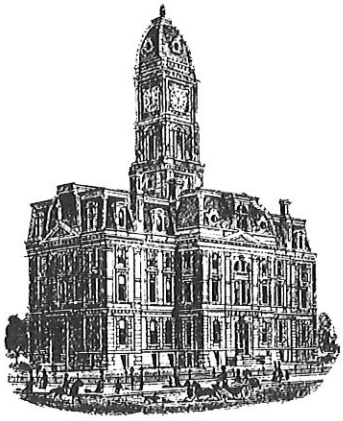
KCW



SURVEYOR'S OFFICE

Hamilton County

Kenton C. Ward, CFM
Surveyor of Hamilton County
Phone (317) 776-8495
Fax (317) 776-9628

Suite 188
One Hamilton County Square
Noblesville, Indiana 46060-2230

November 17, 2020

To: Hamilton County Drainage Board

Re: Intracoastal at Geist Drain

This report is a revision of my report dated July 10, 2020 which is attached. At the Board's meeting August 24, 2020 the public hearing was opened and closed and the hearing was tabled. At it's meeting of November 9, 2020 bids were opened for the proposed reconstruction. One bid was received from Agricon, Inc. in the amount of $100,148.30.

Using the bid figure rather than the figure of the engineer's estimate the cost for the project will be as follows:

Construction Costs	$100,148.30
15% Contingency	$ 15,022.25
	$115,170.55
Study	$ 28,000.00
Engineering	$ 33,000.00
	$176,170.55

I propose the costs for the reconstruction be distributed as follows:

City of Fishers	$ 44,000.00
Drain Maintenance Fund	$ 48,119.09
General Drain Improvement Fund (GDIF)	$ 84,051.46
	$176,170.55

The GDIF would be paid back using 75% of future year's annual assessment. This would be payments of $8,874.08 per year over ten (10) years.

I recommend the Board approve this revision to my original report.

Kenton C. Ward, CFM
Hamilton County Surveyor

KCW/llm

STATE OF INDIANA)
) ss:
COUNTY OF HAMILTON)

BEFORE THE HAMILTON COUNTY DRAINAGE BOARD
NOBLESVILLE, INDIANA

IN THE MATTER OF THE
RECONSTRUCTION OF THE
Intracoastal at Geist Drain

FINDINGS AND ORDER FOR RECONSTRUCTION

The matter of the proposed Reconstruction of the ***Intracoastal at Geist Drain*** came before the Hamilton County Drainage Board for hearing ***on November 23, 2020,*** on the Reconstruction Report consisting of the report and the Schedule of Damages and Assessments. The Board also received and considered the written objection of an owner of certain lands affected by the proposed Reconstruction, said owner being:

Evidence was heard on the Reconstruction Report and on the aforementioned objections.

The Board, having considered the evidence and objections, and, upon motion duly made, seconded and unanimously carried, did find and determine that the costs, damages and expenses of the proposed Reconstruction will be less than the benefits accruing to the owners of all land benefited by the Reconstruction.

The Board having considered the evidence and objections, upon motion duly made, seconded and unanimously carried, did adopt the Schedule of Assessments as proposed, subject to amendment after inspection of the subject drain as it relates to the lands of any owners which may have been erroneously included or omitted from the Schedule of Assessments.

The Board further finds that it has jurisdiction of these proceedings and that all required notices have been duly given or published as required by law.

Wherefore, it is ORDERED, that the proposed Reconstruction of the ***Intracoastal at Geist Drain*** be and is hereby declared established.

Thereafter, the Board made inspection for the purpose of determining whether or not the lands of any owners had been erroneously included or excluded from the Schedule of Assessments. The Board finds on the basis of the reports and findings at this hearing as follows:

HAMILTON COUNTY DRAINAGE BOARD

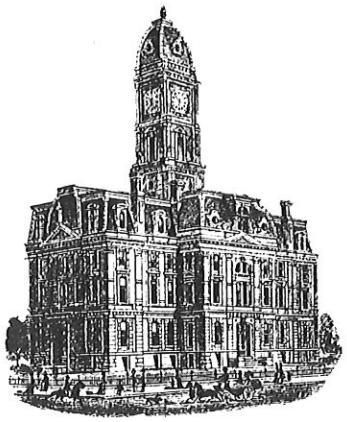
PRESIDENT

Member

Member

ATTEST: Executive Secretary

KCW



SURVEYOR'S OFFICE

Hamilton County

Kenton C. Ward, CFM
Surveyor of Hamilton County
Phone (317) 776-8495
Fax (317) 776-9628

Suite 188
One Hamilton County Square
Noblesville, Indiana 46060-2230

July 10, 2020

TO: Hamilton County Drainage Board

RE: Intracoastal At Geist Drain

Attached is the hydraulic study prepared by Clark Dietz for the Intracoastal at Geist Drain. This was presented to the Board at it's June 22, 2020 meeting. On June 30, 2020 a conference call was held with this office, the City of Fishers and Clark Dietz represented. Those minutes are attached.

As a result of that call it was agreed that Alternate 1 – Increase storm sewer capacity and improve overland flow outlet was the most cost efficient alternative. The cost estimate for that alternative is as follows:

Construction Costs (From study)	$ 76,252.00
15% Contingency	11,437.80
Total Construction	$ 87,689.80
Study Costs	28,000.00
Engineering (Design & construction services)	33,000.00
Total Cost	$148,689.80

At this time the drain fund brings in $11,832.10 annually. The current balance in the fund is $48,119.09. The fund collects on a four (4) year period. Discussions with Fishers has resulted in a 75%/25% split of the costs. With this, Fishers would pay $37,172.45. The county portion would be $111,517.35. Using the funds available in the drain fund at $48,119.09 the remaining $63,398.26 would be paid using 75% of the annual assessment of $11,832.10 which would be $8,874.08 per year over seven (7) years.

I recommend the Board set this for hearing for August 24, 2020.

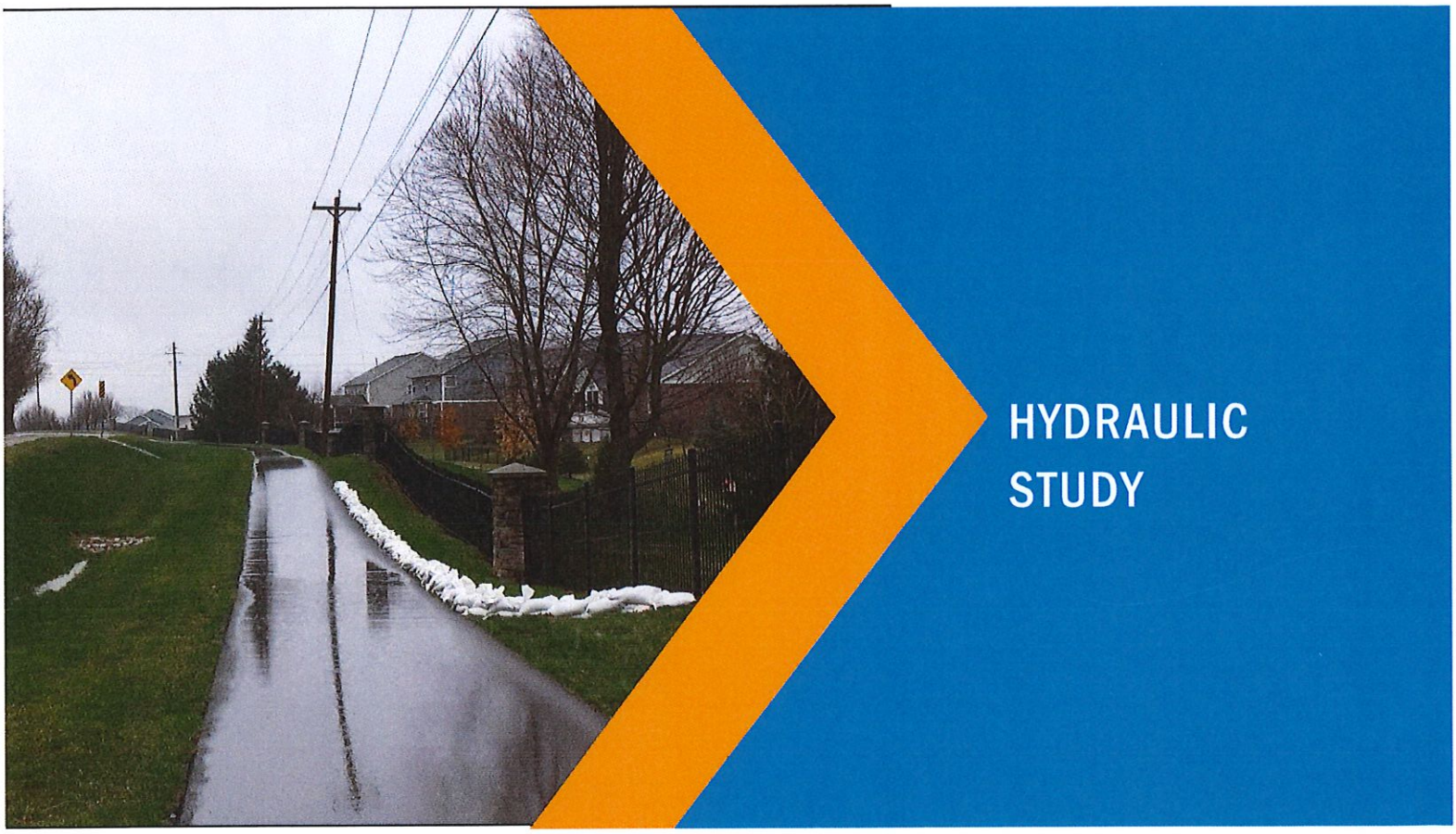
Sincerely,

Kenton C. Ward, CFM
Hamilton County Surveyor

KCW/pll

Clark Dietz

Engineering Quality of Life™



HYDRAULIC STUDY

Intracoastal at Geist Drainage Evaluation

Prepared for: Hamilton County Drainage Board

Prepared by: Clark Dietz, Inc.

Date: June 2020

TABLE OF CONTENTS

FIGURES

ATTACHMENTS

Intracoastal at Geist Drainage Evaluation

1.0 Executive Summary

This study evaluated the storm sewer in the Intracoastal at Geist subdivision. The project area is located south of 113th Street and west of Florida Road. The eastern half of the subdivision experiences flooding problems during heavy rainfall events.

The existing storm sewer ranges in size from 12" to 21" diameter. A hydraulic analysis of the system identified 12" and 15" diameter pipe segments with insufficient capacity to convey a 10-year frequency (Q10) storm event by gravity. The pipe segments are located along the north and east property line of the residence at 15088 Keel Road. The existing 12" pipe segment has a flow capacity of 10.3 cfs. The existing 15" pipe segment has a flow capacity of 12.7 cfs. The peak discharge at this location is 15.2 cfs for the Q10 event and 40.5 cfs for the Q100 event. This location is also lacking a defined overland flow spillway to route the Q100 storm downstream. As a result, during large storm events stormwater ponds at this location and floods the basement of the residence at 15088 Keel Road. Downstream of this location the storm sewer increases to a 21" diameter pipe. The 21" diameter pipes have capacity to convey the Q10 event by gravity and no overland flow obstructions are apparent that would cause flooding in larger than Q10 events.

This study investigated four main alternatives to solve the flooding problem. The alternatives included increasing storm sewer capacity, adding an emergency overflow flow spillway at the problem location, incorporating upstream detention, and rerouting upstream flow to the east. The goal of the alternatives is for the system to have the capacity to convey the Q10 storm by gravity within the storm sewer and route the Q100 storm overland without causing damage to the residences in the neighborhood.

The recommendation of this study is to replace the 12" and 15" diameter pipe segments with 18" and 21" diameter pipes and regrade the overland flow spillway between the residences where the flooding occurs. Two inlets connected to the 12" and 15" sewer will be replaced with larger capacity inlets. The low point of the trail, over the existing drain, also needs to be reconstructed a foot higher to an elevation of 816.0 feet. This will involve reconstructing 100 feet of the trail. The raised trail will provide an extra level of protection against stormwater overflowing into the subdivision and provide a small amount of additional storage between the road and the trail. This solution will allow the storm sewer to convey the Q10 event by gravity and reduce the flooding risk to residences for larger storm events. This option will have the least disruption to the neighborhood and was the lowest cost alternative.

2.0 Introduction

Clark Dietz was retained by the Hamilton County Drainage Board to prepare a drainage evaluation of the storm sewer system for the Intracoastal at Geist subdivision. The project area is located south of 113th Street and west of Florida Road. The eastern half of the subdivision east of Coupler Drive (the entrance into the subdivision) experiences flooding problems during heavy rainfall events.

The area north of 113th Street, including portions of the Indiana Gun Club and a Duke Energy's Geist 230 kv Substation, drains into the subdivision via three culverts under 113th Street. The drainage area north of 113th Street contributes 22.6 acres of runoff to the flooding area. An additional 4.2 acres of drainage area within the subdivision combines with the off-sight drainage at the problem area. Figure 1 shows the watershed subbasins that were analyzed for this study.

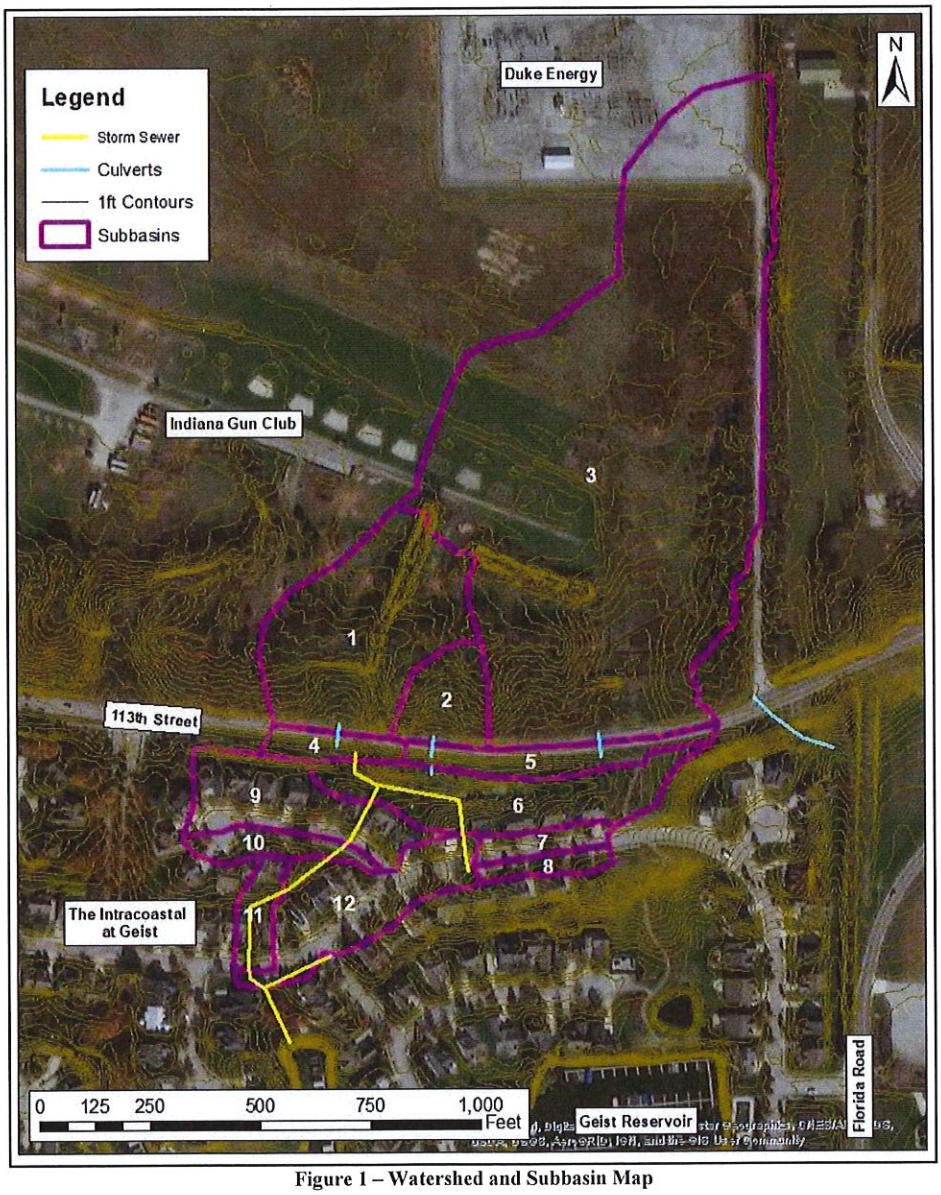


Figure 1 – Watershed and Subbasin Map

The flow from subbains 1 through 6 combine and are routed through a 15" diameter storm sewer. This storm system becomes a 21" diameter storm sewer which outlets into a boat docking channel connected to Geist Reservoir.

3.0 Hydrologic Analysis

3.1 Site Visit / Field Verification

Site visits were conducted on 2/11/2020 and 3/19/2020 to examine and confirm the drainage patterns of the contributing watershed. The first visit occurred on a dry day, the second during a rain event. The drainage patterns established with the Hamilton County 1-foot contours were confirmed with site observation.

3.2 Watershed Delineation

The 2016 Hamilton County 1-foot contours were used to delineate the watershed for the storm sewer and the subbasins. Three subbasins were identified north of 113th Street (subbasins 1 - 3) and another five subbasins within the subdivision contribute flow to the problem area (subbasins 4 - 8). Four additional subbasins were delineated that contribute runoff to the storm sewer downstream of the problem area before outletting to Geist Reservoir (subbasin 9 – 12).

3.3 Hydrologic Calculations

For each subbasin a Time of Concentration and a Travel Path were established. Aerial photography was used to establish land use. The USDA web soil survey was used to establish the soil types through the project area. The soil type and land use were used to establish the runoff curve numbers (CN). Hydrologic calculations for each subbasin are included in Attachment A.

3.4 Hydrologic Model

The Innovyze program XPSWMM 2019.1 was used to calculate the hydrologic flow inputs by using the SCS Method. Per the Hamilton County Stormwater Management Technical Standards Manual, hydrographs were established based on the 24-hour NRCS Type 2 Rainfall Distribution for the Q10 and Q100 design storms. Attachment B includes rainfall depth and distribution data used in the study.

4.0 Existing Storm Sewer Hydraulic Analysis

4.1 Existing System

A hydraulic model was created in XPSWMM with the hydrologic flow inputs described above and hydraulic routing geometry. Overland flow paths were established using the Hamilton County 1-foot contours. The size and elevation of the storm sewer were established using information from the Hamilton County GIS and as-built drawings. The size and elevation of the culverts under 113th Street were established using as-built drawings from the Roadway Resurfacing Plans for 113th Street, created in 2016. The three culverts under 113th Street, from west to east, are 24" CMP, 18" CMP, and 24" CMP.

On Newburyport Drive, two street inlets collect flow and route it north through a 12" RCP, connecting to an inlet structure, then continuing west (in a 12" RCP), joining another inlet structure, then flowing south in a 12" RCP to another inlet where the sewer is upsized to a 15" RCP between the houses at 15088 and 15098 Keel Road. At this location the storm sewers and overland flow from all of the contributing watershed from the north are collected and routed south through this 15" RCP storm sewer. The storm sewer becomes a 21" RCP at Keel

Road, then flows through the neighborhood (as shown on Figure 1), and discharges into the boat dock channel that connects to Geist Reservoir.

4.2 System Deficiencies

The 12" RCP located at the back 15088 Keel Road property line has a flow capacity of 10.3 cfs. The 15" RCP downstream of the 12" RCP has a flow capacity of 12.7 cfs. The peak discharge at this location is 15.2 cfs for the Q10 event and 40.5 cfs for the Q100 event. The 12" and 15" pipes are undersized to convey the Q10 event by gravity. When the storm sewer reaches its full capacity water from the northwest can overtop the trail and flow overland into the yard at 15088 Keel Road. Stormwater collects along the north side of the residence sometimes resulting in entry of water into a window well at the northwest corner of the house. Stormwater that collects in this area will eventually surface flow between the homes at 15088 and 15098 Keel Road out to Keel Road, then along Newburyport Drive to the storm sewer easement that discharges into Geist Reservoir. Approximately 30 cfs would would flow overland during a 100-year storm event, while the remaining flow (approximately 10 cfs) would discharge through the storm sewer.

5.0 Alternative Analysis

This study investigated four alternatives to solve the flooding problems in the Intracoastal at Geist subdivsion. The alternatives included increasing storm sewer capacity, improving the overland flow outlet at the problem location, incorporating upstream detention, and rerouting flow to the east. The performance goal of each alternative is to convey the Q10 storm by gravity within the storm sewer system and safely routing flows in excess of the Q10 event (up to the Q100 storm) overland through the neighborhood.

5.1 Alternative 1 –Increase Storm Sewer Capacity and Improve Overland Flow Outlet

Alternative 1 investigated the benefit of increasing the size of the storm sewer and overland flow route to increase capacity. The bottleneck point in the existing system is in the rear/side yard at 15088 Keel Road. At this location two 12" pipes join at an inlet structure, then are routed south through 26 feet of 12" diameter pipe, followed by 117 feet of 15" diameter pipe. The XPSWMM model shows both of these pipes need to be upsized to 21" diameter to convey the Q10 storm event by gravity. The pipes are located on the property line between 15088 and 15098 Keel Road. All of the pipes downstream of the 15" link are 21" in diameter and have sufficient capacity. Upstream of the junction the 12" diameter pipes to the northwest need to be replaced with 18" diameter pipes. In addition, inlet capacity needs to be improved by replacing existing inlets with larger structures capable of collecting (with minimal ponding) approximately 12 cfs. The inlets should be capable of passing flow with some debris clogging (larger behive or similar inlets). The proposed improvements are all located within the existing drainage easement. The location of the proposed storm pipes are shown in Figure 2.

The capacity of the storm sewer downstream of the project area was evaluated to verify it has enough capacity to receive the additional flow from the proposed improvements. The strom sewer was evaluated all the way to the discharge point at Geist Reservoir in the hydraulic model. The storm sewer downstream of the project area is appropriately sized for existing flows and has enough capacity to take the additional flow from the proposed improvements.

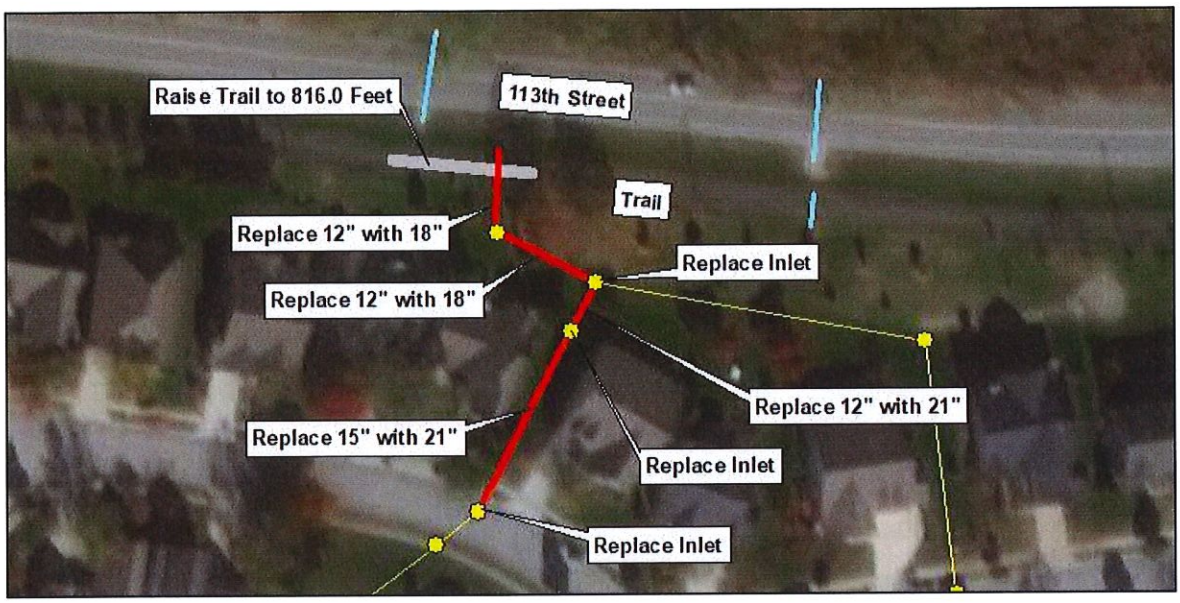


Figure 2 – Alternative 1 – Location of Storm Pipes

The storm sewer pipe replacements alone will not eliminate flooding issues at the problem location for storm events greater than a Q10. An improved overland flow route is also needed to provide protection up to the Q100 event.

An improved overland flow swale would be constructed between the residences at 15088 and 15098 Keel Road. The swale would begin between the back corner of the neighboring houses at a depth of 1.5 feet below the existing ground. The swale would be graded to meet existing ground at the sidewalk at the front of the property. Decorative landscaping and utility boxes are located in the drainage easement that would need to be relocated to accommodate the swale path, though it may be possible to construct the swale around the utility boxes. The conflicts are shown in Figure 3. A preliminary grading plan and typical cross section between the homes are shown in Figures 4 and 5, respectively.

The low point of the trail, over the existing drain, needs to be reconstructed a foot higher to an elevation of 816.0 feet. This will involve reconstructing 100 feet of the trail. The raised trail will provide an extra level of protection against stormwater overflowing into the subdivision and provide a small amount of additional storage between the road and the trail.

This alternative would increase flow in the storm system and decrease the amount of flow discharging overfland. Overland flow would be reduced from approximately 30 cfs to 15 cfs during a 100-year event. The combination of the overland swale and the upgraded storm pipe will allow storm events up to the Q10 year event to be conveyed via the storm sewer system, while larger flows (up to the Q100 event) will flow overland in the improved swale between the homes. The risk of basement flooding at 15088 Keel Road will be significantly reduced.

The construction cost for the overland swale is incidental to the storm sewer replacement and would only involve final grading and sodding. The total cost for this alternative is estimated to be $109,000.

Figure 3 – Overland Swale

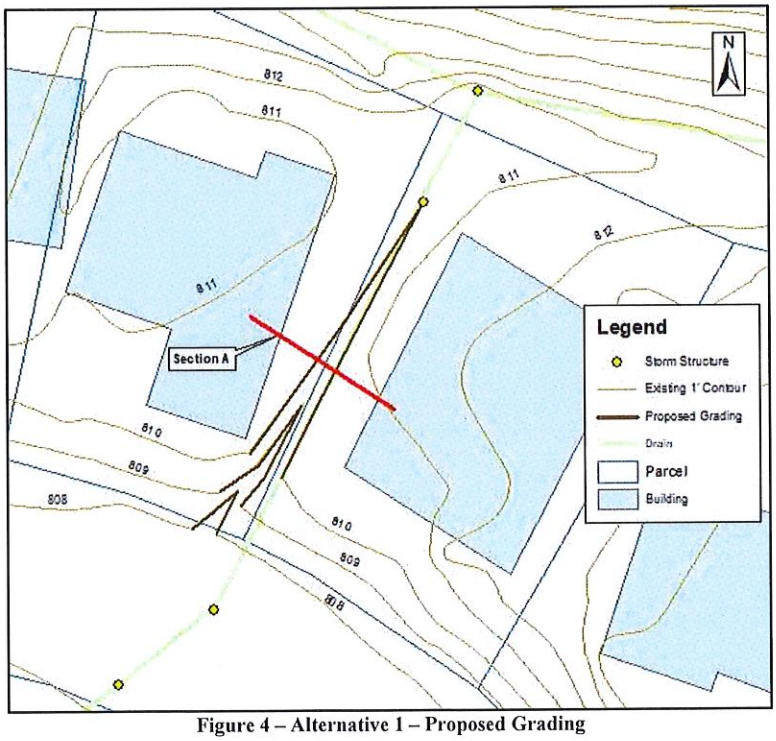


Figure 4 – Alternative 1 – Proposed Grading

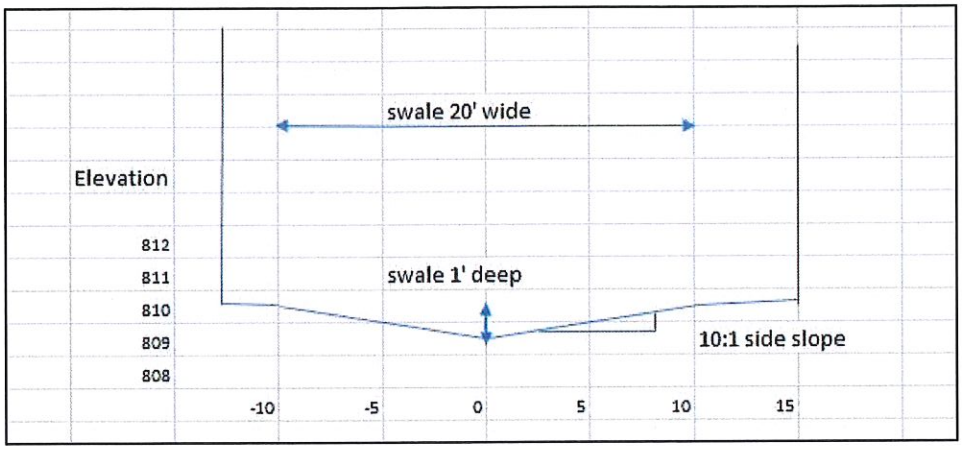


Figure 5 – Swale Cross Section A

5.2 Alternative 2 – Upstream Detention

Alternative 2 investigated the benefit of incorporating detention in the watershed to reduce the peak discharge to the existing storm sewer. Potential detention locations were investigated north of 113th Street and in the area between 113th Street and the trail that runs along the south side of 113th Street.

Detention North of 113th Street

A detention pond could be constructed north of 113th Street upstream of the eastern most culvert that contributes most of the flow to the storm system (see Figure 6). Approximately two thirds of the watershed (17.9 acres), drains through this culvert. This location is not part of the existing drainage easement and is owned by the Indiana Trapshooter's Association. Construction of a detention pond at this location would involve removal of trees from a heavily wooded area and soil removal from the hillside north of 113th Street. A detention facility at this location would reduce the peak discharge to the existing storm sewer and allow it to convey the Q10 event by gravity. The detention pond alone would not eliminate pressure flow from occurring in the northwest segment of the storm sewer up to the Q100 event. Eliminating trail overflow at this location is a priority. The northwest segment of the sewer needs to be upgraded to 18" diameter pipe to prevent pressure flow. The 12" and 15" pipes downstream of the junction also need to be upgraded to 18" pipes. These upgrades will require the replacement of 3 inlet structures. Figure 6 shows the location of the detention pond and storm sewer improvements.

The low point of the trail, over the existing drain, needs to be reconstructed a foot higher to an elevation of 816.0 feet. This will involve reconstructing 100 feet of the trail. The raised trail will provide an extra level of protection against stormwater overflowing into the development and provide a small amount of additional storage between the road and the trail.

The overland swale improvements (described in Alternative 1) would still be required to reduce the flooding risk for residents for storm events up to the Q100 event. The total cost for the detention pond alternative north of 113th Street is estimated to be $346,000.

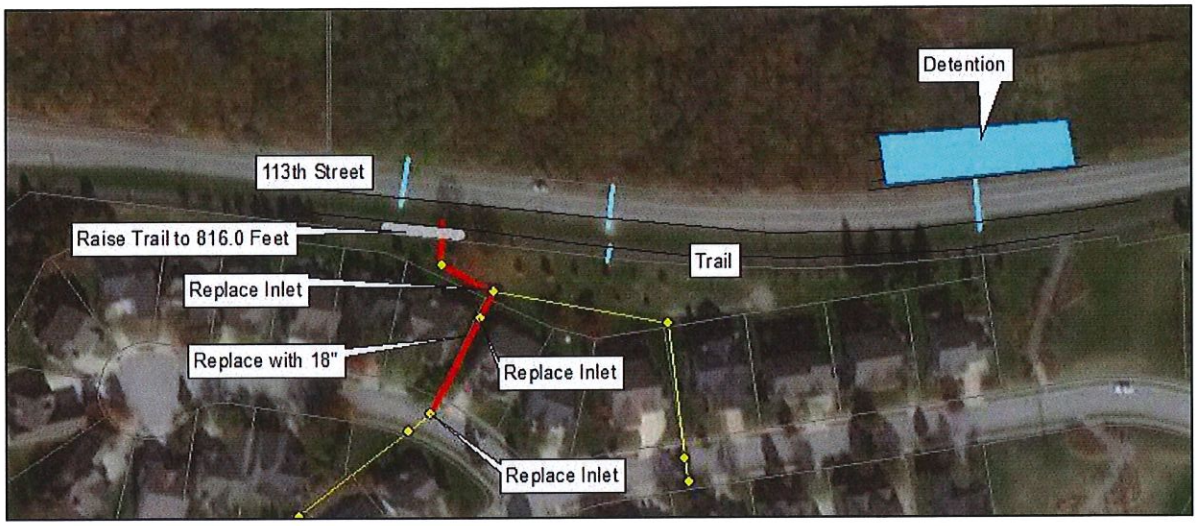


Figure 6 – Detention Pond – North of 113th Street

Detention between 113th Street and the Trail

A detention pond located between 113th Street and the Trail was investigated, see Figure 7. The topography of 113th street decreases by 5 feet from the east side of the investigation area to the west. This location is not ideal for a detention pond. This location would create a potential safety hazard. A raised pond outlet structure and ponded water next to the road may require a guard rail to prevent vehicles from accidently veering off the road and entering the detention area. To create an area suitable for detention, the trail would need to be raised adjacent to the proposed detention. Between the road and the trail there is not enough room to use 3:1 side slopes to reach the required detention depth so a retaining wall would need to be constructed. A pond at this location would not eliminate pressure flow in the northwest section of the stormsewer, and pipe capacity upgrades would still be necessary. A pond is not recommended at this location because of its physical constraints, complexity, and overall cost.

Figure 7 – Detention Pond – Between 113th Street and Trail

Detention between the Trail and Subdivision

A detention pond located in a common area between the trail and the subdivision was investigated (see Figure 8). The topography of this area slopes down from the east to west. Placing a detention pond at this location would require excavation of existing ground to the east and building up a new embankement to the west. The detention pond would outlet to the existing storm sewer. The proposed detention site is not located in an existing drainage easement so the property would need to be acquired from the Homeowners Association for the Intracoastal at Geist. Construction of a detention pond at this location would include regrading, and installation of a pipe and outlet structure. Special care would need to be taken to ensure the grading work would not direct offsite flows toward residences and create additional flooding problems. Proposed detention at this site would reduce the peak discharge to the existing storm sewer and would allow it to convey the Q10 event by gravity. The detention pond alone would not eliminate pressure flow from occurring in the northwest segment of the storm sewer up to the Q100 event. Eliminating trail overflow at this location is a priority. The northwest segment of the sewer needs to be upgraded to 18" diameter pipe to prevent pressure flow. The 12" and 15" pipes downstream of the junction also need to be upgraded to 18" pipes. These upgrades will require the replacement of 3 inlet structures. Figure 8 shows the location of the detention pond and storm sewer improvements.

The low point of the trail, over the existing drain, needs to be reconstructed a foot higher to an elevation of 816.0 feet. This will involve reconstructing 100 feet of the trail. The raised trail will provide an extra level of protection against stormwater overflowing into the development and provide a small amount of additional storage between the road and the trail.

The overland swale improvements described in Alternative 1 would still be required to reduce the flooding risk for residents for storm events up to the Q100 event. The total cost for this detention pond alternative is estimated to be $286,000. A pond is not recommented at this location because of its cost and complexity. In addition, it's likely residents adjacent to the detention area would not view this as a desirable "improvement".

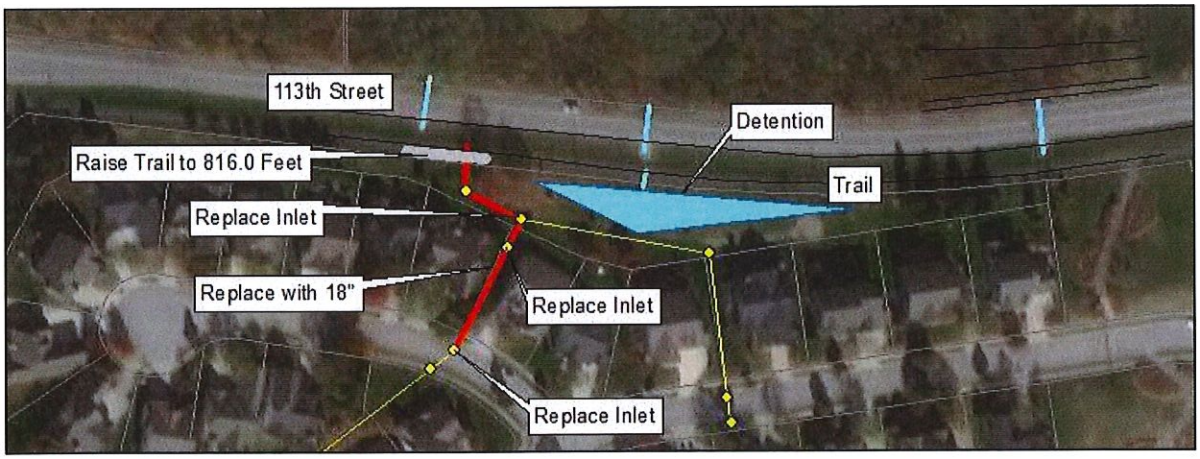


Figure 8 – Detention Pond – Between Trail and Subdivision

5.3 Alternative 3 – Reroute Flow to the East

Alternative 3 investigated the benefit of diverting flow from the watershed subbasin northeast of the subdivision. This subbasin includes a drainage area of 17.9 acres, shown in Figure 9.

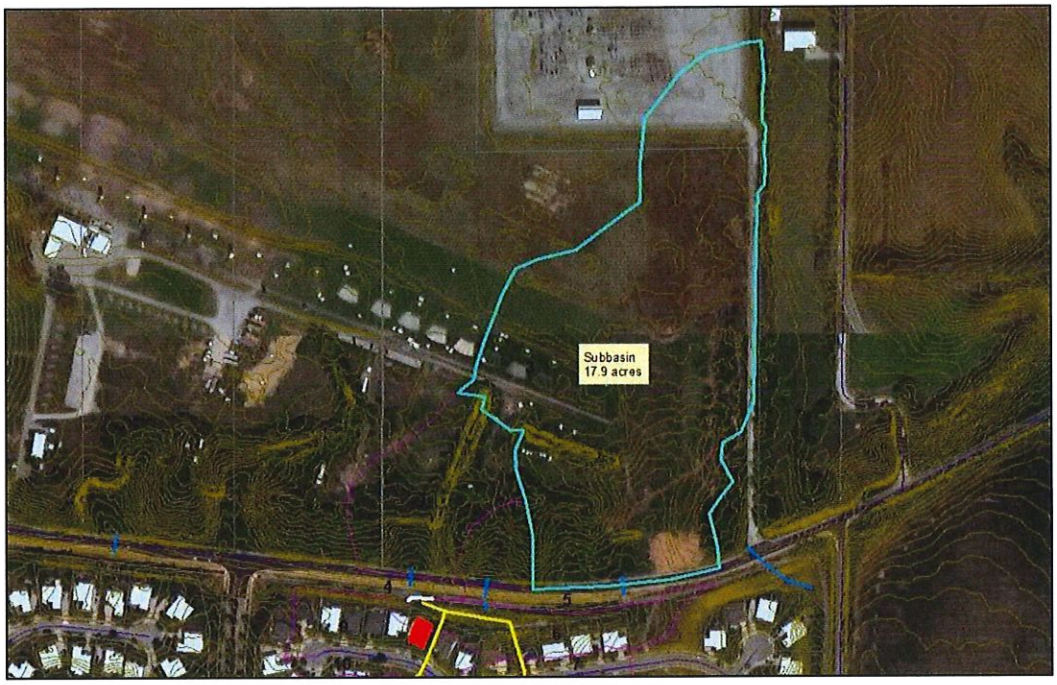


Figure 9 – Northeast Watershed Subbasin

Flow from this area currently is routed through a 24" culvert under 113th Street and then travels overland to the storm sewer to the west. The culvert could be replaced with a 700 foot long storm pipe, 24 inches in diameter, that redirects the flow directly to Geist Reservoir. The proposed route is shown in Figure 10.

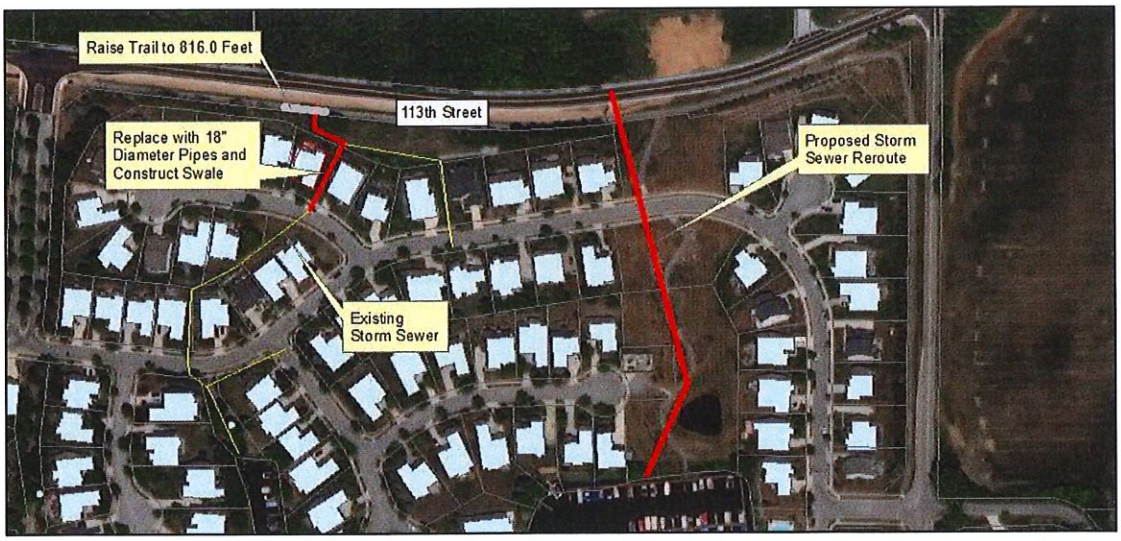


Figure 10 – Storm Sewer Reroute

By diverting flow from the northeast directly to the reservoir, the peak discharge to the existing storm sewer would be reduced allowing the Q10 event to be conveyed by gravity. The detention pond alone would not eliminate pressure flow from occurring in the northwest segment of the storm sewer up to the Q100 event. Eliminating trail overflow at this location is a priority. The northwest segment of the sewer needs to be upgraded to 18" diameter pipe to prevent pressure flow. The 12" and 15" pipes downstream of the junction also need to be upgraded to 18" pipes. These upgrades will require the replacement of 3 inlet structures.

The low point of the trail, over the existing drain, needs to be reconstructed a foot higher to an elevation of 816.0 feet. This will involve reconstructing 100 feet of the trail. The raised trail will provide an extra level of protection against stormwater overflowing into the development and provide a small amount of additional storage between the road and the trail.

The proposed route to the east is not part of the existing drainage easement. The property is currently owned by the homeowners association for the Intracoastal at Geist. This land would need to be purchased or donated to become a permanent drainage easement. High voltage electric lines run along this parcel from north to south that a contractor would have to work around. The total cost for constructing Alternative 3 is estimated to be $325,000.

6.0 Recommendations

The recommendation of this study is to construct Alternative 1, which includes replacing existing 12" and 15" diameter pipe segments with 18" and 21" diameter pipes and improving the overland flow outlet between the residences at 15088 and 15098 Keel Road. The three inlets connected to the proposed pipe will be replaced with higher capacity inlets. The low point of the trail, over the existing drain, also needs to be reconstructed a foot higher to an elevation of 816.0 feet. This will involve reconstructing 100 feet of the trail. The raised trail will provide an extra level of protection against stormwater overflowing into the subdivision and provide a small amount of additional storage between the road and the trail. This solution will allow the storm sewer to convey the Q10 event by gravity and reduce the flooding risk to residences for larger storm events. This option will have the lowest disruption impact to the neighborhood and was the lowest cost alternative that was investigated.

The estimated cost of the recommended improvements is $109,000. A detailed breakdown of the cost estimate for each of the alternatives is included in Attachment 3. Project cost sharing and implementation steps will need to be considered by the Hamilton County Drainage Board, City of Fishers and Intracoastal at Geist Homeowners Association.

It is also recommended that future development north of 113th Street be required to route their stormwater discharge directly to Geist Reservoir rather than into the regulated drain. This will ensure that the regulated drain has the necessary capacity into the future.

ATTACHMENT 1:

Hydrologic Calculations

ClarkDietz

Project// Intercoastal at Geist — Subbasin 1
Project No.// H0210350
Subject// Discharge Calculation — Page// ____ of ____
Prepared By// BEP — Date// 3/18/2020
Checked By// HP — Date// 5/15/2020

Watershed 1 Site Data:

Geographic Area Descriptions	Soil Type	Runoff Curve (C)	Area (Sq. Ft.)	Area (acres) (A)	CxA
Road	N/A	98		0.00	0.00
Agriculture	A	67		0.00	0.00
Forest	A	36		0.00	0.00
HD-Residential	A	54		0.00	0.00
LD-Residential	A	46		0.00	0.00
Agriculture	B	76		0.00	0.00
Commercial	B	92		0.00	0.00
Forest	B	65	93400	2.14	139.37
Grass/Pasture	B	69	16500	0.38	26.14
HD-Residential	B	70		0.00	0.00
LD-Residential	B	65		0.00	0.00
Agriculture	C	83		0.00	0.00
Commercial	C	94		0.00	0.00
Forest	C	70	19500	0.45	31.34
Grass/Pasture	C	79	34500	0.79	62.57
HD-Residential	C	80		0.00	0.00
LD-Residential	C	77		0.00	0.00
Commercial	D	95		0.00	0.00
Forest	D	79		0.00	0.00
Grass/Pasture	D	84		0.00	0.00
LD-Residential	D	82		0.00	0.00
		Totals =	163,900	3.76	259.41
		Area Sq. Mi. =	0.0059		

Weighted C = 68.9

Note - Curve Numbers taken from *Urban Hydrology for Small Watersheds,* Technical Release TR 55, United States of Agriculture, Natural Resources Conservation Service, Table 2-2a, 1986

ClarkDietz

Project// Intercoastal at Geist — Subbasin 1
Project No.// H0210350
Subject// Discharge Calculation — Page// ____ of ____
Prepared By// BEP — Date// 3/18/2020
Checked By// HP — Date// 5/15/2020

Time of Concentration: Watershed 1

Sheet Flow (Applicable to Tc only)

1	Surface Description	S Grass	
2	Manning's Roughness Coeff.,...n (See Figure 202-2B)	0.150	
	Max. Flow Elev.(ft)=	839.2	
	Min. Flow Elev. (ft)=	838.8	
3	Flow length, L .....ft.	93.0	
4	Two-yr 24hr Rainfall[1], P2...in.	2.90	
5	Land Slope (ft/ft)=	0.0043	
6	Tt = 0.007 (nL)^0.8/P2^0.5 * S^0.4 Computed Tt....hr.	0.299 hr	

Shallow Concentration Flow

7	Surface description (paved or unpaved).....	unpaved	unpaved
	Max. Elevation, ...ft	838.80	832.00
	Min Elevation, ...ft	832.00	818.70
8	Flow length, L.....ft.	249.0	166.0
9	Watercourse slope, s.....ft/ft	0.0273	0.0801
10	Average velocity, V ..ft/s(INDOT eq 29-7.7 or7.8)	2.67	4.57
11	Tt = L/(3600 V).....Computed Tt..hr.	0.026 hr	0.010 hr

Channel Flow

Trapezoidal Channel Geometry (Estimated from Survey/Quad maps)

	1	2
b =		
d =		
SS =		
Angle =	0	0

		1	2
12	Cross sectional flow area, a.....ft^2		
13	Wetted perimeter, Pw.....ft		
14	Hydraulic radius, r=a/Pw Compute r....ft		
	Max. Elev of channel, ...(ft) =		
	Min. Elev of channel, ...(ft) =		
15	Channel slope length,s.....ft/ft		
16	Manning's roughness coeff.,n .Based on stream type		
17	V =(1.49 r^2/3 s^1/2)/n Computed V...ft/s		
18	Flow length from shallow to Structure, L .....ft.		
19	Tt = L/(3600 V).....Computed Tt..hr.		
20	Watershed or Subarea Tc or Tt (add Tt in steps 6, 11, and 19)	**0.335 hr**	

or

20.1 min

Notes

1) - 2-year 24 hour rainfall was taken from NOAA Atlas 14, Volume 2

ClarkDietz

Project// Intercoastal at Geist
Project No.// H0210350
Subject// Discharge Calculation
Prepared By// BEP
Checked By// HP

Subbasin 2

Page// ____ of ____
Date// 3/18/2020
Date// 5/15/2020

Watershed 2 Site Data:

Geographic Area Descriptions	Soil Type	Runoff Curve (C)	Area (Sq. Ft.)	Area (acres) (A)	CxA
Road	N/A	98		0.00	0.00
Agriculture	A	67		0.00	0.00
Forest	A	36		0.00	0.00
HD-Residential	A	54		0.00	0.00
LD-Residential	A	46		0.00	0.00
Agriculture	B	76		0.00	0.00
Commercial	B	92		0.00	0.00
Forest	B	65	40000	0.92	59.69
Grass/Pasture	B	69		0.00	0.00
HD-Residential	B	70		0.00	0.00
LD-Residential	B	65		0.00	0.00
Agriculture	C	83		0.00	0.00
Commercial	C	94		0.00	0.00
Forest	C	70		0.00	0.00
Grass/Pasture	C	79		0.00	0.00
HD-Residential	C	80		0.00	0.00
LD-Residential	C	77		0.00	0.00
Commercial	D	95		0.00	0.00
Forest	D	79		0.00	0.00
Grass/Pasture	D	84		0.00	0.00
LD-Residential	D	82		0.00	0.00
		Totals =	40,000	0.92	59.69
		Area Sq. Mi. =	0.0014		
				Weighted C =	65.0

Note - Curve Numbers taken from *Urban Hydrology for Small Watersheds,* Technical Release TR 55, United States of Agriculture, Natural Resources Conservation Service, Table 2-2a, 1986

ClarkDietz

Project// Intercoastal at Geist
Project No.// H0210350
Subject// Discharge Calculation
Prepared By// BEP
Checked By// HP

Subbasin 2

Page// ____ of ____
Date// 3/18/2020
Date// 5/15/2020

Time of Concentration: Watershed 2

Sheet Flow (Applicable to Tc only)

1	Surface Description	D Woods	
2	Manning's Roughness Coeff.,...n (See Figure 202-2B)	0.800	
	Max. Flow Elev.(ft)=	840.2	
	Min. Flow Elev. (ft)=	837.0	
3	Flow length, L .....ft.	70.0	
4	Two-yr 24hr Rainfall[1], P2...in.	2.90	
5	Land Slope (ft/ft)=	0.0457	
6	Tt = 0.007 (nL)^0.8/P2^0.5 * S^0.4 Computed Tt....hr.	0.354 hr	

Shallow Concentration Flow

7	Surface description (paved or unpaved).....	unpaved	
	Max. Elevation, ...ft	837.00	
	Min Elevation, ...ft	824.50	
8	Flow length, L.....ft.	165.0	
9	Watercourse slope, s.....ft/ft	0.0758	
10	Average velocity, V ..ft/s(INDOT eq 29-7.7 or7.8)	4.44	
11	Tt = L/(3600 V).....Computed Tt..hr.	0.010 hr	

Channel Flow

Trapezoidal Channel Geometry (Estimated from Survey/Quad maps)

	1	2
b =		
d =		
SS =		
Angle =	0	0

		1	2
12	Cross sectional flow area, a.....ft^2		
13	Wetted perimeter, Pw.....ft		
14	Hydraulic radius, r=a/Pw Compute r....ft		
	Max. Elev of channel, ...(ft) =		
	Min. Elev of channel, ...(ft) =		
15	Channel slope length,s.....ft/ft		
16	Manning's roughness coeff.,n .Based on stream type		
17	V =(1.49 r^2/3 s^1/2)/n Computed V...ft/s		
18	Flow length from shallow to Structure, L .....ft.		
19	Tt = L/(3600 V).....Computed Tt..hr.		
20	Watershed or Subarea Tc or Tt (add Tt in steps 6, 11, and 19)	**0.364 hr**	

or

21.8 min

Notes

1) - 2-year 24 hour rainfall was taken from NOAA Atlas 14, Volume 2

ClarkDietz

Project// Intercoastal at Geist — Subbasin 3
Project No.// H0210350
Subject// Discharge Calculation — Page// ____ of ____
Prepared By// BEP — Date// 3/18/2020
Checked By// HP — Date// 5/15/2020

Watershed 3 Site Data:

Geographic Area Descriptions	Soil Type	Runoff Curve (C)	Area (Sq. Ft.)	Area (acres) (A)	CxA
Road	N/A	98		0.00	0.00
Agriculture	A	67		0.00	0.00
Forest	A	36		0.00	0.00
HD-Residential	A	54		0.00	0.00
LD-Residential	A	46		0.00	0.00
Agriculture	B	76		0.00	0.00
Commercial	B	92		0.00	0.00
Forest	B	65	88000	2.02	131.31
Grass/Pasture	B	69	400500	9.19	634.40
HD-Residential	B	70		0.00	0.00
LD-Residential	B	65		0.00	0.00
Agriculture	C	83		0.00	0.00
Commercial	C	94		0.00	0.00
Forest	C	70		0.00	0.00
Grass/Pasture	C	79	287000	6.59	520.50
HD-Residential	C	80		0.00	0.00
LD-Residential	C	77		0.00	0.00
Commercial	D	95		0.00	0.00
Forest	D	79		0.00	0.00
Grass/Pasture	D	84		0.00	0.00
LD-Residential	D	82		0.00	0.00
		Totals =	775,500	17.80	1286.21
		Area Sq. Mi. =	0.0278		

Weighted C = 72.2

Note - Curve Numbers taken from *Urban Hydrology for Small Watersheds,* Technical Release TR 55, United States of Agriculture, Natural Resources Conservation Service, Table 2-2a, 1986

ClarkDietz

Project// Intercoastal at Geist — Subbasin 3
Project No.// H0210350
Subject// Discharge Calculation — Page// ____ of ____
Prepared By// BEP — Date// 3/18/2020
Checked By// HP — Date// 5/15/2020

Time of Concentration: Watershed 3

Sheet Flow (Applicable to Tc only)

1	Surface Description	S Grass	
2	Manning's Roughness Coeff.,...n (See Figure 202-2B)	0.150	
	Max. Flow Elev.(ft)=	845.2	
	Min. Flow Elev. (ft)=	843.0	
3	Flow length, L .....ft.	85.0	
4	Two-yr 24hr Rainfall[1], P2...in.	2.90	
5	Land Slope (ft/ft)=	0.0259	
6	Tt = 0.007 (nL)^0.8/P2^0.5 * S^0.4 Computed Tt....hr.	0.136 hr	

Shallow Concentration Flow

7	Surface description (paved or unpaved).....	unpaved	unpaved
	Max. Elevation, ...ft	843.00	836.50
	Min Elevation, ...ft	836.50	826.40
8	Flow length, L.....ft.	940.0	658.0
9	Watercourse slope, s.....ft/ft	0.0069	0.0153
10	Average velocity, V ..ft/s(INDOT eq 29-7.7 or7.8)	1.34	2.00
11	Tt = L/(3600 V).....Computed Tt..hr.	0.195 hr	0.091 hr

Channel Flow

Trapezoidal Channel Geometry (Estimated from Survey/Quad maps)

	1	2
b =		
d =		
SS =		
Angle =	0	0

		1	2
12	Cross sectional flow area, a.....ft^2		
13	Wetted perimeter, Pw.....ft		
14	Hydraulic radius, r=a/Pw Compute r....ft		
	Max. Elev of channel, ...(ft) =		
	Min. Elev of channel, ...(ft) =		
15	Channel slope length,s.....ft/ft		
16	Manning's roughness coeff.,n .Based on stream type		
17	V =(1.49 r^2/3 s^1/2)/n Computed V...ft/s		
18	Flow length from shallow to Structure, L .....ft.		
19	Tt = L/(3600 V).....Computed Tt..hr.		
20	Watershed or Subarea Tc or Tt (add Tt in steps 6, 11, and 19)	**0.422 hr**	

or

25.3 min

Notes

1) - 2-year 24 hour rainfall was taken from NOAA Atlas 14, Volume 2

ClarkDietz

Project// Intercoastal at Geist
Project No.// H0210350
Subject// Discharge Calculation
Prepared By// BEP
Checked By// HP

Subbasin 4

Page// ____ of ____
Date// 3/19/2020
Date// 5/15/2020

Watershed 4 Site Data:

Geographic Area Descriptions	Soil Type	Runoff Curve (C)	Area (Sq. Ft.)	Area (acres) (A)	CxA
Road	N/A	98	10730	0.25	24.14
Agriculture	A	67		0.00	0.00
Forest	A	36		0.00	0.00
HD-Residential	A	54		0.00	0.00
LD-Residential	A	46		0.00	0.00
Agriculture	B	76		0.00	0.00
Commercial	B	92		0.00	0.00
Forest	B	65		0.00	0.00
Grass/Pasture	B	69	9000	0.21	14.26
HD-Residential	B	70		0.00	0.00
LD-Residential	B	65		0.00	0.00
Agriculture	C	83		0.00	0.00
Commercial	C	94		0.00	0.00
Forest	C	70		0.00	0.00
Grass/Pasture	C	79		0.00	0.00
HD-Residential	C	80		0.00	0.00
LD-Residential	C	77		0.00	0.00
Commercial	D	95		0.00	0.00
Forest	D	79		0.00	0.00
Grass/Pasture	D	84		0.00	0.00
LD-Residential	D	82		0.00	0.00
		Totals =	19,730	0.45	38.40
		Area Sq. Mi. =	0.0007		
				Weighted C =	84.8

Note - Curve Numbers taken from *Urban Hydrology for Small Watersheds,* Technical Release TR 55, United States of Agriculture, Natural Resources Conservation Service, Table 2-2a, 1986

ClarkDietz

Project// Intercoastal at Geist — Subbasin 4
Project No.// H0210350
Subject// Discharge Calculation — Page// ____ of ____
Prepared By// BEP — Date// 3/19/2020
Checked By// HP — Date// 5/15/2020

Time of Concentration: Watershed 4

Sheet Flow (Applicable to Tc only)

1	*Surface Description .....*	*Smooth*	
2	*Manning's Roughness Coeff.,...n (See Figure 202-2B)*	*0.011*	
	Max. Flow Elev.(ft)=	*817.8*	
	Min. Flow Elev. (ft)=	*816.8*	
3	*Flow length, L .....ft.*	*33.0*	
4	*Two-yr 24hr Rainfall*[1]*, P2...in.*	*2.90*	
5	*Land Slope (ft/ft)=*	*0.0303*	
6	*Tt = 0.007 (nL)^0.8/P2^0.5 * S^0.4 Computed Tt....hr.*	*0.007 hr*	

Shallow Concentration Flow

7	*Surface description (paved or unpaved).....*	*unpaved*	
	Max. Elevation, ...ft	*816.80*	
	Min Elevation, ...ft	*814.50*	
8	*Flow length, L.....ft.*	*177.0*	
9	*Watercourse slope, s.....ft/ft*	*0.0130*	
10	*Average velocity, V ..ft/s(INDOT eq 29-7.7 or7.8)*	*1.84*	
11	*Tt = L/(3600 V).....Computed Tt..hr.*	*0.027 hr*	

Channel Flow

Trapezoidal Channel Geometry (Estimated from Survey/Quad maps)

	1	*2*
b =		
d =		
SS =		
Angle =	*0*	*0*

		1	2
12	*Cross sectional flow area, a.....ft^2*		
13	*Wetted perimeter, Pw.....ft*		
14	*Hydraulic radius, r=a/Pw Compute r....ft*		
	Max. Elev of channel, ...(ft) =		
	Min. Elev of channel, ...(ft) =		
15	*Channel slope length,s.....ft/ft*		
16	*Manning's roughness coeff.,n .Based on stream type*		
17	*V =(1.49 r^2/3 s^1/2)/n Computed V...ft/s*		
18	*Flow length from shallow to Structure, L .....ft.*		
19	*Tt = L/(3600 V).....Computed Tt..hr.*		
20	*Watershed or Subarea Tc or Tt (add Tt in steps 6, 11, and 19)*	***0.034 hr***	

or

Use	***2.0 min***
	5 Min

Notes

1) - 2-year 24 hour rainfall was taken from NOAA Atlas 14, Volume 2

ClarkDietz

Project// Intercoastal at Geist — Subbasin 5
Project No.// H0210350
Subject// Discharge Calculation — Page// ____ of ____
Prepared By// BEP — Date// 3/19/2020
Checked By// HP — Date// 5/15/2020

Watershed 5 Site Data:

Geographic Area Descriptions	Soil Type	Runoff Curve (C)	Area (Sq. Ft.)	Area (acres) (A)	CxA
Road	N/A	98	15950	0.37	35.88
Agriculture	A	67		0.00	0.00
Forest	A	36		0.00	0.00
HD-Residential	A	54		0.00	0.00
LD-Residential	A	46		0.00	0.00
Agriculture	B	76		0.00	0.00
Commercial	B	92		0.00	0.00
Forest	B	65		0.00	0.00
Grass/Pasture	B	69	22500	0.52	35.64
HD-Residential	B	70		0.00	0.00
LD-Residential	B	65		0.00	0.00
Agriculture	C	83		0.00	0.00
Commercial	C	94		0.00	0.00
Forest	C	70		0.00	0.00
Grass/Pasture	C	79		0.00	0.00
HD-Residential	C	80		0.00	0.00
LD-Residential	C	77		0.00	0.00
Commercial	D	95		0.00	0.00
Forest	D	79		0.00	0.00
Grass/Pasture	D	84		0.00	0.00
LD-Residential	D	82		0.00	0.00
		Totals =	38,450	0.88	71.52
		Area Sq. Mi. =	0.0014		
				Weighted C =	81.0

Note - Curve Numbers taken from *Urban Hydrology for Small Watersheds,* Technical Release TR 55, United States of Agriculture, Natural Resources Conservation Service, Table 2-2a, 1986

ClarkDietz

Project// Intercoastal at Geist
Project No.// H0210350
Subject// Discharge Calculation
Prepared By// BEP
Checked By// HP

Subbasin 5

Page// ____ of ____
Date// 3/19/2020
Date// 5/15/2020

Time of Concentration: Watershed 5

Sheet Flow (Applicable to Tc only)

1	Surface Description	Smooth	
2	Manning's Roughness Coeff.,...n (See Figure 202-2B)	0.011	
	Max. Flow Elev.(ft)=	832.2	
	Min. Flow Elev. (ft)=	830.5	
3	Flow length, L .....ft.	32.0	
4	Two-yr 24hr Rainfall[1], P2...in.	2.90	
5	Land Slope (ft/ft)=	0.0531	
6	Tt = 0.007 (nL)^0.8/P2^0.5 * S^0.4 Computed Tt....hr.	0.006 hr	

Shallow Concentration Flow

7	Surface description (paved or unpaved).....	unpaved	
	Max. Elevation, ...ft	830.50	
	Min Elevation, ...ft	817.50	
8	Flow length, L.....ft.	636.0	
9	Watercourse slope, s.....ft/ft	0.0204	
10	Average velocity, V ..ft/s(INDOT eq 29-7.7 or7.8)	2.31	
11	Tt = L/(3600 V).....Computed Tt..hr.	0.077 hr	

Channel Flow

Trapezoidal Channel Geometry (Estimated from Survey/Quad maps)

	1	2
b =		
d =		
SS =		
Angle =	0	0

		1	2
12	Cross sectional flow area, a.....ft^2		
13	Wetted perimeter, Pw.....ft		
14	Hydraulic radius, r=a/Pw Compute r....ft		
	Max. Elev of channel, ...(ft) =		
	Min. Elev of channel, ...(ft) =		
15	Channel slope length,s.....ft/ft		
16	Manning's roughness coeff.,n .Based on stream type		
17	V =(1.49 r^2/3 s^1/2)/n Computed V...ft/s		
18	Flow length from shallow to Structure, L .....ft.		
19	Tt = L/(3600 V).....Computed Tt..hr.		
20	Watershed or Subarea Tc or Tt (add Tt in steps 6, 11, and 19)	**0.082 hr**	

or

Use	**4.9 min**
	5 Min

Notes

1) - 2-year 24 hour rainfall was taken from NOAA Atlas 14, Volume 2

ClarkDietz

Project// Intercoastal at Geist — Subbasin 6
Project No.// H0210350
Subject// Discharge Calculation — Page// ____ of ____
Prepared By// BEP — Date// 3/19/2020
Checked By// HP — Date// 5/15/2020

Watershed 6 Site Data:

Geographic Area Descriptions	Soil Type	Runoff Curve (C)	Area (Sq. Ft.)	Area (acres) (A)	CxA
Road	N/A	98		0.00	0.00
Agriculture	A	67		0.00	0.00
Forest	A	36		0.00	0.00
HD-Residential	A	54		0.00	0.00
LD-Residential	A	46		0.00	0.00
Agriculture	B	76		0.00	0.00
Commercial	B	92		0.00	0.00
Forest	B	65		0.00	0.00
Grass/Pasture	B	69		0.00	0.00
HD-Residential	B	70		0.00	0.00
LD-Residential	B	65	95396	2.19	142.35
Agriculture	C	83		0.00	0.00
Commercial	C	94		0.00	0.00
Forest	C	70		0.00	0.00
Grass/Pasture	C	79		0.00	0.00
HD-Residential	C	80		0.00	0.00
LD-Residential	C	77		0.00	0.00
Commercial	D	95		0.00	0.00
Forest	D	79		0.00	0.00
Grass/Pasture	D	84		0.00	0.00
LD-Residential	D	82		0.00	0.00
		Totals =	95,396	2.19	142.35
		Area Sq. Mi. =	0.0034		

Weighted C = 65.0

Note - Curve Numbers taken from *Urban Hydrology for Small Watersheds,* Technical Release TR 55, United States of Agriculture, Natural Resources Conservation Service, Table 2-2a, 1986

ClarkDietz

Project// Intercoastal at Geist
Project No.// H0210350
Subject// Discharge Calculation
Prepared By// BEP
Checked By// HP

Subbasin 6

Page// _____ of _____
Date// 3/19/2020
Date// 5/15/2020

Time of Concentration: Watershed 6

Sheet Flow (Applicable to Tc only)

1	Surface Description	S Grass	
2	Manning's Roughness Coeff.,...n (See Figure 202-2B)	0.150	
	Max. Flow Elev.(ft)=	832.2	
	Min. Flow Elev. (ft)=	830.4	
3	Flow length, L .....ft.	79.0	
4	Two-yr 24hr Rainfall[1], P2...in.	2.90	
5	Land Slope (ft/ft)=	0.0228	
6	Tt = 0.007 (nL)^0.8/P2^0.5 * S^0.4 Computed Tt....hr.	0.135 hr	

Shallow Concentration Flow

7	Surface description (paved or unpaved).....	unpaved	
	Max. Elevation, ...ft	830.40	
	Min Elevation, ...ft	810.90	
8	Flow length, L.....ft.	704.0	
9	Watercourse slope, s.....ft/ft	0.0277	
10	Average velocity, V ..ft/s(INDOT eq 29-7.7 or7.8)	2.69	
11	Tt = L/(3600 V).....Computed Tt..hr.	0.073 hr	

Channel Flow

Trapezoidal Channel Geometry (Estimated from Survey/Quad maps)

	1	2
b =		
d =		
SS =		
Angle =	0	0

		1	2
12	Cross sectional flow area, a.....ft^2		
13	Wetted perimeter, Pw.....ft		
14	Hydraulic radius, r=a/Pw Compute r....ft		
	Max. Elev of channel, ...(ft) =		
	Min. Elev of channel, ...(ft) =		
15	Channel slope length,s.....ft/ft		
16	Manning's roughness coeff.,n .Based on stream type		
17	V =(1.49 r^2/3 s^1/2)/n Computed V...ft/s		
18	Flow length from shallow to Structure, L .....ft.		
19	Tt = L/(3600 V).....Computed Tt..hr.		
20	Watershed or Subarea Tc or Tt (add Tt in steps 6, 11, and 19)	**0.208 hr**	

or

12.5 min

Notes

1) - 2-year 24 hour rainfall was taken from NOAA Atlas 14, Volume 2

ClarkDietz

Project// Intercoastal at Geist
Project No.// H0210350
Subject// Discharge Calculation
Prepared By// BEP
Checked By// HP

Subbasin 7

Page// ____ of ____
Date// 3/19/2020
Date// 5/15/2020

Watershed 7 Site Data:

Geographic Area Descriptions	Soil Type	Runoff Curve (C)	Area (Sq. Ft.)	Area (acres) (A)	CxA
Road	N/A	98	3600	0.08	8.10
Agriculture	A	67		0.00	0.00
Forest	A	36		0.00	0.00
HD-Residential	A	54		0.00	0.00
LD-Residential	A	46		0.00	0.00
Agriculture	B	76		0.00	0.00
Commercial	B	92		0.00	0.00
Forest	B	65		0.00	0.00
Grass/Pasture	B	69		0.00	0.00
HD-Residential	B	70		0.00	0.00
LD-Residential	B	65	14000	0.32	20.89
Agriculture	C	83		0.00	0.00
Commercial	C	94		0.00	0.00
Forest	C	70		0.00	0.00
Grass/Pasture	C	79		0.00	0.00
HD-Residential	C	80		0.00	0.00
LD-Residential	C	77		0.00	0.00
Commercial	D	95		0.00	0.00
Forest	D	79		0.00	0.00
Grass/Pasture	D	84		0.00	0.00
LD-Residential	D	82		0.00	0.00
		Totals =	17,600	0.40	28.99
		Area Sq. Mi. =	0.0006		
				Weighted C =	71.8

Note - Curve Numbers taken from *Urban Hydrology for Small Watersheds,* Technical Release TR 55, United States of Agriculture, Natural Resources Conservation Service, Table 2-2a, 1986

ClarkDietz

Project// Intercoastal at Geist
Project No.// H0210350
Subject// Discharge Calculation
Prepared By// BEP
Checked By// HP

Subbasin 7

Page// _____ of _____
Date// 3/19/2020
Date// 5/15/2020

Time of Concentration: Watershed 7

Sheet Flow (Applicable to Tc only)

1	Surface Description	S Grass	
2	Manning's Roughness Coeff.,...n (See Figure 202-2B)	0.150	
	Max. Flow Elev.(ft)=	826.3	
	Min. Flow Elev. (ft)=	824.5	
3	Flow length, L .....ft.	43.0	
4	Two-yr 24hr Rainfall[1], P2...in.	2.90	
5	Land Slope (ft/ft)=	0.0419	
6	Tt = 0.007 (nL)^0.8/P2^0.5 * S^0.4 Computed Tt....hr.	0.065 hr	

Shallow Concentration Flow

7	Surface description (paved or unpaved).....	unpaved	
	Max. Elevation, ...ft	824.50	
	Min Elevation, ...ft	821.00	
8	Flow length, L.....ft.	278.0	
9	Watercourse slope, s.....ft/ft	0.0126	
10	Average velocity, V ..ft/s(INDOT eq 29-7.7 or7.8)	1.81	
11	Tt = L/(3600 V).....Computed Tt..hr.	0.043 hr	

Channel Flow

Trapezoidal Channel Geometry (Estimated from Survey/Quad maps)

	1	2
b =		
d =		
SS =		
Angle =	0	0

		1	2
12	Cross sectional flow area, a.....ft^2		
13	Wetted perimeter, Pw.....ft		
14	Hydraulic radius, r=a/Pw Compute r....ft		
	Max. Elev of channel, ...(ft) =		
	Min. Elev of channel, ...(ft) =		
15	Channel slope length,s.....ft/ft		
16	Manning's roughness coeff.,n .Based on stream type		
17	V =(1.49 r^2/3 s^1/2)/n Computed V...ft/s		
18	Flow length from shallow to Structure, L .....ft.		
19	Tt = L/(3600 V).....Computed Tt..hr.		
20	Watershed or Subarea Tc or Tt (add Tt in steps 6, 11, and 19)	**0.108 hr**	

or

6.5 min

Notes

1) - 2-year 24 hour rainfall was taken from NOAA Atlas 14, Volume 2

ClarkDietz

Project// Intercoastal at Geist
Project No.// H0210350
Subject// Discharge Calculation
Prepared By// BEP
Checked By// HP

Subbasin 8

Page// ____ of ____
Date// 3/19/2020
Date// 5/15/2020

Watershed 8 Site Data:

Geographic Area Descriptions	Soil Type	Runoff Curve (C)	Area (Sq. Ft.)	Area (acres) (A)	CxA
Road	N/A	98	3600	0.08	8.10
Agriculture	A	67		0.00	0.00
Forest	A	36		0.00	0.00
HD-Residential	A	54		0.00	0.00
LD-Residential	A	46		0.00	0.00
Agriculture	B	76		0.00	0.00
Commercial	B	92		0.00	0.00
Forest	B	65		0.00	0.00
Grass/Pasture	B	69		0.00	0.00
HD-Residential	B	70		0.00	0.00
LD-Residential	B	65	14000	0.32	20.89
Agriculture	C	83		0.00	0.00
Commercial	C	94		0.00	0.00
Forest	C	70		0.00	0.00
Grass/Pasture	C	79		0.00	0.00
HD-Residential	C	80		0.00	0.00
LD-Residential	C	77		0.00	0.00
Commercial	D	95		0.00	0.00
Forest	D	79		0.00	0.00
Grass/Pasture	D	84		0.00	0.00
LD-Residential	D	82		0.00	0.00
		Totals =	17,600	0.40	28.99
		Area Sq. Mi. =	0.0006		
				Weighted C =	71.8

Note - Curve Numbers taken from *Urban Hydrology for Small Watersheds,* Technical Release TR 55, United States of Agriculture, Natural Resources Conservation Service, Table 2-2a, 1986

ClarkDietz

Project// Intercoastal at Geist
Project No.// H0210350
Subject// Discharge Calculation
Prepared By// BEP
Checked By// HP

Subbasin 8

Page// _____ of _____
Date// 3/19/2020
Date// 5/15/2020

Time of Concentration: Watershed 8

Sheet Flow (Applicable to Tc only)

1	Surface Description	S Grass	
2	Manning's Roughness Coeff.,...n (See Figure 202-2B)	0.150	
	Max. Flow Elev.(ft)=	825.3	
	Min. Flow Elev. (ft)=	824.0	
3	Flow length, L .....ft.	31.0	
4	Two-yr 24hr Rainfall[1], P2...in.	2.90	
5	Land Slope (ft/ft)=	0.0419	
6	Tt = 0.007 (nL)^0.8/P2^0.5 * S^0.4 Computed Tt....hr.	0.050 hr	

Shallow Concentration Flow

7	Surface description (paved or unpaved).....	unpaved	
	Max. Elevation, ...ft	824.00	
	Min Elevation, ...ft	819.50	
8	Flow length, L.....ft.	284.0	
9	Watercourse slope, s.....ft/ft	0.0158	
10	Average velocity, V ..ft/s(INDOT eq 29-7.7 or7.8)	2.03	
11	Tt = L/(3600 V).....Computed Tt..hr.	0.039 hr	

Channel Flow

Trapezoidal Channel Geometry (Estimated from Survey/Quad maps)

	1	2
b =		
d =		
SS =		
Angle =	0	0

		1	2
12	Cross sectional flow area, a.....ft^2		
13	Wetted perimeter, Pw.....ft		
14	Hydraulic radius, r=a/Pw Compute r....ft		
	Max. Elev of channel, ...(ft) =		
	Min. Elev of channel, ...(ft) =		
15	Channel slope length,s.....ft/ft		
16	Manning's roughness coeff.,n .Based on stream type		
17	V =(1.49 r^2/3 s^1/2)/n Computed V...ft/s		
18	Flow length from shallow to Structure, L .....ft.		
19	Tt = L/(3600 V).....Computed Tt..hr.		
20	Watershed or Subarea Tc or Tt (add Tt in steps 6, 11, and 19)	**0.089 hr**	

or

5.3 min

Notes

1) - 2-year 24 hour rainfall was taken from NOAA Atlas 14, Volume 2

ClarkDietz

Project// Intercoastal at Geist
Project No.// H0210350
Subject// Discharge Calculation
Prepared By// BEP
Checked By// HP

Subbasin 9 and 10

Page// ____ of ____
Date// 4/8/2020
Date// 5/15/2020

Watershed 9 and 10 Site Data:

Geographic Area Descriptions	Soil Type	Runoff Curve (C)	Area (Sq. Ft.)	Area (acres) (A)	CxA
Road	N/A	98	16000	0.37	36.00
Agriculture	A	67		0.00	0.00
Forest	A	36		0.00	0.00
HD-Residential	A	54		0.00	0.00
LD-Residential	A	46		0.00	0.00
Agriculture	B	76		0.00	0.00
Commercial	B	92		0.00	0.00
Forest	B	65		0.00	0.00
Grass/Pasture	B	69		0.00	0.00
HD-Residential	B	70		0.00	0.00
LD-Residential	B	65	83500	1.92	124.60
Agriculture	C	83		0.00	0.00
Commercial	C	94		0.00	0.00
Forest	C	70		0.00	0.00
Grass/Pasture	C	79		0.00	0.00
HD-Residential	C	80		0.00	0.00
LD-Residential	C	77		0.00	0.00
Commercial	D	95		0.00	0.00
Forest	D	79		0.00	0.00
Grass/Pasture	D	84		0.00	0.00
LD-Residential	D	82		0.00	0.00
		Totals =	99,500	2.28	160.59
		Area Sq. Mi. =	0.0036		
				Weighted C =	70.3

Note - Curve Numbers taken from *Urban Hydrology for Small Watersheds,* Technical Release TR 55, United States of Agriculture, Natural Resources Conservation Service, Table 2-2a, 1986

ClarkDietz

Project// Intercoastal at Geist
Project No.// H0210350
Subject// Discharge Calculation
Prepared By// BEP
Checked By// HP

Subbasin 9 and 10

Page// ____ of ____
Date// 4/8/2020
Date// 5/15/2020

Time of Concentration: Watershed 9 and 10

Sheet Flow (Applicable to Tc only)

1	Surface Description	S Grass	
2	Manning's Roughness Coeff.,...n (See Figure 202-2B)	0.150	
	Max. Flow Elev.(ft)=	816.5	
	Min. Flow Elev. (ft)=	813.7	
3	Flow length, L .....ft.	26.1	
4	Two-yr 24hr Rainfall[1], P2...in.	2.90	
5	Land Slope (ft/ft)=	0.1072	
6	Tt = 0.007 (nL)^0.8/P2^0.5 * S^0.4 Computed Tt....hr.	0.030 hr	

Shallow Concentration Flow

7	Surface description (paved or unpaved).....	paved	
	Max. Elevation, ...ft	813.70	
	Min Elevation, ...ft	807.90	
8	Flow length, L.....ft.	457.5	
9	Watercourse slope, s.....ft/ft	0.0127	
10	Average velocity, V ..ft/s(INDOT eq 29-7.7 or7.8)	2.29	
11	Tt = L/(3600 V).....Computed Tt..hr.	0.056 hr	

Channel Flow

Trapezoidal Channel Geometry (Estimated from Survey/Quad maps)

	1	2
b =		
d =		
SS =		
Angle =	0	0

		1	2
12	Cross sectional flow area, a.....ft^2		
13	Wetted perimeter, Pw.....ft		
14	Hydraulic radius, r=a/Pw Compute r....ft		
	Max. Elev of channel, ...(ft) =		
	Min. Elev of channel, ...(ft) =		
15	Channel slope length,s.....ft/ft		
16	Manning's roughness coeff.,n .Based on stream type		
17	V =(1.49 r^2/3 s^1/2)/n Computed V...ft/s		
18	Flow length from shallow to Structure, L .....ft.		
19	Tt = L/(3600 V).....Computed Tt..hr.		
20	Watershed or Subarea Tc or Tt (add Tt in steps 6, 11, and 19)	**0.085 hr**	

or

5.1 min

Notes

1) - 2-year 24 hour rainfall was taken from NOAA Atlas 14, Volume 2

ClarkDietz

Project// Intercoastal at Geist
Project No.// H0210350
Subject// Discharge Calculation
Prepared By// BEP
Checked By// HP

Subbasin 11 and 12

Page// ____ of ____
Date// 4/8/2020
Date// 5/15/2020

Watershed 11 and 12 Site Data:

Geographic Area Descriptions	Soil Type	Runoff Curve (C)	Area (Sq. Ft.)	Area (acres) (A)	CxA
Road	N/A	98	18000	0.41	40.50
Agriculture	A	67		0.00	0.00
Forest	A	36		0.00	0.00
HD-Residential	A	54		0.00	0.00
LD-Residential	A	46		0.00	0.00
Agriculture	B	76		0.00	0.00
Commercial	B	92		0.00	0.00
Forest	B	65		0.00	0.00
Grass/Pasture	B	69		0.00	0.00
HD-Residential	B	70		0.00	0.00
LD-Residential	B	65	86000	1.97	128.33
Agriculture	C	83		0.00	0.00
Commercial	C	94		0.00	0.00
Forest	C	70		0.00	0.00
Grass/Pasture	C	79		0.00	0.00
HD-Residential	C	80		0.00	0.00
LD-Residential	C	77		0.00	0.00
Commercial	D	95		0.00	0.00
Forest	D	79		0.00	0.00
Grass/Pasture	D	84		0.00	0.00
LD-Residential	D	82		0.00	0.00
		Totals =	104,000	2.39	168.82
		Area Sq. Mi. =	0.0037		
				Weighted C =	70.7

Note - Curve Numbers taken from *Urban Hydrology for Small Watersheds,* Technical Release TR 55, United States of Agriculture, Natural Resources Conservation Service, Table 2-2a, 1986

ClarkDietz

Project// Intercoastal at Geist
Project No.// H0210350
Subject// Discharge Calculation
Prepared By// BEP
Checked By// HP

Subbasin 11 and 12

Page// ____ of ____
Date// 4/8/2020
Date// 5/15/2020

Time of Concentration: Watershed 11 and 12

Sheet Flow (Applicable to Tc only)

1	Surface Description	S Grass	
2	Manning's Roughness Coeff.,...n (See Figure 202-2B)	0.150	
	Max. Flow Elev.(ft)=	823.2	
	Min. Flow Elev. (ft)=	821.0	
3	Flow length, L .....ft.	40.0	
4	Two-yr 24hr Rainfall[1], P2...in.	2.90	
5	Land Slope (ft/ft)=	0.0550	
6	Tt = 0.007 (nL)^0.8/P2^0.5 * S^0.4 Computed Tt....hr.	0.055 hr	

Shallow Concentration Flow

7	Surface description (paved or unpaved).....	paved	
	Max. Elevation, ...ft	821.00	
	Min Elevation, ...ft	801.50	
8	Flow length, L.....ft.	x	
9	Watercourse slope, s.....ft/ft	#VALUE!	
10	Average velocity, V ..ft/s(INDOT eq 29-7.7 or7.8)	#VALUE!	
11	Tt = L/(3600 V).....Computed Tt..hr.	0.000 hr	

Channel Flow

Trapezoidal Channel Geometry (Estimated from Survey/Quad maps)

	1	2
b =		
d =		
SS =		
Angle =	0	0

		1	2
12	Cross sectional flow area, a.....ft^2		
13	Wetted perimeter, Pw.....ft		
14	Hydraulic radius, r=a/Pw Compute r....ft		
	Max. Elev of channel, ...(ft) =		
	Min. Elev of channel, ...(ft) =		
15	Channel slope length,s.....ft/ft		
16	Manning's roughness coeff.,n .Based on stream type		
17	V =(1.49 r^2/3 s^1/2)/n Computed V...ft/s		
18	Flow length from shallow to Structure, L .....ft.		
19	Tt = L/(3600 V).....Computed Tt..hr.		
20	Watershed or Subarea Tc or Tt (add Tt in steps 6, 11, and 19)	**0.055 hr**	

or

3.3 min

Notes

1) - 2-year 24 hour rainfall was taken from NOAA Atlas 14, Volume 2

ATTACHMENT 2:

Rainfall Distribution

NRCS Type-2 Rainfall Distribution

% Time	% Storm
0	0.000
5	0.010
10	0.025
15	0.040
20	0.060
25	0.080
30	0.100
35	0.130
40	0.165
45	0.220
50	0.640
55	0.780
60	0.835
65	0.870
70	0.895
75	0.920
80	0.940
85	0.960
90	0.980
95	0.990
100	1.000

10-year 24-hour = 3.83 inches
100-year 24-hour = 6.46 inches

ATTACHMENT 3:

Cost Estimate

HAMILTON COUNTY DRAINAGE BOARD
INTRACOASTAL AT GEIST

ENGINEER'S ESTIMATE

5/22/2020

ALTERNATIVE 1 - UPGRAGE STORM SEWER/OVERLAND SWALE

Contract Item No.	Description	Estimated Quantity	Prices In Figures	
			Unit Price	Total Price for Item
1	CONSTRUCTION ENGINEERING	1 LS	$ 2,500.00	$ 2,500
1	MOBILIZATION AND DEMOBILIZATION	1 LS	$ 5,000.00	$ 5,000
2	CLEARING/RESTORING LANDSCAPE IN DRAINAGE EASEMENT	1 LS	$ 4,000.00	$ 4,000
3	MAINTAINING TRAFFIC	1 LS	$ 1,000.00	$ 1,000
4	COMMON EXCAVATION	21 CYS	$ 40.00	$ 840
5	FINE GRADING	116 CYS	$ 50.00	$ 5,800
6	SODDING	308 SYS	$ 30.00	$ 9,240
7	CURB CONCRETE, A	6 LFT	$ 25.00	$ 150
8	SIDEWALK CONCRETE	4 SYS	$ 200.00	$ 800
9	HMA, TRAIL	9 TON	$ 250.00	$ 2,250
10	PIPE, RCP, CIRCULAR, 18 IN.	101 LFT	$ 75.00	$ 7,575
11	PIPE, RCP, CIRCULAR, 21 IN.	140 LFT	$ 100.00	$ 14,000
12	INLET STRUCTURE	3 EA	$ 2,000.00	$ 6,000
13	PIPE END SECTION, 18" DIA.	1 EA	$ 1,000.00	$ 1,000
14	DEMOLITION, REMOVAL AND DISPOSAL OF EX. STORM PIPE	241 LFT	$ 17.00	$ 4,097
15	EROSION CONTROL	1 LS	$ 500.00	$ 500
16	CONTINGENCY (20%)	1 LS	$ 11,500.00	$ 11,500

Construction Subtotal =	**$**	**76,252**
Legal Costs =	$	2,500
Design and Bidding Services =	$	25,000
Construction Engineering and Observation Services =	$	5,000
Total Project Cost =	**$**	**108,752**

HAMILTON COUNTY DRAINAGE BOARD
INTRACOASTAL AT GEIST

ENGINEER'S ESTIMATE
5/22/2020
ALTERNATIVE 2 - POND 1

Contract Item No.	Description	Estimated Quantity	Prices In Figures	
			Unit Price	Total Price for Item
1	CONSTRUCTION ENGINEERING	1 LS	$ 2,500.00	$ 2,500
2	MOBILIZATION AND DEMOBILIZATION	1 LS	$ 5,000.00	$ 5,000
3	CLEARING/RESTORING LANDSCAPE IN DRAINAGE EASEMENT	1 LS	$ 20,000.00	$ 20,000
4	MAINTAINING TRAFFIC	1 LS	$ 4,000.00	$ 4,000
5	COMMON EXCAVATION	1750 CYS	$ 40.00	$ 70,000
6	FINE GRADING	1120 SYS	$ 50.00	$ 56,000
7	SODDING	308 SYS	$ 30.00	$ 9,240
8	SEEDING	1300 SYS	$ 1.50	$ 1,950
9	HMA, TRAIL	9 TON	$ 250.00	$ 2,250
10	PIPE, RCP, CIRCULAR, 18 IN.	241 LFT	$ 75.00	$ 18,075
11	INLET STRUCTURE	3 EA	$ 2,000.00	$ 6,000
12	PIPE END SECTION, 18" DIA.	1 EA	$ 1,000.00	$ 1,000
13	POND OUTLET CONTROL STRUCTURE	1 EA	$ 10,000.00	$ 10,000
14	DEMOLITION, REMOVAL AND DISPOSAL OF EX. STORM PIPE	241 LFT	$ 17.00	$ 4,097
15	EROSION CONTROL	1 LS	$ 2,000.00	$ 2,000
16	PROPERTY ACQUISITION	1 LS	$ 50,000.00	$ 50,000
17	CONTINGENCY (20%)	1 LS	$ 50,900.00	$ 50,900

Construction Subtotal =	**$**	**313,012**
Legal Costs =	$	2,500
Design and Bidding Services =	$	25,000
Construction Engineering and Observation Services =	$	5,000
Total Project Cost =	**$**	**345,512**

HAMILTON COUNTY DRAINAGE BOARD
INTRACOASTAL AT GEIST

ENGINEER'S ESTIMATE

5/22/2020

ALTERNATIVE 2 - POND 3

Contract Item No.	Description	Estimated Quantity	Prices In Figures	
			Unit Price	Total Price for Item
1	CONSTRUCTION ENGINEERING	1 LS	$ 2,500.00	$ 2,500
2	MOBILIZATION AND DEMOBILIZATION	1 LS	$ 5,000.00	$ 5,000
3	CLEARING/RESTORING LANDSCAPE IN DRAINAGE EASEMENT	1 LS	$ 4,000.00	$ 4,000
4	MAINTAINING TRAFFIC	1 LS	$ 1,000.00	$ 1,000
5	COMMON EXCAVATION	700 CYS	$ 40.00	$ 28,000
6	FINE GRADING	1500 SYS	$ 50.00	$ 75,000
7	SODDING	308 SYS	$ 30.00	$ 9,240
8	SEEDING	1300 SYS	$ 1.50	$ 1,950
9	HMA, TRAIL	9 TON	$ 250.00	$ 2,250
10	PIPE, RCP, CIRCULAR, 12 IN.	20 FT	$ 42.00	$ 840
11	PIPE, RCP, CIRCULAR, 18 IN.	241 LFT	$ 75.00	$ 18,075
12	INLET STRUCTURE	3 EA	$ 2,000.00	$ 6,000
13	PIPE END SECTION, 18" DIA.	1 EA	$ 1,000.00	$ 1,000
14	POND OUTLET CONTROL STRUCTURE	1 EA	$ 10,000.00	$ 10,000
15	DEMOLITION, REMOVAL AND DISPOSAL OF EX. STORM PIPE	241 LFT	$ 17.00	$ 4,097
16	EROSION CONTROL	1 LS	$ 2,000.00	$ 2,000
17	PROPERTY ACQUISITION	1 LS	$ 50,000.00	$ 50,000
18	CONTINGENCY (20%)	1 LS	$ 32,700.00	$ 32,700

Construction Subtotal =	**$ 253,652**
Legal Costs =	$ 2,500
Design and Bidding Services =	$ 25,000
Construction Engineering and Observation Services =	$ 5,000
Total Project Cost =	**$ 286,152**

HAMILTON COUNTY DRAINAGE BOARD
INTRACOASTAL AT GEIST

ENGINEER'S ESTIMATE

5/22/2020

ALTERNATIVE 3 - STORM SEWER REROUTE

Contract Item No.	Description	Estimated Quantity	Prices In Figures	
			Unit Price	Total Price for Item
1	CONSTRUCTION ENGINEERING	1 LS	$ 2,500.00	$ 2,500
2	MOBILIZATION AND DEMOBILIZATION	1 LS	$ 5,000.00	$ 5,000
3	CLEARING/RESTORING LANDSCAPE IN DRAINAGE EASEMENT	1 LS	$ 15,000.00	$ 15,000
4	MAINTAINING TRAFFIC	1 LS	$ 5,000.00	$ 5,000
5	COMMON EXCAVATION	21 CYS	$ 40.00	$ 840
	FINE GRADING	466 SYS	$ 50.00	$ 23,300
6	SODDING	308 SYS	$ 30.00	$ 9,240
7	RESTORE EAST LANDSCAPING	1 LS	$ 25,000.00	$ 25,000
8	HMA ROAD PATCH	22 TON	$ 250.00	$ 5,500
9	HMA, TRAIL	9 TON	$ 250.00	$ 2,250
9	RECONSTRUCT EAST PATH	1 LS	$ 2,000.00	$ 2,000
10	SIDEWALK CONCRETE	8 SYS	$ 200.00	$ 1,600
11	CURB CONCRETE, A	12 LFT	$ 25.00	$ 300
11	PIPE, RCP, CIRCULAR, 18 IN.	140 LFT	$ 75.00	$ 10,500
12	PIPE, RCP, CIRCULAR, 24 IN.	700 LFT	$ 100.00	$ 70,000
13	INLET STRUCTURE	3 EA	$ 2,000.00	$ 6,000
14	PIPE END SECTION, 18" DIA.	1 EA	$ 1,000.00	$ 1,000
15	DEMOLITION, REMOVAL AND DISPOSAL OF EX. STORM PIPE	241 LFT	$ 17.00	$ 4,097
13	EROSION CONTROL	1 LS	$ 5,000.00	$ 5,000
14	PROPERTY ACQUISITION	1 LS	$ 50,000.00	$ 50,000
15	CONTINGENCY (20%)	1 LS	$ 48,300.00	$ 48,300

Construction Subtotal =	**$ 292,427**
Legal Costs =	$ 2,500
Design and Bidding Services =	$ 25,000
Construction Engineering and Observation Services =	$ 5,000
Total Project Cost =	**$ 324,927**

BEFORE THE HAMILTON COUNTY DRAINAGE BOARD
IN THE MATTER OF

Intracoastal at Geist Drain

NOTICE

To Whom It May Concern and: _____

_____

_____

Notice is hereby given of the hearing of the Hamilton County Drainage Board concerning the reconstruction of the **Intracoastal at Geist Drain** on **August 24, 2020, 2020** at **9:00 A.M.** in Commissioners Court, Hamilton County Judicial Center, One Hamilton County Square, Noblesville, Indiana. Construction and maintenance reports of the Surveyor and the Schedule of Assessments proposed by the Drainage Board have been filed and are available for public inspection in the office of the Hamilton County Surveyor.

Hamilton County Drainage Board

Attest: Lynette Mosbaugh

ONE TIME ONLY

STATE OF INDIANA)
) SS BEFORE THE HAMILTON
)
COUNTY OF HAMILTON) DRAINAGE BOARD

IN THE MATTER OF **Intracoastal at Geist Drain Reconstruction**

NOTICE

Notice is hereby given that the Hamilton County Drainage Board at its regular meeting **November 23, 2020** adopted the reconstruction report of the Surveyor and the Amended Schedule of damages and assessments including annual assessment for periodic maintenance, finding that the costs, damages and expense of the proposed improvement would be less than the benefits which will result to the owner of lands benefited thereby.

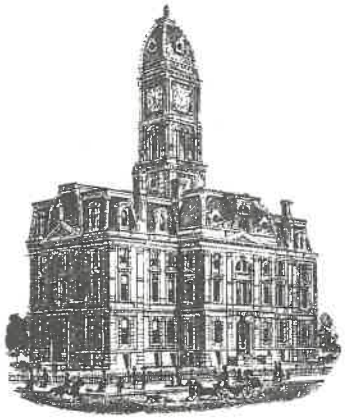
The Board issued an order declaring the proposed improvement established. Such findings and order were marked filed and are available for inspection in the Office of the Hamilton County Surveyor.

If judicial review of the findings and order of the Board is not requested pursuant to Article VIII of the 1965 Indiana Drainage Code as amended within twenty (20) days from the date of publication of this notice, the findings and order shall become conclusive.

HAMILTON COUNTY DRAINAGE BOARD

BY: Mark Heirbrandt
PRESIDENT

ATTEST: Lynette Mosbaugh
SECRETARY



SURVEYOR'S OFFICE

Hamilton County

Kenton C. Ward, CFM
Surveyor of Hamilton County
Phone (317) 776-8495
Fax (317) 776-9628

Suite 188
One Hamilton County Square
Noblesville, Indiana 46060-2230

March 8, 2023

TO: Hamilton County Drainage Board

RE: Intracoastal at Geist Reconstruction – Final Report

This is the final report on the Intracoastal Drain reconstruction, the drain reconstruction work was across Lots 164 and 165 in Intracoastal at Geist Sec. 1, located in Section 6, Township 17 North, Range 6 East in Fall Creek Township, Hamilton County, Indiana.

The February 10, 2020 meeting of the Hamilton County Drainage Board the County Surveyor brought to the attention of the Board a drainage/flooding issue in the Intracoastal at Geist. (Hamilton County Drainage Board Minutes Book 19, Page 145)

The June 22, meeting of the Hamilton County Drainage Board the Board heard a presentation from Clark Dietz for fixes to the drainage/flooding issue in Intracoastal at Geist. (Hamilton County Drainage Board Minutes Book 19, Pages 248-249)

The July 13, 2020 meeting of the Hamilton County Drainage Board the County Surveyor asked the Board to approve the Professional Service Agreement for Clark Dietz. The amount not to exceed $33,000.00 for design and construction services. (Hamilton County Drainage Board Minutes Book 19, Page 261)

The August 24, 2020 meeting of the Hamilton County Drainage Board the Board heard and tabled the Surveyor's report for the Intracoastal at Geist reconstruction. The engineers estimate for the reconstruction is $148,689.80. The County Surveyor asked for permission to obtain three (3) quotes for the work since the estimate is below $150,000.00. (Hamilton County Drainage Board Minutes Book 19, Pages 304-305)

The November 9, 2020 meeting of the Hamilton County Drainage Board the Board received one (1) quote from Agricon Inc. for the Intracoastal at Geist reconstruction. Agricon's quote was for $100,148.30. (Hamilton County Drainage Board Minutes Book 19, Page 384)

The November 23, 2020 meeting of the Hamilton County Drainage Board the Board un-tabled the meeting from August 24, 2020 and approved the quote from Agricon Inc. in the amount of $100, 148.30. (Hamilton County Drainage Board Minutes Book 19, Pages 417-418)

The November 23, 2020 meeting of the Hamilton County Drainage Board the Board awarded the quote/bid for the Intracoastal at Geist reconstruction to Agricon Inc. in the amount of $100,148.30. (Hamilton County Drainage Board Minutes Book 19, Page 422)

Due to utility conflicts between Lots 164-165 with Duke Energy, Lumens and Comcast the reconstruction was delayed until those conflicts were relocated by the appropriate utilities. This work was done between the November 23, 2020 and September 27, 2021 meetings.

The September 27, 2021 meeting of the Hamilton County Drainage Board a revised quote from Agricon was brought to the Board. The revised quote of $106,881.40 was due to delays from utility conflicts and from and from increase cost of materials. This was an increase of $6,733.10 from the original quote of $100,148.30. The Board approved the increase due to the delays. (Hamilton County Drainage Board Minutes Book 20, Page 173)

The Intracoastal at Geist Drain Reconstruction consisted of clearing of existing trees from the project area, concrete sidewalk and asphalt path removal and reconstruction, installation of 136 feet of 21" RCP pipe, installation of 91 feet of 18" RCP pipe and the installation of 3 precast inlet structures with stool type beehive castings and 1 concrete end section.

During the reconstruction there were some minor changes made to the original design of Clark Dietz. A tree on the Orr lot was removed due to difficulty of working around by Agricon. Stumps were ground instead being cut flush with the existing grade at the request of the property owners. Hydro Excavating was done to ensure no conflicts with relocated utilities after locates were requested by Agricon.

Due to supply chain issues the asphalt path reconstruction associated with the project was paved by the Hamilton County Highway Department after Agricon did the prep work and readied the path for paving. Agricon was unable to get a quote/price from a paving company to complete the asphalt path work.

The following are the installed lengths of 18" and 21" RCP pipes between storm structures.

Structures	Proposed	Actual	Pipe
Existing Structure 133 – Structure 101	106 LF	106 LF	21"
Structure 101 – Structure 102	30 LF	30 LF	21"
Structure 102 – Structure 103	59 LF	59 LF	18"
Structure 103 – Structure 104	32 LF	32 LF	18"
Totai	257 LF	257 LF	

During the reconstruction there were two (2) change orders.

Change Order # 1 dated September 20, 2022 was taken to the Hamilton County Drainage Board at the September 26, 2022 meeting for discussion and approval of additional work required for the project. (Hamilton County Drainage Board Minutes Book 19, page 571).

The following are additions to the Intracoastal at Geist Drain Reconstruction contract.

1. Line 13 – Add 3 Units Erosion Control Blanket	$ 8.52
2. Fluid Waste Hydro Excavating	$ 763.75
3. 2 Irrigation Systems Repair	$ 5,400.00
4. Stump Grinding	$ 400.00
Total Cost of Change Order # 1	$ 6.572.27

Change Order # 2 dated October 18, 2022 was taken to the Hamilton County Drainage Board at the October 24, 2022 meeting for discussion and approval for paving work by the County Highway and a deduction from the projects contract. (Hamilton County Drainage Board Minutes Book 21, page 32).

1. Line 15 – Multi-Use Path Paid County Highway for Material	$ 2,031.01

The following item was not billed for on the contract and therefore the costs was deducted from the contract with Change Order # 2.

1. Line 15 - Multi-Use Path Cost Adjusted	$ - 3,533.00

The following is a breakdown of costs associated with the Intracoastal at Geist Reconstruction. During the project there were Four (4) pay applications.

Pay Application # 1 Total	$ 79,103.00
Retainage	$ (11,865.45)
Amount Paid to Agricon (06/14/22)	$ 67,237.55
Pay Application # 2 Total	$ 22,029.67
Retainage	$ (3,304.45)
Amount Paid to Agricon (10/11/22)	$ 18,725.22
Pay Application # 3 Total	$ 8,788.00
Retainage	$ (1,318.20)
Amount Paid to Agricon (11/15/22)	$ 7,469.80
Pay Application # 4 Total (Retainage)	$ (16,488.10)
Amount to be released to Agricon (12/18/22)	$ 16,488.10
Total Paid to Agricon	$ 109,920.67

Engineers Estimate w/ 15% Contingencies	$ 115,170.55
Contractors Revised Quote	$ 106,881.40
Total Additions of Change Orders 1 & 2	$ 8,602.28
	$ 115,483.68
Deletion from Contract (Change Order # 2)	$ (-3,533.00)
Total Paid to Agricon	$ 111,950.68
Study, Engineering, Staking and As-built Drawings	$ 61,000.00
Total Reconstruction Cost	$ 172,950.68

Clark Dietz's Study, Engineering, Construction Staking and As-built Drawings were completed on the reconstruction project at a cost of $ 61,000.00. As-built drawings were submitted to the Surveyor's Office on February 21, 2023.

The project was paid for out of the General Drain Improvement Fund (GDIF) along with a grant from the City of Fishers Stormwater Program by an amount not to exceed $44,000.00. Due to the adjusted final cost, the City of Fishers cost was $43,237.67. The General Drain Improvement Fund (GDIF) will be repaid with future maintenance funds as outlines in my report to the Board dated September 10, 2021 and approved by the Board on September 21, 2021 as mentioned above. The payoff is anticipated to occur in 2031.

The Contractor's Statement that all incurred expenses have been paid was signed by the Contractor as required in IC-36-9-27-82(b) was received on October 18, 2022.

The Payment Bond for the Intracostal at Geist reconstruction in the amount of $100,148.30 was released at the February 13, 2023 meeting of the Hamilton County Drainage Board. See (Hamilton County Drainage Board Minutes Book 21, page 171).

As of November 1, 2022, I hereby attest to and agree that the intracoastal at Geist Drain Reconstruction was completed according to specified plans and have approved such work under IC-36-9-27-82(a). All inspections have been completed.

I recommend the Board approve the drain's reconstruction as complete and acceptable.

Respectfully,

Jerry L. Liston
Hamilton County Surveyor's Office

HAMILTON COUNTY SURVEYOR'S OFFICE

INTRACOASTAL AT GEIST DRAINAGE IMPROVEMENTS

KENTON C. WARD, COUNTY SURVEYOR

HAMILTON COUNTY DRAINAGE BOARD

MARK HEIRBRANDT, PRESIDENT
STEVEN C. DILLINGER, VICE PRESIDENT
CHRISTINE ALTMAN, MEMBER

SECTIONS 6, T17N, R6E IN FALL CREEK TOWNSHIP

SITE LOCATION MAP
NOT TO SCALE

UTILITY CONTACTS

ELECTRIC – DUKE ENERGY INDIANA, INC.
390 N Main Street
MARTINSILLE, IN 46151
PH.: 765-349-4012
EMAIL: tim.umbaugh@duke-energy.com
ATTN: TIM UMBAUGH

COMMUNICATION – CENTURYLINK
213 W. LAPORTE STREET
PLYMOUTH, IN 46563
PH.: 574-926-1247
EMAIL: joseph.megyesi@sprint.com
ATTN: Bruce Emerick

GAS – VECTREN ENERGY
1800 W. 26TH STREET
MUNCIE, IN 47302
PH.: 765-287-2119
EMAIL: jeastham@vectren.com
ATTN: JON EASTHAM

CITY OF FISHERS
1 MUNICIPAL DRIVE,
FISHERS, IN 46038
PH.: 317-595-3111
ATTN: JASON ARMOUR

CABLE – COMCAST (INDIANAPOLIS)
5330 E. 65TH STREET
INDIANAPOLIS, IN 46220
PH.: 317-275-6355
EMAIL: bill_moore@cable.comcast.com
ATTN: BILL MOORE

WATER – CITIZENS WATER
2150 DR. MARTIN LUTHER KING JR STREET
INDIANAPOLIS, IN 46200
PH.: 317-927-6038
EMAIL:
utilitycoordination@citizensenergygroup.com

SEWER – HAMILTON SOUTHEASTERN UTILITIES
11901 LAKESIDE DR. FISHERS, IN 46038
PH.: 317-557-1150 x201
ATTN: JAMES HART

PROJECT LOCATION SHOWN BY ●

DATUM

THE TOPOGRAPHIC SURVEY AND DESIGN USED THE FOLLOWING DATUM:
HORIZONTAL DATUM: US STATE PLANE 1983, NAD 1983 (CONUS)
INDIANA EAST 1301
VERTICAL DATUM: (NAVD 88) (GEOID 12)

BENCHMARKS

SEE GENERAL INFORMATION SHEET 1 FOR BENCHMARK DESCRIPTIONS

"HOLEY MOLEY" SAYS CALL AT LEAST TWO FULL WORKING DAYS BEFORE YOU DIG
IT'S THE LAW

1-800-382-5544
CALL TOLL FREE

LOCATIONS OF ALL EXISTING UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE BASED UPON ABOVE GROUND EVIDENCE (INCLUDING, BUT NOT LIMITED TO, MANHOLES, INLETS, VALVES, AND MARKS MADE UPON THE GROUND BY OTHERS) AND ARE SPECULATIVE IN NATURE. THERE MAY ALSO BE OTHER EXISTING UNDERGROUND UTILITIES FOR WHICH THERE IS NO ABOVE GROUND EVIDENCE OR FOR WHICH NO ABOVE GROUND EVIDENCE WAS OBSERVED. THE EXACT LOCATIONS OF SAID EXISTING UNDERGROUND UTILITIES SHOULD BE VERIFIED BY THE CONTRACTOR PRIOR TO ANY AND ALL CONSTRUCTION.

811
Know what's below.
Call before you dig.

INDEX

AS-BUILT DRAWING

PREPARED BY: CLARK DIETZ, INC.

CERTIFIED BY: HEATH TITZER, PE LS

DATE: 02/13/2023

HEATH A. TITZER
REGISTERED
NO.
LS21000197
STATE OF
INDIANA
LAND SURVEYOR

HAMILTON COUNTY, INDIANA
HAMILTON COUNTY SURVEYOR'S OFFICE
HAMILTON COUNTY GOVERNMENT/JUDICIAL CENTER
ONE HAMILTON COUNTY SQUARE, SUITE 188
NOBLESVILLE, IN 46060
PHONE: (317) 776-8495
FAX: (317) 776-9628
SURVEYOR@HAMILTONCOUNTY.IN.GOV

PROJECT NO: H0210300
WATERSHED: INTRACOASTAL AT GEIST SEC. 1
FIELD BY: DT
DRAWN BY: BEP
CHECKED BY: HJP
DATE: 10/16/2020

BY: -
DATE: -
REVISIONS: -

BRIAN POWERS REGISTERED 10809105 STATE OF INDIANA PROFESSIONAL ENGINEER

CERTIFIED BY:
Brian Powers
BRIAN E. POWERS, P.E.

PROJECT NAME: INTRACOASTAL AT GEIST DRAINAGE IMPROVEMENTS

COVER SHEET

PLOT DATE: 10/16/2020

SHEET NO.
CS OF 9

BEGIN PROJECT
N=1713307.06
E=264096.67

Swale bottom at limits of construction
N = 1713329.0
E = 264122.7
Elev = 807.327 ft

Typical Swale Cross Section
Swale bottom at N = 1713434, E = 264173.5
810.190 — 809.797 — 810.293
7.59' | 7.81'

CONNECT NEW STORM SEWER TO EXISTING INLET BOX WITH A SOIL TIGHT CONNECTION (TYP. ALL NEW CONNECTIONS TO EXISTING)

DISTURBED FENCE SHALL BE REMOVED AND REPLACED AS NEEDED

EXISTING TILE SHALL BE REMOVED AS THE TRENCH FOR THE NEW TILE IS BEING EXCAVATED. REMOVE AND LEGALLY DISPOSE OF THE EXISTING PIPE

LANDSCAPING TO BE REMOVED

PLACE TREE PROTECTION FENCE AT DRIP LINE OF TREE

BRANCH TRIMMING NEEDS TO BE REVIEWED AND APPROVED BY THE HCSO INSPECTOR AND MUST BE MADE AT THE TRUNK

EXISTING STRUCTURE 133

PI: N=1713325.56 E=264120.81

PT: N=1713482.62 E=264130.16

PI: N=1713516.41 E=264133.93

END PROJECT: N=1713531.88 E=264135.15

REMOVE TREE

EXISTING TILE SHALL BE REMOVED AS THE TRENCH FOR THE NEW TILE IS BEING EXCAVATED. REMOVE AND LEGALLY DISPOSE OF THE EXISTING PIPE

PC: N=1713471.81 E=264132.90

PLACE TREE PROTECTION FENCE AT DRIP LINE OF TREE

EXISTING SIDEWALK TO BE REMOVED AND REPLACED. SAW CUT AT THE NEAREST JOINT PAST THE PROJECT LIMITS. REMOVE AND REPLACE FULL SIDEWALK PANELS.

REMOVE TREE

PROTECT IRRIGATION VALVE

12+78

ST 104
18 RCP END SECTION
~~N=1713510.40~~ 1713515.0
~~E=264133.26~~ 264134.4
RIM=815.09
IE=~~813.38~~ (18") S 813.092

REMOVE TREE

EXISTING TILE SHALL BE REMOVED AS THE TRENCH FOR THE NEW TILE IS BEING EXCAVATED. REMOVE AND LEGALLY DISPOSE OF THE EXISTING PIPE

PI: N=1713420.51 E=264167.05

ST 103
BOX INLET
48" MH W/ INLET CASTING
NEENAH 4342
N=~~1713479.48~~ 1713481.0
E=~~264130.85~~ 264129.7
RIM=~~812.33~~ 812.446
IE=~~810.14~~ (18") N 809.66
IE=~~810.04~~ (18") SE 809.61

CONSTRUCTION LIMITS

BRANCH TRIMMING NEEDS TO BE REVIEWED AND APPROVED BY THE HCSO INSPECTOR AND MUST BE MADE AT THE TRUNK

CONSTRUCTION LIMITS

ST 101
BOX INLET
48" MH W/ INLET CASTING
NEENAH 4342
N=~~1713420.51~~ 1713419.0
E=~~264167.05~~ 264167.1
RIM = ~~808.53~~ 808.911
IE=~~805.74~~ (21") NE 805.174, IE = 805.374 (6") PVC E
IE=~~805.64~~ (21") SW 805.024, IE = 805.374 (6") PVC W

PC: N=1713442.93 E=264179.71

ST 102
BOX INLET
48" MH W/ INLET CASTING
NEENAH 4342
N=~~1713447.11~~ 1713447.0
E=~~264180.08~~ 264180.8
RIM=~~809.48~~ 809.890
IE=~~806.18~~ (18") NW 805.986
IE=~~806.08~~ (21") SW 805.936

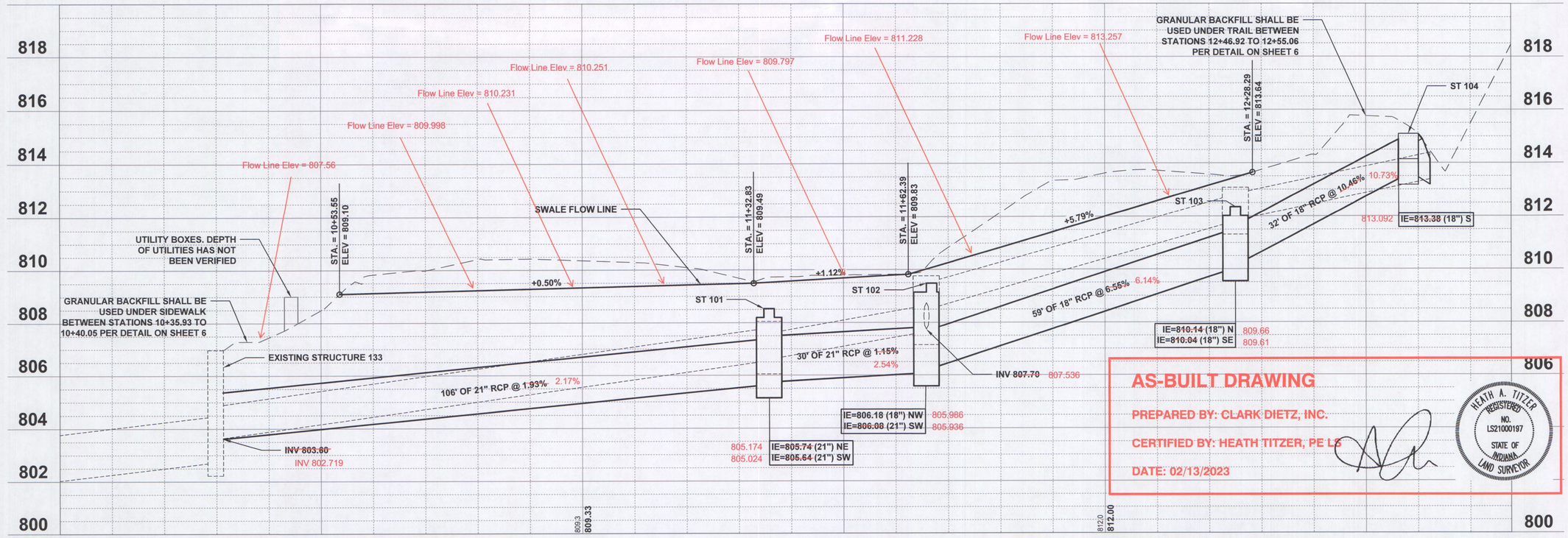
PT: N=1713449.64 E=264177.99

CONNECT EXISTING 12" RCP STORM SEWER PIPE TO NEW INLET WITH A SOILTIGHT CONNECTION (TYP. ALL NEW CONNECTION TO EXISTING)

IE = 807.536 (12") RCP E

NOTE: SEE SHEET 3 FOR TYPICAL SWALE SECTIONS
SEE SHEET 9 FOR SWALE CROSS SECTIONS
RECONNECT ANY EXISTING DRAIN CONNECTIONS TO THE STORM SYSTEM

0' 10' 20'



AS-BUILT DRAWING
PREPARED BY: CLARK DIETZ, INC.
CERTIFIED BY: HEATH TITZER, PE LS
DATE: 02/13/2023

HEATH A. TITZER
REGISTERED
NO. LS21000197
STATE OF INDIANA
LAND SURVEYOR

HAMILTON COUNTY, INDIANA
HAMILTON COUNTY SURVEYOR'S OFFICE
HAMILTON COUNTY GOVERNMENT/JUDICIAL CENTER
ONE HAMILTON COUNTY SQUARE, SUITE 188
NOBLESVILLE, IN 46060
PHONE: (317) 776-8495
FAX: (317) 776-9628
SURVEYOR@HAMILTONCOUNTY.IN.GOV

DATE:	BY:	PROJECT NO: H0210300
-	-	WATERSHED: INTRACOASTAL AT GEIST SEC. 1
		FIELD BY:DT
		DRAWN BY:BEP
		CHECKED BY:HJP
		DATE: 10/16/2020

REVISIONS: -

BRIAN POWERS REGISTERED 10809105 STATE OF INDIANA PROFESSIONAL ENGINEER

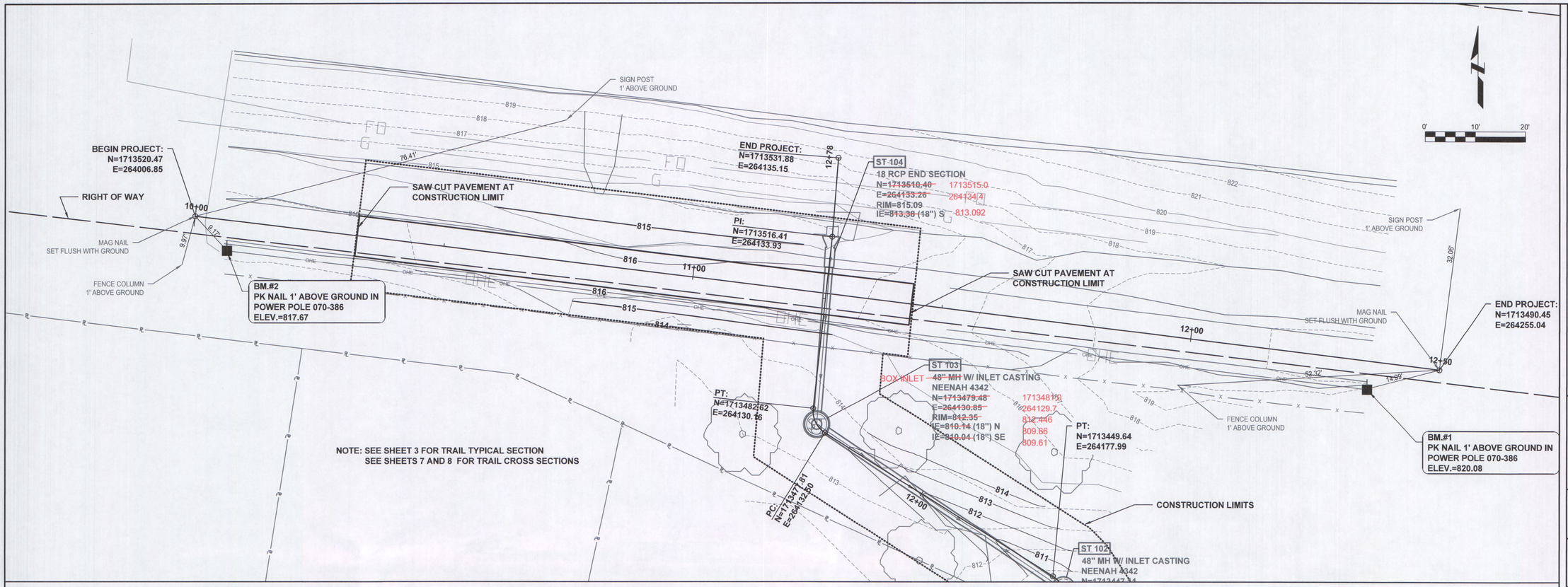
CERTIFIED BY:
Brian Powers
BRIAN E. POWERS, P.E.

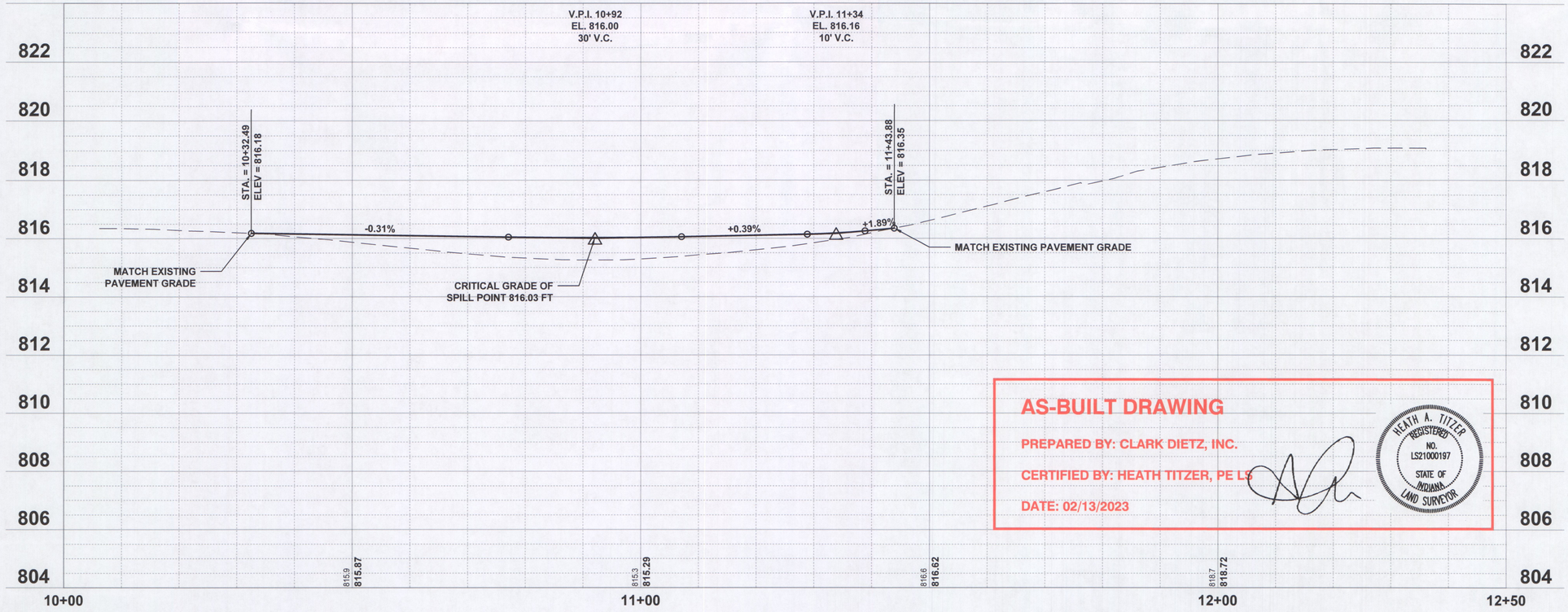
PROJECT NAME: INTRACOASTAL AT GEIST DRAINAGE IMPROVEMENTS

PLAN AND PROFILE - SWALE AND STORM SEWER

PLOT DATE: 10/16/2020

SHEET NO.
1 OF 9





AS-BUILT DRAWING

PREPARED BY: CLARK DIETZ, INC.

CERTIFIED BY: HEATH TITZER, PE LS

DATE: 02/13/2023

HEATH A. TITZER
REGISTERED
NO.
LS21000197
STATE OF
INDIANA
LAND SURVEYOR

HAMILTON COUNTY, INDIANA

HAMILTON COUNTY SURVEYOR'S OFFICE
HAMILTON COUNTY GOVERNMENT/JUDICIAL CENTER
ONE HAMILTON COUNTY SQUARE, SUITE 188
NOBLESVILLE, IN 46060
PHONE: (317) 776-8495
FAX: (317) 776-9628
SURVEYOR@HAMILTONCOUNTY.IN.GOV

HAMILTON COUNTY INDIANA 1823

PROJECT NO:	H0210300
WATERSHED:	INTRACOASTAL AT GEIST SEC. 1
FIELD BY:	DT
DRAWN BY:	BEP
CHECKED BY:	HJP
DATE:	10/16/2020

BY:	DATE:
-	-

REVISIONS: -

BRIAN POWERS
REGISTERED
10809105
STATE OF
INDIANA
PROFESSIONAL ENGINEER

CERTIFIED BY:

Brian Powers

BRIAN E. POWERS, P.E.

PROJECT NAME:
INTRACOASTAL AT GEIST
DRAINAGE IMPROVEMENTS

PLAN AND PROFILE - TRAIL

PLOT DATE: 10/16/2020

SHEET NO.

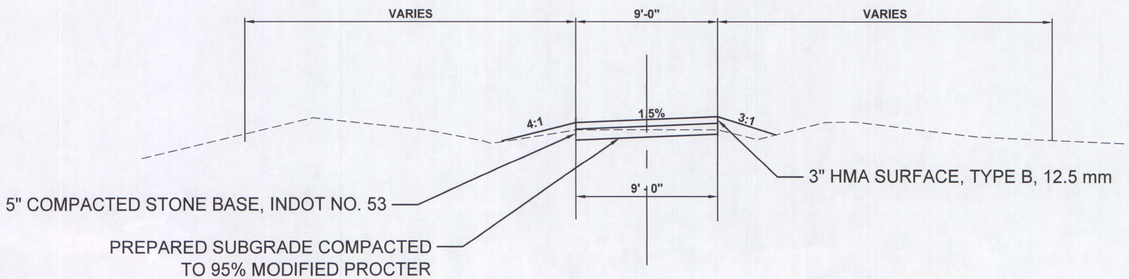
2 OF 9

GENERAL NOTES

1. HCSO INSPECTOR SHALL COORDINATE FENCE REMOVAL, FENCE REPLACEMENT AND GATES WITH PROPERTY OWNERS.
2. ALL EXISTING TILES CONNECTED TO THE EXISTING OPEN DITCH OR TILE AND ANY EXISTING TILES CROSSED BY THE NEW OPEN DITCH OR TILE SHALL BE CONNECTED TO THE NEW OPEN DITCH OR TILE SUCH THAT POSITIVE DRAINAGE IS PROVIDED TO THE LATERAL TILE. REFER TO DETAIL O-3. CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY IF AN EXISTING TILE IS UNCOVERED THAT IS LOWER THAN THE PROPOSED OPEN DITCH OR TILE. ANY SUCH CONNECTIONS SHALL BE DOCUMENTED TO INCLUDE THE STATION AND INVERT AND PROVIDED TO THE INSPECTOR.
3. FOR ALL WORK UNDER POWER LINES:
   a. BE AWARE OF THE POTENTIAL FOR ELECTROSTATIC DISCHARGE.
   b. CONTRACTOR SHALL LIMIT TIME WORKING UNDER THE POWER LINES TO THAT TIME NECESSARY FOR THE WORK.
   c. CONTRACTOR IS ADVISED TO GROUND ALL EQUIPMENT.
   d. CONTRACTOR SHALL NOT PARK OR STORE EQUIPMENT OR MATERIALS UNDER THE POWER LINES.
4. TRENCHING OPERATIONS FOR TILE INSTALLATION SHALL ENDEAVOR TO PRESERVE THE EXISTING SOIL LAYER CONFIGURATION TO THE GREATEST EXTENT POSSIBLE. AS TRENCHING PROGRESSES, THE EXISTING TOPSOIL SHALL BE STRIPPED AND STOCKPILED SEPARATE FROM THE UNDERLYING GENERAL EXCAVATED MATERIAL. THE TOPSOIL SHALL NOT BE INTERMIXED WITH THE GENERAL EXCAVATION MATERIAL. WHEN BACKFILLING THE TRENCH, THE GENERAL EXCAVATED MATERIAL SHALL BE PLACED BACK INTO THE TRENCH FIRST AND TO A SUFFICIENT DEPTH TO ACCOUNT FOR THE SETTLEMENT OF THE MATERIAL ITSELF AS WELL AS THE TOPSOIL PLACED ABOVE IT. THE TOPSOIL SHALL THEN BE PLACED AS THE FINAL BACKFILL MATERIAL TO A DEPTH THAT MATCHES THE EXISTING CONDITION TO THE GREATEST EXTENT POSSIBLE. SUCH TOPSOIL IS EXPECTED TO EXTEND SLIGHTLY ABOVE THE ADJACENT EXISTING GROUND UNTIL THE TRENCH BACKFILL CONSOLIDATES AND SETTLES. THE TOPSOIL SHALL BE NEATLY ROUNDED OVER THE TRENCH. ANY EXCESS GENERAL BACKFILL MATERIAL FROM THE TRENCHING OPERATION SHALL BE SPREAD IN ACCORDANCE WITH GENERAL NOTE 6.
5. ALL STORM SEWER CONSTRUCTION SHALL BE PER HCSO DETAILS AND SPECIFICATIONS.
6. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL UTILITY LOCATIONS BEFORE CONSTRUCTION BEGINS.
7. ALL CONSTRUCTION ACTIVITY ASSOCIATED WITH THIS PROJECT SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE O.S.H.A. STANDARDS.
8. ALL STRUCTURES SHALL HAVE A PRE-CAST TOP AS REQUIRED TO FIT THE CASTING.
9. ANY TREE CLEARING FOR THIS PROJECT SHALL BE REVIEWED BY AND APPROVED BY THE HCSO INSPECTOR BEFORE PERFORMING ANY CLEARING OPERATIONS.
10. NO TREES MAY BE REMOVED FROM THE PROPERTY WITHOUT PERMISSION FROM THE PROPERTY OWNER. THE CONTRACTOR SHALL MEET WITH EACH PROPERTY OWNER AND OBTAIN SUCH PERMISSION PRIOR TO STARTING ANY CLEARING ACTIVITY. DURING THAT MEETING, THE CONTRACTOR SHALL DISCUSS MARKETABLE TIMBER AND THE SALVAGE OF ANY TIMBER MATERIAL FOR OTHER USES SUCH AS FIREWOOD. THE PROPERTY OWNER HAS FIRST RIGHTS TO ANY MARKETABLE TREES WITHIN THE PROJECT LIMITS. THE PROPERTY OWNER MUST RELINQUISH THOSE RIGHTS TO THE CONTRACTOR IN WRITING BEFORE THE CONTRACTOR COULD SELL ANY MARKETABLE TIMBER. ANY MATERIAL SALVAGED TO THE PROPERTY OWNER REQUIRES A WAIVER FROM THE PROPERTY OWNER PER THE CLEARING SECTION OF THE SPECIFICATIONS AND CLEARING SECTION OF THE SPECIAL PROVISIONS. COMMON PRACTICE IS FOR THE CONTRACTOR TO MOVE ANY MATERIAL IDENTIFIED BY THE PROPERTY OWNER TO BE SALVAGED TO JUST OUTSIDE OF THE LIMITS OF THE REGULATED DRAIN EASEMENT. IN THE EVENT THAT THE PROPERTY OWNER IDENTIFIES A TREE OR TREES THAT ARE MARKETABLE AND THAT SUCH A TREE OR TREES NEED TO BE REMOVED BY A TIMBER HARVESTING COMPANY, THE CONTRACTOR SHALL PROVIDE NOTICE TO THE PROPERTY OWNER THAT SUCH WORK MUST BE COMPLETED BEFORE THE DEADLINES ASSOCIATED WITH THIS PROJECT OR SUCH MARKETABLE TREE(S) WILL BE REMOVED BY THIS CONTRACT.
11. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING LEGAL DISPOSAL SITES AND ALL ASSOCIATED COORDINATION AND COSTS.
12. CONSTRUCTION ACTIVITY SHALL BE LIMITED TO THE AREAS DESIGNATED ON THE PLANS FOR REMOVAL OF EXISTING FACILITIES, CLEARING OF TREES AND BRUSH, SLOPE GRADING, SURFACE RESTORATION, TEMPORARY AND PERMANENT EROSION CONTROL, PAVEMENT REPAIR, AND OTHER REQUIRED ACTIVITIES.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ALL CONSTRUCTION RELATED DAMAGE TO EXISTING PAVED AND NON-PAVED SURFACES. PRIOR TO ANY CONSTRUCTION RELATED DISTURBANCE, CONTRACTOR SHALL PROVIDE OWNER WITH PROFESSIONAL VIDEO DOCUMENTATION OF PRE-CONSTRUCTION CONDITIONS AT THE PROJECT AREA, STAGING AREA(S), AND ACCESS ROADS. THE COST FOR PRE-CONSTRUCTION CONDITION DOCUMENTATION AND REPAIR OF CONSTRUCTION RELATED SURFACE DAMAGE SHALL BE CONSIDERED INCIDENTAL TO THE COST OF THE PROJECT.
14. CONTRACTOR SHALL SECURE THE STAGING AND CONSTRUCTION AREAS FROM UNAUTHORIZED ACCESS.
15. TREE PROTECTION FENCE REQUIRED FOR TREES THAT WILL NOT BE REMOVED

BENCHMARKS

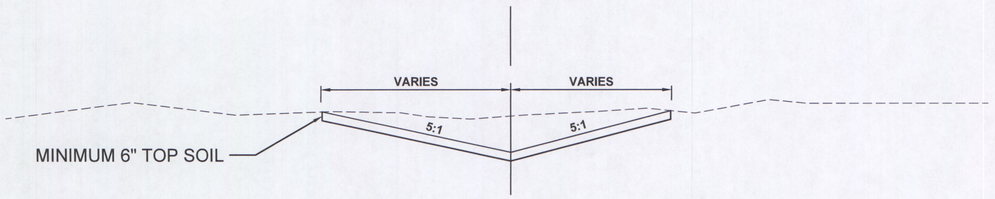
BM	DESCRIPTION	ELEVATION
TBM #1	PK NAIL; 1' ABOVE GROUND IN POWER POLE 070-386	820.08
TBM #2	PK NAIL; 1' ABOVE GROUND IN POWER POLE 070-386	817.67



TRAIL TYPICAL SECTION

STA. 10+26.37 to STA. 11+37.76
LOOKING UP STATION

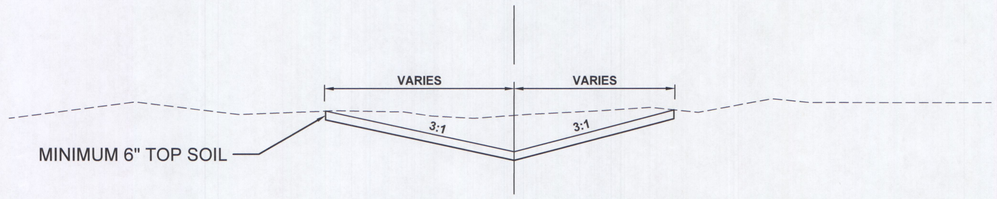
Swale was field verified to conform with this typical



SWALE TYPICAL SECTION

STA. 10+50.65 to STA. 11+62.39
LOOKING UP STATION

Swale was field verified to conform with this typical



SWALE TYPICAL SECTION

STA. 11+62.39 to STA. 12+28.29
LOOKING UP STATION

AS-BUILT DRAWING

PREPARED BY: CLARK DIETZ, INC.

CERTIFIED BY: HEATH TITZER, PE LS

DATE: 02/13/2023

HEATH A. TITZER REGISTERED NO. LS21000197 STATE OF INDIANA LAND SURVEYOR

HAMILTON COUNTY, INDIANA
HAMILTON COUNTY SURVEYOR'S OFFICE
HAMILTON COUNTY GOVERNMENT/JUDICIAL CENTER
ONE HAMILTON COUNTY SQUARE, SUITE 188
NOBLESVILLE, IN 46060
PHONE: (317) 776-8495
FAX: (317) 776-9628
SURVEYOR@HAMILTONCOUNTY.IN.GOV

PROJECT NO: H0210300
WATERSHED: INTRACOASTAL AT GEIST SEC. 1
FIELD BY: DT
DRAWN BY: BEP
CHECKED BY: HJP
DATE: 10/16/2020

BY: -
DATE: -

REVISIONS: -

BRIAN POWERS REGISTERED 10809105 STATE OF INDIANA PROFESSIONAL ENGINEER

CERTIFIED BY:
Brian Powers
BRIAN E. POWERS, P.E.

PROJECT NAME: INTRACOASTAL AT GEIST DRAINAGE IMPROVEMENTS

GENERAL INFORMATION

PLOT DATE: 10/16/2020

SHEET NO.
3 OF 9

EROSION CONTROL BLANKET OR MAT TO BE PLACED OVER DISTURBED AREA UNTIL NEW PLANTINGS BECOME ESTABLISHED

10+00

11+00

12+00

12+50

CONSTRUCTION LIMITS

ST 104

ST 103

CONSTRUCTION LIMITS

KEY

SILT FENCE

INLET PROTECTION

CONSTRUCTION ENTRANCE

AS-BUILT DRAWING

PREPARED BY: CLARK DIETZ, INC.

CERTIFIED BY: HEATH TITZER, PE LS

DATE: 02/13/2023

HEATH A. TITZER REGISTERED NO. LS21000197 STATE OF INDIANA LAND SURVEYOR

0' 10' 20'

2'X2' INLET
RIM=804.1
IE=802.0 NE

STREET SWEEPING REQUIRED FOR TRACKED MATERIAL FROM SITE

2'X2' INLET
RIM=807.0
IE=803.6 NE
IE=802.7 SW

CONSTRUCTION LIMITS

CONSTRUCTION ENTRANCE

ST 101

ST 102

ST 103

ST 104

CONSTRUCTION LIMITS

EROSION CONTROL BLANKET OR MAT TO BE PLACED OVER DISTURBED AREA UNTIL NEW PLANTINGS BECOME ESTABLISHED

0' 10' 20'

HAMILTON COUNTY, INDIANA

HAMILTON COUNTY SURVEYOR'S OFFICE
HAMILTON COUNTY GOVERNMENT/JUDICIAL CENTER
ONE HAMILTON COUNTY SQUARE, SUITE 188
NOBLESVILLE, IN 46060
PHONE: (317) 776-8495
FAX: (317) 776-9628
SURVEYOR@HAMILTONCOUNTY.IN.GOV

PROJECT NO:	H0210300
WATERSHED:	INTRACOASTAL AT GEIST SEC. 1
FIELD BY:	DT
DRAWN BY:	BEP
CHECKED BY:	HJP
DATE:	10/16/2020

BY:	-
DATE:	-

REVISIONS: -

BRIAN POWERS REGISTERED 10809105 STATE OF INDIANA PROFESSIONAL ENGINEER

CERTIFIED BY:

Brian Powers

BRIAN E. POWERS, P.E.

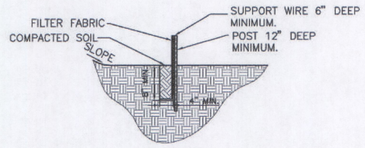
PROJECT NAME: INTRACOASTAL AT GEIST DRAINAGE IMPROVEMENTS

EROSION CONTROL

PLOT DATE: 10/16/2020

SHEET NO.

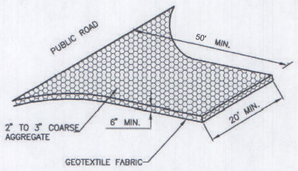
4 OF 9



REQUIREMENTS:

1. THE PLACEMENT OF THE FENCE SHALL BE NEARLY LEVEL AND FOLLOW THE APPROXIMATE LAND CONTOUR. THE FENCE SHALL BE AT LEAST 10 FEET FROM THE TOP OF THE SLOPE.
2. THE TRENCH DEPTH SHALL BE A MINIMUM OF 8 INCHES. THE BOTTOM OF THE TRENCH SHALL BE LEVEL AND SHALL BE BACKFILLED WITH ENOUGH COMPACTED SOIL OR GRAVEL TO BURY THE LOWER PORTION OF THE SUPPORT WIRE AND/OR FENCE FABRIC.
3. THE SUPPORT POSTS SHALL BE EITHER 2" X 2" HARWOOD OR STEEL FENCE POSTS AND SHALL BE A MINIMUM DEPTH OF 1 FOOT. IF STEEL POSTS ARE USED, THEY SHALL HAVE PROJECTIONS TO ALLOW THE FABRIC TO BE FASTENED.
4. THE MAXIMUM SPACING OF THE POSTS SHALL BE 8 FEET IF THE FENCE IS TO BE SUPPORTED BY WIRE. THE MAXIMUM SPACING OF THE POSTS SHALL BE A MAXIMUM OF 6 FEET IF THE FENCE DOES NOT HAVE WIRE BACKING.
5. THE FENCE SHALL BE INSTALLED IN SUCH A WAY AS TO PREVENT THE DEPTH OF PONDED WATER FROM EXCEEDING 1.5 FEET AT ANY POINT ALONG THE FENCE.
6. THE SUPPORT WIRE (IF USED) SHALL BE A MINIMUM THICKNESS OF 14 GAUGE. A 6-INCH MESH WIRE FENCE IS REQUIRED IF A STANDARD STRENGTH FENCING IS USED.
7. THE FENCE FABRIC SHALL BE EITHER A WOVEN OR NON-WOVEN GEOTEXTILE FABRIC WITH THE REQUIRED FILTERING EFFICIENCY, TENSILE STRENGTH, UV INHIBITORS, AND STABILIZERS TO ENSURE A 6 MONTH MINIMUM LIFE AT A TEMPERATURE RANGE OF 0 TO 120 DEGREES F.

SILT FENCE



REQUIREMENTS:

1. MATERIAL SHALL BE 2" TO 3" WASHED STONE (INDOT CA NO. 2) OVER A STABLE FOUNDATION.
2. THICKNESS SHALL BE A MINIMUM OF 6 INCHES.
3. THE WIDTH SHALL BE EITHER A 20 FEET MINIMUM OR FULL WIDTH OF THE ENTRANCE/EXIT ROADWAY, WHICHEVER IS GREATER
4. THE LENGTH SHALL BE 100 FEET.
5. MINIMUM GEOTEXTILE FABRIC UNDERLINER MAY BE USED UNDER WET CONDITIONS OR WITH SOILS WITH A HIGH SEASONAL WATER TABLE.

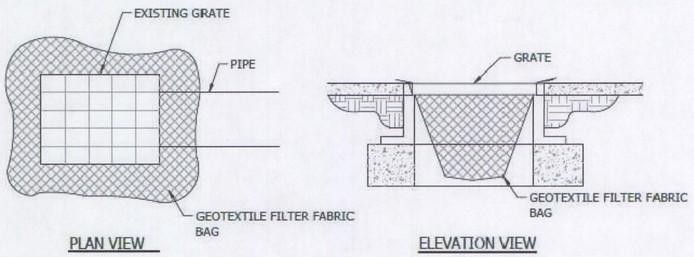
INSTALLATION:

1. AVOID LOCATING ON A STEEP SLOPE OR AT CURVES IN PUBLIC ROADS.
2. REMOVE ALL VEGETATION AND OTHER OBJECTIONABLE MATERIAL FROM THE FOUNDATION AREA, GRADE AND CROWN FOR POSITIVE DRAINAGE.
3. IF SLOPE TOWARDS THE ROAD EXCEEDS 2", CONSTRUCT A 6" TO 8" HIGH WATER BAR (RIDGE) WITH 3:1 SIDE SLOPES ACROSS THE FOUNDATION AREA ABOUT 15' FROM THE ENTRANCE TO DIVERT RUNOFF AWAY FROM THE ROAD.
4. IF NEEDED, INSTALL PIPE UNDER PAD TO MAINTAIN PROPER PUBLIC ROAD DRAINAGE.
5. IF WET CONDITIONS ARE ANTICIPATED, PLACE GEOTEXTILE FABRIC ON THE GRADED FOUNDATION TO IMPROVE STABILITY.
6. DIVERT ALL SURFACE RUNOFF AND DRAINAGE FOR THE STONE PAD TO A SEDIMENT TRAP OR BASIN.

MAINTENANCE:

1. INSPECT AREA WEEKLY AFTER STORM EVENTS OR HEAVY USE.
2. RESHAPE PAD AS NEEDED FOR DRAINAGE AND RUNOFF CONTROL.
3. DRESS TOP WITH CLEAN STONE AS NEEDED.
4. IMMEDIATELY REMOVE MUD AND SEDIMENT TRACKED OR WASHED ONTO PUBLIC ROAD BY BRUSHING OR SWEEPING.
5. REPAIR ANY BROKEN ROAD PAVEMENT IMMEDIATELY.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT



INLET PROTECTION
NOT TO SCALE

INLET PROTECTION

GENERAL EROSION CONTROL NOTES

1. ALL PROPOSED EROSION AND SEDIMENT CONTROL SHALL BE IN CONFORMANCE WITH CHAPTER 600 OF THE HAMILTON COUNTY STORMWATER MANAGEMENT TECHNICAL STANDARDS MANUAL. DISCREPANCIES BETWEEN THE PLANS AND THE MANUAL SHALL NOT ALLEVIATE THE CONTRACTOR FROM ADHERING TO THE REQUIREMENTS AS SET FORTH IN THE MANUAL.
2. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES MAY BE REQUIRED BY THE INSPECTOR.
3. WASTE WATER, SUCH AS CONCRETE WASHOUT, SHALL BE COMPLETELY CONTAINED AND DISPOSED OF PROPERLY. NO WASTE WATER SHALL BE ALLOWED ON THE GROUND, IN A SEWER, IN A STREAM OR ANY OTHER LOCATION WHERE IT IS NOT CONTAINED.
4. HYDRODEMOLITION WASTE WATER SHALL BE COMPLETELY CONTAINED AND REMOVED FROM THE PROJECT SITE PER INDOT CONSTRUCTION MEMO 15-01.
5. NO FILL MATERIAL, SUCH AS STONE FOR TEMPORARY CROSSINGS, CONSTRUCTION MATERIALS, DEMOLITION DEBRIS OR EQUIPMENT IS ALLOWED IN A WATERWAY WITHOUT THE APPROPRIATE PERMITS.
6. INLET PROTECTION MUST BE PROVIDED BY THE CONTRACTOR DURING PAVEMENT OPERATIONS AND UNTIL THE SURFACE COURSE IS PLACED.
7. INLET PROTECTION MUST HAVE AN OVERFLOW, BE MAINTAINABLE WITHOUT DROPPING COLLECTED SEDIMENT AND OTHER POLLUTANTS INTO THE STORM SEWER AND NOT IMPEDE ACTIVE TRAFFIC.
8. NEW INLET CASTINGS SHALL INCLUDE THE WORDS "NO DUMPING, DRAINS TO STREAM" CAST IN RAISED OR RECESSED LETTERS AT A MINIMUM OF 1-INCH TEXT HEIGHT AND A FISH SYMBOL.
9. POST-CONSTRUCTION WATER QUALITY MEASURES SHALL NOT BE USED AS CONSTRUCTION SEDIMENT CONTROL MEASURES.
10. SILT FENCE SHALL BE TRENCHED INTO THE GROUND, SHALL NOT BE LOCATED IN CONCENTRATED FLOW ARES SUCH AS DITCHES AND SHALL BE PLACED PARALLEL TO THE CONTOUR.
11. CONSTRUCTION POLLUTION PREVENTION CONTROLS SUCH AS EROSION CONTROL, SEDIMENT CONTROL AND STREAM DIVERSIONS OR PUMP AROUNDS ARE REQUIRED TO PROTECT THE STORM SEWERS AND WATER BODIES FROM POLLUTANTS DURING ALL PHASES OF CONSTRUCTION.
12. DEWATERING WATER SHALL BE FILTERED PRIOR TO DISCHARGE INTO A STORM SEWER OR WATER BODY
13. IF CONTAMINATED SOILS ARE ENCOUNTERED, "CONTAMINATED SOIL, REMOVE" SHALL BE PERFORMED IN ACCORDANCE TO INDOT SPECIFICATION 202.
14. TEMPORARY SURFACE STABILIZATION SHALL BE DONE IN ACCORDANCE WITH INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT STORM WATER QUALITY MANUAL. ALL DISTURBED AREAS THAT REQUIRE TEMPORARY COVER DURING CONSTRUCTION ACTIVITIES SHALL BE STABILIZED WITH MULCHING ALONE FROM DECEMBER 1 TO MARCH 14 AND FROM JUNE 16 TO AUGUST 31. SPRING MIX SHALL BE USED FROM MARCH 15 THROUGH JUNE 15 AND SHALL BE APPLIED AT THE RATE OF 150 LB/ACRE. SPRING MIX SHALL CONSIST OF OATS. FALL MIX SHALL BE USED FROM SEPTEMBER 1 THROUGH NOVEMBER 30 AND SHALL BE APPLIED AT THE RATE OF 150 LB/ACRE. FALL MIX SHALL CONSIST OF WINTER WHEAT. TEMPORARY STABILIZATION SHALL BE PROVIDED ON AREAS THAT ARE IDLE OR PLANNED TO BE IDLE FOR 7 DAYS OR MORE.
15. SEEDING SHALL TAKE PLACE IN ACCORDANCE WITH THE SPECIFICATIONS.

AS-BUILT DRAWING

PREPARED BY: CLARK DIETZ, INC.

CERTIFIED BY: HEATH TITZER, PE LS

DATE: 02/13/2023

HEATH A. TITZER REGISTERED NO. LS21000197 STATE OF INDIANA LAND SURVEYOR

HAMILTON COUNTY, INDIANA
HAMILTON COUNTY SURVEYOR'S OFFICE
HAMILTON COUNTY GOVERNMENT/JUDICIAL CENTER
ONE HAMILTON COUNTY SQUARE, SUITE 188
NOBLESVILLE, IN 46060
PHONE: (317) 776-8495
FAX: (317) 776-9628
SURVEYOR@HAMILTONCOUNTY.IN.GOV

DATE:	BY:	PROJECT NO: H0210300
-	-	WATERSHED: INTRACOASTAL AT GEIST SEC. 1
		FIELD BY: DT
		DRAWN BY: BEP
		CHECKED BY: HJP
		DATE: 10/16/2020

REVISIONS: -

BRIAN POWERS REGISTERED 10809105 STATE OF INDIANA PROFESSIONAL ENGINEER

CERTIFIED BY:

Brian Powers

BRIAN E. POWERS, P.E.

PROJECT NAME: INTRACOASTAL AT GEIST DRAINAGE IMPROVEMENTS

EROSION CONTROL DETAILS

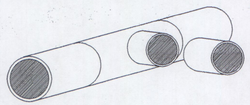
PLOT DATE: 10/16/2020

SHEET NO.

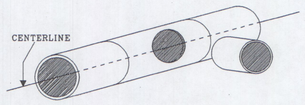
5 OF 9

OFFICE OF THE HAMILTON COUNTY SURVEYOR

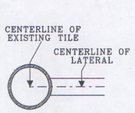
TILE CONNECTION



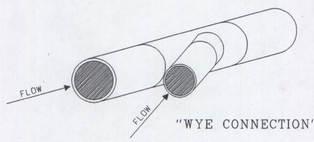
"TEE CONECTION"



"HOLE IN TILE"



CROSS SECTION



"WYE CONNECTION"

(DRAWING NOT TO SCALE)

HAMILTON COUNTY SURVEYOR'S OFFICE

REVISED: 1 JAN 2000

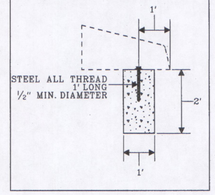
APPROVED: _____ KENTON C. WARD, HAMILTON COUNTY SURVEYOR — DATE: 4 JAN 00

STANDARD PLAN 0-3

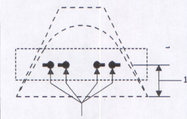
OFFICE OF THE HAMILTON COUNTY SURVEYOR

ANCHOR
FOR CONCRETE END SECTIONS

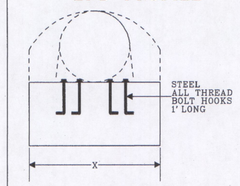
SIDE PROFILE



TOP VIEW



END PROFILE



X = WIDTH OF END SECTION

ALLTHREAD SPACING TO BE TWO PER FOOT
EX: 12" END SECTION - 2 ALLTHREAD
24" END SECTION - 4 ALLTHREAD

(DRAWING NOT TO SCALE)

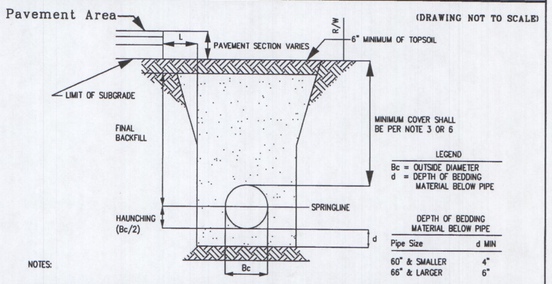
HAMILTON COUNTY SURVEYOR'S OFFICE

REVISED: 1 JAN 2000

APPROVED: _____ KENTON C. WARD, HAMILTON COUNTY SURVEYOR — DATE: 4 JAN 00

STANDARD PLAN 0-5

OFFICE OF THE HAMILTON COUNTY SURVEYOR



NOTES:

1. BEDDING AND HAUNCHING FOR ALL RCP INSTALLATIONS SHALL BE #8 STONE MEETING THE MATERIAL REQUIREMENTS OF THE INDOT. BEDDING SHALL BE PLACED IN THE TRENCH BOTTOM SUCH THAT AFTER THE PIPE IS INSTALLED TO GRADE AND LINE, THERE REMAINS A 4" MINIMUM DEPTH OF MATERIAL BELOW THE PIPE BARREL AND A MINIMUM OF 3" BELOW THE BELL. FOR PIPE SIZES 66" AND LARGER, THE MINIMUM DEPTH OF MATERIAL BELOW THE PIPE BARREL SHALL BE 6". BEDDING SHALL BE PLACED TO BE UNIFORM AS POSSIBLE, BUT SHALL BE LOOSELY PLACED UNCOMPACTED MATERIAL UNDER THE MIDDLE THIRD OF THE PIPE PRIOR TO PLACEMENT OF THE PIPE. IF THE UNDERLYING SOILS OF THE TRENCH BOTTOM ARE SOFT OR YIELDING, THE SOIL SHALL BE UNDERCUT TO SUCH A DEPTH THAT WHEN REPAIRED WITH #2 STONE IT WILL PRODUCE A UNIFORM AND STABLE FOUNDATION ALONG THE ENTIRE LENGTH OF THE PIPE. HAUNCHING AND INITIAL BACKFILL SHALL BE COMPACTED IN 8" MAXIMUM LIFTS TO NOT LESS THAN 90% STANDARD PROCTOR DENSITY FOR THE ENTIRE DEPTH OF THE MATERIAL PLACED. THE BACKFILL SHALL BE BROUGHT UP EVENLY ON BOTH SIDES OF THE PIPE FOR THE FULL LENGTH OF THE PIPE. HAUNCHING SHALL EXTEND TO THE SPRINGLINE OF THE PIPE. MINIMUM TRENCH WIDTH SHALL BE THE OUTSIDE DIAMETER OF THE PIPE PLUS 18".
2. FINAL BACKFILL FOR ALL RCP INSTALLATIONS WHERE "L" IS 5' OR LESS SHALL BE B-BORROW FOR STRUCTURE BACKFILL MEETING THE MATERIAL REQUIREMENTS OF THE INDOT AND SHALL BE COMPACTED IN 6" MAXIMUM LIFTS TO NOT LESS THAN 95% STANDARD PROCTOR DENSITY FOR THE ENTIRE DEPTH OF THE MATERIAL PLACED. THE BACKFILL FOR THE TOP 6" OF THE EXCAVATION BELOW THE START OF THE AGGREGATE SUBBASE OF THE PAVEMENT SHALL BE #53 STONE MEETING THE MATERIAL REQUIREMENT OF THE INDOT AND SHALL BE COMPACTED TO NOT LESS THAN 95% STANDARD PROCTOR DENSITY. FINAL BACKFILL FOR ALL RCP INSTALLATIONS WHERE "L" IS GREATER THAN 5' SHALL BE CLEAN FILL. MATERIAL FREE OF ROCKS LARGER THAN 6" IN DIAMETER, FROZEN LUMPS OF SOIL, WOOD, OR OTHER EXTRANEOUS MATERIAL, COMPACTED IN 12" MAXIMUM LIFTS TO NOT LESS THAT 90% STANDARD PROCTOR DENSITY FOR THE ENTIRE DEPTH OF THE EXCAVATION. THE FINAL 6 INCHES OF THE EXCAVATION SHALL CONSIST OF TOPSOIL.
3. THE MINIMUM COVER FROM THE TOP OF THE INSTALLED PAVEMENT TO THE TOP OF THE INSTALLED PIPE SHALL BE THE PAVEMENT SECTION THICKNESS (ALL BITUMINOUS AND AGGREGATE MATERIAL ABOVE THE SUBGRADE) PLUS 1'-0", BUT UNDER NO CIRCUMSTANCES SHALL THE COVER ALONG ANY PART OF THE PIPE FROM THE FINAL PAVEMENT ELEVATION TO THE TOP OF THE PIPE BE LESS THAT 2.5 FEET.
4. IF EXISTING SUBGRADE HAS BEEN LIME STABILIZED, BACKFILL WITH B-BORROW UP TO BOTTOM OF UNTREATED EXISTING SUBGRADE AND FILL TO TOP OF TREATED SUBGRADE WITH LIME STABALIZED SOIL
5. THESE STANDARDS SHALL APPLY FOR ALL REGULATED DRAIN STORM SEWERS UNLESS THE ENTITY HAVING CONTROL OVER THE RIGHT OF WAY HAS A MORE STRINGENT STANDARD, IN WHICH CASE THE HIGHER STANDARD SHALL APPLY.
6. THE MINIMUM COVER FROM THE FINAL GRADE TO THE TOP OF THE PIPE SHALL BE NOT LESS THAN 2 FEET OUTSIDE OF PAVEMENT AREAS.

HAMILTON COUNTY SURVEYOR'S OFFICE

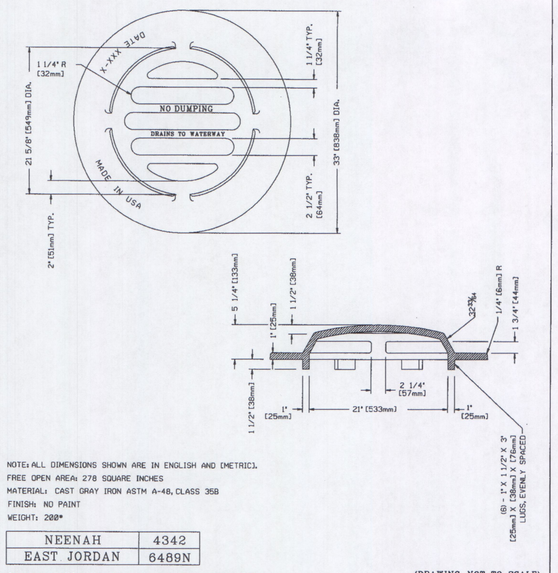
RCP Bedding and Backfill Standard

REVISED: 18 DEC 2006

APPROVED: _____ KENTON C. WARD, HAMILTON COUNTY SURVEYOR — DATE: 8MAR07

STANDARD PLAN D-23

OFFICE OF THE HAMILTON COUNTY SURVEYOR



NOTE: ALL DIMENSIONS SHOWN ARE IN ENGLISH AND (METRIC).
FREE OPEN AREA: 278 SQUARE INCHES
MATERIAL: CAST GRAY IRON ASTM A-48, CLASS 35B
FINISH: NO PAINT
WEIGHT: 282*

NEENAH	4342
EAST JORDAN	6489N

* Or approved by Hamilton County Surveyor's Office

(DRAWING NOT TO SCALE)

HAMILTON COUNTY SURVEYOR'S OFFICE

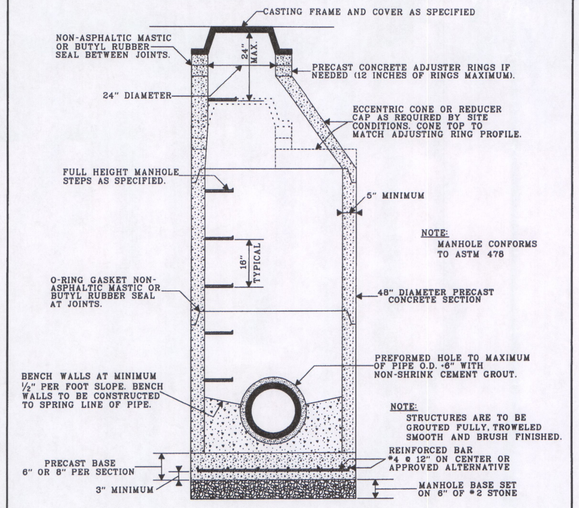
BEEHIVE INLET CASTING

REVISED: 11/16/2004

APPROVED: _____ KENTON C. WARD, HAMILTON COUNTY SURVEYOR — DATE: APR05

STANDARD PLAN CT-10

OFFICE OF THE HAMILTON COUNTY SURVEYOR



STANDARD MANHOLE
FOR PIPE SIZES 12" THRU 24"

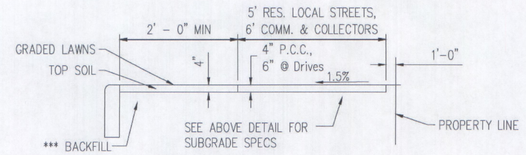
(DRAWING NOT TO SCALE)

HAMILTON COUNTY SURVEYOR'S OFFICE

REVISED: 1 FEB 2002

APPROVED: _____ KENTON C. WARD, HAMILTON COUNTY SURVEYOR — DATE: 2/1/02

STANDARD PLAN D-20



TYPICAL SIDEWALK SECTION
WITH UTILITY STRIP

***WHERE SIDEWALK IS NOT CONSTRUCTED ADJACENT TO THE CURB, THE SPACE BEHIND THE CURB SHALL BE FILLED WITH SUITABLE MATERIAL TO THE REQUIRED ELEVATION AND COMPACTED IN LAYERS NOT TO EXCEED 4"

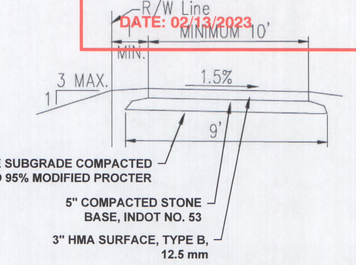
AS-BUILT DRAWING

PREPARED BY: CLARK DIETZ, INC.

CERTIFIED BY: HEATH TITZER, PE LS

DATE: 02/13/2023

HEATH A. TITZER REGISTERED NO. LS21000197 STATE OF INDIANA LAND SURVEYOR



MULTI-USE PATH - ASPHALT

HAMILTON COUNTY, INDIANA

HAMILTON COUNTY SURVEYOR'S OFFICE
HAMILTON COUNTY GOVERNMENT/JUDICIAL CENTER
ONE HAMILTON COUNTY SQUARE, SUITE 188
NOBLESVILLE, IN 46060
PHONE: (317) 776-8495
FAX: (317) 776-9628
SURVEYOR@HAMILTONCOUNTY.IN.GOV

DATE: - | BY: - | PROJECT NO: H0210300
REVISIONS: - | FIELD BY: DT | WATERSHED: INTRACOASTAL AT GEIST SEC. 1
DRAWN BY: BEP
CHECKED BY: HJP
DATE: 10/16/2020

BRIAN POWERS REGISTERED 10809105 STATE OF INDIANA PROFESSIONAL ENGINEER

CERTIFIED BY:
BRIAN E. POWERS, P.E.

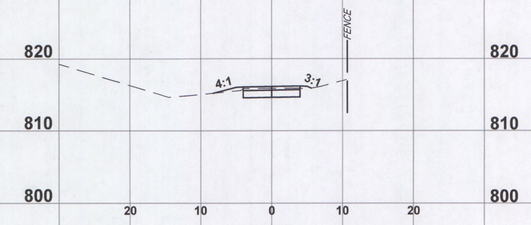
PROJECT NAME: INTRACOASTAL AT GEIST DRAINAGE IMPROVEMENTS

DETAIL

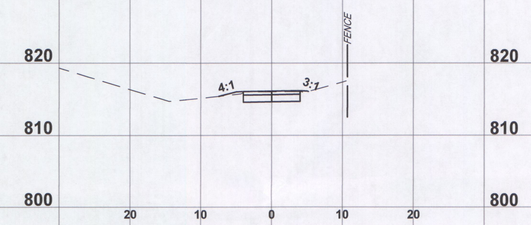
PLOT DATE: 10/16/2020

SHEET NO.
6 OF 9

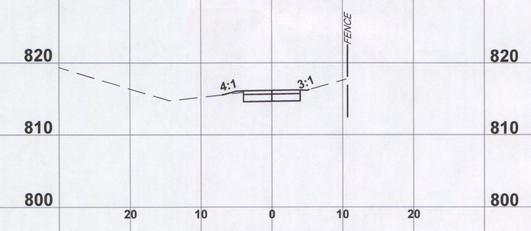
NOTE: SEE SHEET 2 FOR TRAIL PROFILE



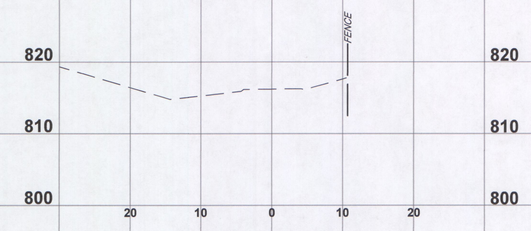
10+50



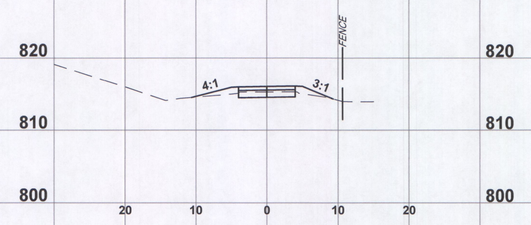
10+40



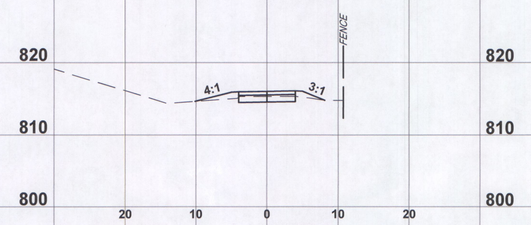
10+32.50



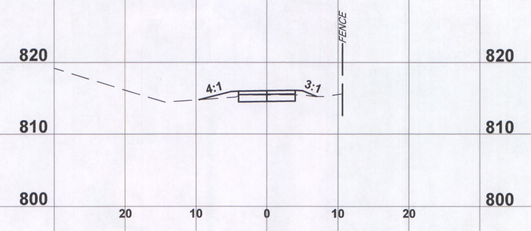
10+32.46



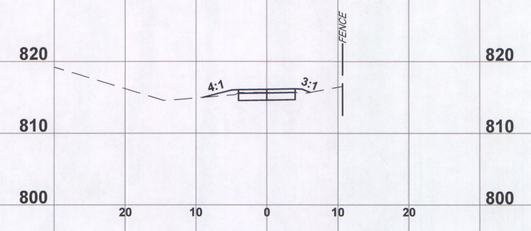
10+90



10+80



10+70



10+60

AS-BUILT DRAWING

PREPARED BY: CLARK DIETZ, INC.

CERTIFIED BY: HEATH TITZER, PE LS

DATE: 02/13/2023

HEATH A. TITZER
REGISTERED
NO.
LS21000197
STATE OF
INDIANA
LAND SURVEYOR

HAMILTON COUNTY, INDIANA

HAMILTON COUNTY SURVEYOR'S OFFICE
HAMILTON COUNTY GOVERNMENT/JUDICIAL CENTER
ONE HAMILTON COUNTY SQUARE, SUITE 188
NOBLESVILLE, IN 46060
PHONE: (317) 776-8495
FAX: (317) 776-9628
SURVEYOR@HAMILTONCOUNTY.IN.GOV

PROJECT NO:	H0210300
BY:	-
WATERSHED:	INTRACOASTAL AT GEIST SEC. 1
FIELD BY:	DT
DRAWN BY:	BEP
CHECKED BY:	HJP
DATE:	10/16/2020

DATE: -

REVISIONS: -

BRIAN POWERS
REGISTERED
10809105
STATE OF
INDIANA
PROFESSIONAL ENGINEER

CERTIFIED BY:

Brian Powers

BRIAN E. POWERS, P.E.

PROJECT NAME:
INTRACOASTAL AT GEIST DRAINAGE IMPROVEMENTS

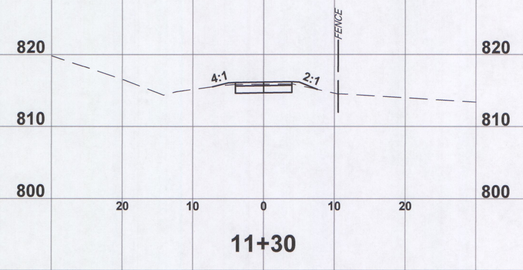
TRAIL CROSS SECTIONS

PLOT DATE: 10/16/2020

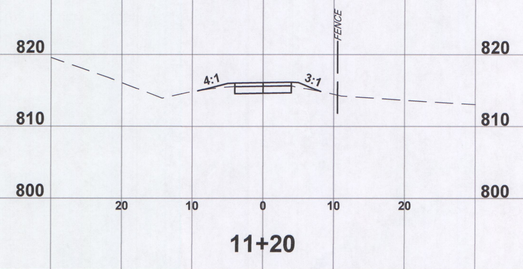
SHEET NO.

7 OF 9

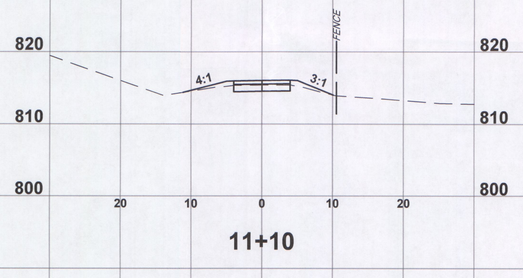
NOTE: SEE SHEET 2 FOR TRAIL PROFILE



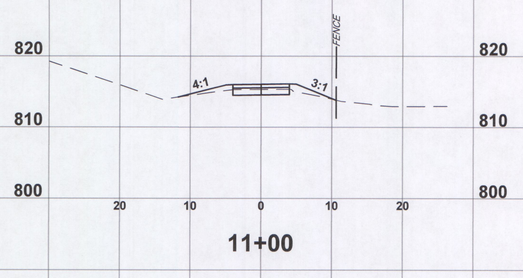
11+30



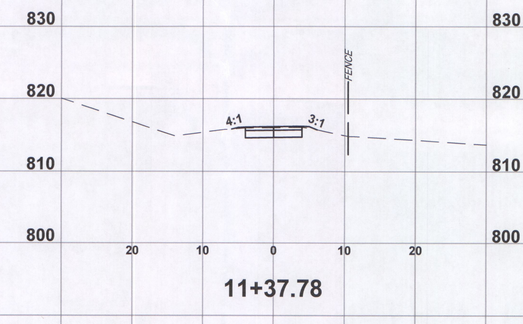
11+20



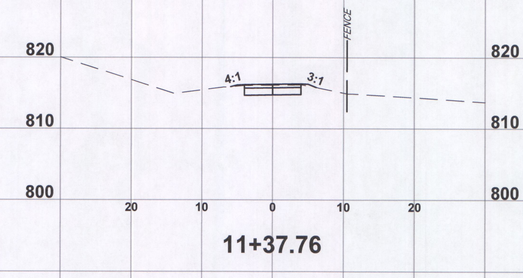
11+10



11+00



11+37.78



11+37.76

AS-BUILT DRAWING

PREPARED BY: CLARK DIETZ, INC.

CERTIFIED BY: HEATH TITZER, PE LS

DATE: 02/13/2023

HEATH A. TITZER REGISTERED NO. LS21000197 STATE OF INDIANA LAND SURVEYOR

HAMILTON COUNTY, INDIANA

HAMILTON COUNTY SURVEYOR'S OFFICE
HAMILTON COUNTY GOVERNMENT/JUDICIAL CENTER
ONE HAMILTON COUNTY SQUARE, SUITE 188
NOBLESVILLE, IN 46060
PHONE: (317) 776-8495
FAX: (317) 776-9628
SURVEYOR@HAMILTONCOUNTY.IN.GOV

PROJECT NO: H0210300
WATERSHED: INTRACOASTAL AT GEIST SEC. 1
FIELD BY: DT
DRAWN BY: BEP
CHECKED BY: HJP
DATE: 10/16/2020

BY: –
DATE: –

REVISIONS: –
DATE: –

BRIAN POWERS REGISTERED 10809105 STATE OF INDIANA PROFESSIONAL ENGINEER

CERTIFIED BY:

Brian Powers

BRIAN E. POWERS, P.E.

PROJECT NAME: INTRACOASTAL AT GEIST DRAINAGE IMPROVEMENTS

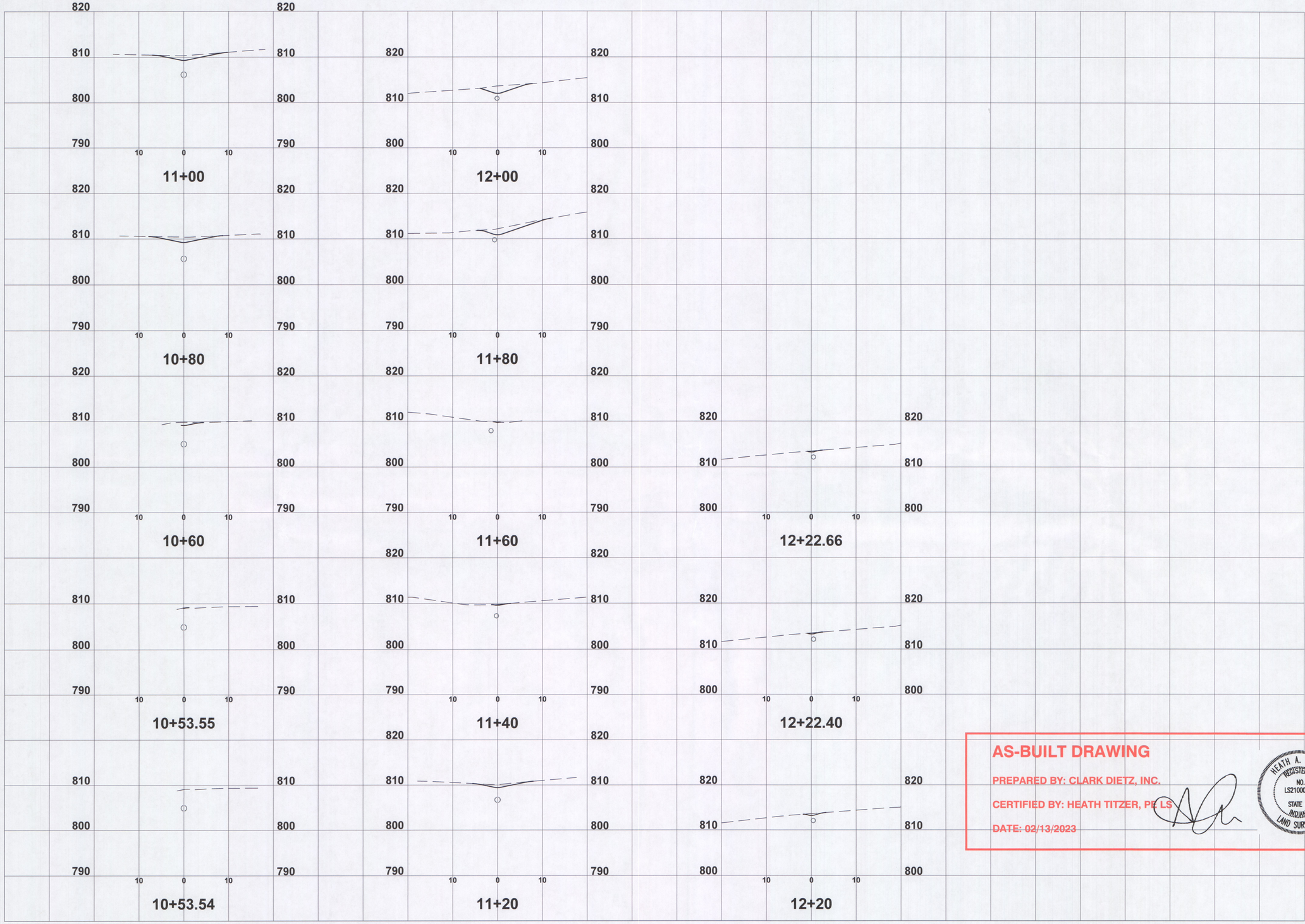
TRAIL CROSS SECTIONS

PLOT DATE: 10/16/2020

SHEET NO.

8 OF 9

NOTE: SEE SHEET 1 FOR SWALE PROFILE



AS-BUILT DRAWING

PREPARED BY: CLARK DIETZ, INC.

CERTIFIED BY: HEATH TITZER, PE LS

DATE: 02/13/2023

HEATH A. TITZER REGISTERED NO. LS21000197 STATE OF INDIANA LAND SURVEYOR

HAMILTON COUNTY, INDIANA

HAMILTON COUNTY SURVEYOR'S OFFICE
HAMILTON COUNTY GOVERNMENT/JUDICIAL CENTER
ONE HAMILTON COUNTY SQUARE, SUITE 188
NOBLESVILLE, IN 46060
PHONE: (317) 776-8495
FAX: (317) 776-9628
SURVEYOR@HAMILTONCOUNTY.IN.GOV

REVISIONS:	-	
DATE:	-	
BY:	-	

PROJECT NO: H0210300
WATERSHED: INTRACOASTAL AT GEIST SEC. 1
FIELD BY: DT
DRAWN BY: BEP
CHECKED BY: HJP
DATE: 10/16/2020

BRIAN POWERS REGISTERED 10809105 STATE OF INDIANA PROFESSIONAL ENGINEER

CERTIFIED BY:

Brian Powers

BRIAN E. POWERS, P.E.

PROJECT NAME: INTRACOASTAL AT GEIST DRAINAGE IMPROVEMENTS

SWALE CROSS SECTIONS

PLOT DATE: 10/16/2020

SHEET NO.

9 OF 9