

## **SUPPLEMENTAL TO THE PRELIMINARY ENGINEERING REPORT DATED: NOVEMBER 18, 2013 FOR THE WHEELOCK & WATKINS DRAIN #0297**

To: Ms. Susan Kubic, PE – Genesee County Drain Commissioner-SWM

From: David Hiler, PE – Fleis & VandenBrink Engineering, Inc.

Date: September 18, 2014

As requested by your office we have reviewed additional preliminary improvement alternatives for the Wheelock & Watkins Drain #0297. The additional preliminary improvement alternatives requested to be looked at include the following:

- an option of taking drainage from the golf course and low area located northeast of Ridge and Huron to the Mill Pond;
- a review of providing detention on the Goodrich Golf Course to reduce the flow to the drain and reduce the proposed storm sewer pipe sizes;
- an alternative storm sewer route thru the park located southeast of Clarence and Erie Streets;

### **Redirect drainage to Mill Pond**

Taking drainage from the golf course and low area located northeast of Ridge and Huron to the Mill Pond could happen assuming the normal and high water elevation of the Goodrich Mill Pond Dam was sufficiently lowered to allow the water from these areas to flow to the Mill Pond. The water can be lowered through either the removal of the Dam or the establishment of a new pond level. The Mill Pond would need to be lowered such that the resulting new 1% chance (100 year) storm event elevation would be at or below the existing elevation of approximately 871.0 in the low area located northeast of Ridge and Huron to avoid the Mill Pond from backing up water into the low area. Based on a review of the FEMA maps and profiles for the Kearsley Creek downstream from the Dam, through the Mill Pond, and upstream of the Mill Pond, it may be possible to set the grade of the Mill Pond such that the low area and the Goodrich Golf Course are able to be redirected and drained to the Mill Pond. Taking these areas directly to the Mill Pond would remove the storm water runoff from these areas from the Wheelock & Watkins Drain.

The existing Wheelock and Watkins storm sewer system was evaluated with the golf course runoff completely removed. The existing storm sewer system was found to still be undersized to handle the existing flows for the 10% chance (10 year) storm event that enter the system downstream from the golf course east of Ridge Road. (See Table 1, Rows 1 and 2). All of the existing pipes would have to be increased in size to meet current requirements even if the area west of Ridge Road was removed.

- The existing 18" private storm sewer from Ridge and Huron to the low area has a capacity of approximately 2.5 cfs, whereas the required capacity for a 10% chance (10 year) storm event is approximately 10.9 cfs.
- The existing 12" storm sewer from the low area to the existing 24" storm sewer at Saginaw Street has capacities of approximately 1.5 cfs to 4.0 cfs, compared to the required capacity of approximately 10.8 to 25.3 cfs.
- The existing 24" storm sewer from Saginaw Street to the Kearsley Creek has capacities of approximately 10.2 to 20.7 cfs, whereas approximately 27.7 to 41.5 cfs is required.

### **Golf Course Detention**

Different outlet rates from the Goodrich Golf Course were reviewed related to providing detention on the golf course for the 1% chance (100 year) design storm event. A discharge rate of approximately 7 cfs would be required to allow the proposed detention areas to drain down over a 24-hour period. To maximize pipe size reduction, a discharge rate of 1 cfs from the golf course was reviewed.

- An average outlet rate of 1 cfs would require a detention volume of approximately 16 acre-feet of storage and the detention area would drain in approximately 8 days at this average rate assuming no infiltration into the ground or evaporation.
- An average outlet rate of 7 cfs would require a detention volume of approximately 12 acre-feet of storage and the detention area would drain in approximately 21 hours at this average rate assuming no infiltration into the ground or evaporation.

Based on the county contours, the natural storage volume available upstream from Ridge Road on the golf course property includes two separate natural storage areas. The first natural storage area is between Ridge Road at Huron (to the north) and the golf course maintenance garage (to the south). The natural storage volume available in this area is approximately 4.1 acre-feet between elevations 872 and 874 and the drainage area to this natural storage area is approximately 52.5 acres. A structure (North Restrictor) to restrict the flow from this area could be constructed on the 18" outlet pipe crossing Ridge Road. The elevation of Ridge Road near the existing 18" outlet pipe from the golf course and the crossing under Ridge Road is approximately 876. It may be possible to increase the elevation of the first storage area to increase the natural storage volume beyond the 4.1 acre-feet while providing a one foot freeboard. The second natural storage area is upstream from the golf course maintenance garage (south of the garage). The natural storage volume available is approximately 26.4 acre-feet between elevations 874 and 876 and the drainage area to this natural storage area is approximately 64.5 acres. A structure (South Restrictor) to restrict the flow from this second area could be constructed at the ditch crossing the path that leads from the maintenance garage to the golf course. This South Restrictor may require some reconfiguration of the path with the structure. This second area has significantly more storage available. This second natural storage area also extends outside of the golf course and into the Green Ridge Subdivision to the south. Further refinement of providing detention in these natural storage areas would be required and would depend on the selected outlet rate and the storage volume that could be contained on the golf course property between these two natural storage areas. Also, it would need to be determined as to how much storage could be allowed, if any, on the Green Ridge Subdivision properties. The storage areas discussed above involve only the natural storage areas and do not include any work or costs associated with reconfiguring any areas on the golf course or filling any low areas in the Green Ridge Subdivision. Costs associated with reconfiguring areas or filling low areas would be in addition to the opinion of construction costs presented for the additional improvement alternatives discussed below. Also, the only overflow option for the natural storage areas would be the proposed pipe system improvement which would be designed for a ten percent chance (10-year) storm event. Therefore, any storm event exceeding the natural storage area design storm event could overload the proposed storm sewer and could cause flooding downstream. Easements around the natural storage areas would need to be granted to the GCDC so that no changes to the areas occur that would affect the storage volume.

The option to dig a detention area on the golf course was not explored and was discussed in the preliminary engineering report dated November 18, 2013. The option to dig a detention area would involve the excavation of approximately 26,000 cubic yards or more of earth to create a storage area that would have a water depth of approximately 4 feet, 1 foot of freeboard, and a 20 foot wide access area around it for maintenance. This excavated detention area would take up an area of approximately 4.5 acres or more on the golf course. The construction costs to construct a storage basin on the golf course are significantly higher than proposed Alternatives 1 and 2 as discussed in the preliminary engineering report.

Using the minimum 1 cfs outlet rate off of the golf course with the natural storage areas, four alternatives to improvement Alternative 2 of the preliminary engineering report were evaluated.

### **Alternative 2A**

Using the minimum outlet rate of 1 cfs from the golf course, the proposed storm sewer sizes for improvement Alternative 2 were evaluated while utilizing the existing 30" storm sewer under Hegel Road for the 10 percent chance (10 year) design storm event. This option is being referred to as improvement Alternative 2A and drawing F1 of Appendix 'F' of the preliminary drainage report may be referred to. Because of the age of the existing storm sewer and because the existing pipe is not of adequate size, Alternative 2A was evaluated without utilizing the capacity of the existing 24" storm sewer. The storm sewer sizes for Alternative 2A could be reduced as follows (See Table 1, Rows 3 and 4):

- Along Huron Street from Ridge Road to the proposed 18" storm sewer from the low area located northeast of Ridge and Huron, the storm sewer size could be reduced from a 42" to a 24".
- From this point to Seneca Street and along Seneca to the existing 30" storm sewer under Hegel Road the storm sewer size could be reduced from a 48" to a 30".
- From the existing 30" storm sewer under Hegel Road to the outlet pipe at the Kearsley Creek the storm sewer size could be reduced from a 48" to a 36".
- The outlet pipe to Kearsley Creek could be reduced from a 54" to a 42".

Because the existing 30" storm sewer under Hegel Road controls the elevations of the pipe and the hydraulic gradeline (water elevation) upstream to the low area, the upper end of the proposed 18" storm sewer to the low area would have approximately one foot of cover. The proposed 18" storm sewer would also be surcharged by approximately 0.5 feet but be below the rim elevation of 871.6 for the 10 percent chance (10 year) design storm event.

The Preliminary Opinion of Probable Construction Cost (POPCC) for Alternative 2A is approximately \$669,000.00 and is approximately \$53,000.00 less than Alternative 2.

### **Alternative 2A-1**

As an option to Alternative 2A, the available capacity of the existing 24" storm sewer was taken into account by keeping the existing 24" pipe along Clarence Street and Erie Street. A relief line could be constructed from the intersection of Clarence and Saginaw Street east through the park and around the tennis courts to the Kearsley Creek. The length of the route through the park is approximately 700 feet. This alternative to improvement Alternative 2A is being referred to as Alternative 2A-1 and drawing F1 of Appendix 'F' of the preliminary drainage report may be referred to. This route thru the park is slightly shorter than the route along Erie Street and avoids the removal of the existing storm sewer along Clarence and Erie. (See Table 1, Row 5):

- From Ridge Road to the existing 30" storm sewer under Hegel Road the proposed storm sewer sizes would be the same as Alternative 2A.
- The proposed pipe slope from Hegel Road to the existing 24" under Seneca Street could be increased to reduce the pipe size from a 36" to a 30".
- From this point to Clarence and Saginaw the proposed storm sewer could be reduced from a 36" to a 30".
- The proposed storm sewer size thru the park would be a 30".
- The outlet pipe to Kearsley Creek would be a 42".

The Preliminary Opinion of Probable Construction Cost (POPCC) for Alternative 2A-1 is approximately \$602,000.00 and is approximately \$120,000.00 less than Alternative 2. The cost reduction for Alternative 2A-1 includes the work proposed in Alternative 2A.

### **Alternative 2A-2**

For Alternative 2A-1, an alternative route to the low area located northeast of Ridge and Huron was reviewed. This alternative is being referred to as improvement Alternative 2A-2 and drawing F1 of Appendix 'F' of the preliminary drainage report may be referred to. The stormwater from Ridge and Huron would flow through the existing private 18" pipe into the low area. At existing CB(1017) just west of proposed CB(3015) a proposed 30" pipe could be constructed to the east to Seneca and then north to the existing 30" under Hegel Road. This

route would lower the proposed 30" storm sewer in the low area by approximately 1.3 feet. The proposed storm sewer for this alternative is not projected to be surcharged for the 10 percent chance (10 year) design storm event. However, the existing 18" private storm sewer from the low area to the golf course would be surcharged and undersized. Due to the ground elevations, the surcharge elevations of the 18" would stay within the structures. (See Table 1, Row 6)

The Preliminary Opinion of Probable Construction Cost (POPCC) for Alternative 2A-2 is approximately \$511,000.00 and is approximately \$211,000.00 less than Alternative 2. The cost reduction for Alternative 2A-2 includes the work proposed in Alternative 2A and Alternative 2A-1.

For Alternatives 2A, 2A-1, and 2A-2, if the outlet rate from the golf course is increased greater than 1 cfs, the storm sewer sizes may increase for the proposed storm sewer system. As a result, the amount of pipe size increase would depend on how much the outlet rate is increased. Because the existing 30" storm sewer under Hegel Road controls the elevations upstream, the hydraulic gradeline (water elevation) will likely also increase as well. Those parts of the existing Wheelock & Watkins Drain that remain along the existing drain route for these Alternates will require continued long term maintenance. Also for these Alternates, storm events greater than the ten percent chance (10-year) storm event may surcharge the pipe system further and potentially the storm sewer rim elevations.

#### **Alternative 2B**

Using the same conditions as Alternative 2A, if the existing 30" pipe under Hegel Road was not used and a new storm sewer pipe constructed across Hegel Road, the proposed storm sewer pipe could be constructed deeper. Constructing the storm sewer deeper does not change the pipe sizes for Alternative 2A and 2B (See Table 1, Row 7). The pipe sizes for Alternative 2A and 2B would be the same. Although without the constraint of the existing 30" under Hegel Road controlling the elevations of the pipes for this alternative, the proposed 18" storm sewer to the low area could be lowered to get more cover and the storm sewer would not be surcharged for the 10 percent chance (10 year) design storm event.

Alternative 2A-1 and Alternative 2A-2 were also evaluated for the effects not using the existing 30" pipe under Hegel Road thus allowing the storm pipe to be constructed deeper. In both of these Alternatives there were also no additional reduction of the pipe sizes.

The Preliminary Opinion of Probable Construction Cost (POPCC) to construct a new 30" pipe across Hegel Road is approximately \$22,000. This \$22,000 would be in addition to the POPCC for the Alternatives listed above.

SUPPLEMENTAL TO THE PRELIMINARY ENGINEERING REPORT DATED: NOVEMBER 18, 2013 FOR  
 THE WHEELOCK & WATKINS DRAIN #0297  
 SEPTEMBER 18, 2014

TABLE 1.

		Private storm sewer from Ridge Rd to low area (CB3014 to CB3015)		County Drain from low area to Hegel Rd (CB3015 to CB3008+/-)		County Drain from Hegel Rd to Saginaw St (CB3008+/- to CB3007)		County Drain from Saginaw St to Clarence St (CB3007 to MH3004)		County Drain from Clarence St to Kearsley Creek (CB3007 to MH3001)		County Drain at outlet (MH3001 to 3000)	
		Flow (cfs)	Pipe Size	Flow (cfs)	Pipe Size	Flow (cfs)	Pipe Size	Flow (cfs)	Pipe Size	Flow (cfs)	Pipe Size	Flow (cfs)	Pipe Size
1.	Existing pipe capacity (along existing route)	2.5	18"	1.5 to 4.0	12"	1.5 to 4.0	12"	10.2 to 20.7	24"	10.2 to 20.7	24"	20.7	24"
2.	Proposed flows if golf course drained to Mill Pond. Flow to Co Drain =0 cfs	10.9	--	10.8 to 25.3	--	10.8 to 25.3	--	27.7 to 41.5	--	27.7 to 41.5	--	41.5	--
3.	Alt 2 proposal- (Appendix F) includes flows from area west of Ridge Rd	See report	42"	See report	48"	See report	48"	See report	48"	See report	48"	See report	54"
4.	Alt 2A proposal- only 1 cfs coming from area west of Ridge Rd	--	24"	--	30"	--	30"	--	36"	--	36"	--	42"
5.	Alt 2A-1 proposal- relief drain	--	Same as 2A	--	Same as 2A	--	30"	--	30"	--	Existing 24" plus 30" relief	--	Existing 24" plus 30" relief
6.	Alt 2A-2 Proposal- alternative outlet for low area	11.9	Existing 18"	--	30"	--	Same as 2A-1	--	Same as 2A-1	--	Same as 2A-1	--	Same as 2A-1
7.	Alt 2B proposal- only 1 cfs coming from area west of Ridge Rd, 30" under Hegel Rd not used	--	Same as 2A	--	Same as 2A	--	Same as 2A	--	Same as 2A	--	Same as 2A	--	Same as 2A

**WHEELOCK & WATKINS DRAIN #0297: SUPPLEMENTAL TO ENG. REPORT-SEPT. 18, 2014**

**Preliminary Opinion of Probable Construction Costs (POPCC)**

- **ALTERNATIVE 2A: same route as Alternative 2 except connecting to ex. 30" storm sewer under Hegel Road and constructing storm sewer without using ex. 24" storm sewer capacity**

Item Description	Qty	Pay Unit	Unit Price	Amount
1 . Remove Ex. Dr Structure	5 +/-	Each	\$350.00 +/-	\$1,750.00 +/-
2 . Remove Ex. Storm Sewer, 6" to 24"	800 +/-	L.F.	\$8.00 +/-	\$6,400.00 +/-
3 . 12" Sewer, C76-III	50 +/-	L.F.	\$40.00 +/-	\$2,000.00 +/-
4 . 18" Sewer, C76-III	175 +/-	L.F.	\$55.00 +/-	\$9,625.00 +/-
5 . 24" Sewer, C76-III	175 +/-	L.F.	\$70.00 +/-	\$12,250.00 +/-
6 . 30" Sewer, C76-III	600 +/-	L.F.	\$85.00 +/-	\$51,000.00 +/-
7 . 36" Sewer, C76-III	1,470 +/-	L.F.	\$90.00 +/-	\$132,300.00 +/-
8 . 42" Sewer, Corrugated Steel Pipe	30 +/-	L.F.	\$140.00 +/-	\$4,200.00 +/-
9 . 42" End Section, Steel	1 +/-	Each	\$1,800.00 +/-	\$1,800.00 +/-
10 . 4' Dia. Drainage Structure, Catch Basin	3 +/-	Each	\$1,800.00 +/-	\$5,400.00 +/-
11 . 4' Dia. Drainage Structure, Manhole	1 +/-	Each	\$1,600.00 +/-	\$1,600.00 +/-
12 . 5' Dia. Drainage Structure, Catch Basin	1 +/-	Each	\$3,300.00 +/-	\$3,300.00 +/-
13 . 5' Dia. Drainage Structure, Manhole	3 +/-	Each	\$2,800.00 +/-	\$8,400.00 +/-
14 . 6' Dia. Drainage Structure, Catch Basin	2 +/-	Each	\$4,000.00 +/-	\$8,000.00 +/-
15 . 6' Dia. Drainage Structure, Manhole	3 +/-	Each	\$3,800.00 +/-	\$11,400.00 +/-
16 . 7' Dia. Drainage Structure, Manhole	1 +/-	Each	\$5,000.00 +/-	\$5,000.00 +/-
17 . Drainage Structure Covers	3,600 +/-	Lb.	\$2.00 +/-	\$7,200.00 +/-
18 . Heavy Rip Rap	50 +/-	S.Y.	\$75.00 +/-	\$3,750.00 +/-
19 . Connect to Existing Storm Sewer	4 +/-	Each	\$500.00 +/-	\$2,000.00 +/-
20 . Regrade Existing Ditch	1 +/-	Lsum	\$1,000.00 +/-	\$1,000.00 +/-
21 . Compacted Sand Backfill	1,800 +/-	L.F.	\$20.00 +/-	\$36,000.00 +/-
22 . Road Surf Removal & Replacement, Asphalt	760 +/-	S.Y.	\$75.00 +/-	\$57,000.00 +/-
23 . Road Surf Removal & Replacement, Aggregate	2,885 +/-	S.Y.	\$40.00 +/-	\$115,400.00 +/-
24 . Driveway Removal & Replacement, Conc.	365 +/-	S.Y.	\$55.00 +/-	\$20,075.00 +/-
25 . Curb & Gutter Removal & Replacement, Conc.	160 +/-	L.F.	\$30.00 +/-	\$4,800.00 +/-
26 . Sidewalk Removal & Replacement, Conc.	120 +/-	S.F.	\$15.00 +/-	\$1,800.00 +/-
27 . Class A Seeding (200 Lbs/Acre)	140 +/-	Lb.	\$10.00 +/-	\$1,400.00 +/-
28 . Chemical Fertilizer Nutrients (240 Lbs/Acres)	170 +/-	Lb.	\$5.00 +/-	\$850.00 +/-
29 . Mulch (2 Tons/Acre)	1.4 +/-	Ton	\$800.00 +/-	\$1,120.00 +/-
30 . Remove and Replace Guardrail	100 +/-	L.F.	\$35.00 +/-	\$3,500.00 +/-
31 . Golf Course Restrictor-North	1 +/-	Each	\$10,000.00 +/-	\$10,000.00 +/-
32 . Golf Course Restrictor-South	1 +/-	Each	\$60,000.00 +/-	\$60,000.00 +/-
33 . Soil Erosion & Sedimentation Control	1 +/-	Lsum	\$7,500.00 +/-	\$7,500.00 +/-
34 . Traffic Control	1 +/-	Lsum	\$10,000.00 +/-	\$10,000.00 +/-
<b>Total</b>				<b>\$607,820 +/-</b>
<b>Contingency 10%</b>				<b>\$60,782 +/-</b>
<b>Grand Total</b>				<b>\$668,602 +/-</b>

**Note:** The figures given for each item and the total figure of the POPCC is only a preliminary opinion based on data from similar projects as of the date of this study and are subject to change. Easement acquisitions, legal, financial, contract administration, engineering, permits, construction staking, and as-builts drawings are not included in these figures.

- **ALTERNATIVE 2A-1: same route as Alternative 2 except connecting to ex. 30” storm sewer under Hegel Road and using ex. 24” storm sewer capacity and route thru park versus route along Erie Street**

Item Description	Qty	Pay Unit	Unit Price	Amount
1 . 18” Sewer, C76-III	175 +/-	L.F.	\$55.00 +/-	\$9,625.00 +/-
2 . 24” Sewer, C76-III	175 +/-	L.F.	\$70.00 +/-	\$12,250.00 +/-
3 . 30” Sewer, C76-III	2,025 +/-	L.F.	\$85.00 +/-	\$172,125.00 +/-
4 . 42” Sewer, Corrugated Steel Pipe	30 +/-	L.F.	\$140.00 +/-	\$4,200.00 +/-
5 . 42” End Section, Steel	1 +/-	Each	\$1,800.00 +/-	\$1,800.00 +/-
6 . 4’ Dia. Drainage Structure, Catch Basin	1 +/-	Each	\$1,800.00 +/-	\$1,800.00 +/-
7 . 4’ Dia. Drainage Structure, Manhole	1 +/-	Each	\$1,600.00 +/-	\$1,600.00 +/-
8 . 5’ Dia. Drainage Structure, Catch Basin	1 +/-	Each	\$3,300.00 +/-	\$3,300.00 +/-
9 . 5’ Dia. Drainage Structure, Manhole	4 +/-	Each	\$2,800.00 +/-	\$11,200.00 +/-
8 . 6’ Dia. Drainage Structure, Catch Basin	3 +/-	Each	\$4,000.00 +/-	\$12,000.00 +/-
9 . 6’ Dia. Drainage Structure, Manhole	2 +/-	Each	\$3,800.00 +/-	\$7,600.00 +/-
10 . Drainage Structure Covers	3,450 +/-	Lb.	\$2.00 +/-	\$6,900.00 +/-
11 . Heavy Rip Rap	50 +/-	S.Y.	\$75.00 +/-	\$3,750.00 +/-
12 . Connect to Existing Storm Sewer	5 +/-	Each	\$500.00 +/-	\$2,500.00 +/-
13 . Compacted Sand Backfill	1,530 +/-	L.F.	\$20.00 +/-	\$30,600.00 +/-
14 . Road Surf Removal & Replacement, Asphalt	635 +/-	S.Y.	\$75.00 +/-	\$47,625.00 +/-
15 . Road Surf Removal & Replacement, Aggregate	2,885 +/-	S.Y.	\$40.00 +/-	\$115,400.00 +/-
16 . Driveway Removal & Replacement, Conc.	50 +/-	S.Y.	\$55.00 +/-	\$2,750.00 +/-
17 . Curb & Gutter Removal & Replacement, Conc.	50 +/-	L.F.	\$30.00 +/-	\$1,500.00 +/-
18 . Sidewalk Removal & Replacement, Conc.	120 +/-	S.F.	\$15.00 +/-	\$1,800.00 +/-
19 . Class A Seeding (200 Lbs/Acre)	160 +/-	Lb.	\$10.00 +/-	\$1,600.00 +/-
20 . Chemical Fertilizer Nutrients (240 Lbs/Acres)	200 +/-	Lb.	\$5.00 +/-	\$1,000.00 +/-
21 . Mulch (2 Tons/Acre)	1.6 +/-	Ton	\$800.00 +/-	\$1,280.00 +/-
22 . Golf Course Restrictor-North	1 +/-	Each	\$10,000.00 +/-	\$10,000.00 +/-
23 . Golf Course Restrictor-South	1 +/-	Each	\$60,000.00 +/-	\$60,000.00 +/-
24 . Soil Erosion & Sedimentation Control	1 +/-	Lsum	\$7,500.00 +/-	\$7,500.00 +/-
25 . Traffic Control	1 +/-	Lsum	\$15,000.00 +/-	\$15,000.00 +/-
<b>Total</b>				\$546,705 +/-
<b>Contingency 10%</b>				\$54,671 +/-
<b>Grand Total</b>				\$601,376 +/-

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- **ALTERNATIVE 2A-2: same route as Alternative 2 except connecting to ex. 30” storm sewer under Hegel Road and using ex. 24” storm sewer capacity and using route thru park versus route along Erie Street and using a more direct route to low area versus running pipe along Huron Street**

Item Description	Qty	Pay Unit	Unit Price	Amount
1 . Remove Ex. Dr Structure	1 +/-	Each	\$350.00 +/-	\$350.00 +/-
2 . Remove Ex. Storm Sewer, 6" to 24"	20 +/-	L.F.	\$8.00 +/-	\$160.00 +/-
3 . 30” Sewer, C76-III	1,925 +/-	L.F.	\$85.00 +/-	\$163,625.00 +/-
4 . 42” Sewer, Corrugated Steel Pipe	30 +/-	L.F.	\$140.00 +/-	\$4,200.00 +/-
5 . 42” End Section, Steel	1 +/-	Each	\$1,800.00 +/-	\$1,800.00 +/-
6 . 5' Dia. Drainage Structure, Catch Basin	2 +/-	Each	\$3,300.00 +/-	\$6,600.00 +/-
7 . 5' Dia. Drainage Structure, Manhole	3 +/-	Each	\$2,800.00 +/-	\$8,400.00 +/-
8 . 6' Dia. Drainage Structure, Catch Basin	5 +/-	Each	\$4,000.00 +/-	\$20,000.00 +/-
9 . 6' Dia. Drainage Structure, Manhole	1 +/-	Each	\$3,800.00 +/-	\$3,800.00 +/-
10 . Drainage Structure Covers	3,150 +/-	Lb.	\$2.00 +/-	\$6,300.00 +/-
11 . Heavy Rip Rap	50 +/-	S.Y.	\$75.00 +/-	\$3,750.00 +/-
12 . Connection to Existing Storm Sewer	5 +/-	Each	\$500.00 +/-	\$2,500.00 +/-
13 . Compacted Sand Backfill	1,020 +/-	L.F.	\$20.00 +/-	\$20,400.00 +/-
14 . Road Surf Removal & Replacement, Asphalt	535 +/-	S.Y.	\$75.00 +/-	\$40,125.00 +/-
15 . Road Surf Removal & Replacement, Aggregate	2,105 +/-	S.Y.	\$40.00 +/-	\$84,200.00 +/-
16 . Curb & Gutter Removal & Replacement, Conc.	20 +/-	L.F.	\$30.00 +/-	\$600.00 +/-
17 . Sidewalk Removal & Replacement, Conc.	120 +/-	S.F.	\$15.00 +/-	\$1,800.00 +/-
18 . Class A Seeding (200 Lbs/Acre)	120 +/-	Lb.	\$10.00 +/-	\$1,200.00 +/-
19 . Chemical Fertilizer Nutrients (240 Lbs/Acres)	150 +/-	Lb.	\$5.00 +/-	\$750.00 +/-
20 . Mulch (2 Tons/Acre)	1.2 +/-	Ton	\$800.00 +/-	\$960.00 +/-
21 . Golf Course Restrictor-North	1 +/-	Each	\$10,000.00 +/-	\$10,000.00 +/-
22 . Golf Course Restrictor-South	1 +/-	Each	\$60,000.00 +/-	\$60,000.00 +/-
23 . Soil Erosion & Sedimentation Control	1 +/-	Lsum	\$7,500.00 +/-	\$7,500.00 +/-
24 . Traffic Control	1 +/-	Lsum	\$15,000.00 +/-	\$15,000.00 +/-
<b>Total</b>				\$464,020 +/-
<b>Contingency 10%</b>				\$46,402 +/-
<b>Grand Total</b>				\$510,422 +/-

**Note:** The figures given for each item and the total figure of the POPCC is only a preliminary opinion based on data from similar projects as of the date of this study and are subject to change. Easement acquisitions, legal, financial, contract administration, engineering, permits, construction staking, and as-builts drawings are not included in these figures.

- **ALTERNATIVE 2B: cost to construct pipe across Hegel Road**

Item Description	Qty	Pay Unit	Unit Price	Amount
1 . 30" Sewer, C76-III	75 +/-	L.F.	\$85.00 +/-	\$6,375.00 +/-
2 . Road Surf Removal & Replacement, Asphalt	180 +/-	S.Y.	\$75.00 +/-	\$13,500.00 +/-
Total				\$19,875 +/-
Contingency 10%				\$1,988 +/-
<b>Grand Total</b>				<b>\$21,863 +/-</b>

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