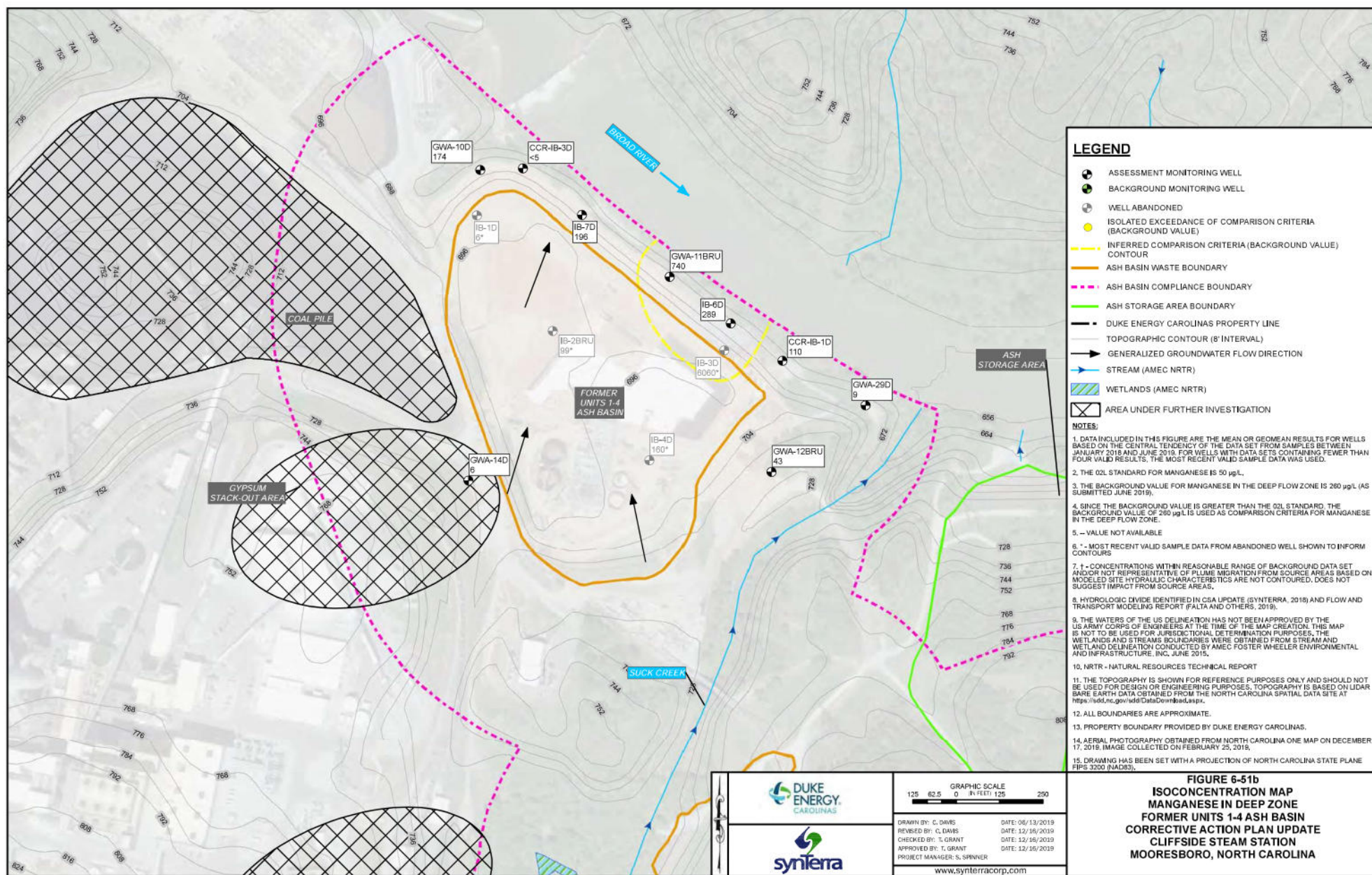


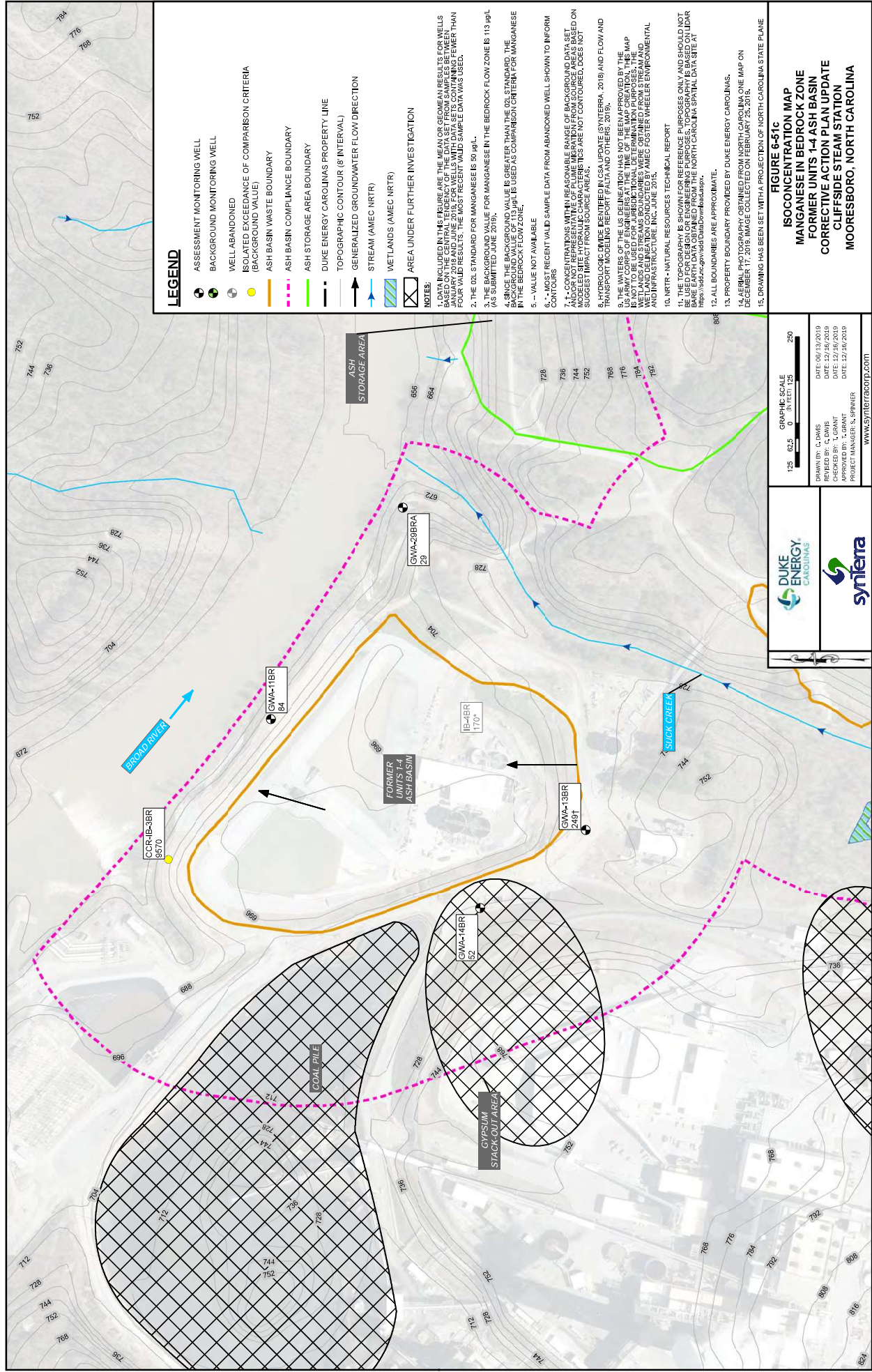
Cliffside part IV

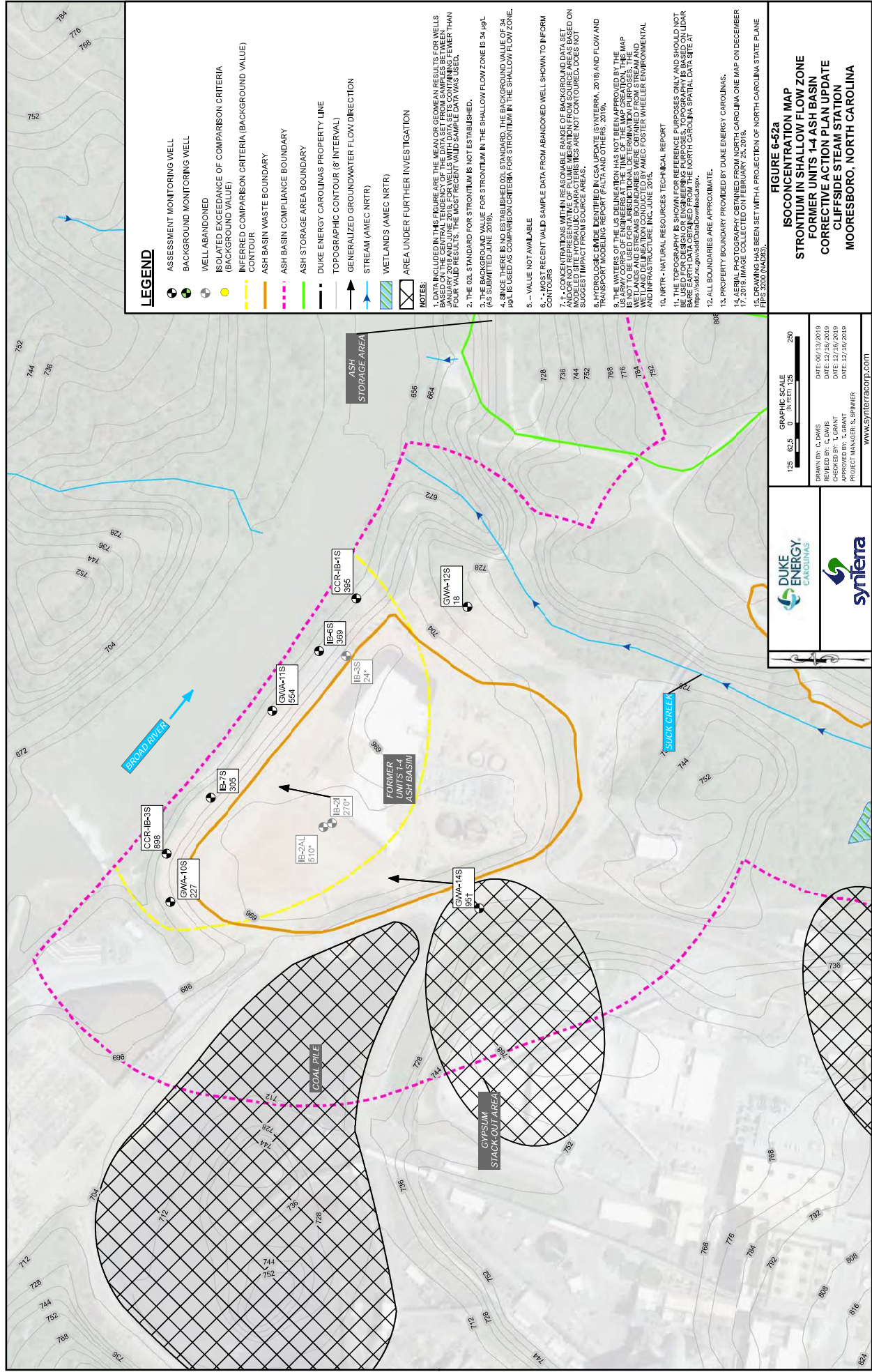


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 Nov 05 2020

Nov 05 2020

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LEGEND

- ASSESSMENT MONITORING WELL
- BACKGROUND MONITORING WELL
- WELL ABANDONED
- ISOLATED EXCEEDANCE OF COMPARISON CRITERIA (BACKGROUND VALUE)
- INFERRED COMPARISON CRITERIA (BACKGROUND VALUE) CONTOUR
- ASH BASIN WASTE BOUNDARY
- ASH BASIN COMPLIANCE BOUNDARY
- ASH STORAGE AREA BOUNDARY
- DUKE ENERGY CAROLINAS PROPERTY LINE
- TOPOGRAPHIC CONTOUR (8' INTERVAL)
- GENERALIZED GROUNDWATER FLOW DIRECTION
- STREAM (AMEC NRTI)
- WETLANDS (AMEC NRTI)
- AREA UNDER FURTHER INVESTIGATION

NOTES:

1. DATA INCLUDED IN THIS FIGURE ARE THE MEAN OR GEOMEAN RESULTS FOR WELLS BASED ON THE CENTRAL TENDENCY OF THE DATA SET FROM SAMPLES BETWEEN FOUR VALID RESULTS. THE MOST RECENT VALID SAMPLE DATA WAS USED.
2. THE DOL STANDARD FOR STROMTUM IS NOT ESTABLISHED.
3. THE BACKGROUND VALUE FOR STROMTUM IN THE SHALLOW FLOW ZONE IS 34 µg/L (AS SUBMITTED JUNE 2019).
4. SINCE THERE IS NO ESTABLISHED DOL STANDARD, THE BACKGROUND VALUE OF 34 µg/L IS USED AS COMPARISON CRITERIA FOR STROMTUM IN THE SHALLOW FLOW ZONE.
5. - VALUE NOT AVAILABLE
6. - MOST RECENT VALID SAMPLE DATA FROM ABANDONED WELL SHOWN TO INFORM CONCENTRATION
7. 1. CONCENTRATIONS WITHIN REASONABLE RANGE OF BACKGROUND DATA SET AND/OR NOT REPRESENTATIVE OF PLUME MIGRATION FROM SOURCE AREAS BASED ON 3000 FEET RADIUS HYDRAULIC CHARACTERISTICS ARE NOT CONTOURED. DOES NOT INCLUDE DATA FROM MONITORING POINTS WITHIN 3000 FEET RADIUS.
8. 3. PROPOSED MODEL RESULTS IN CONJUNCTION WITH (SINTERA, 2019) AND FLOW AND TRANSPORT MODELING REPORT DATA AND OTHERS, 2019).
9. THE WATERS OF THE US DELINEATION HAS NOT BEEN APPROVED BY THE US ARMY CORPS OF ENGINEERS AT THE TIME OF THE MAP CREATION. THIS MAP DOES NOT REPRESENT THE WATERS OF THE US DELINEATION. THE WATERS OF THE US DELINEATION AND STREAMS BOUNDARIES WERE OBTAINED FROM STREAM AND WETLAND DELINEATION CONDUCTED BY AMEC FOSTER WHEELER ENVIRONMENTAL CONSULTANTS (FWEC) IN 2019.
10. NRTI - NATURAL RESOURCES TECHNICAL REPORT
11. THE TOPOGRAPHY IS SHOWN FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE USED FOR ANY OTHER PURPOSES. THE TOPOGRAPHY IS BASED ON A 2018 AERIAL PHOTOGRAPHY OBTAINED FROM THE NORTH CAROLINA STATE PLANE DATUM. THE TOPOGRAPHY IS BASED ON A 2018 AERIAL PHOTOGRAPHY OBTAINED FROM THE NORTH CAROLINA STATE PLANE DATUM. THE TOPOGRAPHY IS BASED ON A 2018 AERIAL PHOTOGRAPHY OBTAINED FROM THE NORTH CAROLINA STATE PLANE DATUM.
12. ALL BOUNDARIES ARE APPROXIMATE.
13. PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY CAROLINAS.
14. AERIAL PHOTOGRAPHY OBTAINED FROM NORTH CAROLINA ONE MAP ON DECEMBER 17, 2018. IMAGE COLLECTED ON FEBRUARY 25, 2019.
15. DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE NAD83 3500 MADS3.

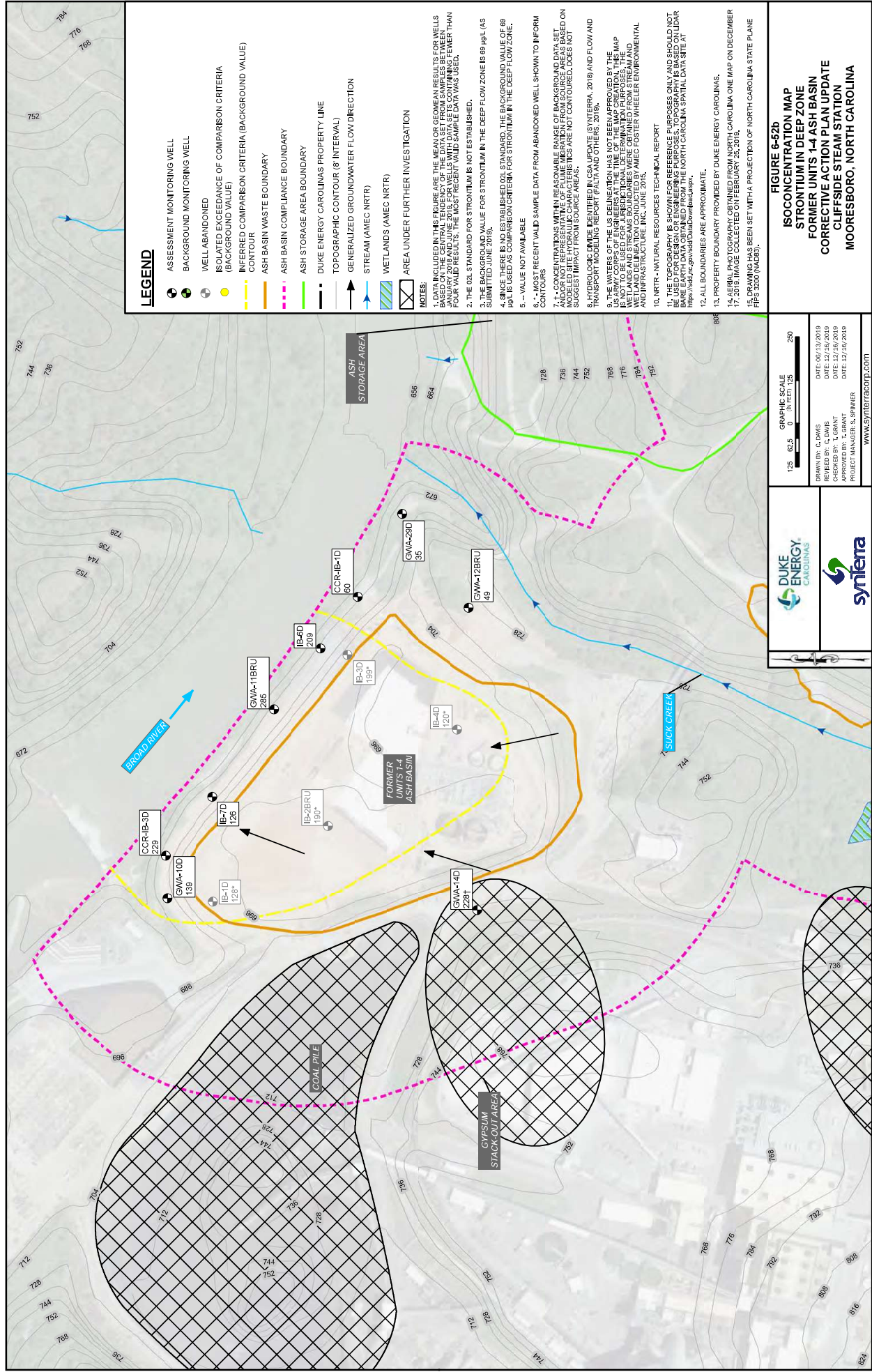


GRAPHIC SCALE
1" = 60.0' (IN FEET) 125'

DATE: 06/12/2019
REVIEWED BY: C. DAVIS
DATE: 12/16/2019
CHECKED BY: T. GRANT
DATE: 12/16/2019
APPROVED BY: T. GRANT
PROJECT MANAGER: S. SPRINGER

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FIGURE 6-52a
ISOCONCENTRATION MAP
STROMTUM IN SHALLOW FLOW ZONE
FORMER UNITS 1-4 ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA



LEGEND

- ASSESSMENT MONITORING WELL
- BACKGROUND MONITORING WELL
- WELL ABANDONED
- ISOLATED EXCEEDANCE OF COMPARISON CRITERIA (BACKGROUND VALUE)
- INFERRED COMPARISON CRITERIA (BACKGROUND VALUE) CONTOUR
- ASH BASIN WASTE BOUNDARY
- ASH BASIN COMPLIANCE BOUNDARY
- ASH STORAGE AREA BOUNDARY
- DUKE ENERGY CAROLINAS PROPERTY LINE
- TOPOGRAPHIC CONTOUR (8' INTERVAL)
- GENERALIZED GROUNDWATER FLOW DIRECTION
- STREAM (AMEC NTR)
- WETLANDS (AMEC NTR)
- AREA UNDER FURTHER INVESTIGATION

NOTES:

1. DATA INCLUDED IN THIS FIGURE ARE THE MEAN OR GEOMEAN RESULTS FOR WELLS BASED ON THE CENTRAL TENDENCY OF THE DATA SET FROM SAMPLES BETWEEN FOUR VALID RESULTS. THE MOST RECENT VALID SAMPLE DATA WAS USED.
2. THE DOL STANDARD FOR STRONTIUM IS NOT ESTABLISHED.
3. THE BACKGROUND VALUE FOR STRONTIUM IN THE DEEP FLOW ZONE IS 69 µg/L (AS SUBMITTED JUNE 2019).
4. SINCE THERE IS NO ESTABLISHED DOL STANDARD, THE BACKGROUND VALUE OF 69 µg/L IS USED AS COMPARISON CRITERIA FOR STRONTIUM IN THE DEEP FLOW ZONE.
5. - VALUE NOT AVAILABLE
6. * MOST RECENT VALID SAMPLE DATA FROM ABANDONED WELL SHOWN TO INFORM CONTOURS
7. 1. CONCENTRATIONS WITHIN REASONABLE RANGE OF BACKGROUND DATA SET WERE USED TO DETERMINE THE MOST REASONABLE SET OF CONTOURS TO SUGGEST IMPACT FROM SOURCE AREAS.
8. HYDROLOGIC DIME IDENTIFIED IN CSA UPDATE (SYNTERRA, 2018) AND FLOW AND TRANSPORT MODELING REPORT (FALC AND OTHERS, 2019).
9. THE WATERS OF THE US DELINEATION HAS NOT BEEN APPROVED BY THE U.S. ARMY CORPS OF ENGINEERS. THIS DELINEATION IS FOR INFORMATIONAL PURPOSES. THE MAP IS NOT TO BE USED FOR JURISDICTIONAL DETERMINATION PURPOSES. THE WATERS OF THE US DELINEATION IS THE PROPERTY OF SYNTERRA AND SYNTERRA AND INFRASTRUCTURE, INC. JUNE 2015.
10. NTR - NATURAL RESOURCES TECHNICAL REPORT
11. THE TOPOGRAPHY IS SHOWN FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE USED FOR DESIGN OR ENGINEERING PURPOSES. TOPOGRAPHY IS BASED ON LIDAR DATA FROM THE STATE OF NORTH CAROLINA. SPATIAL DATA DATE: 1/1/17. <https://sdata.nc.gov/sdata/DataDownload.aspx>.
12. ALL BOUNDARIES ARE APPROXIMATE.
13. PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY CAROLINAS.
14. AERIAL PHOTOGRAPHY OBTAINED FROM NORTH CAROLINA ONE MAP ON DECEMBER 17, 2018. IMAGE COLLECTED ON FEBRUARY 23, 2019.
15. DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE FIPS 3200 (NAD83).

FIGURE 6-52B
ISOCONCENTRATION MAP
STRONTIUM IN DEEP ZONE
FORMER UNITS 1-4 ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA

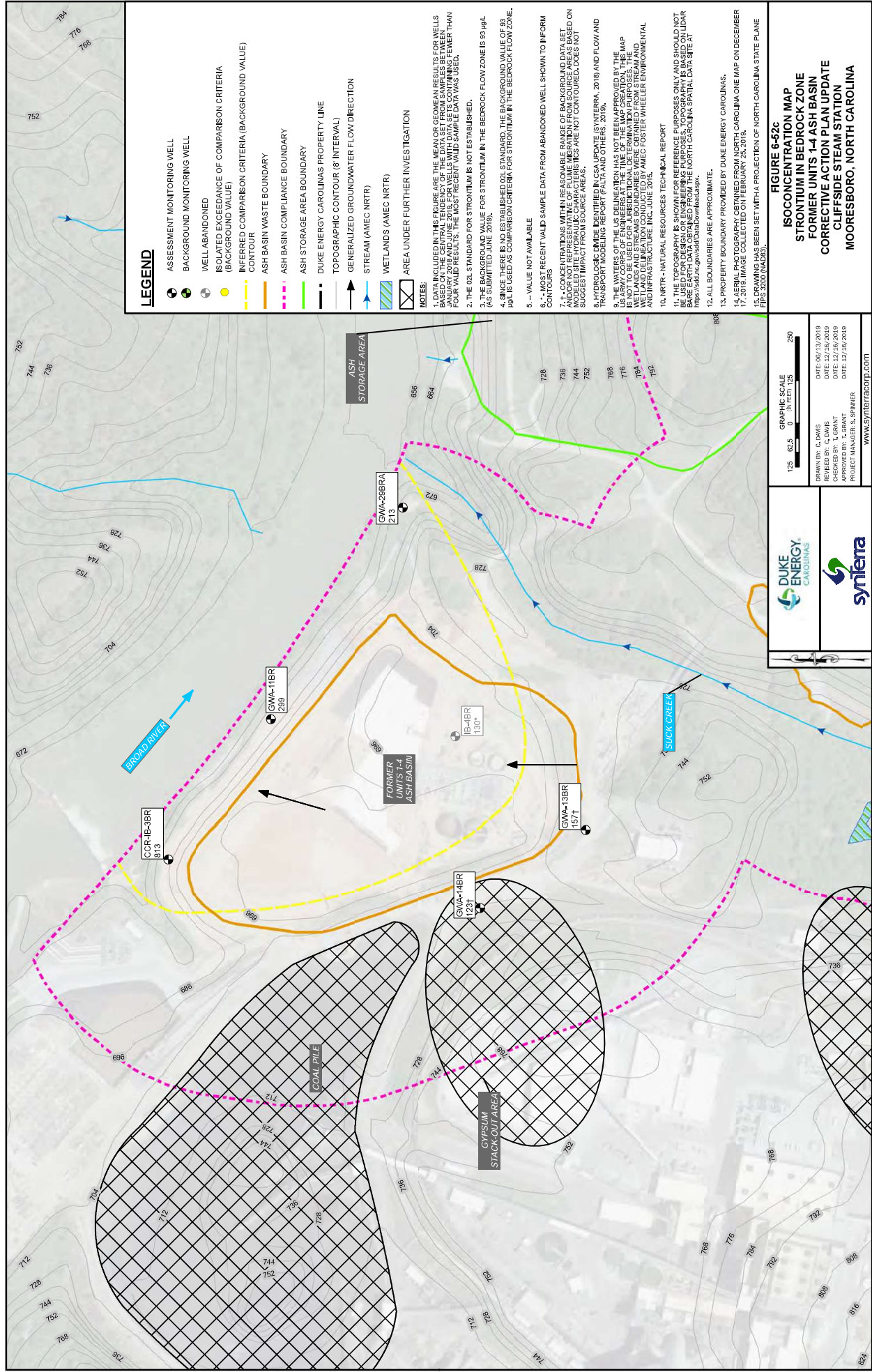
GRAPHIC SCALE: 125 60.5 0 IN FEET 125 250

SYNTERRA

DUKE ENERGY CAROLINAS

DATE: 06/12/2019
REVIEWED BY: C. DAVIS
DATE: 12/16/2019
CHECKED BY: T. GRANT
APPROVED BY: T. GRANT
PROJECT MANAGER: S. SPRINGER

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LEGEND

- ASSESSMENT MONITORING WELL
- BACKGROUND MONITORING WELL
- WELL ABANDONED
- ISOLATED EXCEEDANCE OF COMPARISON CRITERIA (BACKGROUND VALUE)
- INFERRED COMPARISON CRITERIA (BACKGROUND VALUE) CONTOUR
- ASH BASIN WASTE BOUNDARY
- ASH BASIN COMPLIANCE BOUNDARY
- ASH STORAGE AREA BOUNDARY
- DUKE ENERGY CAROLINAS PROPERTY LINE
- TOPOGRAPHIC CONTOUR (8' INTERVAL)
- GENERALIZED GROUNDWATER FLOW DIRECTION
- STREAM (AMEC NRTI)
- WETLANDS (AMEC NRTI)
- AREA UNDER FURTHER INVESTIGATION

NOTES:

1. DATA INCLUDED IN THIS FIGURE ARE THE MEAN OR GEOMEAN RESULTS FOR WELLS BASED ON THE CENTRAL TENDENCY OF THE DATA SET FROM SAMPLES BETWEEN FOUR VALID RESULTS. THE MOST RECENT VALID SAMPLE DATA WAS USED.
2. THE DOL STANDARD FOR STRONTIUM IS NOT ESTABLISHED.
3. THE BACKGROUND VALUE FOR STRONTIUM IN THE BEDROCK FLOW ZONE IS 93 µg/L (AS SUBMITTED JUNE 2019).
4. SINCE THERE IS NO ESTABLISHED DOL STANDARD, THE BACKGROUND VALUE OF 93 µg/L IS USED AS COMPARISON CRITERIA FOR STRONTIUM IN THE BEDROCK FLOW ZONE.
5. - VALUE NOT AVAILABLE
6. - MOST RECENT VALID SAMPLE DATA FROM ABANDONED WELL SHOWN TO INFORM CONCENTRATION
7. - CONCENTRATIONS WITHIN REASONABLE RANGE OF BACKGROUND DATA SET AND/OR NOT REPRESENTATIVE OF PLUME MIGRATION FROM SOURCE AREAS BASED ON EXCEEDANCE OF COMPARISON CRITERIA (BACKGROUND VALUE) ARE NOT SHOWN.
8. - HYDROLOGIC MODEL RESULTS FROM CS, WPPATE, (SYNTERRA, 2019) AND FLOW AND TRANSPORT MODELING REPORT (PATA AND OTHERS, 2019).
9. THE WATERS OF THE US DELINEATION HAS NOT BEEN APPROVED BY THE US ARMY CORPS OF ENGINEERS AT THE TIME OF THE MAP CREATION. THIS MAP WAS CREATED USING THE DELINEATION OF THE US ARMY CORPS OF ENGINEERS. WETLANDS AND STREAMS BOUNDARIES WERE OBTAINED FROM STREAM AND WETLAND DELINEATION CONDUCTED BY AMEC FOSTER WHEELER ENVIRONMENTAL CONSULTANTS (FWEC) IN 2019.
10. NRTI - NATURAL RESOURCES TECHNICAL REPORT
11. THE TOPOGRAPHY IS SHOWN FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE USED FOR ANY OTHER PURPOSES. THE TOPOGRAPHY IS BASED ON A 2018 AERIAL PHOTOGRAPHY OBTAINED FROM THE NORTH CAROLINA STATE PLANE DATUM. THE TOPOGRAPHY IS BASED ON A 2018 AERIAL PHOTOGRAPHY OBTAINED FROM THE NORTH CAROLINA STATE PLANE DATUM. THE TOPOGRAPHY IS BASED ON A 2018 AERIAL PHOTOGRAPHY OBTAINED FROM THE NORTH CAROLINA STATE PLANE DATUM.
12. ALL BOUNDARIES ARE APPROXIMATE.
13. PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY CAROLINAS.
14. AERIAL PHOTOGRAPHY OBTAINED FROM NORTH CAROLINA ONE MAP ON DECEMBER 17, 2018. IMAGE COLLECTED ON FEBRUARY 25, 2019.
15. DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE NAD83 3500 MADS3.

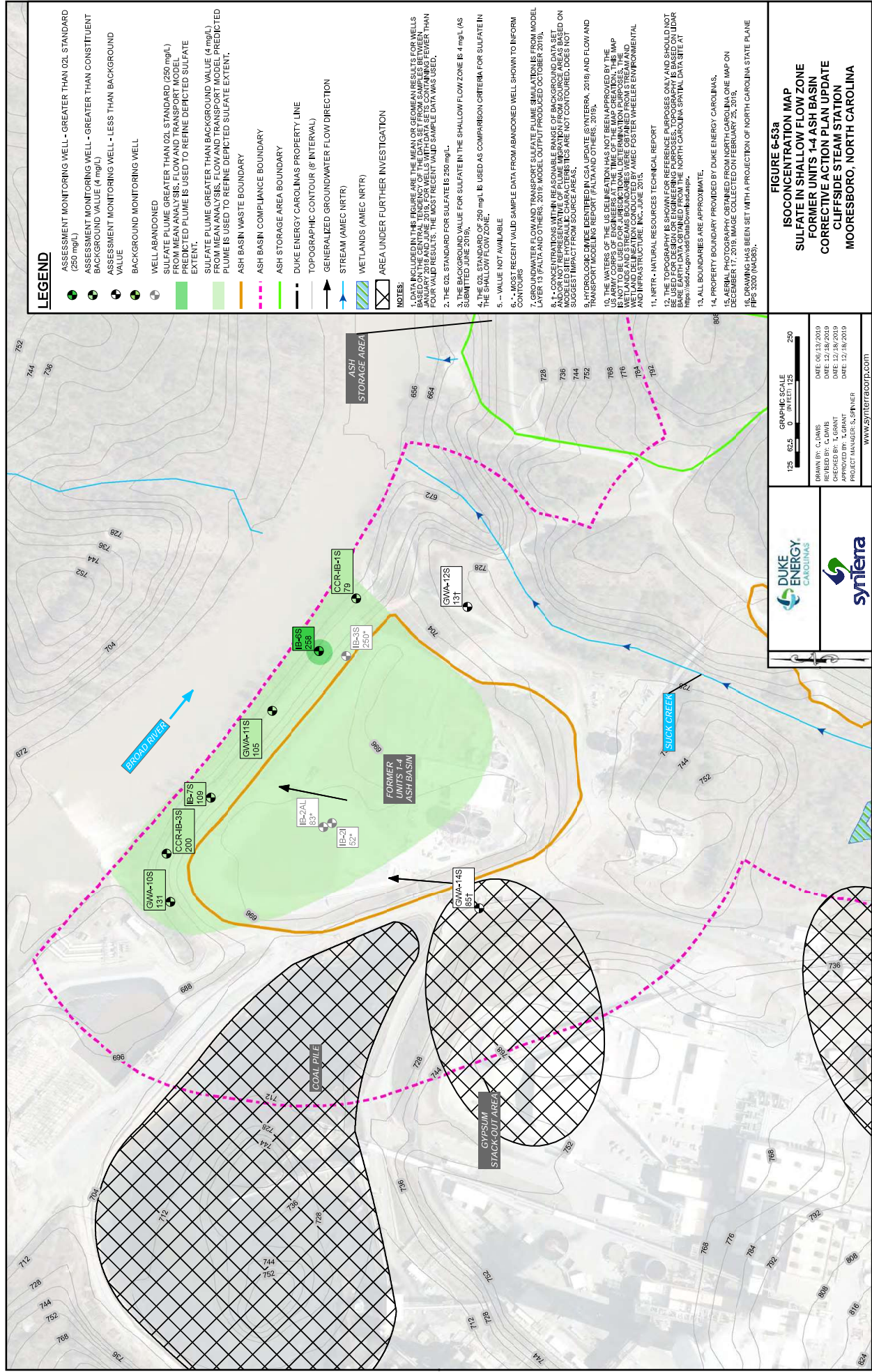
FIGURE 6-52C
ISOCONCENTRATION MAP
STRONTIUM IN BEDROCK ZONE
FORMER UNITS 1-4 ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA

GRAPHIC SCALE: 125 60.5 0 (IN FEET) 125 250

DATE: 06/12/2019
REVIEWED BY: C. DAVIS
CHECKED BY: T. GRANT
APPROVED BY: T. GRANT
PROJECT MANAGER: S. SPRINGER

DUKE ENERGY CAROLINAS
synterra

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LEGEND

- ASSESSMENT MONITORING WELL - GREATER THAN 02L STANDARD (250 mg/L)
- ASSESSMENT MONITORING WELL - GREATER THAN CONSTITUENT BACKGROUND VALUE (4 mg/L)
- ASSESSMENT MONITORING WELL - LESS THAN BACKGROUND VALUE
- BACKGROUND MONITORING WELL

- WELL ABANDONED
- SULFATE PLUME GREATER THAN 02L STANDARD (250 mg/L) FROM MEAN ANALYSIS, FLOW AND TRANSPORT MODEL. PREDICTED PLUME IS USED TO REFINE DEPICTED SULFATE EXTENT.
- SULFATE PLUME GREATER THAN BACKGROUND VALUE (4 mg/L) FROM MEAN ANALYSIS, FLOW AND TRANSPORT MODEL. PREDICTED PLUME IS USED TO REFINE DEPICTED SULFATE EXTENT.

- ASH BASIN COMPLIANCE BOUNDARY
- ASH BASIN COMPLIANCE BOUNDARY
- ASH STORAGE AREA BOUNDARY

- DUKE ENERGY CAROLINAS PROPERTY LINE
- TOPOGRAPHIC CONTOUR (8' INTERVAL)
- GENERALIZED GROUNDWATER FLOW DIRECTION

- STREAM (AMEC NRTI)
- WETLANDS (AMEC NRTI)
- AREA UNDER FURTHER INVESTIGATION

NOTES:

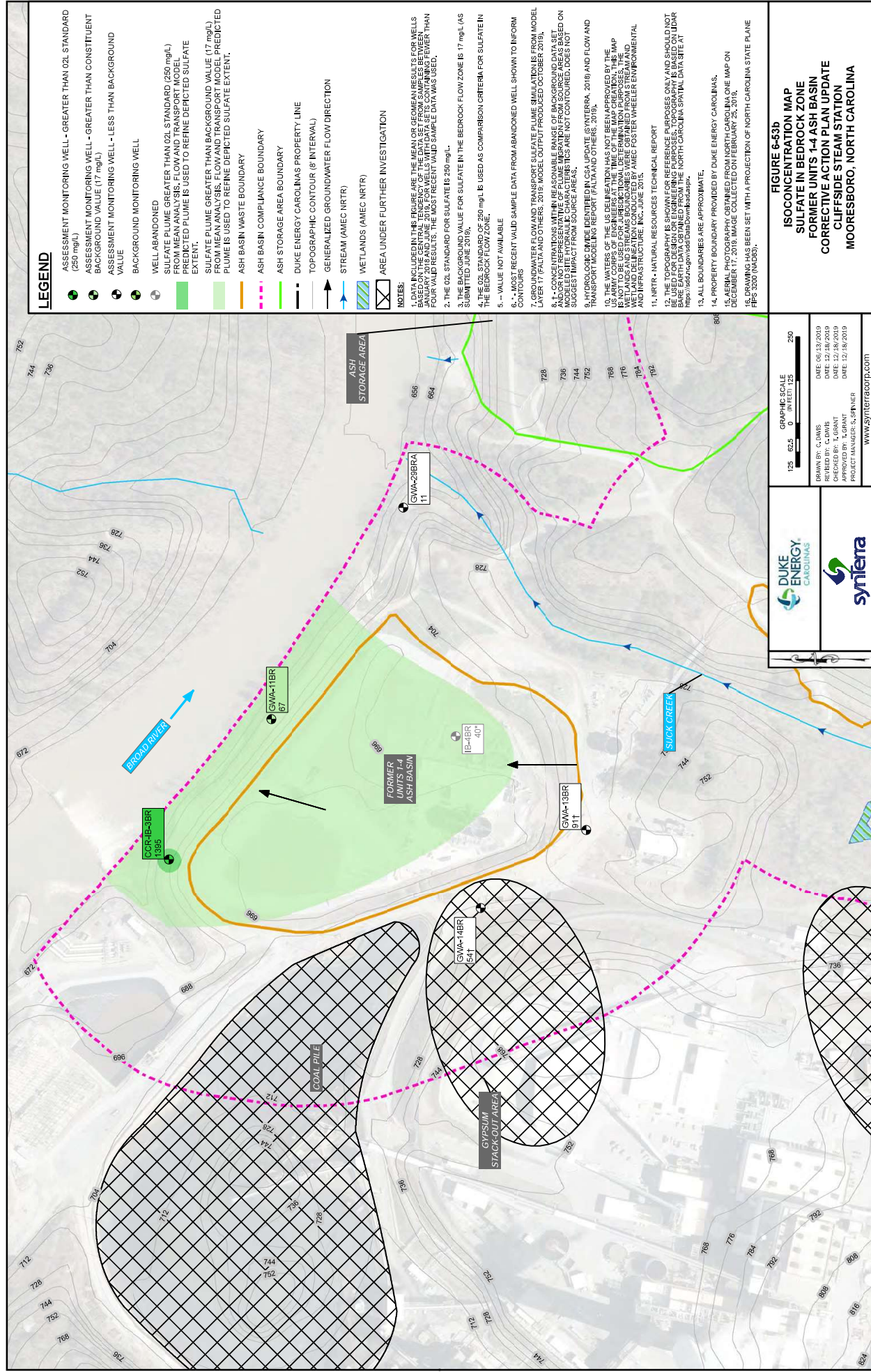
1. DATA INCLUDED IN THIS FIGURE ARE THE MEAN OR GEOMEAN RESULTS FOR WELLS BASED ON THE CENTRAL TENDENCY OF THE DATA FROM SAMPLES COLLECTED BETWEEN FOUR WILD RESULTS. THE MOST RECENT WILD SAMPLE DATA WAS USED.
2. THE 02L STANDARD FOR SULFATE IS 250 mg/L.
3. THE BACKGROUND VALUE FOR SULFATE IN THE SHALLOW FLOW ZONE IS 4 mg/L (AS SUBMITTED JUNE 2019).
4. THE 02L STANDARD OF 250 mg/L IS USED AS COMPARISON CRITERIA FOR SULFATE IN THE SHALLOW FLOW ZONE.
5. - VALUE NOT AVAILABLE
6. * - MOST RECENT WILD SAMPLE DATA FROM ABANDONED WELL SHOWN TO INFORM CONTOURS
7. GROUNDWATER FLOW AND TRANSPORT SULFATE PLUME SIMULATION IS FROM MODEL LATER IS FALIA AND OTHERS, 2019. MODEL OUTPUT PRODUCED OCTOBER 2019.
8. MODELING WAS CONDUCTED USING A HYDRAULIC CONDUCTIVITY DATA SET BASED ON AND OF NOT REPRESENTATIVE OF FLOW AND TRANSPORT DATA. MODELING WAS CONDUCTED USING A HYDRAULIC CONDUCTIVITY DATA SET BASED ON AND OF NOT REPRESENTATIVE OF FLOW AND TRANSPORT DATA. MODELING WAS CONDUCTED USING A HYDRAULIC CONDUCTIVITY DATA SET BASED ON AND OF NOT REPRESENTATIVE OF FLOW AND TRANSPORT DATA.
9. MODELING WAS CONDUCTED USING A HYDRAULIC CONDUCTIVITY DATA SET BASED ON AND OF NOT REPRESENTATIVE OF FLOW AND TRANSPORT DATA. MODELING WAS CONDUCTED USING A HYDRAULIC CONDUCTIVITY DATA SET BASED ON AND OF NOT REPRESENTATIVE OF FLOW AND TRANSPORT DATA.
10. THE WATERS OF THE US DELINEATION HAS NOT BEEN APPROVED BY THE US ARMY CORPS OF ENGINEERS AT THE TIME OF THE MAP CREATION. THE MAP WAS CREATED USING THE WATERS OF THE US DELINEATION. THE WATERS OF THE US DELINEATION HAS NOT BEEN APPROVED BY THE US ARMY CORPS OF ENGINEERS AT THE TIME OF THE MAP CREATION. THE MAP WAS CREATED USING THE WATERS OF THE US DELINEATION.
11. NRTI - NATURAL RESOURCES TECHNICAL REPORT
12. THE TOPOGRAPHY IS SHOWN FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE USED FOR ANY OTHER PURPOSES. THE TOPOGRAPHY IS SHOWN FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE USED FOR ANY OTHER PURPOSES. THE TOPOGRAPHY IS SHOWN FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE USED FOR ANY OTHER PURPOSES.
13. ALL BOUNDARIES ARE APPROXIMATE.
14. PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY CAROLINAS.
15. AERIAL PHOTOGRAPHY OBTAINED FROM NORTH CAROLINA ONE MAP ON DECEMBER 17, 2019. IMAGE COLLECTED ON FEBRUARY 28, 2019.
16. DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE FIPS 3200 (NAD83).

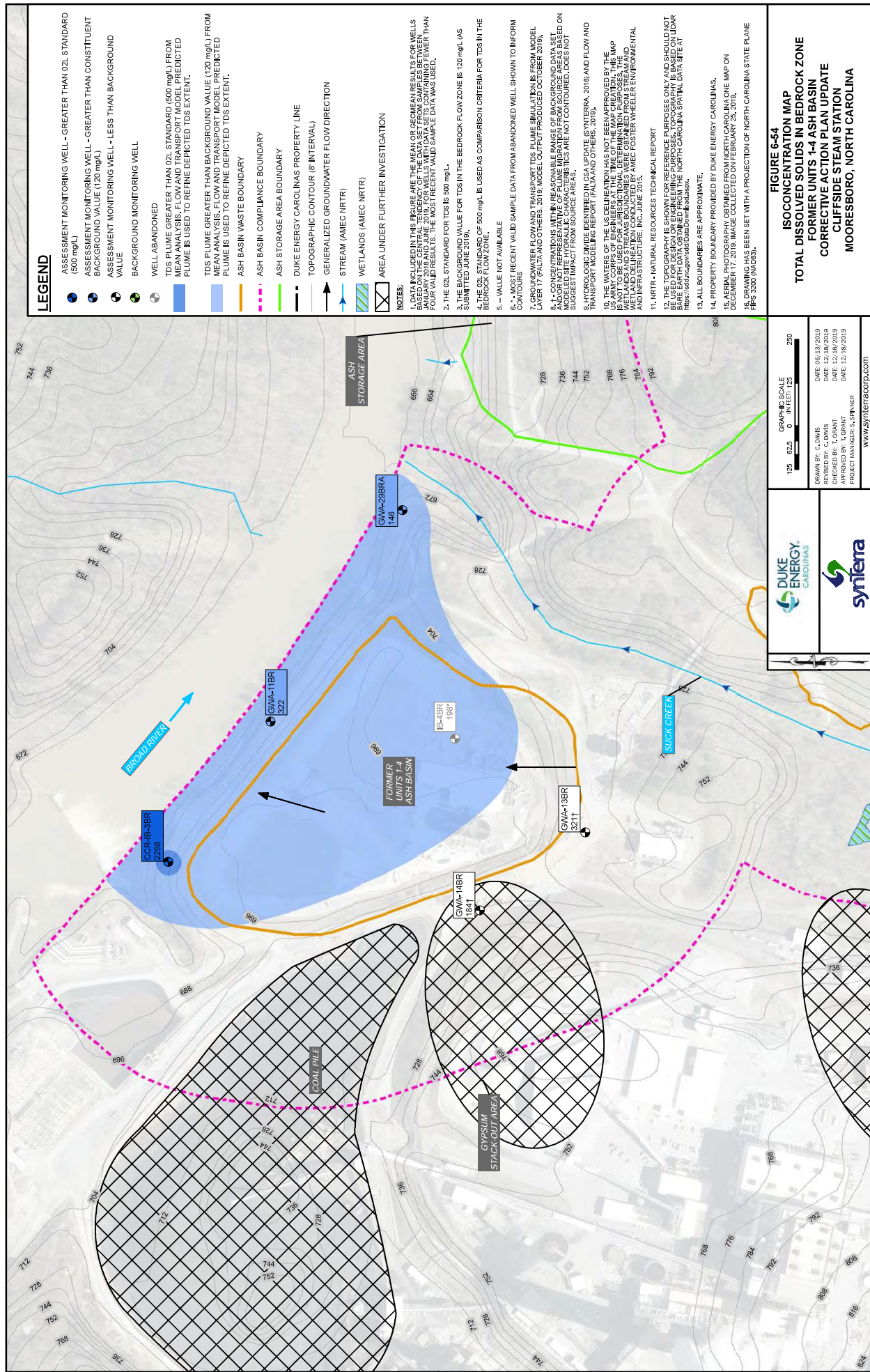


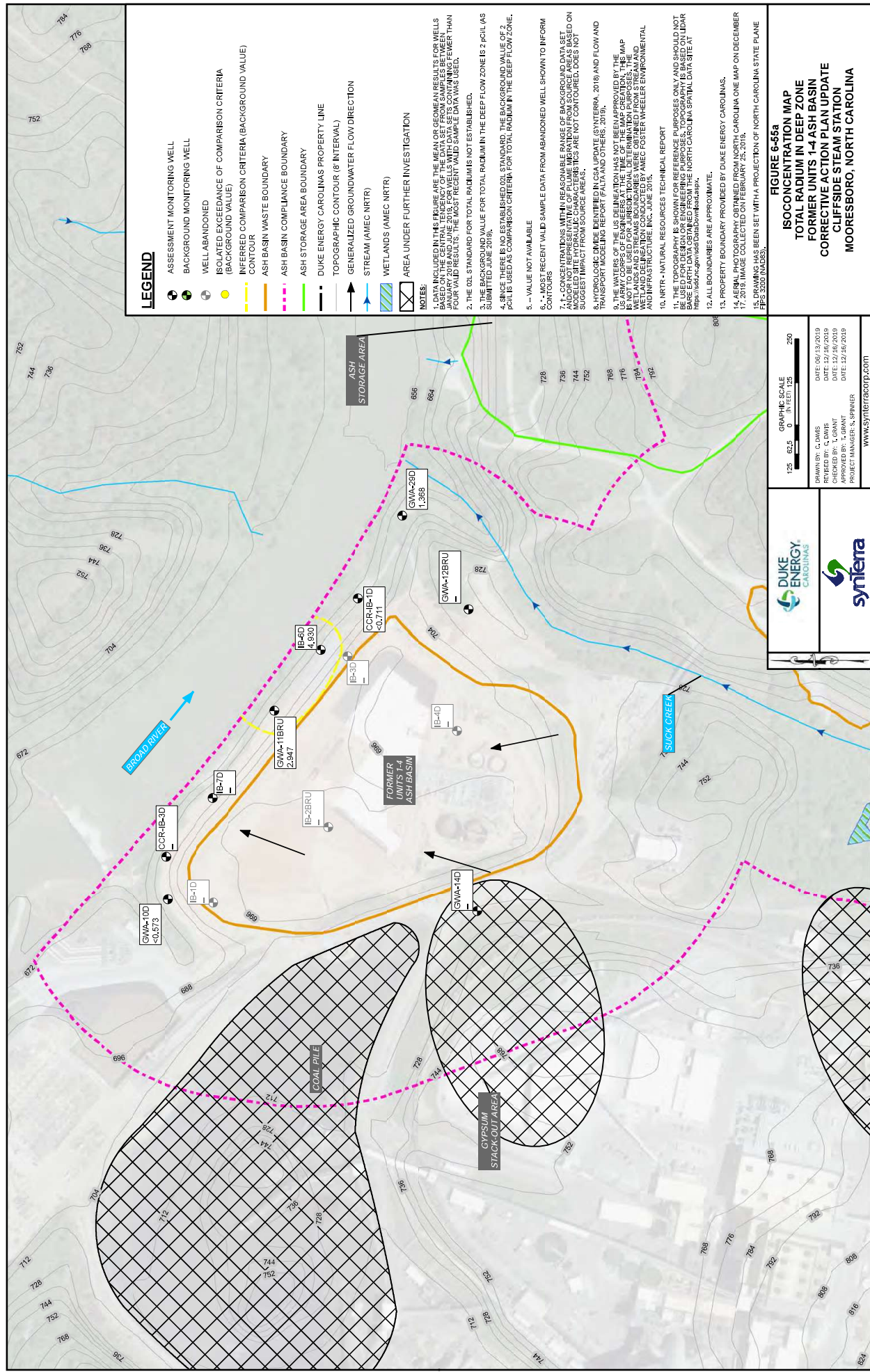
GRAPHIC SCALE
125 62.5 0 IN FEET 125

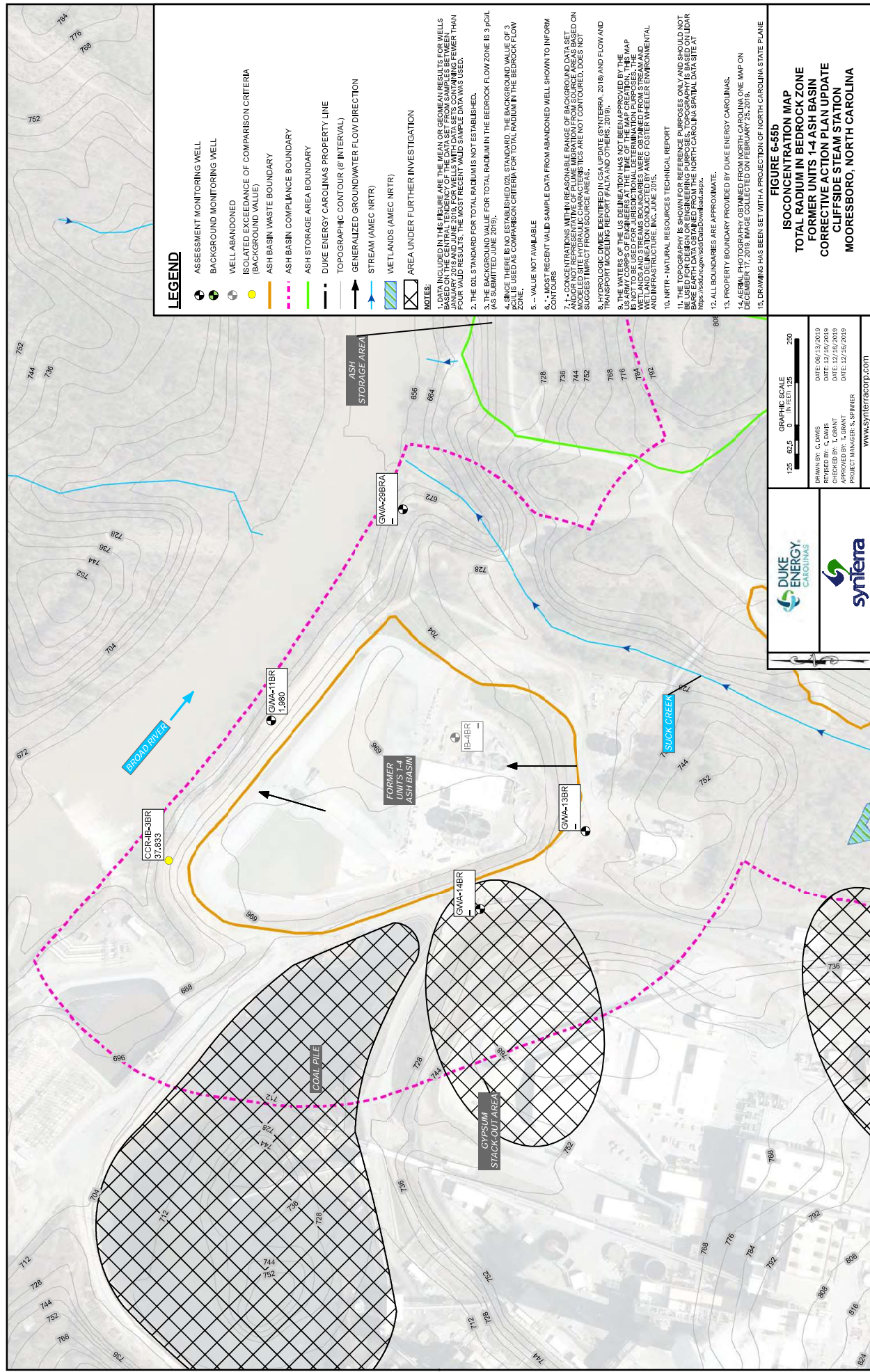
DATE: 06/12/2019
REVIEWED BY: C. DAVIS
CHECKED BY: T. GRANT
APPROVED BY: T. GRANT
PROJECT MANAGER: S. SPINER
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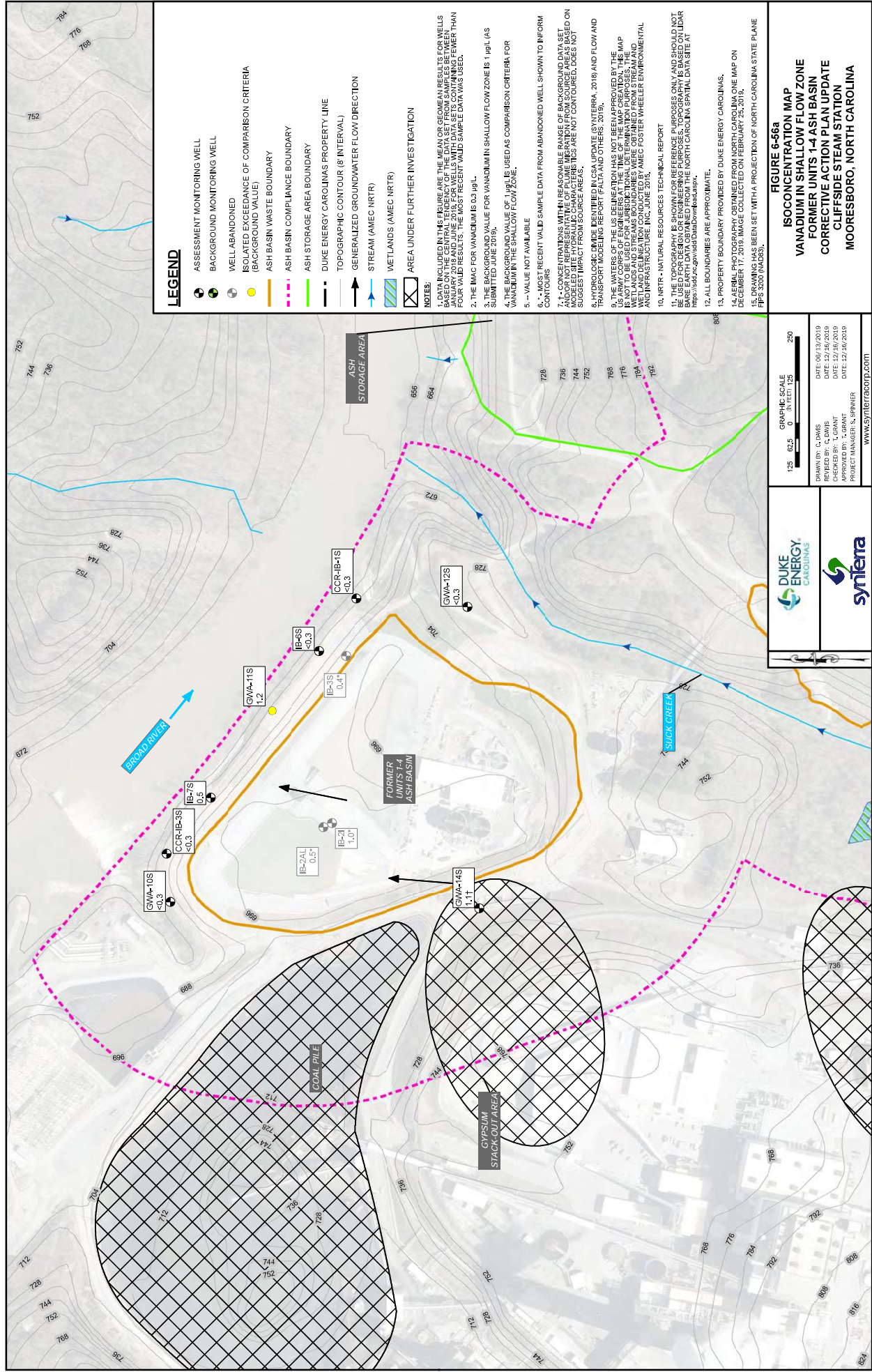
FIGURE 6-53a
ISOCONCENTRATION MAP
Sulfate in Shallow Flow Zone
FORMER UNITS 1-4 ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA

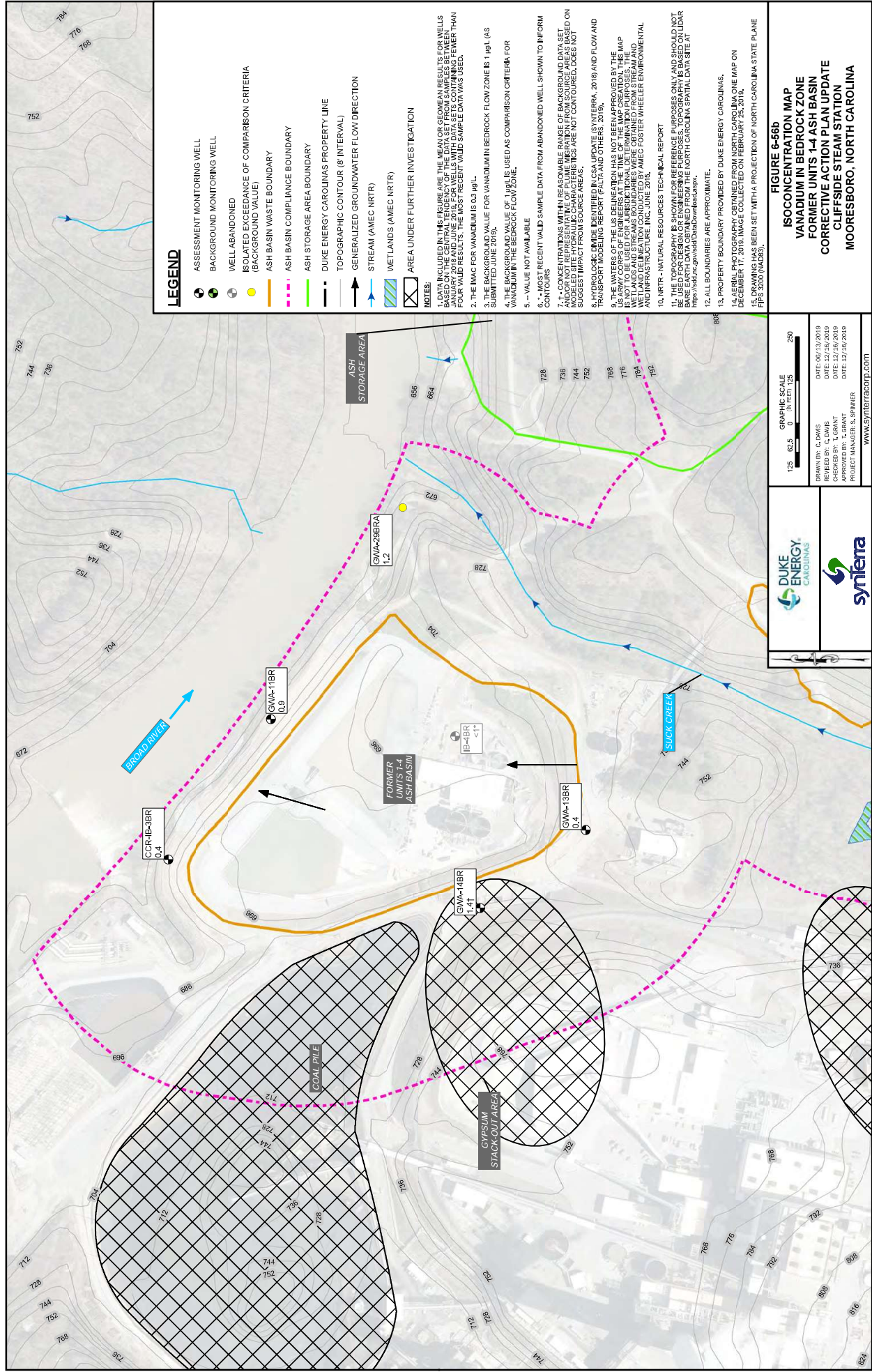












LEGEND

- ASSESSMENT MONITORING WELL
- BACKGROUND MONITORING WELL
- WELL ABANDONED
- ISOLATED EXCEEDANCE OF COMPARISON CRITERIA (BACKGROUND VALUE)
- ASH BASIN WASTE BOUNDARY
- ASH BASIN COMPLIANCE BOUNDARY
- ASH STORAGE AREA BOUNDARY
- DUKE ENERGY CAROLINAS PROPERTY LINE
- TOPOGRAPHIC CONTOUR (8' INTERVAL)
- GENERALIZED GROUNDWATER FLOW DIRECTION
- STREAM (AMEC NRTR)
- WETLANDS (AMEC NRTR)
- AREA UNDER FURTHER INVESTIGATION

NOTES:

1. DATA INCLUDED IN THIS FIGURE ARE THE MEAN QS GEOWEEN RESULTS FOR WELLS BASED ON THE CENTRAL TENDENCY OF THE DATA SET FROM SAMPLES BETWEEN JANUARY 2018 AND JUNE 2018. FOR WELLS WITH DATA SETS CONTAINING FEWER THAN FOUR DATA POINTS, THE RESULTS ARE PRESENT AND SAMPLE DATA WERE USED.

2. THE IMAC FOR VANADIUM IS 0.3 µg/L.

3. THE BACKGROUND VALUE FOR VANADIUM IN BEDROCK FLOW ZONE IS 1 µg/L (AS A COMPARISON CRITERION).

4. THE BACKGROUND VALUE OF 1 µg/L IS USED AS COMPARISON CRITERION FOR VANADIUM IN THE BEDROCK FLOW ZONE.

5. - VALUE NOT AVAILABLE

6. - MOST RECENT VALID SAMPLE DATA FROM ABANDONED WELL SHOWN TO INFORM CONTOURS

7. 1- CONCENTRATIONS WITHIN REASONABLE RANGE OF BACKGROUND DATA SET AND OF REPRESENTATIVE OF PLUME MIGRATION FROM SOURCE AREAS BASED ON SOURCE IMPACT ANALYSIS. THESE ARE NOT CONTOURED, DOES NOT SUGGEST IMPACT FROM SOURCE AREAS.

8. HYDROLOGIC DIVIDE IDENTIFIED IN LCA UPDATE (SYNTERRA 2018) AND FLOW AND TRANSPORT MODELING REPORT (FALTA AND OTHERS, 2019).

9. THE WATERS OF THE US DELINEATION HAS NOT BEEN APPROVED BY THE US ARMY CORPS OF ENGINEERS. THE DELINEATION IS FOR INFORMATION. THE MAP IS NOT TO BE USED FOR ENGINEERING PURPOSES. THE FLOWING MAP DELINEATION, THE WETLANDS AND STREAMS BOUNDARIES WERE OBTAINED FROM STREAM AND WETLANDS DATA SETS. THE DATA SETS WERE OBTAINED FROM STREAM AND WETLANDS DATA SETS. THE DATA SETS WERE OBTAINED FROM STREAM AND WETLANDS DATA SETS. THE DATA SETS WERE OBTAINED FROM STREAM AND WETLANDS DATA SETS.

10. NRTR - NATURAL RESOURCES TECHNICAL REPORT

11. THE TOPOGRAPHY IS SHOWN FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE USED FOR DESIGN OR ENGINEERING PURPOSES. TOPOGRAPHY IS BASED ON LIDAR DATA OBTAINED FROM THE NORTH CAROLINA STATE PLANE DATUM.

12. ALL BOUNDARIES ARE APPROXIMATE.

13. PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY CAROLINAS.

14. AERIAL PHOTOGRAPHY OBTAINED FROM NORTH CAROLINA ONE MAP ON DECEMBER 17, 2019. IMAGE COLLECTED ON FEBRUARY 25, 2019.

15. DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE (NAD 83) UTM ZONE 18N.

FIGURE 6-56B

**ISOCONCENTRATION MAP
VANADIUM IN BEDROCK ZONE
FORMER UNITS 1-4 ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA**

GRAPHIC SCALE: 1" = 60.5' (IN FEET) 1" = 250'

DRAWN BY: C. DAVIS
DATE: 06/13/2019
REVIEWED BY: C. DAVIS
DATE: 12/16/2019
CHECKED BY: T. GRANT
DATE: 12/16/2019
APPROVED BY: T. GRANT
PROJECT NUMBER: S. SPRINGER
WWW.SYNTERRACORP.COM



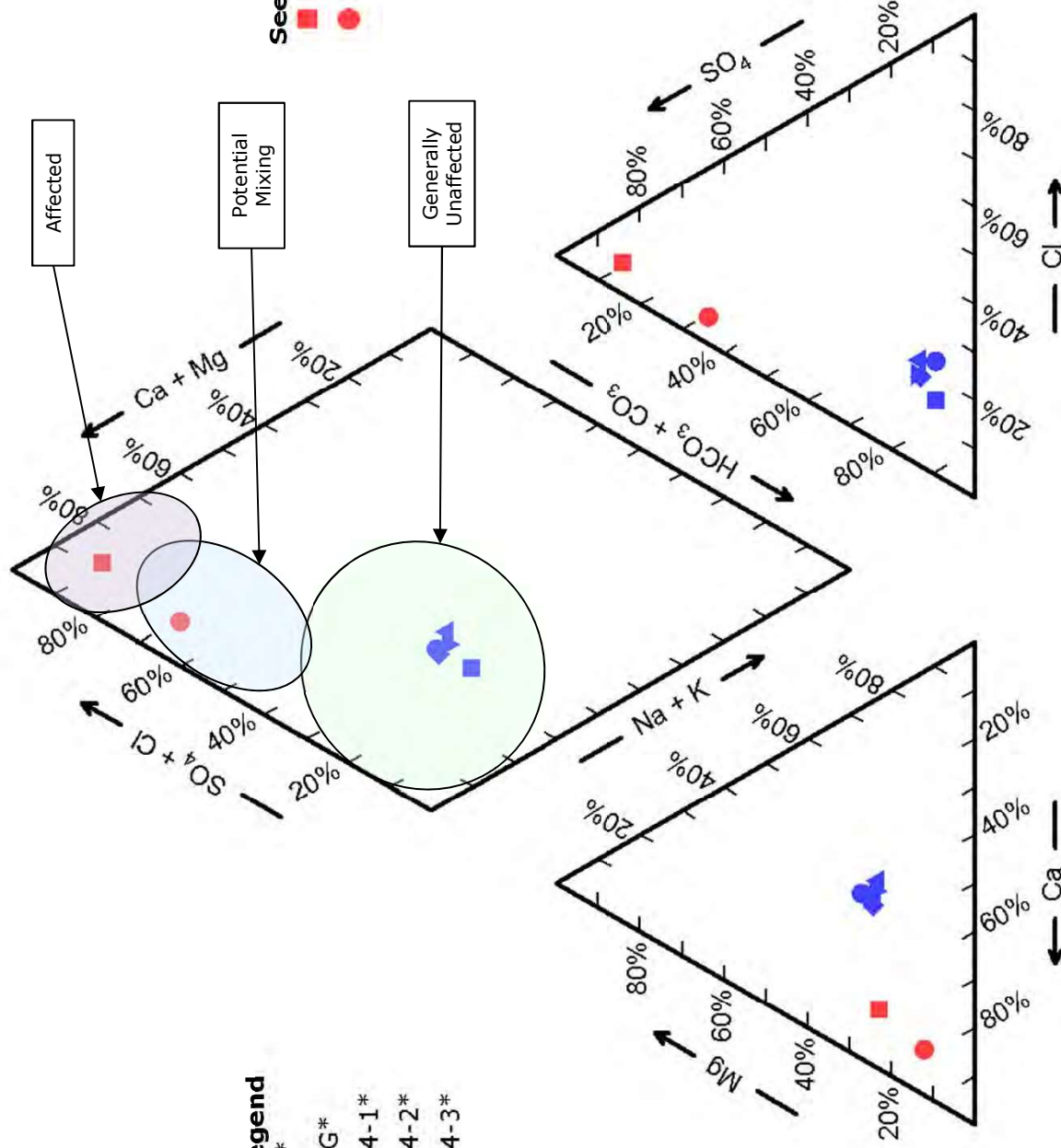
Note:
* - Sampling events prior to 1/1/2018

Surface Water Legend

- SW-BR-3*
- SW-SBRBG*
- ▲ SW-BRU14-1*
- ▼ SW-BRU14-2*
- ◆ SW-BRU14-3*

Seeps Legend

- S-3*
- S-10*



DRAWN BY: R. Badum
REVISED BY: R. Badum
CHECKED BY: T. Grant
APPROVED BY: T. Grant
PROJECT MANAGER: S. Spinner

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DATE: 10/18/2019

FIGURE 6-57
SEEP AND SURFACE WATER
QUALITY PIPER DIAGRAMS
FORMER UNITS 1-4 ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA

Figure 6-58a

Remedial Alternative 2 – System Layout – Groundwater Remediation by Phytoremediation and TreeWell Technology

Provided in separate electronic figure file as a
large sheet size

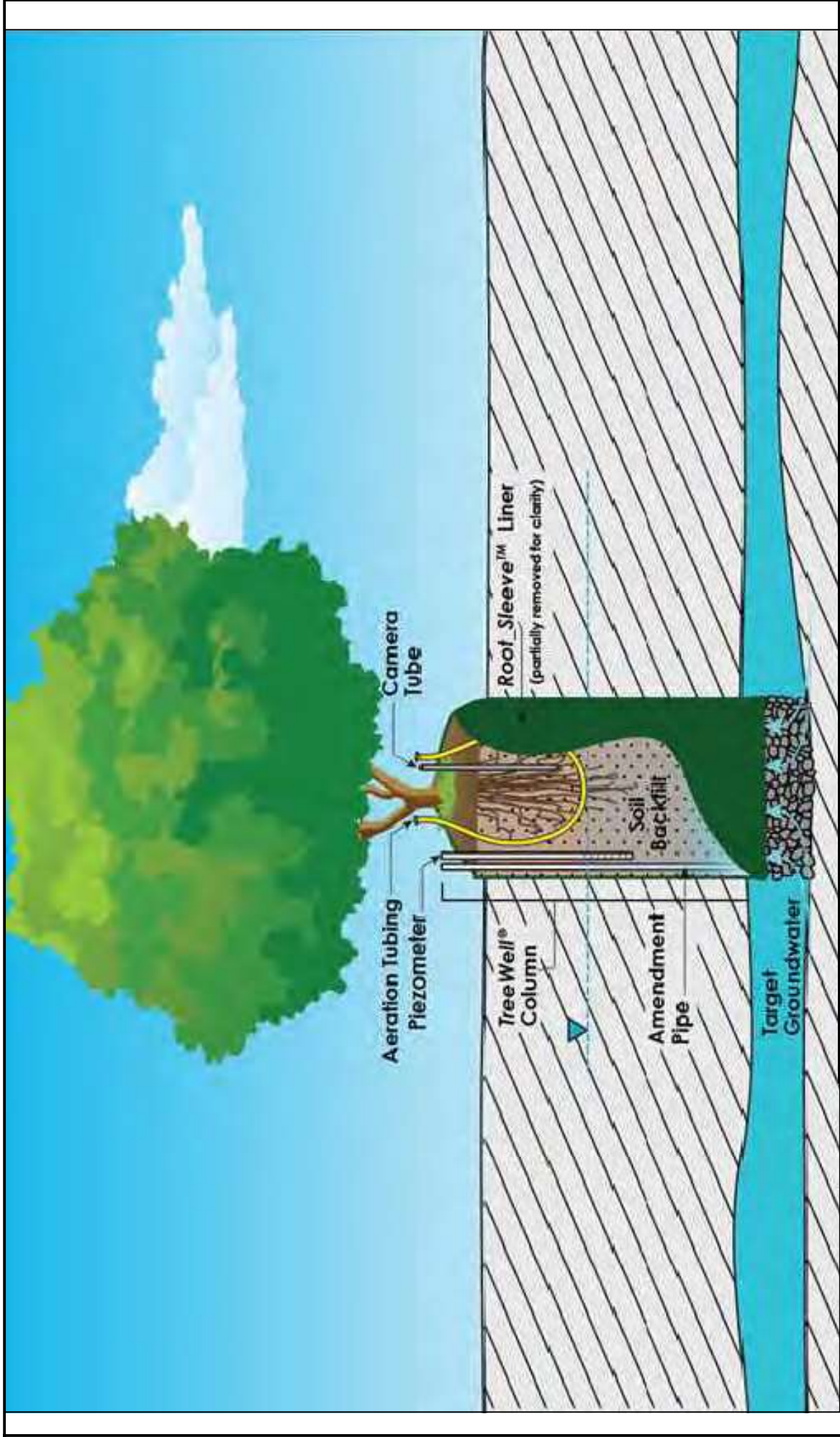
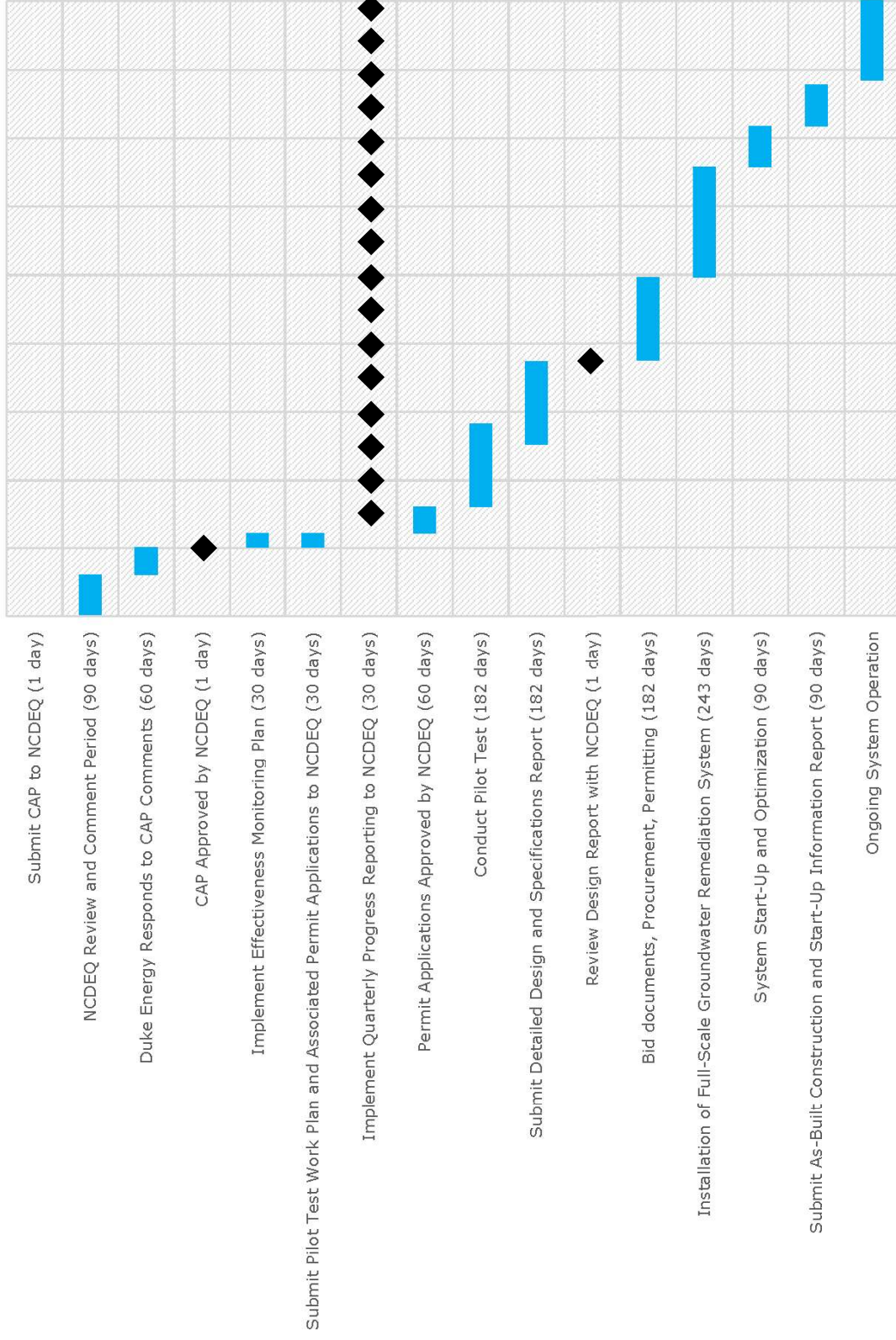


FIGURE 6-58b
REMEDIAL ALTERNATIVE 2
CONCEPTUAL TREE WELL
GROUNDWATER REMEDIATION BY PHYTOREMEDIATION
AND TREE WELL TECHNOLOGY
FORMER UNITS 1-4 ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA

DUKE ENERGY CAROLINAS	NOT TO SCALE	
	DRAWN BY: J. CHASTAIN REVISOR: J. CHASTAIN CHECKED BY: T. GRANT APPROVED BY: T. GRANT PROJECT MANAGER: S. SPINNER	DATE: 12/21/2019 DATE: - DATE: 12/21/2019 DATE: 12/21/2019
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Days
0 150 300 450 600 750 900 1050 1200 1350



Notes:

* - Either submittal of the Effectiveness Monitoring Plan or the pilot test work plan and permit applications (as applicable) will fulfill section G.S.130A-309.209.(b)(3).

** - Actual time may vary due to a variety of factors including agency review and approvals, weather delays, equipment availability, etc.

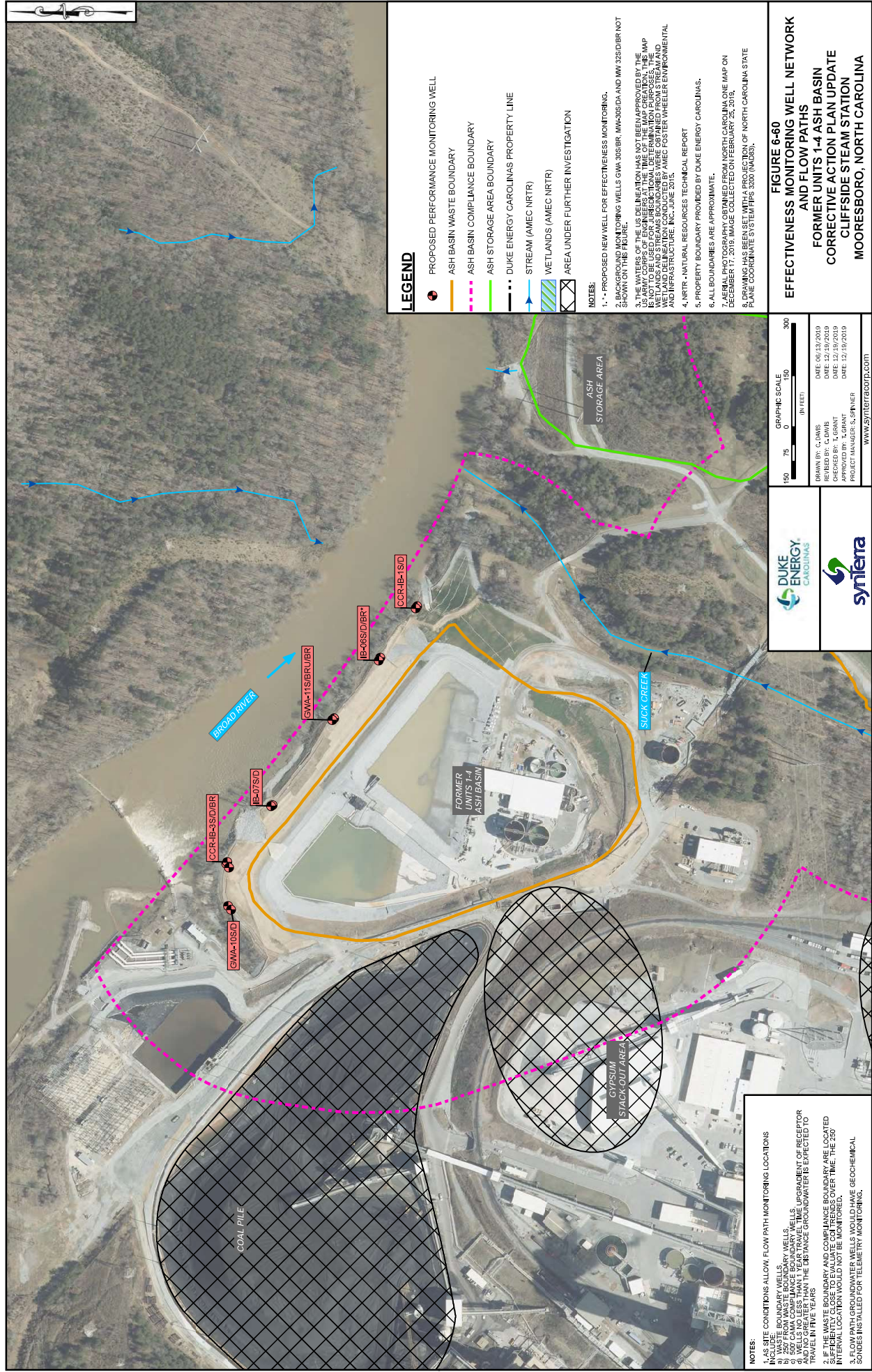


DRAWN BY: R. ISHAM
 REVISED BY:
 CHECKED BY: S. WOOD
 APPROVED BY: T. GRANT
 PROJECT MANAGER: S. SPINNER

DATE: 12/5/2019

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FIGURE 6-59
CAP IMPLEMENTATION GANTT CHART
FORMER UNITS 1-4 ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA



LEGEND

- PROPOSED PERFORMANCE MONITORING WELL
- ASH BASIN WASTE BOUNDARY
- ASH BASIN COMPLIANCE BOUNDARY
- ASH STORAGE AREA BOUNDARY
- DUKE ENERGY CAROLINAS PROPERTY LINE
- STREAM (AMEC NTR)
- WETLANDS (AMEC NTR)
- AREA UNDER FURTHER INVESTIGATION

NOTES:

1. PROPOSED NEW WELL FOR EFFECTIVENESS MONITORING.
2. BACKGROUND MONITORING WELLS GWA-30S/BR, MM-30S/DA AND MM-32S/DBR NOT SHOWN ON THIS FIGURE.
3. THE WATERS OF THE US DELINEATION HAS NOT BEEN APPROVED BY THE US ARMY CORPS OF ENGINEERS AT THE TIME OF THE MAP CREATION. THE MAP WETLANDS AND STREAM BOUNDARIES WERE OBTAINED FROM STREAM AND WETLANDS DATA PROVIDED BY AMEC FOSTER WHEELER ENVIRONMENTAL AND INFRASTRUCTURE CONSULTING.
4. NTR - NATURAL RESOURCES TECHNICAL REPORT
5. PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY CAROLINAS.
6. ALL BOUNDARIES ARE APPROXIMATE.
7. AERIAL PHOTOGRAPHY OBTAINED FROM NORTH CAROLINA ONE MAP ON DECEMBER 17, 2019. IMAGE COLLECTED ON FEBRUARY 25, 2019.
8. DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE COORDINATE SYSTEM 3200 (NAD83).

FIGURE 6-60

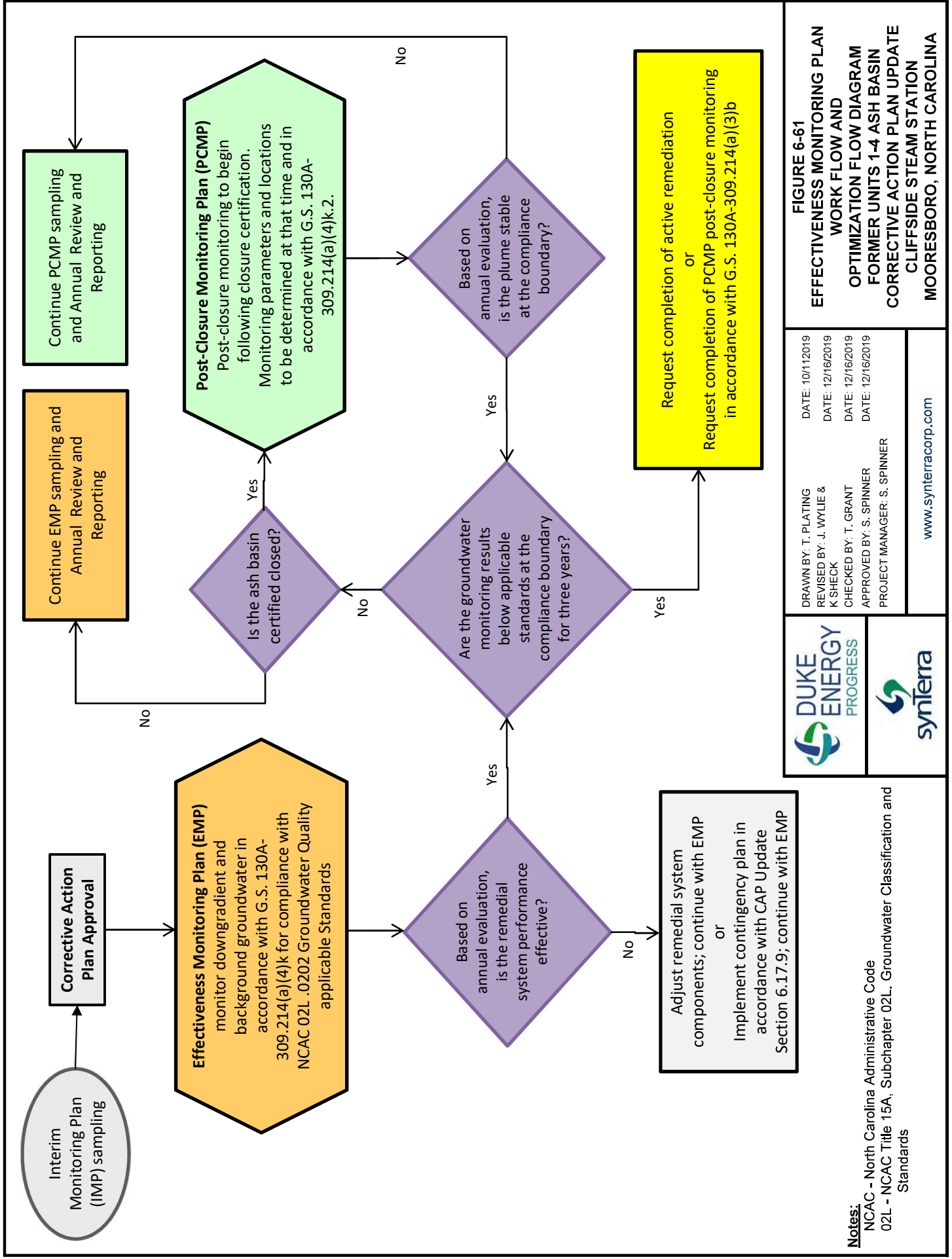
EFFECTIVENESS MONITORING WELL NETWORK AND FLOW PATHS
FORMER UNITS 1-4 ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA

GRAPHIC SCALE
150 0 150 300
(IN FEET)

DRAWN BY: C. DAVIS
DATE: 06/13/2019
REVIEWED BY: C. DAVIS
DATE: 12/19/2019
CHECKED BY: T. GRANT
DATE: 12/19/2019
PROJECT MANAGER: S. SPINER
WWW.SYNTEGECORP.COM



- NOTES:**
1. AS SITE CONDITIONS ALLOW, FLOW PATH MONITORING LOCATIONS
 2. WASTE BOUNDARY WELLS
 3. 200' CAMA COMPLIANCE BOUNDARY WELLS
 4. WELLS NO LESS THAN 1 YEAR TRAVEL TIME UPGRADE OF RECEPTOR
 5. WELLS NO LESS THAN 1 YEAR TRAVEL TIME UPGRADE OF RECEPTOR
 6. IF THE WASTE BOUNDARY AND COMPLIANCE BOUNDARY ARE LOCATED SUFFICIENTLY CLOSE TO EVALUATE THE CONTINUES OVER TIME, THE 200' TRAVEL TIME UPGRADE OF RECEPTOR WOULD HAVE GEOCHEMICAL
 7. FLOW PATH MONITORING WELLS WOULD HAVE GEOCHEMICAL
 8. SCALES INSTALLED FOR TELEMETRY MONITORING.

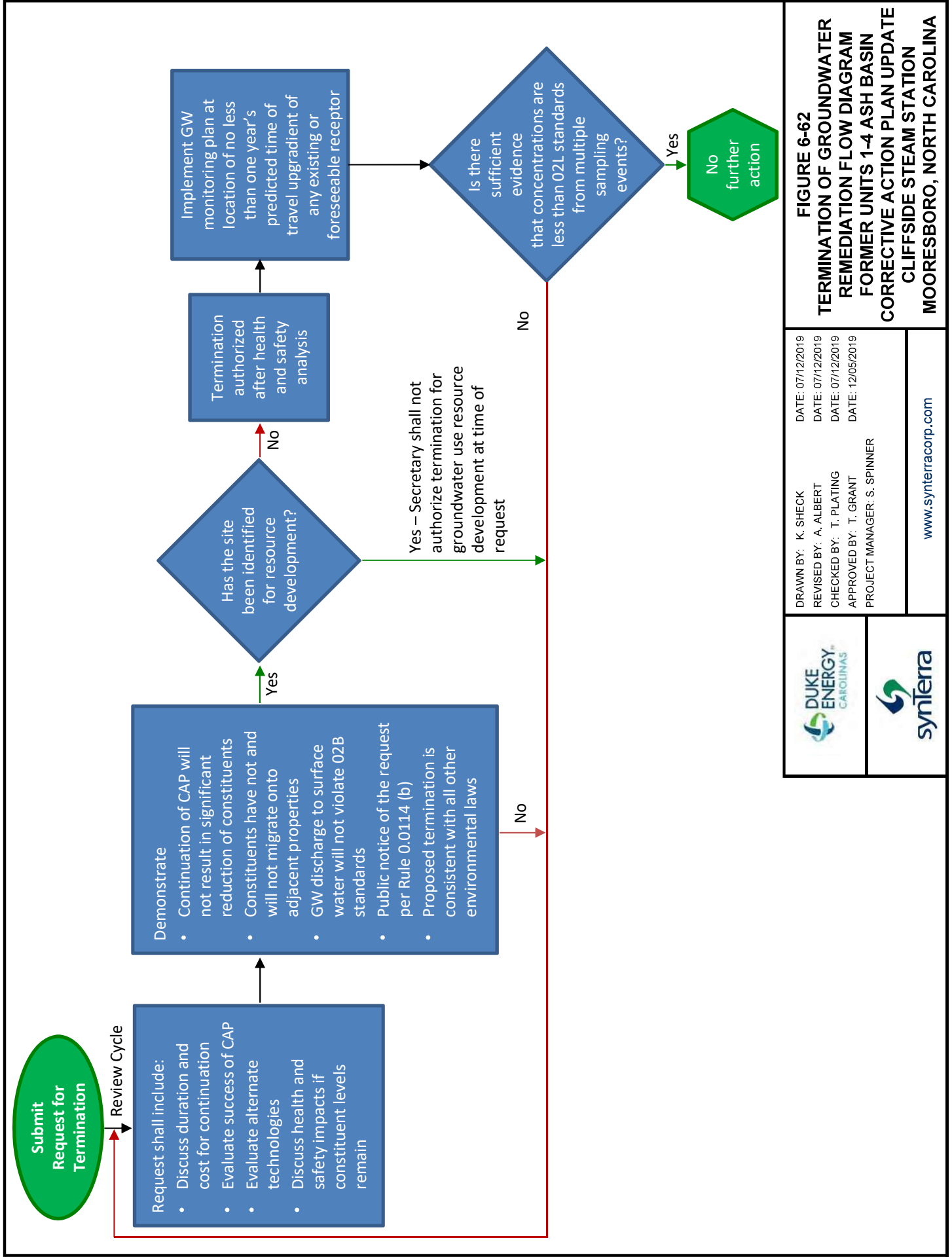


Notes:
NCAC - North Carolina Administrative Code
02L - NCAC Title 15A, Subchapter 02L, Groundwater Classification and Standards



DRAWN BY: T. PLATING REVISD BY: J. WYLIE & K. SHECK CHECKED BY: T. GRANT APPROVED BY: S. SPINNER PROJECT MANAGER: S. SPINNER	DATE: 10/11/2019 DATE: 12/16/2019 DATE: 12/16/2019 DATE: 12/16/2019
www.synterracorp.com	

FIGURE 6-61
EFFECTIVENESS MONITORING PLAN
WORK FLOW AND
OPTIMIZATION FLOW DIAGRAM
FORMER UNITS 1-4 ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA



			
DRAWN BY: K. SHECK REVISOR BY: A. ALBERT CHECKED BY: T. PLATING APPROVED BY: T. GRANT PROJECT MANAGER: S. SPINNER		DATE: 07/12/2019 DATE: 07/12/2019 DATE: 07/12/2019 DATE: 12/05/2019	
		www.synterracorp.com	

FIGURE 6-62
TERMINATION OF GROUNDWATER REMEDIATION FLOW DIAGRAM
FORMER UNITS 1-4 ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA

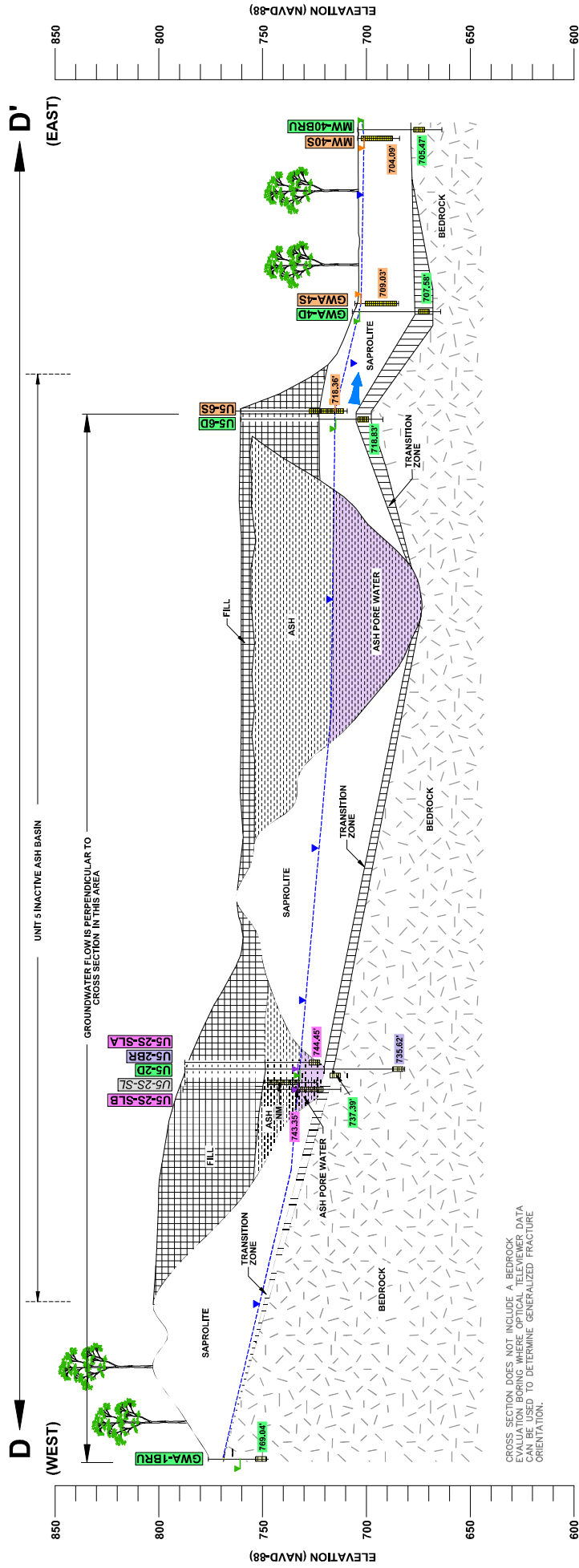
Source Area 3

(Unit 5 Inactive Ash Basin)

Figure 6-63

**Fly Ash and Bottom Ash Interbedded
Depiction**

Included in Section 6 text



CROSS SECTION DOES NOT INCLUDE A BEDROCK EVALUATION BORING WHERE OPTICAL TELEVIEWER DATA CAN BE USED TO DETERMINE GENERALIZED FRACTURE ORIENTATION.

LEGEND

- WELL IN SHALLOW FLOW LAYER
- WELL IN DEEP FLOW LAYER
- WELL IN BEDROCK FLOW LAYER
- WELL IN ASH PORE WATER
- ABANDONED WELL/ GEOTECHNICAL BORING
- GENERALIZED WATER TABLE
- GENERALIZED GROUNDWATER FLOW DIRECTION
- ASH
- ASH PORE WATER
- FILL
- SAPROLITE
- TRANSITION ZONE
- BEDROCK

- ASH PORE WATER ELEVATION
- SHALLOW GROUNDWATER ELEVATION
- DEEP GROUNDWATER ELEVATION
- BEDROCK GROUNDWATER ELEVATION
- WATER LEVEL ELEVATION (NAVD-88) (LABEL COLORING BY FLOW ZONE)
- WELL SCREEN
- COMPLIANCE BOUNDARY

NOTES

1. DEPTH TO WATER GAUGED IN MONITORING WELLS ON APRIL 22, 2019.
2. NW - NOT MEASURED DURING 24-HOUR WATER LEVEL EVENT.
3. ALL VERTICAL ELEVATIONS ARE MEASURED IN FEET, NORTH AMERICA VERTICAL DATUM (NAVD) OF 1988.



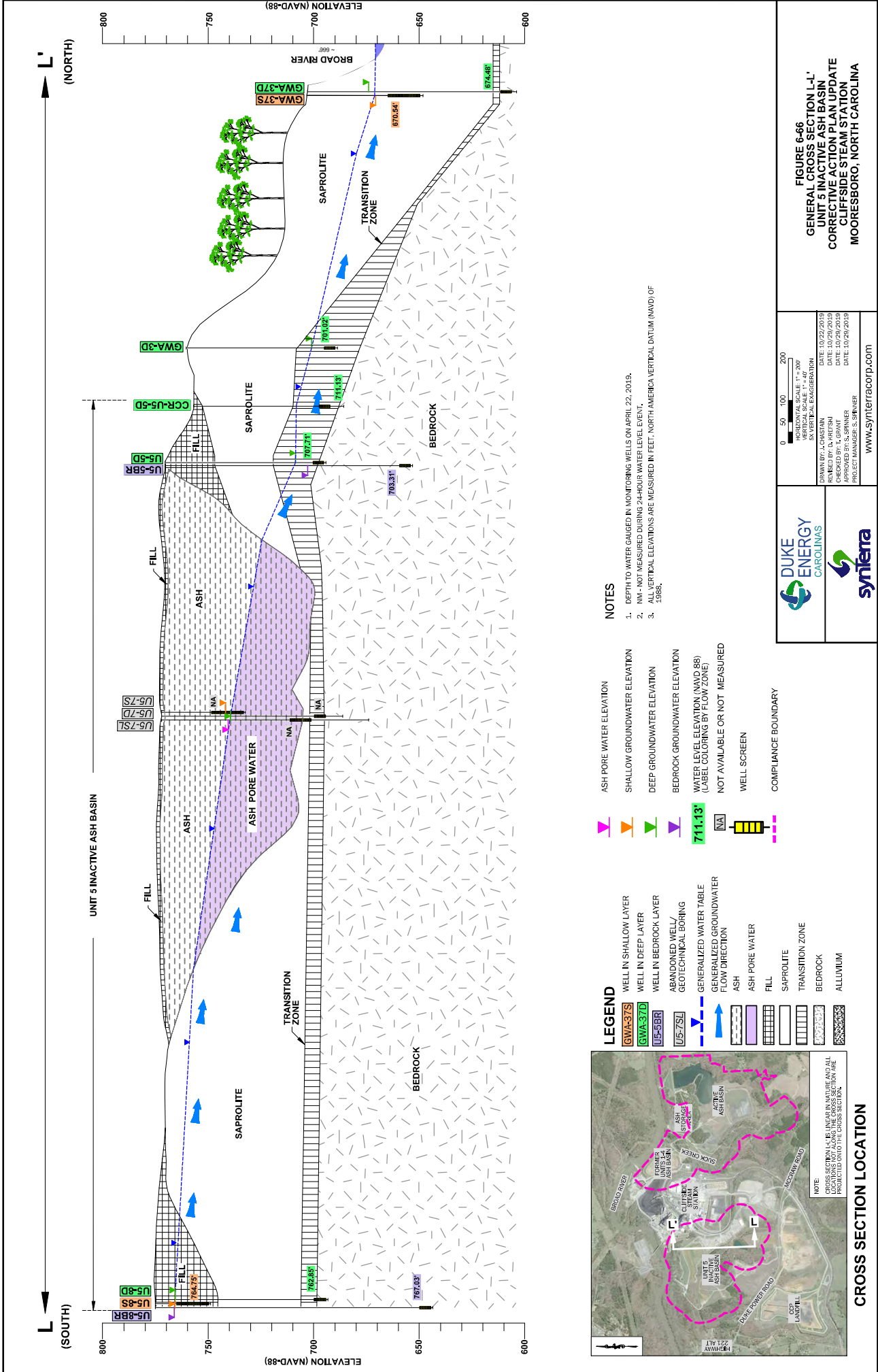
NOTE: CROSS SECTION D-D' IS LINEAR IN NATURE AND ALL PROJECTIONS ARE PROJECTED ONTO THE CROSS SECTION.

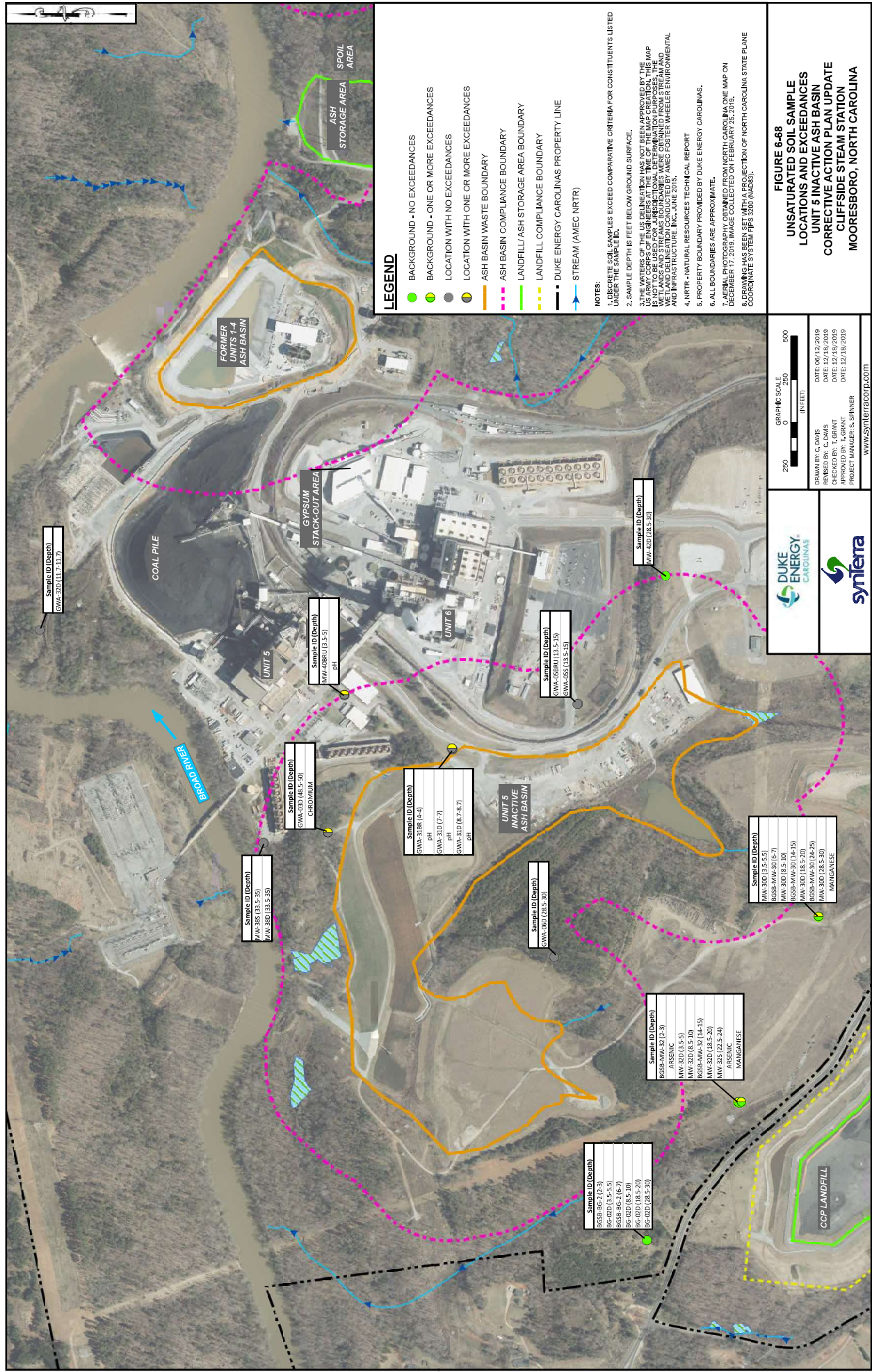
CROSS SECTION LOCATION

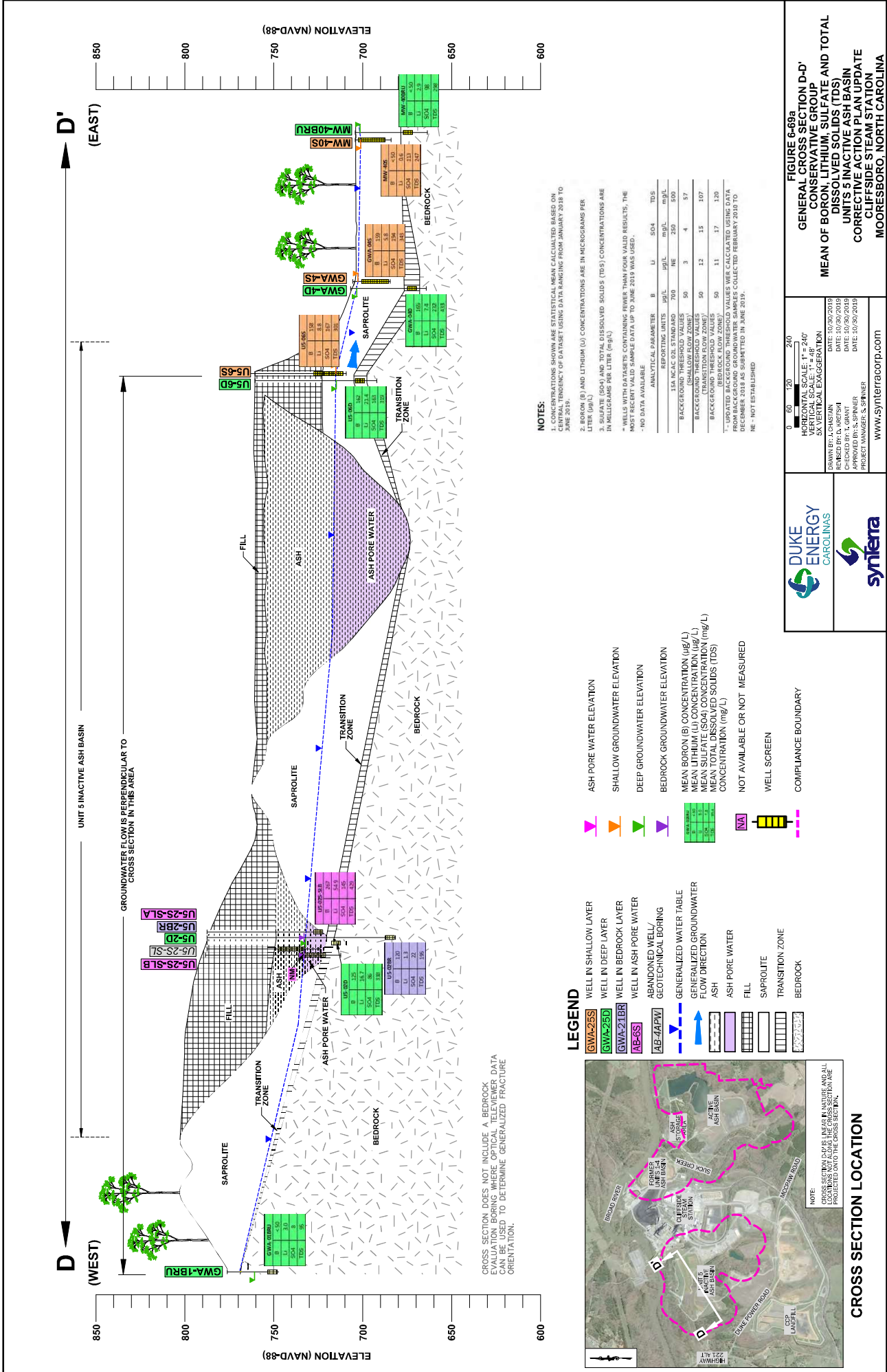


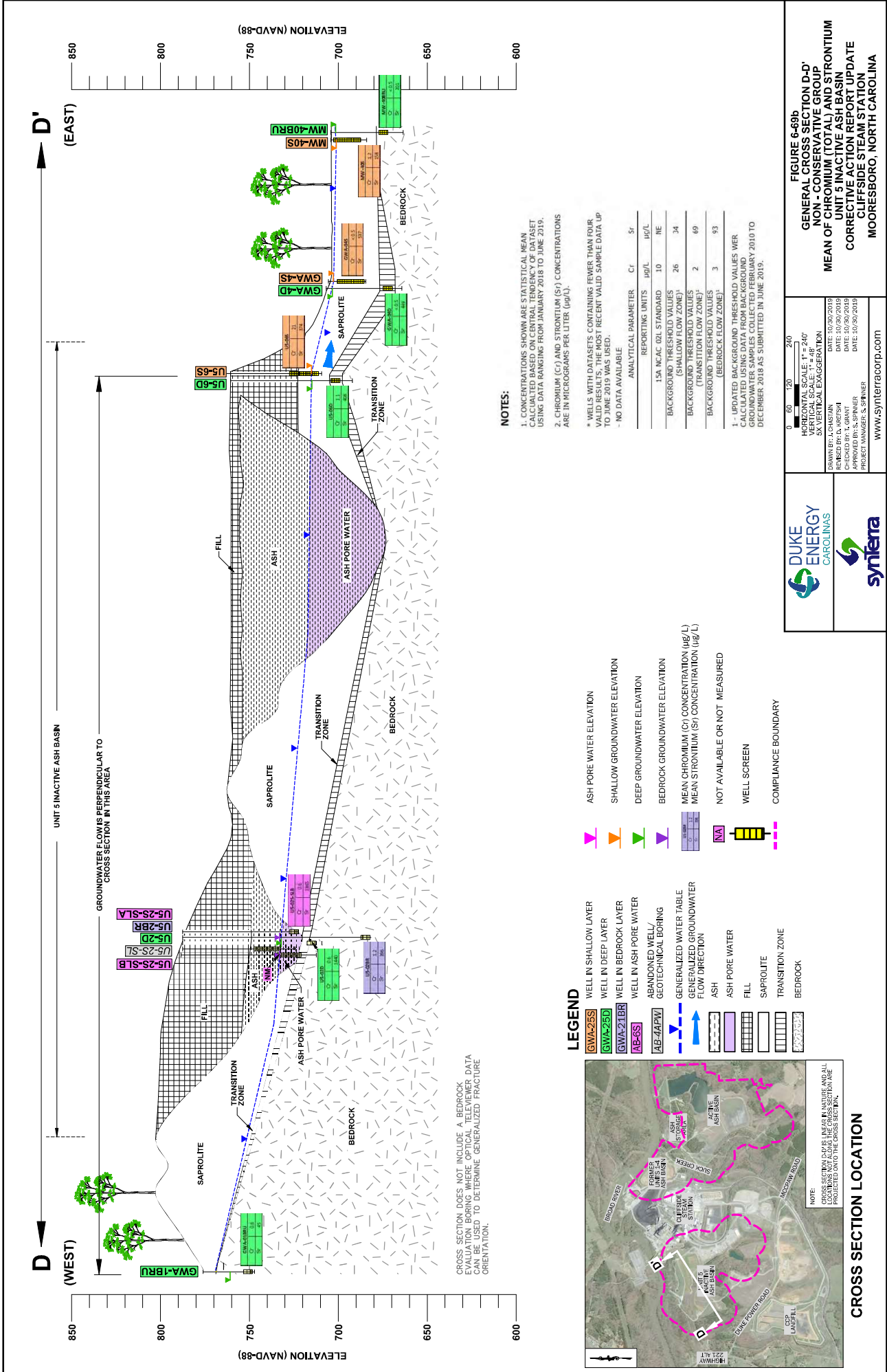
FIGURE 6-64
GENERAL CROSS SECTION D-D'
UNIT 5 INACTIVE ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA

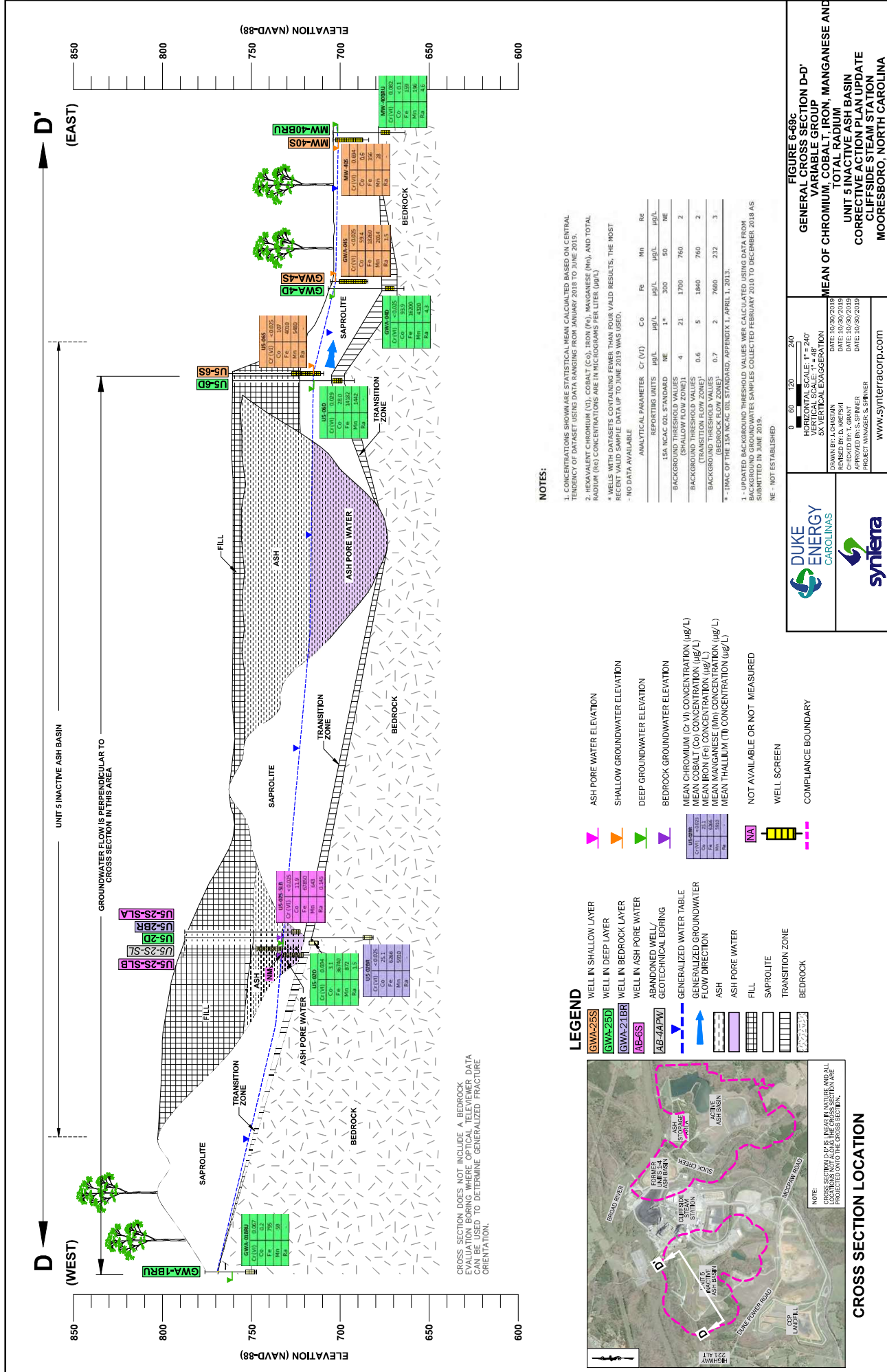
DATE: 10/30/2019
DRAWN BY: L. GRIFFIN
CHECKED BY: T. GRANT
APPROVED BY: S. SPINER
PROJECT MANAGER: S. SPINER
www.synterracorp.com

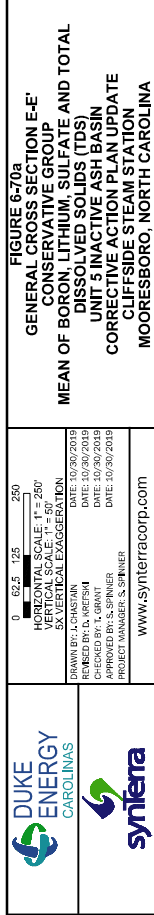


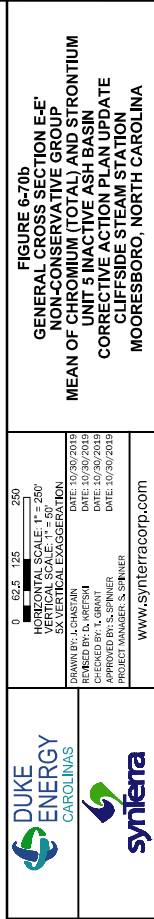


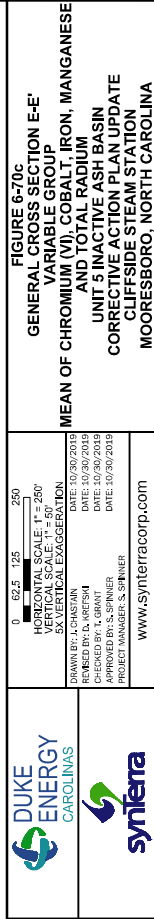




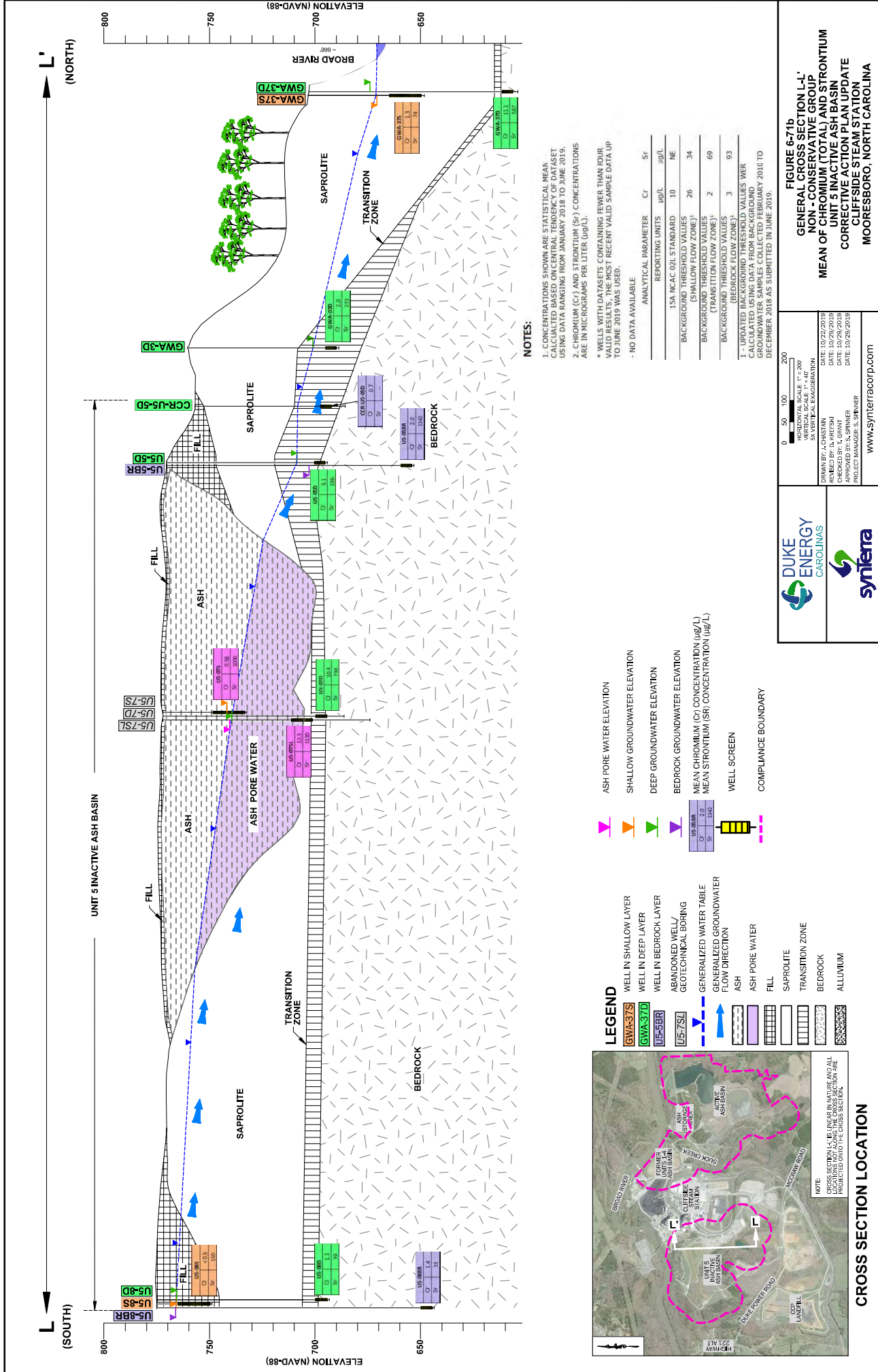












Note:
*sampling events prior to 1/1/2018

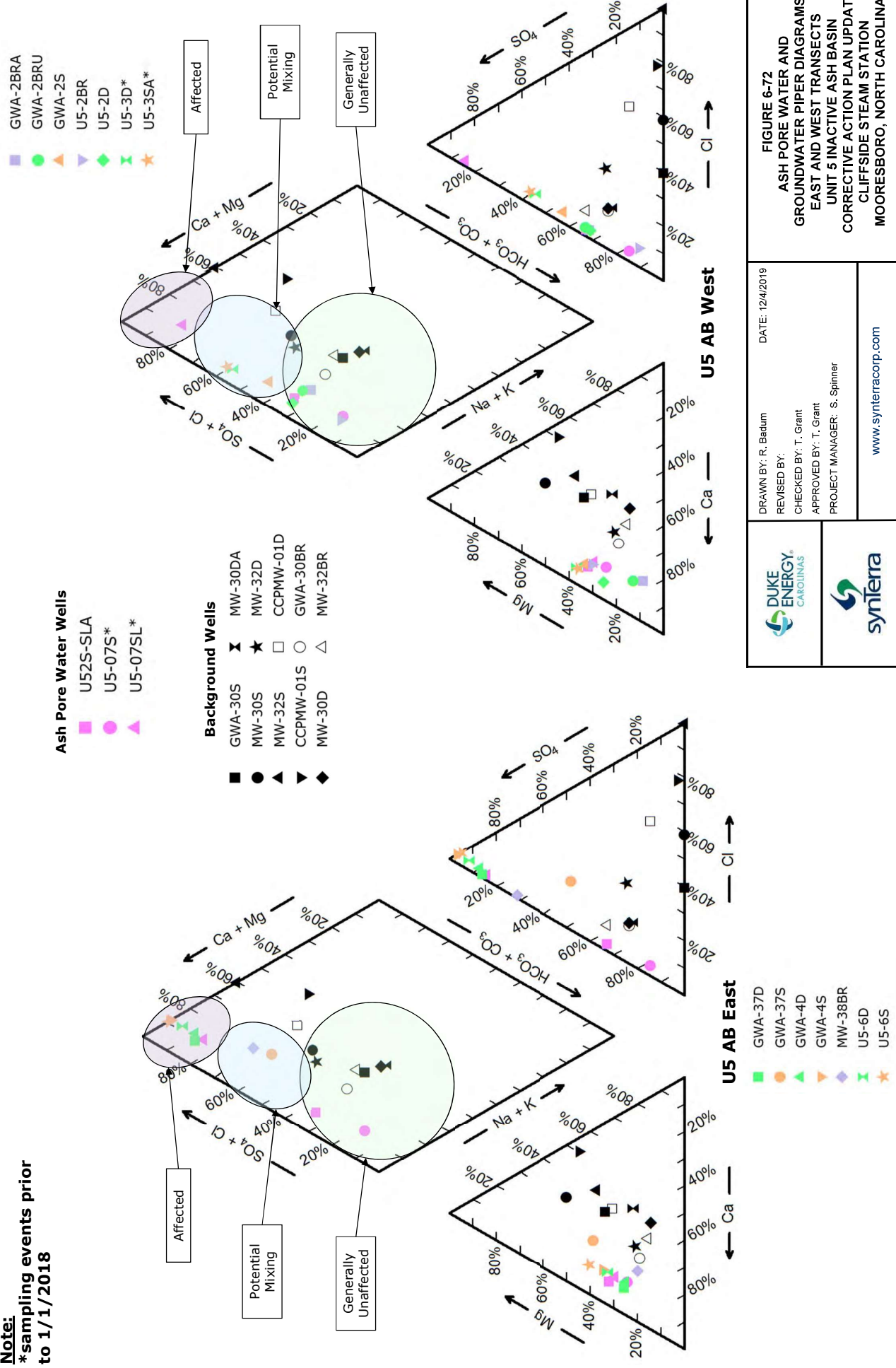
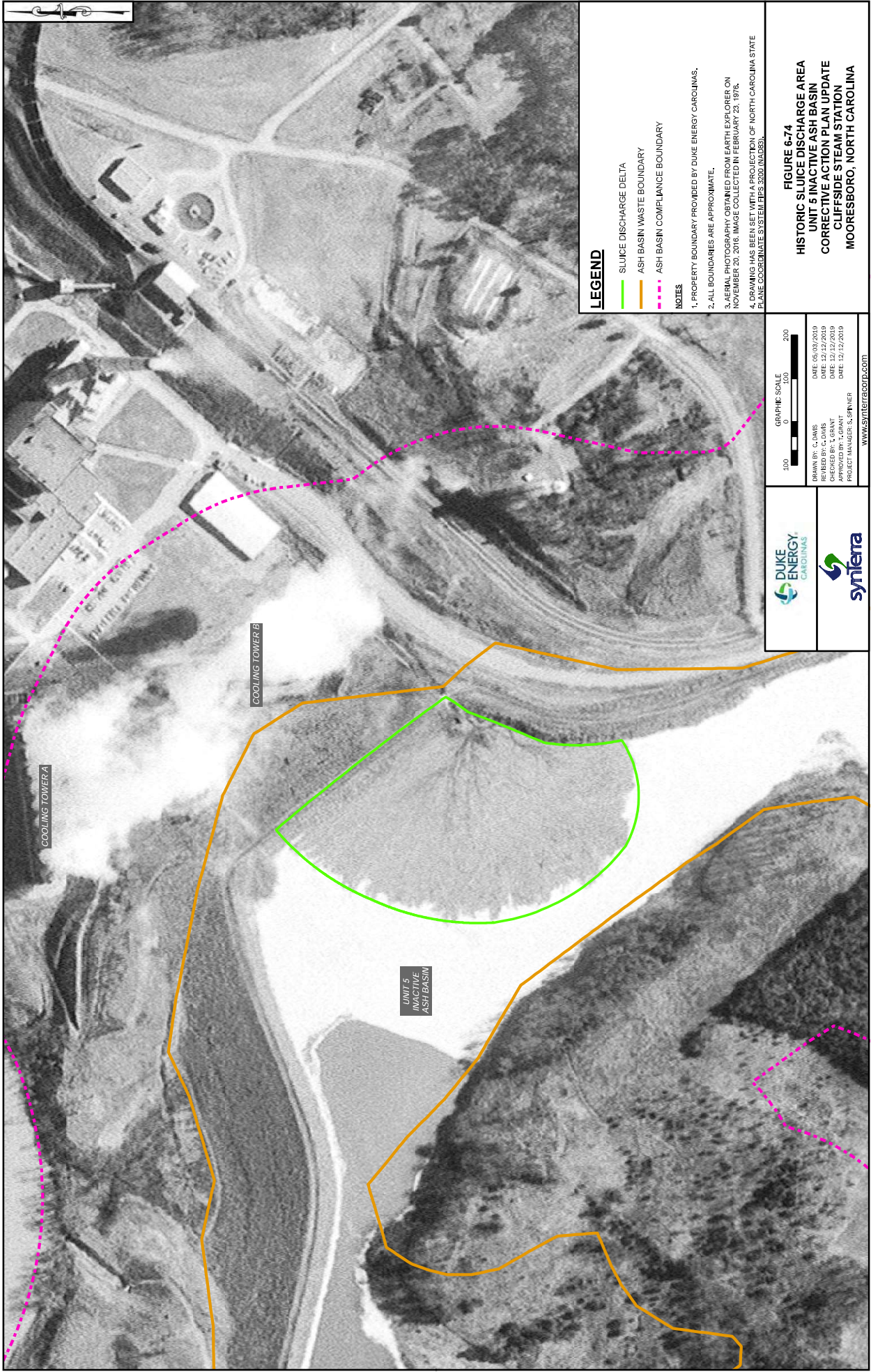
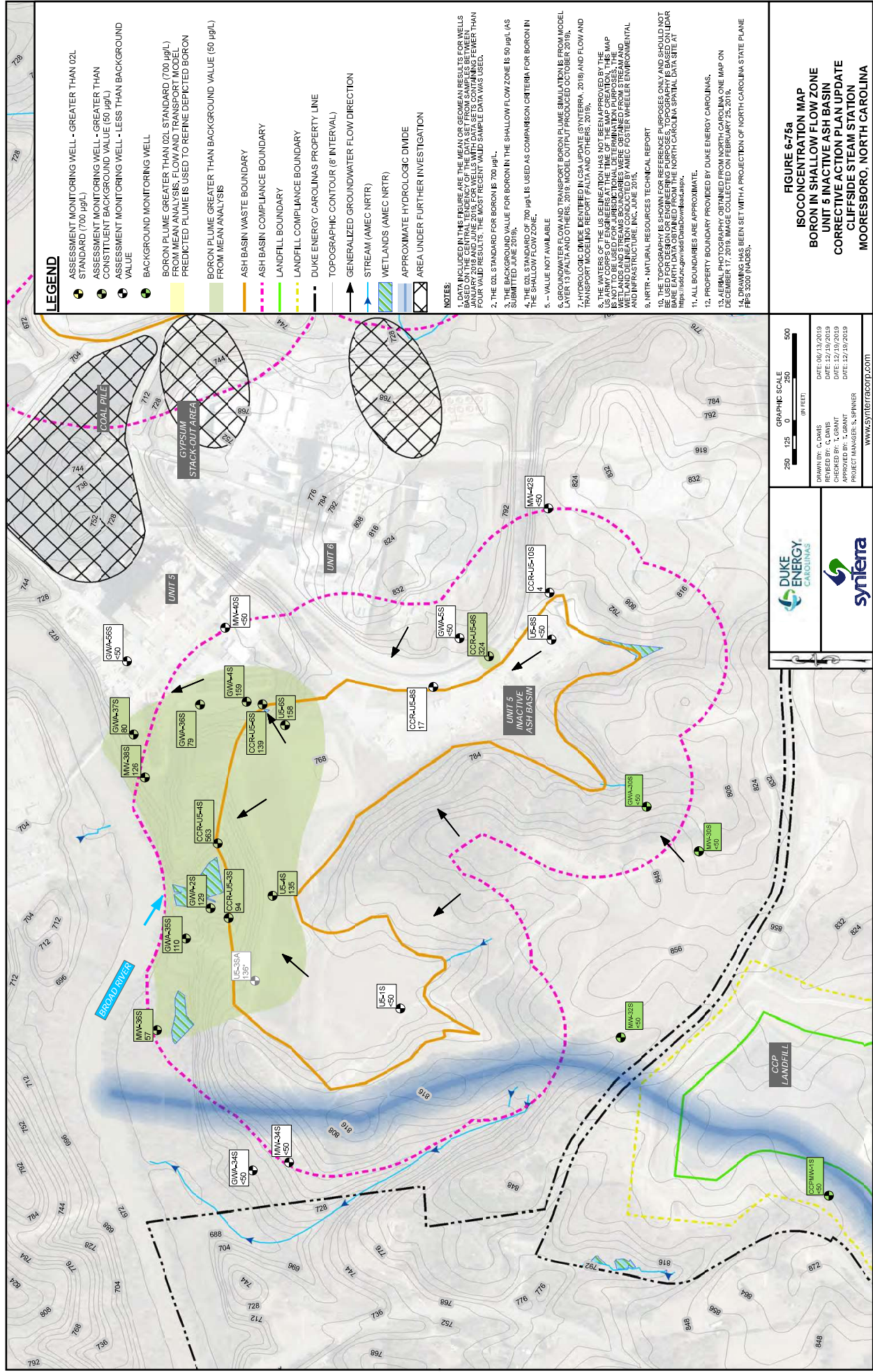


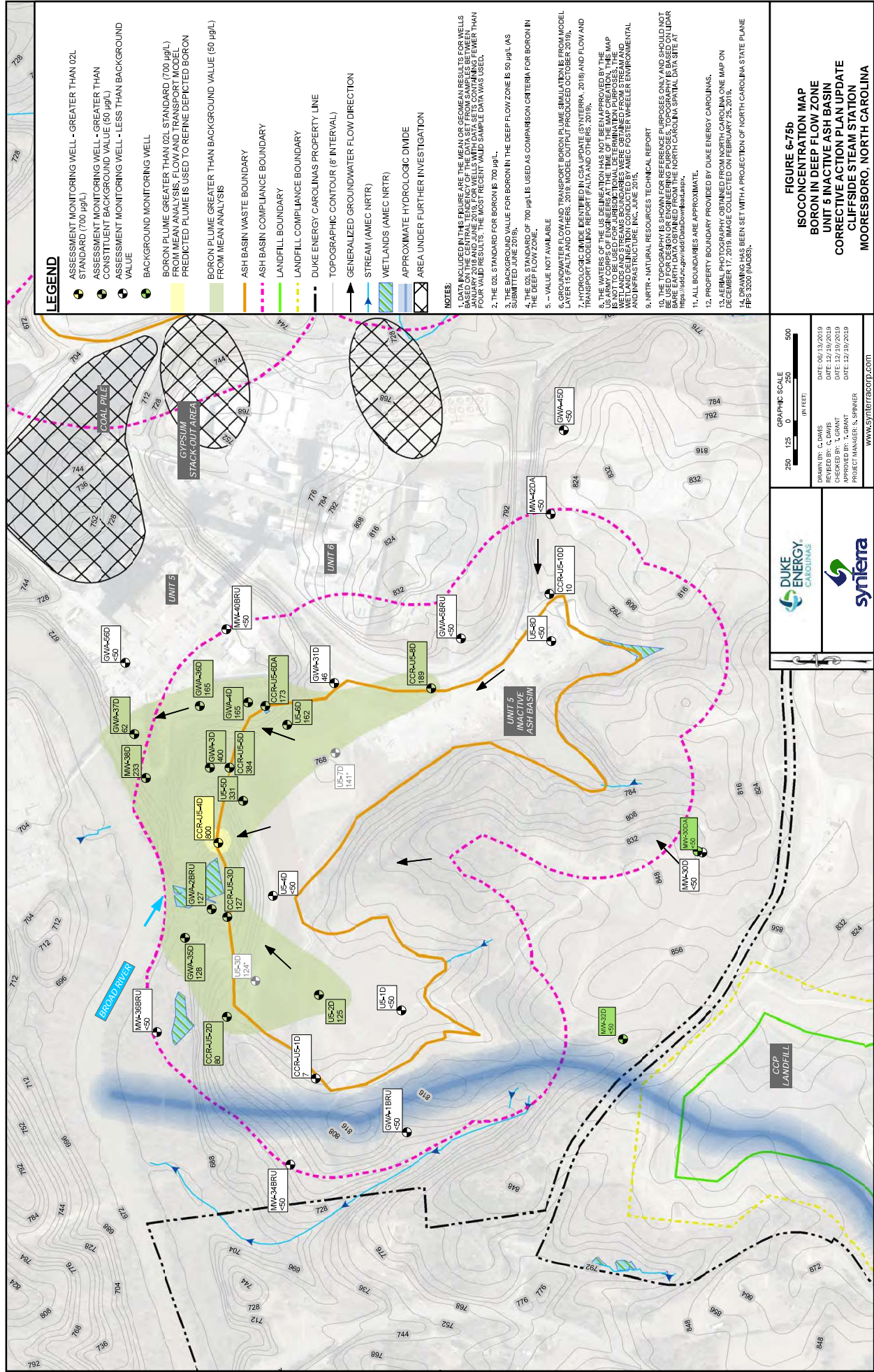
FIGURE 6-72
ASH PORE WATER AND
GROUNDWATER PIER DIAGRAMS
EAST AND WEST TRANSECTS
UNIT 5 INACTIVE ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA

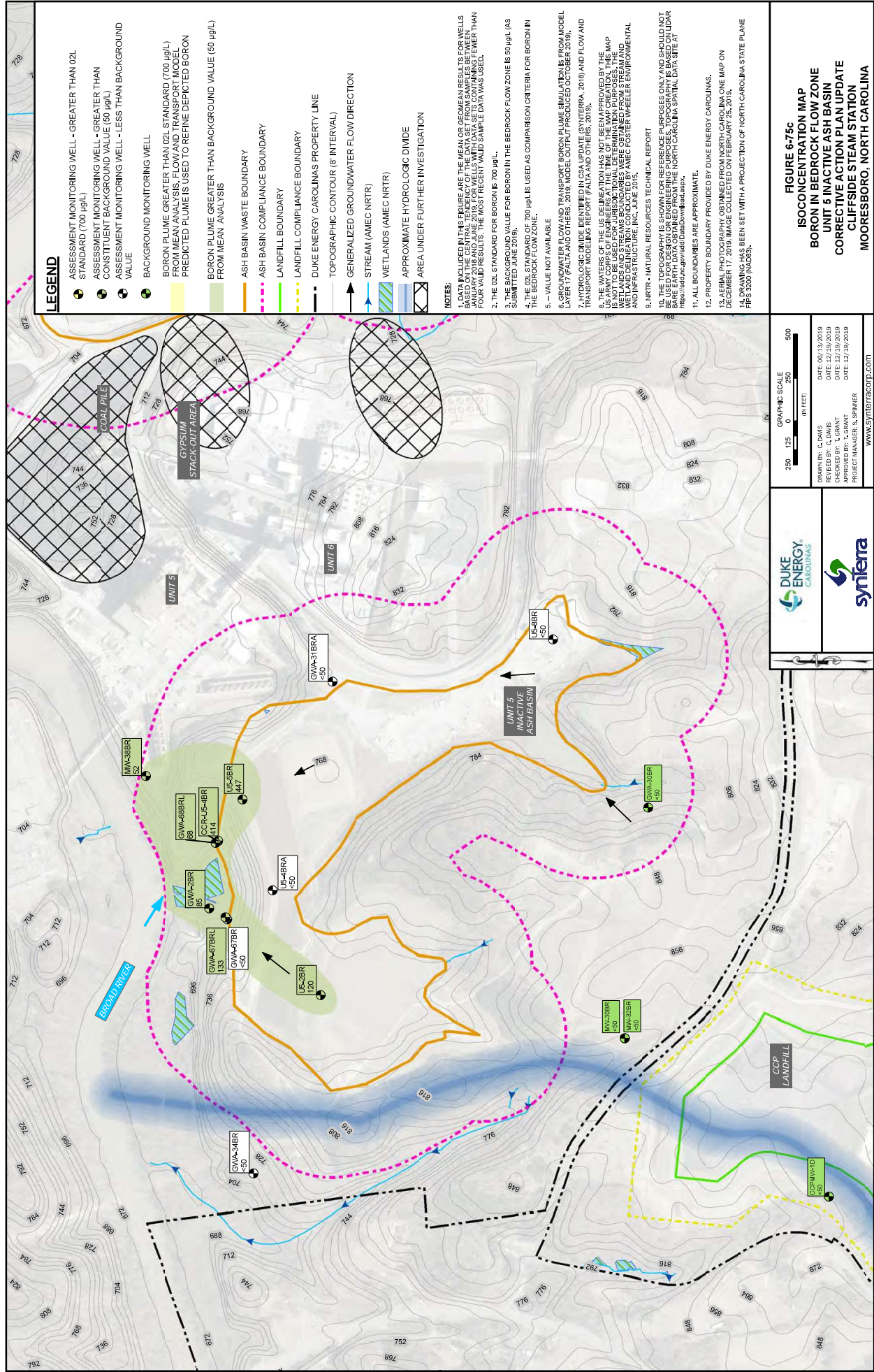
DRAWN BY: R. Badum
REVISED BY:
CHECKED BY: T. Grant
APPROVED BY: T. Grant
PROJECT MANAGER: S. Spinner
DATE: 12/4/2019
www.synterracorp.com

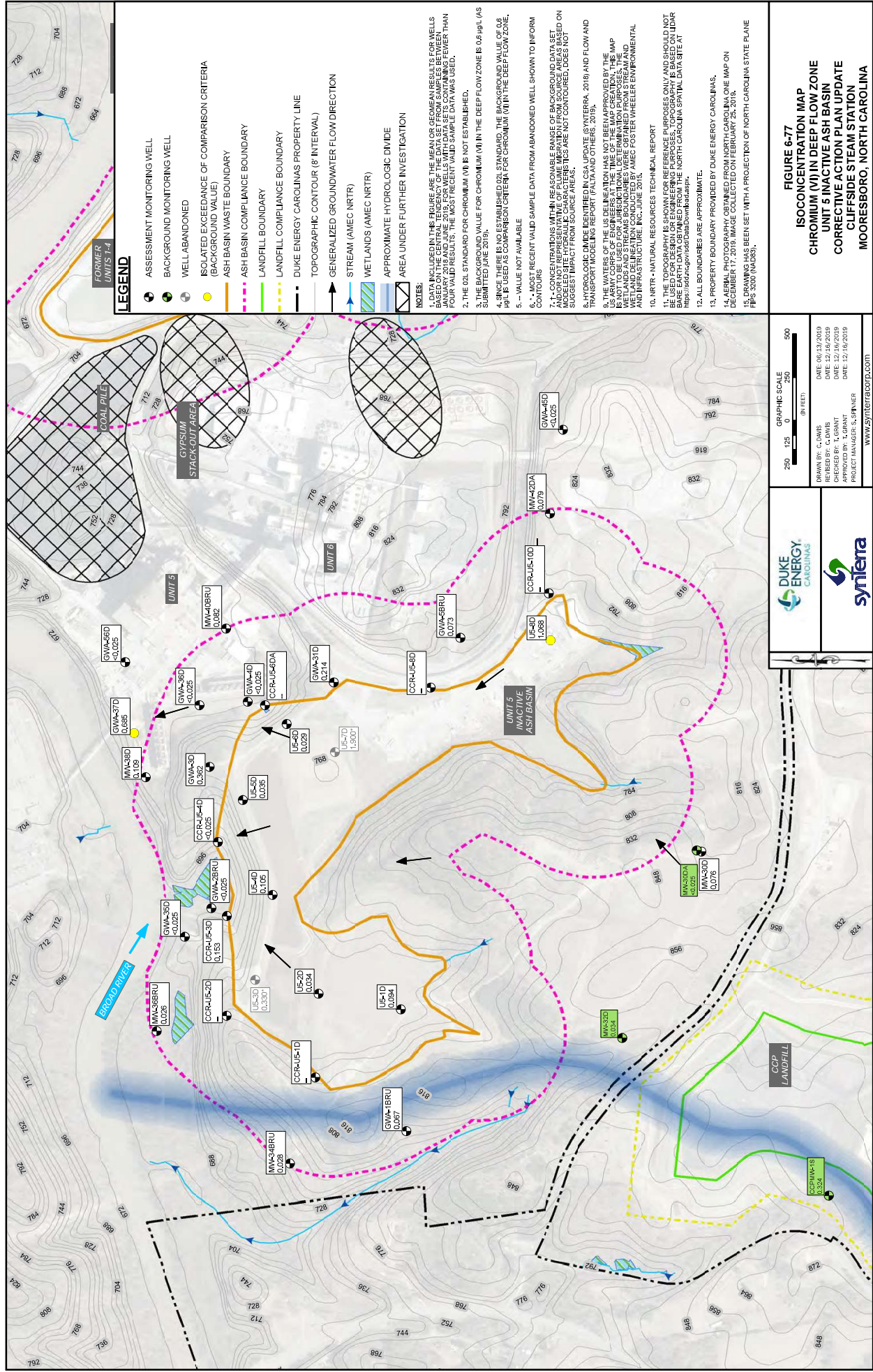


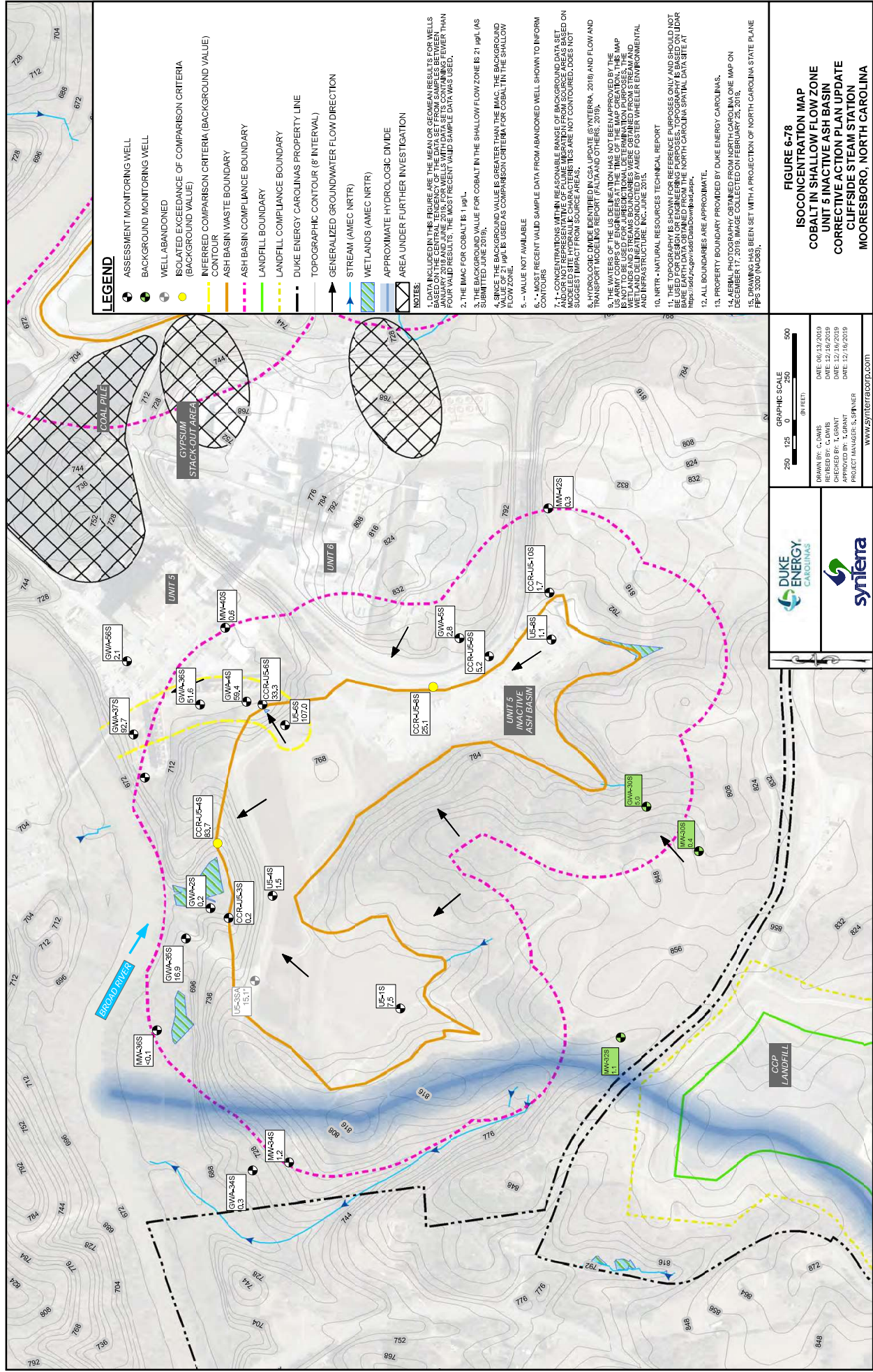


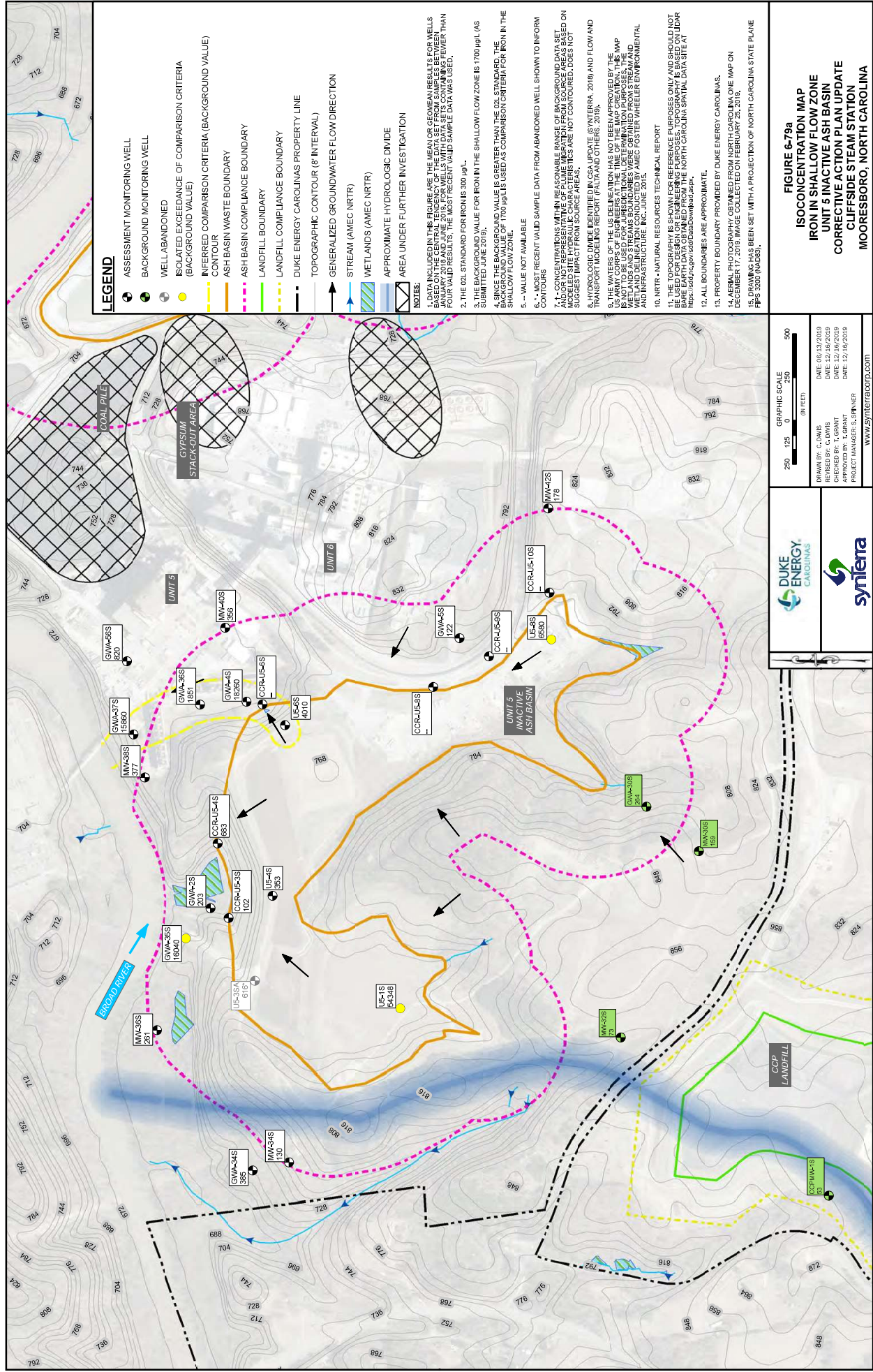


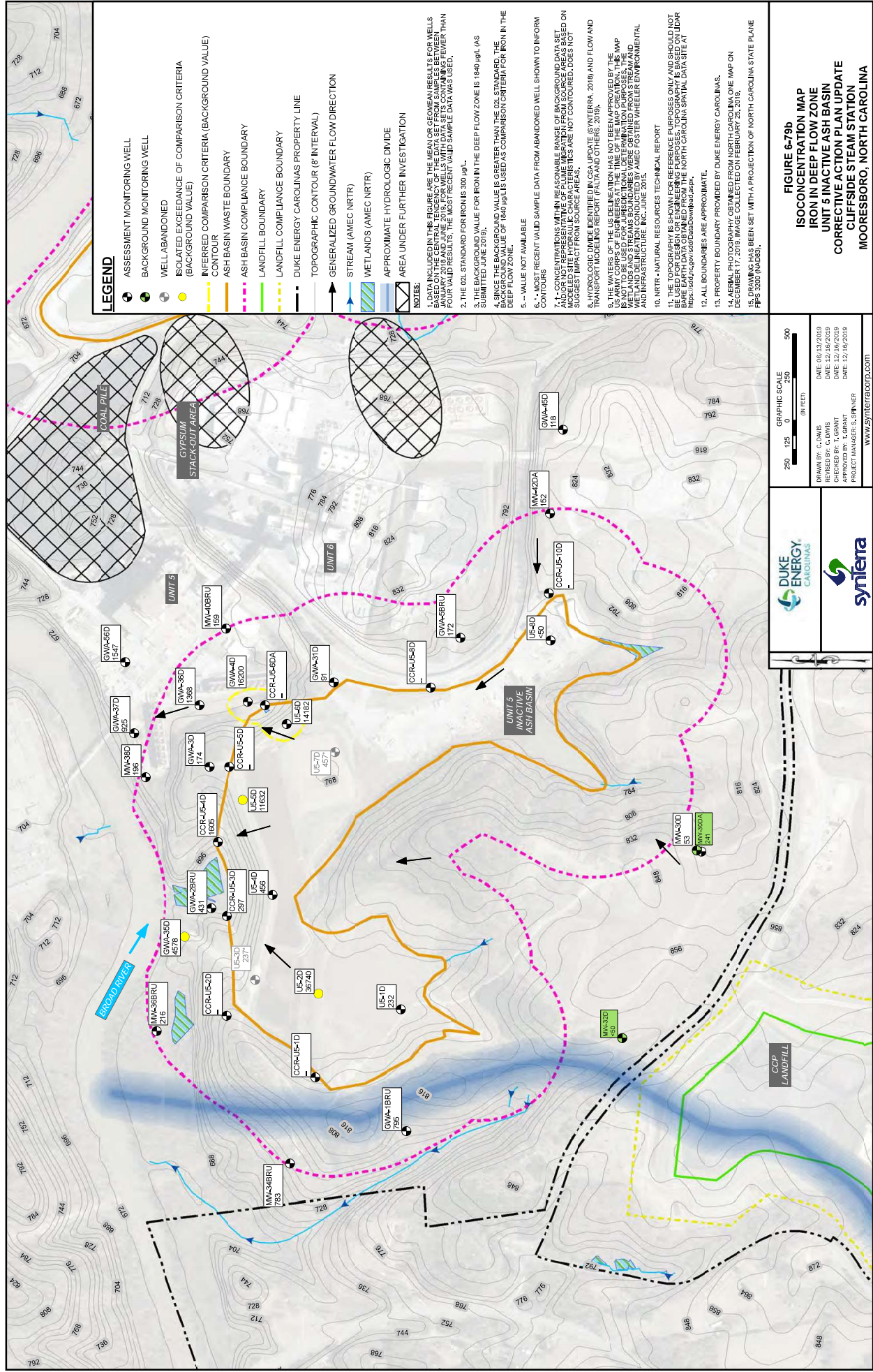


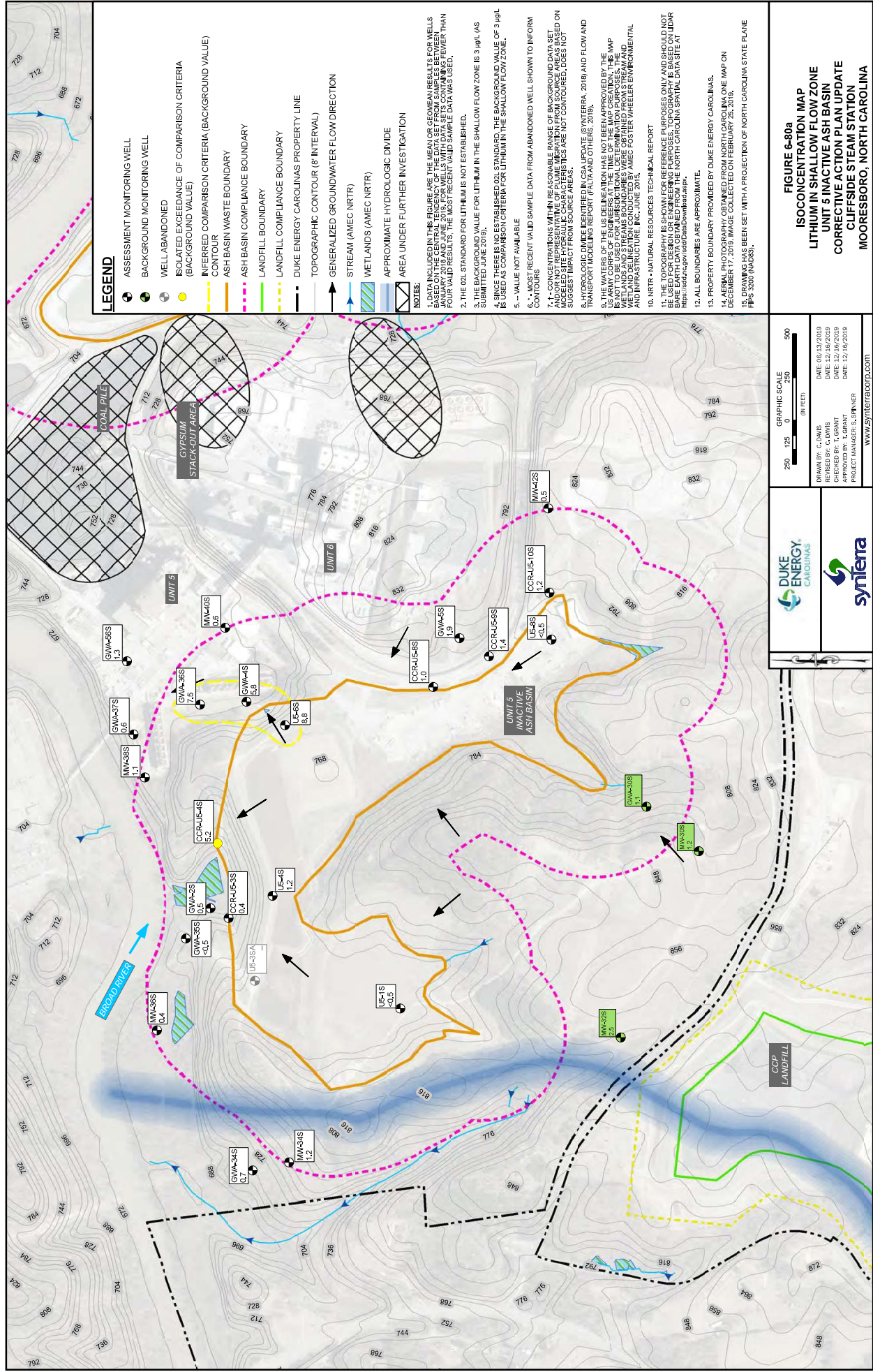


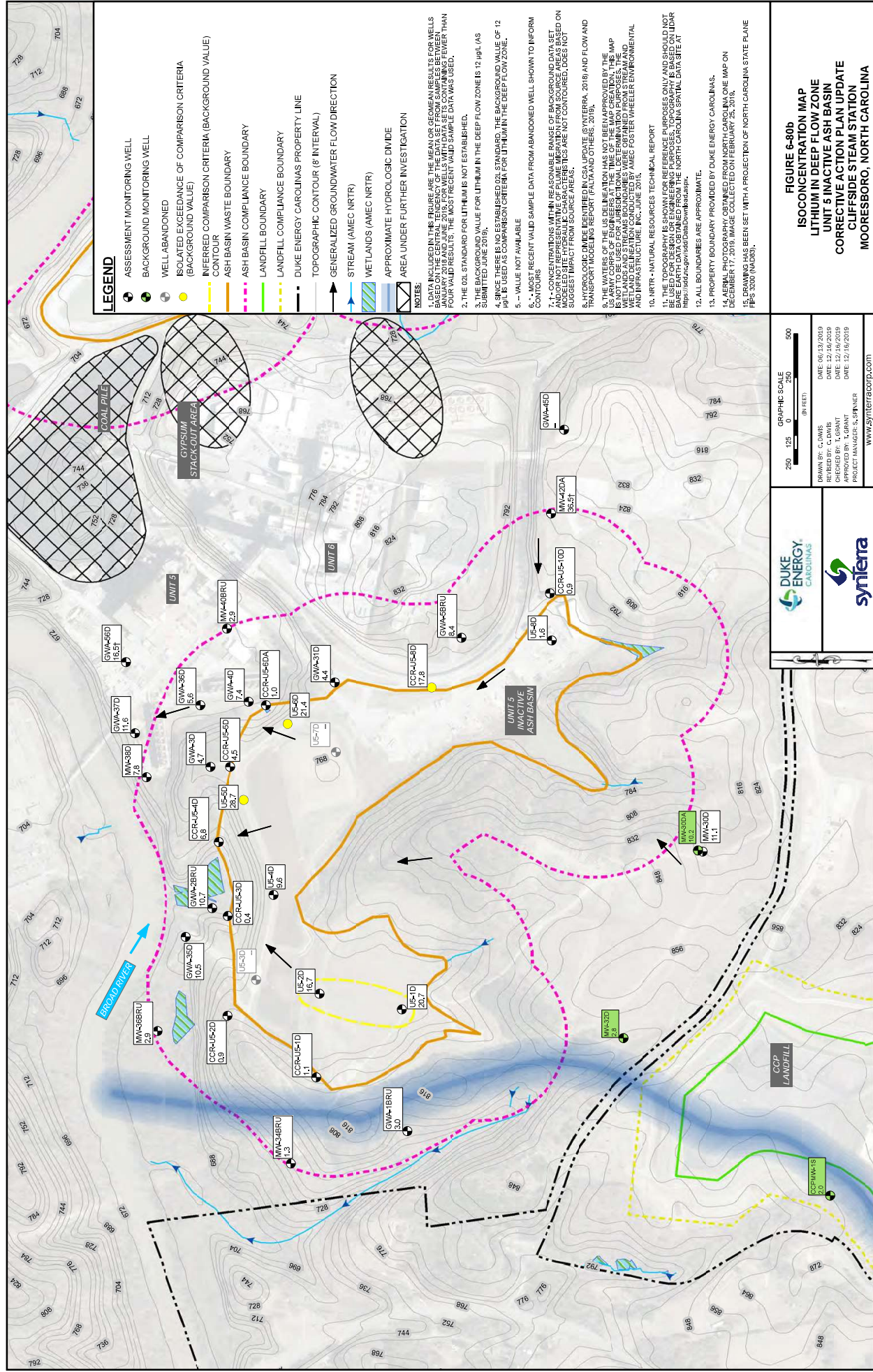


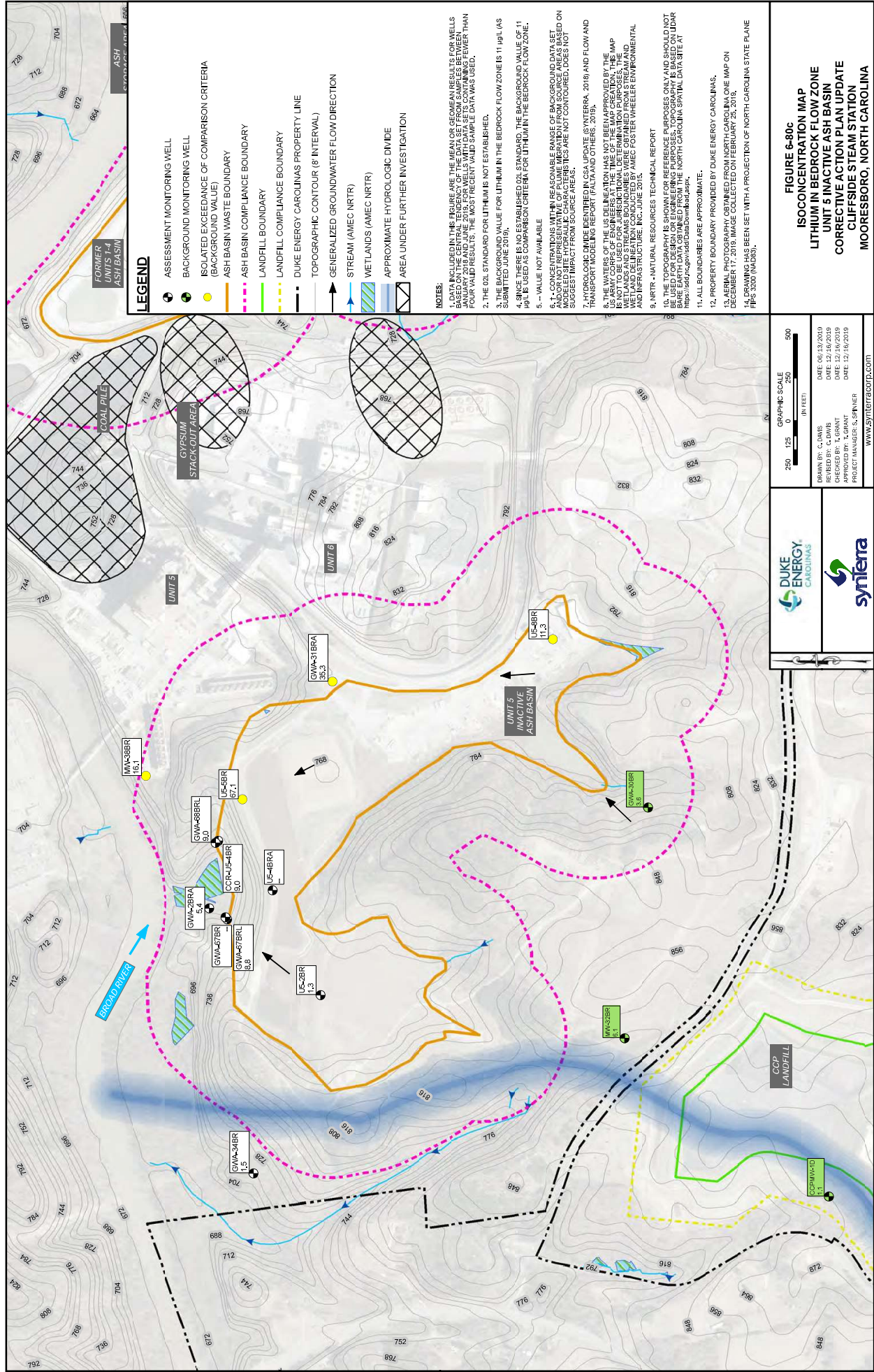


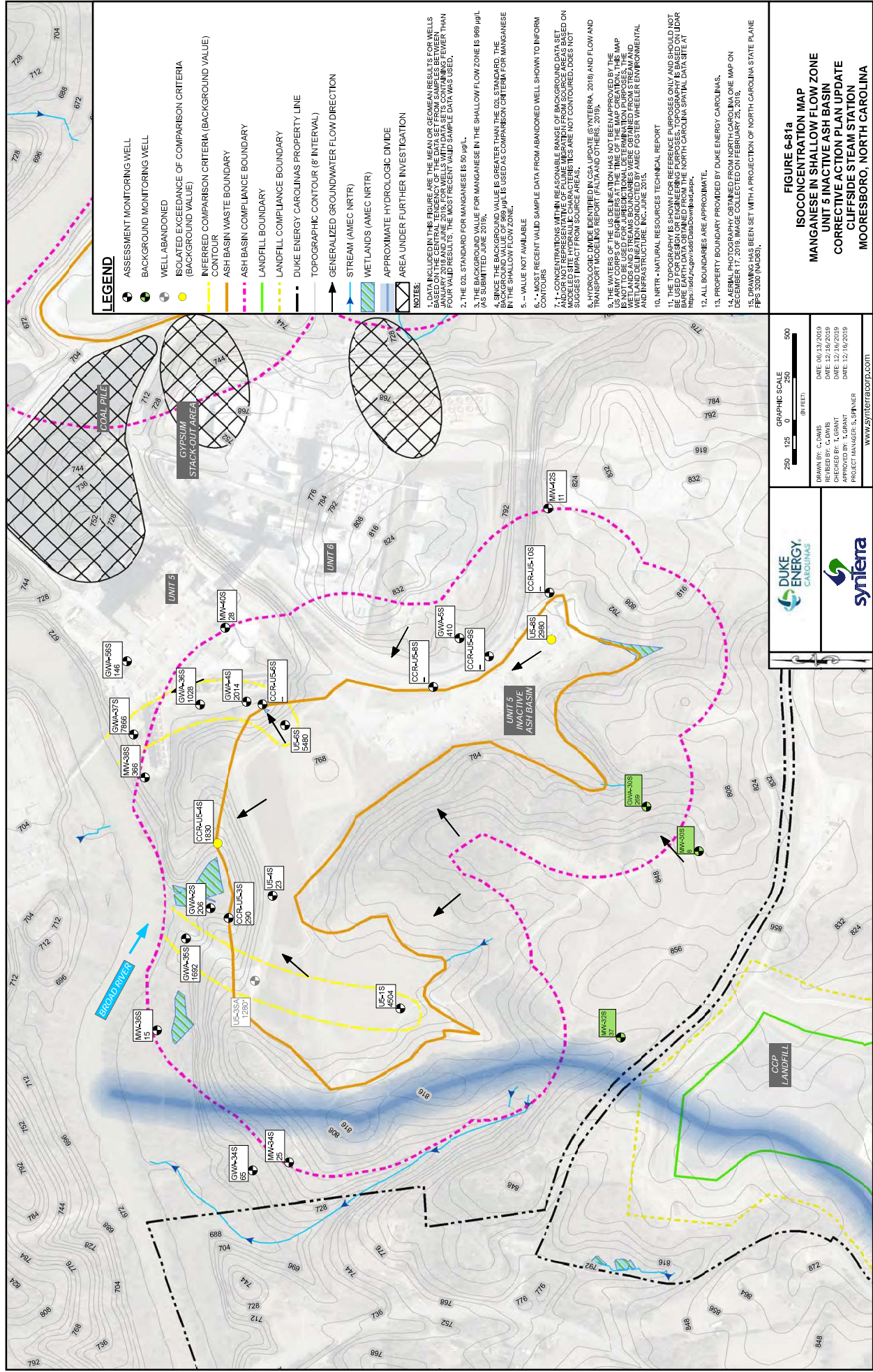


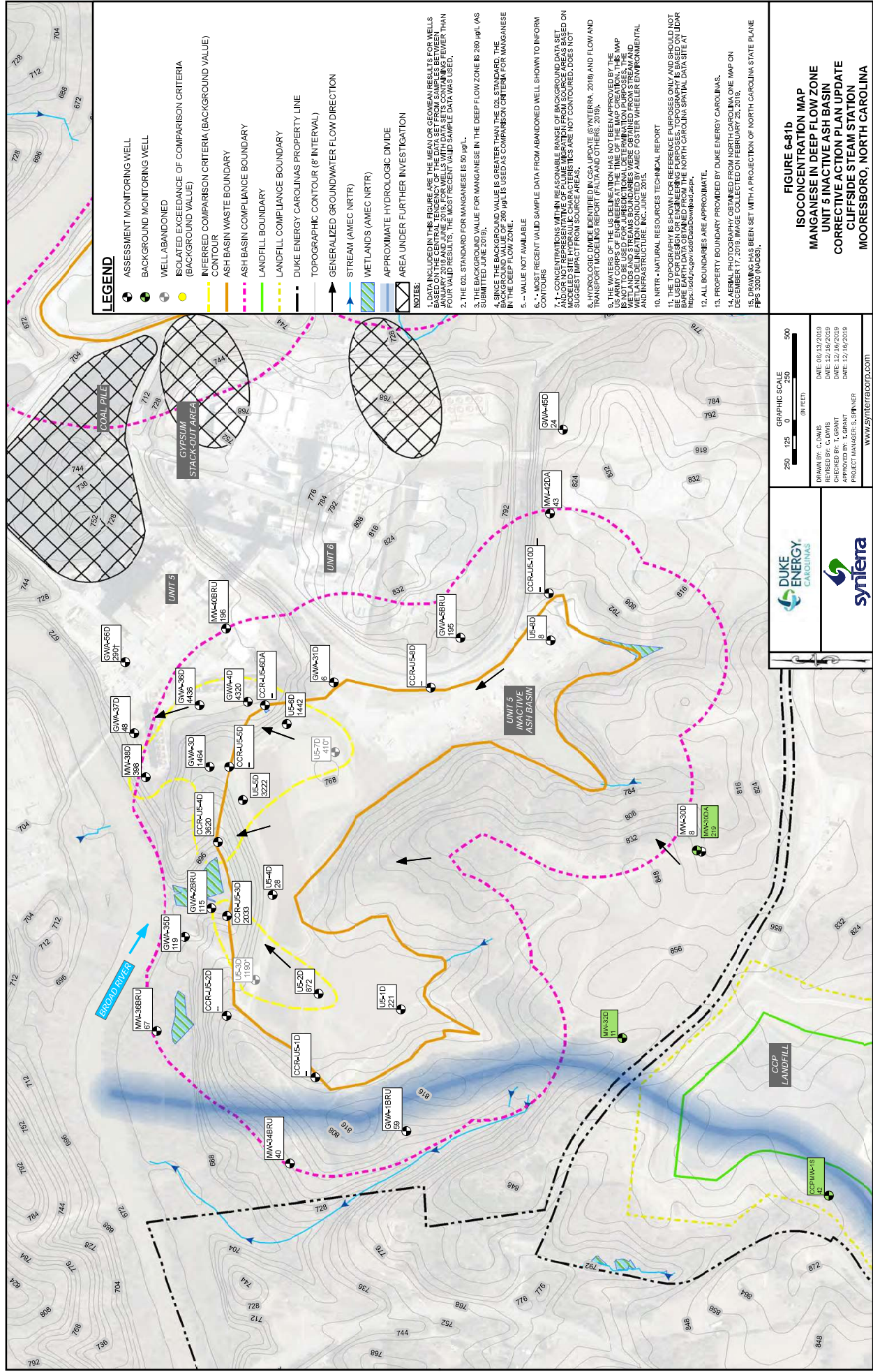


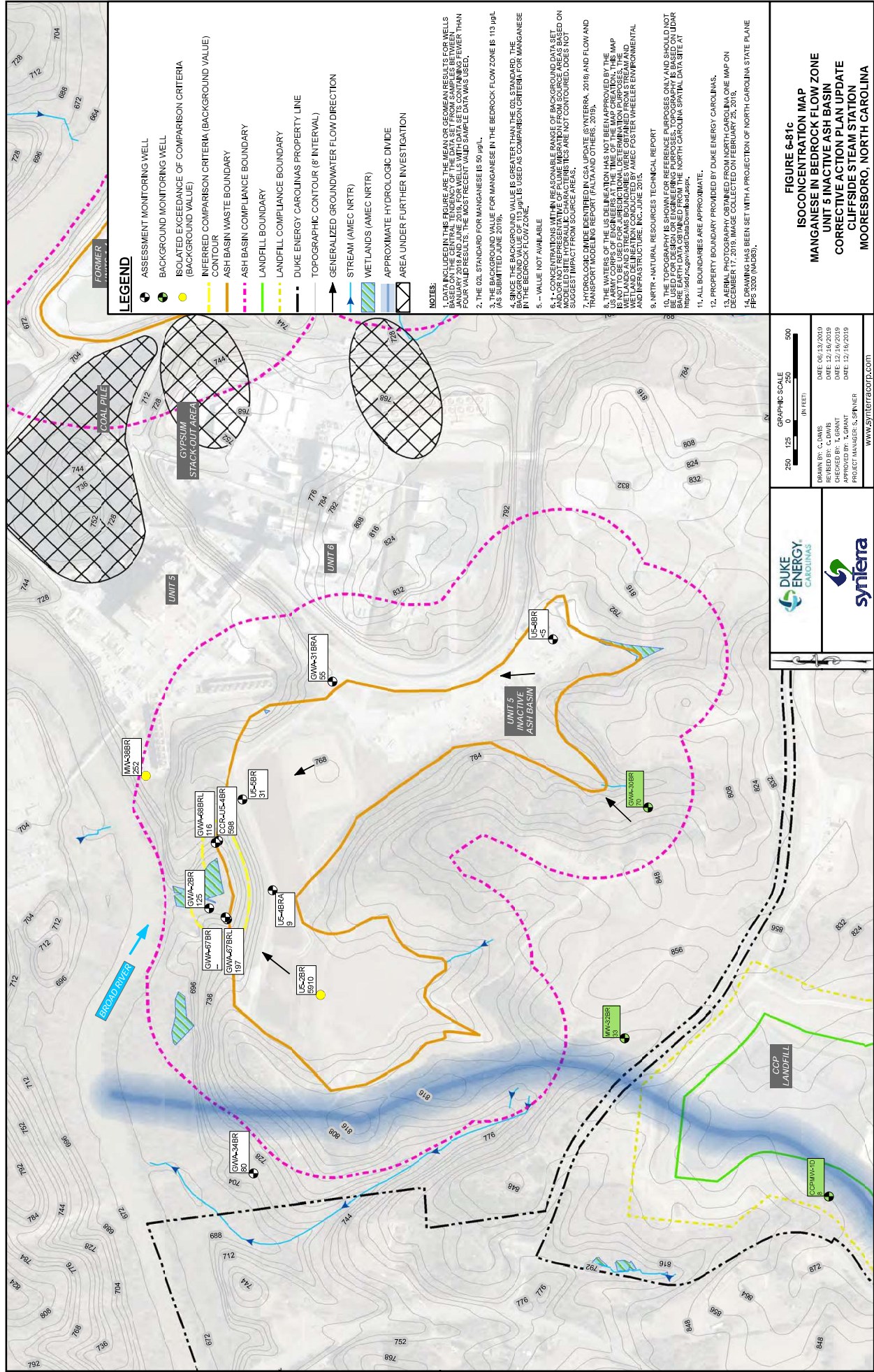


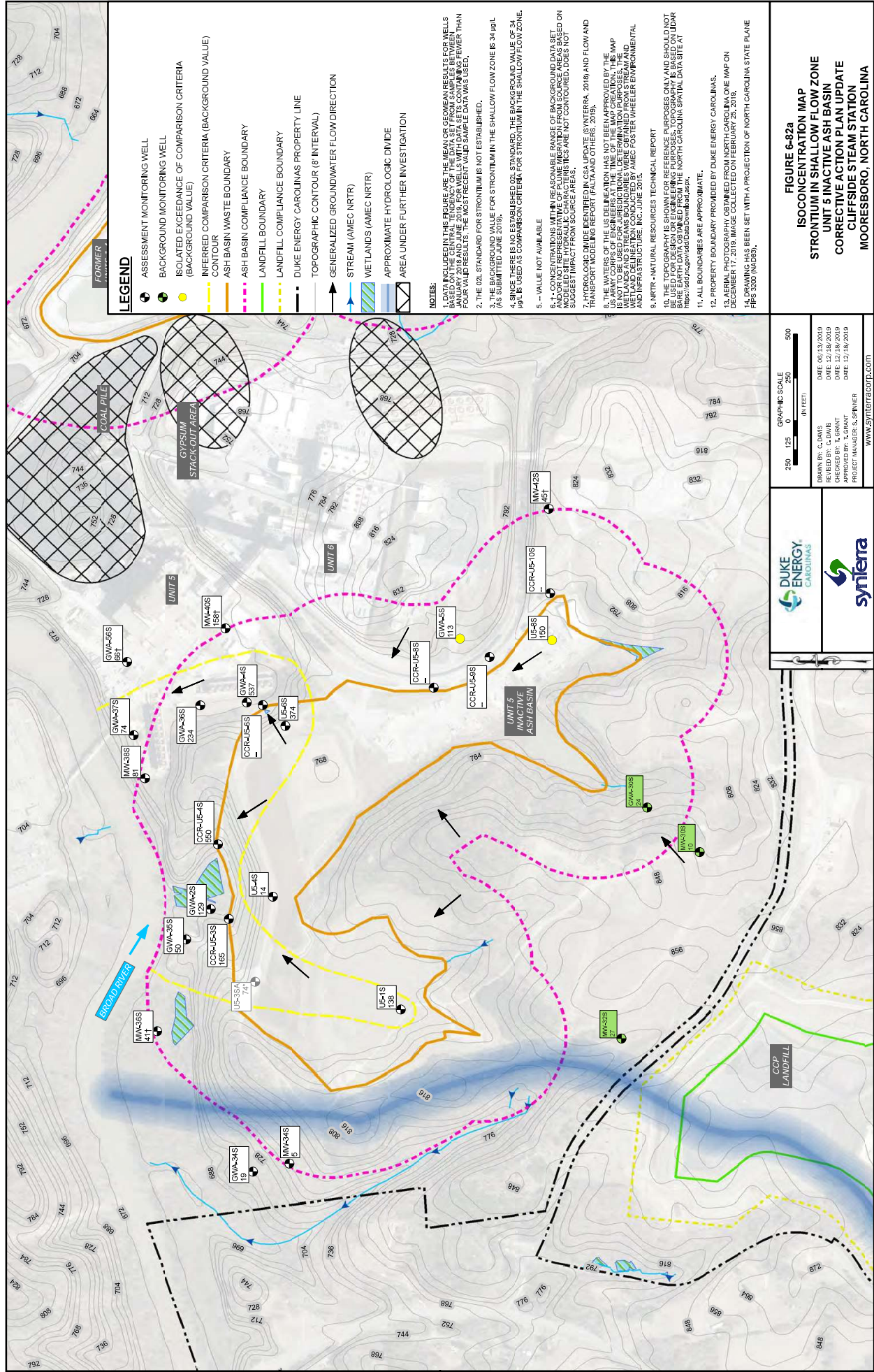


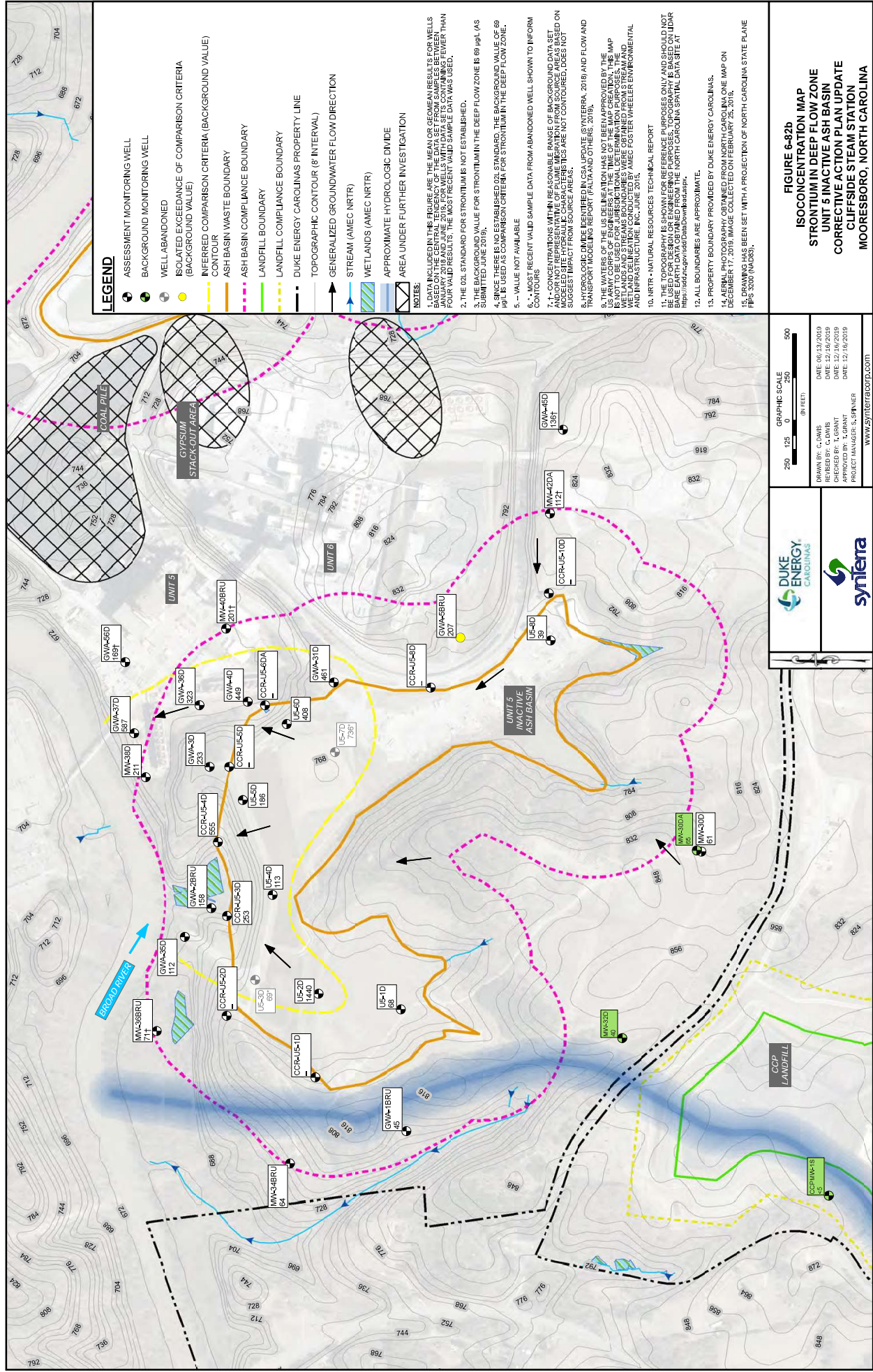


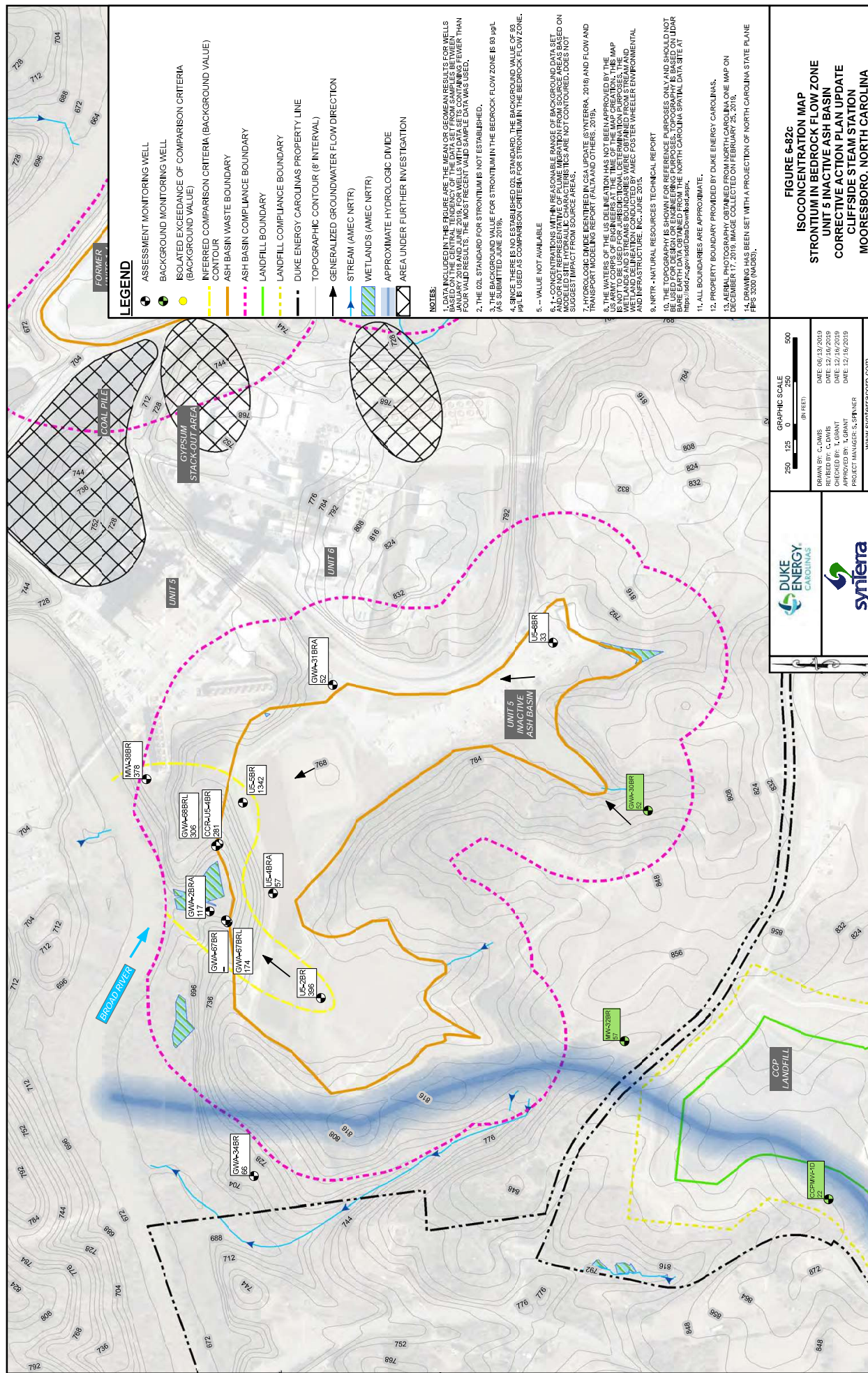


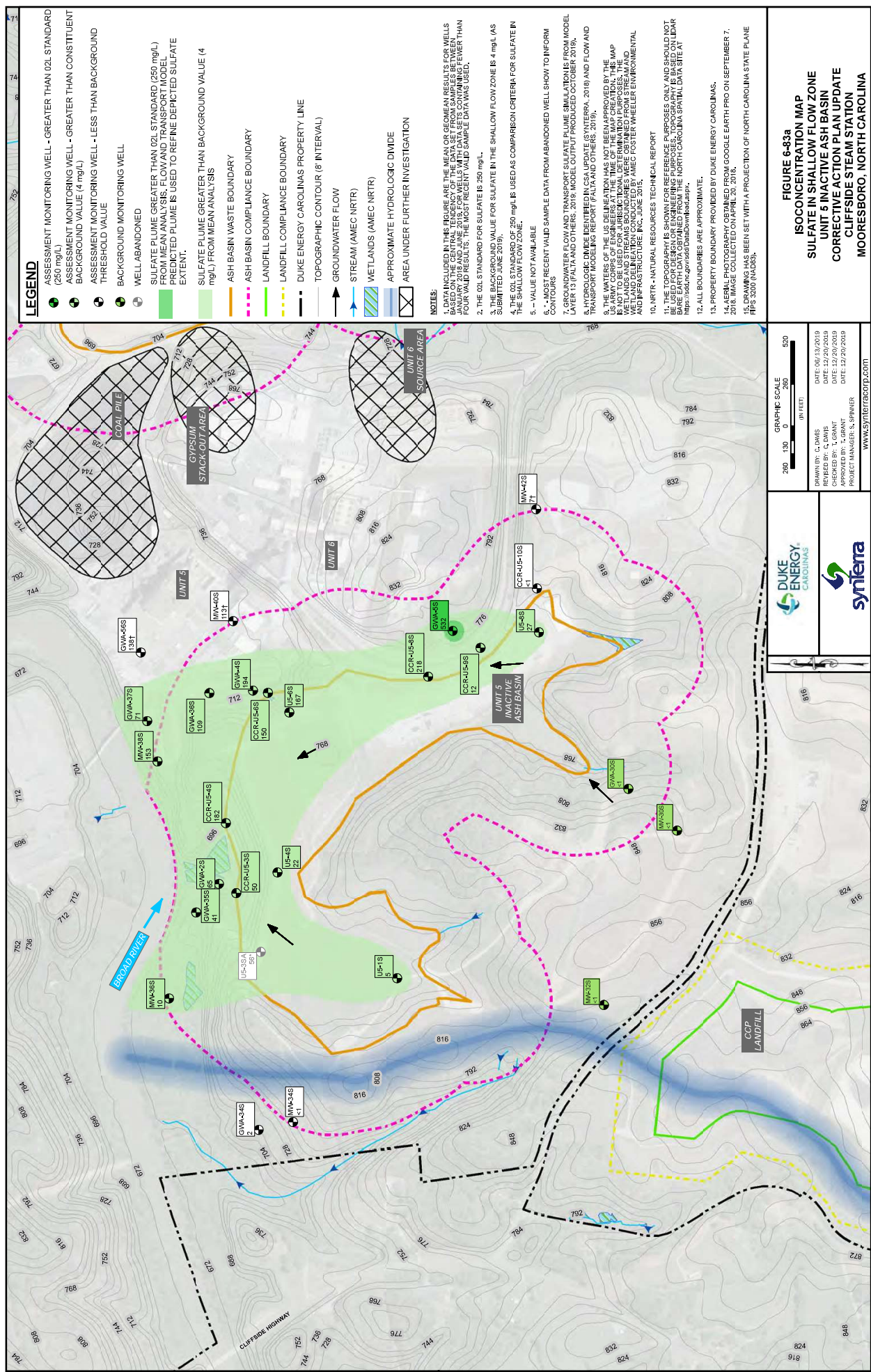


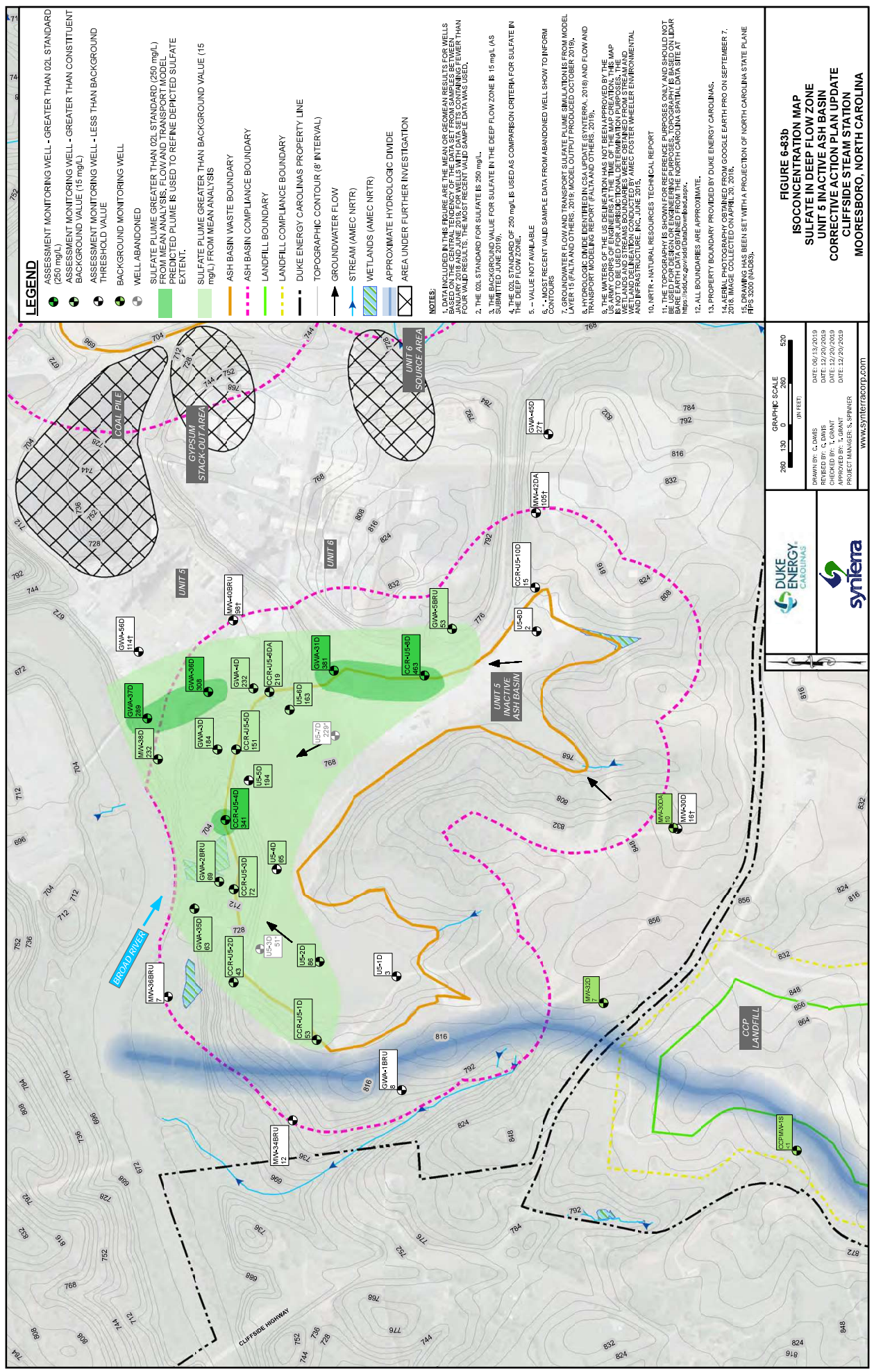


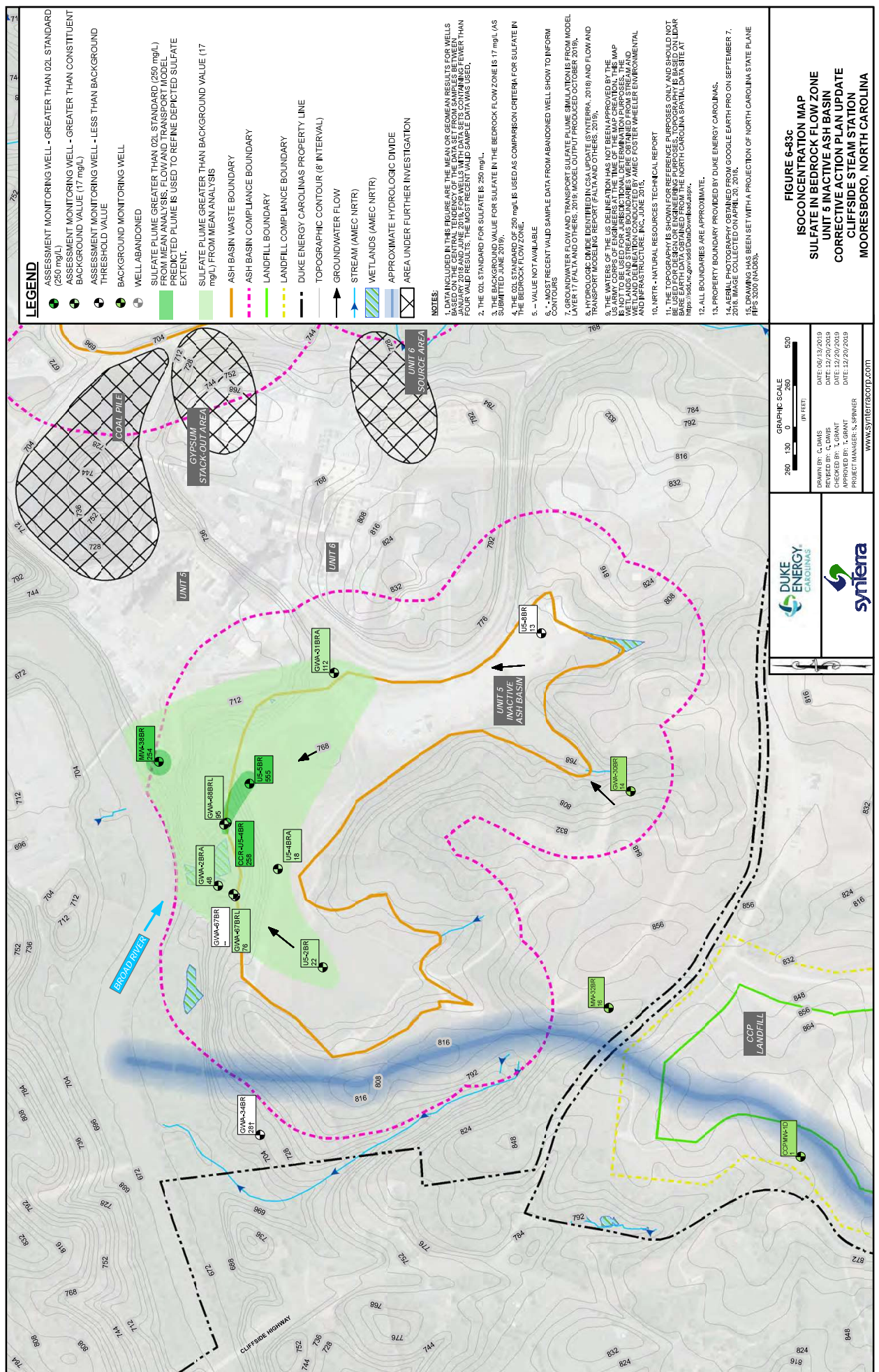












- LEGEND**
- ASSESSMENT MONITORING WELL - GREATER THAN 02L STANDARD (250 mg/L)
 - ASSESSMENT MONITORING WELL - GREATER THAN CONSTITUENT BACKGROUND VALUE (17 mg/L)
 - ASSESSMENT MONITORING WELL - LESS THAN BACKGROUND THRESHOLD VALUE
 - BACKGROUND MONITORING WELL
 - WELL ABANDONED
 - SULFATE PLUME GREATER THAN 02L STANDARD (250 mg/L) FROM MEAN ANALYSIS, FLOW AND TRANSPORT MODEL
 - PREDICTED PLUME IS USED TO REFINE DEPICTED SULFATE EXTENT.
 - SULFATE PLUME GREATER THAN BACKGROUND VALUE (17 mg/L) FROM MEAN ANALYSIS
 - ASH BASIN WASTE BOUNDARY
 - ASH BASIN COMPLIANCE BOUNDARY
 - LANDFILL BOUNDARY
 - LANDFILL COMPLIANCE BOUNDARY
 - DUKE ENERGY CAROLINAS PROPERTY LINE
 - TOPOGRAPHIC CONTOUR (8' INTERVAL)
 - GROUNDWATER FLOW
 - STREAM (AMEC NRTR)
 - WETLANDS (AMEC NRTR)
 - APPROXIMATE HYDROLOGIC DIVIDE
 - AREA UNDER FURTHER INVESTIGATION

NOTES:

1. DATA INCLUDED IN THIS FIGURE ARE THE MEAN OR GEOMEAN RESULTS FOR WELLS BASED ON THE CENTRAL TENDENCY OF THE DATA SET FROM SAMPLES BETWEEN 2016 AND 2018. THE DATA SET FOR THIS FIGURE IS THE MOST RECENT VALID SAMPLE DATA WAS USED.

2. THE 02L STANDARD FOR SULFATE IS 250 mg/L.

3. THE BACKGROUND VALUE FOR SULFATE IN THE BEDROCK FLOW ZONE IS 17 mg/L (AS SUBMITTED JUNE 2019).

4. THE 02L STANDARD OF 250 mg/L IS USED AS COMPARISON CRITERIA FOR SULFATE IN THE BEDROCK FLOW ZONE.

5. - VALUE NOT AVAILABLE

6. - MOST RECENT VALID SAMPLE DATA FROM ABANDONED WELL SHOW TO INFORM CONTOURS

7. GROUNDWATER FLOW AND TRANSPORT SULFATE PLUME SIMULATION IS FROM MODEL LAYER 17 (PALLA AND OTHERS, 2019; MODEL OUTPUT PRODUCED OCTOBER 2019).

8. HYDROLOGIC DIVIDE IDENTIFIED IN CSA DRAFT (SYNTERRA, 2018) AND FLOW AND TRANSPORT SULFATE PLUME SIMULATION IS FROM MODEL LAYER 17 (PALLA AND OTHERS, 2019; MODEL OUTPUT PRODUCED OCTOBER 2019).

9. THE WATERS OF THE US DELINEATION HAS NOT BEEN APPROVED BY THE US ARMY CORPS OF ENGINEERS AT THE TIME OF THE MAP CREATION. THE MAP IS NOT BE USED FOR ANY PURPOSES THAT REQUIRE A DETERMINATION OF WATERS OF THE US DELINEATION. THE MAP IS FOR INFORMATIONAL PURPOSES ONLY. THE WATERS OF THE US DELINEATION CONDUCTED BY AMEC FOSTER WHEELER ENVIRONMENTAL AND INFRASTRUCTURE, INC. JUNE 2015.

10. NRTR - NATURAL RESOURCES TECHNICAL REPORT

11. THE TOPOGRAPHY IS SHOWN FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE USED FOR ANY PURPOSES THAT REQUIRE A DETERMINATION OF WATERS OF THE US DELINEATION. THE TOPOGRAPHY IS SHOWN FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE USED FOR ANY PURPOSES THAT REQUIRE A DETERMINATION OF WATERS OF THE US DELINEATION.

12. ALL BOUNDARIES ARE APPROXIMATE.

13. PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY CAROLINAS.

14. AERIAL PHOTOGRAPHY OBTAINED FROM GOOGLE EARTH PRO ON SEPTEMBER 7, 2018. IMAGE COLLECTED ON APRIL 20, 2018.

15. DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE RPS 3200 (NAD83).

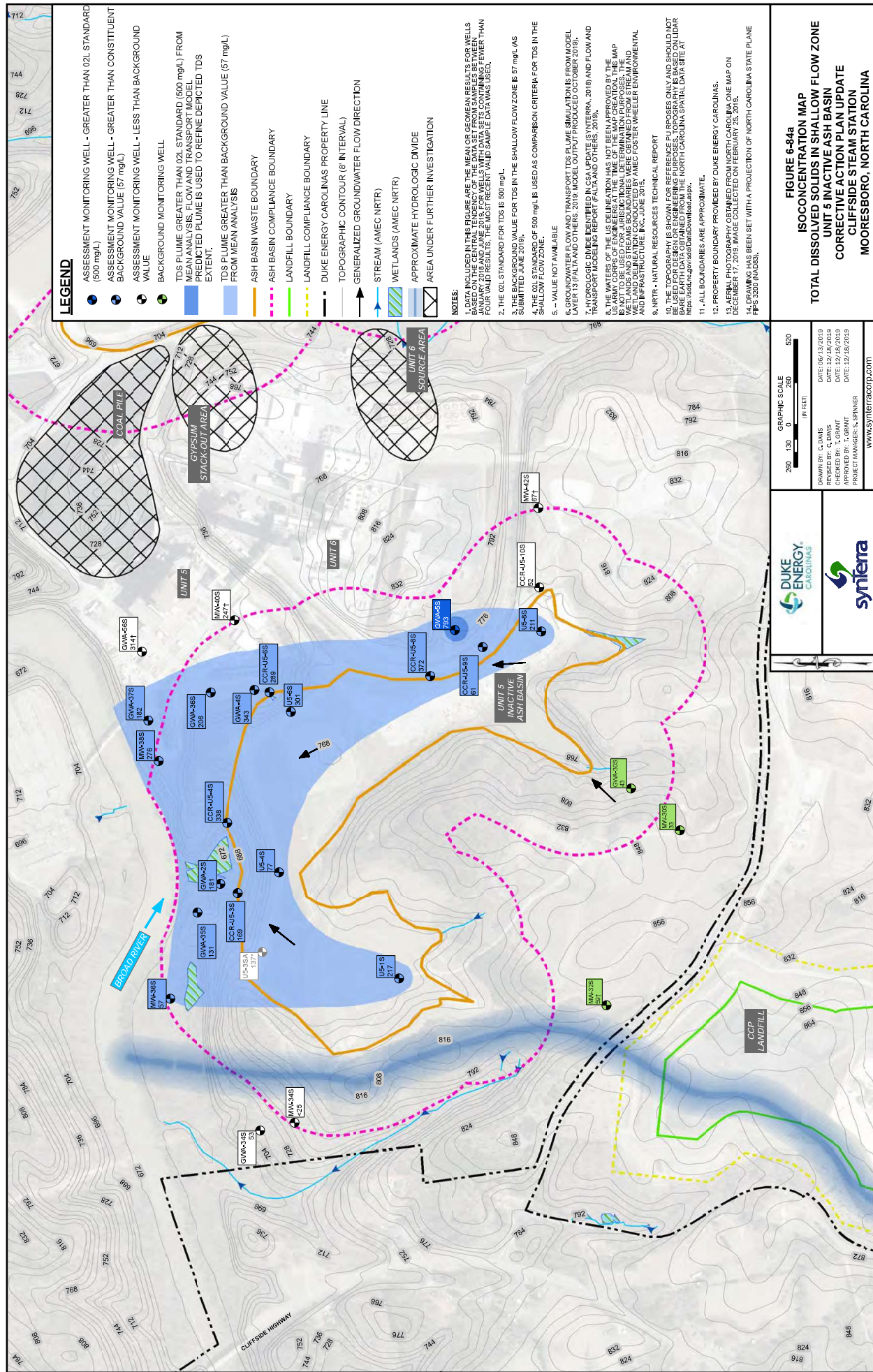
FIGURE 6-83C
ISOCONCENTRATION MAP
SULFATE IN BEDROCK FLOW ZONE
UNIT 5 INACTIVE ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA

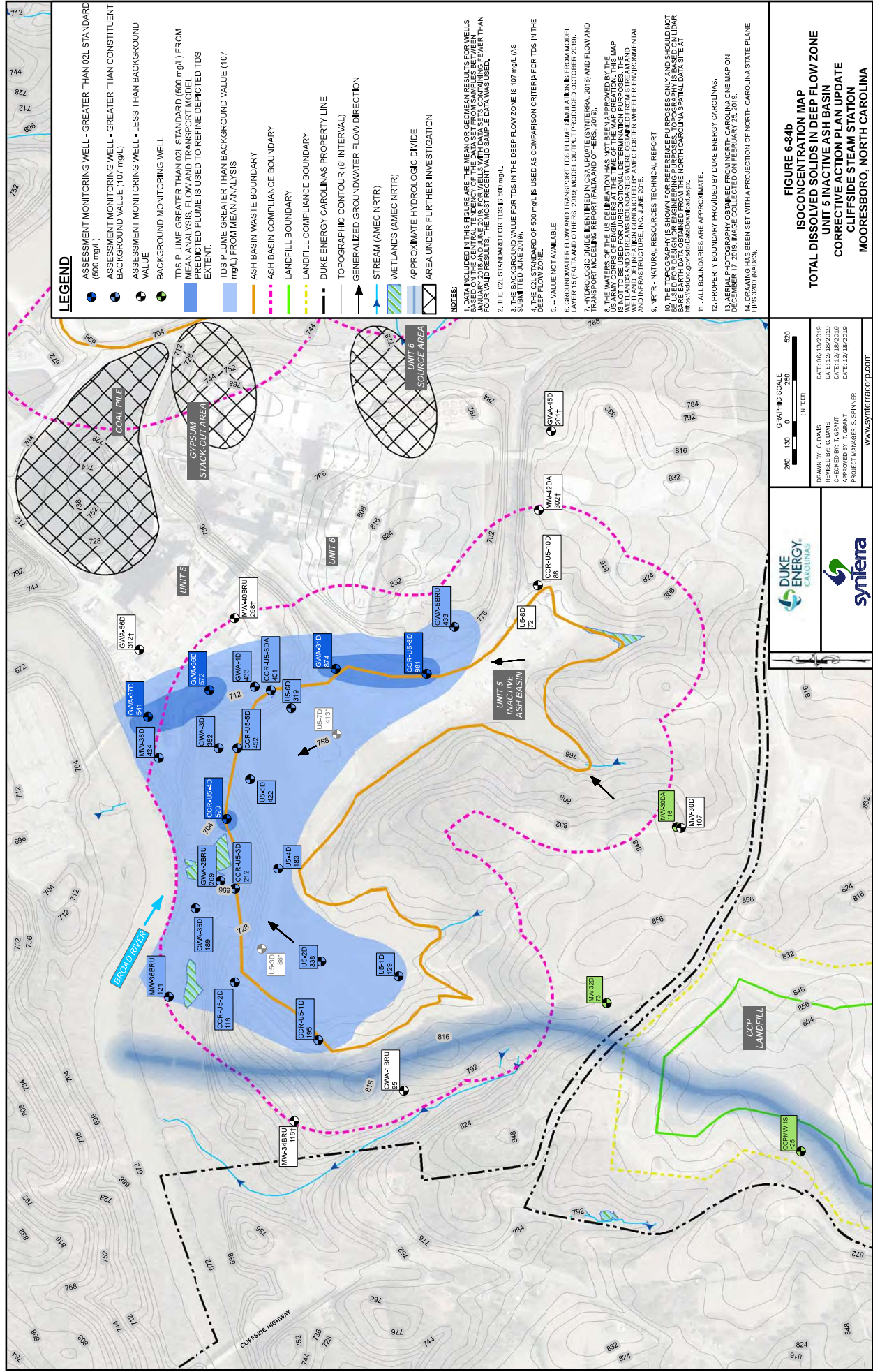
GRAPHIC SCALE
0 200 400 600
(IN FEET)

DATE: 06/12/2019
DATE: 12/20/2018
REVIEWED BY: C. DAVIS
CHECKED BY: T. GRANT
APPROVED BY: T. GRANT
PROJECT MANAGER: S. SPRINGER

DUKE ENERGY CAROLINAS
synterra

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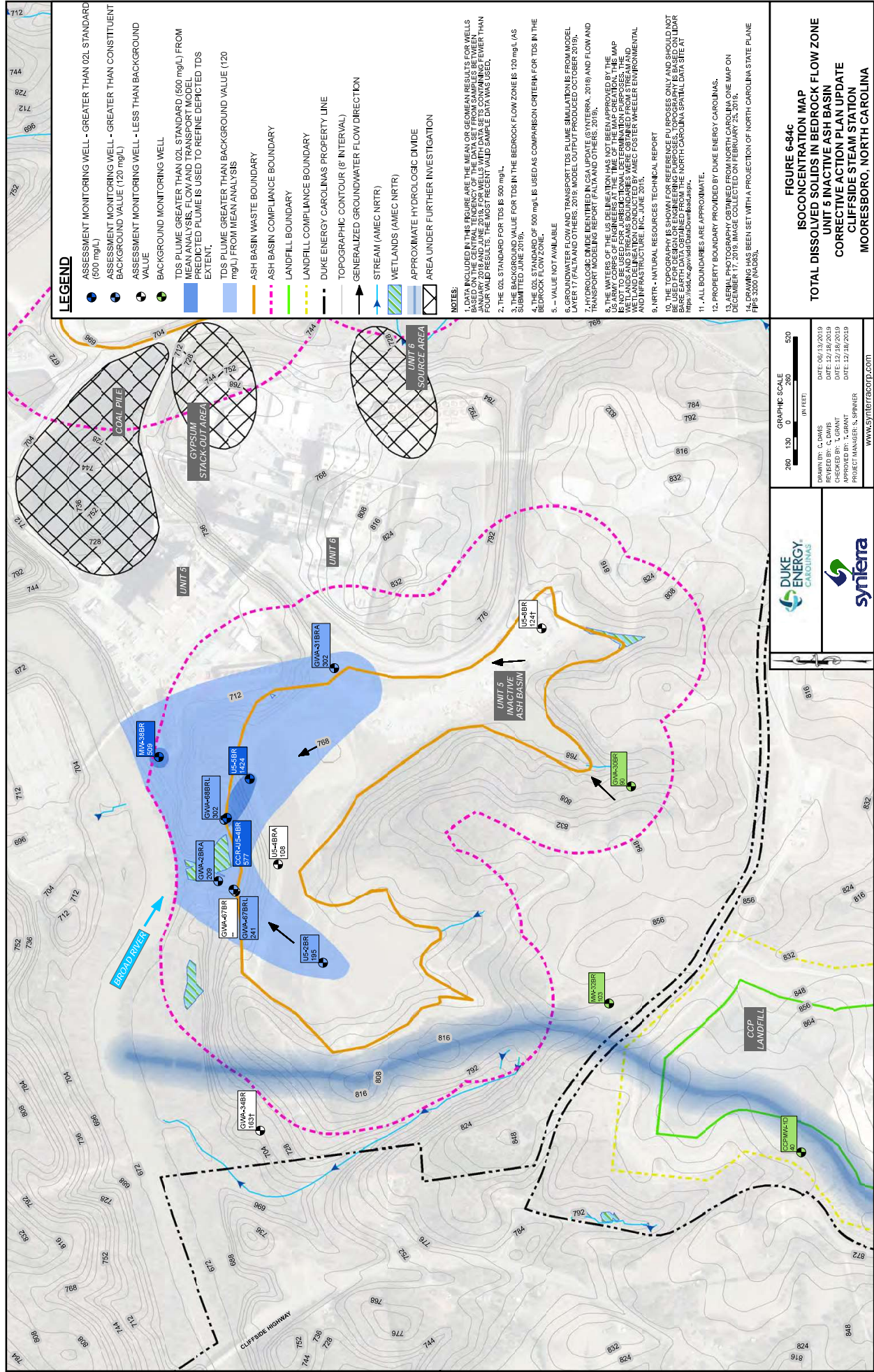


FIGURE 6-84C
ISOCONCENTRATION MAP
TOTAL DISSOLVED SOLIDS IN BEDROCK FLOW ZONE
UNIT 5 INACTIVE ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA

GRAPHIC SCALE
0 200 400 500
(IN FEET)

DATE: 12/18/2019
DRAWN BY: C. DAVIS
CHECKED BY: T. GRANT
APPROVED BY: T. GRANT
PROJECT MANAGER: S. SPRINGER

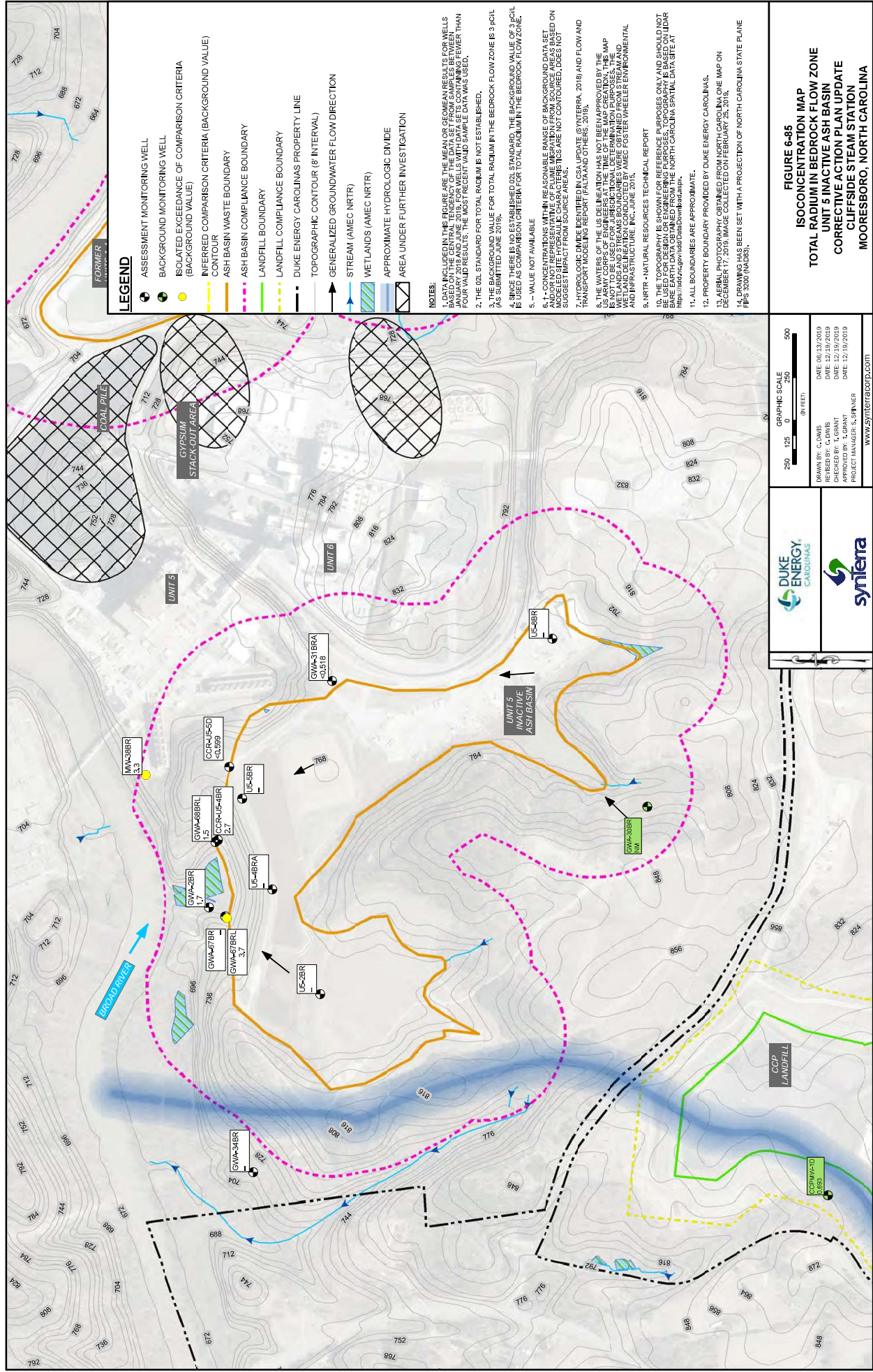


LEGEND

- ASSESSMENT MONITORING WELL - GREATER THAN 02L STANDARD (600 mg/L)
- ASSESSMENT MONITORING WELL - GREATER THAN CONSTITUENT BACKGROUND VALUE (120 mg/L)
- ASSESSMENT MONITORING WELL - LESS THAN BACKGROUND VALUE
- BACKGROUND MONITORING WELL
- TDS PLUME GREATER THAN 02L STANDARD (600 mg/L) FROM MEAN ANALYSIS, FLOW AND TRANSPORT MODEL PREDICTED PLUME IS USED TO REFINE DEPICTED TDS EXTENT.
- TDS PLUME GREATER THAN BACKGROUND VALUE (120 mg/L) FROM MEAN ANALYSIS
- ASH BASIN WASTE BOUNDARY
- ASH BASIN COMPLIANCE BOUNDARY
- LANDFILL BOUNDARY
- LANDFILL COMPLIANCE BOUNDARY
- DUKE ENERGY CAROLINAS PROPERTY LINE
- TOPOGRAPHIC CONTOUR (8' INTERVAL)
- GENERALIZED GROUNDWATER FLOW DIRECTION
- STREAM (AMEC NRT)
- WETLANDS (AMEC NRT)
- APPROXIMATE HYDROLOGIC DIVIDE
- AREA UNDER FURTHER INVESTIGATION

NOTES:

1. DATA INCLUDED IN THIS FIGURE ARE THE MEAN OR GEOMETRIC RESULTS FOR WELLS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.
2. THE 02L STANDARD FOR TDS IS 500 mg/L.
3. THE BACKGROUND VALUE FOR TDS IN THE BEDROCK FLOW ZONE IS 120 mg/L (AS SUBMITTED JUNE 2019).
4. THE 02L STANDARD OF 500 mg/L IS USED AS COMPARISON CRITERIA FOR TDS IN THE BEDROCK FLOW ZONE.
5. - VALUE NOT AVAILABLE
6. GROUNDWATER FLOW AND TRANSPORT TDS PLUME SIMULATION IS FROM MODEL LAYER 17 (FALL 2018). 2019 MODEL OUTPUT PRODUCED OCTOBER 2019.
7. THE 02L STANDARD FOR TDS IN THE BEDROCK FLOW ZONE IS 500 mg/L. TRANSPORT MODELING RESULTS FOR TDS IN THE BEDROCK FLOW ZONE FOR JANUARY 2018 AND JUNE 2019. FOR WELLS WITH DATA SETS CONTAINING FEWER THAN FOUR VALID RESULTS, THE MOST RECENT VALID SAMPLE DATA WAS USED.
8. THE WATERS OF THE US DELINEATION HAS NOT BEEN APPROVED BY THE US ARMY CORPS OF ENGINEERS AT THE TIME OF THE MAP CREATION. THE MAP SHOWS THE WATERS OF THE US DELINEATION FOR THE BEDROCK FLOW ZONE. WETLAND AND STREAM BOUNDARIES WERE OBTAINED FROM STREAM AND WETLAND DELINEATION CONDUCTED BY AMEC FOSTER WHEELER ENVIRONMENTAL AND INFRASTRUCTURE, INC. IN JUNE 2019.
9. NRT - NATURAL RESOURCES TECHNICAL REPORT
10. THE TOPOGRAPHY IS SHOWN FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE USED FOR ENGINEERING PURPOSES. THE TOPOGRAPHY IS BASED ON THE LIDAR DATA OBTAINED FROM THE NORTH CAROLINA SPATIAL DATA SITE AT <https://data.nc.gov/dataset/north-carolina-spatial-data-site>.
11. ALL BOUNDARIES ARE APPROXIMATE.
12. PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY CAROLINAS.
13. AERIAL PHOTOGRAPHY OBTAINED FROM NORTH CAROLINA ONE MAP ON DECEMBER 17, 2019. IMAGE COLLECTED ON FEBRUARY 25, 2019.
14. DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE FIPS 3200 (NAD83).



Note:

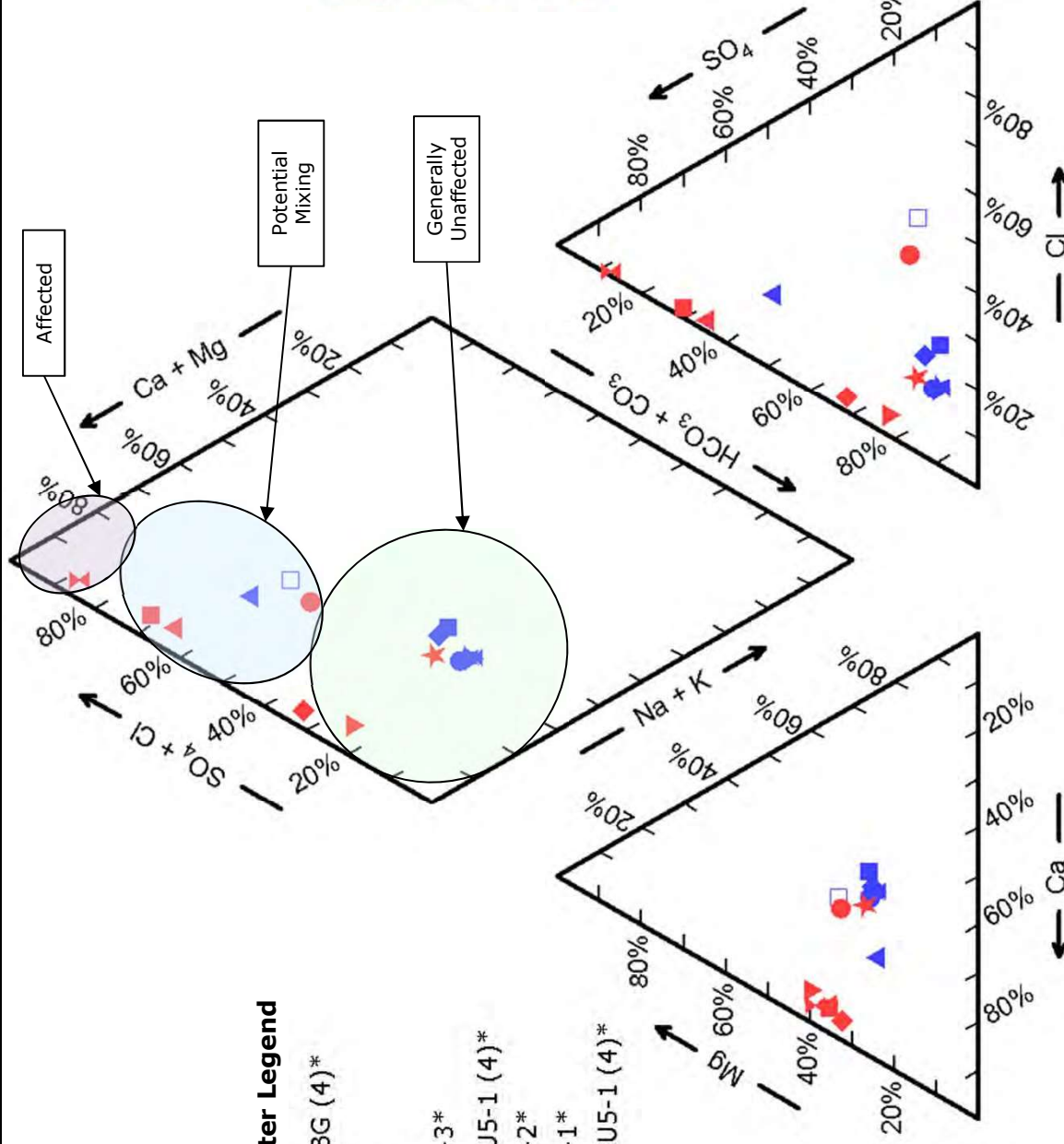
* - Sampling events prior to 1/1/2018

Surface Water Legend

- SW-BRBG (4)*
- SW-9*
- ▲ SW-1*
- ▼ SW-BR-3*
- ◆ SW-BRU5-1 (4)*
- ✕ SW-BR-2*
- ★ SW-BR-1*
- SW-WCU5-1 (4)*

Seeps Legend

- CLFTD-004*
- S-1
- ▲ S-2
- ▼ S-19*
- ◆ S-19A*
- ✕ S-18*
- ★ S-17*



DRAWN BY: R. Badum
 REVISED BY: R. Badum
 CHECKED BY: T. Grant
 APPROVED BY: T. Grant
 PROJECT MANAGER: S. Spinner

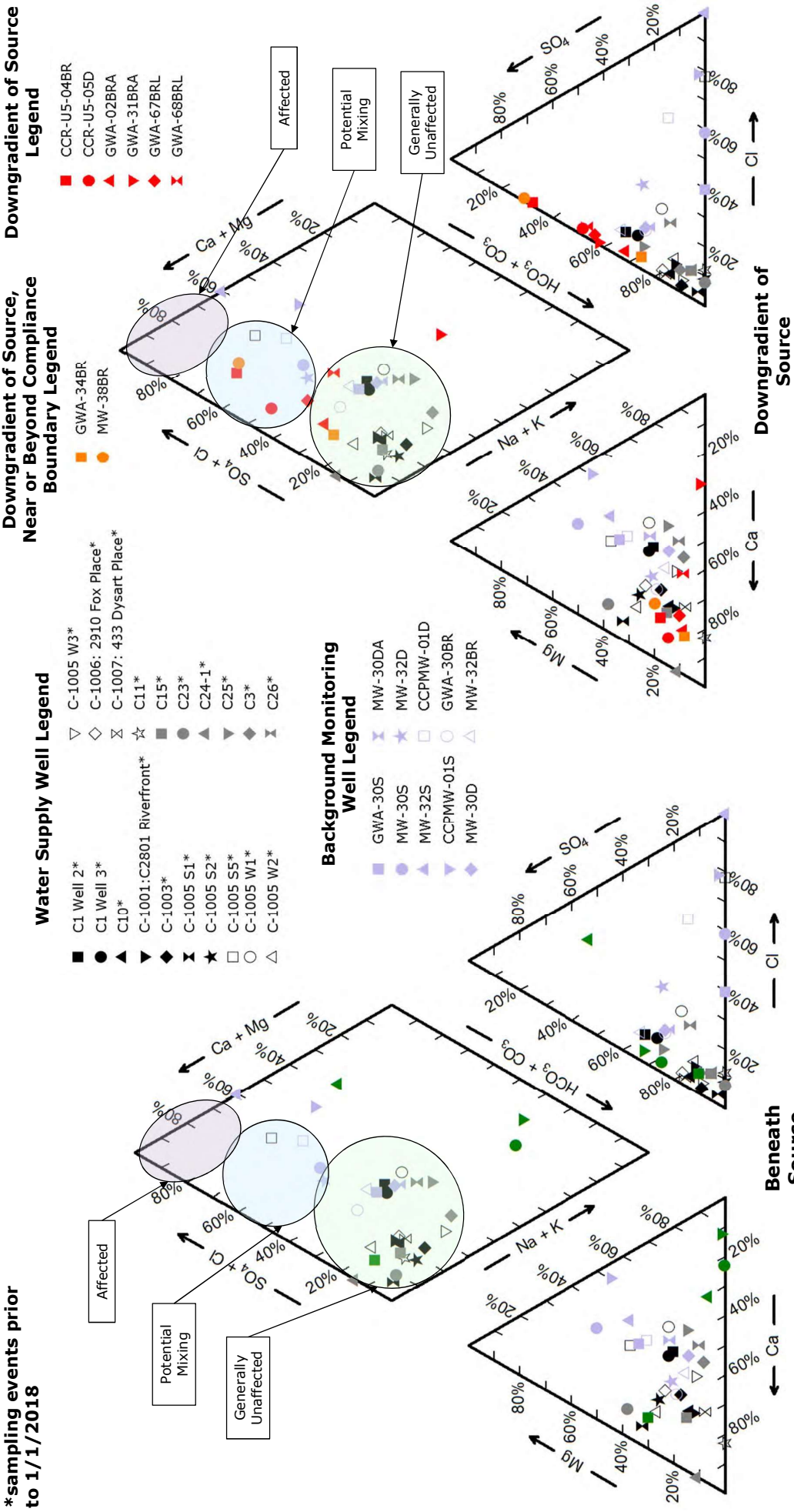
DATE: 10/18/2019

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FIGURE 6-86
SEEP AND SURFACE WATER
QUALITY PIPER DIAGRAMS
UNIT 5 INACTIVE ASH BASIN
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA

Note:

*sampling events prior to 1/1/2018



Beneath Source Legend

- U5-02BR
- U5-04BRA
- ▲ U5-05BR
- ▼ U5-08BR

DATE: 11/8/2019

DRAWN BY: R. Badum

REVISED BY: R. Badum

CHECKED BY: T. Grant

APPROVED BY: T. Grant

PROJECT MANAGER: S. Spinner

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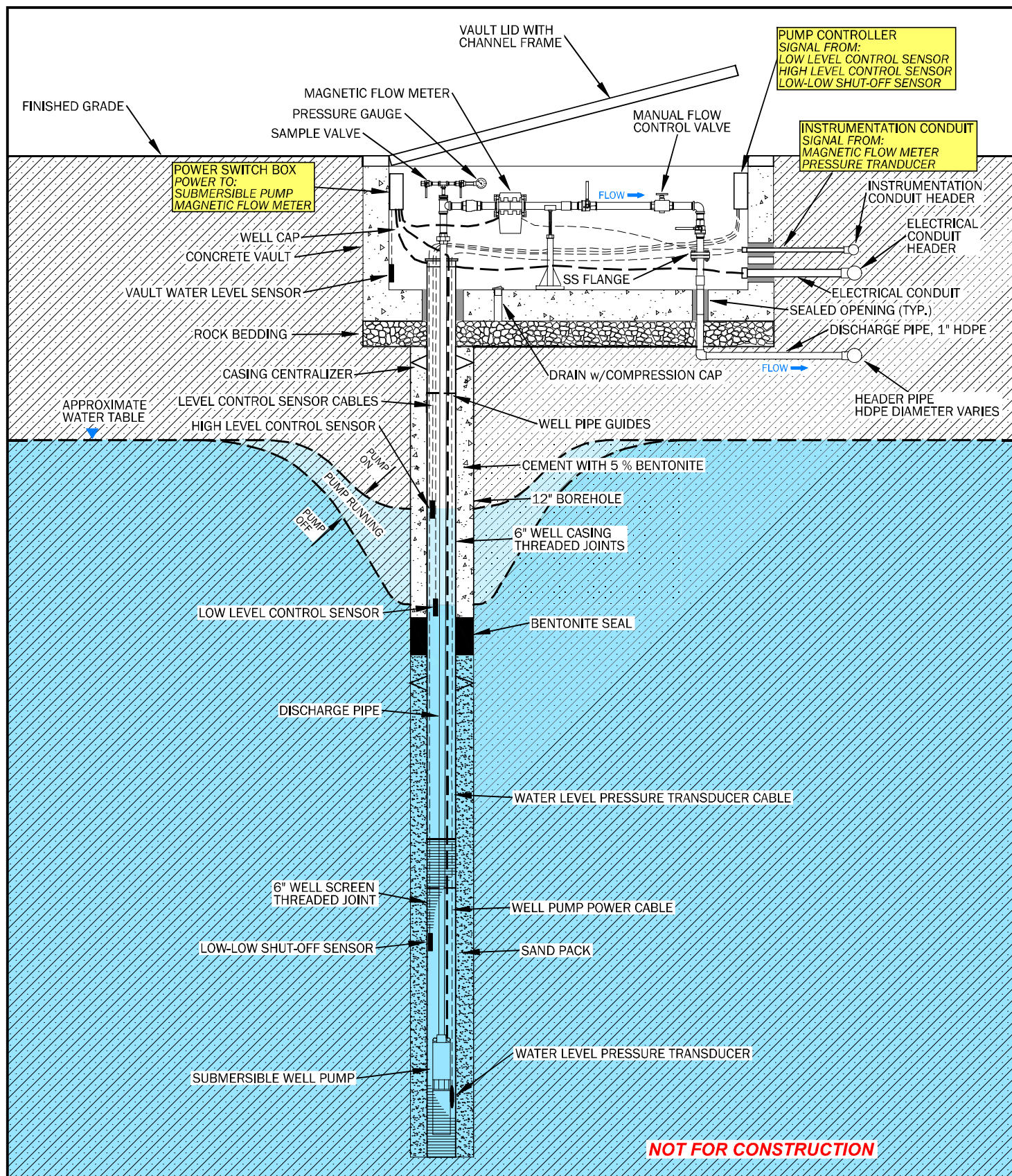


FIGURE 6-87
WATER SUPPLY WELL
GROUNDWATER PIPER DIAGRAMS
UNIT 5 INACTIVE ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA

Figure 6-88a

Remedial Alternative 3 – System Layout – Groundwater Remediation by Extraction

Provided in separate electronic figure file as a
large sheet size

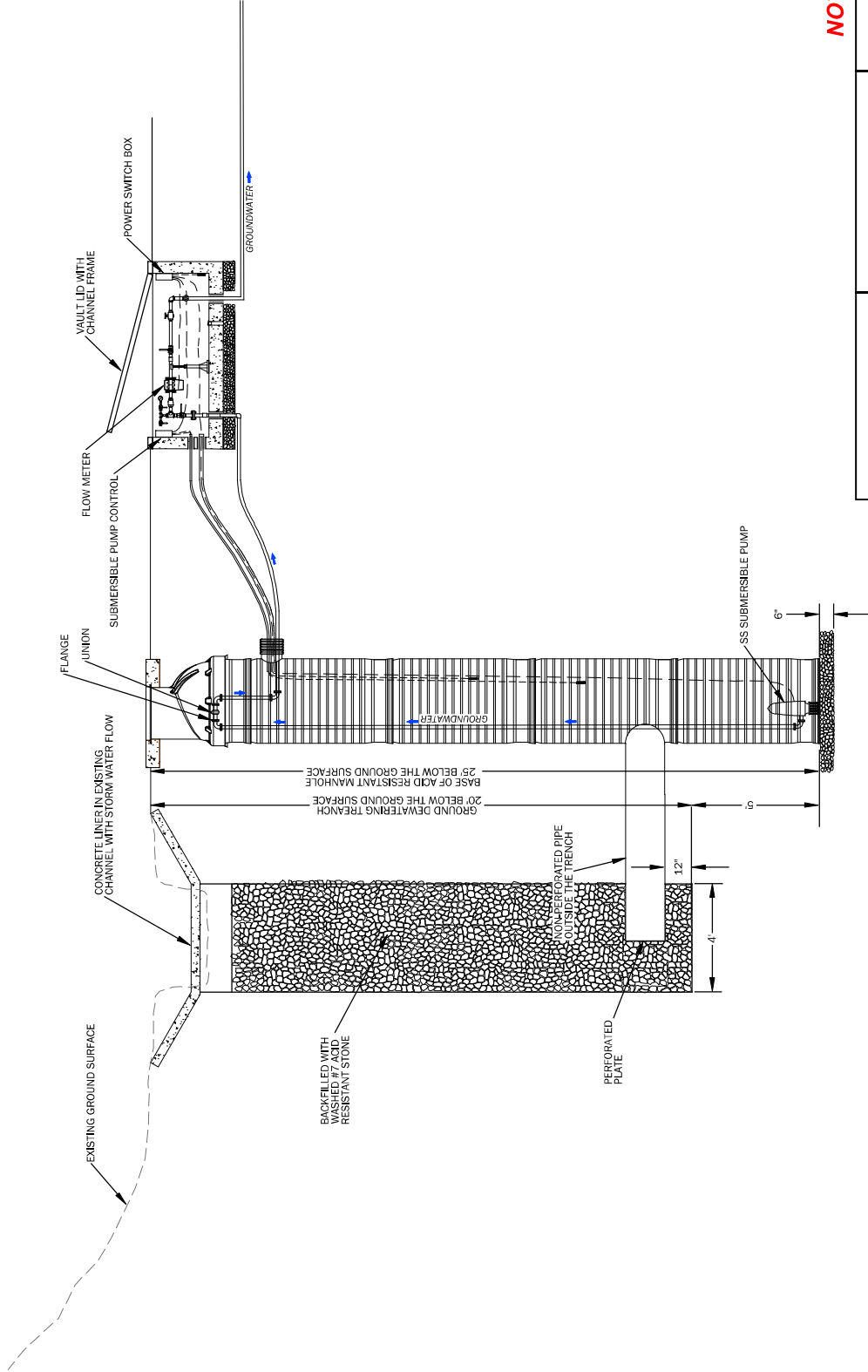


NOT TO SCALE

DRAWN BY: J. CHASTAIN DATE: 12/21/2019
 REVISED BY: DATE: -
 CHECKED BY: J. CLEMMER DATE: 12/21/2019
 APPROVED BY: J. CLEMMER DATE: 12/21/2019
 PROJECT MANAGER: S. SPINNER

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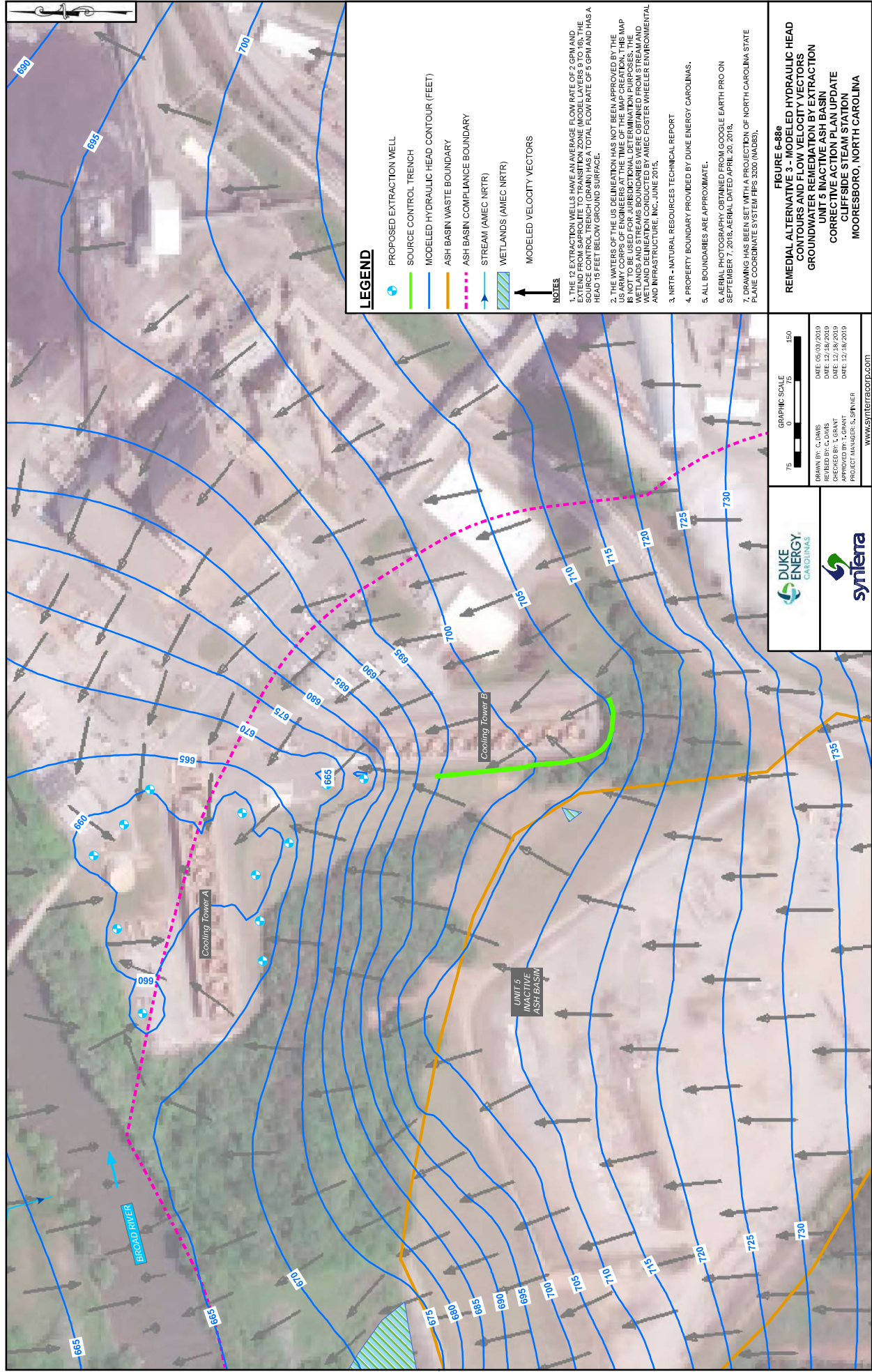
FIGURE 6-88b
REMEDIAL ALTERNATIVE 3
CONCEPTUAL VERTICAL EXTRACTION WELL
SCHEMATIC
GROUNDWATER REMEDIATION BY EXTRACTION
UNIT 5 INACTIVE ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA



NOT FOR CONSTRUCTION

	NOT TO SCALE	FIGURE 6-88C REMEDIAL ALTERNATIVE 3 CONCEPTUAL SOURCE CONTROL TRENCH PUMP STATION GROUNDWATER REMEDIATION BY EXTRACTION UNIT 5 INACTIVE ASH BASIN CORRECTIVE ACTION PLAN UPDATE CLIFFSIDE STEAM STATION MOORESBORO, NORTH CAROLINA
	www.synterracorp.com	DATE: 12/21/2019 DRAWN BY: J. CHRISTIAN DATE: 12/21/2019 CHECKED BY: J. CLEMMER DATE: 12/21/2019 APPROVED BY: J. CLEMMER PROJECT MANAGER: S. SPINER

FIGURE 6-88d
REMEDIAL ALTERNATIVE 3
CONCEPTUAL PIPELINE TRENCH DETAIL
GROUNDWATER REMEDIATION BY EXTRACTION
UNIT 5 INACTIVE ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA



LEGEND

- PROPOSED EXTRACTION WELL
- SOURCE CONTROL TRENCH
- MODELED HYDRAULIC HEAD CONTOUR (FEET)
- ASH BASIN WASTE BOUNDARY
- ASH BASIN COMPLIANCE BOUNDARY
- STREAM (AMEC NRTR)
- WETLANDS (AMEC NRTR)
- MODELED VELOCITY VECTORS

NOTES

1. THE 12 EXTRACTION WELLS HAVE AN AVERAGE FLOW RATE OF 3 GPM AND EXTEND FROM SAPROLITE TO TRANSITION ZONE (MODEL LAYERS 9 TO 16). THE SOURCE CONTROL TRENCH (DRAIN) HAS A TOTAL FLOW RATE OF 6 GPM AND HAS A HEAD 15 FEET BELOW GROUND SURFACE.
2. THE WATERS OF THE US DELINEATION HAS NOT BEEN APPROVED BY THE US ARMY CORPS OF ENGINEERS AT THE TIME OF THE MAP CREATION. THIS MAP WAS CREATED USING THE US ARMY CORPS OF ENGINEERS' DELINEATION. WETLANDS AND STREAMS BOUNDARIES WERE OBTAINED FROM STREAM AND WETLAND DELINEATION CONDUCTED BY AMEC FOSTER WHEELER ENVIRONMENTAL AND INFRASTRUCTURE, INC. JUNE 2015.
3. NRTR - NATURAL RESOURCES TECHNICAL REPORT
4. PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY CAROLINAS.
5. ALL BOUNDARIES ARE APPROXIMATE.
6. AERIAL PHOTOGRAPHY OBTAINED FROM GOOGLE EARTH PRO ON SEPTEMBER 7, 2016. AERIAL DATED APRIL 20, 2016.
7. DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE COORDINATE SYSTEM FPS 3200 (NAD83).

FIGURE C-88e
REMEDIAL ALTERNATIVE 3 - MODELED HYDRAULIC HEAD CONTOURS AND FLOW VELOCITY VECTORS
GROUNDWATER REMEDIATION BY EXTRACTION
UNIT 5 INACTIVE ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA

GRAPHIC SCALE

0 75 150

DRAWN BY: C. DAVIS

DATE: 06/09/2019

CHECKED BY: T. GRANT

DATE: 12/18/2019

APPROVED BY: T. GRANT

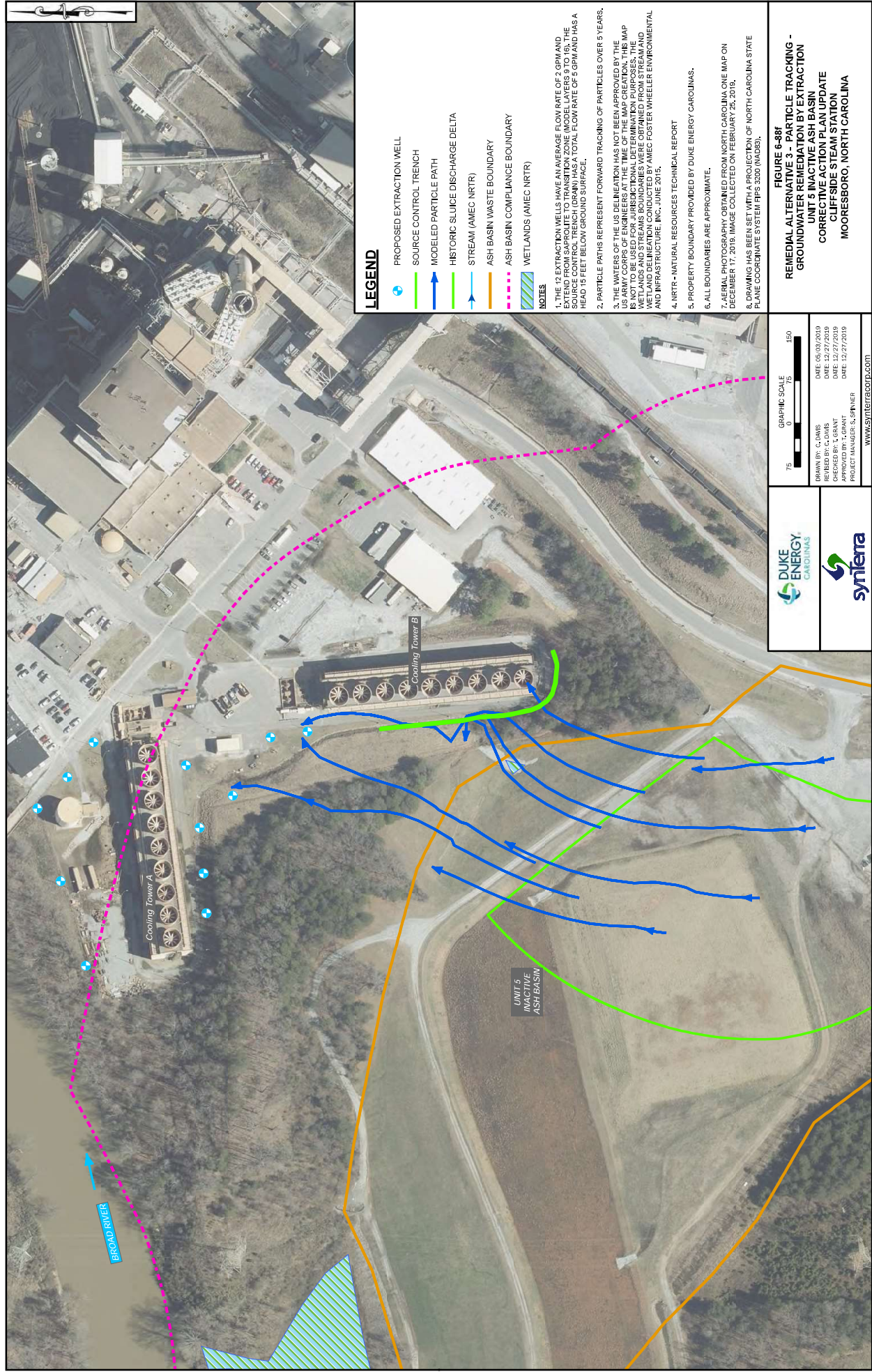
DATE: 12/18/2019

PROJECT MANAGER: S. SPRINGER

DUKE ENERGY CAROLINAS

synera

WWW.SYNERECORP.COM



LEGEND

- PROPOSED EXTRACTION WELL
- SOURCE CONTROL TRENCH
- MODELED PARTICLE PATH
- HISTORIC SLUICE DISCHARGE DELTA
- STREAM (AMEC NRTR)
- ASH BASIN WASTE BOUNDARY
- ASH BASIN COMPLIANCE BOUNDARY
- WETLANDS (AMEC NRTR)

NOTES

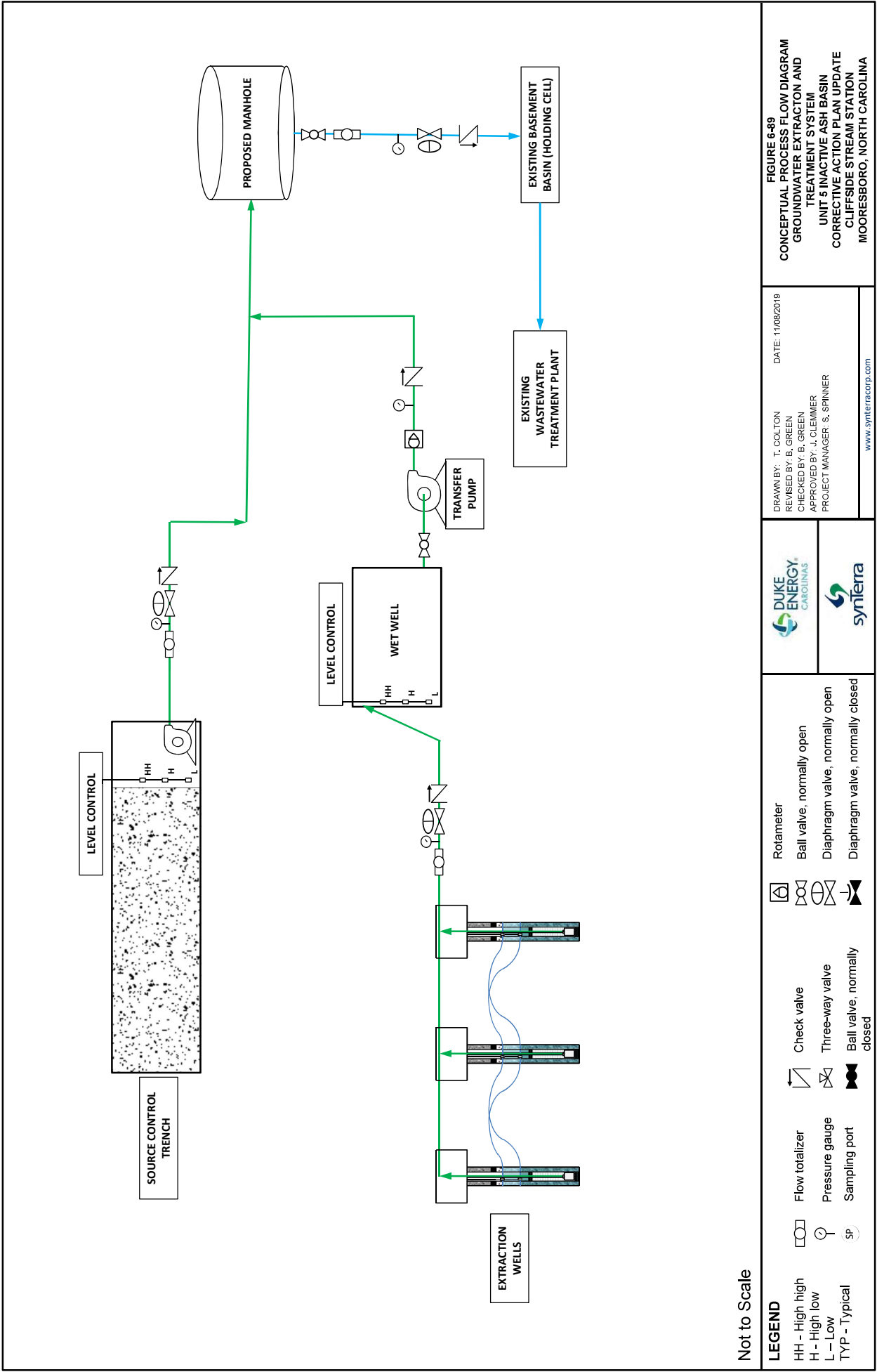
1. THE 12 EXTRACTION WELLS HAVE AN AVERAGE FLOW RATE OF 2 GPM AND EXTEND FROM SAPROLITE TO TRANSITION ZONE (MODEL LAYERS 9 TO 16). THE SOURCE CONTROL TRENCH (DRAWING HAS A TOTAL FLOW RATE OF 5 GPM AND HAS A HEAD 10 FEET BELOW GROUND SURFACE.
2. PARTICLE PATHS REPRESENT FORWARD TRACKING OF PARTICLES OVER 5 YEARS.
3. THE WATERS OF THE US DELINEATION HAS NOT BEEN APPROVED BY THE US ARMY CORPS OF ENGINEERS AT THE TIME OF THE MAP CREATION. THIS MAP IS NOT TO BE USED FOR JURISDICTIONAL DETERMINATION PURPOSES. THE WATERS OF THE US DELINEATION WAS CONDUCTED BY AMEC FOSTER WHEELER ENVIRONMENTAL AND INFRASTRUCTURE, INC. JUNE 2015.
4. NRTR - NATURAL RESOURCES TECHNICAL REPORT
5. PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY CAROLINAS.
6. ALL BOUNDARIES ARE APPROXIMATE.
7. AERIAL PHOTOGRAPHY OBTAINED FROM NORTH CAROLINA ONE MAP ON DECEMBER 17, 2019. IMAGE COLLECTED ON FEBRUARY 25, 2019.
8. DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3200 (NAD83).

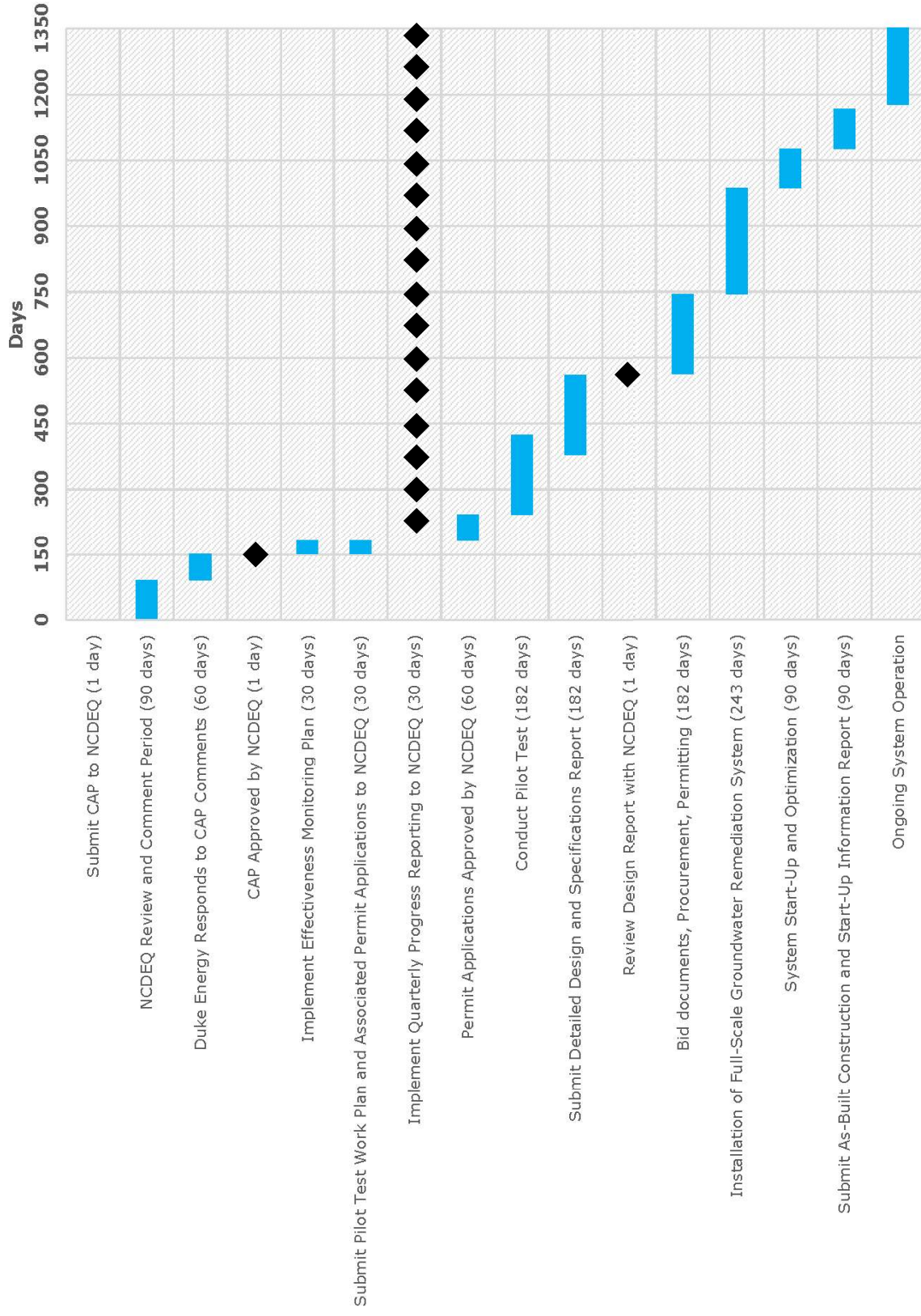
FIGURE 6-38F
REMEDIAL ALTERNATIVE 3 - PARTICLE TRACKING -
GROUNDWATER REMEDIATION BY EXTRACTION
UNIT 5 INACTIVE ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA

GRAPHIC SCALE
0 75 150

DRAWN BY: C. OWENS
DATE: 06/03/2019
REVIEWED BY: C. OWENS
DATE: 12/27/2019
CHECKED BY: T. GRANT
DATE: 12/27/2019
APPROVED BY: S. SPENCER
PROJECT MANAGER: S. SPENCER
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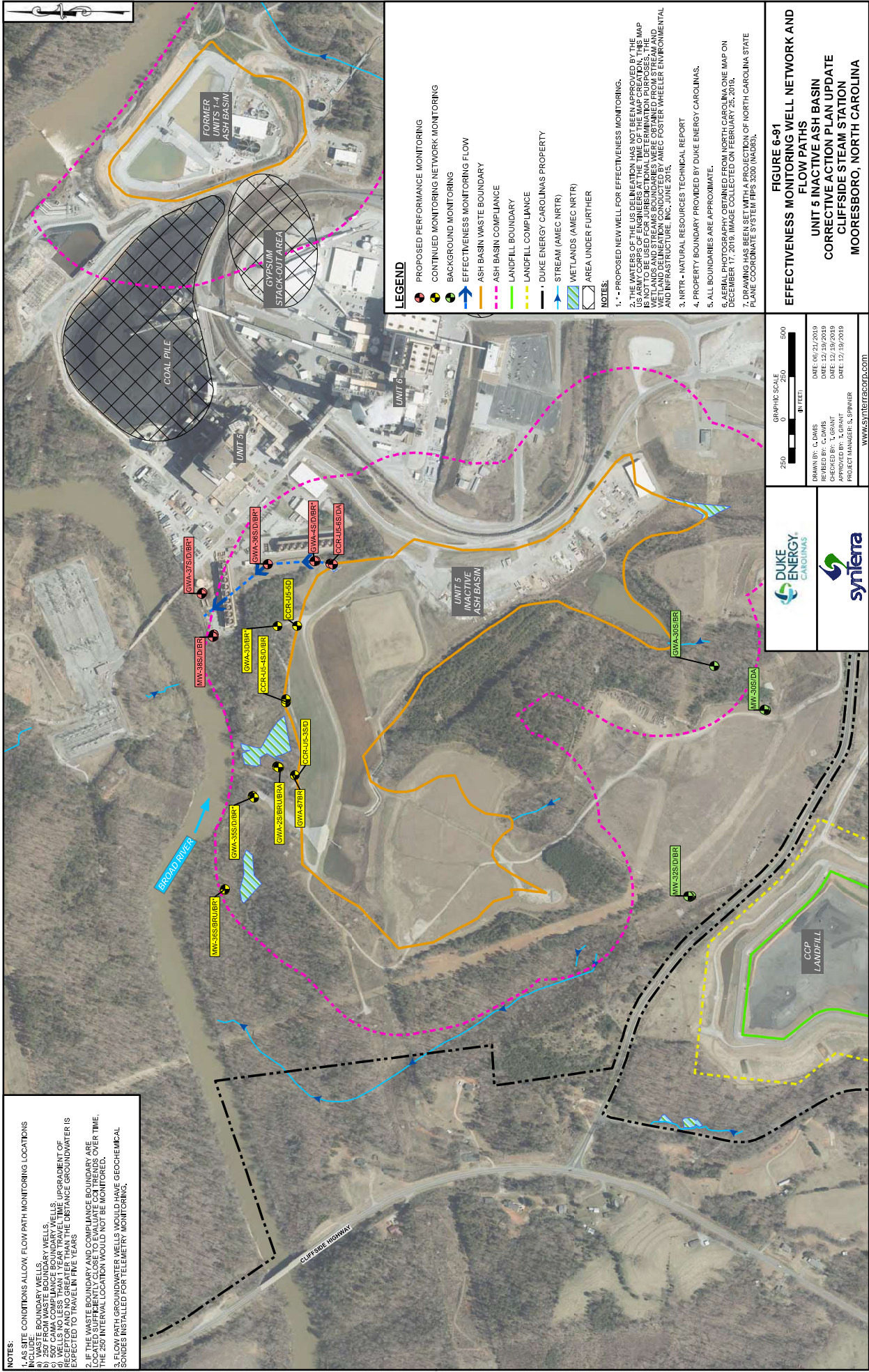
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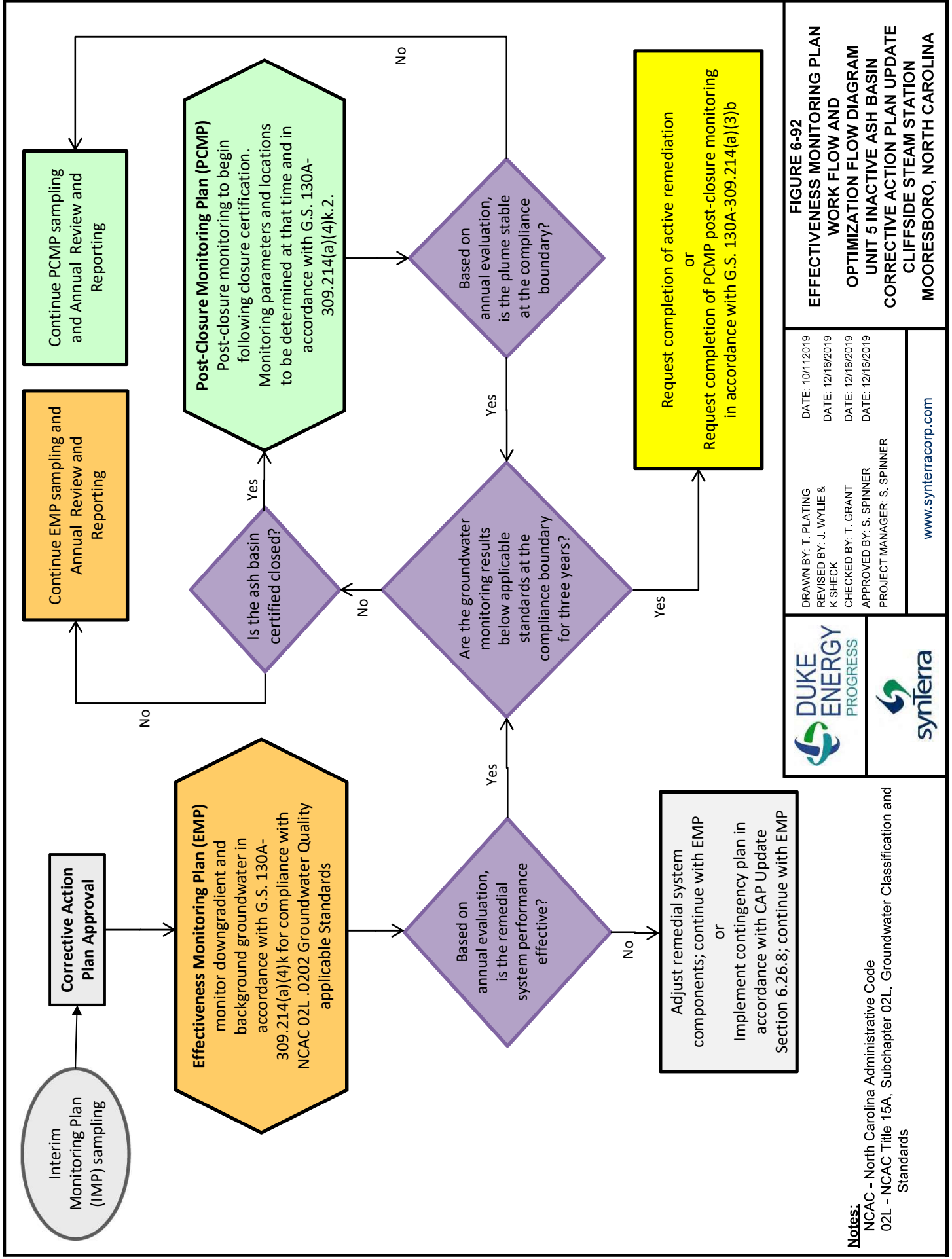
- * - Either submittal of the Effectiveness Monitoring Plan or the pilot test work plan and permit applications (as applicable) will fulfill section G.S.130A-309.209.(b)(3).
- ** - Actual time may vary due to a variety of factors including agency review and approvals, weather delays, equipment availability, etc.

DRAWN BY: R. ISHAM
REVISOR BY: S. WOOD
CHECKED BY: T. GRANT
APPROVED BY: S. SPINNER
PROJECT MANAGER: S. SPINNER

DATE: 12/5/2019
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FIGURE 6-90
CAP IMPLEMENTATION GANTT CHART
UNIT 5 INACTIVE ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA





Notes:
NCAC - North Carolina Administrative Code
02L - NCAC Title 15A, Subchapter 02L, Groundwater Classification and Standards



DRAWN BY: T. PLATING	DATE: 10/11/2019
REVISD BY: J. WYLIE & K. SHECK	DATE: 12/16/2019
CHECKED BY: T. GRANT	DATE: 12/16/2019
APPROVED BY: S. SPINNER	DATE: 12/16/2019
PROJECT MANAGER: S. SPINNER	
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FIGURE 6-92
EFFECTIVENESS MONITORING PLAN
WORK FLOW AND
OPTIMIZATION FLOW DIAGRAM
UNIT 5 INACTIVE ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA

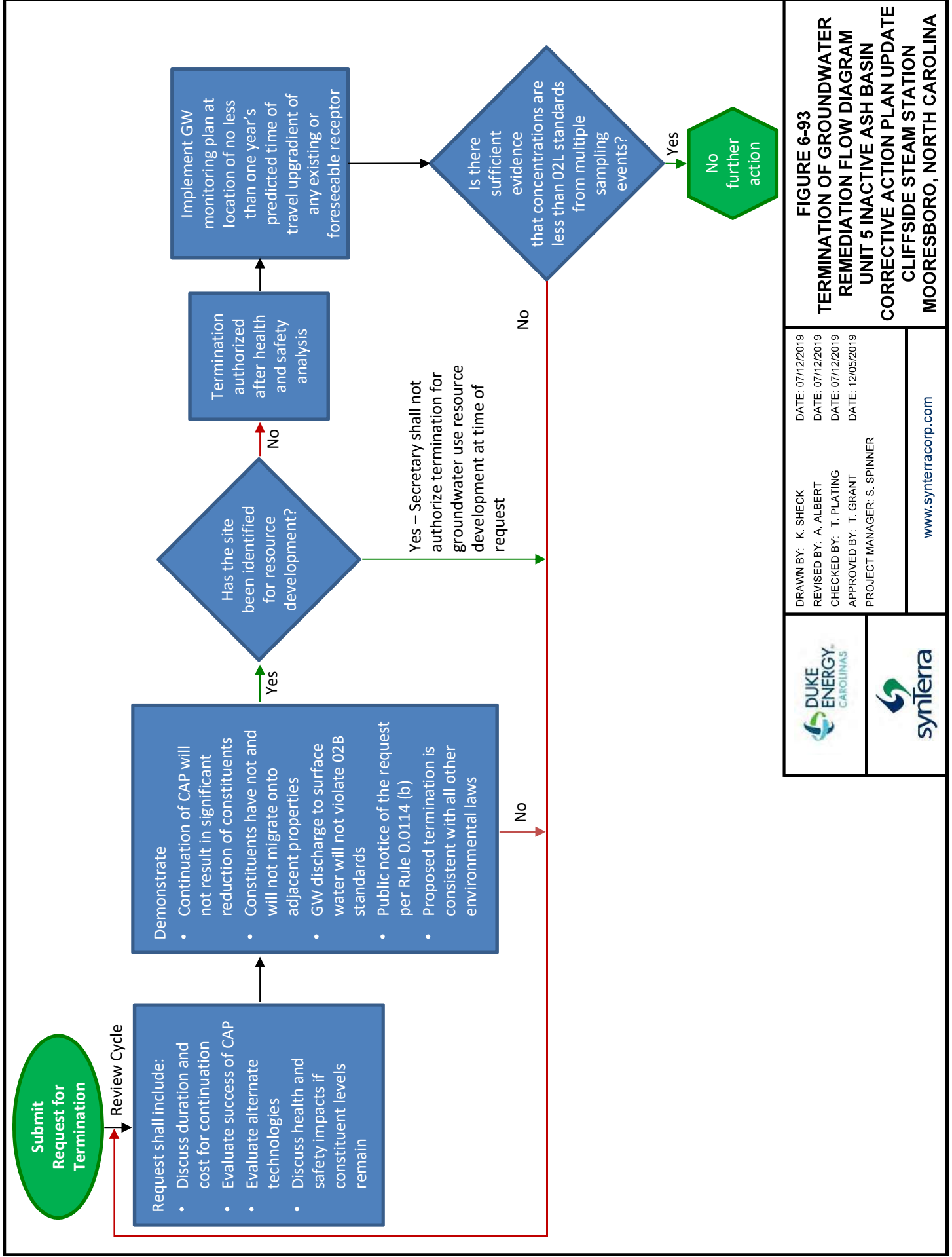


FIGURE 6-93
TERMINATION OF GROUNDWATER
REMEDATION FLOW DIAGRAM
UNIT 5 INACTIVE ASH BASIN
CORRECTIVE ACTION PLAN UPDATE
CLIFFSIDE STEAM STATION
MOORESBORO, NORTH CAROLINA

DRAWN BY: K. SHECK	DATE: 07/12/2019
REVISED BY: A. ALBERT	DATE: 07/12/2019
CHECKED BY: T. PLATING	DATE: 07/12/2019
APPROVED BY: T. GRANT	DATE: 12/05/2019
PROJECT MANAGER: S. SPINNER	
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