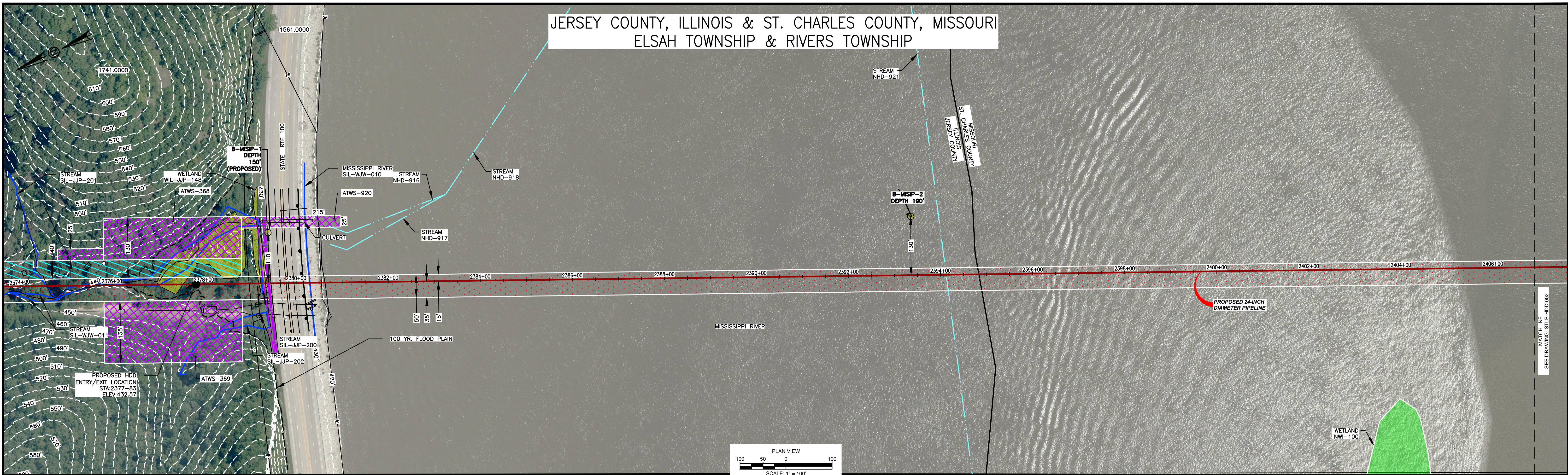


JERSEY COUNTY, ILLINOIS & ST. CHARLES COUNTY, MISSOURI  
ELSAH TOWNSHIP & RIVERS TOWNSHIP



- HDD NOTES:**
- ALL DIMENSIONS AND ELEVATIONS ARE IN FEET, UNLESS OTHERWISE SPECIFIED.
  - ALL CHAINAGES ARE HORIZONTAL.
  - CONTRACTOR SHALL DETERMINE FINAL LOCATIONS AND DIMENSIONS OF ALL PITS NECESSARY TO ACCOMMODATE THEIR MEANS AND METHODS.
  - CONTRACTOR SHALL DETERMINE DIAMETER, GRADE, WALL THICKNESS AND ADDITIONAL LENGTH OF TEMPORARY CONDUCTOR CASINGS THAN THOSE SHOWN ON THE DRAWINGS. ANY INSTALLED TEMPORARY CONDUCTOR CASING SHALL BE FULLY REMOVED UPON COMPLETION OF PULLBACK OPERATIONS.
  - THE MINIMUM ALLOWABLE DRILLING RADIUS SHALL BE 1,750 FEET BASED ON A 3-JOINT AVERAGE.
  - EXISTING UTILITY LOCATIONS AND DEPTHS, INCLUDING PRIVATE SERVICES, ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION OPERATIONS.
  - HDD OPERATIONS SHALL BE CONDUCTED IN ACCORDANCE WITH ALL PERMIT REQUIREMENTS.
  - DOWNHOLE ANNUAL DRILLING FLUID PRESSURES SHALL BE MONITORED AT ALL TIMES DURING THE PILOT BORE DRILLING PROCESS. LOCATION OF MONITORING SHALL BE AS CLOSE TO THE DRILL BIT AS POSSIBLE.
  - PILOT BORE SHALL BE CONTINUOUSLY TRACKED AT ALL TIMES. NO BLIND SECTIONS SHALL BE PERMITTED, EVEN WHEN THE DRILL BIT IS UNDER WATER.
  - UPON HDD COMPLETION AND EXTRACTION OF TEMPORARY CASING PIPE (IF APPLICABLE), CONTRACTOR SHALL PLACE A UNIFORM CEMENT BASED GROUT WITHIN THE NEAREST 200 FEET OF THE ANNULAR SPACE OF THE HDD BORE BETWEEN THE PRODUCT PIPE AND THE UNDISTURBED EARTH AT EACH HDD ENTRY AND EXIT LOCATIONS. GROUT DELIVERY METHOD SHALL BE FROM MULTIPLE POINTS WITHIN THE ANNULAR SPACE. CONTRACTOR SHALL MONITOR AND CONTROL GROUT PRESSURES TO WITHIN LIMITS FOR THE ENCOUNTERED GEOTECHNICAL MATERIALS.

- IF THE CONTRACTOR ENCOUNTERS AN OBSTRUCTION THAT PREVENTS THE INSTALLATION ACCORDING TO THE PROJECT SPECIFICATIONS, THE CONTRACTOR SHALL PLACE A CEMENT BASED GROUT WITHIN THE BORE. WORK SHALL NOT RESUME UNTIL REVISED PLANS AND PROCEDURES HAVE BEEN SUBMITTED TO AND ACCEPTED BY THE OWNER.
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- THE PILOT BORE WILL BE EITHER 10.625" OR 12.25" IN DIAMETER. THE FINAL REAMED HOLE DIAMETER IS ANTICIPATED TO BE 36". THE NUMBER OF REAMING PASSES WILL BE DETERMINED BY THE CONTRACTOR SELECTED FOR THE WORK.
- CONTRACTOR SHALL USE A GYROSCOPIC GUIDANCE SYSTEM TO COMPLETE THE PILOT BORE INSTALLATION.
- CONTRACTOR SHALL MONITOR PRECIPITATION AND RIVER LEVEL ELEVATIONS AND BE PREPARED TO REMOVE EQUIPMENT PRIOR TO A FORECASTED FLOOD EVENT

**MISSISSIPPI HDD PLAN VIEW**

PILOT BORE DRILLING TOLERANCES SHALL BE AS FOLLOWS:

ITEM	TOLERANCE
PILOT ENTRY ANGLE	INCREASE ANGLE UP TO 1 (STEEPER), BUT NO DECREASE IN ANGLE ALLOWED.
PILOT ENTRY LOCATION	AS STAKED BY OWNER. NO CHANGES WITHOUT OWNER APPROVAL
PILOT EXIT ANGLE	DECREASE ANGLE UP TO 2° (FLATTER), BUT NO INCREASES IN EXIT ANGLE ALLOWED.
PILOT EXIT LOCATION	UP TO TEN (10) FEET SHORTER OR LONGER.
PILOT DEPTH	UP TO THREE (3) FEET SHALLOWER DEPTH ALLOWED. UP TO TEN (10) FEET INCREASE IN PIPE DESIGN DEPTH (DEEPER) ALLOWED.
PILOT ALIGNMENT	UP TO TEN (10) FEET LEFT OR RIGHT OF THE OWNER SURVEY CENTERLINE BUT NOT WITHIN FIVE (5) FEET OF THE RIGHT-OF-WAY/EASEMENT BOUNDARY OR ANY BELOW GRADE UTILITY OR STRUCTURE.

**Soil Stratigraphic Legend:**

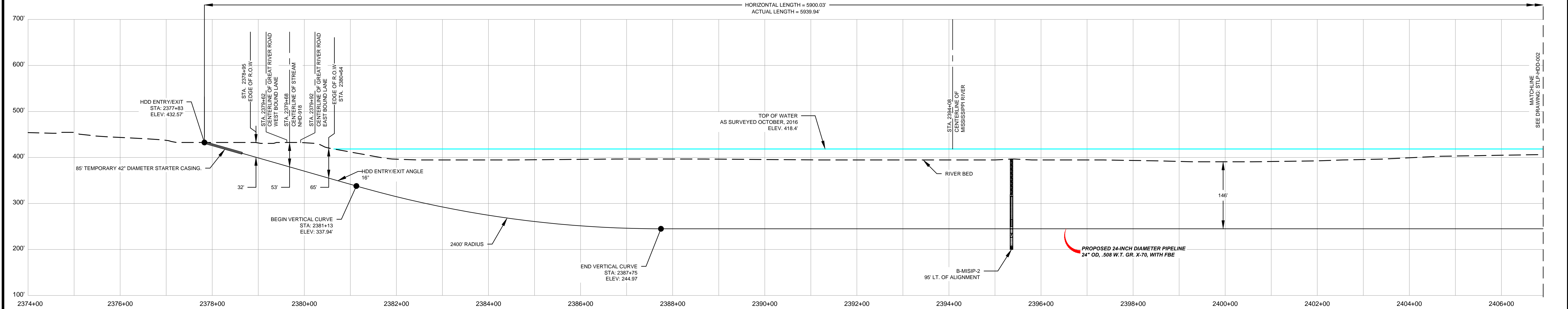
ML	CH	CL	SP
SW	GP	LIMESTONE	SM

**Rock Stratigraphic Legend:**

LIMESTONE	MUDSTONE	SHALE
CONCRETE	GP	

**LEGEND**

PROPOSED PERMANENT EASEMENT	PROPOSED 24-INCH DIAMETER PIPELINE	STREAM (DELINEATED)
EXISTING PERMANENT EASEMENT	PROPERTY LINE	STREAM (DESKTOP)
TEMPORARY WORKSPACE	MMID	WETLAND (DESKTOP)
ADDITIONAL TEMPORARY WORKSPACE	EXISTING GAS PIPELINE	WETLAND (DELINEATED)
PROPOSED STAGING AREA	EXISTING FOREIGN PIPELINE	
ACCESS ROAD	EXISTING OVERHEAD LINE	
USACE EASEMENT	ROAD CENTERLINE	



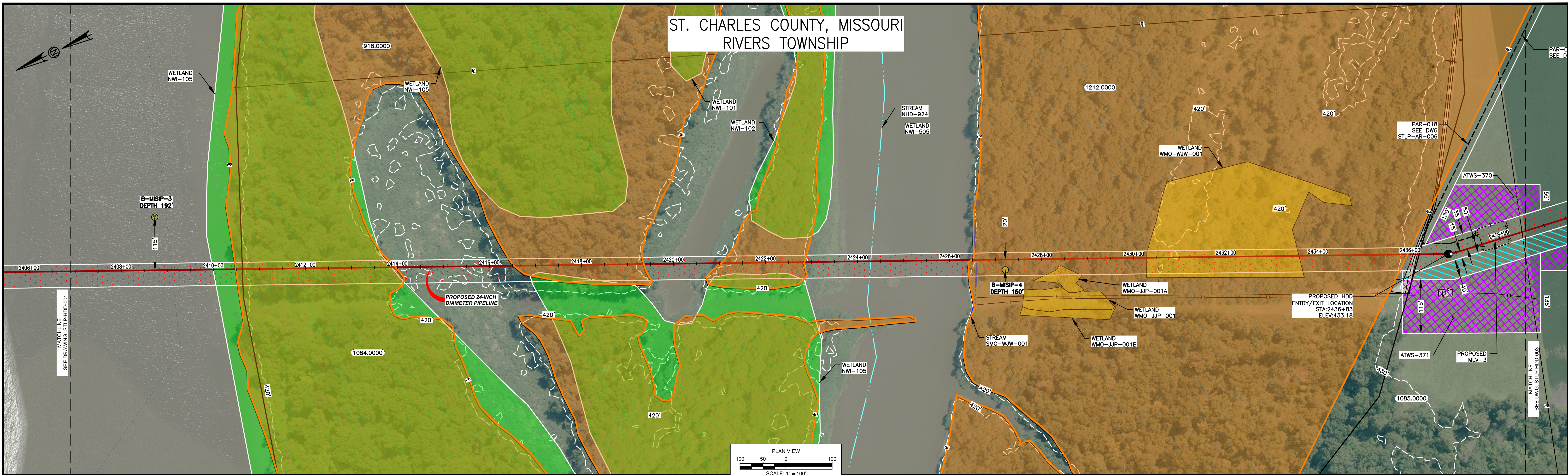
- NOTES:**
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  - PROPERTY LINES DEPICTED ON THIS PLAN ARE BASED ON GIS TAX MAP DATA.
  - BASE FLOOD ELEVATION LINE SHOWN FOR 100 YEAR FLOOD PLAIN LIMIT WAS PULLED FROM FEMA FLOOD INSURANCE RATE MAPS (FIRM). THE ELEVATION OF 438 FEET WAS DETERMINED USING MAP NUMBERS 29189C0080K AND 17083C0278D.

REFERENCE DRAWINGS		REFERENCE DRAWINGS		REVISIONS				REVISIONS				APPROVALS				PREPARED FOR		PREPARED BY		PROJECT						
DWG. NO.	TITLE	DWG. NO.	TITLE	NO.	REVISIONS	DATE	DRAWN	CK	APPR	NO.	REVISIONS	DATE	DRAWN	CK	APPR	DRAWN BY	DATE	ENG. APPROVAL	DATE	CLIENT APPROVAL	DATE	SPiRE	MOTT MACDONALD	STL PIPELINE PROJECT	HDD PROFILE OVERVIEW	
STLP-A-052	ALIGNMENT SHEET			1	ISSUE FOR FERC	01/2017	RJR	EB	RJP							R.J.P.	07/2017	D.G.G.	07/2017				STLP-HDD-001			
STLP-HDD-002	HDD PROFILE OVERVIEW			2	AMENDMENT TO FERC	04/2017	RJR	EB	RJP							M.A.P.	07/2017	J.E.W.	07/2017							
				3	FERC SUPPLEMENTAL FILING	07/2017	RJP	EB	RJP																	

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ST. CHARLES COUNTY, MISSOURI  
RIVERS TOWNSHIP



HDD NOTES:

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MISSISSIPPI HDD PLAN VIEW

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Soil Stratigraphic Legend:

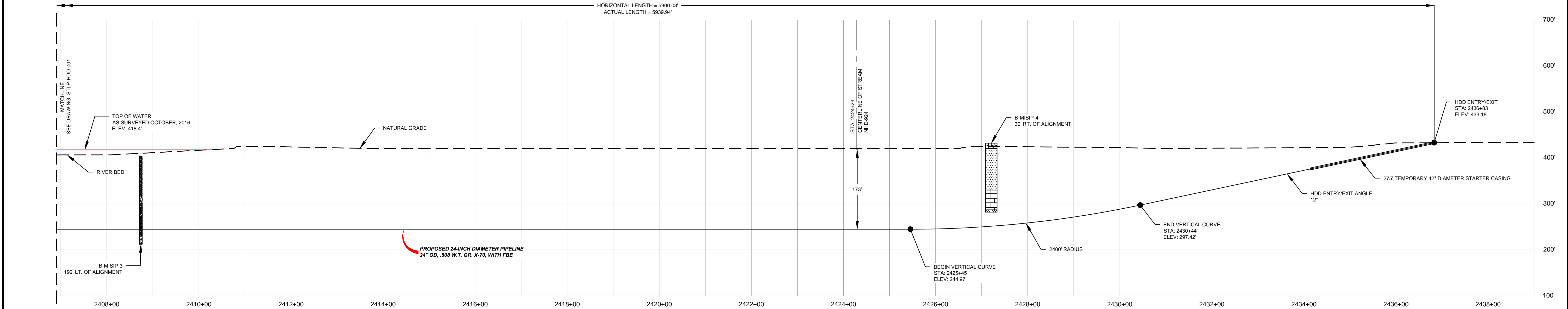
ML	CH	CL	SP
SW	GP	LIMESTONE	SM

Rock Stratigraphic Legend:

LIMESTONE	MAIDSTONE	SHALE
CONCRETE	GP	

LEGEND

[Red hatched]	PROPOSED PERMANENT EASEMENT	[Red line with circle]	PROPOSED 24-INCH DIAMETER PIPELINE	[Blue dashed line]	STREAM (DELINEATED)
[Blue hatched]	EXISTING PERMANENT EASEMENT	[Black line with circle]	PROPERTY LINE	[Cyan dashed line]	STREAM (DESKTOP)
[Green hatched]	TEMPORARY WORKSPACE	[Red line with X's]	MMID	[Green arrow]	WETLAND (DESKTOP)
[Purple hatched]	ADDITIONAL TEMPORARY WORKSPACE	[Red line with X's]	EXISTING GAS PIPELINE	[Yellow arrow]	WETLAND (DELINEATED)
[Green hatched]	PROPOSED STAGING AREA	[Red line with X's]	EXISTING FOREIGN PIPELINE	[Green dashed line]	
[Orange hatched]	USACE EASEMENT	[Red line with X's]	EXISTING OVERHEAD LINE	[Black dashed line]	
		[Red line with X's]	ROAD CENTERLINE		



- NOTES:
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REFERENCE DRAWINGS		REFERENCE DRAWINGS		REVISIONS				REVISIONS				APPROVALS										
DWG NO.	TITLE	DWG NO.	TITLE	NO.	REVISIONS	DATE	DRAWN	CK	APPR	NO.	REVISIONS	DATE	DRAWN	CK	APPR	DRAWN BY	DATE	ENG. APPROVAL	DATE	CLIENT APPROVAL	DATE	
STLP-A-052	ALIGNMENT SHEET	STLP-HDD-001	HDD PROFILE OVERVIEW	1	ISSUE FOR FERC	01/2017	RJR	EB	RJP							D.R.G.	07/2017	D.G.G.	07/2017			
STLP-A-053	ALIGNMENT SHEET	STLP-HDD-003	HDD PROFILE OVERVIEW	2	AMENDMENT TO FERC	04/2017	RJR	EB	RJP							CHECKED BY	DATE	P.M. APPROVAL	DATE			
STLP-AR-006	ACCESS ROAD SITE PLAN - PAR-018			3	FERC SUPPLEMENTAL FILING	07/2017	RJP	EB	RJP							M.A.P.	07/2017	J.E.W.	07/2017			STLP-HDD-002

PREPARED FOR  
**Spire STL Pipeline**

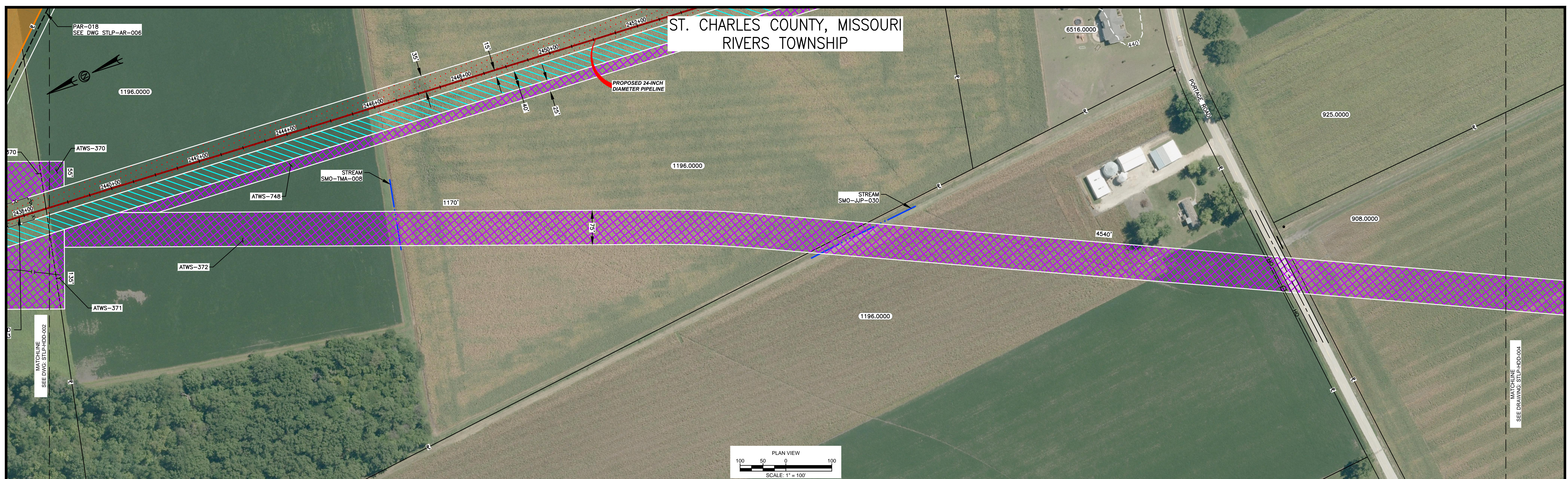
PREPARED BY  
**MOTT MACDONALD**

SPIRE STL PIPELINE PROJECT  
HDD PROFILE OVERVIEW  
MISSISSIPPI RIVER MAINLINE  
JERSEY COUNTY, ILLINOIS & ST. CHARLES COUNTY, MISSOURI

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ST. CHARLES COUNTY, MISSOURI  
RIVERS TOWNSHIP



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1. ALL DIMENSIONS AND ELEVATIONS ARE IN FEET, UNLESS OTHERWISE SPECIFIED.
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  4. CONTRACTOR SHALL DETERMINE DIAMETER, GRADE, WALL THICKNESS AND ADDITIONAL LENGTH OF TEMPORARY CONDUCTOR CASINGS THAN THOSE SHOWN ON THE DRAWINGS. ANY INSTALLED TEMPORARY CONDUCTOR CASING SHALL BE FULLY REMOVED UPON COMPLETION OF PULLBACK OPERATIONS.
  5. THE MINIMUM ALLOWABLE DRILLING RADIUS SHALL BE 1,750 FEET BASED ON A 3-JOINT AVERAGE.
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7. HDD OPERATIONS SHALL BE CONDUCTED IN ACCORDANCE WITH ALL PERMIT REQUIREMENTS.
8. DOWNHOLE ANNULAR DRILLING FLUID PRESSURES SHALL BE MONITORED AT ALL TIMES DURING THE PILOT BORE DRILLING PROCESS. LOCATION OF MONITORING SHALL BE AS CLOSE TO THE DRILL BIT AS POSSIBLE.
9. PILOT BORE SHALL BE CONTINUOUSLY TRACKED AT ALL TIMES. NO BLIND SECTIONS SHALL BE PERMITTED, EVEN WHEN THE DRILL BIT IS UNDER WATER.
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14. CONTRACTOR SHALL MONITOR PRECIPITATION AND RIVER LEVEL ELEVATIONS AND BE PREPARED TO REMOVE EQUIPMENT PRIOR TO A FORECASTED FLOOD EVENT.

**MISSISSIPPI HDD PLAN VIEW**

PILOT BORE DRILLING TOLERANCES SHALL BE AS FOLLOWS:	
ITEM	TOLERANCE
PILOT ENTRY ANGLE	INCREASE ANGLE UP TO 1 (STEEPER), BUT NO DECREASE IN ANGLE ALLOWED.
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**Soil Stratigraphic Legend:**

- ML: MUDSTONE
- CH: CLAY
- CL: CLAY
- SP: SAND
- SW: SAND
- GP: GRAVEL
- SM: SILT
- LIMESTONE: LIMESTONE

**Rock Stratigraphic Legend:**

- LIMESTONE: LIMESTONE
- MUDSTONE: MUDSTONE
- SHALE: SHALE
- CONCRETE: CONCRETE
- GP: GRAVEL

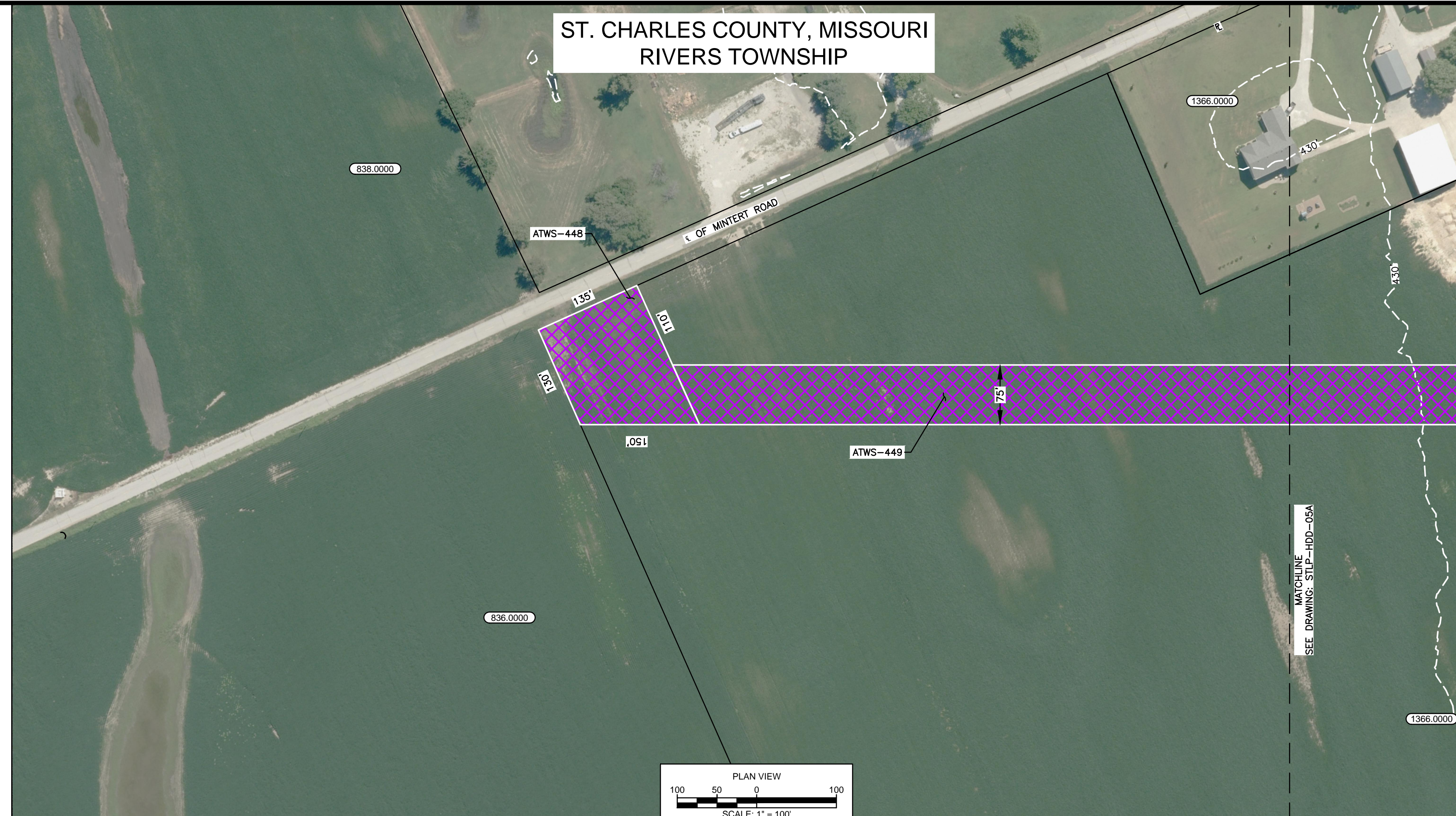
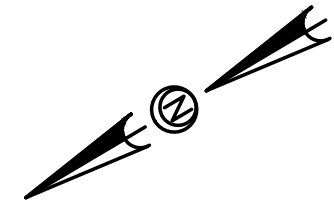
**LEGEND**

- PROPOSED PERMANENT EASEMENT
- EXISTING PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- ADDITIONAL TEMPORARY WORKSPACE
- PROPOSED STAGING AREA
- ACCESS ROAD
- USACE EASEMENT
- PROPOSED 24-INCH DIAMETER PIPELINE
- PROPERTY LINE
- MMID
- EXISTING GAS PIPELINE
- EXISTING FOREIGN PIPELINE
- EXISTING OVERHEAD LINE
- ROAD CENTERLINE
- STREAM (DELINEATED)
- STREAM (DESKTOP)
- WETLAND (DESKTOP)
- WETLAND (DELINEATED)

- NOTES:**
1. THE IMAGERY SHOWN WAS PROVIDED BY AERIAL DATA SERVICES, 2016. ADDITIONAL IMAGERY SUPPLEMENTED FROM USFWS-AWI AND USGS.
  2. EXISTING FEATURES SHOWN WERE SURVEYED BY MOTT MACDONALD AND DIGITIZED FROM IMAGERY. ALL LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED BY CONTRACTOR.
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  4. BASE FLOOD ELEVATION LINE SHOWN FOR 100 YEAR FLOOD PLAIN LIMIT WAS PULLED FROM FEMA FLOOD INSURANCE RATE MAPS (FIRM). THE ELEVATION OF 438 FEET WAS DETERMINED USING MAP NUMBERS 29189C0090K AND 17083C0278D.

REFERENCE DRAWINGS		REFERENCE DRAWINGS		REVISIONS				REVISIONS				APPROVALS				PREPARED FOR <b>Spire</b> STL Pipeline	PREPARED BY <b>MOTT MACDONALD</b>	SPIRE STL PIPELINE PROJECT HDD PROFILE OVERVIEW MISSISSIPPI RIVER MAINLINE ST. CHARLES COUNTY, MISSOURI				
DWG NO.	TITLE	DWG NO.	TITLE	NO.	REVISIONS	DATE	DRAWN	CK	APPR	NO.	REVISIONS	DATE	DRAWN	CK	APPR				DRAWN BY	DATE	ENG. APPROVAL	DATE
STLP-A-053	ALIGNMENT SHEET	STLP-HDD-004	HDD PROFILE OVERVIEW	1	ISSUE FOR FERC	01/2017	RJR	EB	RJP								D.R.G.	01/2017	D.G.G.	07/2017		
STLP-AR-006	ACCESS ROAD SITE PLAN - PAR-018			2	AMENDMENT TO FERC	04/2017	RJR	EB	RJP										P.M. APPROVAL	DATE		
STLP-HDD-002	HDD PROFILE OVERVIEW			3	FERC SUPPLEMENTAL FILING	07/2017	RJR	EB	RJP								M.A.P.	07/2017	J.E.W.	07/2017		





PLAN VIEW  
SCALE: 1" = 100'

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**MISSOURI RIVER HDD PLAN VIEW**

PILOT BORE DRILLING TOLERANCES SHALL BE AS FOLLOWS:	
ITEM	TOLERANCE
PILOT ENTRY ANGLE	INCREASE ANGLE UP TO 1° (STEEPER), BUT NO DECREASE IN ANGLE ALLOWED.
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Soil Stratigraphic Legend:


Rock Stratigraphic Legend:


**LEGEND**

	PROPOSED PERMANENT EASEMENT		PROPOSED 24-INCH DIAMETER PIPELINE		STREAM (DELINEATED)
	EXISTING PERMANENT EASEMENT		PROPERTY LINE		STREAM (DESKTOP)
	TEMPORARY WORKSPACE		MMID		WETLAND (DESKTOP)
	ADDITIONAL TEMPORARY WORKSPACE		EXISTING GAS PIPELINE		WETLAND (DELINEATED)
	PROPOSED STAGING AREA		EXISTING FOREIGN PIPELINE		EXISTING OVERHEAD LINE
	ACCESS ROAD		ROAD CENTERLINE		
	USACE EASEMENT				

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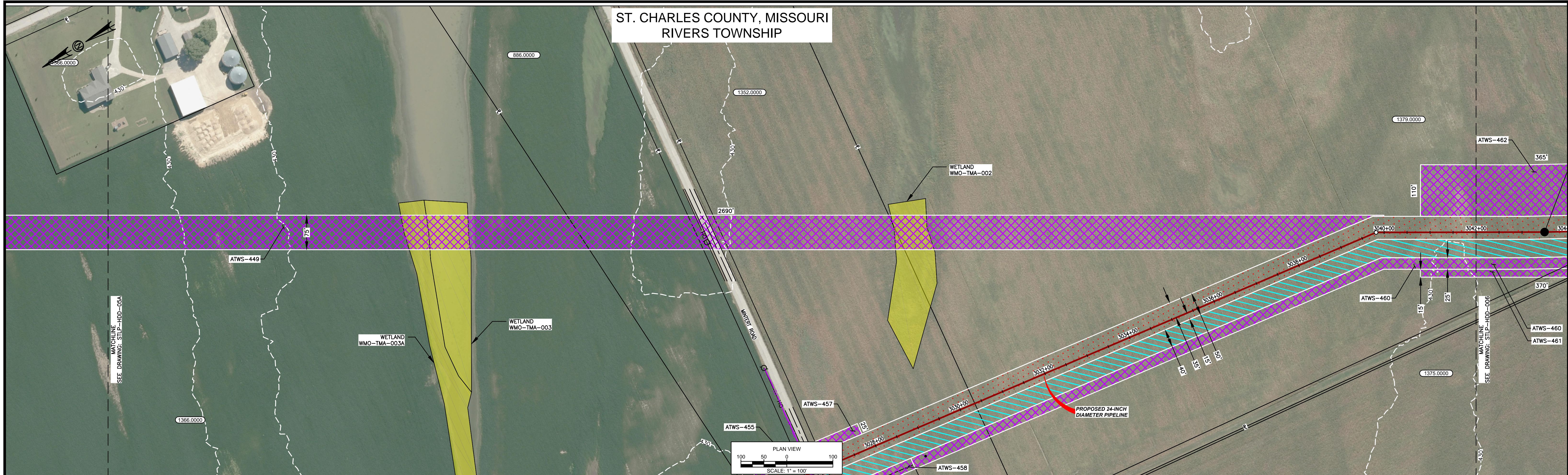
REFERENCE DRAWINGS		REFERENCE DRAWINGS		REVISIONS				REVISIONS				APPROVALS				PREPARED FOR		PREPARED BY		SPIRE STL PIPELINE PROJECT							
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STLP-A-066	ALIGNMENT SHEET			3	FERC SUPPLEMENTAL FILING	07/2017	R.J.P.	EB	R.J.P.							R.J.P.	07/2017	D.G.G.	07/2017								
STLP-A-067	ALIGNMENT SHEET																M.A.P.	07/2017	J.E.W.	07/2017							

SPIRE STL PIPELINE PROJECT  
 HDD PROFILE OVERVIEW  
 MISSOURI RIVER MAINLINE  
 ST. CHARLES & ST. LOUIS COUNTIES, MISSOURI

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ST. CHARLES COUNTY, MISSOURI  
RIVERS TOWNSHIP



HDD NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE IN FEET, UNLESS OTHERWISE SPECIFIED.
2. ALL CHAINAGES ARE HORIZONTAL.
3. CONTRACTOR SHALL DETERMINE FINAL LOCATIONS AND DIMENSIONS OF ALL PITS NECESSARY TO ACCOMMODATE THEIR MEANS AND METHODS.
4. CONTRACTOR SHALL DETERMINE DIAMETER, GRADE, WALL THICKNESS AND ADDITIONAL LENGTH OF TEMPORARY CONDUCTOR CASINGS THAN THOSE SHOWN ON THE DRAWINGS. ANY INSTALLED TEMPORARY CONDUCTOR CASING SHALL BE FULLY REMOVED UPON COMPLETION OF PULLBACK OPERATIONS.
5. THE MINIMUM ALLOWABLE DRILLING RADIUS SHALL BE 1,750 FEET BASED ON A 3-JOINT AVERAGE.
6. EXISTING UTILITY LOCATIONS AND DEPTHS, INCLUDING PRIVATE SERVICES, ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION OPERATIONS.
7. HDD OPERATIONS SHALL BE CONDUCTED IN ACCORDANCE WITH ALL PERMIT REQUIREMENTS.
8. DOWNHOLE ANNULAR DRILLING FLUID PRESSURES SHALL BE MONITORED AT ALL TIMES DURING THE PILOT BORE DRILLING PROCESS. LOCATION OF MONITORING SHALL BE AS CLOSE TO THE DRILL BIT AS POSSIBLE.
9. PILOT BORE SHALL BE CONTINUOUSLY TRACKED AT ALL TIMES. NO BLIND SECTIONS SHALL BE PERMITTED, EVEN WHEN THE DRILL BIT IS UNDER WATER.
10. UPON HDD COMPLETION AND EXTRACTION OF TEMPORARY CASING PIPE (IF APPLICABLE), CONTRACTOR SHALL PLACE A UNIFORM CEMENT BASED GROUT WITHIN THE NEAREST 200 FEET OF THE ANNULAR SPACE OF THE HDD BORE BETWEEN THE PRODUCT PIPE AND THE UNDISTURBED EARTH AT EACH HDD ENTRY AND EXIT LOCATIONS. GROUT DELIVERY METHOD SHALL BE FROM MULTIPLE POINTS WITHIN THE ANNULAR SPACE. CONTRACTOR SHALL MONITOR AND CONTROL GROUT PRESSURES TO WITHIN LIMITS FOR THE ENCOUNTERED GEOTECHNICAL MATERIALS.
11. IF THE CONTRACTOR ENCOUNTERS AN OBSTRUCTION THAT PREVENTS THE INSTALLATION ACCORDING TO THE PROJECT SPECIFICATIONS, THE CONTRACTOR SHALL PLACE A CEMENT BASED GROUT WITHIN THE BORE. WORK SHALL NOT RESUME UNTIL REVISED PLANS AND PROCEDURES HAVE BEEN SUBMITTED TO AND ACCEPTED BY THE OWNER.
12. CONTRACTOR SHALL USE THE DRILL AND INTERSECT INSTALLATION STRATEGY TO COMPLETE THIS INSTALLATION.
13. THE PILOT BORE WILL BE EITHER 10.625" OR 12.25" IN DIAMETER. THE FINAL REAMED HOLE DIAMETER IS ANTICIPATED TO BE 36". THE NUMBER OF REAMING PASSES WILL BE DETERMINED BY THE CONTRACTOR SELECTED FOR THE WORK.
14. CONTRACTOR SHALL USE A GYROSCOPIC GUIDANCE SYSTEM TO COMPLETE THE PILOT BORE INSTALLATION.
15. CONTRACTOR SHALL MONITOR PRECIPITATION AND RIVER LEVEL ELEVATIONS AND BE PREPARED TO REMOVE EQUIPMENT PRIOR TO A FORECASTED FLOOD EVENT

MISSOURI RIVER HDD PLAN VIEW

PILOT BORE DRILLING TOLERANCES SHALL BE AS FOLLOWS:	
ITEM	TOLERANCE
PILOT ENTRY ANGLE	INCREASE ANGLE UP TO 1 (STEEPER), BUT NO DECREASE IN ANGLE ALLOWED.
PILOT ENTRY LOCATION	AS STAKED BY OWNER. NO CHANGES WITHOUT OWNER APPROVAL
PILOT EXIT ANGLE	DECREASE ANGLE UP TO 2° (FLATTER), BUT NO INCREASES IN EXIT ANGLE ALLOWED.
PILOT EXIT LOCATION	UP TO TEN (10) FEET SHORTER OR LONGER.
PILOT DEPTH	UP TO THREE (3) FEET SHALLOWER DEPTH ALLOWED. UP TO TEN (10) FEET INCREASE IN PIPE DESIGN DEPTH (DEEPER) ALLOWED.
PILOT ALIGNMENT	UP TO TEN (10) FEET LEFT OR RIGHT OF THE OWNER SURVEY CENTERLINE BUT NOT WITHIN FIVE (5) FEET OF THE RIGHT-OF-WAY/EASEMENT BOUNDARY OR ANY BELOW GRADE UTILITY OR STRUCTURE.

Soil Stratigraphic Legend:

ML	CH	CL	SP
SW	GP	LIMESTONE	SM
LIMESTONE	MUDSTONE	SHALE	
CONCRETE	GP		

LEGEND

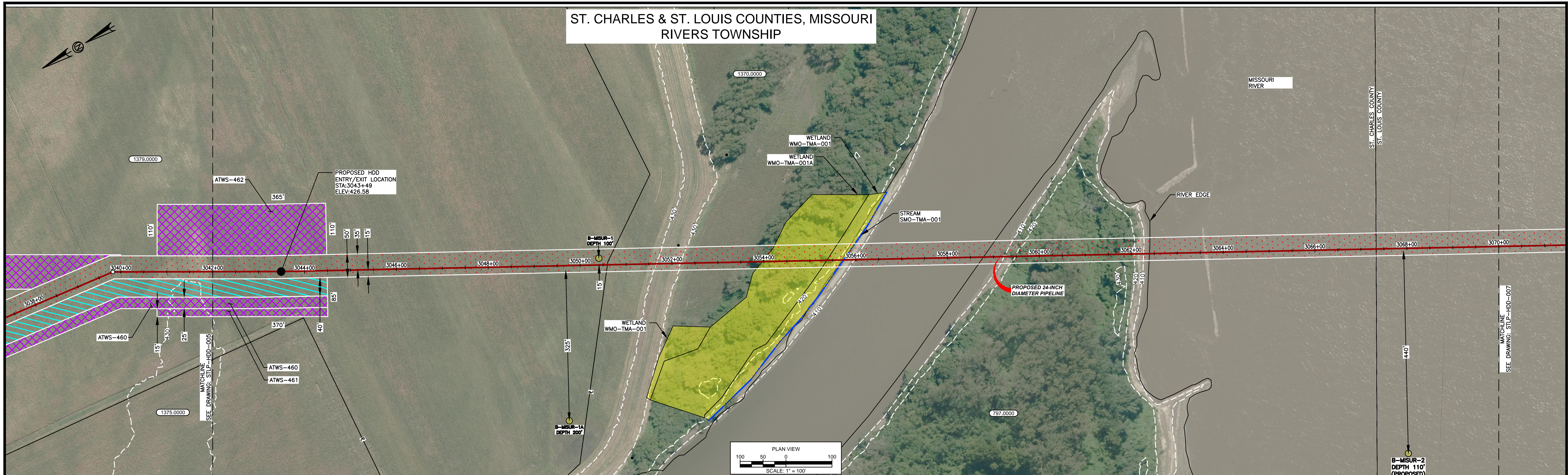
	PROPOSED PERMANENT EASEMENT		PROPOSED 24-INCH DIAMETER PIPELINE		STREAM (DELINEATED)
	EXISTING PERMANENT EASEMENT		PROPERTY LINE		STREAM (DESKTOP)
	TEMPORARY WORKSPACE		MMID		WETLAND (DESKTOP)
	ADDITIONAL TEMPORARY WORKSPACE		EXISTING GAS PIPELINE		WETLAND (DELINEATED)
	PROPOSED STAGING AREA		EXISTING FOREIGN PIPELINE		
	ACCESS ROAD		EXISTING OVERHEAD LINE		
	USACE EASEMENT		ROAD CENTERLINE		

- NOTES:
1. THE IMAGERY SHOWN WAS PROVIDED BY AERIAL DATA SERVICES, 2018. ADDITIONAL IMAGERY SUPPLEMENTED FROM USFWS-AWI AND USGS.
  2. EXISTING FEATURES SHOWN WERE SURVEYED BY MOTT MACDONALD AND DIGITIZED FROM IMAGERY. ALL LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED BY CONTRACTOR.
  3. PROPERTY LINES DEPICTED ON THIS PLAN ARE BASED ON GIS TAX MAP DATA.
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REFERENCE DRAWINGS		REFERENCE DRAWINGS		REVISIONS				REVISIONS				APPROVALS				PREPARED FOR		PREPARED BY		SPIRE STL PIPELINE PROJECT								
DWG. NO.	TITLE	DWG. NO.	TITLE	NO.	REVISIONS	DATE	DRAWN	CK	APPR	NO.	REVISIONS	DATE	DRAWN	CK	APPR	DRAWN BY	DATE	ENG. APPROVAL	DATE	CLIENT APPROVAL	DATE	Spire STL Pipeline		MOTT MACDONALD		HDD PROFILE OVERVIEW		
STLP-A-066	ALIGNMENT SHEET			1	ISSUE FOR FERC	01/2017	RJR	EB	RJP							R.J.P.	07/2017	D.G.G.	07/2017									
STLP-A-067	ALIGNMENT SHEET			2	HDD PROFILE OVERVIEW	04/2017	RJR	EB	RJP										P.M. APPROVAL	DATE								
				3	FERC SUPPLEMENTAL FILING	07/2017	RJR	EB	RJP								M.A.P.	07/2017	J.E.W.	07/2017								



ST. CHARLES & ST. LOUIS COUNTIES, MISSOURI  
RIVERS TOWNSHIP



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**MISSOURI RIVER HDD PLAN VIEW**

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**LEGEND**

**Soil Stratigraphic Legend:**

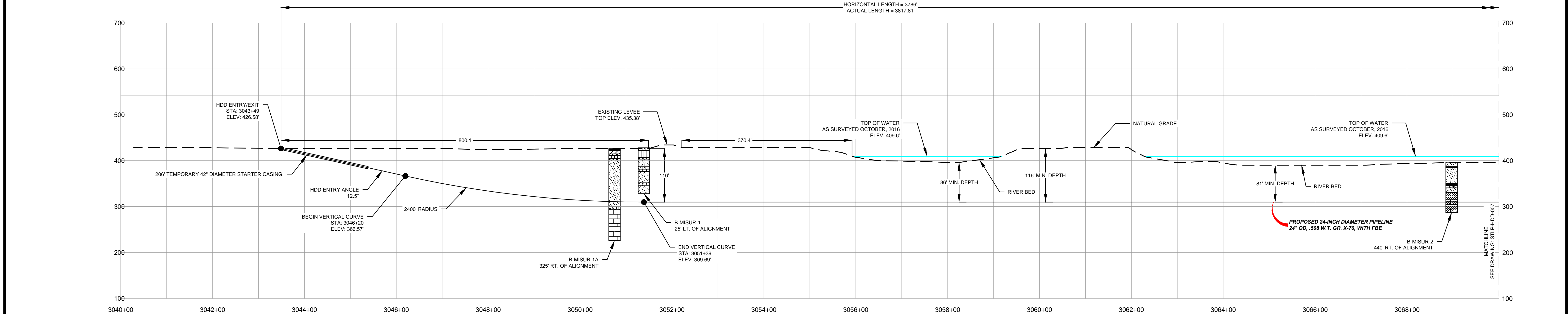
- ML: MUDSTONE
- CH: CLAY
- CL: CLAY
- SP: SAND
- SW: SAND
- GP: GRAVEL
- SM: SILT

**Rock Stratigraphic Legend:**

- L: LIMESTONE
- M: MUDDSTONE
- S: SHALE
- C: CONCRETE
- GP: GRAVEL

**LEGEND (continued):**

- PROPOSED PERMANENT EASEMENT
- EXISTING PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- ADDITIONAL TEMPORARY WORKSPACE
- PROPOSED STAGING AREA
- USACE EASEMENT
- PROPOSED 24-INCH DIAMETER PIPELINE
- PIPELINE PROPERTY LINE
- MMID
- EXISTING GAS PIPELINE
- EXISTING FOREIGN PIPELINE
- EXISTING OVERHEAD LINE
- ROAD CENTERLINE
- STREAM (DELINEATED)
- STREAM (DESKTOP)
- WETLAND (DESKTOP)
- WETLAND (DELINEATED)



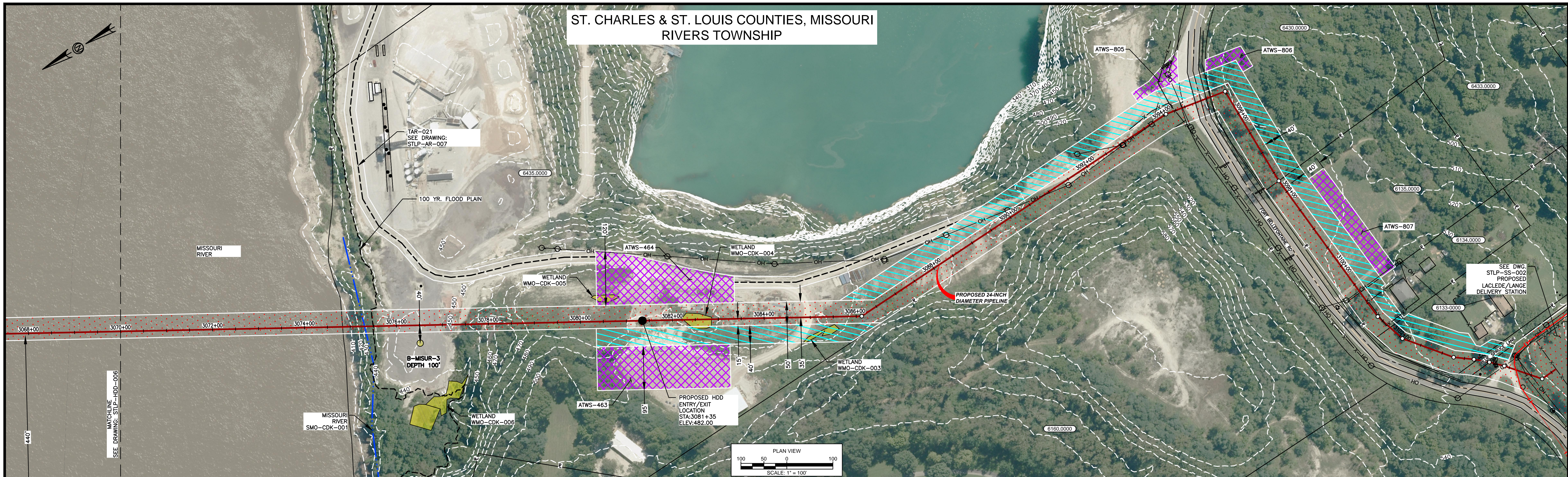
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REFERENCE DRAWINGS		REFERENCE DRAWINGS		REVISIONS				REVISIONS				APPROVALS				PREPARED FOR		PREPARED BY		SPIRE STL PIPELINE PROJECT							
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STLP-A-067	ALIGNMENT SHEET			1	ISSUE FOR FERC	01/2017	RJR	EB	RJP							R.J.P.	07/2017	D.G.G.	07/2017								
STLP-HDD-007	HDD PROFILE OVERVIEW			2	AMENDMENT TO FERC	04/2017	RJR	EB	RJP							M.A.P.	07/2017	P.M. APPROVAL	DATE								
				3	FERC SUPPLEMENTAL FILING	07/2017	RJP	EB	RJP									J.E.W.	07/2017								

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ST. CHARLES & ST. LOUIS COUNTIES, MISSOURI  
RIVERS TOWNSHIP



HDD NOTES:

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MISSOURI RIVER HDD PLAN VIEW

PILOT BORE DRILLING TOLERANCES SHALL BE AS FOLLOWS:

ITEM	TOLERANCE
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LEGEND

Soil Stratigraphic Legend:

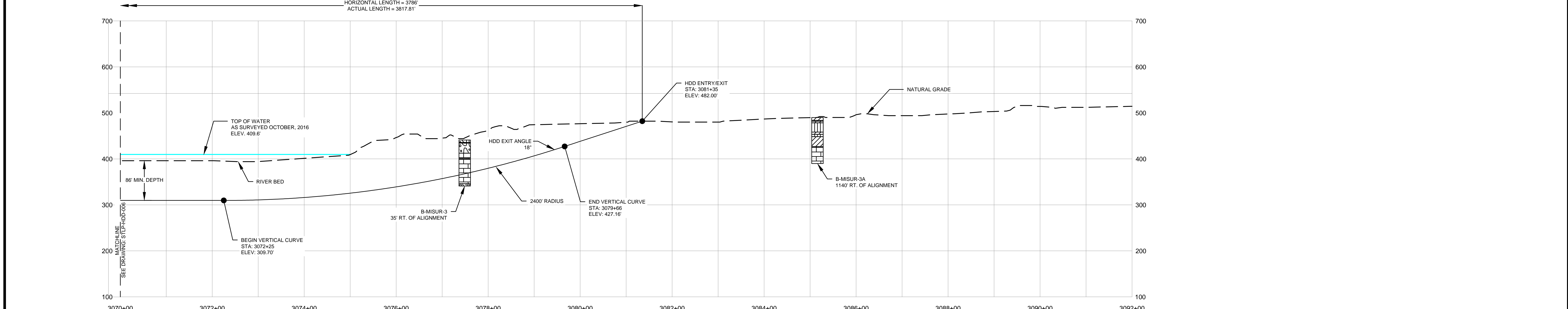
- ML: MUDSTONE
- CH: CLAY
- CL: CLAY
- SP: SAND
- SW: SAND WITH GRAVEL
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Rock Stratigraphic Legend:

- L: LIMESTONE
- M: MUDSTONE
- S: SHALE
- C: CONCRETE
- GP: GRAVEL

LEGEND:

- PROPOSED PERMANENT EASEMENT
- EXISTING PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- ADDITIONAL TEMPORARY WORKSPACE
- PROPOSED STAGING AREA
- ACCESS ROAD
- USACE EASEMENT
- PROPOSED 24-INCH DIAMETER PIPELINE
- PROPERTY LINE
- MMID
- EXISTING GAS PIPELINE
- EXISTING FOREIGN PIPELINE
- EXISTING OVERHEAD LINE
- ROAD CENTERLINE
- STREAM (DELINEATED)
- STREAM (DESKTOP)
- WETLAND (DESKTOP)
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REFERENCE DRAWINGS		REFERENCE DRAWINGS		REVISIONS				REVISIONS				APPROVALS									
DWG NO.	TITLE	DWG NO.	TITLE	NO.	REVISIONS	DATE	DRAWN	CK	APPR	NO.	REVISIONS	DATE	DRAWN	CK	APPR	DRAWN BY	DATE	ENG. APPROVAL	DATE	CLIENT APPROVAL	DATE
STLP-A-068	ALIGNMENT SHEET	STLP-HDD-006	HDD PROFILE OVERVIEW	1	ISSUE FOR FERC	01/2017	RJR	EB	RJP							R.J.P.	07/2017	D.G.G.	07/2017		
STLP-AR-007	ACCESS ROAD SITE PLAN - TAR-021			2	AMENDMENT TO FERC	04/2017	RJR	EB	RJP							CHECKED BY	DATE	P.M. APPROVAL	DATE		
STLP-SS-002	LACLEDE/LANGE DELIVERY STATION SITE LAYOUT - STLP-SS-002			3	FERC SUPPLEMENTAL FILING	07/2017	RJP	EB	RJP							M.A.P.	07/2017	J.E.W.	07/2017		STLP-HDD-007

PREPARED FOR  
**Spire STL Pipeline**

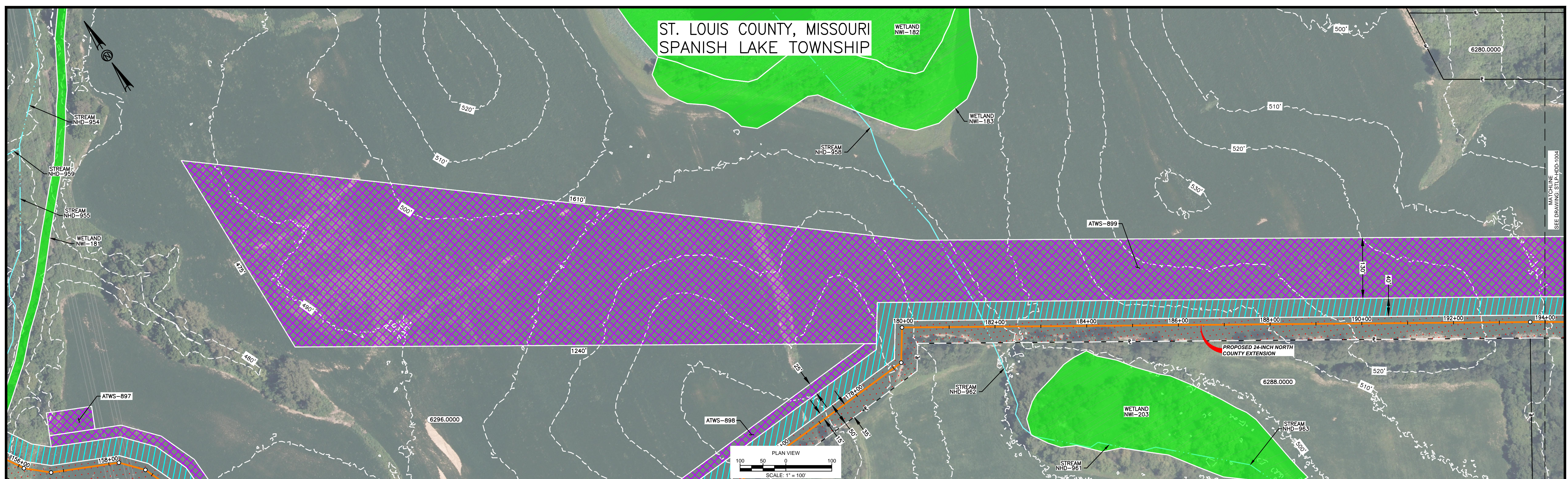
PREPARED BY  
**MOTT MACDONALD**

SPIRE STL PIPELINE PROJECT  
HDD PROFILE OVERVIEW  
MISSOURI RIVER MAINLINE  
ST. CHARLES & ST. LOUIS COUNTIES, MISSOURI

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ST. LOUIS COUNTY, MISSOURI  
SPANISH LAKE TOWNSHIP



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**SPANISH LAKE PARK HDD PLAN VIEW**

PILOT BORE DRILLING TOLERANCES SHALL BE AS FOLLOWS:	
ITEM	TOLERANCE
PILOT ENTRY ANGLE	INCREASE ANGLE UP TO 1 (STEEPER), BUT NO DECREASE IN ANGLE ALLOWED.
PILOT ENTRY LOCATION	AS STAKED BY OWNER. NO CHANGES WITHOUT OWNER APPROVAL
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- CH: CLAY
- CL: CLAY
- SP: SAND
- SW: SAND
- GP: GRAVEL
- SM: SAND
- LIMESTONE: LIMESTONE
- MUDSTONE: MUDSTONE
- SHALE: SHALE
- CONCRETE: CONCRETE
- GP: GRAVEL

**Rock Stratigraphic Legend:**

- LIMESTONE: LIMESTONE
- MUDSTONE: MUDSTONE
- SHALE: SHALE
- CONCRETE: CONCRETE
- GP: GRAVEL

**LEGEND**

- PROPOSED PERMANENT EASEMENT
- EXISTING PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- ADDITIONAL TEMPORARY WORKSPACE
- PROPOSED STAGING AREA
- ACCESS ROAD
- USACE EASEMENT
- PROPOSED 24-INCH NORTH COUNTY EXTENSION PROPERTY LINE
- MMID
- EXISTING GAS PIPELINE
- EXISTING FOREIGN PIPELINE
- EXISTING OVERHEAD LINE
- ROAD CENTERLINE
- STREAM (DELINEATED)
- STREAM (DESKTOP)
- WETLAND (DESKTOP)
- WETLAND (DELINEATED)

- NOTES:**
1. THE IMAGERY SHOWN WAS PROVIDED BY AERIAL DATA SERVICES, 2017. ADDITIONAL IMAGERY SUPPLEMENTED FROM USFWS-NWI AND USGS.
  2. EXISTING FEATURES SHOWN WERE SURVEYED BY MOTT MACDONALD AND DIGITIZED FROM IMAGERY. ALL LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED BY CONTRACTOR.
  3. PROPERTY LINES DEPICTED ON THIS PLAN ARE BASED ON GIS TAX MAP DATA.
  4. BASE FLOOD ELEVATION LINE SHOWN FOR 100 YEAR FLOOD PLAIN LIMIT WAS PULLED FROM FEMA FLOOD INSURANCE RATE MAPS (FIRM). THE ELEVATION OF 438 FEET WAS DETERMINED USING MAP NUMBERS 29189C0080K AND 17083C0278D.

REFERENCE DRAWINGS		REFERENCE DRAWINGS		REVISIONS				REVISIONS				APPROVALS				PREPARED FOR		PREPARED BY		SPIRE STL PIPELINE PROJECT								
DWG. NO.	TITLE	DWG. NO.	TITLE	NO.	REVISIONS	DATE	DRAWN	CK	APPR	NO.	REVISIONS	DATE	DRAWN	CK	APPR	DRAWN BY	DATE	ENG. APPROVAL	DATE	CLIENT APPROVAL	DATE	Spire STL Pipeline		MOTT MACDONALD		HDD PROFILE OVERVIEW		
STLP-A-1004	ALIGNMENT SHEET			2	AMENDMENT TO FERC	04/2017	AK	KAM	RJP							R.J.P.	07/2017	D.G.G.	07/2017									
STLP-HDD-1004	HDD PROFILE OVERVIEW			3	FERC SUPPLEMENTAL FILING	07/2017	RJP	KAM	RJP							M.A.P.	07/2017	J.E.W.	07/2017			STLP-HDD-1003						

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