

## Alternative Review - Draft

To: **Marcus Hall, P.E.**  
**Burleigh County Highway Dept.**

From: **Craig Odenbach, P.E.**  
**Michael Gunsch, P.E.**

Date: **October 26, 2013**

Subject: **Lincoln Township Cost Participation**

As the BCWRD works toward a preferred alternative for the Fox Island Flood Control Project that can be taken to an assessment vote, the need to identify the most likely configuration of a township roadway grade raise and levee has become critical for residents who will be asked to approve or reject a special assessment against their property. This Memorandum is intended to identify the feasible alternatives, and to serve as a basis for further discussions with Lincoln Township regarding the selection of a mutually acceptable alternative.

The attached Figure illustrates five potential roadway/levee segments. The Burleigh County Highway Department has committed to provide a connecting closure between the Tavis Road control structure and Mills Avenue in order to protect South Bismarck. **Segment A** (color coded yellow) constitutes the shortest, most direct route for a grade raise that would provide the desired closure. However, this approach leaves a large area of Fox Island residences unprotected and does not achieve the objective of the petitioners for the Fox Island flood control project.

As an alternative, **Segment B** (color coded green) is another roadway grade raise of similar length and cost. However, the **Segment B** grade raise would require one of three alternative closures to complete the tie in to protect South Bismarck, each providing protection to larger portions of Fox Island. **Alternative Segment B-1** (color coded red) includes both a grade raise along Gallatin Loop, as well as a river levee running from the county owned lot northward to the entrance channel for Whispering Bay. This alternative maximizes the area being provided flood protection. **Alternative Segment B-2** (color coded brown) involves a grade raise along Gallatin Drive, and **Alternative Segment B-3** (color coded blue) involves a grade raise along Far West and Fontenelle Drives. Both **Alternative Segments B-2 and B-3** provide protection to a greater area of Fox Island than the construction of **Segment A** alone, but less than would be protected by the construction of **Segment B** and **Alternative Segment B-1**.

Preliminary Opinions of Probable Cost have been developed for these alternatives are provided in **Table One**.

<b>Table One</b>						
<b>Project Segment and OPC's</b>						
<b>Segment</b>	<b>Length (ft)</b>	<b>Levee Cost</b>	<b>Paving Cost</b>	<b>Total Cost</b>	<b>Cost/Foot</b>	<b>Cost/Foot W/SWC Cost Share [1]</b>
<b>Segment A</b>	3,770	\$795,508	\$503,762	\$1,299,270	\$344.63	\$244.15
<b>Segment B</b>	3,121	\$608,429	\$417,005	\$1,025,434	\$328.56	\$235.73
<b>Alternative B-1</b>	6,510	\$1,580,196	\$408,907	\$1,989,103	\$305.55	\$191.57
<b>Alternative B-2</b>	1,690	\$352,089	\$225,806	\$577,895	\$341.95	\$242.74
<b>Alternative B-3</b>	2,348	\$465,845	\$313,673	\$779,519	\$331.99	\$237.52

[1] SWC cost share is based on 60% of eligible construction costs

# Fox Island Flood Control



If the special assessment project is not approved by Fox Island residents, the Burleigh County Highway Department (Lincoln Township) has three roadway options, and a roadway levee option to provide the required tie in to protect South Bismarck, each of which also provides varying degrees of flood protection within Fox Island. These options and their respective opinions of probable costs are listed in **Table Two** in ascending order of area or residences/lots protected.

<b>Table Two</b>		
<b>Project Configurations and OPC</b>		
<b>Alternative</b>	<b>Lots Protected</b>	<b>Cost</b>
Segment A (road)	48	\$1,299,270
Segment B + B-2 (road)	73	\$1,603,329
Segment B + B-3 (road)	80	\$1,804,953
Segment B + B-1 (road/levee)	116	\$3,014,537

If Segment A were constructed to provide the required closure, the SWC would likely provide 60% cost share assistance for the grade raise portion of the project. This would leave a total cost to Lincoln Township of \$920,456. Thus, the Burleigh County Highway Department has provided a preliminary confirmation of their willingness, through Lincoln Township, to provide up to \$920,456 to whichever alternative is ultimately selected, since this is the minimum cost required to provide the necessary closure. The following **Table Three** lists the potential project cost breakdown for each alternative and the cost per lot with and without State Water Commission cost share funding. It was assumed that only the cost of the levee construction, in the case of Segment B + B-1, and the cost of any associated roadway grade raises would possibly be eligible for State Water Commission cost share funding. None of the roadway surfacing costs (i.e., paving) would be eligible based on prior discussions with staff.

<b>Table Three</b>						
<b>Opinion of Probable Cost Per Residential Lot</b>						
<b>Alternative</b>	<b>Total Cost</b>	<b>Lots Protected</b>	<b>Township Funds</b>	<b>Potential SWC Funds</b>	<b>Cost/Lot No SWC Funds</b>	<b>Cost/Lot w/SWC Funds</b>
Segment A	\$1,299,270	48	\$920,456	\$378,813	NA	NA
Segment B + B-2	\$1,603,329	73	\$920,456	\$457,389	\$9,354	\$3,089
Segment B + B-3	\$1,804,953	80	\$920,456	\$511,559	\$11,056	\$4,662
Segment B + B-1	\$3,014,537	116	\$920,456	\$1,031,726	\$18,052	\$9,158

The values in these tables represent preliminary opinions of probable costs and assume State Water Commission cost participation in the amount of 60% of the eligible construction costs. The SWC does not provide conditional cost share approval prior to the assessment vote for anything other than drainage projects. Therefore it would be necessary to vote the entire assessment, or it may be possible to vote on the reduced cost conditioned on the SWC providing the cost share. In that case, if the cost share were not approved, a new vote would be required to advance the project, if desired.

In conclusion it is recommended the Burleigh County Water Resource District request Lincoln Township to consider participation in the Fox Island flood control project as described. Lincoln Township's need and/or desire to special assess the grade raise and paving costs remains to be determined. If they did assess those costs, the figures in **Table Three** would increase accordingly, however this would be a separate paving district.

# Fox Island Flood Control

The next step in project development is to obtain concurrence from Lincoln Township, after which the following steps would likely occur to further develop the project.

- ✓ Meeting with Fox Island Homeowner's Association to discuss project alternatives
- ✓ Update assessment district and establish final cost distribution
  - Consideration of river levee easements and assessment provisions
- ✓ Finalized Feasibility Study Report
- ✓ Request SWC cost share reimbursement for Feasibility Study
- ✓ Create project per NDCC – Board Action
- ✓ Complete Preliminary Engineering Report
- ✓ Public Informational Meeting – (if deemed necessary or proceed directly to the vote)
- ✓ Public Hearing and Vote
- ✓ Proceed to final design or abandon project

# Segment A - Fox Island Flood Protection

## Permanent Levee Construction

Opinion of Probable Cost

HEI# 6025-006

Monday, August 12, 2013

Item No.	Description	Quantity	Unit	Unit Price	Amount
1	Contract Bond	1	L SUM	\$ 27,450.23	\$ 27,450.23
2	Mobilization	1	L SUM	\$ 54,900.46	\$ 54,900.46
3	Pipe Conduit 18"	578	LF	\$ 112.00	\$ 64,770.16
4	Sluice Gate & Connection	12	EA	\$ 6,500	\$ 75,179.65
5	Remove, Stockpile, & Replace Topsoil	4.00	Acre	\$ 2,800	\$ 11,197.26
6	Saw Bituminous Surfacing	150	LF	\$ 3.00	\$ 450.00
7	Removal of Bituminous Surfacing	12566	SY	\$ 5.75	\$ 72,255.08
8	Excavation Waste	1094	CY	\$ 11.00	\$ 12,034.81
9	Levee Embankment - Fat Clay	14668	CY	\$ 8.90	\$ 130,546.13
10	Tree Removal	113	EA	\$ 750.00	\$ 84,821.18
11	Erosion Control Levee	13782	SY	\$ 3.50	\$ 48,237.38
12	Seeding & Hydromulch	5.70	Acre	\$ 5,005	\$ 28,503.91
13	Silt Fence	7640	LF	\$ 2.75	\$ 21,009.07
<b>Construction Cost =</b>					<b>\$ 631,355.31</b>

Engineering (Design and Const. Mgmt Services)	\$ 113,643.96
Administration (ROW, Legal, Admin)	\$ 50,508.42

<b>Total Grade Raise Cost</b>	<b>\$ 795,507.69</b>
<b>SWC Cost Share</b>	<b>\$ 378,813.18</b>
<b>Grade Raise Cost w/SWC</b>	<b>\$ 416,694.50</b>

### Township/County Paving Cost

Item No.	Description	Quantity	Unit	Unit Price	Amount
1	Contract Bond	1	L SUM	\$ 17,383.09	\$ 17,383.09
2	Mobilization	1	L SUM	\$ 34,766.18	\$ 34,766.18
3	Hot Bituminous Pavement CL 29	2792	TON	\$ 45.00	\$ 125,660.87
4	Asphlat Cement	168	TON	\$ 600.00	\$ 100,528.70
5	Aggregate Base Course CL 5	4189	TON	\$ 29.00	\$ 121,472.18
<b>Construction Cost =</b>					<b>\$ 399,811.01</b>

Engineering (Design and Const. Mgmt Services)	\$ 71,965.98
Administration (ROW, Legal, Admin)	\$ 31,984.88

<b>Total Paving Cost</b>	<b>\$ 503,761.88</b>
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<b>Total Project Construction Cost</b>	<b>\$ 1,299,269.57</b>
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<b>Total Project Construction Cost w/SWC</b>	<b>\$ 920,456.38</b>
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## Segment B - Fox Island Flood Protection

### Permanent Levee Construction

Opinion of Probable Cost

HEI# 6025-006

Monday, August 12, 2013

Item No.	Description	Quantity	Unit	Unit Price	Amount
1	Contract Bond	1	L SUM	\$ 20,994.79	\$ 20,994.79
2	Mobilization	1	L SUM	\$ 41,989.58	\$ 41,989.58
3	Pipe Conduit 18"	470	LF	\$ 112.00	\$ 52,651.20
4	Sluice Gate & Connection	9	EA	\$ 6,500	\$ 61,113.00
5	Remove, Stockpile, & Replace Topsoil	3.41	Acre	\$ 2,800	\$ 9,548.83
6	Saw Bituminous Surfacing	120	LF	\$ 3.00	\$ 360.00
7	Removal of Bituminous Surfacing	10402	SY	\$ 5.75	\$ 59,811.50
8	Levee Embankment - Fat Clay	9006	CY	\$ 8.90	\$ 80,155.09
9	Tree Removal	94	EA	\$ 750.00	\$ 70,213.50
10	Erosion Control Levee	12321	SY	\$ 3.50	\$ 43,122.73
11	Seeding & Hydromulch	5.09	Acre	\$ 5,005	\$ 25,481.61
12	Silt Fence	6341	LF	\$ 2.75	\$ 17,438.30
<b>Construction Cost =</b>					<b>\$ 482,880.12</b>

Engineering (Design and Const. Mgmt Services)	\$ 86,918.42
Administration (ROW, Legal, Admin)	\$ 38,630.41

<b>Total Grade Raise Cost</b>	<b>\$ 608,428.95</b>
<b>SWC Cost Share</b>	<b>\$ 289,728.07</b>
<b>Grade Raise Cost w/SWC</b>	<b>\$ 318,700.88</b>

### Township/County Paving Cost

Item No.	Description	Quantity	Unit	Unit Price	Amount
1	Contract Bond	1	L SUM	\$ 14,389.42	\$ 14,389.42
2	Mobilization	1	L SUM	\$ 28,778.84	\$ 28,778.84
3	Hot Bituminous Pavement CL 29	2312	TON	\$ 45.00	\$ 104,019.90
4	Asphlat Cement	139	TON	\$ 600.00	\$ 83,215.92
5	Aggregate Base Course CL 5	3467	TON	\$ 29.00	\$ 100,552.57
<b>Construction Cost =</b>					<b>\$ 330,956.64</b>

Engineering (Design and Const. Mgmt Services)	\$ 59,572.19
Administration (ROW, Legal, Admin)	\$ 26,476.53

<b>Total Paving Cost</b>	<b>\$ 417,005.36</b>
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<b>Total Project Construction Cost</b>	<b>\$ 1,025,434.32</b>
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<b>Total Project Construction Cost w/SWC</b>	<b>\$ 735,706.24</b>
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# Segment B1 - Fox Island Flood Protection

## Permanent Levee Construction

Opinion of Probable Cost

HEI# 6025-006

Monday, August 12, 2013

Item No.	Description	Quantity	Unit	Unit Price	Amount
1	Contract Bond	1	L SUM	\$ 53,767.96	\$ 53,767.96
2	Mobilization	1	L SUM	\$ 107,535.93	\$ 107,535.93
3	Pipe Conduit 18"	1,035	LF	\$ 112.00	\$ 115,920.00
4	Sluice Gate & Connection	21	EA	\$ 6,500	\$ 134,550.00
5	Remove, Stockpile, & Replace Topsoil	11.36	Acre	\$ 2,800	\$ 31,804.44
6	Saw Bituminous Surfacing	60	LF	\$ 3.00	\$ 180.00
7	Removal of Bituminous Surfacing	10200	SY	\$ 5.75	\$ 58,650.00
8	Excavation Waste	3580	CY	\$ 11.00	\$ 39,378.37
9	Levee Embankment - Fat Clay	40035	CY	\$ 8.90	\$ 356,311.16
10	Tree Removal	195	EA	\$ 750.00	\$ 146,475.00
11	Erosion Control Levee	28066	SY	\$ 3.50	\$ 98,231.39
12	Seeding & Hydromulch	11.54	Acre	\$ 5,005	\$ 57,778.90
13	Silt Fence	13120	LF	\$ 2.75	\$ 36,080.00
14	Drainage Easements and Improvements	1	LS	\$ 65,000.00	\$ 65,000.00
<b>Construction Cost =</b>					<b>\$ 1,236,663.15</b>

Geotechnical	\$ 10,000.00
Drainage Easement Documents	\$ 12,000.00
Engineering (Design and Const. Mgmt Services)	\$ 222,599.37
Administration (ROW, Legal, Admin)	\$ 98,933.05

<b>Total Grade Raise Cost</b>	<b>\$ 1,580,195.57</b>
<b>SWC Cost Share</b>	<b>\$ 741,997.89</b>
<b>Grade Raise Cost w/SWC</b>	<b>\$ 838,197.68</b>

### Township/County Paving Cost

Item No.	Description	Quantity	Unit	Unit Price	Amount
1	Contract Bond	1	L SUM	\$ 14,109.99	\$ 14,109.99
2	Mobilization	1	L SUM	\$ 28,219.97	\$ 28,219.97
3	Hot Bituminous Pavement CL 29	2267	TON	\$ 45.00	\$ 101,999.90
4	Asphlat Cement	136	TON	\$ 600.00	\$ 81,599.92
5	Aggregate Base Course CL 5	3400	TON	\$ 29.00	\$ 98,599.90
<b>Construction Cost =</b>					<b>\$ 324,529.68</b>

Engineering (Design and Const. Mgmt Services)	\$ 58,415.34
Administration (ROW, Legal, Admin)	\$ 25,962.37

<b>Total Paving Cost</b>	<b>\$ 408,907.39</b>
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<b>Total Project Construction Cost</b>	<b>\$ 1,989,102.96</b>
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<b>Total Project Construction Cost w/SWC</b>	<b>\$ 1,247,105.07</b>
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## Segment B2 - Fox Island Flood Protection

### Permanent Levee Construction

Opinion of Probable Cost

HEI# 6025-006

Monday, August 12, 2013

Item No.	Description	Quantity	Unit	Unit Price	Amount
1	Contract Bond	1	L SUM	\$ 12,149.36	\$ 12,149.36
2	Mobilization	1	L SUM	\$ 24,298.73	\$ 24,298.73
3	Pipe Conduit 18"	232	LF	\$ 112.00	\$ 25,942.75
4	Sluice Gate & Connection	5	EA	\$ 6,500	\$ 30,112.12
5	Remove, Stockpile, & Replace Topsoil	2.08	Acre	\$ 2,800	\$ 5,822.53
6	Saw Bituminous Surfacing	60	LF	\$ 3.00	\$ 180.00
7	Removal of Bituminous Surfacing	5633	SY	\$ 5.75	\$ 32,387.64
8	Excavation Waste	122	CY	\$ 11.00	\$ 1,346.07
9	Levee Embankment - Fat Clay	5935	CY	\$ 8.90	\$ 52,818.03
10	Tree Removal	51	EA	\$ 750.00	\$ 38,020.28
11	Erosion Control Levee	8403	SY	\$ 3.50	\$ 29,410.25
12	Seeding & Hydromulch	3.47	Acre	\$ 5,005	\$ 17,378.78
13	Silt Fence	3480	LF	\$ 2.75	\$ 9,568.85
<b>Construction Cost =</b>					<b>\$ 279,435.38</b>

Engineering (Design and Const. Mgmt Services)

\$ 50,298.37

Administration (ROW, Legal, Admin)

\$ 22,354.83

**Total Grade Raise Cost \$ 352,088.58**

**SWC Cost Share \$ 167,661.23**

**Grade Raise Cost w/SWC \$ 184,427.35**

### Township/County Paving Cost

Item No.	Description	Quantity	Unit	Unit Price	Amount
1	Contract Bond	1	L SUM	\$ 7,791.80	\$ 7,791.80
2	Mobilization	1	L SUM	\$ 15,583.60	\$ 15,583.60
3	Hot Bituminous Pavement CL 29	1252	TON	\$ 45.00	\$ 56,326.28
4	Asphalt Cement	75	TON	\$ 600.00	\$ 45,061.02
5	Aggregate Base Course CL 5	1878	TON	\$ 29.00	\$ 54,448.73
<b>Construction Cost =</b>					<b>\$ 179,211.44</b>

Engineering (Design and Const. Mgmt Services)

\$ 32,258.06

Administration (ROW, Legal, Admin)

\$ 14,336.92

**Total Paving Cost \$ 225,806.41**

**Total Project Construction Cost \$ 577,894.99**

**Total Project Construction Cost w/SWC \$ 410,233.76**

**Segment B3 - Fox Island Flood Protection**  
**Permanent Levee Construction**  
**Opinion of Probable Cost**  
**HEI# 6025-006**  
**Monday, August 12, 2013**

Item No.	Description	Quantity	Unit	Unit Price	Amount
1	Contract Bond	1	L SUM	\$ 16,074.71	\$ 16,074.71
2	Mobilization	1	L SUM	\$ 32,149.42	\$ 32,149.42
3	Pipe Conduit 18"	341	LF	\$ 112.00	\$ 38,216.83
4	Sluice Gate & Connection	7	EA	\$ 6,500	\$ 44,358.82
5	Remove, Stockpile, & Replace Topsoil	2.72	Acre	\$ 2,800	\$ 7,613.69
6	Saw Bituminous Surfacing	120	LF	\$ 3.00	\$ 360.00
7	Removal of Bituminous Surfacing	7824	SY	\$ 5.75	\$ 44,990.49
8	Levee Embankment - Fat Clay	7241	CY	\$ 8.90	\$ 64,446.06
9	Tree Removal	70	EA	\$ 750.00	\$ 52,814.93
10	Erosion Control Levee	9969	SY	\$ 3.50	\$ 34,890.82
11	Seeding & Hydromulch	4.12	Acre	\$ 5,005	\$ 20,617.30
12	Silt Fence	4795	LF	\$ 2.75	\$ 13,185.32
<b>Construction Cost =</b>					<b>\$ 369,718.37</b>

<b>Engineering (Design and Const. Mgmt Services)</b>	\$ 66,549.31
<b>Administration (ROW, Legal, Admin)</b>	\$ 29,577.47

<b>Total Grade Raise Cost</b>	<b>\$ 465,845.14</b>
<b>SWC Cost Share</b>	<b>\$ 221,831.02</b>
<b>Grade Raise Cost w/SWC</b>	<b>\$ 244,014.12</b>

**Township/County Paving Cost**

Item No.	Description	Quantity	Unit	Unit Price	Amount
1	Contract Bond	1	L SUM	\$ 10,823.79	\$ 10,823.79
2	Mobilization	1	L SUM	\$ 21,647.58	\$ 21,647.58
3	Hot Bituminous Pavement CL 29	1739	TON	\$ 45.00	\$ 78,244.26
4	Asphlat Cement	104	TON	\$ 600.00	\$ 62,595.40
5	Aggregate Base Course CL 5	2608	TON	\$ 29.00	\$ 75,636.11
<b>Construction Cost =</b>					<b>\$ 248,947.14</b>

<b>Engineering (Design and Const. Mgmt Services)</b>	\$ 44,810.48
<b>Administration (ROW, Legal, Admin)</b>	\$ 19,915.77

<b>Total Paving Cost</b>	<b>\$ 313,673.39</b>
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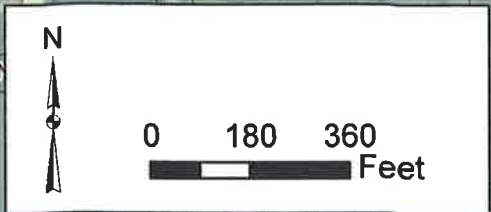
<b>Total Project Construction Cost</b>	<b>\$ 779,518.54</b>
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<b>Total Project Construction Cost w/SWC</b>	<b>\$ 557,687.52</b>
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# Legend


- Segment A
- Segment B
- Segment B-1
- Segment B-2
- Segment B-3



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**PERMANENT LEVEE ALTERNATIVES  
FOX ISLAND  
BISMARCK, ND**

Scale:	Drawn By:	Checked By:	Project No.	Date:
AS SHOWN	NRC	MHG	6025-006	8/7/2013

 **Houston Engineering Inc.**

Bismarck  
P: 701.323.0200  
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