

Sibley Island Flood Control

Preferred Alternative Recommendation

To: James Landenberger, Chairman BCWRD
Dennis Reep, Manager

From: Michael H. Gunsch, PE, CFM, Senior Project Manager

Subject: Preferred Alternative Justification – Alternative #2

Date: January 14, 2023

Project: HEI No. 6025-0028

Lincoln Township, via the Burleigh County Highway Department (BCHD) has requested consideration to implement **Alternative #2** versus a lower total cost **Alternative #3**. While evaluating this request several considerations were validated to justify the additional expense, which are noted as follows:

1. The condition of South 12th Street and 48th Avenue are such that they are in need to be upgraded and brought into compliance with current design standards. These modifications include sliver widening and pavement width adjustments, which provides the ability to accommodate increased traffic, safety improvements, as well as lowering annual O&M expenses, at least initially.
2. While these asphalt roadways are well maintained they are nearing their design life and replacement versus continued increasing maintenance repairs is prudent in the near term.
3. Impacts from the 2011 flood on these roadways was notable, with limited or no access during the event, and the restoration costs that followed. Therefore, incorporating these roadway grade raises into a cooperative flood control system provides significant value in improved access and flood control. Under this request these improvements would be designed and constructed independently from the Sibley Island Flood Control Project, which is consistent with the initial understanding with the BCWRD under **Alternative #1**. The additional expenses are essentially related to select fill material required between sliver widening and full grade raise to comply with the **Burleigh County 20-Foot Plan**.
4. Completing these grade raises honors the temporary line of protection that was implemented during the 2011 event, to protect properties to the north. Subsequently, the special assessment district boundary for the *Sibley Island Flood Control Project* would be terminated along 12th Street on the east and 48th Avenue on the north. This boundary is consistent with previous discussions with the residents that are at risk in this area, regarding the anticipated district boundaries and greatly simplifies the special assessment and funding process.
5. Funding for the township grade raises remains to be secured and should be in place or designated, if practical, prior to requesting construction funding from the State Water Commission (SWC) for the *Sibley Island Flood Control Project*. That way the SWC can be provided assurance that this segment of the flood control system will be implemented, as part of their funding authorization. The timeline to implement these grade raises is the same as the flood control project and is anticipated in 2024 – 2025.

Considering various cost factors, the following table presents a summary of projected expenditures. The distribution of these costs is illustrated on the attached Opinion of Probable Cost (OPC).

Township Roadway Expenses		
Construction Costs - Alternative #2		
Existing/Projected Annual O&M Costs	2023 - \$TBD	~2024 - \$TBD
Sliver Widening and Repaving		\$1,530,278 ⁽²⁾
Grade Raise for Flood Control – Alternative #2 ⁽¹⁾		\$2,477,260 ⁽²⁾
<ol style="list-style-type: none"> 1. Cost increase cost to provide flood protection is \$946,982 (inc. contingencies). 2. The OPC values are not all inclusive and need to be updated by the Township to include any missing, duplicated items or adjustments to unit prices. These costs include 20% contingencies, but not engineering or administration. 3. The Alternative #3 levee [Unit D] OPC is ~\$308,603 (w/core trench), using the 20% contingency and no engineering or administration, has net increase from Alternative #2 at ~\$638,379. 		

Lincoln Township proposes to complete these grade raises at their expense using other available roadway funding. As such expenses associated with these roadway improvements are removed from the State Water Commission (SWC) cost share consideration and special assessment district process. Subsequently, the benefits associated with the Economic Analysis (EA) are not impacted, however the expenses assigned to the *Sibley Island Flood Control Project* cost share funding are measurably reduced. The result is an increase in the net benefit cost ratio, which aids in securing 60% funding assigned to the special assessment district, therefore lowering individual assessments.

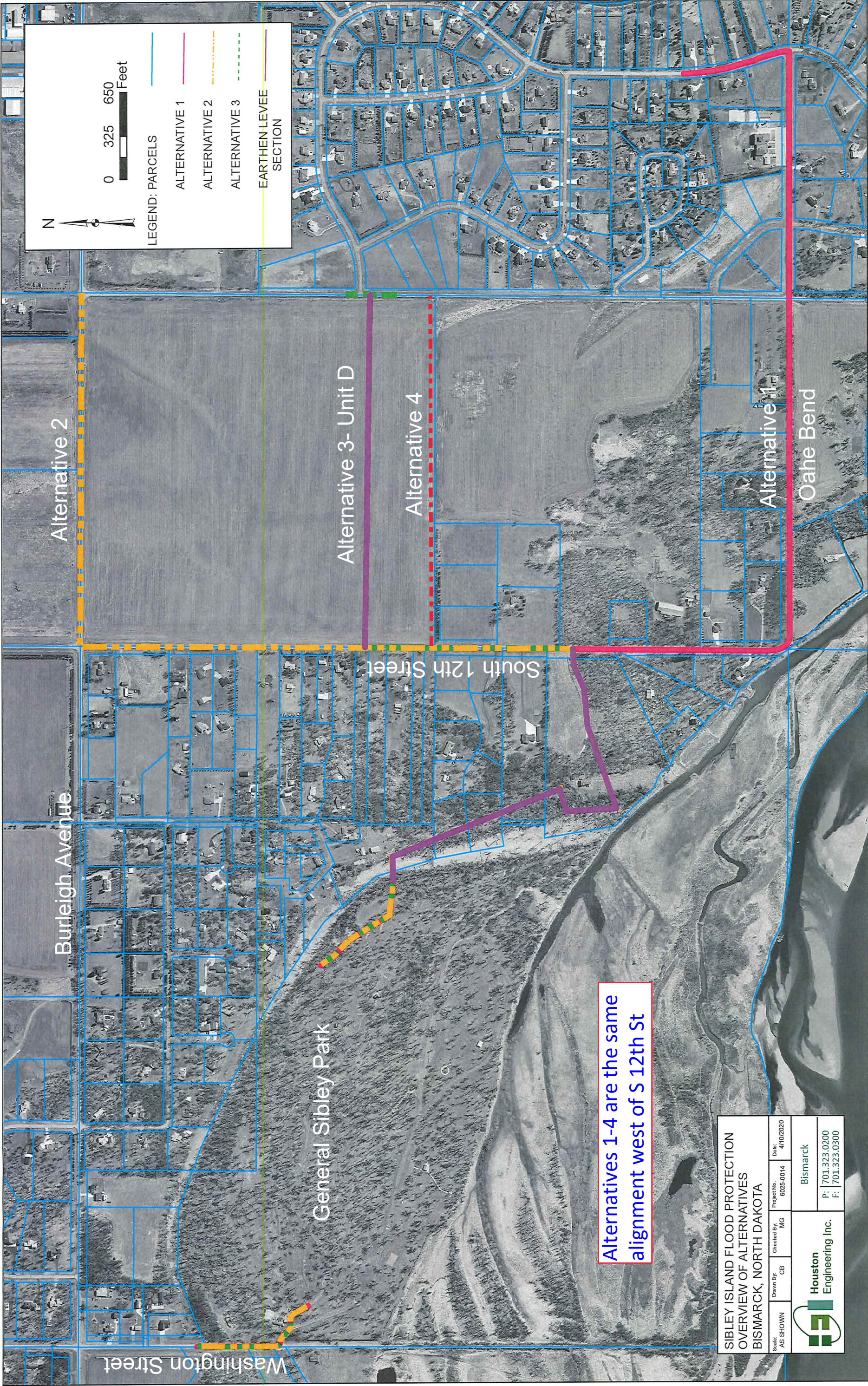
Other advantages to implementing **Alternative #2** include:

- ✓ The line of protection is along a public roadway, which allows the County/Twp to facilitate the placement of additional protective measures more easily during a flood event. This roadway section complies with the other segments of the **Burleigh County 20-foot Plan**, see **Layout1**.
- ✓ Landowner easements are not required, however an agreement with Lincoln Township to maintain the roadway for flood control purposes is encouraged. This may also be necessary to secure the *Sibley Island Flood Control Project* SWC cost share. Permitting the grade raises as a levee system will be required if any culverts through the alignment are gated. As this system is not a FEMA accredited flood control system the design standards are less restrictive, however materials in the grade raise should comply with levee seepage standards. Given the increased roadway width this could be reasonably accomplished with a suitable material.
- ✓ Landowner easements are required for construction of **Alternative #2** along the roadway system, however, Lincoln Township will need to confirm its current and future ROW needs. Additional ROW would be acquired by the township on an as needed basis.
- ✓ Operation and maintenance expenses on this portion of the flood control system would be borne by the roadway authority (a.k.a. Lincoln Township) and not the Special Assessment District.

Recommendation

It is recommended the BCWRD proceed with implementing Alternative #2 for the *Sibley Island Flood Control Project*. This includes creating the respective special assessment district and associated cost distributions. The attached letter from the BCHD outlines their position on those portions of the larger flood control project along the Lincoln Township roadways (i.e., South 12th Street and 48th Avenue).





Alternatives 1-4 are the same alignment west of S 12th St

SIBLEY ISLAND FLOOD PROTECTION OVERVIEW OF ALTERNATIVES BISMARCK, NORTH DAKOTA			
Scale: AS SHOWN	Drawn By: CB	Checked By: MG	Date: 4/10/2020
Project No: 6025-0014		Bismarck	
P: 701.323.0200		F: 701.323.0300	
Houston Engineering Inc.			

Sibley Island Flood Control Project - Alternative #2

Roadway Grade Raise - Flood Control Levee - 12th St and 48th Ave

Opinion of Probable Cost

Rev Date

9/23/2022

Item No.	Material	Quantity	Unit	Unit Price	Cost
1	Contract Bond	LSUM	1	\$5,000.00	\$5,000.00
2	Mobilization	LSUM	1	\$20,000.00	\$20,000.00
3	Clearing & Grubbing	LSUM	1	\$15,000.00	\$15,000.00
4	Traffic Control & Flagging	LSUM	1	\$10,500.00	\$10,500.00
Roadway Grade Raise Option - 12th Street and 48th Avenue					
5	Subgrade Preparation	SY	23111	\$3.25	\$75,110.75
6	Borrow Material	CY	32614	\$28.00	\$913,192.00
7	Blended Base	TON	2106	\$32.00	\$67,392.00
8	Superpave FAA 42	TON	3851	\$120.00	\$462,120.00
9	Emulsified Asphalt Tack Coat	GAL	6933	\$3.00	\$20,799.00
10	Bituminous Seal Coat	SY	17333	\$4.25	\$73,665.25
11	Remove Asphalt Surfacing	SY	17333	\$8.00	\$138,664.00
12	Topsoiling	CY	1852	\$10.00	\$18,518.48
13	Seeding Class II	AC	3	\$2,500.00	\$8,608.80
14	Overseeding	AC	3	\$2,500.00	\$8,608.80
15	24" RCP	LF	105	\$150.00	\$15,750.00
16	24" RCP Flared End Section	EA	2	\$2,000.00	\$4,000.00
17	Gate Well Control Structure	EA	1	\$40,000.00	\$40,000.00
18	16" CMP Culvert	LF	471	\$95.00	\$44,745.00
19	16" CMP Flared End Section	EA	36	\$600.00	\$21,600.00
20	Remove Aggregate Surfacing	SY	20222	\$5.00	\$101,110.00
Construction Cost					\$2,064,384.07
Contingency 20%					\$412,876.81
Total Construction Cost					\$2,477,260.89
Difference from Sliver Widening below:					
				\$789,152.00	Construction Cost
				\$157,830.40	Contingency
				\$946,982.40	Total Construction

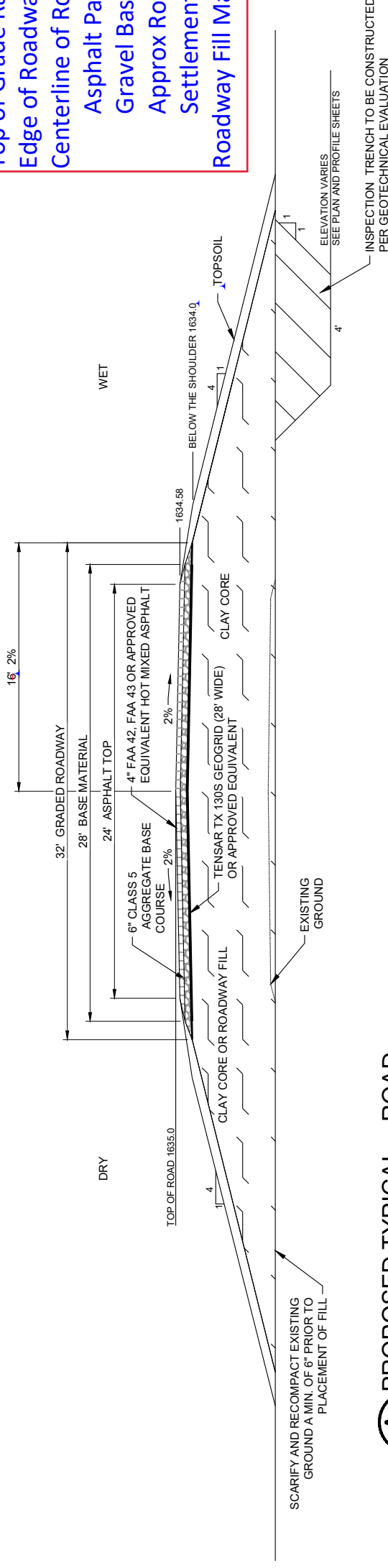
Roadway Improvements - Sliver Widening - 12th St and 48th Ave

Item No.	Material	Quantity	Unit	Unit Price	Cost
1	Contract Bond	LSUM	1	\$5,000.00	\$5,000.00
2	Mobilization	LSUM	1	\$20,000.00	\$20,000.00
3	Clearing & Grubbing	LSUM	1	\$15,000.00	\$15,000.00
4	Traffic Control & Flagging	LSUM	1	\$10,500.00	\$10,500.00
Sliver Widening Only - 12th Street and 48th Avenue					
5	Subgrade Preparation	SY	23111	\$3.25	\$75,110.75
6	Borrow Material	CY	4430	\$28.00	\$124,040.00
7	Blended Base	TON	2106	\$32.00	\$67,392.00
8	Superpave FAA 42	TON	3851	\$120.00	\$462,120.00
9	Emulsified Asphalt Tack Coat	GAL	6933	\$3.00	\$20,799.00
10	Bituminous Seal Coat	SY	17333	\$4.25	\$73,665.25
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17	24" RCP	LF	105	\$150.00	\$15,750.00
18	24" RCP Flared End Section	EA	2	\$2,000.00	\$4,000.00
19	Gate Well Control Structure	EA	1	\$40,000.00	\$40,000.00
20	16" CMP Culvert	LF	471	\$95.00	\$44,745.00
21	16" CMP Flared End Section	EA	36	\$600.00	\$21,600.00
22	Remove Aggregate Surfacing	SY	20222	\$5.00	\$101,110.00
Construction Cost					\$1,275,232.07
Contingency 20%					\$255,046.41
Total Construction Cost					\$1,530,278.49

Sibley Island - Typical Grade Raise and Levee Section

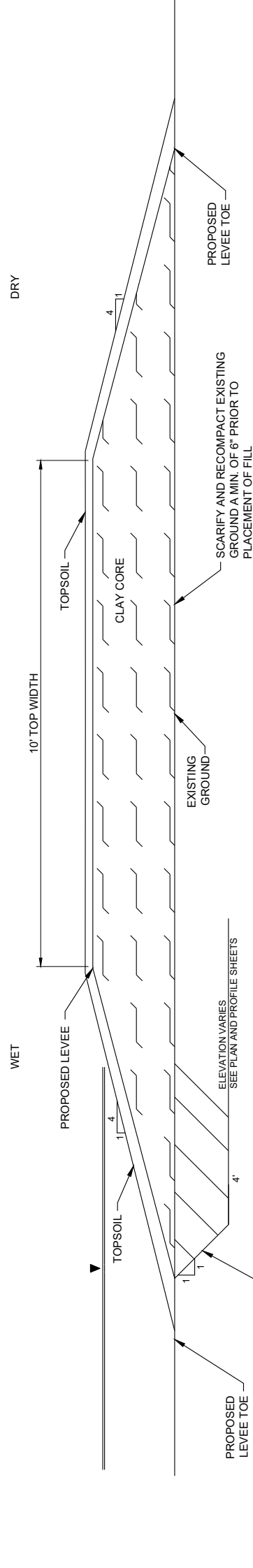
Design Notes:

- 2011 Flood Elevation = 1633.95
- Shoulder of Roadway at flood elevation 1634
- 20 foot plan 0.7 ft freeboard = 1634.7
- Top of Grade Raise = 1635 (centerline)
- Edge of Roadway = 1634.58
- Centerline of Roadway = 1635
- Asphalt Paving = 4 inches
- Gravel Base Material = 6 inches
- Approx Rough Grade at Crown = 1634.17
- Settlement allowance = 0.17 feet ~ 2 inches
- Roadway Fill Material - Suitable clay based on seepage



A PROPOSED TYPICAL - ROAD
NOT TO SCALE

Lincoln Township



B PROPOSED TYPICAL - LEVEE
NOT TO SCALE

PRELIMINARY
NOT FOR CONSTRUCTION

No.	Revision	Date	By

HOUSTON
engineering, inc.

Drawn by: CB
Checked by: PM
Date: 8-13-20
Scale: AS SHOWN

SIBLEY ISLAND FHMP
BURLEIGH COUNTY
BURLEIGH COUNTY

LAYOUT1
PROJECT NO. 6025-0014

SHEET
