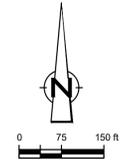


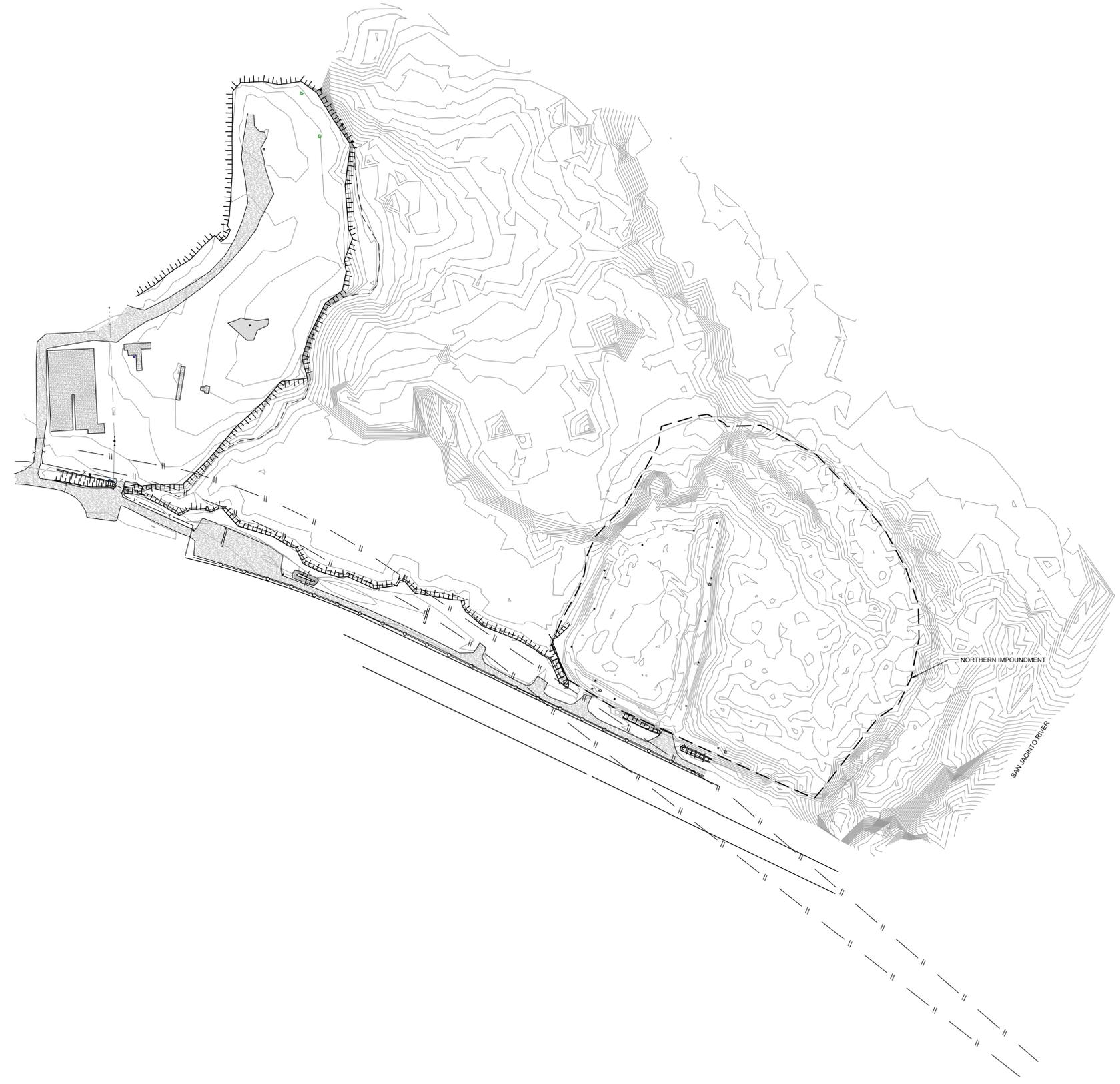
# **Appendix E**

## **Design Drawing Package**





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**LEGEND**

---	TCRA CAP PERIMETER
---X---	EXISTING CONTOUR INTERVAL
---	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
■ SJSB002	BORING LOCATION
● MW	MONITORING WELL
● P.P.	POWER POLE
● L.P.	LIGHT POLE
○ WELL	WELL
---	ASPHALT
---	CONCRETE
---	GRAVEL

SOURCE: TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019

Client  
**SAN JACINTO RIVER WASTE PITS**  
 Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	30% EPA REVIEW	MW	RH	05/28/2020
1	30% CLIENT REVIEW	MW	RH	05/15/2020
No.	Issue	Drawn	Approved	Date
Drawn	MW		Designer	RH
Drafting	BP		Design	LL
Check			Check	
Project	CM		Date	May 28, 2020
Coordinator			Scale	1" = 150'

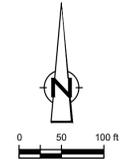
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**Arch D**  
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 0 1"

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 ENG: Logan M. Lucifero  
 STATE: TEXAS  
 LIC. NO: 132028  
 DATE: 5-28-2020

**GHD SERVICES INC.**  
 JOB NO. 11187072 FILE NO. 010  
 GHD TEXAS FIRM REGISTRATION NO. 276

Project No. **11187072**  
 Title  
**OVERALL PLAN**

Sheet No.  
**C-01**  
 Sheet - of -



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---	EXISTING CONTOUR INTERVAL
-X-	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	PIPELINE
○	BORING LOCATION
●	MONITORING WELL
●	POWER POLE
●	LIGHT POLE
○	WELL
■	AREA WITH MATERIAL >30 mg/kg TEQ
---	ASPHALT
---	CONCRETE
---	GRAVEL

SOURCE: TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019

Client  
**SAN JACINTO RIVER WASTE PITS**  
 Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	30% EPA REVIEW	MW	RH	05/28/2020
1	30% CLIENT REVIEW	MW	RH	05/15/2020

Drawn	MW	Designer	RH
Drafting	BP	Design	LL
Check		Check	
Project Coordinator	CM	Date	May 28, 2020

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**PRELIMINARY NOT FOR CONSTRUCTION**  
 ENG: Logan M. Loggiero  
 STATE: TEXAS  
 LIC. NO: 132028  
 DATE: 5-28-2020

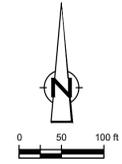
GHD SERVICES INC.  
 JOB NO. 11187072 FILE NO. 010  
 GHD TEXAS FIRM REGISTRATION NO. 276

Project No. 11187072  
 Title  
**EXISTING CONDITIONS**

Sheet No.  
**C-02**  
 Sheet - of -



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	EXISTING CONTOUR INTERVAL
	FENCELINE
	SHORELINE
	TOP OF BANK
	TOE OF SLOPE
	OVERHEAD ELECTRICAL GUARDRAIL PIPELINE
	BORING LOCATION
	MONITORING WELL
	POWER POLE
	LIGHT POLE
	WELL
	AREA WITH MATERIAL >30 ng/kg TEQ
	ASPHALT
	CONCRETE
	GRAVEL
	PAZ66/AZ38-700N PILE
	HZ 1080M A PILE

SOURCE: TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	30% EPA REVIEW	MW	RH	05/28/2020
1	30% CLIENT REVIEW	MW	RH	05/15/2020

No.	Issue	Drawn	Approved	Date

Drawn MW Designer RH

Drafting BP Design Check LL

Project Coordinator CM Date May 28, 2020

Original Size Scale 1" = 100'

Arch D Bar is one inch on original size drawing

Project No. 11187072

Title  
**SSA AREA AND NORTHERN IMPOUNDMENT WORKS**

Sheet No.

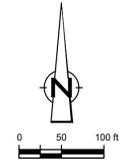
**C-03**

- NOTES:**
1. LOCATION OF OVERBURDEN STOCKPILE, DECONTAMINATION PAD, SOLIDIFICATION PAD, AND DEWATERING FACILITY ARE PRELIMINARY AND SUBJECT TO CHANGE.
  2. CELL NUMBERS FOR IDENTIFICATION ONLY AND DO NOT REPRESENT ORDER OF EXCAVATION SEQUENCING.
  3. BMP DESIGN IS SUBJECT TO CHANGE BASED ON ADDITIONAL DATA ANALYSIS AND ENGINEERING EVALUATION, AS WELL AS CHANGES IN POTENTIAL WATER SURFACE ELEVATIONS RESULTING FROM UPSTREAM CONDITIONS CURRENTLY UNDER CONSIDERATION, BUT IS SHOWN AS A CANTILEVERED PILE COFFERDAM WITH A TOP OF PILE HEIGHT OF 47 NAVD88 AND IS COMPOSED OF A PAZ66/AZ38-700N PIPE-Z SYSTEM WITH A PILE TIP DEPTH OF -87 NAVD88 AND A HZ 1080M A HZ-M WALL WITH A PILE TIP DEPTH OF -100 NAVD88.
  4. PILES SHOWN ON DRAWINGS DO NOT MEET MAXIMUM DEFLECTION CRITERIA TYPICALLY USED FOR PILE WALLS. SECTIONS ARE SHOWN THAT MEET STABILITY AND STRENGTH REQUIREMENTS ONLY. MEETING DEFLECTION CRITERIA WILL LEAD TO EITHER MUCH LARGER PILE SECTIONS OR DIFFERENT WALL TYPE CONCEPTS OR A DIFFERENT DESIGN APPROACH.
  5. BASED ON THE PILE DRIVING ANALYSIS PERFORMED, IT IS UNCERTAIN THAT PILES WILL BE ABLE TO BE DRIVEN COMPLETELY AND PRACTICAL REFUSAL OF THE PILES IS POSSIBLE PRIOR TO REACHING REQUIRED PILE TIP DEPTH.
  6. HARD PILE DRIVING CONDITIONS COULD LEAD TO LATERAL MOVEMENT OF THE PILES CREATING ALIGNMENT ISSUES.
  7. HARD DRIVING CONDITIONS WILL CAUSE VIBRATIONS THROUGH SOIL CAUSING SOIL PARTICLE ACCELERATION. THESE ACCELERATIONS MAY CAUSE SLOPE INSTABILITY. PREDICTION OF DESIGN MAGNITUDE OF SOIL ACCELERATION IS HIGHLY VARIABLE DUE TO VARIABILITY OF SOIL CONDITIONS, TRANSFER OF FORCES FROM PILE TO SOIL, AND AMOUNT OF PILE DRIVING ENERGY REQUIRED DURING ANY PHASE OF DRIVING.
  8. CONSIDERATION OF ADDITIONAL DESIGN SECTIONS ALONG EACH LENGTH OF CELL WALL COULD RESULT IN LARGER PILE SECTIONS, INABILITY TO DRIVE PILES TO REQUIRED DEPTH DUE TO DIFFICULT DRIVING CONDITIONS, AND/OR REFUSAL PRIOR TO REQUIRED TIP DEPTH.
  9. SCHEDULE AND CONSTRUCTABILITY WILL BE IMPACTED BY THE PREDICTED LARGE PILE SIZES AND DEPTHS AND MAY BE ADDITIONALLY AFFECTED OR DEEMED IMPRACTICAL BY DIFFICULT DRIVING CONDITIONS AND GEOTECHNICAL UNCERTAINTIES.

**PRELIMINARY NOT FOR CONSTRUCTION**

ENG: Logan M. Lockwood  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020

GHD SERVICES INC.  
JOB NO. 11187072 FILE NO. 010  
GHD TEXAS PILE REGISTRATION NO. 276



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	EXISTING CONTOUR INTERVAL
	FENCELINE
	SHORELINE
	TOP OF BANK
	TOE OF SLOPE
	OVERHEAD ELECTRICAL
	GUARDRAIL
	PIPELINE
	BORING LOCATION
	MONITORING WELL
	POWER POLE
	L.P.
	WELL
	AREA WITH MATERIAL >30 mg/kg TEQ
	ASPHALT
	CONCRETE
	GRAVEL
	SILT FENCE
	TURBIDITY CURTAIN
	OIL BOOM

SOURCE: TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 150608, JULY 6, 2019 TO AUGUST 2, 2019

Client  
**SAN JACINTO RIVER WASTE PITS**  
 Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	30% EPA REVIEW	MW	RH	05/28/2020
1	30% CLIENT REVIEW	MW	RH	05/15/2020
No.	Issue	Drawn	Approved	Date
Drawn	MW		Designer RH	
Drafting	BP		Design Check LL	
Project Coordinator	CM		Date May 28, 2020	
			Scale 1" = 100'	
Original Size			Bar is one inch on original size drawing	

NOTES:  
 1. LOCATION AND TYPE OF SOIL EROSION AND SEDIMENT CONTROLS ARE PRELIMINARY AND SUBJECT TO CHANGE.

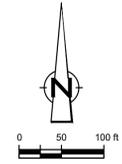
**PRELIMINARY NOT FOR CONSTRUCTION**  
 ENG: Logan M. Lozano  
 STATE: TEXAS  
 LIC. NO: 132028  
 DATE: 5-15-2020

GHD SERVICES INC.  
 JOB NO. 11187072 FILE NO. 010  
 GHD TEXAS FIRM REGISTRATION NO. 276

Project No. 11187072  
 Title  
**SOIL EROSION AND SEDIMENT CONTROL PLAN (OVERALL)**

Sheet No.  
**C-04**  
 Sheet - of -





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	FENCELINE
	SHORELINE
	TOP OF BANK
	TOE OF SLOPE
	OVERHEAD ELECTRICAL GUARDRAIL
	PIPELINE
	BORING LOCATION
	MONITORING WELL
	POWER POLE
	LIGHT POLE
	WELL
	AREA WITH MATERIAL >30 mg/kg TEQ
	ASPHALT
	CONCRETE
	GRAVEL
	SILT FENCE
	TURBIDITY CURTAIN
	OIL BOOM

SOURCE: TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 150608 , JULY 6, 2019 TO AUGUST 2, 2019

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	30% EPA REVIEW	MW	RH	05/28/2020
1	30% CLIENT REVIEW	MW	RH	05/15/2020

Drawn	MW	Designer	RH
Drafting	BP	Design	LL
Check		Check	
Project Coordinator	CM	Date	May 28, 2020

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 0 1"

Project No. 11187072  
 Title

**SOIL EROSION AND SEDIMENT CONTROL PLAN (SEASONAL)**

Sheet No.

**C-05**

Sheet - of -



NOTES:

1. LOCATION AND TYPE OF SOIL EROSION AND SEDIMENT CONTROLS ARE PRELIMINARY AND SUBJECT TO CHANGE.

**PRELIMINARY NOT FOR CONSTRUCTION**

DESIGNED BY: Logan M. Lozano  
 STATE: TEXAS  
 LIC. NO.: 132028  
 DATE: 5-28-2020



JOB NO. 11187072 FILE NO. 010  
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Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	30% EPA REVIEW	MW	RH	05/28/2020
1	30% CLIENT REVIEW	MW	RH	05/15/2020

Drawn	MW	Designer	RH
Drafting Check	BP	Design Check	LL
Project Coordinator	CM	Date	May 28, 2020

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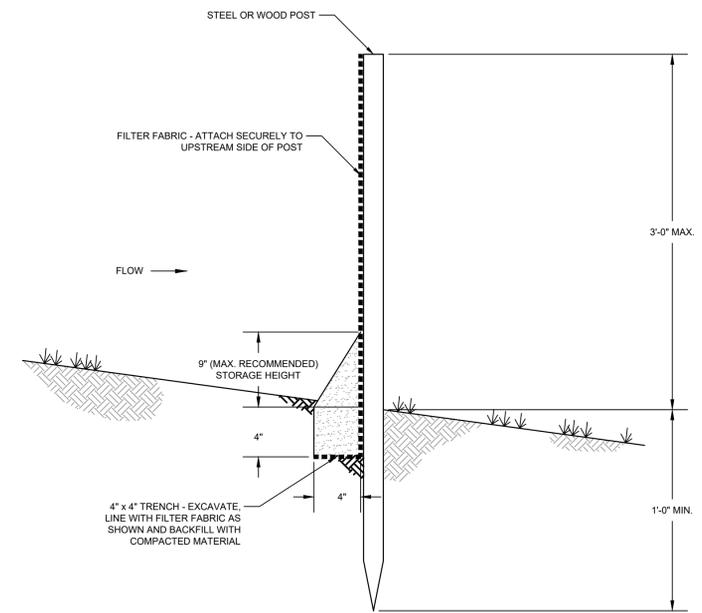
Project No. 11187072  
Title

**SOIL EROSION AND SEDIMENT CONTROL DETAILS**

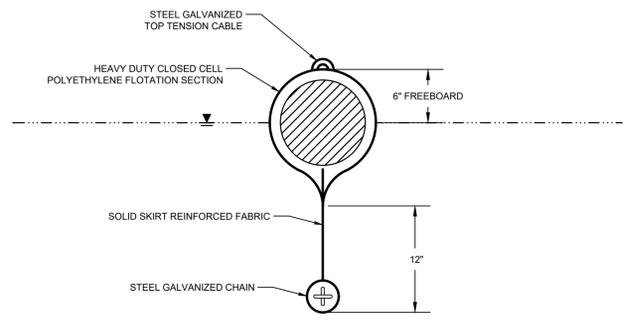
Sheet No.

**C-06**

Sheet - of -

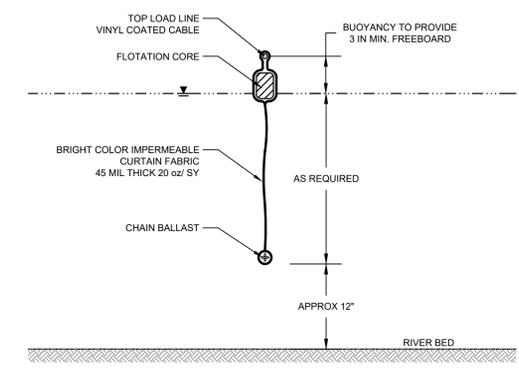


**DETAIL 1 TEMPORARY SILT FENCE**  
N.T.S. C-05



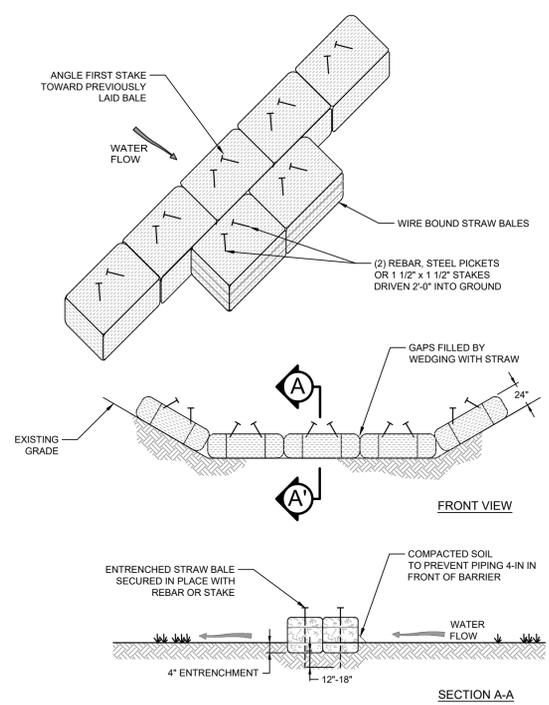
- NOTES
- OIL BOOM SHALL CONFORM TO COAST GUARD OPA 90 REGULATION AND ASTM F-1523
  - OIL BOOM SHALL BE CONTINUOUS TYPE.

**DETAIL 2 NON-ABSORBENT OIL BOOM**  
N.T.S. C-04



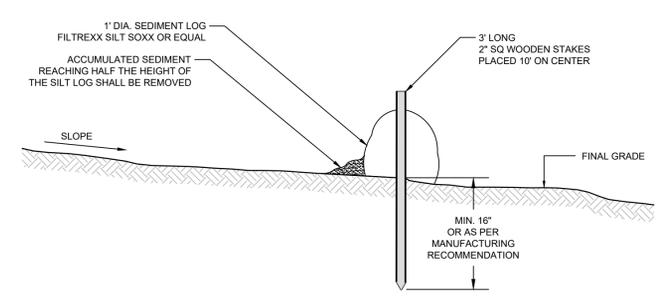
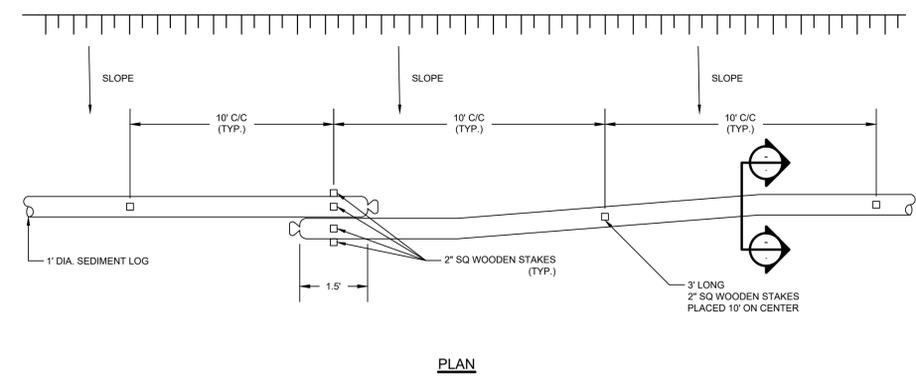
- NOTES
- TURBIDITY CURTAIN SHALL BE TYPE II ACCORDING TO DEPARTMENT OF THE ARMY, US ARMY CORPS OF ENGINEERS WASHINGTON, DC, ENGINEERING AND DESIGN "HANDBOOK FOR THE PREPARATION OF STORM WATER POLLUTION PREVENTION PLANS FOR CONSTRUCTION ACTIVITIES", APPENDIX "D" BMP 27 TURBIDITY CURTAIN, DOCUMENT EP1110-1-16, 1997.
  - CURTAIN SYSTEM SHALL BE EQUIPPED WITH LOAD TRANSFER TYPE PANEL CONNECTORS, HEAT SEALED FABRIC SEAMS AND TIGHT SKIRT JOINTS.
  - INCLUDE MOORING SYSTEM IF REQUIRED.

**DETAIL 3 TURBIDITY CURTAIN**  
N.T.S. C-04



NOTE:  
INSTALL SECOND ROW OF STRAW BALES IN BOTTOM OF SWALE ONLY.

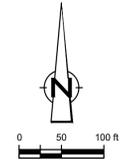
**DETAIL 4 STRAW BALE BARRIER**  
N.T.S. C-04



**DETAIL 5 SEDIMENT LOG**  
N.T.S. C-05

**PRELIMINARY NOT FOR CONSTRUCTION**  
ENG: Logan M. Lockero  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020

GHD SERVICES INC.  
JOB NO. 11187072 FILE NO. 010  
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	FENCELINE
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	TOP OF BANK
	TOE OF SLOPE
	OVERHEAD ELECTRICAL
	GUARDRAIL
	PIPELINE
	BORING LOCATION
	MONITORING WELL
	POWER POLE
	LIGHT POLE
	WELL
	ASPHALT
	CONCRETE
	GRAVEL
	TRAFFIC FLOW

SOURCE: TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

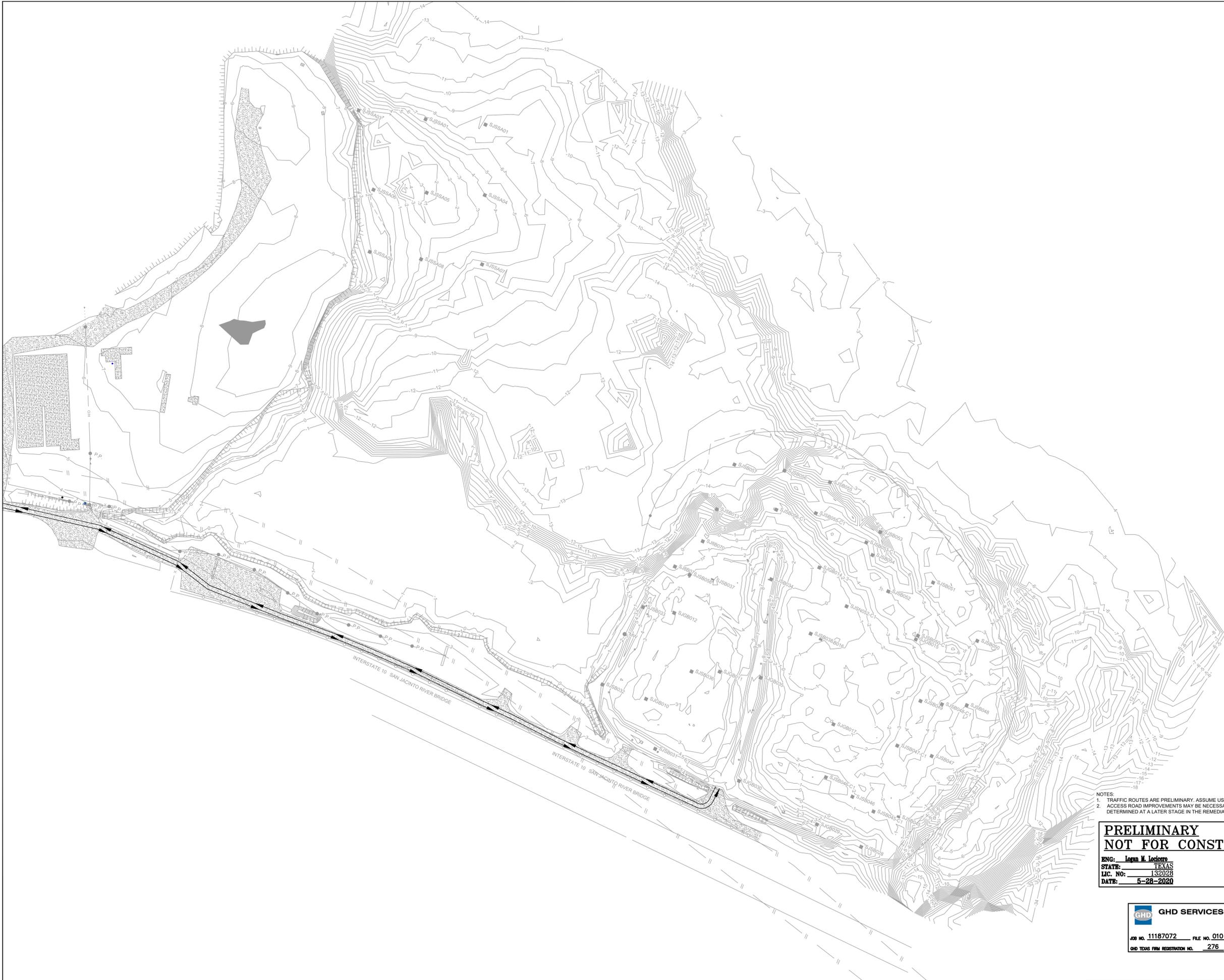
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1	30% CLIENT REVIEW	MW	RH	05/15/2020

Drawn	MW	Designer	RH
Drafting	BP	Design	LL
Check		Check	
Project Coordinator	CM	Date	May 28, 2020

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 Bar is one inch on original size drawing  
 0 1"

Project No. 11187072  
 Title  
**PROJECT TRAFFIC CONTROL PLAN**

Sheet No.  
**C-07**  
 Sheet - of -



NOTES:  
 1. TRAFFIC ROUTES ARE PRELIMINARY. ASSUME USE OF TXDOT ACCESS ROAD.  
 2. ACCESS ROAD IMPROVEMENTS MAY BE NECESSARY AND WILL BE DETERMINED AT A LATER STAGE IN THE REMEDIAL DESIGN.

**PRELIMINARY NOT FOR CONSTRUCTION**

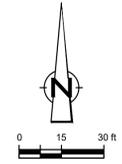
ENG: Logan M. Lociore  
 STATE: TEXAS  
 LIC. NO: 132028  
 DATE: 5-28-2020

**GHD SERVICES INC.**

JOB NO. 11187072 FILE NO. 010  
 GHD TEXAS FIRM REGISTRATION NO. 276



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	SHORELINE
	TOP OF BANK
	TOE OF SLOPE
	OVERHEAD ELECTRICAL
	GUARDRAIL
	PIPELINE
	SJSB002 BORING LOCATION
	MW MONITORING WELL
	P.P. POWER POLE
	L.P. LIGHT POLE
	WELL
	AREA WITH MATERIAL >30 mg/kg TEQ
	ASPHALT
	CONCRETE
	GRAVEL
	PAZ266/AZ38-700N PILE
	HZ 1080M A PILE

SOURCE: TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

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1	30% CLIENT REVIEW	MW	RH	05/15/2020

No.	Issue	Drawn	Approved	Date

Drawn	MW	Designer	RH
-------	----	----------	----

Drafting	BP	Design	LL
----------	----	--------	----

Project Coordinator	CM	Date	May 28, 2020
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Original Size	Arch D	Bar is one inch on original size drawing
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Project No.	11187072
-------------	----------

Title  
**EXCAVATION PLAN CELL 1**

Sheet No.	C-08
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Sheet - of -

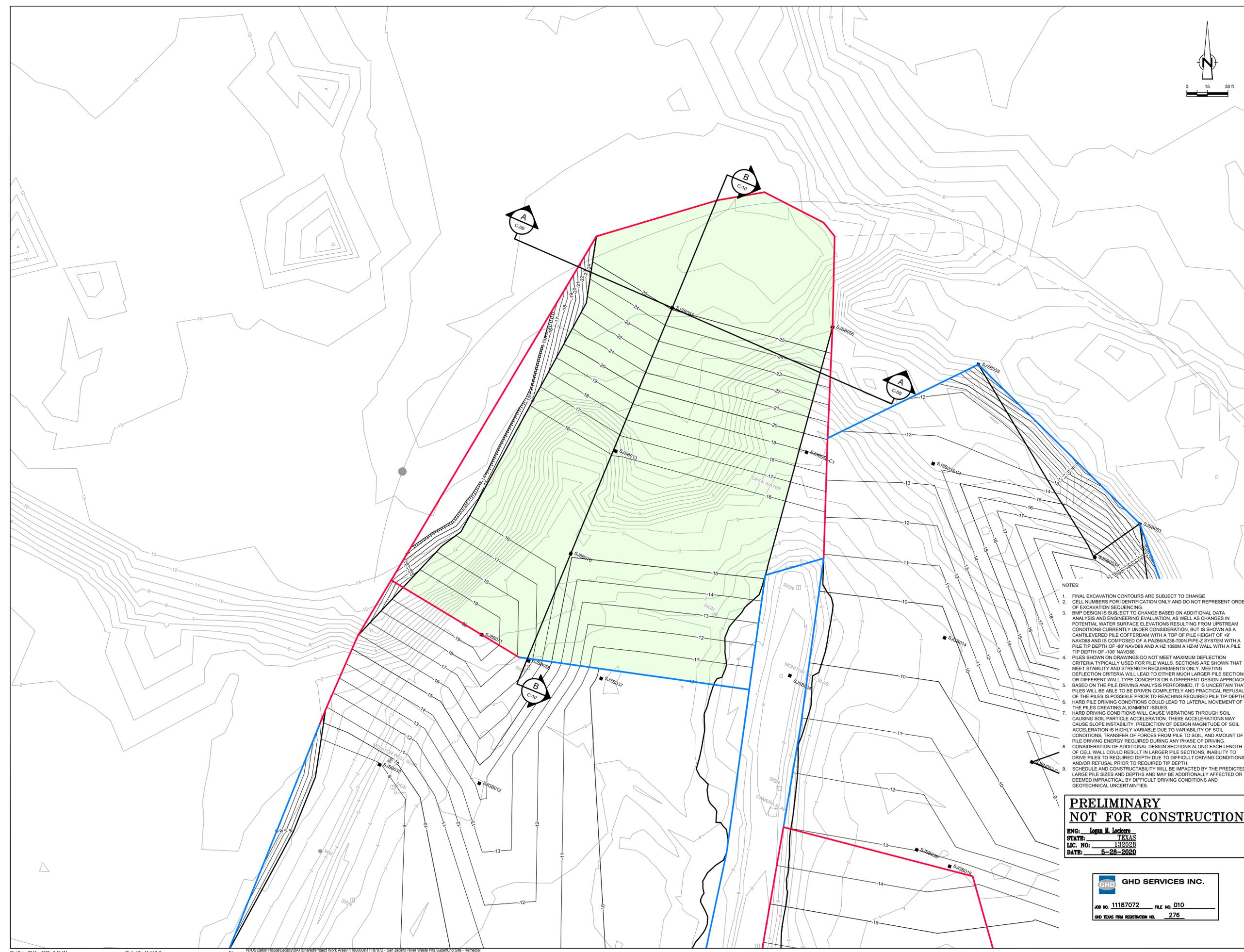
- NOTES:
- FINAL EXCAVATION CONTOURS ARE SUBJECT TO CHANGE.
  - CELL NUMBERS FOR IDENTIFICATION ONLY AND DO NOT REPRESENT ORDER OF EXCAVATION SEQUENCING.
  - BMP DESIGN IS SUBJECT TO CHANGE BASED ON ADDITIONAL DATA ANALYSIS AND ENGINEERING EVALUATION, AS WELL AS CHANGES IN POTENTIAL WATER SURFACE ELEVATIONS RESULTING FROM UPSTREAM CONDITIONS CURRENTLY UNDER CONSIDERATION, BUT IS SHOWN AS A CANTILEVERED PILE COFFERDAM WITH A TOP OF PILE HEIGHT OF 67 NAVD88 AND IS COMPOSED OF A PAZ266/AZ38-700N PIPE-Z SYSTEM WITH A PILE TIP DEPTH OF 80' NAVD88 AND A HZ 1080M A HZ-M WALL WITH A PILE TIP DEPTH OF 100' NAVD88.
  - PILES SHOWN ON DRAWINGS DO NOT MEET MAXIMUM DEFLECTION CRITERIA TYPICALLY USED FOR PILE WALLS. SECTIONS ARE SHOWN THAT MEET STABILITY AND STRENGTH REQUIREMENTS ONLY. MEETING DEFLECTION CRITERIA WILL LEAD TO EITHER MUCH LARGER PILE SECTIONS OR DIFFERENT WALL TYPE CONCEPTS OR A DIFFERENT DESIGN APPROACH. BASED ON THE PILE DRIVING ANALYSIS PERFORMED, IT IS UNCERTAIN THAT PILES WILL BE ABLE TO BE DRIVEN COMPLETELY AND PRACTICAL REFUSAL OF THE PILES IS POSSIBLE PRIOR TO REACHING REQUIRED PILE TIP DEPTH. HARD PILE DRIVING CONDITIONS COULD LEAD TO LATERAL MOVEMENT OF THE PILES CREATING ALIGNMENT ISSUES.
  - HARD DRIVING CONDITIONS WILL CAUSE VIBRATIONS THROUGH SOIL CAUSING SOIL PARTICLE ACCELERATION. THESE ACCELERATIONS MAY CAUSE SLOPE INSTABILITY. PREDICTION OF DESIGN MAGNITUDE OF SOIL ACCELERATION IS HIGHLY VARIABLE DUE TO VARIABILITY OF SOIL CONDITIONS. TRANSFER OF FORCES FROM PILE TO SOIL, AND AMOUNT OF PILE DRIVING ENERGY REQUIRED DURING ANY PHASE OF DRIVING.
  - CONSIDERATION OF ADDITIONAL DESIGN SECTIONS ALONG EACH LENGTH OF CELL WALL COULD RESULT IN LARGER PILE SECTIONS. INABILITY TO DRIVE PILES TO REQUIRED DEPTH DUE TO DIFFICULT DRIVING CONDITIONS, AND/OR REFUSAL PRIOR TO REQUIRED TIP DEPTH.
  - SCHEDULE AND CONSTRUCTABILITY WILL BE IMPACTED BY THE PREDICTED LARGE PILE SIZES AND DEPTHS AND MAY BE ADDITIONALLY AFFECTED OR DEEMED IMPRACTICAL BY DIFFICULT DRIVING CONDITIONS AND GEOTECHNICAL UNCERTAINTIES.

**PRELIMINARY NOT FOR CONSTRUCTION**

ENG: Logan M. Lockero  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020

**GHD SERVICES INC.**

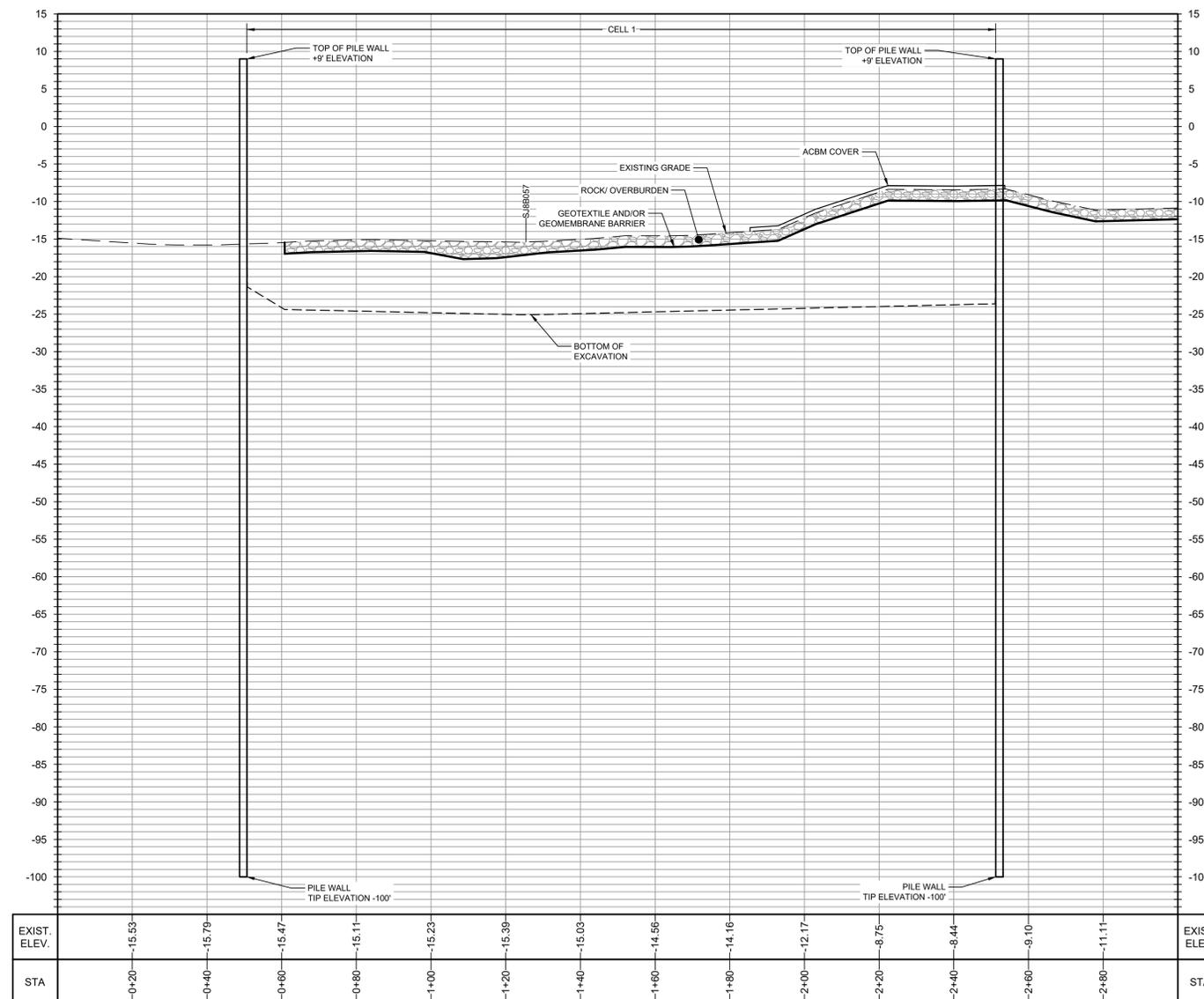
JOB NO. 11187072 FILE NO. 010  
GHD TEXAS FIRM REGISTRATION NO. 276





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SECTION **A** EAST/WEST  
HORIZ: 1"=20'  
VERT: 1"=10'  
C-08

- NOTES:
1. BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.
  2. CELL NUMBERS FOR IDENTIFICATION ONLY AND DO NOT REPRESENT ORDER OF EXCAVATION SEQUENCING.
  3. BMP DESIGN IS SUBJECT TO CHANGE BASED ON ADDITIONAL DATA ANALYSIS AND ENGINEERING EVALUATION, AS WELL AS CHANGES IN POTENTIAL WATER SURFACE ELEVATIONS RESULTING FROM UPSTREAM CONDITIONS CURRENTLY UNDER CONSIDERATION. BUT IS SHOWN AS A CANTILEVERED PILE COFFERDAM WITH A TOP OF PILE HEIGHT OF +9' NAVD88 AND IS COMPOSED OF A PA286/AZ38-700N PIPE-Z SYSTEM WITH A PILE TIP DEPTH OF -80' NAVD88 AND A HZ 1080M A HZ-M WALL WITH A PILE TIP DEPTH OF -100' NAVD88.
  4. PILES SHOWN ON DRAWINGS DO NOT MEET MAXIMUM DEFLECTION CRITERIA TYPICALLY USED FOR PILE WALLS. SECTIONS ARE SHOWN THAT MEET STABILITY AND STRENGTH REQUIREMENTS ONLY. MEETING DEFLECTION CRITERIA WILL LEAD TO EITHER MUCH LARGER PILE SECTIONS OR DIFFERENT WALL TYPE CONCEPTS OR A DIFFERENT DESIGN APPROACH.
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  6. HARD PILE DRIVING CONDITIONS COULD LEAD TO LATERAL MOVEMENT OF THE PILES CREATING ALIGNMENT ISSUES.
  7. HARD DRIVING CONDITIONS WILL CAUSE VIBRATIONS THROUGH SOIL CAUSING SOIL PARTICLE ACCELERATION. THESE ACCELERATIONS MAY CAUSE SLOPE INSTABILITY. PREDICTION OF DESIGN MAGNITUDE OF SOIL ACCELERATION IS HIGHLY VARIABLE DUE TO VARIABILITY OF SOIL CONDITIONS. TRANSFER OF FORCES FROM PILE TO SOIL, AND AMOUNT OF PILE DRIVING ENERGY REQUIRED DURING ANY PHASE OF DRIVING.
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**PRELIMINARY  
NOT FOR CONSTRUCTION**

ENG: Logan M. Loggiero  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020

**GHD SERVICES INC.**

JOB NO. 11187072 FILE NO. 010  
GHD TEXAS FIRM REGISTRATION NO. 276

Client  
**SAN JACINTO RIVER  
WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT  
PRELIMINARY 30% REMEDIAL DESIGN  
HARRIS COUNTY, TEXAS**

2	30% EPA REVIEW	MW	RH	05/28/2020
1	30% CLIENT REVIEW	MW	RH	05/15/2020
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting Check	BP	Design Check	LL	
Project Coordinator	CM	Date	May 28, 2020	
This document shall not be used for construction unless signed and sealed for construction.		Scale	AS SHOWN	
Original Size	Arch D			Bar is one inch on original size drawing 0 1"

Project No. **11187072**

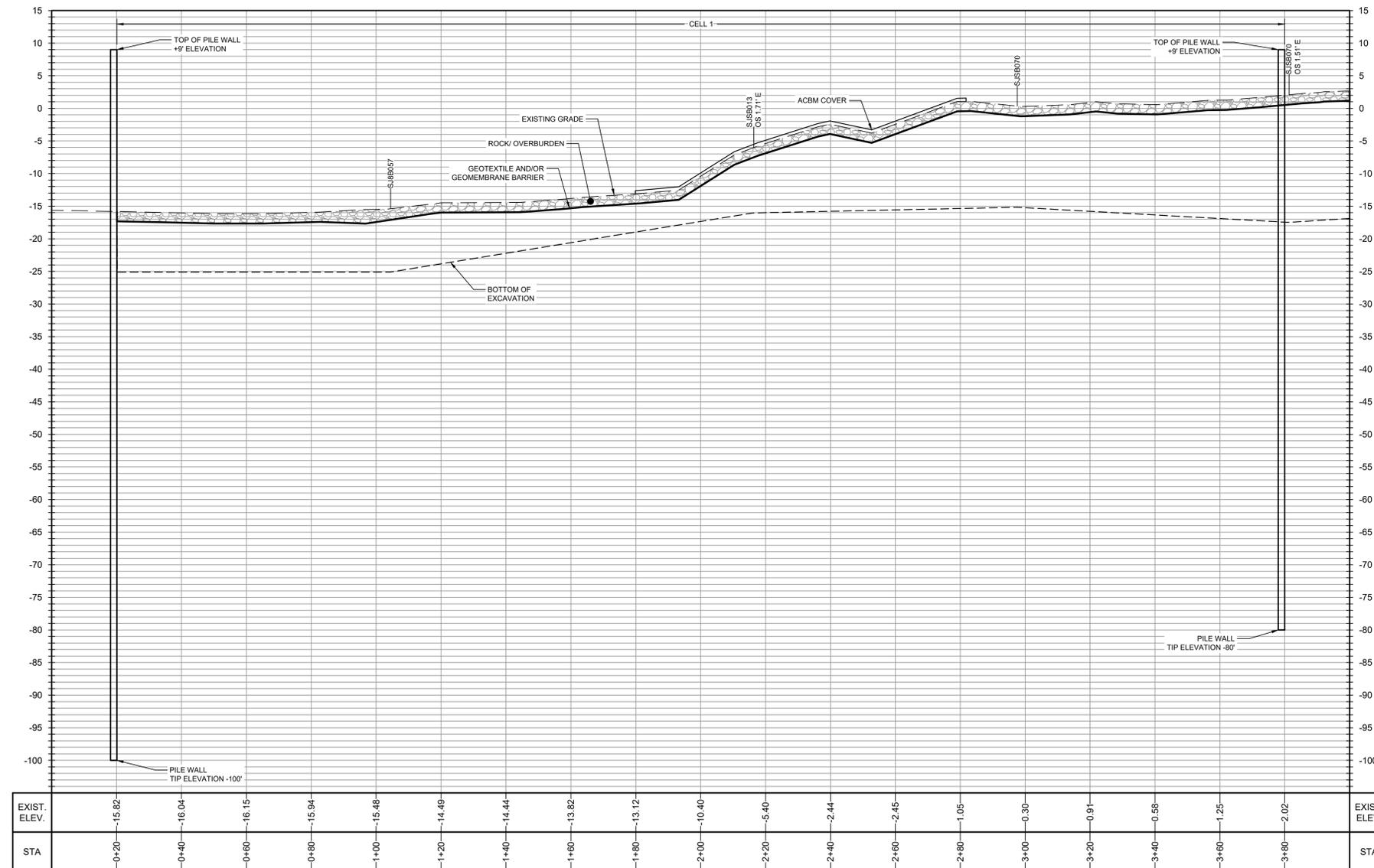
Title  
**EXCAVATION SECTION  
CELL 1  
(1 OF 2)**

Sheet No.  
**C-09**

Sheet - of -



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SECTION **B** NORTH/SOUTH  
C-08  
HORIZ: 1"=20'  
VERT: 1"=10'

NOTES:

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**PRELIMINARY  
NOT FOR CONSTRUCTION**

ENG: Logan M. Loggiero  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020



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Client  
**SAN JACINTO RIVER  
WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT  
PRELIMINARY 30% REMEDIAL DESIGN  
HARRIS COUNTY, TEXAS**

2	30% EPA REVIEW	MW	RH	05/28/2020
1	30% CLIENT REVIEW	MW	RH	05/15/2020
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting Check	BP	Design Check	LL	
Project Coordinator	CM	Date	May 28, 2020	
This document shall not be used for construction unless signed and sealed for construction.	Scale	AS SHOWN		

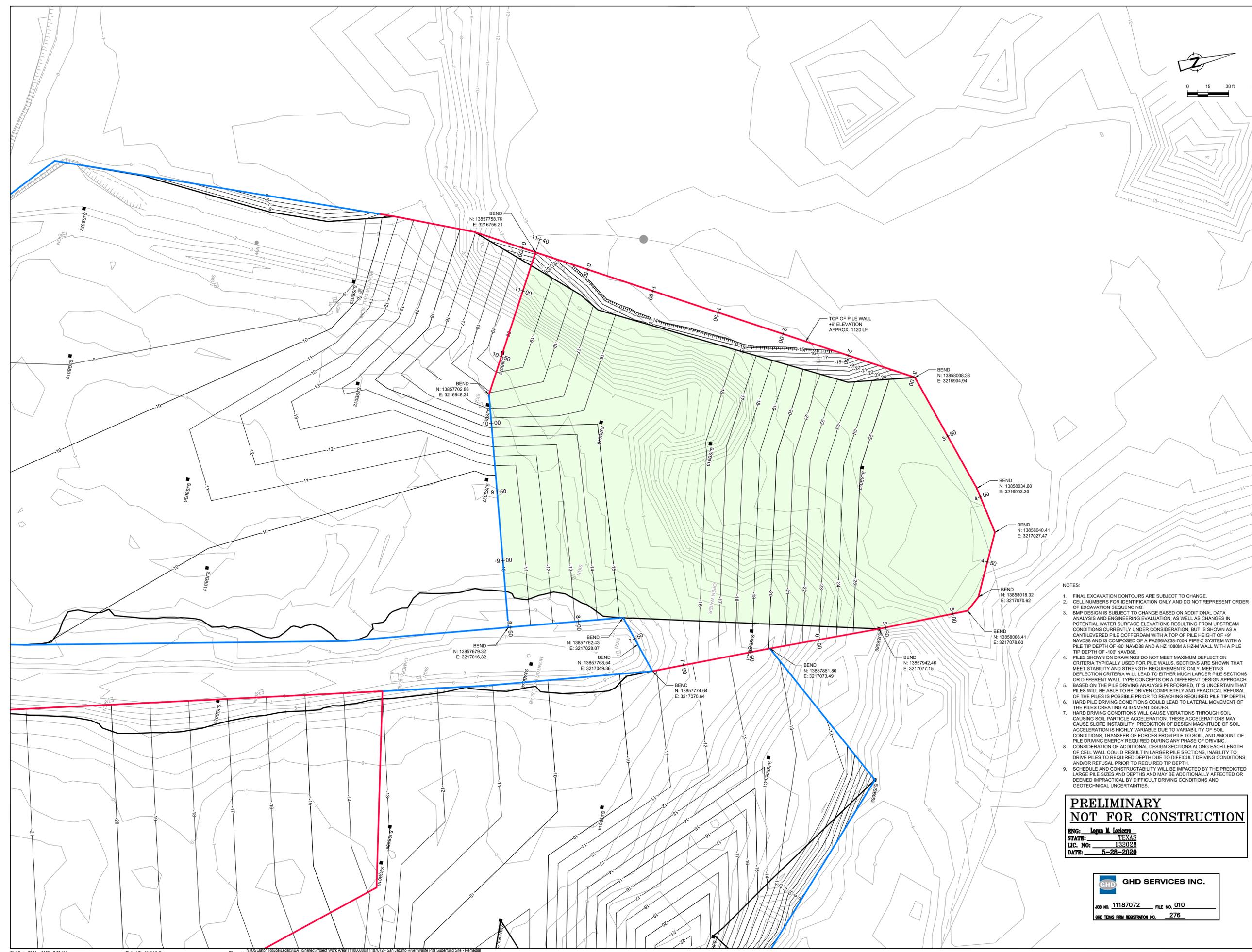
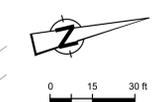
Original Size  
**Arch D**  
Bar is one inch on original size drawing  
0 1"

Project No. 11187072  
Title  
**EXCAVATION SECTION  
CELL 1  
(2 OF 2)**

Sheet No.  
**C-10**  
Sheet - of -



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**LEGEND**

---	TOGA CAP PERIMETER
---	EXISTING CONTOUR INTERVAL
-X-	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
■	SJSB002
●	MW
○	P.P.
○	L.P.
○	WELL
---	AREA WITH MATERIAL >30 mg/kg TEQ
---	ASPHALT
---	CONCRETE
---	GRAVEL
---	PAZ66/AZ38-700N PILE
---	HZ 1080M A PILE

SOURCE: TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019

Client  
**SAN JACINTO RIVER WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	30% EPA REVIEW	MW	SC	05/28/2020
1	30% CLIENT REVIEW	MW	SC	05/15/2020
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting	BP	Design	LL	
Check		Check		
Project	CM	Date	May 28, 2020	
Coordinator		Scale	1" = 30'	

- NOTES:
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**PRELIMINARY NOT FOR CONSTRUCTION**

ENG: Logan M. Lockard  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020

**GHD SERVICES INC.**  
JOB NO. 11187072 FILE NO. 010  
GHD TEXAS PILE REGISTRATION NO. 276

Original Size  
**Arch D**  
Bar is one inch on original size drawing  
0 1"

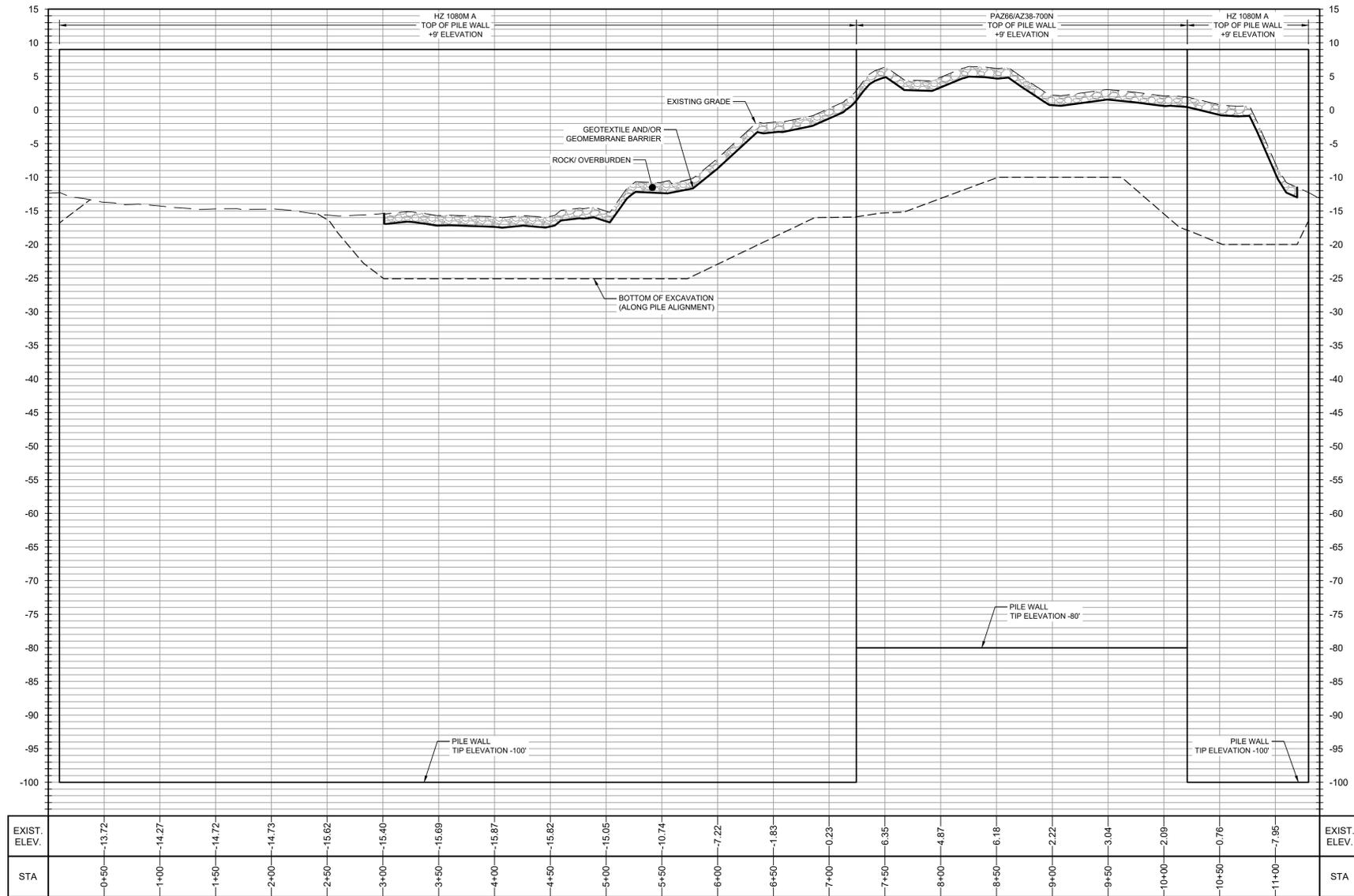
Project No. 11187072  
Title

**PILE LAYOUT PLAN CELL 1**

Sheet No.  
**C-11**



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**PROFILE**  
HORIZ: 1" = 60'  
VERT: 1" = 10'

- NOTES:
1. BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.
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**PRELIMINARY  
NOT FOR CONSTRUCTION**

ENG: Logan M. Lockero  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020



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Client: **SAN JACINTO RIVER WASTE PITS**  
Project: **NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	30% EPA REVIEW	MW	SC	05/28/2020
1	30% CLIENT REVIEW	MW	SC	05/15/2020

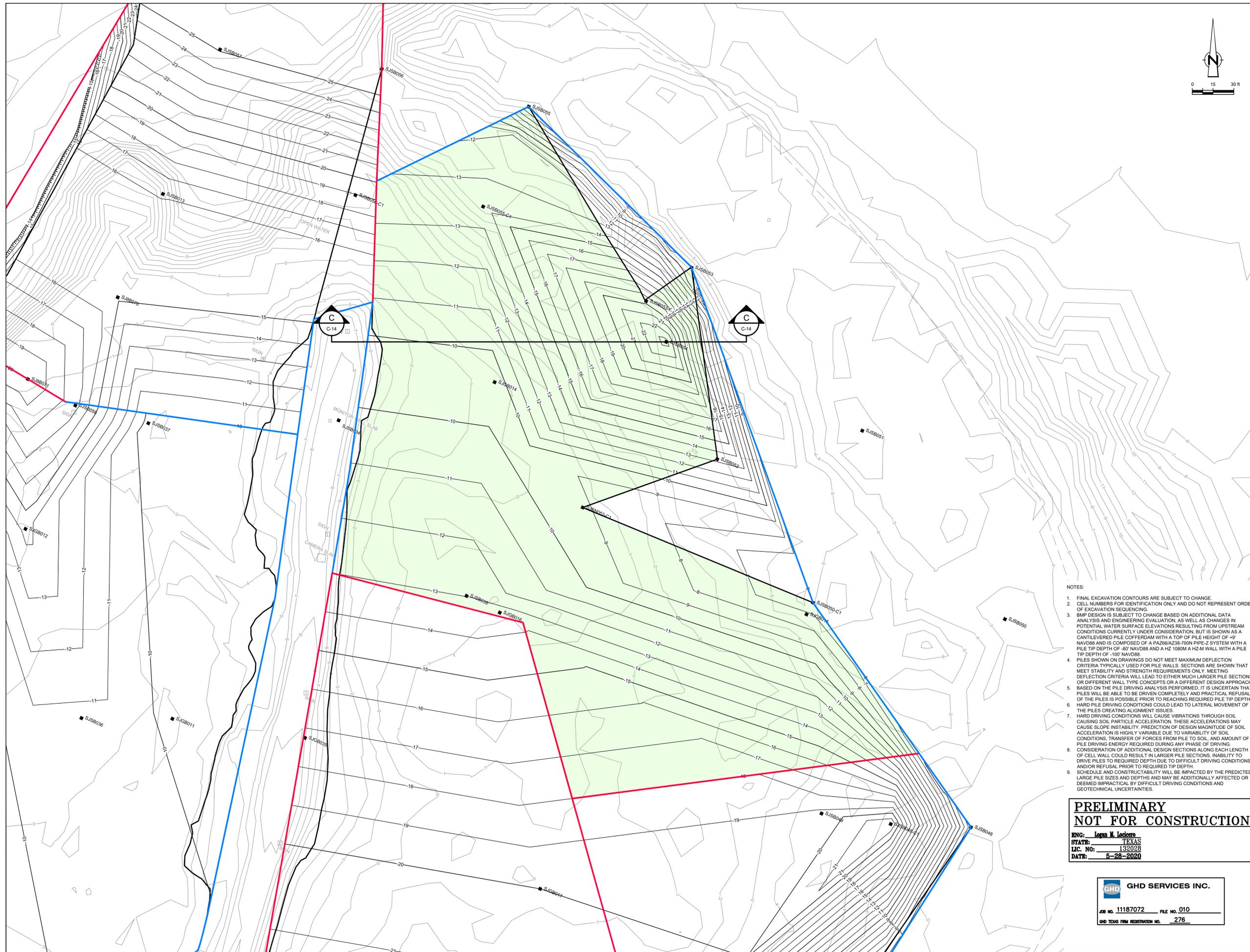
Drawn	MW	Designer	RH
Drafting Check	BP	Design Check	LL
Project Coordinator	CM	Date	May 28, 2020
This document shall not be used for construction unless signed and sealed for construction.		Scale	AS SHOWN

Original Size: **Arch D**  
Bar is one inch on original size drawing  
0 1"

Project No. **11187072**  
Title

**PILE PROFILE CELL 1**

Sheet No. **C-12**



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LEGEND	
	TOGA CAP PERIMETER
	EXISTING CONTOUR INTERVAL
	FENCELINE
	SHORELINE
	TOP OF BANK
	TOE OF SLOPE
	OVERHEAD ELECTRICAL GUARDRAIL PIPELINE
	SJSB002 BORING LOCATION
	MW MONITORING WELL
	P.P. POWER POLE
	L.P. LIGHT POLE
	WELL
	AREA WITH MATERIAL >30 mg/kg TEO
	ASPHALT
	CONCRETE
	GRAVEL
	PAZ266/AZ38-700N PILE
	HZ 1080M A PILE

SOURCE: TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

- NOTES:
- FINAL EXCAVATION CONTOURS ARE SUBJECT TO CHANGE.
  - CELL NUMBERS FOR IDENTIFICATION ONLY AND DO NOT REPRESENT ORDER OF EXCAVATION SEQUENCING.
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**PRELIMINARY NOT FOR CONSTRUCTION**

ENG: Logan M. Lockero  
 STATE: TEXAS  
 LIC. NO: 132028  
 DATE: 5-28-2020

**GHD SERVICES INC.**

JOB NO. 11187072 FILE NO. 010  
 GHD TEXAS PILE REGISTRATION NO. 276

No.	Issue	Drawn	Approved	Date
2	30% EPA REVIEW	MW	RH	05/28/2020
1	30% CLIENT REVIEW	MW	RH	05/15/2020

Drawn	MW	Designer	RH
Drafting	BP	Design	LL
Check		Check	
Project Coordinator	CM	Date	May 28, 2020
Original Size		Scale	1" = 30'
		Bar is one inch on original size drawing	0 1"

Project No. 11187072  
 Title

**EXCAVATION PLAN CELL 2**

Sheet No.  
**C-13**  
 Sheet - of -





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LEGEND	
	TORA CAP PERIMETER
	EXISTING CONTOUR INTERVAL
	FENCELINE
	SHORELINE
	TOP OF BANK
	TOE OF SLOPE
	OVERHEAD ELECTRICAL
	GUARDRAIL
	PIPELINE
	BORING LOCATION
	MONITORING WELL
	POWER POLE
	LIGHT POLE
	WELL
	AREA WITH MATERIAL >30 ng/kg TEQ
	ASPHALT
	CONCRETE
	GRAVEL
	PAZ66/AZ38-700N PILE
	HZ 1080M A PILE

SOURCE: TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019

Client  
**SAN JACINTO RIVER WASTE PITS**  
 Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	30% EPA REVIEW	MW	SC	05/28/2020
1	30% CLIENT REVIEW	MW	SC	05/15/2020

Drawn	MW	Designer	RH
Drafting	BP	Design	LL
Check		Check	

Project Coordinator	CM	Date	May 28, 2020
Original Size		Scale	1" = 30'

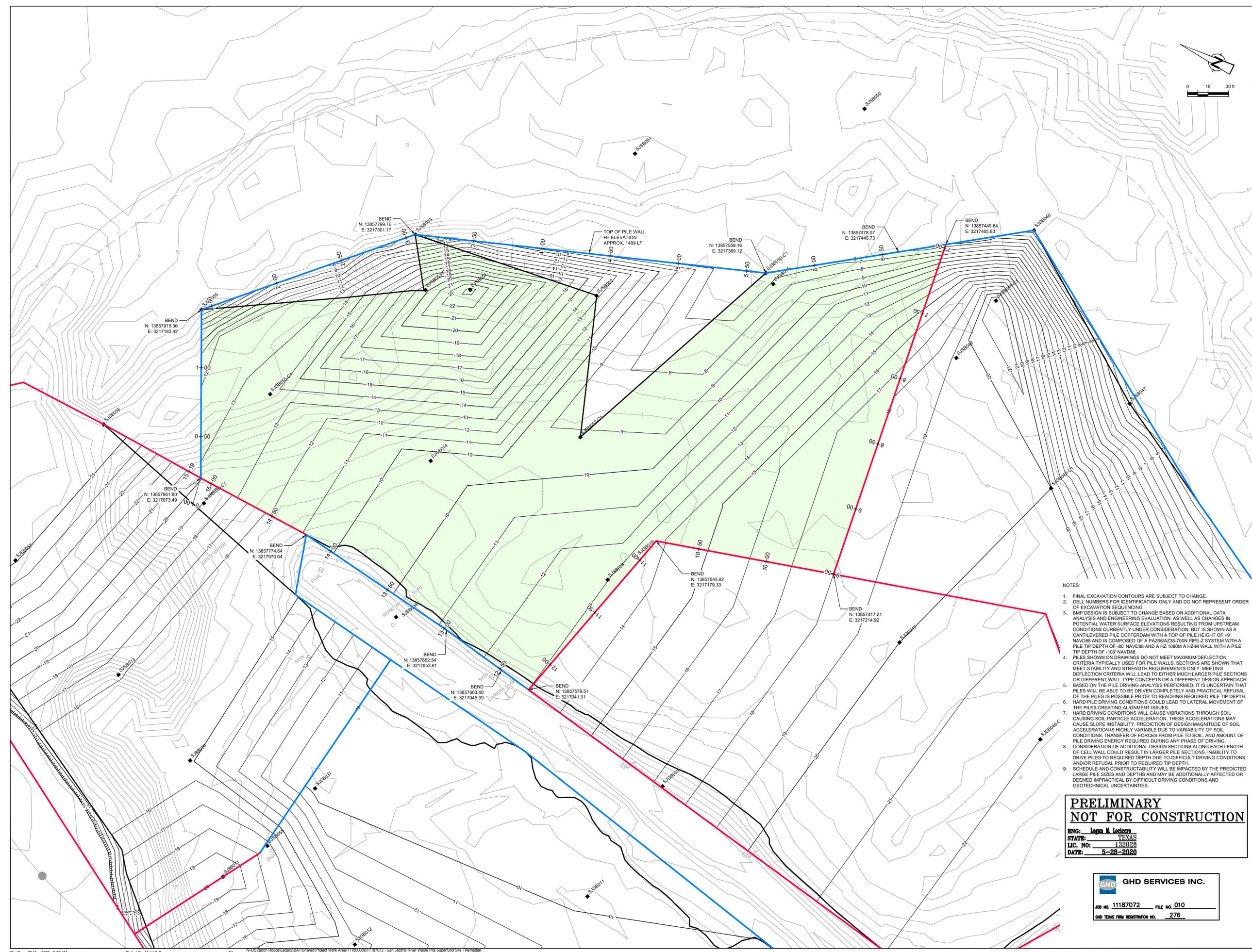
Arch D  
 Bar is one inch on original size drawing  
 0 1"

Project No. 11187072  
 Title

**PILE LAYOUT PLAN CELL 2**

Sheet No.

**C-15**  
 Sheet - of -



- NOTES:
- FINAL EXCAVATION CONTOURS ARE SUBJECT TO CHANGE.
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  - BMP DESIGN IS SUBJECT TO CHANGE BASED ON ADDITIONAL DATA ANALYSIS AND ENGINEERING EVALUATION, AS WELL AS CHANGES IN POTENTIAL WATER SURFACE ELEVATIONS RESULTING FROM UPSTREAM CONDITIONS CURRENTLY UNDER CONSIDERATION, BUT IS SHOWN AS A CANTILEVERED PILE COFFERDAM WITH A TOP OF PILE HEIGHT OF 47 NAVD88 AND IS COMPOSED OF A PAZ66/AZ38-700N PIPE-Z SYSTEM WITH A PILE TIP DEPTH OF 80' NAVD88 AND A HZ 1080M A HZ-M WALL WITH A PILE TIP DEPTH OF 100' NAVD88.
  - PILES SHOWN ON DRAWINGS DO NOT MEET MAXIMUM DEFLECTION CRITERIA TYPICALLY USED FOR PILE WALLS. SECTIONS ARE SHOWN THAT MEET STABILITY AND STRENGTH REQUIREMENTS ONLY. MEETING DEFLECTION CRITERIA WILL LEAD TO EITHER MUCH LARGER PILE SECTIONS OR DIFFERENT WALL TYPE CONCEPTS OR A DIFFERENT DESIGN APPROACH.
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  - HARD DRIVING CONDITIONS WILL CAUSE VIBRATIONS THROUGH SOIL CAUSING SOIL PARTICLE ACCELERATION. THESE ACCELERATIONS MAY CAUSE SLOPE INSTABILITY. PREDICTION OF DESIGN MAGNITUDE OF SOIL ACCELERATION IS HIGHLY VARIABLE DUE TO VARIABILITY OF SOIL CONDITIONS. TRANSFER OF FORCES FROM PILE TO SOIL, AND AMOUNT OF PILE DRIVING ENERGY REQUIRED DURING ANY PHASE OF DRIVING.
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  - SCHEDULE AND CONSTRUCTABILITY WILL BE IMPACTED BY THE PREDICTED LARGE PILE SIZES AND DEPTHS AND MAY BE ADDITIONALLY AFFECTED OR DEEMED IMPRACTICAL BY DIFFICULT DRIVING CONDITIONS AND GEOTECHNICAL UNCERTAINTIES.

**PRELIMINARY NOT FOR CONSTRUCTION**

ENG: Logan M. Lockard  
 STATE: TEXAS  
 LIC. NO: 132028  
 DATE: 5-28-2020

**GHD SERVICES INC.**  
 JOB NO. 11187072 FILE NO. 010  
 GHD TEXAS FIRM REGISTRATION NO. 276



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Client  
**SAN JACINTO RIVER  
WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT  
PRELIMINARY 30% REMEDIAL DESIGN  
HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	30% EPA REVIEW	MW	SC	05/28/2020
1	30% CLIENT REVIEW	MW	SC	05/15/2020

Drawn	MW	Designer	RH
Drafting	BP	Design	LL
Check		Check	
Project	CM	Date	May 28, 2020
Coordinator		Scale	AS SHOWN

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Original Size  
**Arch D**  
Bar is one inch on original size drawing  
0 1"

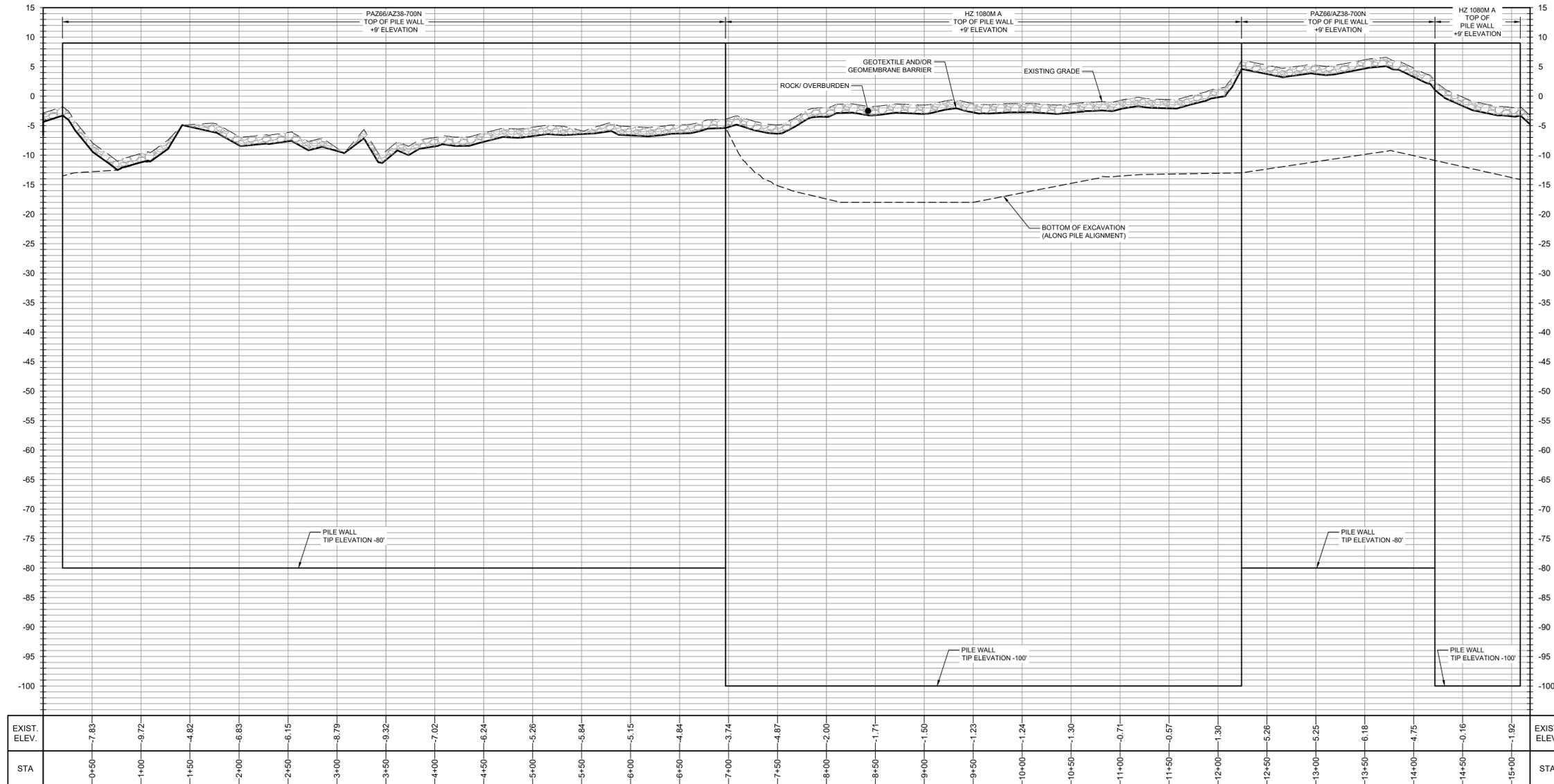
Project No.  
Title

**PILE  
PROFILE  
CELL 2**

Sheet No.

**C-16**

Sheet - of -



**PROFILE**  
HORIZ: 1" = 60'  
VERT: 1" = 10'

NOTES:

- BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.
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**PRELIMINARY  
NOT FOR CONSTRUCTION**

ENG: Logan M. Lockero  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020





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	EXISTING CONTOUR INTERVAL
	FENCELINE
	SHORELINE
	TOP OF BANK
	TOE OF SLOPE
	OVERHEAD ELECTRICAL GUARDRAIL PIPELINE
	BORING LOCATION
	MONITORING WELL
	POWER POLE
	LIGHT POLE
	WELL
	AREA WITH MATERIAL >30 mg/kg TEO
	ASPHALT
	CONCRETE
	GRAVEL
	PAZ266/AZ38-700N PILE
	HZ 1080M A PILE

SOURCE: TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	30% EPA REVIEW	MW	RH	05/28/2020
1	30% CLIENT REVIEW	MW	RH	05/15/2020

Drawn	MW	Designer	RH
Drafting Check	BP	Design Check	LL

Project Coordinator	CM	Date	May 28, 2020
Original Size		Scale	1" = 30'

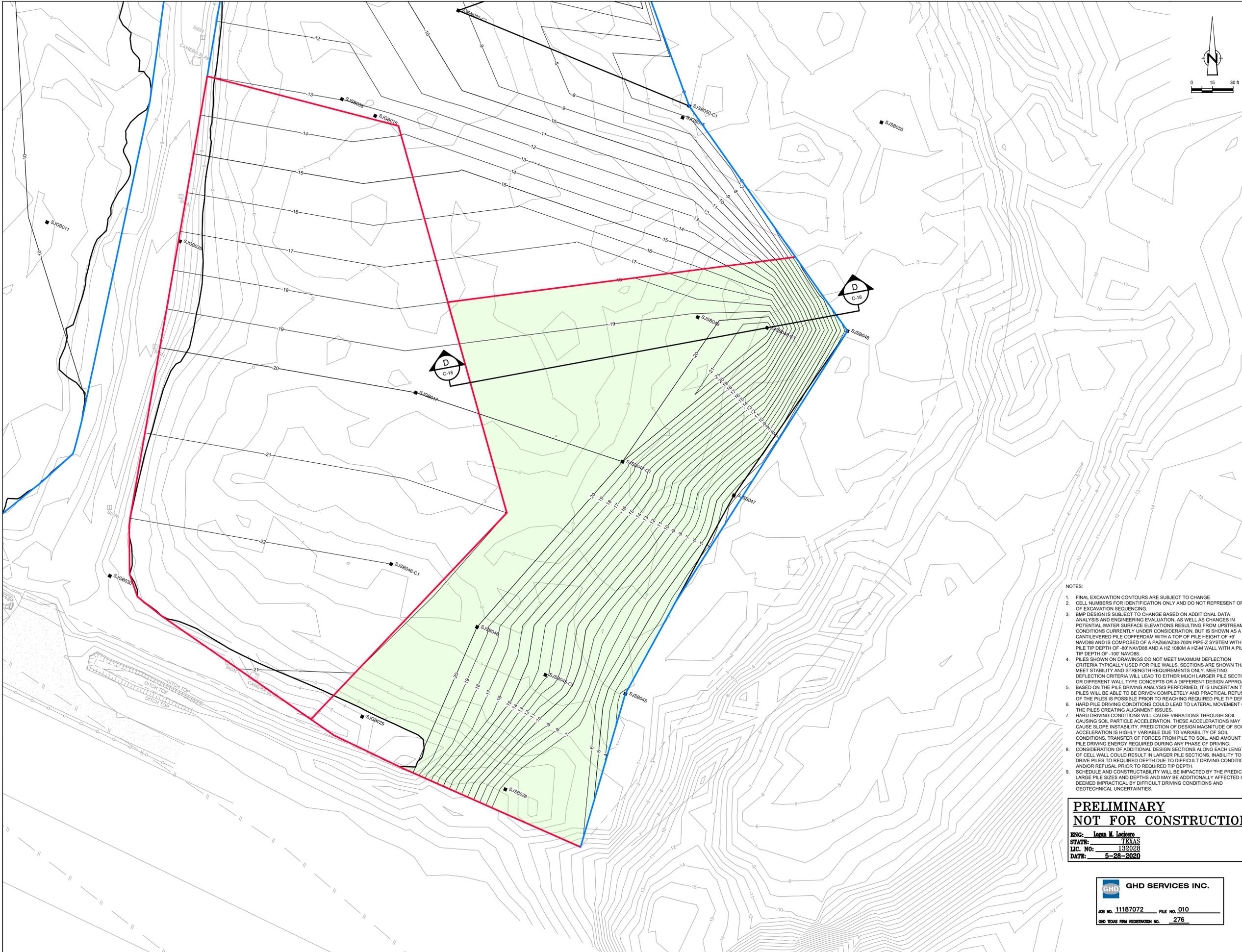
Arch D  
Bar is one inch on original size drawing  
0 1"

Project No. 11187072

Title  
**EXCAVATION PLAN CELL 3**

Sheet No.

**C-17**  
Sheet - of -



- NOTES:
- FINAL EXCAVATION CONTOURS ARE SUBJECT TO CHANGE.
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  - PILES SHOWN ON DRAWINGS DO NOT MEET MAXIMUM DEFLECTION CRITERIA TYPICALLY USED FOR PILE WALLS. SECTIONS ARE SHOWN THAT MEET STABILITY AND STRENGTH REQUIREMENTS ONLY. MEETING DEFLECTION CRITERIA WILL LEAD TO EITHER MUCH LARGER PILE SECTIONS OR DIFFERENT WALL TYPE CONCEPTS OR A DIFFERENT DESIGN APPROACH.
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**PRELIMINARY NOT FOR CONSTRUCTION**

ENG: Logan M. Lockero  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020

**GHD SERVICES INC.**

JOB NO. 11187072 FILE NO. 010  
GHD TEXAS FIRM REGISTRATION NO. 276





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	EXISTING CONTOUR INTERVAL
	FENCELINE
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	TOP OF BANK
	TOE OF SLOPE
	OVERHEAD ELECTRICAL
	GUARDRAIL
	PIPELINE
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	L.P. LIGHT POLE
	WELL
	AREA WITH MATERIAL >30 ng/kg TEQ
	ASPHALT
	CONCRETE
	GRAVEL
	PA266/AZ38-700N PILE
	HZ 1080M A PILE

SOURCE: TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	30% EPA REVIEW	MW	SC	05/28/2020
1	30% CLIENT REVIEW	MW	SC	05/15/2020

Drawn	MW	Designer	RH
Drafting	BP	Design	LL
Check		Check	

Project Coordinator	CM	Date	May 28, 2020
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Original Size	Arch D	Bar is one inch on original size drawing
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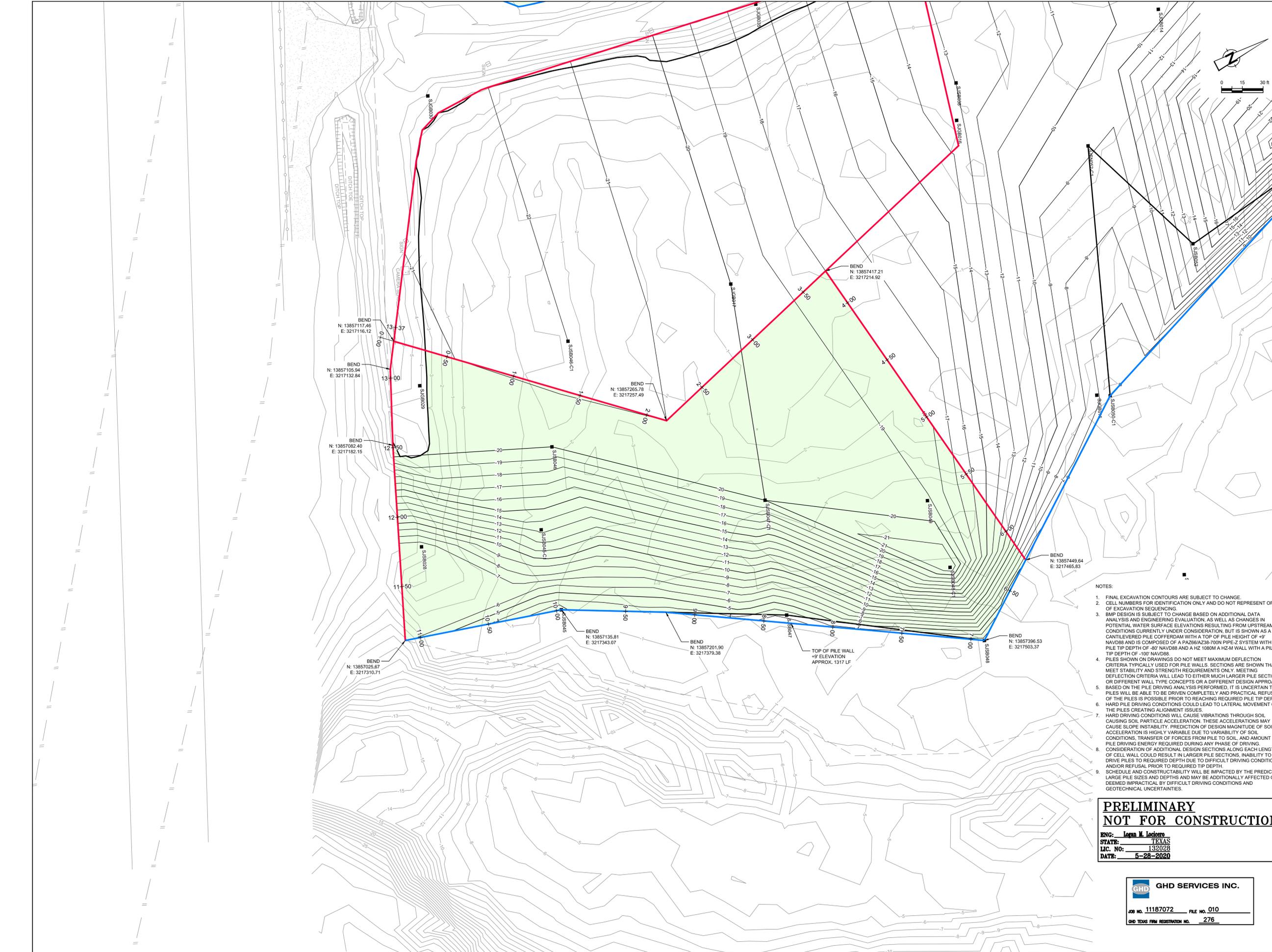
Project No. 11187072

Title  
**PILE LAYOUT PLAN CELL 3**

Sheet No.

**C-19**

Sheet - of -



- NOTES:
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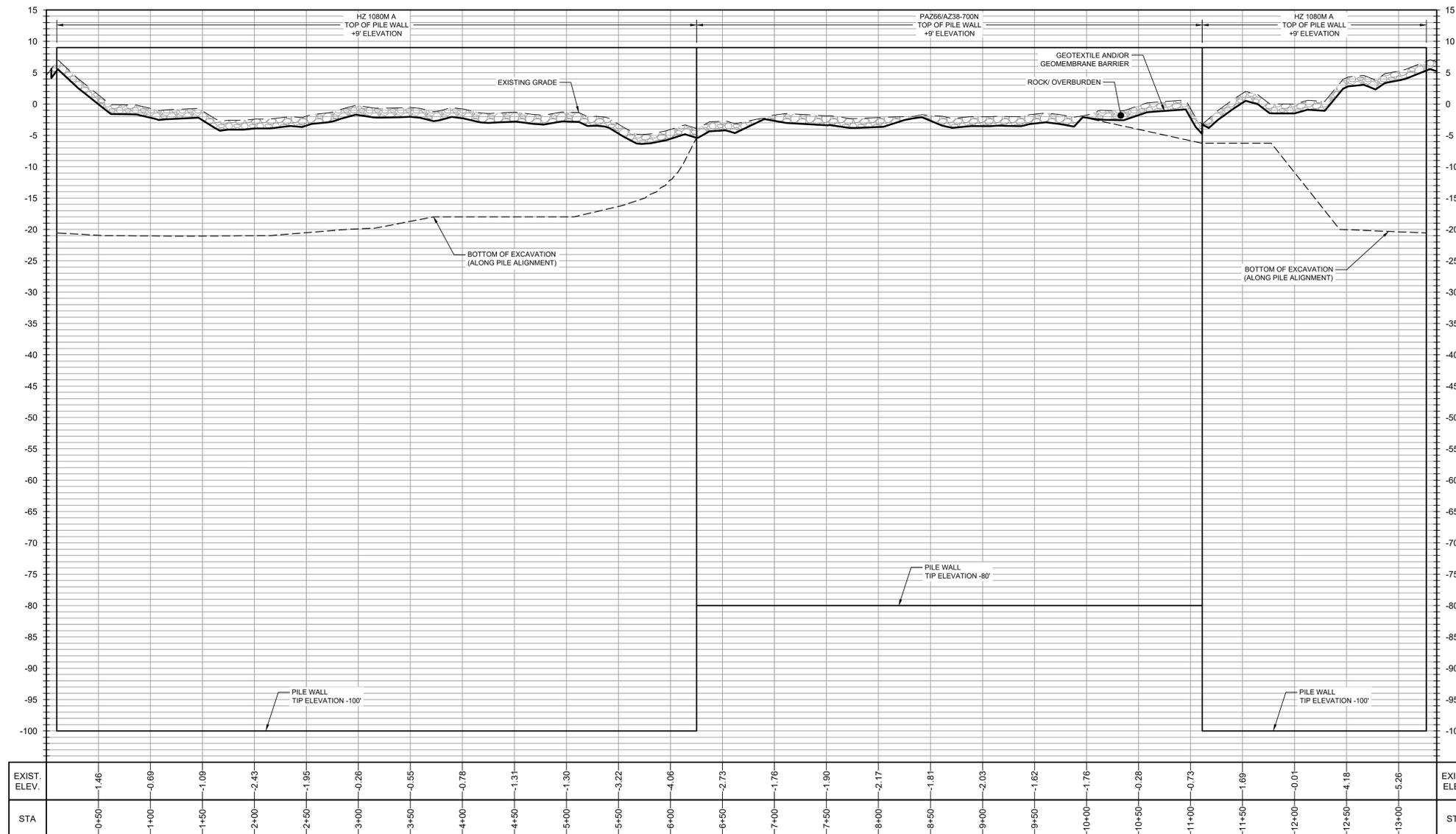
**PRELIMINARY NOT FOR CONSTRUCTION**

ENG: Logan M. Lockero  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020

GHD SERVICES INC.  
JOB NO. 11187072 FILE NO. 010  
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**PROFILE**  
HORIZ: 1" = 60'  
VERT: 1" = 10'

**NOTES:**

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**PRELIMINARY  
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ENG: Logan M. Lozano  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020



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Client  
**SAN JACINTO RIVER  
WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT  
PRELIMINARY 30% REMEDIAL DESIGN  
HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
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1	30% CLIENT REVIEW	MW	SC	05/15/2020

Drawn	MW	Designer	RH
Drafting Check	BP	Design Check	LL
Project Coordinator	CM	Date	May 28, 2020

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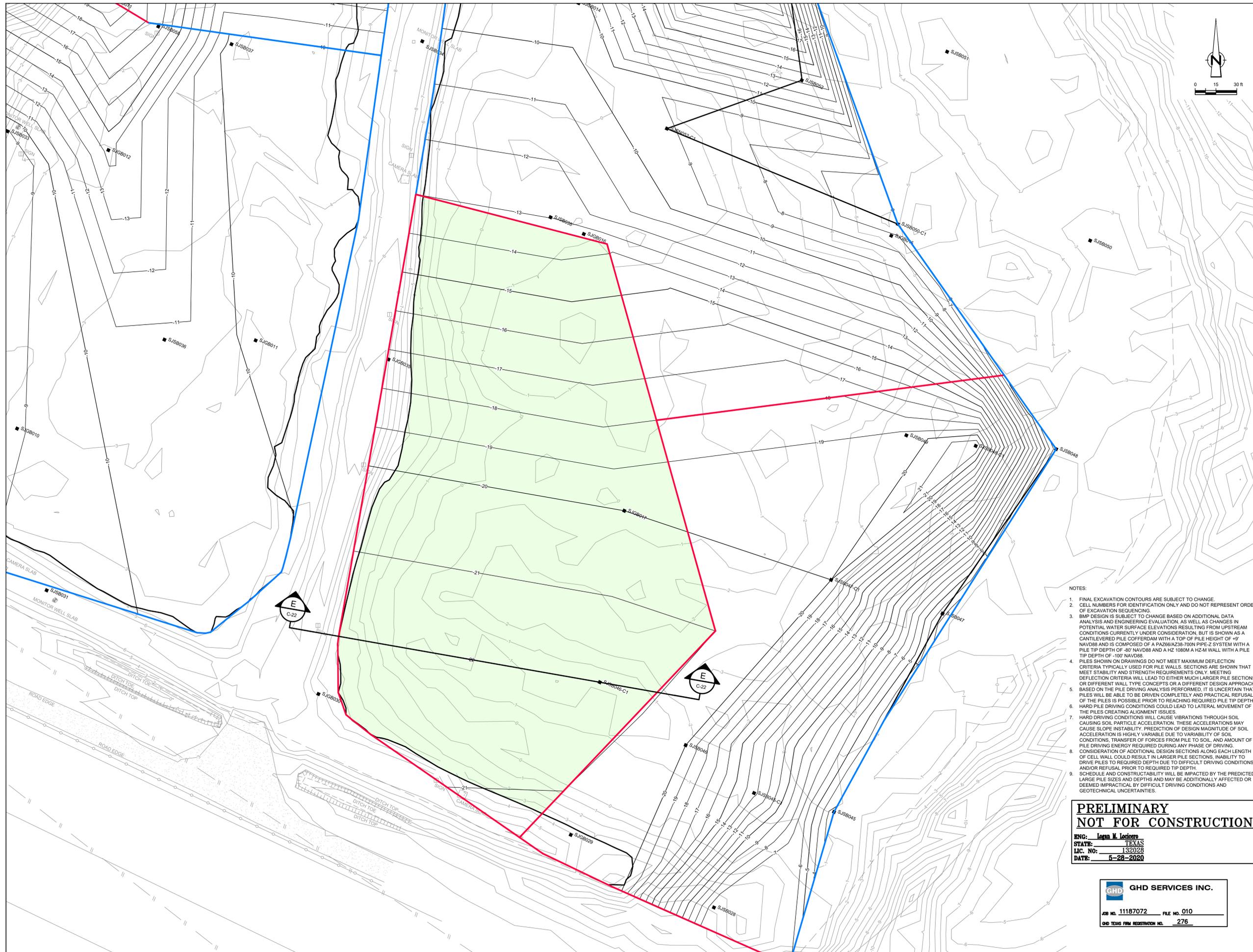
Original Size  
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Project No. 11187072  
Title

**PILE  
PROFILE  
CELL 3**

Sheet No.

**C-20**  
Sheet - of -



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Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	30% EPA REVIEW	MW	RH	05/28/2020
1	30% CLIENT REVIEW	MW	RH	05/15/2020

Drawn MW Designer RH  
 Drafting BP Design Check LL  
 Project Coordinator CM Date May 28, 2020  
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 Scale 1" = 30'  
 Original Size Arch D Bar is one inch on original size drawing  
 0 1"

Project No. 11187072  
 Title

**EXCAVATION PLAN CELL 4**

Sheet No.

**C-21**  
 Sheet - of -

- NOTES:
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**PRELIMINARY NOT FOR CONSTRUCTION**

ENG: Logan M. Lockero  
 STATES: TEXAS  
 LIC. NO: 132028  
 DATE: 5-28-2020

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	AREA WITH MATERIAL >30 ng/kg TEQ
	ASPHALT
	CONCRETE
	GRAVEL
	PAZ266/AZ38-700N PILE
	HZ 1080M A PILE

SOURCE: TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019

Client  
**SAN JACINTO RIVER WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	30% EPA REVIEW	MW	SC	05/28/2020
1	30% CLIENT REVIEW	MW	SC	05/15/2020

Drawn	MW	Designer	RH
Drafting Check	BP	Design Check	LL
Project Coordinator	CM	Date	May 28, 2020
Original Size		Scale	1" = 30'
		Bar is one inch on original size drawing	0 1"

Project No. 11187072  
Title

**PILE LAYOUT PLAN CELL 4**

Sheet No.

**C-23**

Sheet - of -



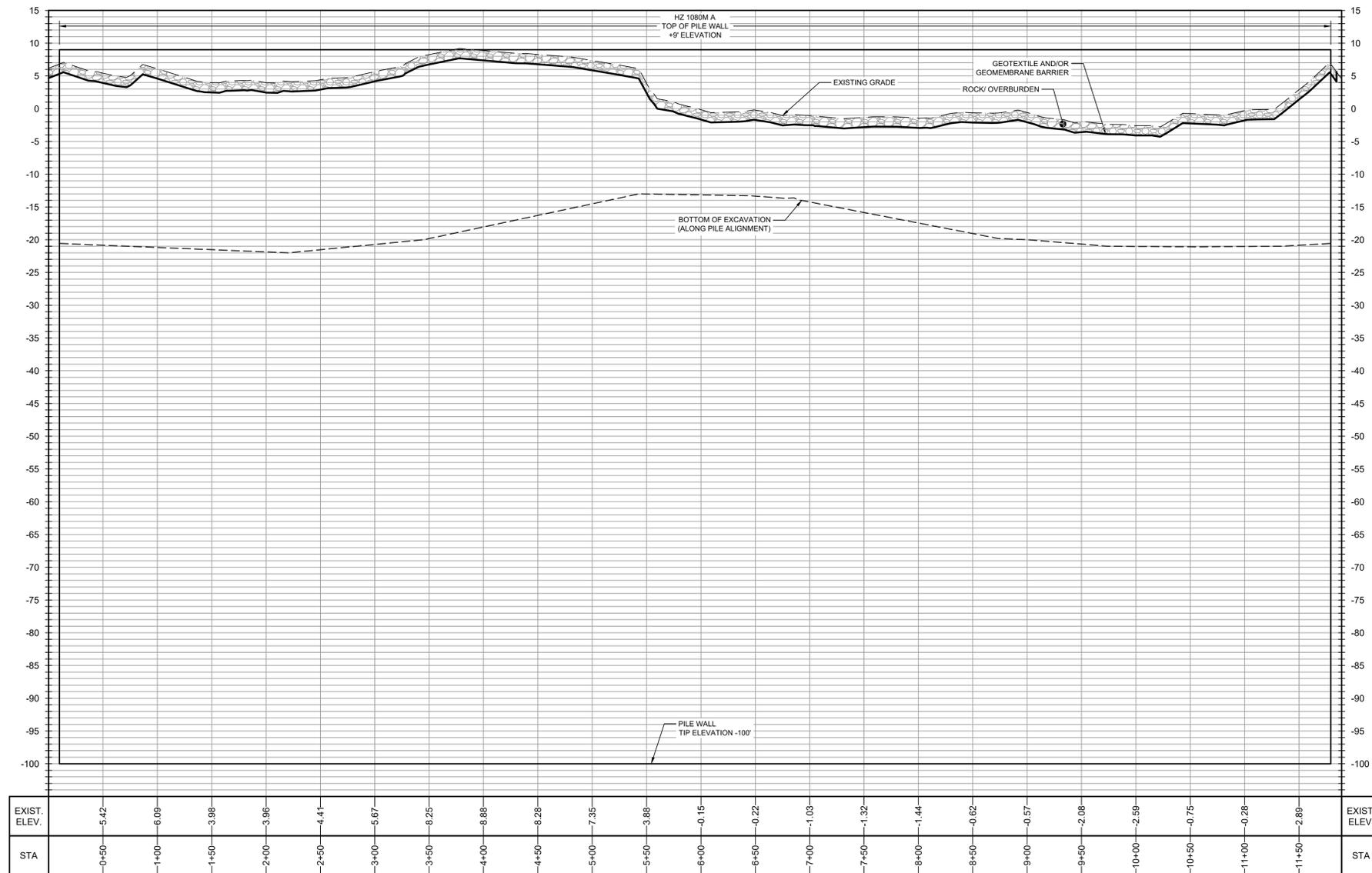
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  - BASED ON THE PILE DRIVING ANALYSIS PERFORMED, IT IS UNCERTAIN THAT PILES WILL BE ABLE TO BE DRIVEN COMPLETELY AND PRACTICAL REFUSAL OF THE PILES IS POSSIBLE PRIOR TO REACHING REQUIRED PILE TIP DEPTH. HARD PILE DRIVING CONDITIONS COULD LEAD TO LATERAL MOVEMENT OF THE PILES CREATING ALIGNMENT ISSUES.
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**PRELIMINARY NOT FOR CONSTRUCTION**  
 ENG: Logan M. Lockard  
 STATES: TEXAS  
 LIC. NO: 132028  
 DATE: 5-28-2020

GHD SERVICES INC.  
 JOB NO. 11187072 FILE NO. 010  
 GHD TEXAS FIRM REGISTRATION NO. 276



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5551 Corporate Boulevard Suite 200  
Baton Rouge Louisiana USA  
T 225 292 9007 F 225 952 2978 W www.ghd.com



**PROFILE**  
HORIZ: 1" = 60'  
VERT: 1" = 10'

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ENG: Logan M. Loggiero  
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Client  
**SAN JACINTO RIVER  
WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT  
PRELIMINARY 30% REMEDIAL DESIGN  
HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	30% EPA REVIEW	MW	SC	05/28/2020
1	30% CLIENT REVIEW	MW	SC	05/15/2020

Drawn	MW	Designer	RH
Drafting	BP	Design	LL
Check		Check	
Project	CM	Date	May 28, 2020
Coordinator		Scale	AS SHOWN
Original Size		Bar is one inch on original size drawing	0 1"

Project No. 11187072

Title  
**PILE  
PROFILE  
CELL 4**

Sheet No.

**C-24**

Sheet - of -



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	TCR CAP PERIMETER
	EXISTING CONTOUR INTERVAL
	FENCELINE
	SHORELINE
	TOP OF BANK
	TOE OF SLOPE
	OVERHEAD ELECTRICAL
	GUARDRAIL
	PIPELINE
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**SAN JACINTO RIVER WASTE PITS**

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**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

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Drawn	MW	Designer	RH
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Project Coordinator	CM	Date	May 28, 2020
Original Size	Arch D	Scale	1" = 30'
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Project No. 11187072

Title  
**EXCAVATION PLAN CELL 5**

Sheet No.

**C-25**

Sheet - of -



- NOTES:
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**PRELIMINARY NOT FOR CONSTRUCTION**

ENG: Logan M. Lockard  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020

GHD SERVICES INC.  
JOB NO. 11187072 FILE NO. 010  
GHD TEXAS PILE REGISTRATION NO. 276



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Client  
**SAN JACINTO RIVER WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

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Drawn	MW	Designer	RH
Drafting Check	BP	Design Check	LL
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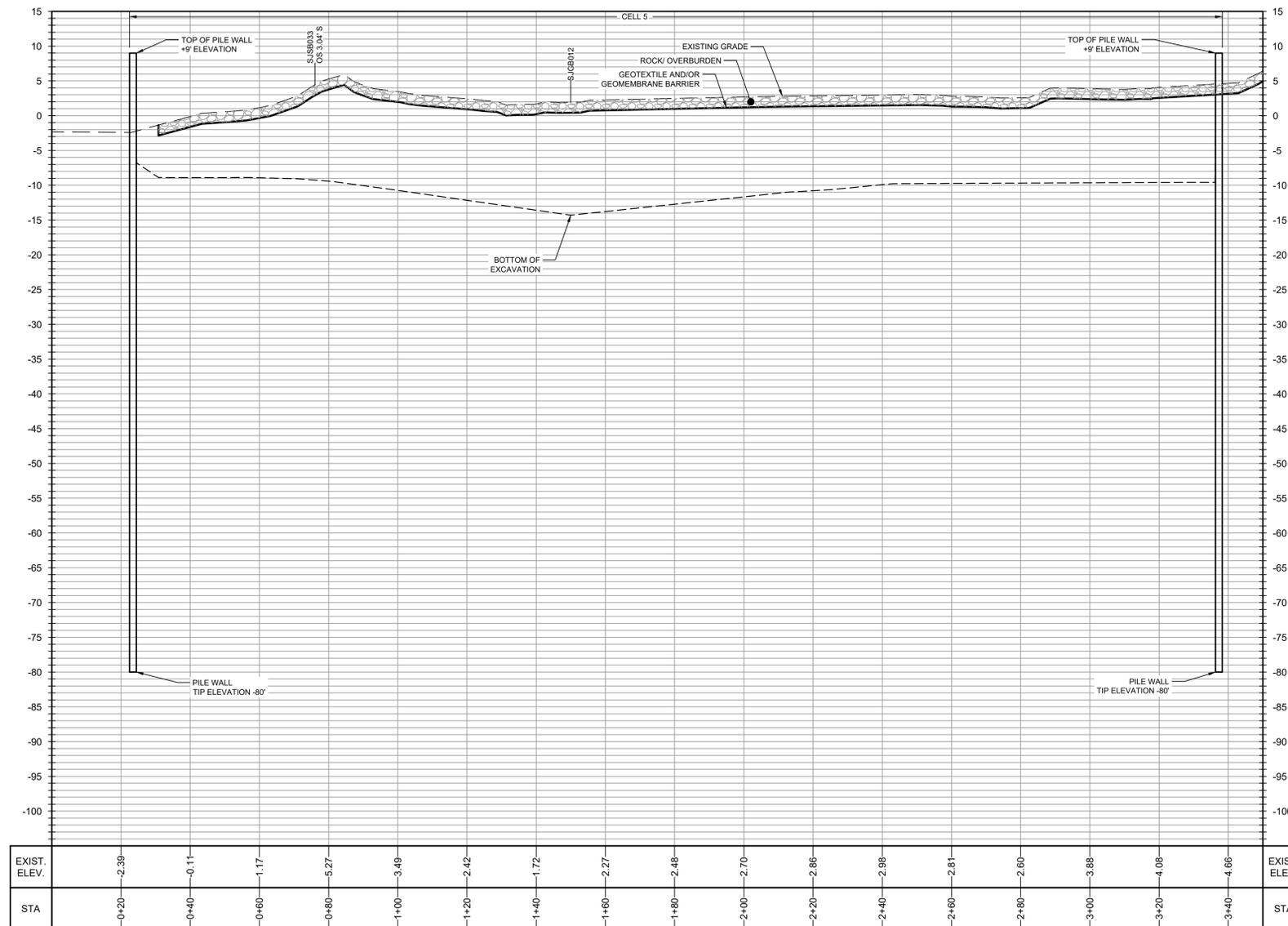
Project No. 11187072  
Title

**EXCAVATION SECTION CELL 5**

Sheet No.

**C-26**

Sheet - of -



**SECTION F**  
HORIZ: 1"=20'  
VERT: 1"=10'  
C-25

NOTES:

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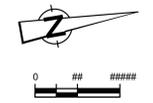
**PRELIMINARY NOT FOR CONSTRUCTION**

ENG: Logan M. Loggiero  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020





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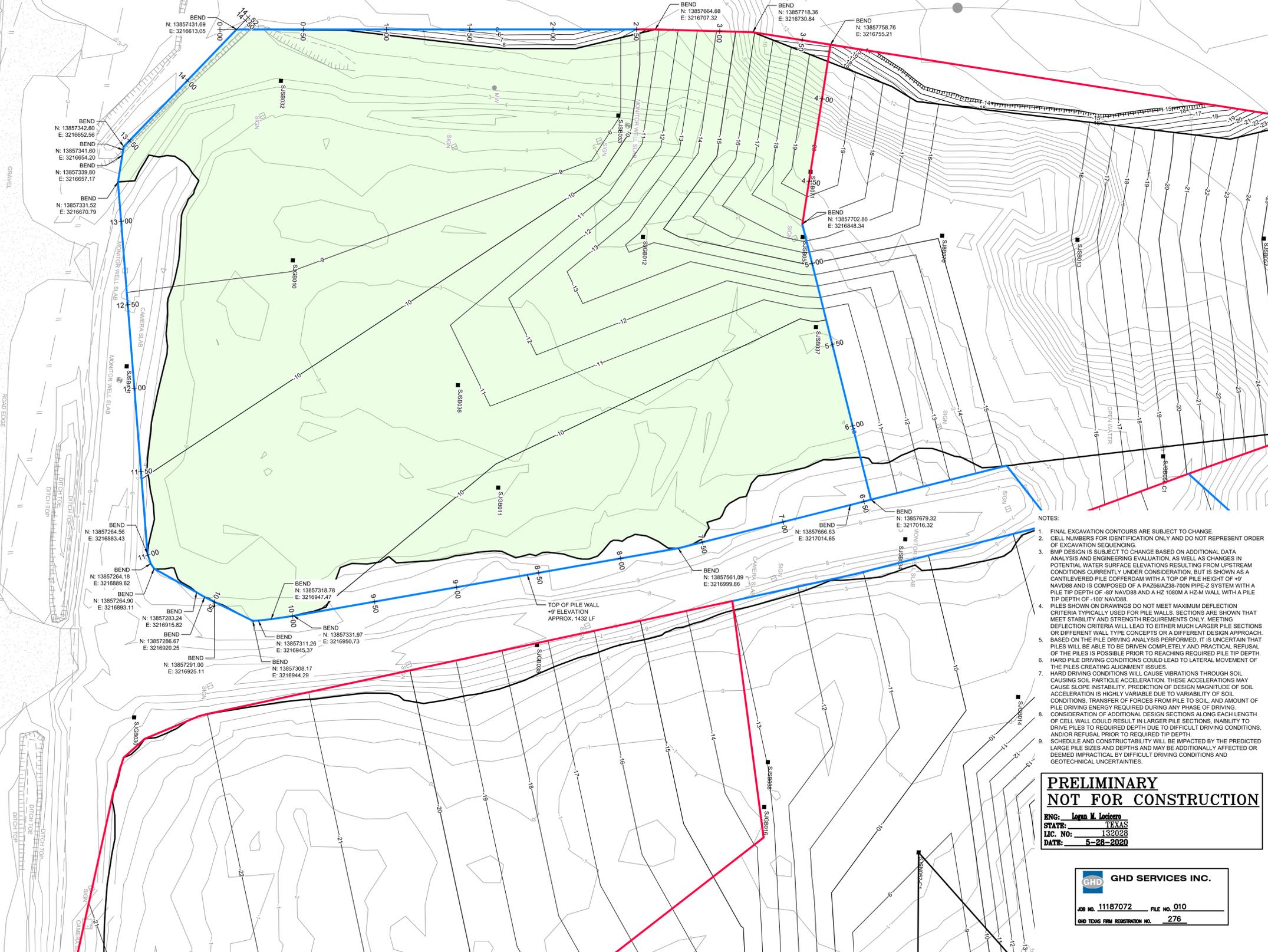
INTERSTATE 10 SAN JACINTO RIVER BRIDGE

GRAVEL

ROAD EDGE

ROAD EDGE

DITCH TOP



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Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

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**PRELIMINARY NOT FOR CONSTRUCTION**

ENG: Logan M. Lockport  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020



JOB NO. 11187072 FILE NO. 010  
GHD TEXAS PILE REGISTRATION NO. 276

No.	Issue	Drawn	Approved	Date
2	30% EPA REVIEW	MW	SC	05/28/2020
1	30% CLIENT REVIEW	MW	SC	05/15/2020

Drawn	MW	Designer	RH
Drafting	BP	Design	LL

Project Coordinator	CM	Date	May 28, 2020
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Original Size	Arch D
Bar is one inch on original size drawing	

Project No. 11187072  
Title

**PILE LAYOUT PLAN CELL 5**

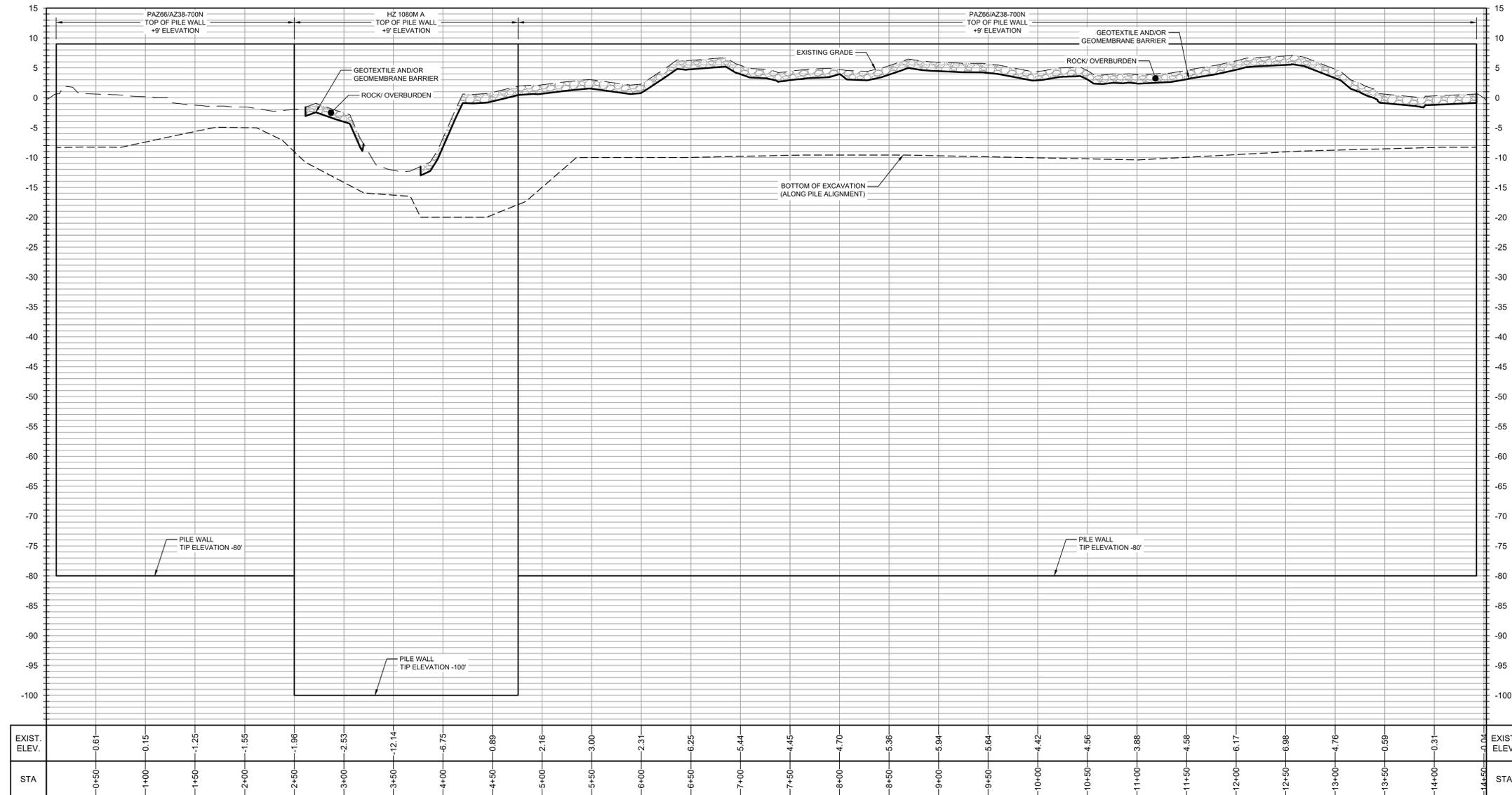
Sheet No.

**C-27**

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**PROFILE**  
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Client  
**SAN JACINTO RIVER  
WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT  
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Project No. 11187072  
Title

**PILE  
PROFILE  
CELL 5**

Sheet No.

**C-28**



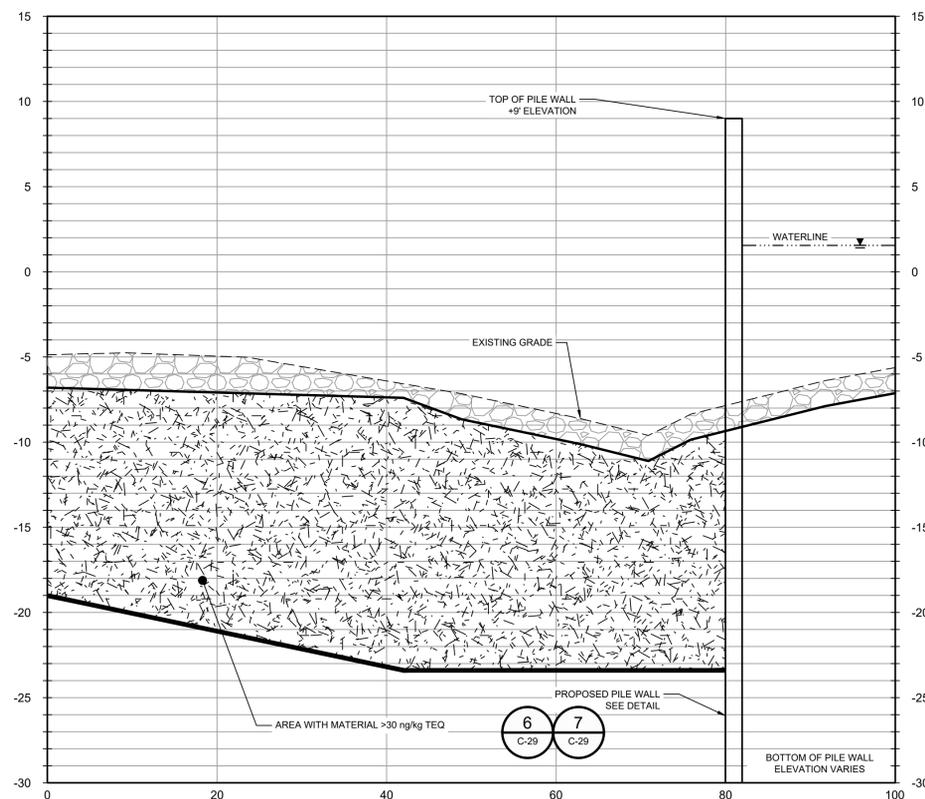
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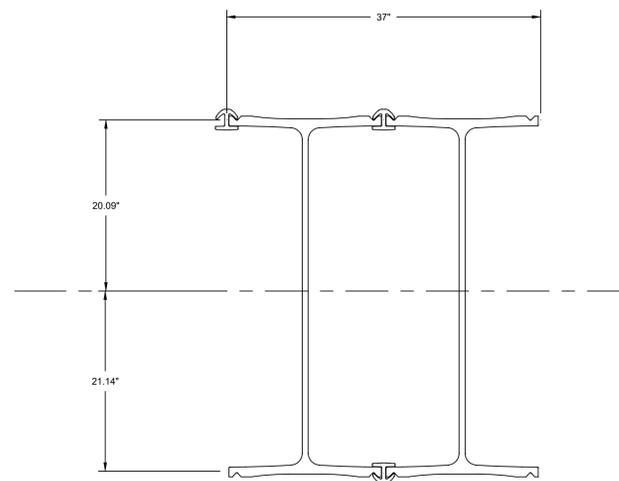
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No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer RH		
Drafting Check	BP	Design Check LL		
Project Coordinator	CM	Date May 28, 2020		
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Original Size	Arch D Bar is one inch on original size drawing 0 1"			

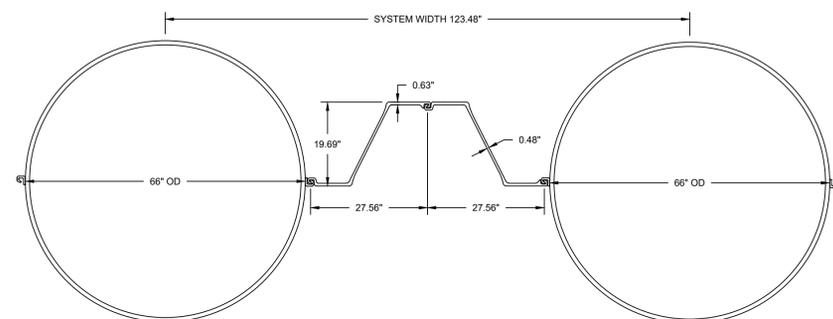
Project No. 11187072  
Title  
**PILE DETAILS**  
Sheet No.  
**C-29**  
Sheet - of -



SECTION G TYPICAL PILE  
N.T.S.



DETAIL 6 HZ 1080M A PILE WALL  
N.T.S.



DETAIL 7 PAZ66/AZ38-700N PILE WALL  
N.T.S.

NOTES:

- BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.
- BMP DESIGN IS SUBJECT TO CHANGE BASED ON ADDITIONAL DATA ANALYSIS AND ENGINEERING EVALUATION, AS WELL AS CHANGES IN POTENTIAL WATER SURFACE ELEVATIONS RESULTING FROM UPSTREAM CONDITIONS CURRENTLY UNDER CONSIDERATION, BUT IS SHOWN AS A CANTILEVERED PILE COFFERDAM WITH A TOP OF PILE HEIGHT OF +9' NAVD88 AND IS COMPOSED OF A PAZ66/AZ38-700N PIPE-Z SYSTEM WITH A PILE TIP DEPTH OF -80' NAVD88 AND A HZ 1080M A HZ-M WALL WITH A PILE TIP DEPTH OF -100' NAVD88.
- PILES SHOWN ON DRAWINGS DO NOT MEET MAXIMUM DEFLECTION CRITERIA TYPICALLY USED FOR PILE WALLS. SECTIONS ARE SHOWN THAT MEET STABILITY AND STRENGTH REQUIREMENTS ONLY. MEETING DEFLECTION CRITERIA WILL LEAD TO EITHER MUCH LARGER PILE SECTIONS OR DIFFERENT WALL TYPE CONCEPTS OR A DIFFERENT DESIGN APPROACH. BASED ON THE PILE DRIVING ANALYSIS PERFORMED, IT IS UNCERTAIN THAT PILES WILL BE ABLE TO BE DRIVEN COMPLETELY AND PRACTICAL REFUSAL OF THE PILES IS POSSIBLE PRIOR TO REACHING REQUIRED PILE TIP DEPTH.
- HARD PILE DRIVING CONDITIONS COULD LEAD TO LATERAL MOVEMENT OF THE PILES CREATING ALIGNMENT ISSUES.
- HARD DRIVING CONDITIONS WILL CAUSE VIBRATIONS THROUGH SOIL CAUSING SOIL PARTICLE ACCELERATION. THESE ACCELERATIONS MAY CAUSE SLOPE INSTABILITY. PREDICTION OF DESIGN MAGNITUDE OF SOIL ACCELERATION IS HIGHLY VARIABLE DUE TO VARIABILITY OF SOIL CONDITIONS, TRANSFER OF FORCES FROM PILE TO SOIL, AND AMOUNT OF PILE DRIVING ENERGY REQUIRED DURING ANY PHASE OF DRIVING.
- CONSIDERATION OF ADDITIONAL DESIGN SECTIONS ALONG EACH LENGTH OF CELL WALL COULD RESULT IN LARGER PILE SECTIONS, INABILITY TO DRIVE PILES TO REQUIRED DEPTH DUE TO DIFFICULT DRIVING CONDITIONS, AND/OR REFUSAL PRIOR TO REQUIRED TIP DEPTH.
- SCHEDULE AND CONSTRUCTABILITY WILL BE IMPACTED BY THE PREDICTED LARGE PILE SIZES AND DEPTHS AND MAY BE ADDITIONALLY AFFECTED OR DEEMED IMPRACTICAL BY DIFFICULT DRIVING CONDITIONS AND GEOTECHNICAL UNCERTAINTIES.

**PRELIMINARY NOT FOR CONSTRUCTION**

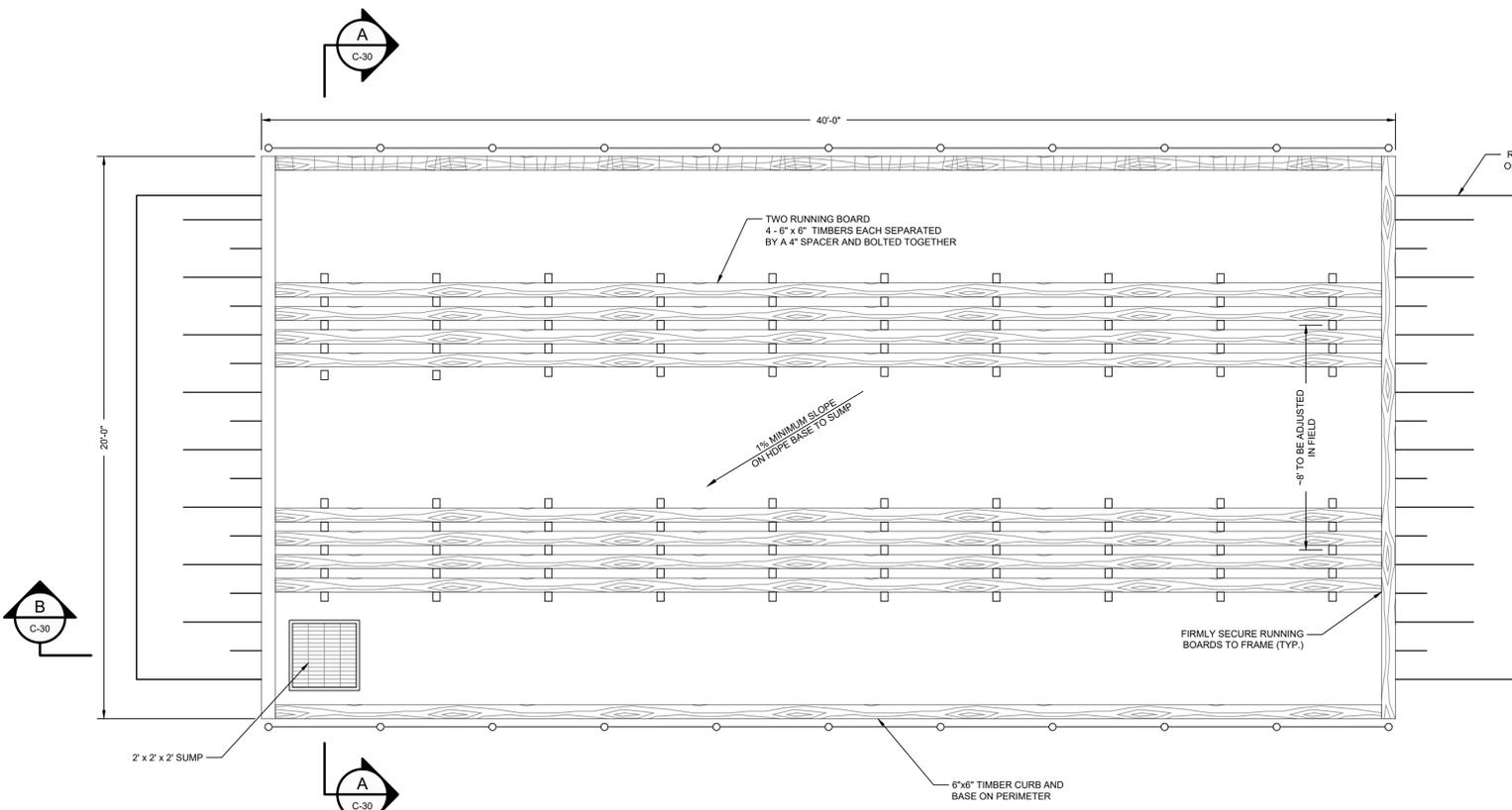
ENG: Logan M. Lockard  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020



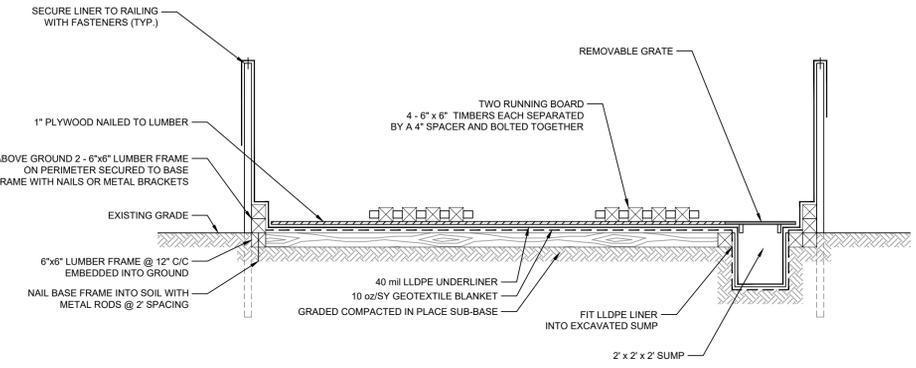


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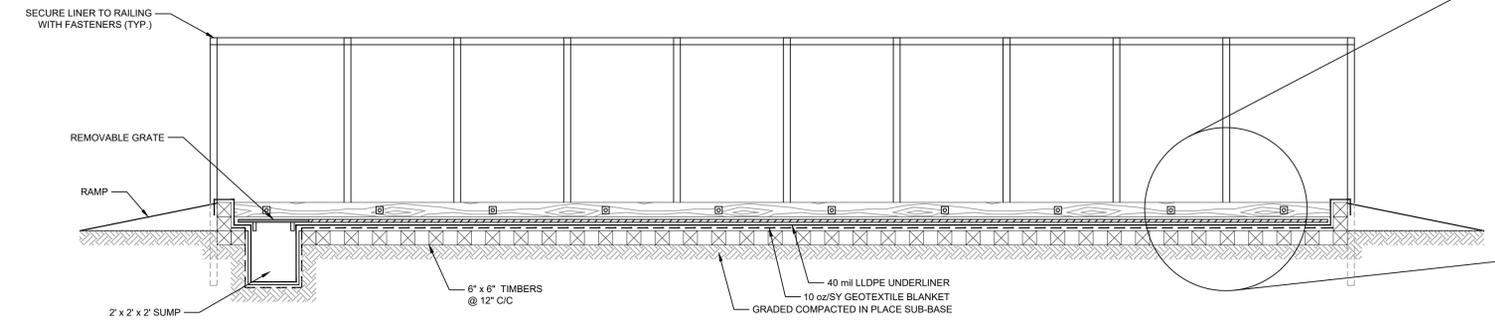
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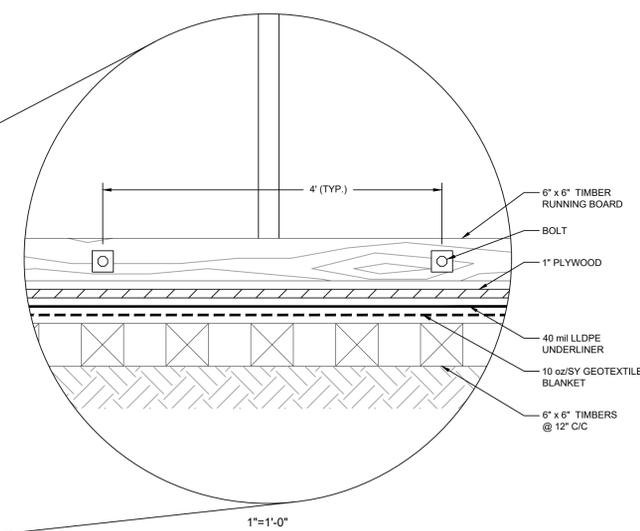
**PLAN**  
1"=3'-0"



**SECTION A**  
1"=3'-0"



**SECTION B**  
1"=3'-0"



1"=1'-0"

**PRELIMINARY  
NOT FOR CONSTRUCTION**  
ENG: Logan M. Lozano  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020

**GHD SERVICES INC.**  
JOB NO. 11187072 FILE NO. 010  
GHD TEXAS FIRM REGISTRATION NO. 276

**DETAIL 8 TEMPORARY EQUIPMENT DECONTAMINATION PAD**  
1"=3'-0"

Client  
**SAN JACINTO RIVER  
WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT  
PRELIMINARY 30% REMEDIAL DESIGN  
HARRIS COUNTY, TEXAS**

2	30% EPA REVIEW	MW	RH	05/28/2020
1	30% CLIENT REVIEW	MW	RH	05/15/2020

Drawn **MW** Designer **RH**

Drafting Check **BP** Design Check **LL**

Project Coordinator **CM** Date **May 28, 2020**

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Original Size **Arch D** Bar is one inch on original size drawing 0 1"

Project No. **11187072**  
Title

**TYPICAL DETAILS  
1 OF 3**

Sheet No.

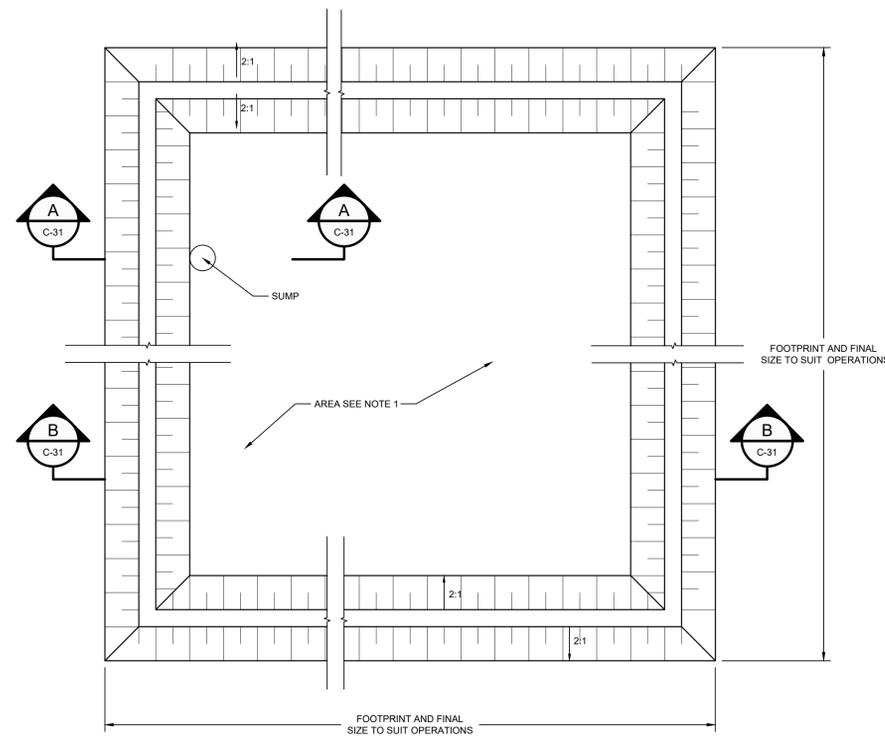
**C-30**

Sheet - of -

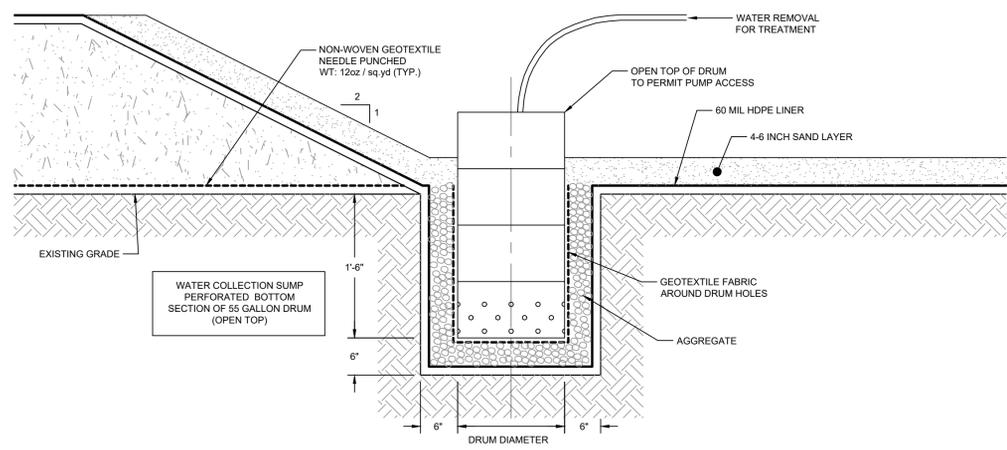


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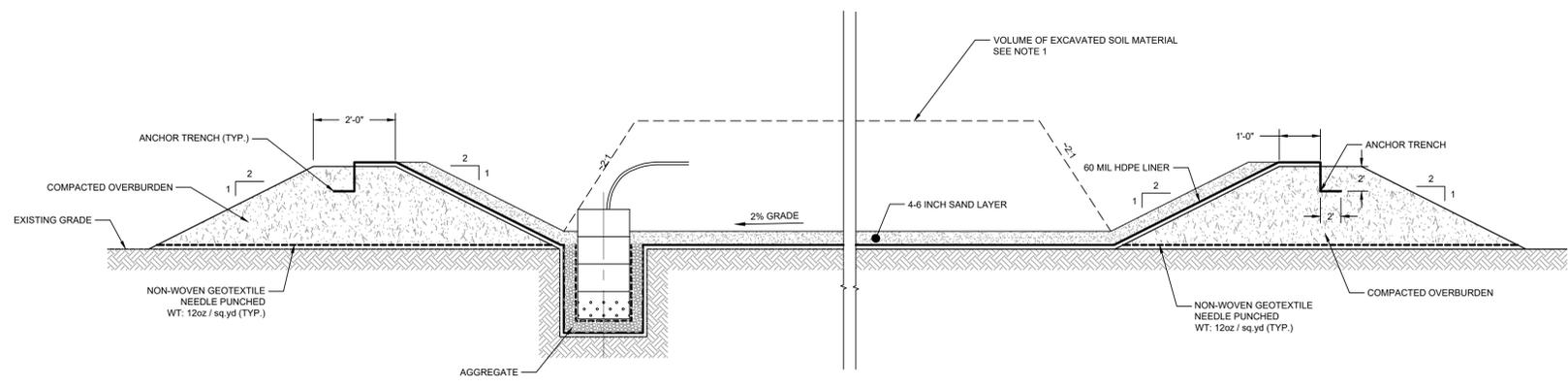


**PLAN**  
N.T.S.



**SECTION A SUMP**  
N.T.S.

NOTES:  
1. TYPICAL DETAILS SHOWN AT DEWATERING AND SOLIDIFICATION AREA MAY BE REVISED BY THE CONTRACTOR. CONTRACTOR'S REVISED DETAILS SHALL BE SUBMITTED FOR REVIEW PRIOR TO CONSTRUCTION.



**SECTION B**  
N.T.S.

**DETAIL 9 TEMPORARY DEWATERING FACILITY**  
N.T.S.

**PRELIMINARY  
NOT FOR CONSTRUCTION**  
ENG: Logan M. Lucero  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020

**GHD SERVICES INC.**  
JOB NO. 11187072 FILE NO. 010  
GHD TEXAS FIRM REGISTRATION NO. 276

Client  
**SAN JACINTO RIVER  
WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT  
PRELIMINARY 30% REMEDIAL DESIGN  
HARRIS COUNTY, TEXAS**

2	30% EPA REVIEW	MW	RH	05/28/2020
1	30% CLIENT REVIEW	MW	RH	05/15/2020
No.	Issue	Drawn	Approved	Date

Drawn	MW	Designer	RH
Drafting	BP	Design	LL
Check		Check	
Project Coordinator	CM	Date	May 28, 2020

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Project No. 11187072  
Title

**TYPICAL DETAILS  
2 OF 3**

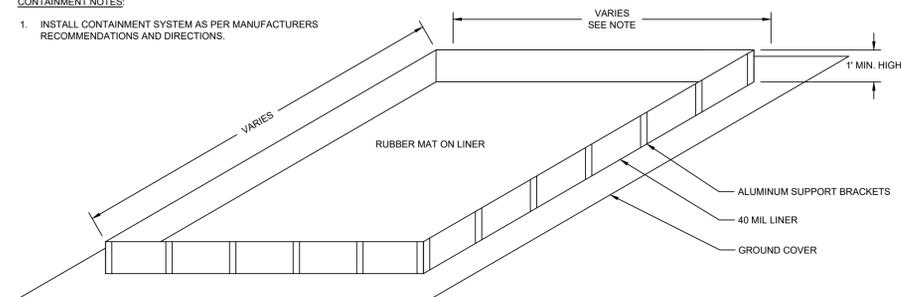
Sheet No.  
**C-31**  
Sheet - of -



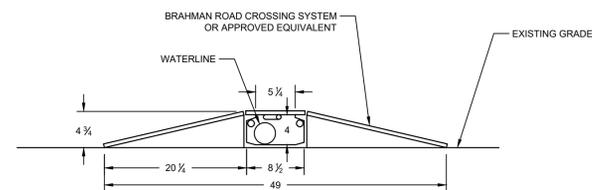
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**CONTAINMENT NOTES**

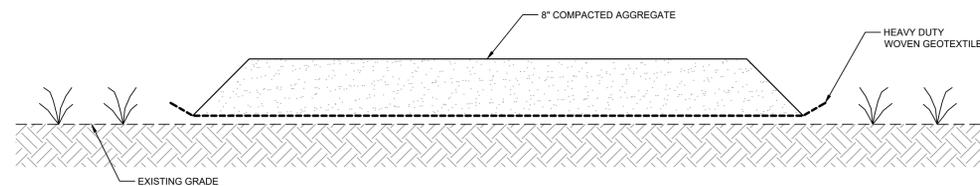
1. INSTALL CONTAINMENT SYSTEM AS PER MANUFACTURERS RECOMMENDATIONS AND DIRECTIONS.



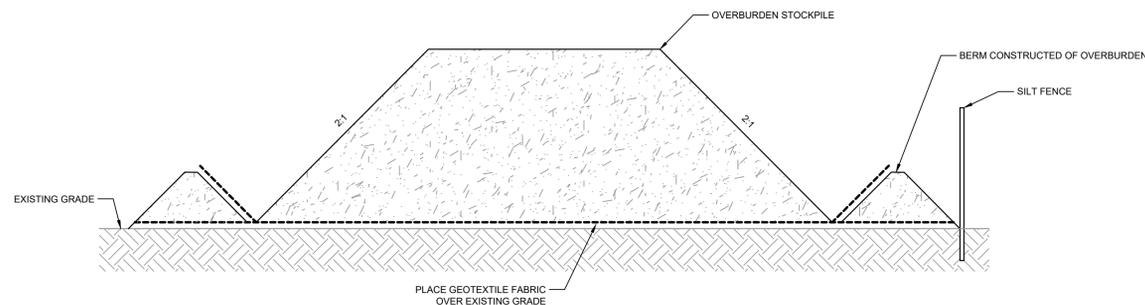
**DETAIL 10 WATER STORAGE TANK CONTAINMENT PAD**  
N.T.S.



**DETAIL 11 TEMPORARY PIPE CROSSING PROTECTION**  
1"=1'-0"



**DETAIL 12 TEMPORARY GRAVEL ACCESS ROAD**  
N.T.S.



**DETAIL 13 TEMPORARY OVERBURDEN STOCKPILE**  
N.T.S.

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Client **SAN JACINTO RIVER WASTE PITS**  
Project **NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	30% EPA REVIEW	MW	RH	05/28/2020
1	30% CLIENT REVIEW	MW	RH	05/15/2020

Drawn **MW** Designer **RH**  
Drafting Check **BP** Design Check **LL**  
Project Coordinator **CM** Date **May 28, 2020**  
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Scale **AS SHOWN**  
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0 1"

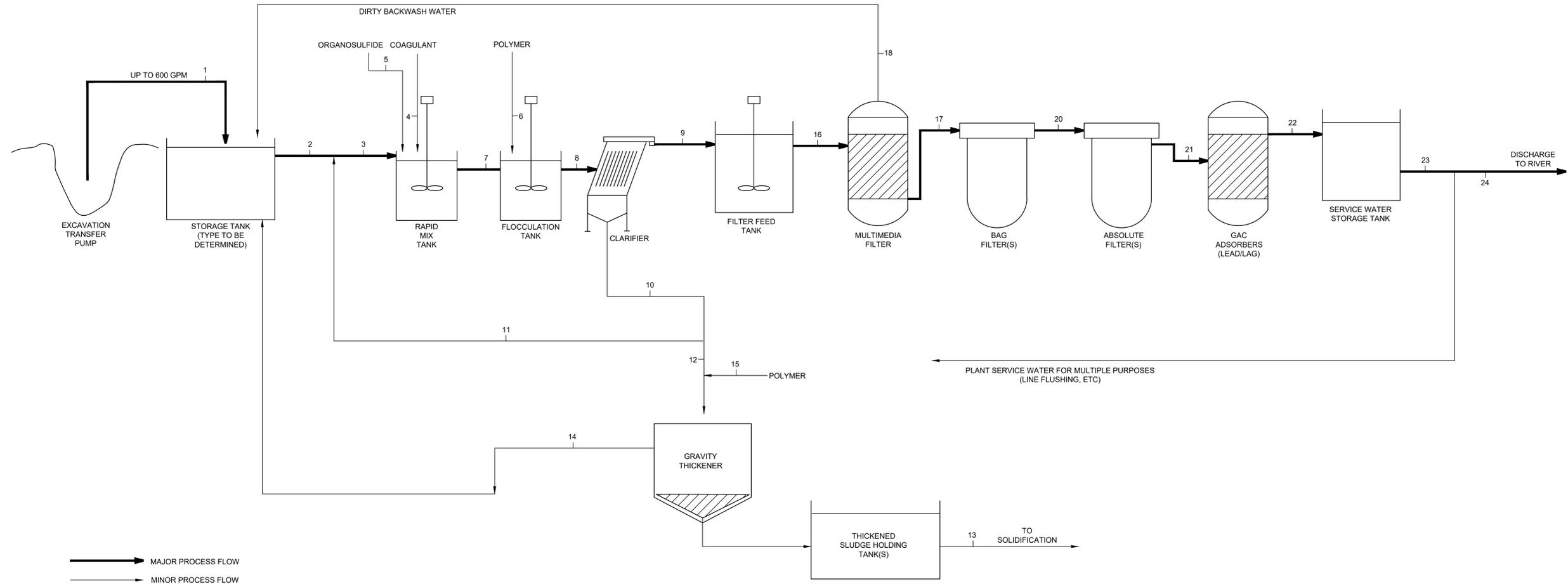
**PRELIMINARY NOT FOR CONSTRUCTION**  
ENG: Logan M. Lucero  
STATE: TEXAS  
LIC. NO: 132028  
DATE: 5-28-2020

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Project No. **11187072**  
Title **TYPICAL DETAILS 3 OF 3**  
Sheet No. **C-32**  
Sheet - of -



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WATER TREATMENT PLANT PROCESS STREAMS

Streams	Units	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	20	21	22	23	24
		Contact Water	Storage Tank Effluent	Rapid Mix Tank Influent	Coagulant Feed	Organosulfide Feed	Polymer Feed	Flocculation Tank Influent	Flocculation Tank Effluent	Clarifier Effluent	Clarifier Underflow	Sludge Recycle	Sludge to Thickener	Sludge to Solidification	Decant to Storage Tank(s)	Polymer Feed	Multimedia Filter	Multimedia Filter Effluent	Multimedia Filter Backwash	Absolute Filter Feed	GAC Adsorber Feed	Effluent Storage Tank Feed	Service Water Storage Tank Effluent	Discharge
Volumetric Flow	gpm	600	421	772	0.02	0.03	0.2	773	773	304	468	351	117	17	100	0.059	304	21	21	304	304	304	304	284
Total Mass Flow	lb/hr	300,240	210,805	386,519	14	14	107	394,369	386,660	152,351	241,313	180,985	60,328	10,013	50,227	30	152,351	10,458	10,458	152,347	152,347	152,347	152,347	141,888
Suspended Solids	%	0.41%	0.29%	0.61%	0.50%	0.50%	1.00%	0.61%	0.61%	0.00%	1.00%	1.00%	1.00%	6.00%	0.01%	1.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%
Chemical Feed	ppm				50.0	50.0	500.0									500.0								
Chem Solids Generation	lb/lb				0.3	0.3	0.01									0.01								
Chem Solids Generation	lb/hr				3.2	3.2	1.1									0.0								
Mass Flow Liquid	lb/hr	299,024	210,193	384,150	11	11	105	391,951	384,290	152,347	238,900	179,175	59,725	9,412	50,225	29	0	10,458	10,457	152,347	152,347	152,347	152,347	141,888
Mass Flow Solids	lb/hr	1,216	612	2,369	3.2	3.2	1.1	2,418	2,370	4.6	2,413	1,810	603	601	2.5	0.3	4.6	0.02	1.5	0.6	0.3	0.3	0.3	0.3
Specific Gravity		1.0	1.0	1.0	1.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Density	lb/cf	62.4	62.4	62.4	81.1	62.4	62.4	63.6	62.4	62.4	64.3	64.3	64.3	74.9	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4

**PRELIMINARY  
NOT FOR CONSTRUCTION**

ENG: Keith Brocken  
STATE: TEXAS  
LIC. NO: 130378  
DATE: 5-28-2020



NOTE:  
1. SOME PROCESS FLOWS ARE AVERAGED OVER ESTIMATED TOTAL OPERATING CYCLE. PROCESS FLOW/MASS BALANCE SHOULD NOT BE USED FOR EQUIPMENT SIZING PURPOSES  
2. TREATMENT IS 300 GPM PLUS RECYCLE FLOWS  
3. THE TREATMENT SYSTEM DESIGNS ARE PRELIMINARY AND SUBJECT TO CHANGE.

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Client  
**SAN JACINTO RIVER  
WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT  
PRELIMINARY 30% REMEDIAL DESIGN  
HARRIS COUNTY, TEXAS**

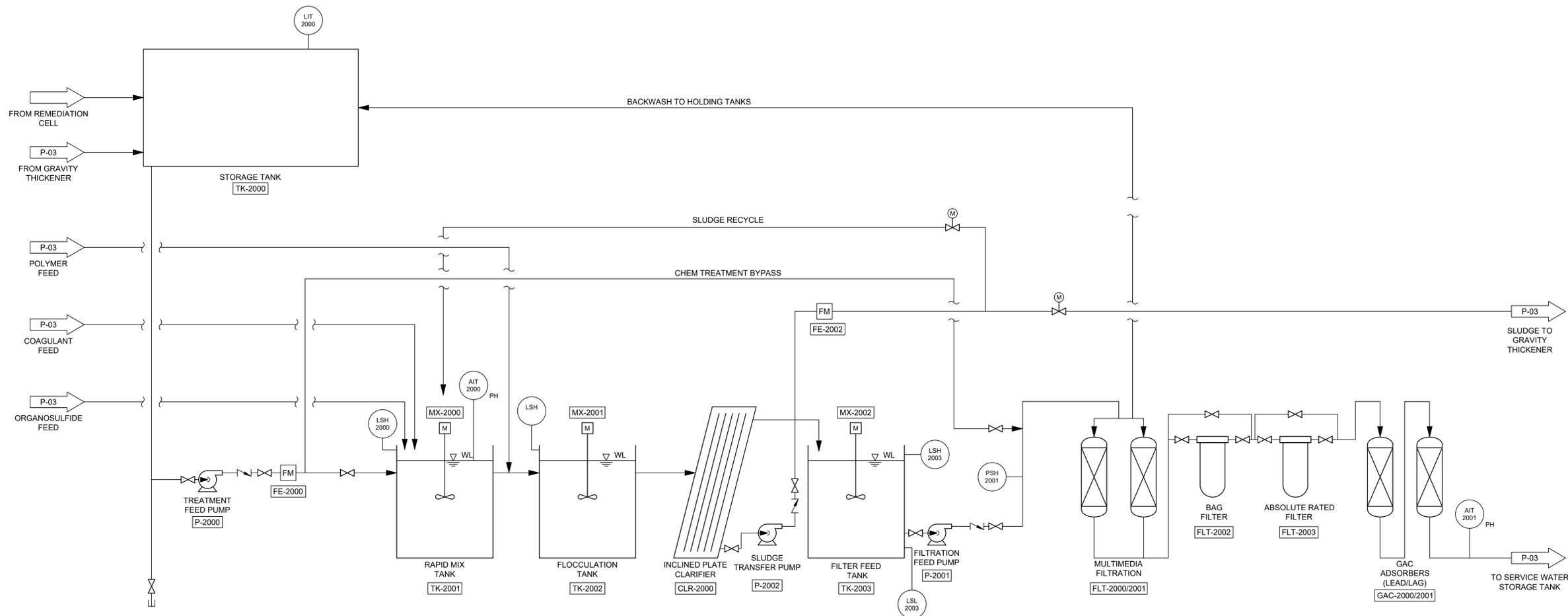
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1	30% CLIENT REVIEW	BP	NF	05/15/2020	
No.	Issue	Drawn	Approved	Date	
Drawn	BP	Designer	KJ		
Drafting Check	MW	Design Check	NF		
Project Coordinator	CM	Date	May 28, 2020		
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Original Size				Bar is one inch on original size drawing 0 1"	

Project No. 11187072  
Title  
**WATER TREATMENT SYSTEM  
APPROACH A  
PROCESS FLOW DIAGRAM/  
MASS BALANCE**

Sheet No.  
**P-01**  
Sheet - of -



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Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	30% EPA REVIEW	BP	NF	05/28/2020
1	30% CLIENT REVIEW	BP	NF	05/15/2020

No.	Issue	Drawn	Approved	Date
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Drawn BP Designer KJ

Drafting MW Design Check NF

Project Coordinator CM Date May 28, 2020

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Original Size  
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Project No. 11187072

Title  
**WATER TREATMENT SYSTEM APPROACH A P&ID (1 OF 2)**

Sheet No.

**P-02**

Sheet - of -

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ENG: Keith Brockman  
STATE: TEXAS  
LIC. NO: 130378  
DATE: 5-28-2020

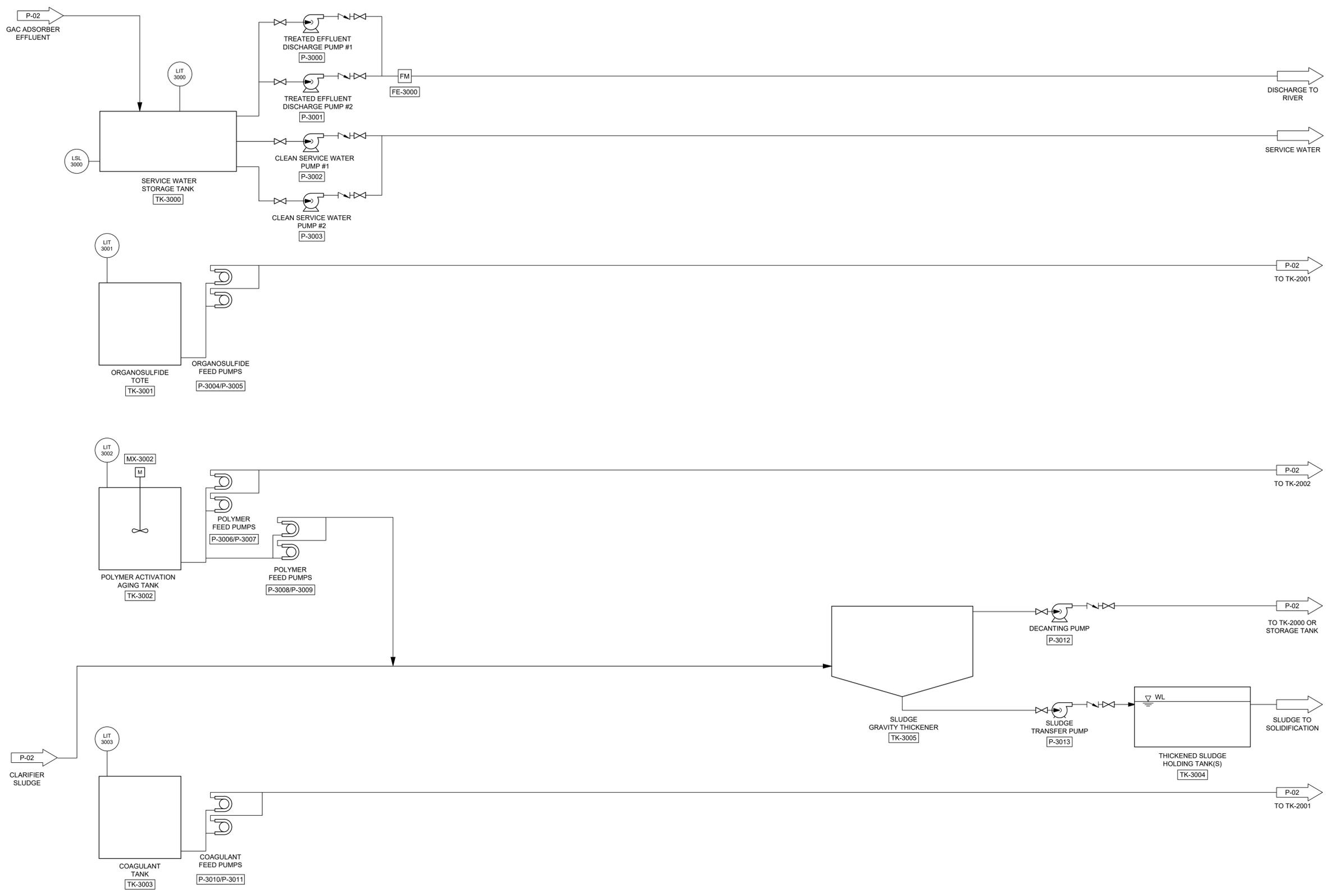
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JOB NO. 11187072 FILE NO. 010  
GHD TEXAS PERM REGISTRATION NO. 276

NOTE:  
1. FOR CLARITY NOT ALL SYSTEM ELEMENTS (E.G. VALVES, PIPE SIZES) HAVE BEEN SHOWN. P&IDs ARE CONCEPTUAL ONLY AND ARE TO BE FINALIZED BY CONTRACTOR.  
2. THE TREATMENT SYSTEM DESIGNS ARE PRELIMINARY AND SUBJECT TO CHANGE.



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NOTE:  
1. FOR CLARITY NOT ALL SYSTEM ELEMENTS (E.G. VALVES, PIPE SIZES) HAVE BEEN SHOWN. P&IDs ARE CONCEPTUAL ONLY AND ARE TO BE FINALIZED BY CONTRACTOR.  
2. THE TREATMENT SYSTEM DESIGNS ARE PRELIMINARY AND SUBJECT TO CHANGE.

**PRELIMINARY  
NOT FOR CONSTRUCTION**  
ENG: Keith Brechen  
STATE: TEXAS  
LIC. NO: 130378  
DATE: 5-28-2020

**GHD SERVICES INC.**  
JOB NO. 11187072 FILE NO. 010  
GHD TEXAS PPM REGISTRATION NO. 276

Client  
**SAN JACINTO RIVER  
WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT  
PRELIMINARY 30% REMEDIAL DESIGN  
HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	30% EPA REVIEW	BP	NF	05/28/2020
1	30% CLIENT REVIEW	BP	NF	05/15/2020

Drawn	BP	Designer	KJ
Drafting Check	MW	Design Check	NF
Project Coordinator	CM	Date	May 28, 2020
		Scale	N.T.S.

Original Size  
**Arch D**  
Bar is one inch on original size drawing  
0 1"

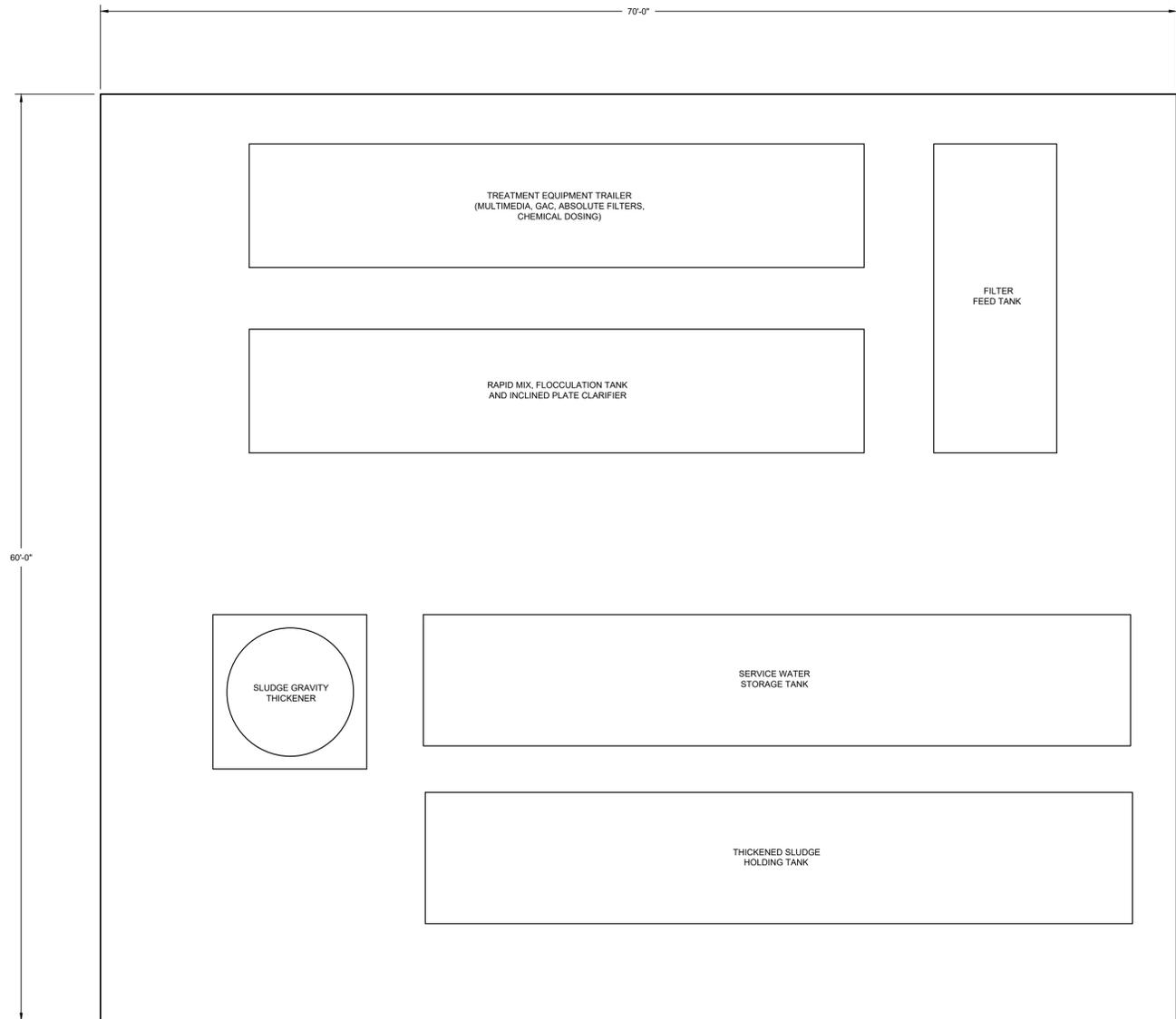
Project No. 11187072  
Title  
**WATER TREATMENT SYSTEM  
APPROACH A  
P&ID  
(2 OF 2)**

Sheet No.  
**P-03**  
Sheet - of -



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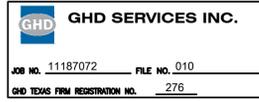
Client  
**SAN JACINTO RIVER  
 WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT  
 PRELIMINARY 30% REMEDIAL DESIGN  
 HARRIS COUNTY, TEXAS**

2	30% EPA REVIEW	BP	NF	05/28/2020
1	30% CLIENT REVIEW	MW	NF	05/15/2020
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	KJ	
Drafting	BP	Design	NF	
Check		Check		
Project	CM	Date	May 28, 2020	
Coordinator		Scale	N.T.S.	
Original Size	Bar is one inch on original size drawing			
<b>Arch D</b>	0 1"			

**PRELIMINARY  
 NOT FOR CONSTRUCTION**

ENG: Keith Broehm  
 STATE: TEXAS  
 LIC. NO: 130378  
 DATE: 5-28-2020



Project No. 11187072  
 Title  
**WATER TREATMENT SYSTEM  
 APPROACH A  
 PLAN**

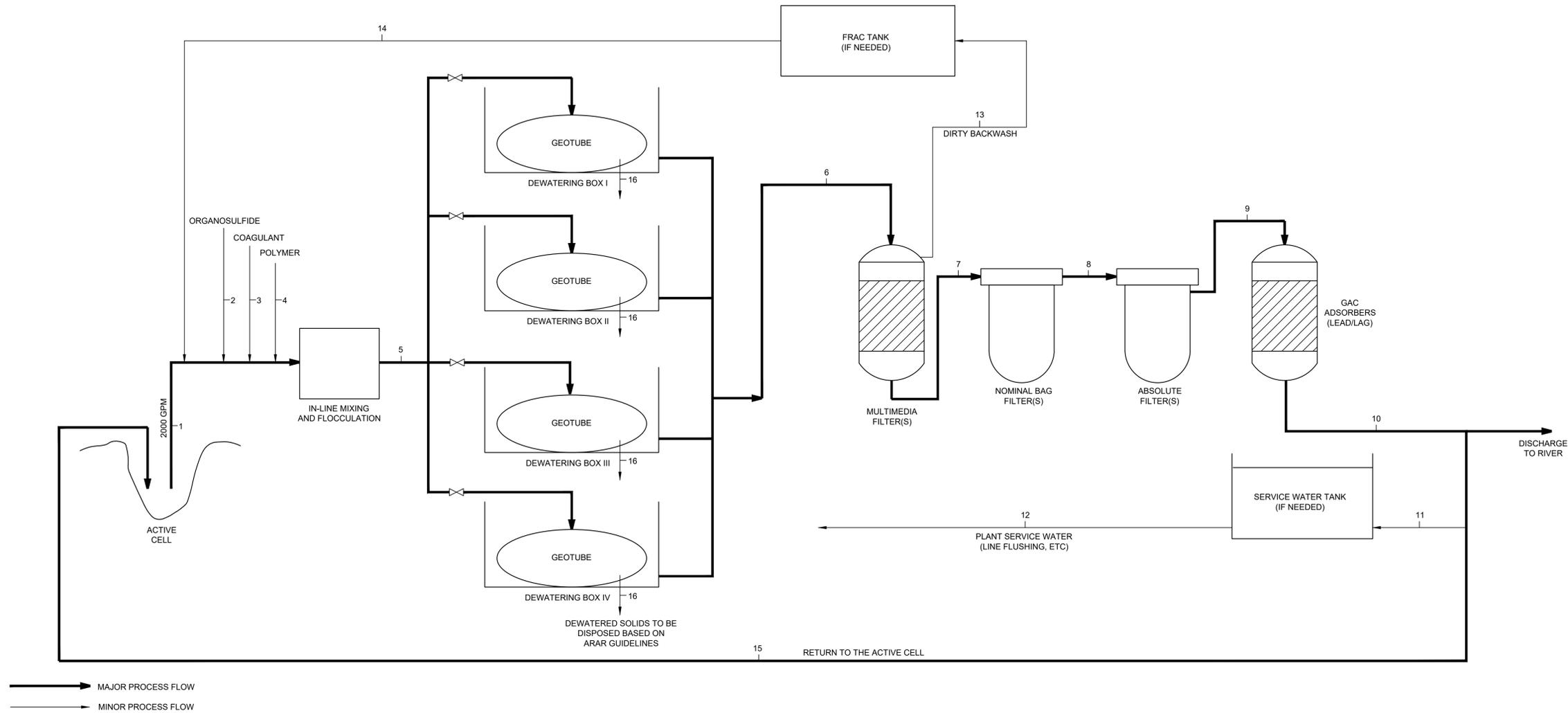
Sheet No.  
**P-04**  
 Sheet - of -

NOTE:  
 1. AREA REQUIRED IS FOR A TREATMENT FLOW OF 300 GPM.  
 2. AREA REQUIRED FOR THE STORAGE TANK(S) IN THE FRONT HEAD OF THE TREATMENT SYSTEM ARE NOT SHOWN.  
 3. LOCATION OF WATER TREATMENT SYSTEM PENDING ACCESS AGREEMENTS.  
 4. THE TREATMENT SYSTEM DESIGNS ARE PRELIMINARY AND SUBJECT TO CHANGE.



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MAJOR PROCESS FLOW  
MINOR PROCESS FLOW

WATER TREATMENT PLANT PROCESS STREAMS

Streams	Units	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Contact Water	Organosulfide Feed	Coagulant Feed	Polymer Feed	Geotube(s) Feed	Geotube Effluent	Nominal Bag Filter(s) Feed	Absolute Filter(s) Feed	GAC Adsorber(s) Feed	GAC Adsorber(s) Effluent	Service Water Tank Feed	Plant Service Water Feed	Dirty Backwash to Storage Tank	Dirty Backwash Return	Treated Water Return to the Active Cell	Dewatered Solids to Solidification
Volumetric Flow	gpm	2,000	0.10	0.08	1.00	2,142	2,097	2,097	2,097	2,097	2,097	140	140	140	140	1,957	35.12
Total Mass Flow	lb/hr	1,000,800	50	50	501	1,072,077	1,049,232	1,049,147	1,049,131	1,049,129	1,049,129	70,056	70,056	70,141	70,141	979,073	22,845
Suspended Solids	%	0.41%	0.00%	0.00%	0.00%	0.44%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.12%	0.12%	0.00%	20.00%
Chemical Feed	ppm		50.0	50.0	500.0												
Chem Solids Generation	lb/lb		0.3	0.3	0.0												
Chem Solids Generation	lb/hr		15.0	15.0	5.0												
Mass Flow Liquid	lb/hr	996,747	50	50	501	1,067,403	1,049,127	1,049,127	1,049,127	1,049,127	1,049,127	70,056	70,056	70,056	70,056	979,071	18,276
Mass Flow Solids	lb/hr	4,053	0	0	0	4,674	105	20	4.0	2.0	2.0	0.1	0.1	85.0	85.0	2.0	4,569
Specific Gravity		1.0	1.0	1.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.3
Density	lb/cf	62.4	62.4	81.1	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4	81.1

**PRELIMINARY  
NOT FOR CONSTRUCTION**

ENG: Keith Brodman  
STATE: TEXAS  
LIC. NO: 130378  
DATE: 5-28-2020

GHD SERVICES INC.  
JOB NO. 11187072 FILE NO. 010  
GHD TEXAS PPM REGISTRATION NO. 276

NOTE:  
1. SOME PROCESS FLOWS ARE AVERAGED OVER ESTIMATED TOTAL OPERATING CYCLE. PROCESS FLOW/MASS BALANCE SHOULD NOT BE USED FOR EQUIPMENT SIZING PURPOSES.  
2. FOR CLARITY, THE NUMBER OF GEOTUBES ON THIS DRAWING HAS BEEN REDUCED.  
3. THE MAXIMUM OPERATION FLOW OF 2000 GPM HAS BEEN USED IN THE MASS BALANCE TABLE. THE OPERATION FLOW MAY RANGE FROM 250 TO 2000 GPM AND WILL BE PROVIDED BY TWO 1000 GPM TRAINS.  
4. CAPTURED SOLIDS INSIDE THE GEOTUBES WILL BE EXCAVATED OUT ONCE IT'S DEWATERED. LINE 16 IN THE PFD IS JUST FOR MASS BALANCE PURPOSES.  
5. THE TREATMENT SYSTEM DESIGNS ARE PRELIMINARY AND SUBJECT TO CHANGE.

Client  
**SAN JACINTO RIVER  
WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT  
PRELIMINARY 30% REMEDIAL DESIGN  
HARRIS COUNTY, TEXAS**

2	30% EPA REVIEW	BP	NF	05/28/2020	
1	30% CLIENT REVIEW	BP	NF	05/15/2020	
No.	Issue	Drawn	Approved	Date	
Drawn	BP	Designer	KJ		
Drafting Check	MW	Design Check	NF		
Project Coordinator	CM	Date	May 28, 2020		
This document shall not be used for construction unless signed and sealed for construction.				Scale	N.T.S.
Original Size				Bar is one inch on original size drawing 0 1"	

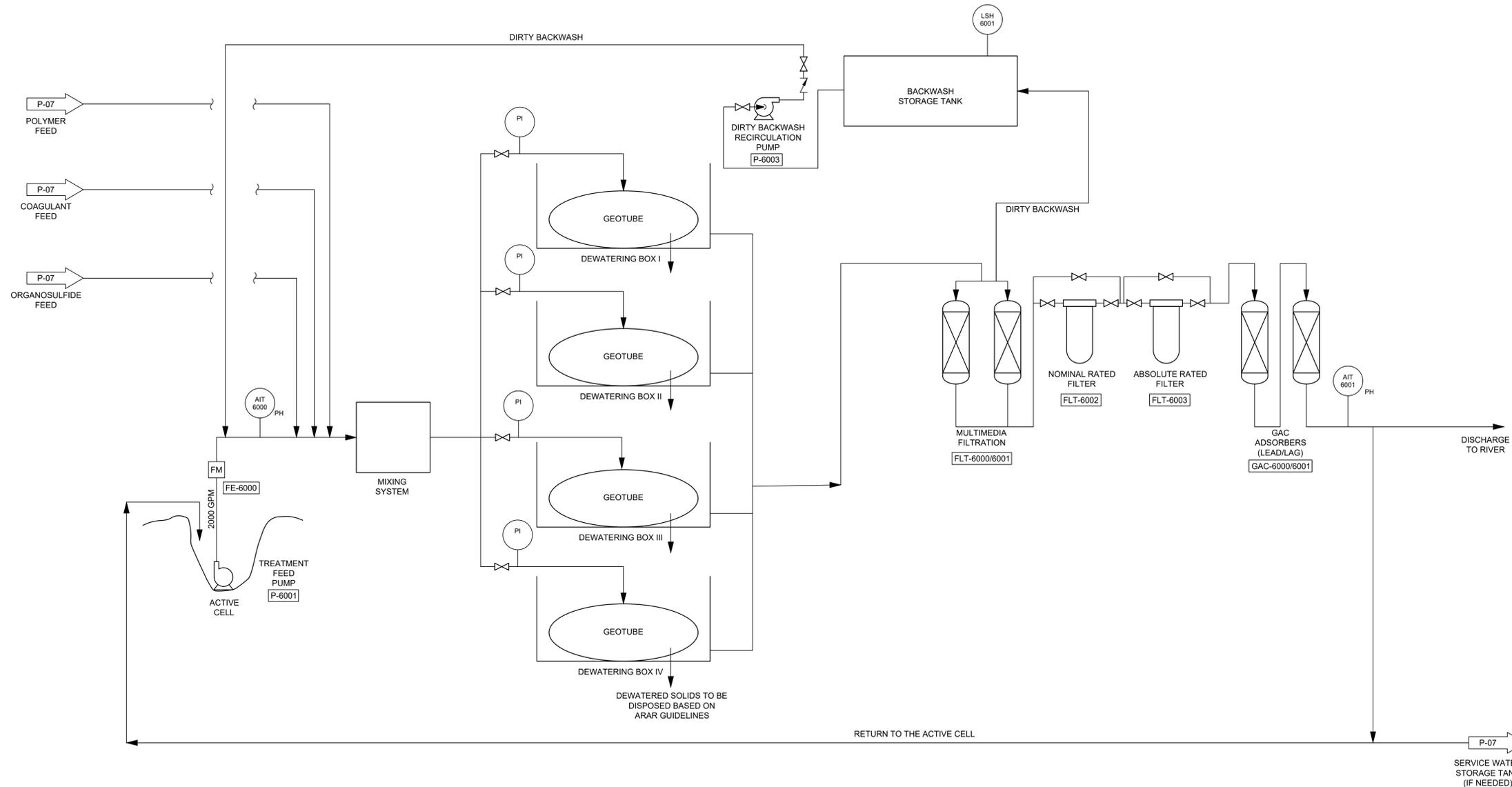
Project No. 11187072  
Title  
**WATER TREATMENT SYSTEM  
APPROACH B  
PROCESS FLOW DIAGRAM/  
MASS BALANCE**

Sheet No.  
**P-05**  
Sheet - of -



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Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	30% EPA REVIEW	BP	NF	05/28/2020
1	30% CLIENT REVIEW	BP	NF	05/15/2020

Drawn BP Designer KJ  
Drafting MW Design Check NF  
Project Coordinator CM Date May 28, 2020  
Scale N.T.S.

Original Size  
**Arch D**  
Bar is one inch on original size drawing  
0 1"

Project No. 11187072  
Title  
**WATER TREATMENT SYSTEM APPROACH B P&ID (1 OF 2)**

Sheet No.  
**P-06**

**PRELIMINARY NOT FOR CONSTRUCTION**  
ENG: Keith Broekman  
STATE: TEXAS  
LIC. NO: 130378  
DATE: 5-28-2020



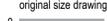
NOTE:  
1. FOR CLARITY NOT ALL SYSTEM ELEMENTS (E.G. VALVES, PIPE SIZES) HAVE BEEN SHOWN. P&IDs ARE CONCEPTUAL ONLY AND ARE TO BE FINALIZED BY CONTRACTOR.  
2. FOR CLARITY, THE NUMBER OF GEOTUBES ON THIS DRAWING HAS BEEN REDUCED.  
3. THE TREATMENT SYSTEM DESIGNS ARE PRELIMINARY AND SUBJECT TO CHANGE.



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Project  
**NORTHERN IMPOUNDMENT PRELIMINARY 30% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	30% EPA REVIEW	BP	NF	05/28/2020	
1	30% CLIENT REVIEW	BP	NF	05/15/2020	
No.	Issue	Drawn	Approved	Date	
Drawn	BP	Designer	KJ		
Drafting Check	MW	Design Check	NF		
Project Coordinator	CM	Date	May 28, 2020		
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Original Size				Bar is one inch on original size drawing 0  1"	

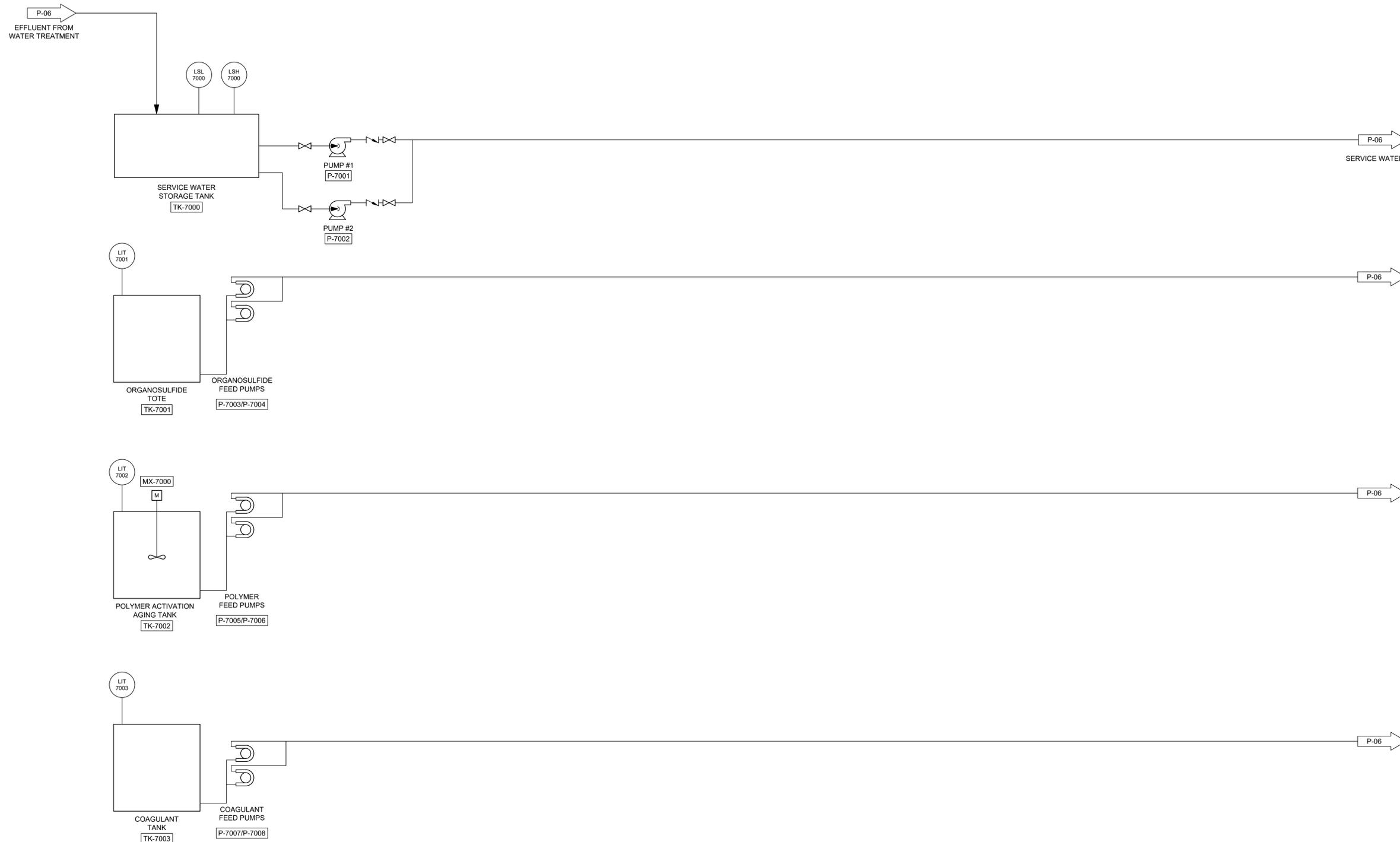
Project No. 11187072

Title  
**WATER TREATMENT SYSTEM APPROACH B P&ID (2 OF 2)**

Sheet No.

**P-07**

Sheet - of -



NOTE:  
1. FOR CLARITY NOT ALL SYSTEM ELEMENTS (E.G. VALVES, PIPE SIZES) HAVE BEEN SHOWN. P&IDs ARE CONCEPTUAL ONLY AND ARE TO BE FINALIZED BY CONTRACTOR.  
2. THE TREATMENT SYSTEM DESIGNS ARE PRELIMINARY AND SUBJECT TO CHANGE.

**PRELIMINARY NOT FOR CONSTRUCTION**  
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STATE: TEXAS  
LIC. NO: 130378  
DATE: 5-28-2020

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