

**DEPARTMENT OF THE ARMY PERMIT**

Permittee: **Mississippi Department of Environmental Quality**

Permit No.: **SAM-2019-00594-JRO**

Issuing Office: **MOBILE DISTRICT**

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the U.S. Army Corps of Engineers (Corps) having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

**Project Description: The permittee is authorized to place approximately 9,500 cubic yards of fill in waters of the U.S. to create approximately 10 acres of subtidal reef and 2 acres of intertidal reef in Jackson County, Mississippi. The fill material will consist of granite, graded limestone, processed concrete aggregates, and/or oyster shell. The fill material will be placed along the boundary of the existing marsh in a manner to provide substrate from 0.5 feet above Mean Lower Low Water to 1.5 feet below Mean Lower Low Water in an undulating pattern. Additional material may be placed within the authorized dimensions to maintain the proposed reef elevations over the 5 year monitoring period of the project. Any additional material placed shall be the same type as described above.**

- ATTACHED:**
- 1. Locations and Plan Drawings.**
  - 2. Mississippi Department of Marine Resources (DMR) Coastal Program Consistency.**
  - 3. Mississippi Department of Environmental Quality (DEQ) Section 401 Certification dated August 19, 2019 (WQC2019036).**

**Project Location: The project is located in Graveline Bay, Section 8, Township 8 South, Range 7 West, Jackson County, Mississippi. The area is depicted on the Gautier South Quadrangle, United States Geological Survey Topographic Map, Hydrologic Unit Code 03170009. The coordinates of 4 separate reef polygons are provided in Appendix A of the permit attachments. The coordinates are referenced to Mississippi State Plane East Zone, NAD83, in U.S. Survey Feet.**

**Permit Conditions**

**General Conditions:**

1. The time limit for completing the work authorized ends on **31 May 2025**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least 1 month before the above date is reached.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.
6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

**Special Conditions:**

- a. **Only suitable material free of waste, metal, organic trash, unsightly debris, etc., may be used as fill, and material discharged must be free from toxic pollutants in toxic amounts.**
- b. **The permittee shall comply with all requirements of the Mississippi Department of Environmental Quality 401 Water Quality Certification (WQC2019036) dated August 19, 2019.**
- c. **All conditions of the Coastal Zone Consistency Determination issued by the Department of Marine Resources are incorporated as conditions of this DA permit.**
- d. **It is the permittee's responsibility to ensure that the contractors working on this project are aware of all General and Special permit conditions.**
- e. **Best management practices shall be implemented to minimize turbidity, siltation damage to adjacent wetlands and waters of the United States, and submerged aquatic vegetation. All in-water project work will be conducted during daylight hours, and noise will be kept to the minimum feasible level. All vessels/barges will travel at slow speed in and around construction zones (5 knots or less).**
- f. **The Permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the Permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.**
- g. **Prior to bringing any equipment (including personal gear, machinery, vehicles or vessels) to the work site, each item shall be inspected for mud or soil, seeds, and vegetation. If present, the equipment, vehicles, or personal gear shall be cleaned until they are free from mud, soil, seeds, and vegetation. This inspection will occur each time equipment, vehicles, and personal gear are being prepared to go to a site or prior to transferring between sites to avoid spreading exotic, nuisance species.**
- h. **The National Ocean Service (NOS) has been notified of this authorization. You must notify NOS and this office, in writing, at least 2 weeks before you begin work and upon completion of the activity authorized by the permit. Your notification of completion must include the drawing which certifies the location and configuration of the completed activity (a certified permit drawing(s) may be used). Notification to NOS will be sent to [ocs.ndb@noaa.gov](mailto:ocs.ndb@noaa.gov) or the following address: National Ocean Service, Office of Coast Survey, N/CS26, 1315 East West Highway, Silver Springs, Maryland 20910-3282.**
- i. **The permitted activity must not interfere with the public's right to free navigation on all navigable waters of the United States.**
- j. **The permittee must install and maintain, at the permittee's expense, any safety lights, signs, and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, on the permittee's authorized facilities.**

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

- Section 404 of the Clean Water Act (33 U.S.C. 1344).**
- Section 10 of the Rivers and Harbors Act 1899 (33 U.S.C. 403).**

2. Limits of this authorization.

- a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.
- b. This permit does not grant any property rights or exclusive privileges.
- c. This permit does not authorize any injury to the property or rights of others.
- d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

- a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
- b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
- c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
- d. Design or construction deficiencies associated with the permitted work.
- e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

- a. You fail to comply with the terms and conditions of this permit.
- b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).
- c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit. Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.



\_\_\_\_\_  
(PERMITTEE) **CHRIS WELLS**  
**INTERIM EXECUTIVE DIRECTOR**  
**MS DEPT OF ENVIRONMENTAL QUALITY**  
**P.O. BOX 2261**  
**JACKSON, MISSISSIPPI 39225**

\_\_\_\_\_  
5/15/2020  
(DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

**SEVASTIEN P. JOLY**  
**COLONEL, U.S. ARMY**  
**DISTRICT COMMANDER**

BY: \_\_\_\_\_  
**ALLISON F MONROE** (DATE)  
**TEAM LEADER, SOUTH MISSISSIPPI BRANCH**  
**REGULATORY DIVISION**

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

\_\_\_\_\_  
(TRANSFEE)

\_\_\_\_\_  
(DATE)



Filepath: mobile\mobile\Projects\161232-01.01 Ms Living Shorelines\04 Task Order 2\2.5 Design\Sub Tidal Reefs\Graveline Bay\BODR for Permit App

**Figure 1**

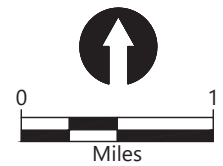
**Graveline Bay Intertidal and Subtidal Reefs (Phase IV RP/EA)**

Preliminary Conceptual Design  
Basis of Design Report  
Restoring Living Shorelines and Reefs in Mississippi Estuaries Project  
Mississippi Department of Environmental Quality





**SOURCE:** 2010 NAVTEC © and 2017 Microsoft Corporation.  
**HORIZONTAL DATUM:** Mississippi State Plane East, NAD83, U.S. Feet.  
**VERTICAL DATUM:** Mean Lower Low Water (MLLW).



Publish Date: 2020/05/13 3:30 PM | User: dholmer  
 Filepath: K:\Projects\1232-Mississippi Department of Environmental Quality\Mississippi Estuaries Living Shoreline\1232-RP-006 (Graveline Bay - Vicinity Map).dwg Vicinity Map



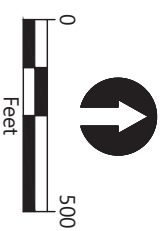
**Figure 2**  
**Graveline Bay Intertidal and Subtidal Reefs Vicinity Map**

Basis of Design Report  
 Restoring Living Shorelines and Reefs in Mississippi Estuaries Project  
 Mississippi Department of Environmental Quality



**SOURCE:** Aerial image courtesy of USGS Earthstar Geographics SIO © 2017  
 Microsoft Corporation. Survey provided by DIMCO dated June 28, 2016.  
**HORIZONTAL DATUM:** Mississippi State Plane East, NAD83, U.S. Feet.  
**VERTICAL DATUM:** Mean Lower Low Water (MLLW).

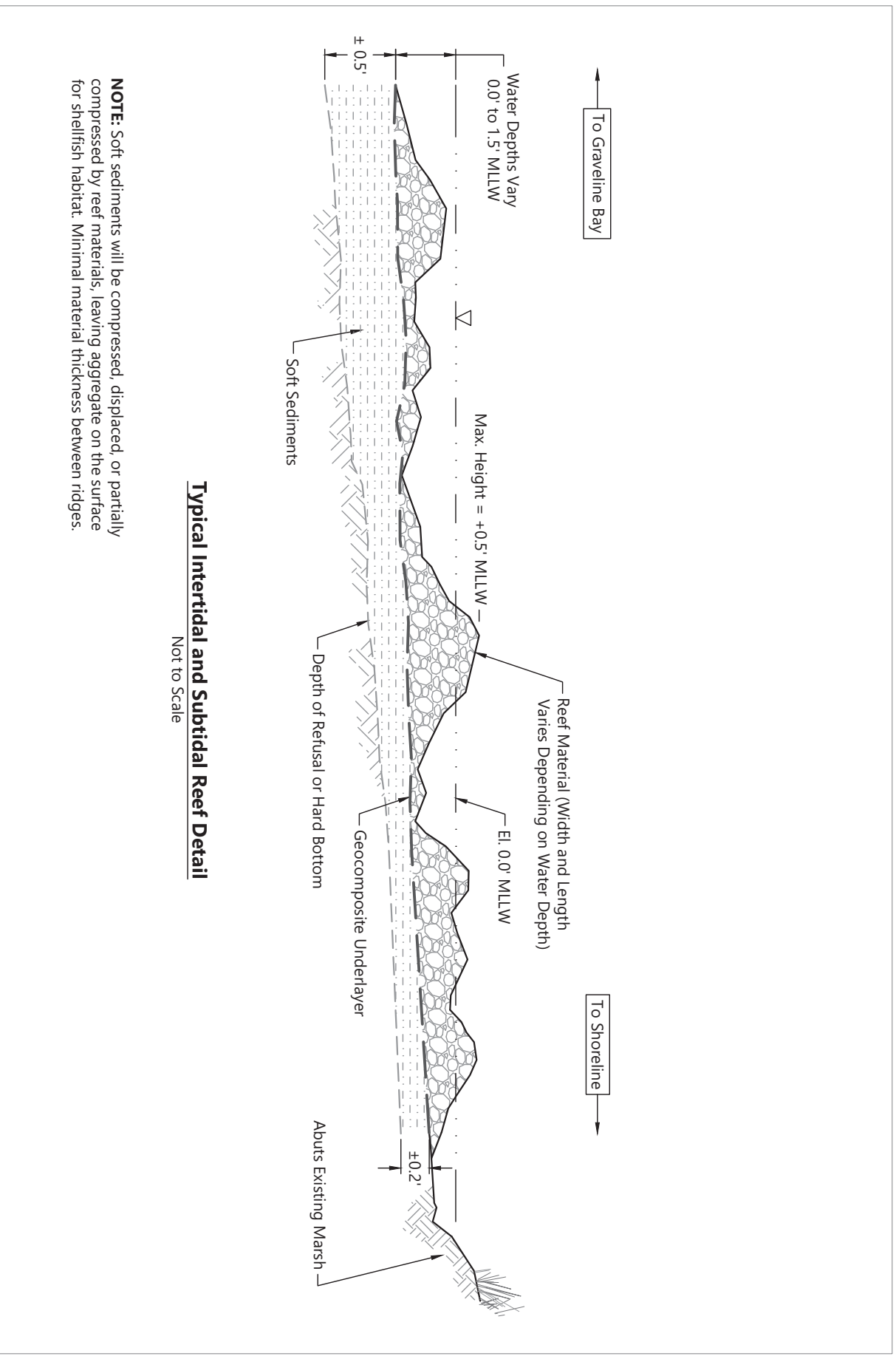
**LEGEND:**  
 - - - Potential Integrated Intertidal and Subtidal Reef Areas  
 0 - Bathymetric Contour in Feet (1' Interval)



Publish Date: 2020/05/13 3:30 PM | User: dtholmer  
 Filepath: K:\Projects\1232-Mississippi Department of Environmental Quality\Mississippi Estuaries Living Shoreline\1232-RP-008 (Graveline Bay-Plan).dwg Plan View



**Figure 3**  
**Graveline Bay Intertidal and Subtidal Reefs**  
 Basis of Design Report  
 Restoring Living Shorelines and Reefs in Mississippi Estuaries Project  
 Mississippi Department of Environmental Quality



**NOTE:** Soft sediments will be compressed, displaced, or partially compressed by reef materials, leaving aggregate on the surface for shellfish habitat. Minimal material thickness between ridges.

**Typical Intertidal and Subtidal Reef Detail**  
Not to Scale

Publish Date: 2020/05/13 3:30 PM | User: dholmer  
 Filepath: K:\Projects\1232-Mississippi Department of Environmental Quality\Mississippi Estuaries Living Shoreline\1232-RP-026 (Graveline Bay Sections).dwg Section Ridged



**Figure 4**  
**Graveline Bay Typical Ridged Intertidal and Subtidal Reef Section**



## **Appendix A**

### **Graveline Bay Subtidal and Intertidal Reef Coordinates**

# Graveline Bay

Centroid for the Permitted Area

Start Point (North Lat., West Long.)

30.364969      -88.702862

near the middle of the south shoreline

No.	Length	Direction	Start Station	End Station	Start Point (MS83EF)	End Point (MS83EF)	Start Point (North Lat., West Long.)	End Point (North Lat., West Long.)
1	56.569'	S35° 20' 53.0+00.00'	0+56.57'	0+56.57'	1023626.43	1023593.71	30.36849745 88.70847295	30.36837068 88.70857687
2	34.555'	S09° 39' 06.0+56.57'	0+91.12'	0+91.12'	1023599.71	1023599.50	30.36837068 88.70857687	30.36827698 88.70855863
3	46.328'	S18° 14' 21.0+91.12'	1+37.45'	1+37.45'	1023599.50	1023585.00	30.36827698 88.70855863	30.36815605 88.70860476
4	51.308'	S52° 07' 30.1+37.45'	1+88.76'	1+88.76'	1023585.00	1023544.50	30.36815605 88.70860476	30.36806956 88.70873329
5	130.386'	S27° 38' 45.1+88.76'	3+19.15'	3+19.15'	1023544.50	1023484.00	30.36806956 88.70873329	30.36775216 88.70892553
6	68.639'	S14° 20' 23.3+19.15'	3+87.78'	3+87.78'	1023484.00	1023467.00	30.36775216 88.70892553	30.36756937 88.70897967
7	81.059'	S06° 43' 49.3+87.78'	4+68.84'	4+68.84'	1023467.00	1023476.50	30.36756937 88.70897967	30.367348 88.70894983
8	187.650'	S34° 34' 45.4+68.84'	6+56.49'	6+56.49'	1023476.50	1023583.00	30.367348 88.70894983	30.36692286 88.70861267
9	215.804'	S15° 25' 56.6+56.49'	8+72.30'	8+72.30'	1023583.00	1023640.43	30.36692286 88.70861267	30.36635072 88.70843129
10	56.569'	S88° 34' 47.8+72.30'	9+28.87'	9+28.87'	1023640.43	1023696.98	30.36635072 88.70843129	30.36634667 88.70825198
11	90.126'	N46° 25' 1.9+28.87'	10+18.99'	10+18.99'	1023696.98	1023762.27	30.36634667 88.70825198	30.36651731 88.70804474
12	43.563'	N13° 25' 3' 10+18.99'	10+62.55'	10+62.55'	1023762.27	1023772.38	30.36651731 88.70804474	30.3666338 88.70801253
13	176.461'	N13° 06' 01.10+62.55'	12+39.02'	12+39.02'	1023772.38	1023732.38	30.3666338 88.70801253	30.3671065 88.70813877
14	116.922'	N36° 20' 3' 12+39.02'	13+55.94'	13+55.94'	1023732.38	1023663.10	30.3671065 88.70813877	30.36736563 88.70835812
15	58.815'	N33° 03' 3' 13+55.94'	14+14.75'	14+14.75'	1023663.10	1023631.01	30.36736563 88.70835812	30.36750129 88.7084597
16	30.923'	N05° 03' 1' 14+14.75'	14+45.67'	14+45.67'	1023631.01	1023633.74	30.36750129 88.7084597	30.36758596 88.70845093
17	83.343'	N28° 23' 4' 14+45.67'	15+29.02'	15+29.02'	1023633.74	1023673.37	30.36758596 88.70845093	30.36778742 88.70832501
18	61.234'	N52° 07' 3' 15+29.02'	15+90.25'	15+90.25'	1023673.37	1023721.71	30.36778742 88.70832501	30.36789065 88.70817116
19	134.801'	N18° 14' 2' 15+90.25'	17+25.05'	17+25.05'	1023721.71	1023763.90	30.36789065 88.70817116	30.36824256 88.70803737
20	74.287'	N09° 39' 0' 17+25.05'	17+99.34'	17+99.34'	1023763.90	1023751.44	30.36824256 88.70803737	30.36844394 88.70807662
21	56.569'	N54° 39' 0' 17+99.34'	18+55.91'	18+55.91'	1023751.44	1023705.30	30.36844394 88.70807662	30.36853408 88.70822282
22	80.000'	S80° 20' 53.18+55.91'	0+00.00'	0+00.00'	1023705.30	1023626.43	30.36853408 88.70822282	30.36849745 88.70847295

No.	Length	Direction	Start Station	End Station	Start Point (MS3EF)	End Point (MS3EF)	Start Point (North Lat., West Long.)	End Point (North Lat., West Long.)
1	22.719'	N63° 58' 01.93"E	0+00.00'	0+22.72'	1023633.59	314806.25	30.36558573	88.70843392
2	116.021'	S54° 11' 20.38"E	0+22.72'	1+38.74'	1023654.00	314816.22	30.36558573	88.7083899
3	113.842'	S65° 55' 25.75"E	1+38.74'	2+52.58'	1023748.09	314748.34	30.36561308	88.70776171
4	72.601'	N87° 58' 57.15"E	2+52.58'	3+25.18'	1023852.02	314701.89	30.36529812	88.70753163
5	132.312'	N26° 08' 28.73"E	3+25.18'	4+57.49'	1023924.58	314704.45	30.36530493	88.70734638
6	50.552'	N45° 52' 21.44"E	4+57.49'	5+08.05'	1023982.87	314823.23	30.36503163	88.70723118
7	113.063'	S63° 04' 24.73"E	5+08.05'	6+21.11'	1024019.16	314858.43	30.36572802	88.70723118
8	225.738'	S74° 42' 15.45"E	6+21.11'	8+46.85'	1024119.97	314807.22	30.36558691	88.70622151
9	251.013'	S86° 09' 55.13"E	8+46.85'	10+97.86'	1024337.71	314747.67	30.3654225	88.70542743
10	175.754'	N75° 47' 12.98"E	10+97.86'	12+73.61'	1024588.16	314730.89	30.36537559	88.70488706
11	182.294'	S84° 49' 17.44"E	12+73.61'	14+55.91'	1024758.53	314774.04	30.3654937	88.70431145
12	110.916'	S63° 54' 53.43"E	14+55.91'	15+66.83'	1024940.08	314757.59	30.36544791	88.70399575
13	82.956'	S68° 50' 40.51"E	15+66.83'	16+49.78'	1025039.70	314708.82	30.3653135	88.70375053
14	13.111'	S58° 04' 20.42"E	16+49.78'	16+62.89'	1025117.07	314678.88	30.36523093	88.70371527
15	59.127'	S18° 21' 41.03"W	16+62.89'	17+22.02'	1025128.20	314671.94	30.36521181	88.70371527
16	33.138'	S37° 34' 44.14"E	17+22.02'	17+55.16'	1025109.57	314615.83	30.36505759	88.70377454
17	4.622'	N86° 28' 50.68"E	17+55.16'	17+59.78'	1025129.78	314589.56	30.36505759	88.70371055
18	28.061'	N41° 55' 51.85"E	17+59.78'	17+87.84'	1025134.39	314589.56	30.3649853	88.70369594
19	46.815'	N14° 43' 58.46"E	17+87.84'	18+34.65'	1025153.14	314610.72	30.36498608	88.70363641
20	21.382'	N28° 25' 37.78"E	18+34.65'	18+56.04'	1025165.05	314656.00	30.36504341	88.70359848
21	35.412'	N17° 43' 41.94"W	18+56.04'	18+56.04'	1025175.23	314674.80	30.36521953	88.70356613
22	19.787'	N58° 22' 01.74"W	18+56.04'	19+11.24'	1025164.45	314708.53	30.36531231	88.70360019
23	90.934'	N00° 03' 51.42"W	19+11.24'	20+02.17'	1025147.50	314718.91	30.3653409	88.70365357
24	43.250'	N32° 47' 26.63"W	20+02.17'	20+45.42'	1025147.50	314809.85	30.36559095	88.70365357
25	157.611'	N63° 56' 48.15"W	20+45.42'	22+03.03'	1025124.07	314846.20	30.36559095	88.70372773
26	230.167'	N84° 54' 37.34"W	22+03.03'	24+33.20'	1024982.48	314915.43	30.36569097	88.70417644
27	193.026'	S76° 49' 42.03"W	24+33.20'	26+26.22'	1024753.22	314935.85	30.36588177	88.70490332
28	191.333'	N86° 09' 47.73"W	26+26.22'	28+17.56'	1024565.27	314891.86	30.36593863	88.70549943
29	198.321'	N74° 14' 40.08"W	28+17.56'	30+15.88'	1024374.37	314904.67	30.36581826	88.7061047
30	57.452'	N54° 24' 17.87"W	30+15.88'	30+73.33'	1024183.50	314958.52	30.36600273	88.70670973
31	60.759'	N74° 34' 43.06"W	30+73.33'	31+34.09'	1024136.78	314991.96	30.3660273	88.70685776
32	56.569'	S60° 25' 16.94"W	31+34.09'	31+90.66'	1024078.21	315008.11	30.3661394	88.70704342
33	80.000'	S15° 25' 16.94"W	31+90.66'	32+70.66'	1024029.01	314980.19	30.3661394	88.70719952
34	79.638'	S45° 52' 21.44"W	32+70.66'	33+50.30'	1024007.74	314903.07	30.36606278	88.70726724
35	71.441'	S28° 14' 47.77"W	33+50.30'	34+21.74'	1023950.57	314847.62	30.3658508	88.70744871
36	45.097'	S24° 10' 55.49"W	34+21.74'	34+66.83'	1023916.76	314784.69	30.36569851	88.70755614
37	38.434'	S87° 58' 57.15"W	34+66.83'	35+05.27'	1023898.29	314743.55	30.36552558	88.70761485
38	100.462'	N65° 55' 25.75"W	35+05.27'	36+05.73'	1023859.88	314742.20	30.36541252	88.70773665
39	135.870'	N54° 11' 20.38"W	36+05.73'	37+41.60'	1023768.16	314783.18	30.36540893	88.70802733
40	46.679'	S63° 58' 01.93"W	37+41.60'	37+88.28'	1023657.97	314862.68	30.36552188	88.70837645
41	40.000'	S26° 01' 58.07"E	37+88.28'	0+00.00'	1023616.03	314842.19	30.36574081	88.7085095
					1023633.59	314806.25	30.36568646	88.7085573

No.	Length	Direction	Start Station	End Station	Start Point (MS83EF)	End Point (MS83EF)	Start Point (North Lat., West Long.)	End Point (North Lat., West Long.)
1	36.814'	N78° 09' 52.0+00.00'	0+36.81'	0+36.81'	1025232.31	314560.82	30.36490595	88.70338555
2	53.469'	N107° 16' 35.0+36.81'	0+90.28'	0+90.28'	1025268.34	314568.37	30.36492666	88.70327128
3	49.016'	N02° 59' 31.0+90.28'	1+39.30'	1+39.30'	1025270.47	314621.80	30.36492666	88.70326433
4	24.607'	N46° 36' 55.1+39.30'	1+63.91'	1+63.91'	1025261.12	314669.91	30.36520581	88.70329381
5	61.887'	N82° 02' 46.1+63.91'	2+25.79'	2+25.79'	1025279.00	314686.82	30.36525225	88.70323705
6	54.473'	S18° 23' 56.2+25.79'	2+80.27'	2+80.27'	1025340.30	314695.38	30.36527556	88.70304265
7	66.596'	S09° 44' 54.2+80.27'	3+46.86'	3+46.86'	1025357.49	314643.69	30.36513342	88.70298833
8	48.847'	N89° 56' 01.3+46.86'	3+95.71'	3+95.71'	1025368.77	314578.06	30.36513342	88.70295228
9	31.888'	S42° 25' 42.3+95.71'	4+27.60'	4+27.60'	1025417.61	314578.11	30.36495291	88.70279794
10	44.644'	S51° 16' 34.4+27.60'	4+72.24'	4+72.24'	1025439.13	314554.58	30.36495291	88.70279794
11	45.428'	S52° 22' 18.4+72.24'	5+17.67'	5+17.67'	1025439.13	314554.58	30.36488814	88.70261945
12	26.335'	S80° 01' 23.5+17.67'	5+44.01'	5+44.01'	1025473.96	314526.65	30.36481124	88.70261945
13	43.144'	S25° 27' 29.5+44.01'	5+87.15'	5+87.15'	1025509.94	314498.91	30.36473485	88.70250547
14	40.755'	S35° 07' 46.5+87.15'	6+27.91'	6+27.91'	1025535.87	314494.35	30.36472223	88.70242326
15	56.112'	S87° 51' 11.6+27.91'	6+84.02'	6+84.02'	1025554.42	314455.39	30.36461505	88.70236459
16	40.601'	S71° 18' 31.6+84.02'	7+24.62'	7+24.62'	1025554.42	314455.39	30.36461505	88.70229036
17	57.693'	N84° 33' 22.7+24.62'	7+82.31'	7+82.31'	1025577.87	314422.06	30.36452333	88.70211258
18	71.286'	N67° 51' 05.7+82.31'	8+53.60'	8+53.60'	1025633.94	314419.96	30.36451737	88.70199067
19	41.997'	N60° 13' 1.8+53.60'	8+95.59'	8+95.59'	1025672.40	314406.95	30.36451737	88.70211258
20	2.128'	N40° 49' 52.8+97.72'	9+52.66'	9+52.66'	1025729.84	314412.42	30.36448148	88.70180852
21	54.941'	N84° 33' 22.7+24.62'	7+82.31'	7+82.31'	1025729.84	314412.42	30.36448148	88.70180852
22	80.129'	N02° 32' 35.9+52.66'	10+32.79'	10+32.79'	1025795.86	314439.30	30.36457004	88.70159909
23	58.151'	N49° 10' 07.10+32.79'	10+90.94'	10+90.94'	1025832.31	314460.16	30.36462728	88.70148343
24	40.661'	S84° 12' 19.10+90.94'	11+31.60'	11+31.60'	1025834.43	314460.16	30.36462728	88.70147671
25	102.224'	S62° 59' 02.11+31.60'	12+33.83'	12+33.83'	1025870.35	314501.94	30.364642705	88.70136266
26	16.949'	N71° 18' 31.12+33.83'	12+50.78'	12+50.78'	1025870.35	314501.94	30.36496215	88.70137362
27	67.988'	N23° 47' 1.12+50.78'	13+18.77'	13+18.77'	1025822.80	314620.01	30.36506683	88.701513
28	72.456'	N80° 01' 2.13+18.77'	13+91.22'	13+91.22'	1025675.22	314574.91	30.36505568	88.70164131
29	35.258'	N51° 25' 06.13+91.22'	14+26.48'	14+26.48'	1025691.27	314569.47	30.36492828	88.70193024
30	77.113'	N42° 25' 42.14+26.48'	15+03.59'	15+03.59'	1025496.85	314728.58	30.36494329	88.70198112
31	101.336'	N10° 47' 44.15+03.59'	16+04.93'	16+04.93'	1025477.87	314828.12	30.36564014	88.70260595
32	52.573'	N51° 52' 46.16+04.93'	16+57.50'	16+57.50'	1025436.51	314853.32	30.3657295	88.70273698
33	140.318'	S87° 02' 10.16+57.50'	17+97.82'	17+97.82'	1025496.38	314809.87	30.36571	88.70318134
34	57.576'	S41° 00' 23.17+97.82'	18+55.40'	18+55.40'	1025296.38	314853.32	30.36559065	88.70330129
35	59.791'	S05° 01' 23.18+55.40'	19+15.19'	19+15.19'	1025263.83	314750.31	30.36542687	88.70328492
36	41.882'	S26° 32' 45.19+15.19'	19+57.07'	19+57.07'	1025245.12	314712.84	30.3653239	88.70334438
37	24.170'	S58° 06' 54.19+57.07'	19+81.24'	19+81.24'	1025224.59	314700.08	30.36528888	88.70340953
38	31.766'	S07° 09' 22.19+81.24'	20+13.00'	20+13.00'	1025220.64	314668.56	30.36520223	88.70342217
39	50.752'	S10° 59' 31.20+13.00'	20+63.76'	20+63.76'	1025230.64	314618.74	30.36502223	88.70339169
40	19.768'	S18° 17' 50.20+63.76'	20+83.52'	20+83.52'	1025230.31	314618.74	30.36506522	88.70341141
41	23.885'	S41° 30' 00.20+83.52'	21+07.41'	21+07.41'	1025224.11	314599.97	30.36501363	88.70346167
42	32.086'	S48° 29' 59.21+07.41'	0+00.00'	0+00.00'	1025208.28	314582.08	30.36496449	88.70338555

No.	Length	Direction	Start Station	End Station	Start Point (MS83EF)	End Point (MS83EF)	Start Point (North Lat., West Long.)	End Point (North Lat., West Long.)
1	35.515'	N88° 51' 42.0+00.00'	0+35.51'		1026115.99	1026151.50	30.3648279	88.70047107
2	127.852'	N67° 56' 56.0+35.51'	1+63.37'		1026151.50	1026270.50	30.3648279	88.70047107
3	68.283'	N60° 37' 05.1+63.37'	2+31.65'		1026270.00	1026329.50	30.3649595	88.70009515
4	66.500'	N90° 00' 02.2+31.65'	2+98.15'		1026329.50	1026396.00	30.36505142	88.69990636
5	30.582'	N66° 10' 54.2+98.15'	3+28.73'		1026396.00	1026423.98	30.36505121	88.6996955
6	73.428'	N44° 09' 24.3+28.73'	4+02.16'		1026423.98	1026475.13	30.36508507	88.69960674
7	17.486'	N19° 37' 14.4+02.16'	4+19.64'		1026475.13	1026481.00	30.36522975	88.69944435
8	81.995'	N06° 18' 05.4+19.64'	5+01.64'		1026481.00	1026472.00	30.36527502	88.69945391
9	51.884'	N27° 33' 15.5+01.64'	5+53.52'		1026472.00	1026496.00	30.36549914	88.69937764
10	206.619'	N38° 48' 45.5+53.52'	7+60.14'		1026496.00	1026625.50	30.36562554	88.69896641
11	73.207'	N66° 14' 17.7+60.14'	8+33.35'		1026625.50	1026692.50	30.36606781	88.69875385
12	171.012'	N51° 03' 08.8+33.35'	10+04.36'		1026692.50	1026825.50	30.3661487	88.69833172
13	65.904'	N02° 49' 48.10+04.36'	10+70.27'		1026825.50	1026828.75	30.36662481	88.69832116
14	80.509'	N48° 07' 15.10+70.27'	11+50.78'		1026828.75	1026768.81	30.3667728	88.69851102
15	59.691'	S83° 37' 16.11+50.78'	12+10.47'		1026768.81	1026709.49	30.36675476	88.69869915
16	131.764'	S50° 52' 37.12+10.47'	13+42.23'		1026709.49	1026607.27	30.36652647	88.69902359
17	97.985'	S66° 14' 10.13+42.23'	14+40.22'		1026607.27	1026517.59	30.36641821	88.6993081
18	100.028'	S33° 11' 34.14+40.22'	15+40.24'		1026517.59	1026462.83	30.36618822	88.69948205
19	151.080'	S41° 19' 03.15+40.24'	16+91.32'		1026462.83	1026363.08	30.36587654	88.69979876
20	159.190'	S28° 19' 22.16+91.32'	18+50.51'		1026363.08	1026287.55	30.36549149	88.70003878
21	99.981'	S60° 37' 09.18+50.51'	19+50.49'		1026287.55	1026200.43	30.3653569	88.70031521
22	93.693'	S69° 15' 20.19+50.49'	20+44.19'		1026200.43	1026112.81	30.36526593	88.70059316
23	56.569'	S43° 51' 42.20+44.19'	21+00.76'		1026112.81	1026073.62	30.36515393	88.70071757
24	80.000'	S01° 08' 17.21+00.76'	21+00.76'		1026073.62	1026075.21	30.36493398	88.70071283
25	56.569'	S46° 08' 17.21+80.76'	0+00.00'		1026075.21	1026115.99	30.36482607	88.70058367