 350
- 2017 APEX Consulting & Surveying, INC.





Base Map





Traffic Data Analysis

Currently:

- No safe way for children and visitors to safely travel from the beach to Capt'N Pete's Dairy Dock, LLC
- Major road adjacent to current travel path (Major Collector)
- 40 mph





Data Collection

- Pneumatic Road Tubes
- INDOT (TCDS)





Data

Tuesday 8-21-18

Speed Ra	nge (r	nph)													
Start Time	0-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-85	86+			TOTAL
12:00 AM	7	3	5	0	0	0	0	0	0	0	0	0	0	00	15
1:00 AM	4	7	6	0	0	0	0	0	0	0	0	0	0	00	17
2:00 AM	6	7	4	2	0	0	0	0	0	0	0	0	0	00	19
3:00 AM	3	6	2	1	0	0	0	0	0	0	0	0	0	00	12
4:00 AM	16	35	7	4	1	0	0	0	0	0	0	0	0	00	63
5:00 AM	31	53	17	2	0	0	0	0	0	0	0	0	0	00	103
6:00 AM	74	78	34	5	1	0	0	0	0	0	0	0	0	00	192
7:00 AM	76	114	50	11	3	0	0	0	0	0	0	0	0	00	254
8:00 AM	70	76	28	7	0	1	0	0	0	0	0	0	0	00	182
9:00 AM	72	71	27	4	0	0	0	0	0	0	0	0	0	00	174
10:00 AM	75	76	25	4	0	0	0	0	0	0	0	0	0	00	180
11:00 AM	80	80	27	6	1	0	0	0	0	0	0	0	0	00	194
12:00 PM	58	64	24	3	1	1	0	0	0	0	1	0	0	00	152
1:00 PM	84	68	29	9	3	0	0	0	0	0	0	0	0	00	193
2:00 PM	54	93	50	12	2	0	0	0	0	0	0	0	0	00	211
3:00 PM	131	111	51	14	0	0	0	0	0	0	0	0	0	00	307
4:00 PM	102	123	47	12	0	0	0	0	0	0	0	0	0	00	284
5:00 PM	80	114	58	12	2	0	0	0	0	0	0	0	0	00	266
6:00 PM	57	82	34	12	2	0	0	0	0	0	0	0	0	00	187
7:00 PM	53	59	20	5	0	0	0	0	0	0	0	0	0	00	137
8:00 PM	51	47	10	2	2	0	0	0	0	0	0	0	0	00	112
9:00 PM	33	34	14	2	1	0	0	0	0	0	0	0	0	00	84
10:00 PM	15	23	2	1	0	0	0	0	0	0	0	0	0	00	41
11:00 PM	8	13	3	2	0	0	0	0	0	0	0	0	0	00	26
TOTAL	1240	1437	574	132	19	2	0	0	0	0	1	0	0	00	3405

Wednesday 8-22-18

Speed Ra	nge (I	nph)														
Start Time	0-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-85	86+				TOTAL
12:00 AM	10	4	2	0	0	0	0	0	0	0	0	0	0	0	0	16
1:00 AM	7	4	1	1	0	0	0	0	0	0	0	0	0	0	0	13
2:00 AM	4	9	3	1	0	0	0	0	0	0	0	0	0	0	0	17
3:00 AM	4	10	2	0	0	0	0	0	0	0	0	0	0	0	0	16
4:00 AM	15	28	6	3	0	0	0	0	0	0	0	0	0	0	0	52
5:00 AM	32	59	10	3	0	1	0	0	0	0	0	0	0	0	0	105
6:00 AM	90	91	22	5	1	0	0	0	0	0	0	0	0	0	0	209
7:00 AM	86	119	50	5	1	0	0	0	0	0	0	0	0	0	0	261
8:00 AM	56	84	47	9	0	0	0	0	0	0	0	0	0	0	0	196
9:00 AM	46	68	41	5	1	1	0	0	0	0	0	0	0	0	0	162
10:00 AM	53	77	30	10	1	0	0	0	0	0	0	0	0	0	0	171
11:00 AM	79	74	33	9	1	0	0	0	0	0	0	0	0	0	0	196
12:00 PM	79	78	35	4	0	1	0	0	0	0	0	0	0	0	0	197
1:00 PM	68	64	23	8	4	2	0	0	0	0	0	0	0	0	0	169
2:00 PM	90	96	55	8	4	0	0	0	0	0	0	0	0	0	0	253
3:00 PM	113	125	65	10	1	1	0	0	0	0	0	0	0	0	0	315
4:00 PM	113	124	67	17	1	0	0	0	0	0	0	0	0	0	0	322
5:00 PM	90	126	53	17	0	0	0	0	0	0	0	0	0	0	0	286
6:00 PM	78	103	44	10	3	1	0	0	0	0	0	0	0	0	0	239
7:00 PM	59	73	33	7	1	0	0	0	0	0	0	0	0	0	0	173
8:00 PM	68	43	18	3	2	0	0	0	0	0	0	0	0	0	0	134
9:00 PM	55	40	9	1	0	0	0	0	0	0	0	0	0	0	0	105
10:00 PM	13	12	7	2	0	0	0	0	0	0	0	0	0	0	0	34
11:00 PM	7	12	5	0	1	0	0	0	0	0	0	0	0	0	0	25
TOTAL	1315	1523	661	138	22	7	0	0	0	0	0	0	0	0	0	3666



Data

TCDS AADT Section Description

AADT = Annual Average Daily Traffic

Calculation:

 $AADT = VOL \times SF \times AF$ (if applicable)

Note: Each count interval is multiplied by the SF (and AF if needed) for that day of the week and month of the year. A 24-hr count may have taken over two different days and thus use two different sets of factors. The sum of the factored intervals equals the AADT.

VOL = 24-hour volume count

SF = applicable month/day combination seasonal factor

AF = applicable axle-correction factor

2018	2018 INDOT Traffic Database System									
Date	Volume Count	Average								
	(# of vehicles)	AADT								
8/22/2018	3,666	2205								
8/21/2018	3,405	5205								







- Soil Boring
 - Soil sampling (6 samples along 6 feet)
 - DCP Test

• Soil Test (ASTM Standards)

- Atterberg Limits (Samples #6)
- Sieve Analysis (Samples # 1 to 5)





• Test Boring logs (By: Town of Hamilton)

4		IRT IR.C	H ORATK			LOG OF TEST BORING Project Hamilton Lake Dam Location Hamilton, Steuben County, India Client Lawson-Fisher Associates P.C. 7770 West New York Street · Indianapolis, Indiana 46 317-273-1690 / 317-273-2250 (Fax)	na 214	Bo Ele Da EE	oring N evatior atum El Proj. neet	lo. n No. 1	ND- 900.7 USC&0 1-638 of	2 iS 4		
Proj. IDNF	No Fil	e.	E06 7	57020 5-11		Station 2+53* Weathe Offset 14.6' Rt. H.L. Lane* Tem	er O	vercas 43 De	t/Rain eg F	Drille Insp	er ector	C	.N. .K.	-
	S	A	MPLE			DESCRIPTION/CLASSIFICATION		S	OILF	RO	PERT	IE	S	-
No.	T P Pe	Rec %	Value	Depth ft n	n	and REMARKS		q _p tsf	q _u tsf	Y, pc	f W	LL %	PL %	PI %
SS-1	X.	65	12	-	A A A A A A A A A A A A A A A A A A A	SM, SILTY SAND, little gravel, medium								
SS-2	Xe	65	15		البنيط	dense, brown to black below 3', with fragments of wood from 4-1/2' to 5' (fill)		_					_	
_				5	x		-			-	-			-





- Atterberg Limits Test (Sample #6)
 - Liquid Limit (27%)
 - Plastic Limit (16%)
 - Plasticity Index

PI=(LL-PL)=(27%-16%)=11%

Tin Number	Wt. of Tin (empty)	Wt. of Tin + Wet Soil	Wt. of Tin + Dry Soil	Moisture Content (%)	Number of Blows (N)
16	19.01	39.85	35.65	25.2	27
719	18.95	38.18	34.33	25.0	34
1010	13.84	40.1	34.23	28.8	14

Tin	Wt. of Tin	Wt. of Tin +	Wt. of Tin +	Plastic
Number	(empty)	Wet Soil	Dry Soil	Limit*
701	14.42	29.23	27.15	16.3







Plasticity Chart

- Sieve Analysis Test (Samples # 1,2,3,4,5)
 - $\circ \quad 150\,g\,of\,Soil$
 - Sieves:
 - #4,#10,#20,#40#,#60,#140,#200

Sieve Number	Wt. of Sieve (empty)	Wt. of Sieve + Soil	Wt. of Soil Retained	Cummul. Percent Retained	Cummul. Percent Finer
4	611.4	623.63	12.23	8.23	91.77
10	530.25	553.98	23.73	24.21	75.79
20	497.62	524.41	26.79	42.24	57.76
40	406	425.2	19.2	55.17	44.83
60	429.38	448.18	18.8	67.82	32.18
140	416.2	435.5	19.3	80.81	19.19
200	505.9	513.09	7.19	90.48	9.52
pan	436.15	457.46	21.31	100	0.00

total: 148.55

Sieve Analysis Test Results (Sample #1)

Sieve	Wt. of Sieve	Wt. of Sieve	Wt. of Soil	Cummul. Percent	Cummul. Percent
Number	(empty)	+ Soil	Retained	Retained	Finer
4	611.68	643.2	31.52	21.22	78.78
10	530.32	559.08	28.76	40.58	59.42
20	497.62	523.85	26.23	58.24	41.76
40	406	425.8	19.8	71.57	28.43
60	429.3	449.51	20.21	85.17	14.83
140	416.14	429.89	13.75	94.43	5.57
200	505.85	508.47	2.62	96.19	3.81
pan	436.26	441.8	5.54	100	0.00

total: 148.43

Sieve Analysis Test Results (Sample #2)



- Sieve Analysis Test (Samples # 1,2,3,4,5)
 - Grain Size Distribution







- Sieve Analysis Test (Samples # 1,2,3,4,5) \bullet
 - USCS (Classification Flow Chart)

$$CU = \frac{D_{60}}{D_{10}} \qquad CC = \frac{D_{30}^2}{D_{10} \times D_{60}}$$

Cample #	Gra	in size (m	im)	Coef. of Uniformity	Coef. of Curvature		
Sample #	D10	D30	D60	Cu	Cc		
1	0.08	0.22	1.10	13.75	0.550		
2	0.18	0.50	2.20	12.22	0.631		
3	0.29	0.65	2.20	7.59	0.662		
4	0.28	0.70	2.20	7.86	0.795		
5	0.13	0.29	0.70	5.38	0.924		

Coefficients of Uniformity and Curvature



soils that plot as CL-ML on Figure 5.3.



- Soil Classification:
 - **#1:** SP-SC, Poorly-graded sand with clay.
 - **#2:** SP, Poorly-graded sand with gravel.
 - **#3:** SP, Poorly-graded sand with gravel.
 - **#4:** SP, Poorly-graded sand with gravel.
 - **#5:** SP-SC, Poorly-graded sand with silty clay.
 - **#6:** CL, Sandy lean clay with gravel.

	HAND A		OBE LO	G							
Project: Hamilton	County Beach ReImprovment			P	robe #: E	3-1					
Client: Brent Shu	1	Date: 9/1/2018									
Inspactor: LADS	Engineering, LCC	Location: Hamilton Lake Beach - Wayne St, Hamilton, IN 46703									
Ground Water El	evation: 4 ft										
Depth (ft)	Soil Description	PL %	LL %	MC %	PI %	DCP (N)	Relative Compactness				
1	SP-SC, Poorly-graded sand with clay			6.2		4	Very loose				
2	SP, Poorly-graded sand with gravel			5.3		5	Loose				
3	SP, Poorly-graded sand with gravel			6.9		16	Medium Dense				
4	SP, Poorly-graded sand with gravel			9.3		7	Loose				
5	SP-SC, Poorly-graded sand with silty clay			12.7		7	Loose				
6	CL, Sandy lean clay with gravel	16	27	21.8	11	13	Stiff				
-						-					



Hydrological Study



Hydrological Study





Rain Garden/LID Implementation







Current Parking Lot



Parking Lot Proposed Geometric Design





Parking Lot Pavement

Pavement Type	Thickness (in)
HMA Surface	1.5
HMA Intermediate	3
No. 53 Aggregate	6
No. 2 Aggregate	8





Parking Lot Additional Features

GOLF CART PARKING

01 0

-0" (TYP,) 8'-0"

PROPOSED BOLLARDS

SIX (6) 5'-0"x10'-0" PROPOSED COLF CART PARKING SPACES UNES TO BE PAINTED USING D.O.T. YELLOW OR WHITE PAINT

PROPOSED ECHO BIKE RACK



Sidewalk Location

• Pedestrian Sidewalk from the beach to Capt'N Pete's Dairy Dock



Sidewalk Location



Sidewalk Design

- Designed to meet ADA Requirements
 - 5 feet wide
 - 4 inches thick
 - Expansion Joint: Every 50'
 - Saw Cuts (Contraction Joint) : every 5 feet
 - 2 inches #53 crushed stone Base



Sidewalk Cross-Section (City of Fort Wayne Design Manual)



Sidewalk Design

- Location of Stop Bar
 - 4 feet west of crosswalk
 - 15 feet west of the intersection
- Guardrail cut
 - 3 feet
- Detectable Warning Surface
 - 4 feet by 2 feet
 - Red color







Sidewalk Design

Clear Sight Triangle of Intersection Sight Distance
ISD = 1.47(tg)(Vmajor)

Case	tg	Vmajor (mph)	ISD (ft)
Turn left from the stop bar (B1)	9.5	40	558
Turn right from the stop bar (B2)	8.5	35	437
Crossing the major road (B3)	8.5	35	437





Restroom & Shower Facility



- Location
- Dimensions
- Plan View
- Load Determination
- Information of Restroom
- Truss and Column
- Type of Wood

• Information of Restroom and shower





Structural type: Gable

Pitch of Roof: 6:12

Type of wall: Stud wall (6")

Length:15ft

Width: 24 ft

Height: 8 ft

Shower Location: Exterior



Plan View





Location of the Restroom & Shower





Load Determination

Load Type	Load (psf)
Dead Load Due to Self Weight	14.9
Snow Load	14
Live Load	20

• Determined Using ASCE 7-10 Minimum Design Loads for Buildings & Other Structures



• Truss and Column



• Designed according to National Design Specification for Wood

Trusses:

2 2x6

2 3x6 4x6 lumber

Columns:

- 4 3x3 > 4 3x4 -
- 4x4 lumber

Ridge Beam:

(1) 4x6







•Southern Pine

- **Cost Effective** \bullet
- Readily Available ullet



Restroom/Shower Facility Foundation Design





Shade Structure

Requirements:

- Fire Resistant
- Removable fabric
- Provide adequate shelter



Shade Structure

Design Constraints:

Wind Load

Foundation (Freeze & Thaw)

Size



Foundation Details







ACI 7-10 Wind Load

Table 1.5-1 Risk Category of Buildings and Other Structures for Flood, Wind, Snow, Earthquake, and Ice Loads

Use or Occupancy of Buildings and Structures	
Buildings and other structures that represent a low risk to human life in the event of failure	I
All buildings and other structures except those listed in Risk Categories I, III, and IV	II
Buildings and other structures, the failure of which could pose a substantial risk to human life.	ш
Buildings and other structures, not included in Risk Category IV, with potential to cause a substantial economic impact and/or mass disruption of day-to-day civilian life in the event of failure.	
Pulling of the destruction of the ball of the Pill Control of the ball of the	

Buildings and other structures not included in Risk Category IV (including, but not limited to, facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, hazardous waste, or explosives) containing toxic or explosive substances where their quantity exceeds a threshold quantity established by the authority having jurisdiction and is sufficient to pose a threat to the public if released.

Buildings and other structures designated as essential facilities.

IV

Buildings and other structures, the failure of which could pose a substantial hazard to the community.

Buildings and other structures (including, but not limited to, facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, or hazardous waste) containing sufficient quantities of highly toxic substances where the quantity exceeds a threshold quantity established by the authority having jurisdiction to be dangerous to the public if released and is sufficient to pose a threat to the public if released.^{*a*}

Buildings and other structures required to maintain the functionality of other Risk Category IV structures.

^aBuildings and other structures containing toxic, highly toxic, or explosive substances shall be eligible for classification to a lower Risk Category if it can be demonstrated to the satisfaction of the authority having jurisdiction by a hazard assessment as described in Section 1.5.2 that a release of the substances is commensurate with the risk associated with that Risk Category.





Option Considerations

Option 1





22'x14'

15'x15'

Final Site Layout





Cost Estimate

Project Portion	Total Cost
Construction Engineering	\$35,000
Mobilization/Demobilization	\$20,000
Parking Lot Pavement Section	\$50,374
Shade Structure	\$ 4,400
Restroom/Shower room Structure	\$9,413
Sidewalk	\$9,745
Parking Lot Additional Features	\$5,004
Erosion Control Measures	\$3,730
Geotechnical Exploration/Testing	\$612
Rain Garden	\$3,413
Construction Surveying	\$4,000
Sum	\$145,690



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