Appendix A

Preliminary Evaluations

Appendix A: Preliminary Evaluations

Sub-Area 1 - Nunn Parcel

- Parcel can be potentially served by gravity sewer.
- The proposed route is heavily wooded except where the parcel has been cleared for methane gas line and power transmission lines.
- Ground elevation decreases toward Eubanks Road from the Nunn parcel; from an elevation of just over 520 (southeast corner of Nunn parcel) to an elevation of 480 (Eubanks Road).
- Currently, there is one residence to serve on the Nunn parcel; located in the northeast quarter of the property.
- There are multiple monitoring wells along the eastern property boundary of the Orange County (Landfill) parcel. There is a methane gas pipeline located along the eastern boundary and a portion of the southern boundary of the Orange County (Landfill) parcel where it adjoins the Nunn parcel and the West/Harris parcel.
- The sanitary sewer alignment to the Nunn parcel must avoid Duke Energy transmission towers.

Figure A.1 Duke Power Transmission Tower (left); Monitoring Well (right)

Sub-Area 1 - Harris/West Parcel (Northeast Portion of Parcel)

- Parcel can be potentially served by gravity sewer, but potential sewer may have to be installed deep (over 26' deep).
- The proposed route is wooded except where the parcel has been cleared for an existing methane gas line. The area potentially includes wetlands and a jurisdictional stream.
- The ground elevation of the corridor of the recommended sanitary sewer alignment decreases toward a stream bed or swale and then increases toward the Nunn parcel. The stream channel meanders through the northern portion of the West-Harris parcel and along the western boundary of the Nunn parcel.

- The new sewer (pressure or gravity) alignment must cross the methane gas pipe line running along the southern boundary of Orange County (Landfill) parcel that adjoins the Nunn parcel.
- Currently, there is one residence to serve on the West-Harris parcel; the structure is located in the southeast quarter of the parcel.
- Ground elevation decreases from an elevation of approximately 530 (southern portion of the parcel) to approximately 500 (northern portion of the parcel).
- Wetland and buffer rules may impact design in this area.
- At this location where the recommended corridor alignment is shown at the northeast corner of the West/Harris parcel, there is a probability that an archaeological field survey will be needed.

Figure A.2 Southern portion of West/Harris Property, looking north (left); Southern portion of West/Harris Property, looking northeast (right)

Sub-Area 1 - West/Harris Parcel (Southwest Quarter of the Parcel)

- Parcel can be potentially served by gravity sewer.
- Proposed sewer alignment is through a wooded area.
- Ground elevation decreases from an existing residential dwelling toward the new sanitary sewer alignment at a rate of approximately 2.2 percent.
- Currently, there is one residence to serve on the West-Harris parcel; located in the southeast quarter of the parcel.
- Ground elevation decreases from the southern portion of the parcel (elevation approximately 530 ft) to the northern portion of the parcel (elevation approximately 500 ft).

Figure A.3 Southern portion of West/Harris Property, looking east (left); Proposed Sewer Alignment along Gravel Road (right)

Sub-Area 2 – Sanitary Sewer along and off West Side of Rogers Road, between Meadow Run Court and Priscilla Lane

- Parcels can be potentially served by gravity sewer, but sewer will have to be deep to be able to serve residential structures on west side of Rogers Road.
- A portion of the sewer alignment will be adjacent to and within NCDOT right of way (east side of Rogers Road). The proposed alignment on the west side of Rogers Road would be behind existing residential structures, along the edge of a wooded area, and along partially cleared areas.
- Topography on the east and west sides of Rogers Road southeast of the intersection Meadow Run is relatively flat (approximately elevation 530). The ground elevation decreases on the west side of Rogers Road to an intermittent stream channel (swale), at approximately elevation 510. On the east side of Rogers Road the ground elevation slopes downward from the residential structures toward Rogers Road.
- Wetland and buffer rules and contaminated soils may impact design in this area, especially in the vicinity of the intersection of Priscilla Lane and Rogers Road.
- Finished floor and ground elevations on the east side of Rogers Road are greater than the elevation at the centerline of Rogers Road.
- Finished floor and ground elevations for approximately 6 out of 11 houses located on the west side of Rogers Road (from Meadowbrook Run to Priscilla Lane) are less than the centerline of the roadway.
- The Town of Carrboro is planning future sidewalk and storm sewer improvements on the west side of Rogers Road. The improvements will be on the west side of Rogers Road from the intersection of Meadow Run and Rogers Road to the intersection of Homestead Road and Rogers Road.

Figure A.4 Existing Water Line Easement, west side of Rogers Road (left); Looking West from Rogers Road Down Toward Houses (right)

Figure A.5 Looking North along Rogers Road (left); Looking South along Rogers Road (right)

Sub-Area 3 – Near Intersections of Homestead Road and Seawell School Road and Hearthstone Lane and Homestead Road

- Portions of the parcels can be potentially served by gravity sewer (See Appendix B for more information).
- The recommended sanitary sewer alignment corridor is located within NCDOT right of way.
- Numerous underground utilities are located at the intersection of Homestead Road and Seawell School Road; the intersection is signalized. There are numerous underground utilities along Homestead Road right of way. Vehicle traffic on Homestead Road appears to be moderate to heavy, traffic on Seawell School Road appears to be moderate and, traffic on Hearthstone Lane appears to be light to moderate.
- One recommended sanitary sewer alignment includes an existing manhole located immediately south of the intersection, within the Seawell School Road right of way.

- Another recommended sanitary sewer alignment includes an existing manhole located immediately south of the intersection of Hearthstone Lane and Homestead Road, within the roadway of Hearthstone Lane.
- Ground elevations gently decrease from approximately elevation 540 ft (on the north side of Homestead Road) to approximately elevation 530 ft at the existing manhole.

Figure A.6 Intersection of Seawell School Road and Homestead Road Intersection of Seawell School Road and Homestead Road (left - looking north); (right - looking west)

Figure A.7 House with Basement near Intersection of Homestead Road and Merin Road, looking northwest

Sub-Area 4 – Sandberg Lane

- Parcels can be potentially served by gravity sewer if recommended sewer corridor alignment is modified.
- A portion of the proposed sewer alignment will be on and/or adjacent to an existing dirt / gravel road (Sandberg Lane). An additional alignment is in a heavily wooded / wetland area to the west of Sandberg Lane.
- Ground elevations east and west of Sandberg Lane decrease toward an intermittent stream channel (swale). The proposed sanitary sewer corridor is adjacent to the stream channel and then continues to the south along Sandberg Lane.
- Ground elevations gently decline to the south on Sandberg Lane from an elevation of approximately 540 ft near the intersection of Sandberg Lane and Purefoy Drive to an approximate elevation of 520 ft at the southern portion of Sandberg Lane. There is a low point at the intermittent stream channel on the east and west side of Sandberg Lane, approximately 450 feet south of the intersection of Sandberg Lane and Purefoy Drive.
- A water line easement exists on a portion of the recommended sanitary sewer corridor. Existing underground power and cable have been installed along Sandberg Lane. The sanitary sewer corridor can be shifted to run adjacent to an existing water main easement or be installed within the water main easement if separation between the new sewer and existing water line can be achieved. If adequate separation can be achieved, the easement would be renamed / recorded as a utility easement.

Figure A.8 End of Sandberg Lane/Existing Water Line Easement, looking south (left); Low Point on Sandberg Lane, looking south (right)

Figure A.9 Looking East toward Sandberg Drive, from back of Purefoy Parcel (left); looking west, from back of Purefoy Parcel (right)

Other Locations with Potential Minor Sewer Alignment Shifts

Along Priscilla Lane

- Parcels can be potentially served by gravity sewer.
- Proposed alignment will be on and/or adjacent to an existing dirt/gravel road and cleared easement.
- A portion of proposed sanitary sewer corridor along the dirt/gravel road (near the intersection with Rogers Road) and along some portions of the existing water line easement is in close proximity to possible areas of soil contamination.
- The recommended sanitary sewer alignment corridor is in conflict with the location of a mobile home. The proposed sanitary sewer corridor will be located adjacent to an existing water main easement or within the water main easement (if separation criteria can be achieved) in order to resolve the conflict. The existing water main easement would be renamed / recorded as a utility easement.
- Topography slopes gently upward from Rogers Road (approximate elevation 500 ft) northward along Priscilla Lane to the end of Priscilla Lane (approximate elevation 510 ft). At this point the water line easement continues to the east and topography is relatively flat; however, there is an area where the proposed sewer crosses an intermittent stream/swale, and may be shallower (less than 2 feet) than is typical for sewer construction.
- Separation between the existing power lines and water lines will dictate on which side of the existing water line easement the sewer will be installed, or if there is adequate separation between the new sewer and existing water line within the existing water line easement.

- Wetland and buffer rules and contaminated soils may impact design in this area.

Figure A.10 Existing Water Line on West Side of Road (left); Existing Power Line located on East Side of Road (right)

Figure A.11 Low Spot along Proposed Sanitary Sewer Corridor (left); Wetland Area and Possible Location of Contaminated Soils (right)

Off East Side of Rogers Road

- Parcels can be potentially served by gravity sewer.
- A portion of the proposed sanitary sewer corridor will be on and/or adjacent to existing dirt/gravel driveways and cleared water line easements.
- Topography slopes gently upward (from approximately elevation 530 ft) from Rogers Road eastward to the end of the existing water line easement and then gently downward to an elevation of 525 to 530 ft.
- There is an existing overhead power service line located along the recommended sanitary sewer alignment of the proposed corridor. The overhead power service is

approximately 12 – 15' above ground with an abandoned (assumed) electric service line located on the ground.

- There is existing water line easement along the proposed sanitary sewer corridor. The proposed sanitary sewer corridor will be located adjacent to an existing water main easement or within the water main easement (if separation criteria can be achieved). The existing water main easement would be renamed / recorded as a utility easement.
- Separation between the existing power lines and/or water line may dictate the alignment of the sanitary sewer corridor.

Figure A.12 Approximate Location of Water Line Easement, looking west (left); Recommended Sanitary Sewer Alignment near Power Line, looking east (right)

Figure A.13 Approximate Location of End of Water Line Easement (left); Approximate Location of Water Line Easement, looking east toward wooded area to be cleared (right)

Lair Court

- Parcels can be potentially served by gravity sewer.
- A portion of the proposed sewer alignment in the vicinity of Lair Court is on and/or adjacent to an existing dirt/gravel driveway. The sewer corridor beyond the gravel drive is wooded.
- The recommended sanitary sewer alignment is adjacent to an area where an existing power service line is located. An existing private water well may also be located within the corridor.
- The ground elevation of the alternate alignment at this location gently slopes down the gravel driveway toward Lair Court (from approximate elevation 520 ft to approximate elevation 510 ft). The topography is relatively flat on Lair Court to Tallyho Drive and then the slopes down Tallyho Drive to a point where the recommended sewer corridor continues to the west along Tallyho Drive.

Figure A.14 Proposed Corridor Down Gravel Driveway (left); Recommended Alignment of Sewer (right)

Sanitary Sewer off West Side of Rogers Road, just Southeast of Priscilla Lane

- Parcels can be potentially served by gravity sewer.
- A portion of the proposed sewer alignment is just southeast of Priscilla Lane on and/or adjacent to an existing dirt driveway. The sewer corridor beyond the dirt drive is wooded.
- The recommended sanitary sewer alignment is adjacent to an area deemed to have contaminated soils. An existing private septic system may also be located within the corridor.
- The ground elevation of the alternate alignment at this location gently slopes down the gravel driveway toward west (from approximate elevation 510 ft to an approximate elevation 500 ft). The topography slopes down Rogers Road to a point where the recommended sewer corridor continues to the southwardly away from Rogers Road.

Figure A.15 Proposed Corridor Down Dirt Driveway (left);
Existing Residential Structure on Eastern Part of Jones Parcel (right)

Tallyho Trail

- Parcels can be potentially served with gravity sewer, however the recommended alignment west of the house at 1322 Tallyho Drive may potentially be 20 feet deep.
- The recommended sanitary sewer alignment corridor is heavily wooded and contains wetlands and jurisdictional streams.
- The recommended sanitary sewer alignment is adjacent to a jurisdictional stream, until the proposed sewer alignment reaches the intersection of Tallyho Drive and the stream. The recommended alignment appears to shift to the west of a house (1322 Tallyho Drive). The recommended sanitary sewer alignment of the sewer then crosses Tallyho Drive and continues on the west side of a house located at 1319 Tallyho Drive.
- Due to this westward shift in alignment, the ground elevation of the alignment will increase from approximately 490 to an approximate ground elevation of just over 500 on the west side of the house (1322 Tallyho Drive). The elevation across Tallyho Drive and west of the house located at 1319 Tallyho Drive is approximately elevation 490.
- A septic field, dosing pump, and water well are located near or within the recommended sanitary sewer alignment corridor on the west side of the house (1319 Tallyho Drive).

Figure A.16 Tallyho Drive, looking west (left); Tallyho Drive, looking northwest toward 1322 Tallyho Drive (right)

Figure A.17 Tallyho Drive, looking southwest toward 1319 Tallyho Drive (left); Tallyho Drive, looking north along stream channel corridor (right)

Council Parcel

- Parcel can be potentially served with gravity sewer.
- The proposed sanitary sewer corridor is in a heavily wooded area except where the parcel has been previously cleared for an old roadway bed and power transmission lines.
- Ground elevations slope gently from the end of Sandberg Lane (approximate elevation 520 ft) to Billabong Drive (approximate elevation 490 ft).

Figure A.18 Old Roadway Bed (left); Power Line Easement, looking west near end of Sandberg Lane (right)

Figure A.19 Power Line Easement, looking southeast near end of Sandberg Lane

East Side of Sylvan Way

- Parcels can be potentially served by gravity sewer but the recommended sewer corridor alignment will have to be modified.
- The recommended sanitary sewer alignment corridor is located in a heavily wooded area that contains wetlands, a jurisdictional stream, and pond.
- The recommended sanitary sewer alignment is adjacent to an existing stream channel and beneath/adjacent to an existing pond.
- Existing residential houses/decks on the east side of Sylvan Way are in close proximity to one another (approximately 25').
- Ground elevations gently decline along the stream channel corridor, from approximately 490 ft at Billabong Drive to approximately 480 ft, just south of the existing pond.

Figure A.20 Existing Pond, looking east from Sylvan Way (left); Existing Manhole West of Pond (right)

Figure A.21 Close Corridor between Residential Structure and Pond, looking northeast from Sylvan Way

Appendix B

Alternatives Development

Appendix B: Alternatives Development

URS Evaluated Alternatives (Includes Sub-Areas 1 - 4) (See Exhibits 2, 2A, 2B, 2C, and 2D)

Sub-Area 1 – Sanitary Sewer along Rogers Road (West Side)

Discussion of Modifications

Two proposed sanitary sewer corridor alignments could be located along Rogers Road; one on the eastern side of Rogers Road and the other sanitary sewer alignment on the west side.

One sanitary sewer alignment on the west side of Rogers Road could be located in back of the Mink residence (west of the intersection of Meadow Run and Rogers Road) and continue behind the residential structures located on the Maxwell, Thompson, Blue Mountain Homes LLC, and Stewart parcels. Since the finished floor elevations of the structures are located well below the centerline elevation of the Rogers Road, a sanitary sewer corridor located behind these residential structures would allow for shallower sewer service laterals. Additionally, the topography of theses parcels slope downward to the back toward an intermittent stream channel/ toward the proposed sewer corridor.

If a single sanitary sewer alignment is located on the eastern side of Rogers Road, the depth of the sewer would have to be deep enough to collect sewage from the residential structures on the properties listed above and also, deep enough to avoid future Town of Carrboro sidewalk/storm water improvements. Since the road is NCDOT maintained, each sewer service lateral will have to be bore and jacked beneath Rogers Road.

Comparison of Modification to Recommended Alignment

Field evaluations performed determined that the recommended sanitary sewer alignment presented for this portion of the proposed sanitary sewer corridor is possible. However, the overall depth of the proposed sanitary sewer (east side of Rogers Road only) will have to be installed at a depth so sewer service laterals will not conflict with the Town of Carrboro's future sidewalk and storm water infrastructure improvements and be able to serve residential structures (with low finish floor elevations) on the west side of Rogers Road.

Table B.1 Potential Advantages and Disadvantages

Modification	Advantages	Disadvantages
Recommended Sewer Alignment	• Sanitary sewer would be installed at shallower depths • Sewer service laterals would be easier to connect to sanitary sewers • Elimination of bore and jacks under Rogers Road	• More manholes and sanitary sewer pipeline required • Clearing of additional wooded area around existing structures would be required • Potential wetland and buffers permitting • Possible buffer and wetland mitigation
Alternative Sewer Alignment	• Less manholes and sanitary sewer pipeline required • Less potential wetland and buffers permitting	• Sewer service laterals would have to be bore and jacked beneath Rogers Road for residences on west side of Rogers Road • Manholes near Rogers Road would be deeper due to future improvements and lower finish floor elevations on west side of Rogers Road • More complex permitting with NCDOT • May require and engineered shoring system

Sub-Area 2 - Nunn Parcel

Discussion of Alternatives

An existing residential dwelling located on the Nunn parcel can be served by extending new gravity sanitary sewer from existing sanitary sewer located on Eubanks Road (near the intersection of Eubanks Road and Millhouse Road). The recommended sewer alignment would be within Duke Energy property/right of way and Orange County property. The configuration of the sewer alignment will be adjusted to accommodate existing monitoring wells and methane gas pipeline on the property boundary of Orange County (Landfill). Additionally, there are numerous Duke Energy power transmission tower structures that must be avoided. Per Duke Energy regulations, no manholes will be allowed within the power transmission main right of way and sanitary sewer may not be located within 25 feet of a tower structure.

Comparison of Alternative to Recommended Alignment

The recommended sewer alignment is proposed to be shifted east from the western property boundary of Orange County (Landfill) due to existing monitoring wells and methane gas line. The presence of the existing monitoring wells, methane gas line, and Duke Energy power transmission

lines may preclude the ability to construct new sanitary sewer sewers as recommended. The recommended sewer alignment will have to be offset (eastwardly) along western boundary of the Orange County and Duke Energy parcels. The recommended corridor alignment will cross the Duke Energy right of way at angle greater than 30 degrees and end.

Table B.2 Potential Advantages and Disadvantages

Modification	Advantages	Disadvantages
Recommended Sewer Alignment	• Fewer or no conflicts with monitoring wells, methane gas line and Duke Energy Infrastructure. • Manhole will be closer to residence for sewer connection	• Additional sanitary sewer easement/encroachment to be acquired from Duke Energy • Easement on the Nunn parcel will be farther into the property • More manholes and sanitary sewer pipeline
Alternative Sewer Alignment	• Fewer manholes and sanitary sewer pipeline • Less sanitary sewer easement to acquire from Duke Energy	• Conflicts with monitoring wells, methane gas line and Duke Energy Infrastructure; may not be constructible • Manhole will be farther from residence for sewer connection

Sub-Area 2 - West / Harris Parcel (Northeast Quarter of Parcel)

Discussion of Modifications

The residential structure located on the West/Harris property could be served by a new gravity sanitary sewer extended from the recommended sewer alignment from Eubanks Road. However, the extension of sewer to serve the West/Harris Parcel would be approximately 24 to 26 feet deep near the southwest corner of the Nunn parcel. Additionally, the sewer service to the existing residential structure would require approximately 1,000 feet of sewer service lateral to connect to the new gravity sewer. If the existing residential structure on the West/Harris parcel is served from the recommended sewer alignment to be located on the west boundary of the West/Harris parcel, this sewer alignment would not need to be constructed at this time. New sewer would be built at a later date when the northern portion of the West/Harris property is developed. However, possibly additional archaeological survey will have to be performed near the northeast corner of the West/Harris parcel and along the northern boundary of the Orange County parcel if this alignment is pursued.

The lower elevations of the West/Harris parcel (approximately the northern half of the parcel) could be served with a small pump station and force main. The force main could connect to the recommended sewer alignment extended from Eubanks Road to the Nunn Parcel. The use of a small pump station and force main may reduce the construction cost, but would increase operation

and maintenance costs. The southern portion of the Harris/West parcel could be served by recommended sewer alignment located on the west side of the West/Harris Parcel.

Comparison of Modification to Recommended Alignment

Field evaluations performed determined that the recommended sewer alignment is feasible with some minor alignment changes pending wetland and buffer delineations. Construction of the recommended sewer alignment would require additional manholes and pipeline to connect to the recommended sewer alignment to the Nunn Parcel.

Table B.3 Potential Advantages and Disadvantages

Modification	Advantages	Disadvantages
Alternative Sewer Alignment - Gravity Sewer	• Low Maintenance	• Deep Installation of sanitary sewer • Long sewer service lateral required • More area to be cleared • Possible Archaeological Survey to be performed
Alternative Sewer Alignment - Lift Station and Force Main	• Shallow installation • Routing of force main easier through wetlands and buffers • Less clearing	• Annual operation & maintenance costs would increase • Installation of power to lift station • Long sewer service lateral required • Possible Archaeological Survey to be performed

Sub-Area 2 – West / Harris Parcel (Southwest Quarter of Parcel)

Discussion of Modifications

The existing residential structure/southwest quarter of the West/Harris property can be served by extending a new gravity sanitary sewer from a proposed sanitary sewer (along an existing gravel road) that will serve the northern portion of the HRRA. Approximately 400 feet of sewer service lateral would be needed to connect the residential structure to the new gravity sanitary sewer.

If the remainder of the parcel is deemed unsuitable for development (i.e., wetlands, soils, etc.) or if OWASA sewer service policy regulations are satisfied by serving the West/Harris parcel at this location only, the recommended sewer alignment on the west side of the West/Harris Parcel will be suffice and the deep sewer that would be located near the northwest corner of the Nunn Parcel may be eliminated.

If the remainder of the parcel is developable, then the lower elevations of the West/Harris parcel (approximately the northern half of the parcel) could be served with a small pump station and force main.

Comparison of Modification to Recommended Alignment

This is a new sanitary sewer alignment to serve the southern half of the West/Harris Parcel. There was no recommended alignment for this sanitary sewer corridor for comparison.

Table B.4 Potential Advantages and Disadvantages

Modification	Advantages	Disadvantages
Recommended Sewer Alignment - Sanitary Sewer Located off Existing Gravel Drive	• Low Maintenance. • Less service lateral to be installed • Avoiding deeper sanitary sewer trenching costs • Less initial costs if the alternative deep sewer is not constructed at this time	• Only south half of parcel could be served, but does provide service to existing residence
Alternative Sewer Alignment - Sanitary Sewer Located at Northeast Corner of Parcel	• Will serve more areas of the parcel	• Routing of sewer through more wetlands and buffers • Long sewer service lateral required

Sub-Area 3 – Near Intersection of Homestead Road and Seawell School Road

Discussion of Alternatives

After field investigations were performed, it appears that the existing residential structures located on the Homestead Group, LLC and the Dayspring Investments Inc. parcels cannot be served by gravity sewer due to the shallowness of the existing sewer, just south of the intersection of Hearthstone Lane and Homestead Road and south of the intersection of Homestead Road and Seawell School Road. The residential structure located on Daysprings Investments Inc. parcel has a basement.

The of the recommended sewer alignments would be to extend the existing sewer located approximately 100 feet south of the intersection Hearthstone Lane and Homestead Road northward to the intersection. Similarly, another recommended sewer alignment would be to extend the existing sewer located approximately 150 feet south of the intersection Seawell School Road and Homestead Road northward to the intersection.

A more extensive survey of this area, including a Level "A" subsurface utility exploration may be warranted to verify this preliminary finding.

Additionally, since Homestead Road is a NCDOT road, a bore and jack would need to be performed to get the proposed sewer to the north side of Homestead Road at the intersection of Seawell School Road and also at the intersection of Hearthstone Road.

Comparison of Modification to Recommended Alignment

Preliminary evaluations performed determined that the recommended sewer alignment is feasible but comes with limitations, residential pumps tanks may be required to serve the residential structures instead of by gravity. Survey shots taken of the finished floor of the residential structures disclosed that the feasibility in serving all or some of the existing residential structures on these parcels is in question.

In conjunction with a more extensive topographic survey, a Level "A" subsurface utility exploration is recommended to verify if the existing underground utilities can be avoided within NCDOT right of way. For either alignment, a sanitary sewer easement will possibly be required.

Table B.5 Potential Advantages and Disadvantages

Modification	Advantages	Disadvantages
Recommended Sewer Alignment	• Less manholes and potentially less sanitary sewer • Would eliminate bore and jack of 8" sewer (16" Steel Encasement) beneath Homestead Road • Potentially less wooded area to be cleared.	• Would potentially require the installation of residential pump tanks/force main. • Would require services to be bored beneath Homestead Road.
Alternative Sewer Alignment	• Residential structures would be served by gravity sewer. • Sewer extension near the intersection of Homestead Road and Hearthstone Lane would be eliminated.	• More wooded areas would need to be cleared. • Sewer will have to be installed at deep elevation. • More manholes will have to be installed • Relaying of approximately 100 feet of existing sewer would have to be relayed.

Sub-Area 4 – Sandberg Lane

Discussion of Modifications

A proposed sanitary sewer corridor alignment could be located along Sandberg Lane to serve parcels located in the southeast portion of the HRRA. A substantial length of the proposed sanitary sewer corridor can be located along Sandberg. However, the sanitary sewer corridor will need to be extended to the back of the parcels located on the south side of Purefoy Drive to provide service to parcels that cannot be served by the existing sanitary sewer.

The Rogers-Eubanks Neighborhood Association requested consideration of extending sanitary sewer from the Cattail Lane area. After performing preliminary calculations and reviewing Sanitary Sewer "As Built" information, the required invert elevations along the proposed sewer corridor would be too low to connect to the existing sanitary sewer located along Cattail Lane and Zeiger Lane.

A proposed sanitary sewer corridor would be located in back of the Purefoy properties (located on the south side of Purefoy Drive) and back of the Bradshaw parcel and in front of the Burnette parcel (also located on the south side of Purefoy Drive) and west of Sandberg Lane. The residential structures are located significantly below the centerline elevation of Purefoy Road, and the topography of the properties slope downward (southward), toward the back of each parcel.

A segment of the proposed sanitary sewer corridor should be extended northward along Sandberg Lane (toward Purefoy Drive) to serve the Reid and Kaizen parcels.

Comparison of Modification to Recommended Alignment

Field investigations determined that the recommended sewer alignment presented for this proposed sewer corridor can only serve a few residential structures south of Purefoy Drive. A sanitary sewer corridor will need to be located generally along the southern boundary of the parcels (south of Purefoy Drive) so installation of service laterals to the residential structures will be economically feasible.

Table B.6 Potential Advantages and Disadvantages

Modification	Advantages	Disadvantages
Recommended Sewer Alignment	• Service laterals could easily be connected to new sanitary sewer • Residences can be connected along Purefoy Drive that cannot connect to existing sewers	• More wooded areas would need to be cleared • More wetland and buffers permitting. • More manholes and sanitary sewer pipeline required
Alternative Sewer Alignment	• Less manholes and potentially less sanitary sewer pipeline • Less wooded clearing • Less wetland and buffer permitting	• Not all parcels could be easily connected to new sanitary sewer

Appendix B

Alternatives Development

Appendix B: Alternatives Development

URS Evaluated Alternatives (Includes Sub-Areas 1 - 4) (See Exhibits 2, 2A, 2B, 2C, and 2D)

Sub-Area 1 – Sanitary Sewer along Rogers Road (West Side)

Discussion of Modifications

Two proposed sanitary sewer corridor alignments could be located along Rogers Road; one on the eastern side of Rogers Road and the other sanitary sewer alignment on the west side.

One sanitary sewer alignment on the west side of Rogers Road could be located in back of the Mink residence (west of the intersection of Meadow Run and Rogers Road) and continue behind the residential structures located on the Maxwell, Thompson, Blue Mountain Homes LLC, and Stewart parcels. Since the finished floor elevations of the structures are located well below the centerline elevation of the Rogers Road, a sanitary sewer corridor located behind these residential structures would allow for shallower sewer service laterals. Additionally, the topography of theses parcels slope downward to the back toward an intermittent stream channel/ toward the proposed sewer corridor.

If a single sanitary sewer alignment is located on the eastern side of Rogers Road, the depth of the sewer would have to be deep enough to collect sewage from the residential structures on the properties listed above and also, deep enough to avoid future Town of Carrboro sidewalk/storm water improvements. Since the road is NCDOT maintained, each sewer service lateral will have to be bore and jacked beneath Rogers Road.

Comparison of Modification to Recommended Alignment

Field evaluations performed determined that the recommended sanitary sewer alignment presented for this portion of the proposed sanitary sewer corridor is possible. However, the overall depth of the proposed sanitary sewer (east side of Rogers Road only) will have to be installed at a depth so sewer service laterals will not conflict with the Town of Carrboro's future sidewalk and storm water infrastructure improvements and be able to serve residential structures (with low finish floor elevations) on the west side of Rogers Road.

Table B.1 Potential Advantages and Disadvantages

Modification	Advantages	Disadvantages
Recommended Sewer Alignment	• Sanitary sewer would be installed at shallower depths • Sewer service laterals would be easier to connect to sanitary sewers • Elimination of bore and jacks under Rogers Road	• More manholes and sanitary sewer pipeline required • Clearing of additional wooded area around existing structures would be required • Potential wetland and buffers permitting • Possible buffer and wetland mitigation
Alternative Sewer Alignment	• Less manholes and sanitary sewer pipeline required • Less potential wetland and buffers permitting	• Sewer service laterals would have to be bore and jacked beneath Rogers Road for residences on west side of Rogers Road • Manholes near Rogers Road would be deeper due to future improvements and lower finish floor elevations on west side of Rogers Road • More complex permitting with NCDOT • May require and engineered shoring system

Sub-Area 2 - Nunn Parcel

Discussion of Alternatives

An existing residential dwelling located on the Nunn parcel can be served by extending new gravity sanitary sewer from existing sanitary sewer located on Eubanks Road (near the intersection of Eubanks Road and Millhouse Road). The recommended sewer alignment would be within Duke Energy property/right of way and Orange County property. The configuration of the sewer alignment will be adjusted to accommodate existing monitoring wells and methane gas pipeline on the property boundary of Orange County (Landfill). Additionally, there are numerous Duke Energy power transmission tower structures that must be avoided. Per Duke Energy regulations, no manholes will be allowed within the power transmission main right of way and sanitary sewer may not be located within 25 feet of a tower structure.

Comparison of Alternative to Recommended Alignment

The recommended sewer alignment is proposed to be shifted east from the western property boundary of Orange County (Landfill) due to existing monitoring wells and methane gas line. The presence of the existing monitoring wells, methane gas line, and Duke Energy power transmission

lines may preclude the ability to construct new sanitary sewer sewers as recommended. The recommended sewer alignment will have to be offset (eastwardly) along western boundary of the Orange County and Duke Energy parcels. The recommended corridor alignment will cross the Duke Energy right of way at angle greater than 30 degrees and end.

Table B.2 Potential Advantages and Disadvantages

Modification	Advantages	Disadvantages
Recommended Sewer Alignment	• Fewer or no conflicts with monitoring wells, methane gas line and Duke Energy Infrastructure. • Manhole will be closer to residence for sewer connection	• Additional sanitary sewer easement/encroachment to be acquired from Duke Energy • Easement on the Nunn parcel will be farther into the property • More manholes and sanitary sewer pipeline
Alternative Sewer Alignment	• Fewer manholes and sanitary sewer pipeline • Less sanitary sewer easement to acquire from Duke Energy	• Conflicts with monitoring wells, methane gas line and Duke Energy Infrastructure; may not be constructible • Manhole will be farther from residence for sewer connection

Sub-Area 2 - West / Harris Parcel (Northeast Quarter of Parcel)

Discussion of Modifications

The residential structure located on the West/Harris property could be served by a new gravity sanitary sewer extended from the recommended sewer alignment from Eubanks Road. However, the extension of sewer to serve the West/Harris Parcel would be approximately 24 to 26 feet deep near the southwest corner of the Nunn parcel. Additionally, the sewer service to the existing residential structure would require approximately 1,000 feet of sewer service lateral to connect to the new gravity sewer. If the existing residential structure on the West/Harris parcel is served from the recommended sewer alignment to be located on the west boundary of the West/Harris parcel, this sewer alignment would not need to be constructed at this time. New sewer would be built at a later date when the northern portion of the West/Harris property is developed. However, possibly additional archaeological survey will have to be performed near the northeast corner of the West/Harris parcel and along the northern boundary of the Orange County parcel if this alignment is pursued.

The lower elevations of the West/Harris parcel (approximately the northern half of the parcel) could be served with a small pump station and force main. The force main could connect to the recommended sewer alignment extended from Eubanks Road to the Nunn Parcel. The use of a small pump station and force main may reduce the construction cost, but would increase operation

and maintenance costs. The southern portion of the Harris/West parcel could be served by recommended sewer alignment located on the west side of the West/Harris Parcel.

Comparison of Modification to Recommended Alignment

Field evaluations performed determined that the recommended sewer alignment is feasible with some minor alignment changes pending wetland and buffer delineations. Construction of the recommended sewer alignment would require additional manholes and pipeline to connect to the recommended sewer alignment to the Nunn Parcel.

Table B.3 Potential Advantages and Disadvantages

Modification	Advantages	Disadvantages
Alternative Sewer Alignment - Gravity Sewer	• Low Maintenance	• Deep Installation of sanitary sewer • Long sewer service lateral required • More area to be cleared • Possible Archaeological Survey to be performed
Alternative Sewer Alignment - Lift Station and Force Main	• Shallow installation • Routing of force main easier through wetlands and buffers • Less clearing	• Annual operation & maintenance costs would increase • Installation of power to lift station • Long sewer service lateral required • Possible Archaeological Survey to be performed

Sub-Area 2 – West / Harris Parcel (Southwest Quarter of Parcel)

Discussion of Modifications

The existing residential structure/southwest quarter of the West/Harris property can be served by extending a new gravity sanitary sewer from a proposed sanitary sewer (along an existing gravel road) that will serve the northern portion of the HRRA. Approximately 400 feet of sewer service lateral would be needed to connect the residential structure to the new gravity sanitary sewer.

If the remainder of the parcel is deemed unsuitable for development (i.e., wetlands, soils, etc.) or if OWASA sewer service policy regulations are satisfied by serving the West/Harris parcel at this location only, the recommended sewer alignment on the west side of the West/Harris Parcel will be suffice and the deep sewer that would be located near the northwest corner of the Nunn Parcel may be eliminated.

If the remainder of the parcel is developable, then the lower elevations of the West/Harris parcel (approximately the northern half of the parcel) could be served with a small pump station and force main.

Comparison of Modification to Recommended Alignment

This is a new sanitary sewer alignment to serve the southern half of the West/Harris Parcel. There was no recommended alignment for this sanitary sewer corridor for comparison.

Table B.4 Potential Advantages and Disadvantages

Modification	Advantages	Disadvantages
Recommended Sewer Alignment - Sanitary Sewer Located off Existing Gravel Drive	• Low Maintenance. • Less service lateral to be installed • Avoiding deeper sanitary sewer trenching costs • Less initial costs if the alternative deep sewer is not constructed at this time	• Only south half of parcel could be served, but does provide service to existing residence
Alternative Sewer Alignment - Sanitary Sewer Located at Northeast Corner of Parcel	• Will serve more areas of the parcel	• Routing of sewer through more wetlands and buffers • Long sewer service lateral required

Sub-Area 3 – Near Intersection of Homestead Road and Seawell School Road

Discussion of Alternatives

After field investigations were performed, it appears that the existing residential structures located on the Homestead Group, LLC and the Dayspring Investments Inc. parcels cannot be served by gravity sewer due to the shallowness of the existing sewer, just south of the intersection of Hearthstone Lane and Homestead Road and south of the intersection of Homestead Road and Seawell School Road. The residential structure located on Daysprings Investments Inc. parcel has a basement.

The of the recommended sewer alignments would be to extend the existing sewer located approximately 100 feet south of the intersection Hearthstone Lane and Homestead Road northward to the intersection. Similarly, another recommended sewer alignment would be to extend the existing sewer located approximately 150 feet south of the intersection Seawell School Road and Homestead Road northward to the intersection.

A more extensive survey of this area, including a Level "A" subsurface utility exploration may be warranted to verify this preliminary finding.

Additionally, since Homestead Road is a NCDOT road, a bore and jack would need to be performed to get the proposed sewer to the north side of Homestead Road at the intersection of Seawell School Road and also at the intersection of Hearthstone Road.

Comparison of Modification to Recommended Alignment

Preliminary evaluations performed determined that the recommended sewer alignment is feasible but comes with limitations, residential pumps tanks may be required to serve the residential structures instead of by gravity. Survey shots taken of the finished floor of the residential structures disclosed that the feasibility in serving all or some of the existing residential structures on these parcels is in question.

In conjunction with a more extensive topographic survey, a Level "A" subsurface utility exploration is recommended to verify if the existing underground utilities can be avoided within NCDOT right of way. For either alignment, a sanitary sewer easement will possibly be required.

Table B.5 Potential Advantages and Disadvantages

Modification	Advantages	Disadvantages
Recommended Sewer Alignment	• Less manholes and potentially less sanitary sewer • Would eliminate bore and jack of 8" sewer (16" Steel Encasement) beneath Homestead Road • Potentially less wooded area to be cleared.	• Would potentially require the installation of residential pump tanks/force main. • Would require services to be bored beneath Homestead Road.
Alternative Sewer Alignment	• Residential structures would be served by gravity sewer. • Sewer extension near the intersection of Homestead Road and Hearthstone Lane would be eliminated.	• More wooded areas would need to be cleared. • Sewer will have to be installed at deep elevation. • More manholes will have to be installed • Relaying of approximately 100 feet of existing sewer would have to be relayed.

Sub-Area 4 – Sandberg Lane

Discussion of Modifications

A proposed sanitary sewer corridor alignment could be located along Sandberg Lane to serve parcels located in the southeast portion of the HRRA. A substantial length of the proposed sanitary sewer corridor can be located along Sandberg. However, the sanitary sewer corridor will need to be extended to the back of the parcels located on the south side of Purefoy Drive to provide service to parcels that cannot be served by the existing sanitary sewer.

The Rogers-Eubanks Neighborhood Association requested consideration of extending sanitary sewer from the Cattail Lane area. After performing preliminary calculations and reviewing Sanitary Sewer "As Built" information, the required invert elevations along the proposed sewer corridor would be too low to connect to the existing sanitary sewer located along Cattail Lane and Zeiger Lane.

A proposed sanitary sewer corridor would be located in back of the Purefoy properties (located on the south side of Purefoy Drive) and back of the Bradshaw parcel and in front of the Burnette parcel (also located on the south side of Purefoy Drive) and west of Sandberg Lane. The residential structures are located significantly below the centerline elevation of Purefoy Road, and the topography of the properties slope downward (southward), toward the back of each parcel.

A segment of the proposed sanitary sewer corridor should be extended northward along Sandberg Lane (toward Purefoy Drive) to serve the Reid and Kaizen parcels.

Comparison of Modification to Recommended Alignment

Field investigations determined that the recommended sewer alignment presented for this proposed sewer corridor can only serve a few residential structures south of Purefoy Drive. A sanitary sewer corridor will need to be located generally along the southern boundary of the parcels (south of Purefoy Drive) so installation of service laterals to the residential structures will be economically feasible.

Table B.6 Potential Advantages and Disadvantages

Modification	Advantages	Disadvantages
Recommended Sewer Alignment	• Service laterals could easily be connected to new sanitary sewer • Residences can be connected along Purefoy Drive that cannot connect to existing sewers	• More wooded areas would need to be cleared • More wetland and buffers permitting. • More manholes and sanitary sewer pipeline required
Alternative Sewer Alignment	• Less manholes and potentially less sanitary sewer pipeline • Less wooded clearing • Less wetland and buffer permitting	• Not all parcels could be easily connected to new sanitary sewer

Appendix C

Recommended Sewer Alignment Based on Preliminary Evaluations and Field Investigations

Appendix C: Recommended Sewer Alignment Based on Preliminary Evaluations and Field Investigations

Table C.1 URS Recommended Sewer Alignment

Recommended Sewer Alignment Locations	Comments
End of Priscilla Lane	**Comments** ▪ It appears that the existing water line is located on the north side of the easement. Additional investigations will need to be performed on location of existing water line throughout entire easement. ▪ Possible Level "A" Subsurface Utility Investigations to be performed in Phase 2 services. ▪ Recommended sewer alignment to be on opposite side of existing water line (of existing easement). ▪ Wetlands and buffers will need to be delineated in this area. **Results** ▪ A limited spot shot survey of finished floor elevations show that this particular corridor is feasible and structures can be served by gravity sewer. ▪ Contaminated soils appear not to be present at boring location in the vicinity of this corridor but more extensive testing may be required if wetland and buffer delineation dictate the recommended sewer alignment.
East Side of Rogers Road, just south of Meadow Run Court	**Comments** ▪ More investigations will need to be performed on location of existing water line. ▪ Possible Level "A" Subsurface Utility Investigations to be performed in Phase 2 services. ▪ More extensive topographic and locate survey will have to be performed to determine where detached structures are located for actual recommended sewer alignment. **Results** ▪ A limited spot shot survey of finished floor show that this particular corridor is feasible and structures can be served by gravity sewer.

Recommended Sewer Alignment Locations	Comments
Lair Court	**Comments** ▪ Parcel owner for selected alignment will need to be contacted and discuss concerns or impacts to parcel. ▪ More extensive topographic survey will need to be performed. ▪ Wetlands and buffers will need to be delineated in this area to determine further alignment modifications. ▪ Numerous existing underground utilities along Lair Court and Tallyho Drive will have to be marked and avoided during construction. ▪ Possible Level "A" Subsurface Utility Explorations to be performed in the design phase. ▪ County well information will need to be obtained to determine depth of private wells in this area. **Results** ▪ A limited spot shot survey of well locations in this area appear to be outside the 25 foot buffer for private wells. ▪ A limited spot shot survey of finished floor elevations show that this particular alignment may be feasible to serve some existing residential structures (not included in the HRRA) by gravity sewer in the future.
East Side of Rogers Road, just south of Priscilla Lane	**Results** ▪ Recommended sewer alignment primarily to serve the Jones and Stroud parcel. ▪ A limited spot shot survey of finished floor elevations show that some residential structures located within the St. Paul AME Church Property will only be able to be served by a recommended corridor alignment 600 feet north of the structure. ▪ Testing for contaminated soils may be required for this recommended corridor alignment. ▪ More extensive topographic survey will need to be performed. ▪ Wetlands and buffers will need to be delineated in this area to determine further alignment modifications.
Tallyho Trail	**Comments** ▪ Winstead parcel owner for selected alignment will need to be contacted and discuss concerns or impacts to parcel. ▪ More extensive topographic survey will need to be performed. ▪ Wetlands and buffers will need to be delineated in this area to determine further alignment modifications.

Recommended Sewer Alignment Locations	Comments
	▪ Possible Level "A" Subsurface Utility Investigations to be performed in Phase 2 services. ▪ County well information will need to be obtained to determine depth of private wells in this area. ▪ More investigations will need to be performed on exact locations of existing utility easements, fence corners, detached buildings, and existing septic systems. ▪ There is a probability that an archaeological field survey will be needed in this area, near the location where the recommended sewer alignment will connect to the existing 12" sewer. **Results** ▪ A limited spot shot survey of well locations in this area appear to be outside the 25 foot buffer for private wells. ▪ A limited spot shot survey of finished floor and LAG elevations show that this particular alignment may be feasible to serve residential structures (not included in the HRRA) by gravity sewer in the future. ▪ Wetlands and buffers will need to be delineated in this area to determine further alignment modifications.
Council Parcel	**Comments** ▪ A limited spot shot survey of finished floor elevations show that this particular corridor is feasible and structures can be served by gravity sewer. However, it appears the recommended sewer depth will be approximately 20 feet deep. **Results** ▪ More extensive topographic survey will need to be performed, especially the exact location of the old road bed in respect to property/boundary lines. ▪ Deed research and boundary survey may need to be performed. ▪ A limited spot shot survey of finished floor elevations show that this particular corridor is may be feasible to serve most residential structures (not included in the HRAA) by gravity sewer in the future. However, existing storm drainage structures and swells on the south side of Billabong Road may prevent some residential structures to be served by gravity in the future. ▪ Wetlands and buffers will need to be delineated in this area to determine further alignment modifications.

Appendix D

Geotechnical Investigations

Project: OWASA - Rogers Road
Project Location: Orange County., NC
Project Number: 31829996

Key to Log of Boring

Elevation, feet	Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Samp. Resist. Blows per 6/ or % RQD	SAMPLES: Recovery, %	SAMPLES: Pocket Pene-trometer, tsf	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	REMARKS AND OTHER DETAILS
1	2	3	4	5	6	7	8	9	10	11

COLUMN DESCRIPTIONS

1 **Elevation:** Elevation in feet referenced to mean sea level (MSL) or site datum.

2 **Depth:** Depth in feet below the ground surface.

3 **Sample Type:** Type of soil sample collected at depth interval shown; sampler symbols are explained below.

4 **Sample Number:** Sample identification number.

5 **Sampling Resistance:** Number of blows required to advance driven sampler each 6-inch interval, or distance noted, using a 140-lb hammer with a 30-inch drop.

6 **Recovery:** Percentage of driven or cored sample length actually recovered.

7 **Pocket Penetrometer:** Pocket penetrometer field consistency measurement in tons per square foot (tsf).

8 **Graphic Log:** Graphic depiction of subsurface material encountered; typical symbols are explained below.

9 **Material Description:** Description of subsurface material encountered; may include color, moisture, texture, soil/material type, and relative density/consistency.

10 **Water Content:** Water content of soil sample measured in laboratory, expressed as percent of dry weight of sample.

11 **Remarks and Other Details:** Comments and observations regarding drilling or sampling made by driller or field personnel.

- **PL** Plastic Limit, in percent
- **LL** Liquid Limit, in percent
- **PI** Plasticity Index, in percent
- **%G** Percent gravel
- **%S** Percent sand
- **%M** Percent silt
- **%C** Percent clay
- **%F** Percent fine

TYPICAL MATERIAL GRAPHIC SYMBOLS

- Topsoil
- Low Plastic CLAY (CL)
- Low Plastic SILT (ML)
- Silty SAND (SM)
- Clayey SAND (SC)
- Weathered Rock (WR)
- Artifical FILL

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	STD. PENETRATION RESISTANCE BLOWS / FOOT
Very Soft	0 to 2
Soft	3 to 4
Firm	5 to 8
Stiff	9 to 15
Very Stiff	16 to 30
Hard	31 to 50
Very Hard	Over 50

RELATIVE DENSITY OF COHESIONLESS SOILS

RELATIVE DENSITY	STD. PENETRATION RESISTANCE BLOWS / FOOT
Very Loose	0 to 4
Loose	5 to 10
Medium Dense	11 to 30
Dense	31 to 50
Very Dense	Over 50

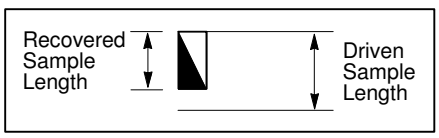
---- Inferred or gradational lithologic contact

ATD At Time of Drilling
NM Not Measured
NA Not Applicable
bgs Below Ground Surface

Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; field descriptions may have been modified to reflect lab test results. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced; they are not warranted to be representative of subsurface conditions at other locations or times.

SAMPLING METHOD GRAPHIC SYMBOLS

- Split Spoon
- Shelby Tube
- Rock Core
- BULK



MINOR SOIL TYPE(s)

"trace"	When the soil type's percentage is estimated, using visual/manual procedures, to be between 1 and 15 percent of the total sample.
"with"	When the soil type's percentage is estimated, using visual/manual procedures, to be greater than 15 percent and less than 30 percent of the total sample.
"y"	When the soil type's percentage is estimated, using visual/manual procedures, to be greater than 30 percent of the total sample.

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Project: OWASA - Rogers Road
Project Location: Orange County., NC
Project Number: 31829996

Log of Boring B-1

Sheet 1 of 1

Date(s) Drilled	12-23-14	Logged By	C. Scheip	Checked By	P. Zhang
Drilling Method	Hand Auger	Drill Bit Size/Type	N/A	Total Depth of Borehole	6.0´ bgs
Drill Rig Type	N/A	Drilling Contractor	N/A	Surface Elevation	530.0 ft MSL ft above msl
Borehole Backfill	Cuttings	Sampling Method(s)	Hand Auger	Hammer Data	N/A
Coordinate Location	N 805,875.00 E 1,973,837.00	Groundwater Level(s)	Dry 12-23-14		

Elevation, feet	Depth, feet	SAMPLES Type	Number	Sampling Resist. Blows/6" OR CORE% RQD	Recovery, %	Pocket Pene-trometer, tsf	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	REMARKS AND OTHER DETAILS
530	0							530.0 / 0.0		
								529.5 TOPSOIL with some organics 0.5		
								Residuum: Brown and white, dry, clayey SAND (SC)		
								527.0 / 3.0		
								Brow, dry, silty SAND (SM)		
525	5									*Hand Auger refusal at 6 ft. bgs.*
								524.0 / 6.0		
								End of Boring at 6´ bgs		
520										
515										
510										
505										
500										

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Project: OWASA - Rogers Road
Project Location: Orange County., NC
Project Number: 31829996

Log of Boring B-2

Sheet 1 of 1

Date(s) Drilled	12-23-14	Logged By	C. Scheip	Checked By	P. Zhang
Drilling Method	Hand Auger	Drill Bit Size/Type	N/A	Total Depth of Borehole	6.0´ bgs
Drill Rig Type	N/A	Drilling Contractor	N/A	Surface Elevation	504.1 ft MSL ft above msl
Borehole Backfill	Cuttings	Sampling Method(s)	Hand Auger	Hammer Data	N/A
Coordinate Location	N 804,628.00 E 1,974,611.00	Groundwater Level(s)	Dry 12-23-14		

Elevation, feet	Depth, feet	SAMPLES Type	Number	Sampling Resist. Blows/6" OR CORE% RQD	Recovery, %	Pocket Pene-trometer, tsf	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	REMARKS AND OTHER DETAILS
	0							504.1 / 0.0 Fill: Reddish brown, moist, sandy CLAY (CL) with some weathered rock fragments		
500										
	5							498.1 / 6.0		*Hand Auger refusal at 6 ft. bgs.*
								End of Boring at 6´ bgs		
495										
490										
485										
480										
475										

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Project: OWASA - Rogers Road
Project Location: Orange County., NC
Project Number: 31829996

Log of Boring B-3

Sheet 1 of 1

Date(s) Drilled	12-22-14	Logged By	S. Crockett	Checked By	P. Zhang
Drilling Method	Hollow Stem Augering	Drill Bit Size/Type	2.25-inch ID HSA	Total Depth of Borehole	10.0´ bgs
Drill Rig Type	CME 55	Drilling Contractor	F&R	Surface Elevation	523.1 ft MSL ft above msl
Borehole Backfill	Cuttings	Sampling Method(s)	2 inch split-spoon	Hammer Data	Automatic/Hydraulic
Coordinate Location	N 804,109.00 E 1,975,238.00	Groundwater Level(s)	Dry 12-22-14		

Elevation, feet	Depth, feet	SAMPLES Type	Number	Sampling Resist. Blows/6" OR CORE% RQD	Recovery, %	Pocket Pene-trometer, tsf	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	REMARKS AND OTHER DETAILS
	0							523.1 — 0.0		
			SS-1	2 3 2				Fill: Brown and tan, moist, firm, silty SAND (SM) with gravel	19.7	*LL=36 PL=25 PI=11 %G=25.0 %S=27.1 %F=47.9*
			SS-2	4 3 7				Same to stiff		
520								520.1 — 3.0		
			SS-3	11 14 25				Residuum: Tan and white, dry, hard, sandy CLAY (CL)		
	5							517.1 — 6.0		
			SS-4	11 25 50				Brown, dry, very dense, silty SAND (SM)		
515								515.1 — 8.0		
			SS-5	11 11 17				Brown and black, mottled, dry, medium dense, clayey SAND (SC)		
	10							513.1 — 10.0		
								End of Boring at 10´ bgs		
510										
505										
500										
495										

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Project: OWASA - Rogers Road
Project Location: Orange County., NC
Project Number: 31829996

Log of Boring B-4

Sheet 1 of 1

Date(s) Drilled	12-23-14	Logged By	C. Scheip	Checked By	P. Zhang
Drilling Method	Hand Auger	Drill Bit Size/Type	N/A	Total Depth of Borehole	10.0´ bgs
Drill Rig Type	N/A	Drilling Contractor	N/A	Surface Elevation	548.5 ft MSL ft above msl
Borehole Backfill	Cuttings	Sampling Method(s)	Hand Auger	Hammer Data	N/A
Coordinate Location	N 803,583.00 E 1,975,649.00	Groundwater Level(s)	Dry 12-23-14		

Elevation, feet	Depth, feet	SAMPLES Type	Number	Sampling Resist. Blows/6" OR CORE% RQD	Recovery, %	Pocket Pene-trometer, tsf	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	REMARKS AND OTHER DETAILS
	0							548.5 / 0.0 Alluvium: Light brown, moist, silty CLAY (CL)		
545								545.5 / 3.0 Residuum: Red-brown, dry, silty SAND (SM) with weathered rock fragments		
	5									
540								540.0 / 8.5 White and red-brown, mottled, dry, sandy SILT (ML)		
	10							538.5 / 10.0 End of Boring at 10´ bgs		
535										
530										
525										
520										

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Project: OWASA - Rogers Road
Project Location: Orange County., NC
Project Number: 31829996

Log of Boring B-5

Sheet 1 of 1

Date(s) Drilled	12-23-14	Logged By	S. Crockett	Checked By	P. Zhang
Drilling Method	Hollow Stem Augering	Drill Bit Size/Type	2.25-inch ID HSA	Total Depth of Borehole	8.0´ bgs
Drill Rig Type	CME 55	Drilling Contractor	F&R	Surface Elevation	502.2 ft MSL ft above msl
Borehole Backfill	Cuttings	Sampling Method(s)	2 inch split-spoon	Hammer Data	Automatic/Hydraulic
Coordinate Location	N 802,482.00 E 1,976,953.00	Groundwater Level(s)	Dry 11-20-14		

Elevation, feet	Depth, feet	SAMPLES Type	Number	Sampling Resist. Blows/6" OR CORE% RQD	Recovery, %	Pocket Pene-trometer, tsf	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	REMARKS AND OTHER DETAILS
	0							502.2 — 0.0		
								501.7 TOPSOIL with some organics — 0.5		
								Alluvium: Light brown, dry, medium dense, silty SAND (SM)		
500		SS-1		4 7 7						
								499.2 — 3.0		
								Light brown, dry, medium dense, clayey SAND (SC)		
								498.2 — 4.0		
		SS-2		5 7 8				Tan and white, mottled, dry, stiff, sandy CLAY (CL)	19.3	*LL=46 PL=18 PI=28 %G=0.2 %S=29.9 %F=69.9*
	5									
								496.2 — 6.0		
		SS-3		50/5"				Weathered Rock: Gray and White, QUARTZITE		
495										
								494.2 — 8.0		*Auger refusal at 8 ft bgs.*
		SS-4		50/0				End of Boring at 8´ bgs		
490										
485										
480										
475										

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Project: OWASA - Rogers Road
Project Location: Orange County., NC
Project Number: 31829996

Log of Boring B-6

Sheet 1 of 1

Date(s) Drilled	12-23-14	Logged By	C. Scheip	Checked By	P. Zhang
Drilling Method	Hand Auger	Drill Bit Size/Type	N/A	Total Depth of Borehole	4.5´ bgs
Drill Rig Type	N/A	Drilling Contractor	N/A	Surface Elevation	503.6 ft MSL ft above msl
Borehole Backfill	Cuttings	Sampling Method(s)	Hand Auger	Hammer Data	N/A
Coordinate Location	N 804,583.00 E 1,974,663.00	Groundwater Level(s)	Dry 12-23-14		

Elevation, feet	Depth, feet	SAMPLES Type	Number	Sampling Resist. Blows/6" OR CORE% RQD	Recovery, %	Pocket Pene-trometer, tsf	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	REMARKS AND OTHER DETAILS
	0							503.6 0.0 Alluvium: Reddish brown, moist, sandy CLAY (CL)		
500								499.6 4.0		*Hand Auger refusal at 4.5 ft. bgs.*
								499.1 Weathered Rock: Black and tan, SLATE 4.5		
								End of Boring at 4.5´ bgs		
495										
490										
485										
480										
475										

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Project: OWASA - Rogers Road
Project Location: Orange County., NC
Project Number: 31829996

Log of Boring B-7

Sheet 1 of 1

Date(s) Drilled	12-23-14	Logged By	C. Scheip	Checked By	P. Zhang
Drilling Method	Hand Auger	Drill Bit Size/Type	N/A	Total Depth of Borehole	6.0´ bgs
Drill Rig Type	N/A	Drilling Contractor	N/A	Surface Elevation	526.2 ft MSL ft above msl
Borehole Backfill	Cuttings	Sampling Method(s)	Hand Auger	Hammer Data	N/A
Coordinate Location	N 804,207.00 E 1,975,080.00	Groundwater Level(s)	Dry 12-23-14		

Elevation, feet	Depth, feet	SAMPLES Type	Number	Sampling Resist. Blows/6" OR CORE% RQD	Recovery, %	Pocket Pene-trometer, tsf	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	REMARKS AND OTHER DETAILS
	0							526.2 / 0.0		
								525.7 TOPSOIL with some organics / 0.5		
525								Alluvium: Brown, moist, silty SAND (SM)		
	5									*Hand Auger refusal at 6 ft. bgs.*
								520.2 / 6.0		
520								End of Boring at 6´ bgs		
515										
510										
505										
500										

URS

Report: GEO_CR; File P:\JOBS4_PROJECTS\GINT FILES\GEOTECHNICAL SUPPORT\OWASA\GINT\OWASA - ROGERS ROAD.GPJ; 1/21/2015 10:26:05 AM

Project: OWASA - Rogers Road
Project Location: Orange County., NC
Project Number: 31829996

Log of Boring B-8

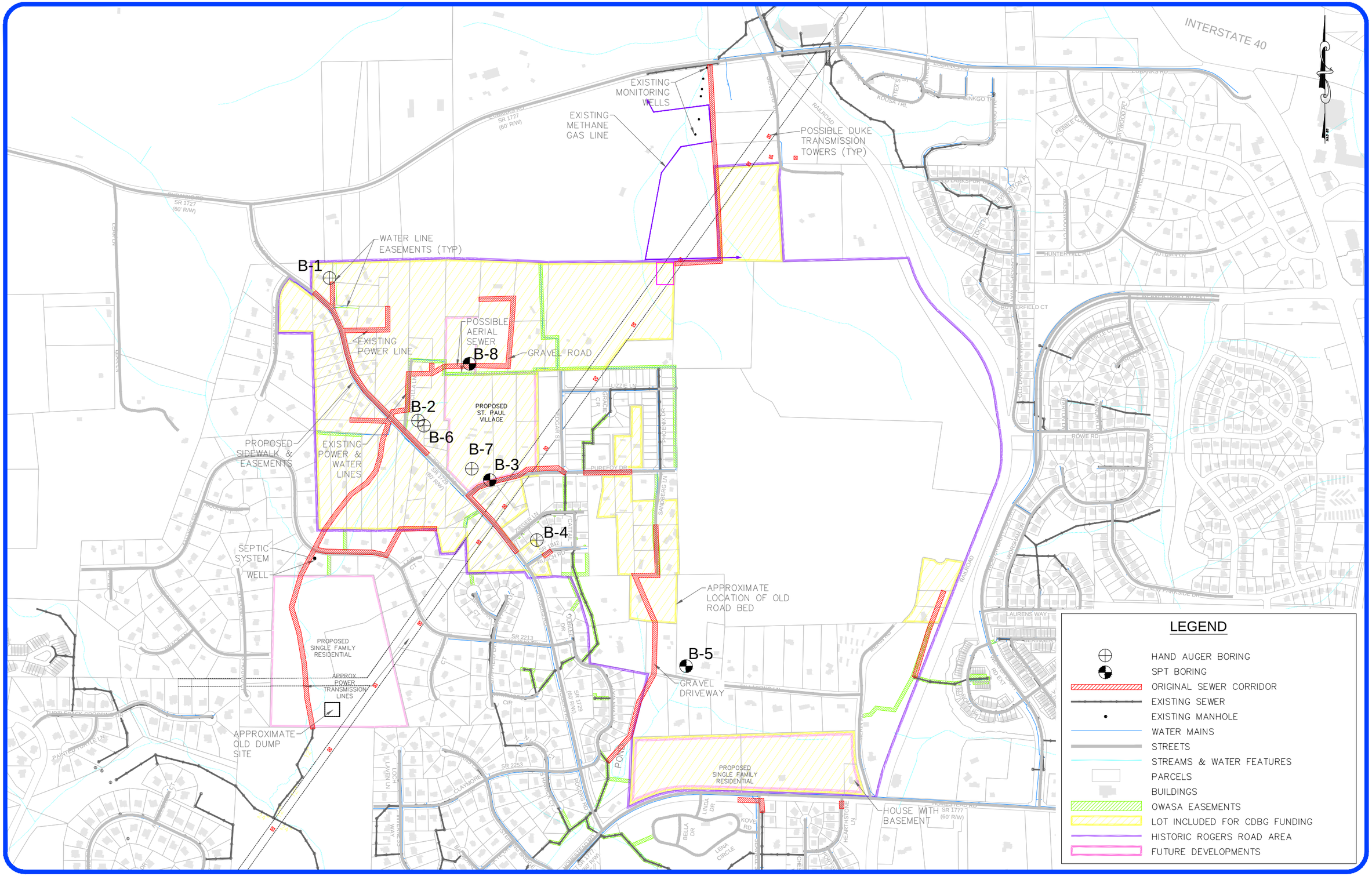
Sheet 1 of 1

Date(s) Drilled	12-22-14	Logged By	S. Crockett	Checked By	P. Zhang
Drilling Method	Hollow Stem Augering	Drill Bit Size/Type	2.25-inch ID HSA	Total Depth of Borehole	9.5´ bgs
Drill Rig Type	CME 55	Drilling Contractor	F&R	Surface Elevation	525.9 ft MSL ft above msl
Borehole Backfill	Cuttings	Sampling Method(s)	2 inch split-spoon	Hammer Data	Automatic/Hydraulic
Coordinate Location	N 805,124.00 E 1,975,060.00	Groundwater Level(s)	Dry 12-22-14		

Elevation, feet	Depth, feet	SAMPLES Type	Number	Sampling Resist. Blows/6" OR CORE% RQD	Recovery, %	Pocket Pene-trometer, tsf	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	REMARKS AND OTHER DETAILS
	0							525.9 / 0.0		
525			SS-1	1 2 2 3				Alluvium: Light brown, wet, soft, sandy CLAY (CL)	21.2	*LL=28 PL=19 PI=9 %G=0.3 %S=20.9 %F=78.8*
			SS-2	4 4 5 7				Same to stiff		
								521.9 / 4.0		
	5		SS-3	10 20 35 34				Residuum: Light brown, dry, hard, sandy CLAY (CL)		
520			SS-4	30 36 28 30						
								517.9 / 8.0		
			SS-5	21 32 50				Brown and white, dry, very dense, clayey SAND (SC)		
								516.4 / 9.5		
								End of Boring at 9.5´ bgs		
515										
510										
505										
500										

URS

Report: GEO_CR; File P:\JOBS4_PROJECTS\GINT FILES\GEOTECHNICAL SUPPORT\OWASA\GINT\OWASA - ROGERS ROAD.GPJ; 1/21/2015 10:26:06 AM



FIELD INVESTIGATION - BORING LOCATION PLAN

NOT TO SCALE

URS

Appendix E

Contaminants/Subsurface Investigations

Southeast ACCUTEST LABORATORIES

Reissue #1
01/13/15

Technical Report for

URS Corporation

OWASA; Rodgers Rd, Chapel Hill, NC

31829996.20008

Accutest Job Number: FA21035

Sampling Date: 12/23/14

Report to:

URS Corporation

NCChemists@urs.com

ATTN: Martha Meyers

Total number of pages in report: 72

NELAP ACCREDITED TNI LABORATORY

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Norm Farmer
Technical Director

Client Service contact: Heather Wandrey 407-425-6700

Certifications: FL (E83510), LA (03051), KS (E-10327), IA (366), IL (200063), NC (573), NJ (FL002), SC (96038001) DoD ELAP (L-A-B L2229), CA (2937), TX (T104704404), PA (68-03573), VA (460177), AK, AR, GA, KY, MA, NV, OK, UT, WA

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.

Test results relate only to samples analyzed.

Accutest Laboratories is the sole authority for authorizing edits or modifications to this document. Unauthorized modification of this report is strictly prohibited.

January 13, 2015

Ms. Adeline Bock
URS
1600 Perimeter Park Dr
Morrisville, NC 27560

RE: Accutest job FA21035 Reissue

Dear Ms. Bock,

The final report for job number FA21035 has been edited to reflect requested corrections. These edits have been incorporated into the revised report.

The list has been revised to report the 8260 TCL 1.2 list per your request.

Accutest apologies for any inconvenience this may have caused. Please feel free to contact us if we can be of further assistance.

Sincerely,

Accutest Laboratories, SE

Florida ♦ 4405 Vineland Road ♦ Suite C-15 ♦ Orlando, FL 32811 ♦ tel: 407 425-6700 ♦ fax: 407 425-0707 ♦ htpp:/www.accutest.com

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Sample Summary

URS Corporation

Job No: FA21035

OWASA; Rodgers Rd, Chapel Hill, NC
Project No: 31829996.20008

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
FA21035-1	12/23/14	12:00	CS	12/24/14	SO	Soil	B-6 2-4
FA21035-2	12/23/14	11:20	CS	12/24/14	SO	Soil	B-7 4-6
FA21035-3	12/23/14	15:00	CS	12/24/14	SO	Soil	B-8 4-6

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client: URS Corporation **Job No:** FA21035

Site: OWASA; Rodgers Rd, Chapel Hill, NC **Report Date:** 1/9/2015 9:54:43 AM

3 Sample(s) were collected on 12/23/2014 and were received at Accutest SE on 12/24/2014 properly preserved, at 2.4 Deg. C and intact. These Samples received an Accutest job number of FA21035. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: SO **Batch ID:** VY781

All samples were analyzed within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) FA21037-1MS, FA21037-1MSD were used as the QC samples indicated.

Matrix Spike/Matrix Spike Duplicate Recovery(s) for Carbon disulfide are outside control limits. Probable cause is due to matrix interference. % RPD was within control limits in MS/MSD. For method performance in a clean matrix, refer to Blank Spike.

FA21037-1MS/MSD: Soil vials were not received within 48 hours of sampling; results are considered minimum value. Spiked sample is not part of this SDG.

Extractables by GCMS By Method SW846 8270D

Matrix: SO **Batch ID:** OP54465

All samples were extracted within the recommended method holding time.

All samples were analyzed within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) FA20914-7MS, FA20914-7MSD were used as the QC samples indicated.

Matrix Spike Recovery(s) for 2,4-Dinitrotoluene, 4,6-Dinitro-o-cresol, Benzoic Acid, Hexachlorocyclopentadiene are outside control limits. Probable cause is due to matrix interference. % RPD was within control limits in MS/MSD. For method performance in a clean matrix, refer to Blank Spike.

Matrix Spike Duplicate Recovery(s) for 2,4-Dinitrophenol, 2,4-Dinitrotoluene, 4,6-Dinitro-o-cresol, 4-Bromophenyl phenyl ether, Hexachlorocyclopentadiene are outside control limits. Probable cause is due to matrix interference. % RPD was within control limits in MS/MSD. For method performance in a clean matrix, refer to Blank Spike.

Metals By Method SW846 6010C

Matrix: SO **Batch ID:** MP28425

All samples were digested within the recommended method holding time.

All samples were analyzed within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) FA21151-1DUP, FA21151-1MS, FA21151-1MSD, FA21151-1PS, FA21151-1SDL were used as the QC samples for metals.

Matrix Spike Recovery(s) for Antimony are outside control limits. Spike recovery indicates possible matrix interference and/or sample non-homogeneity.

Matrix Spike Duplicate Recovery(s) for Antimony are outside control limits. Spike recovery indicates possible matrix interference and/or sample non-homogeneity.

RPD(s) for Duplicate for Silver are outside control limits for sample MP28425-D1. RPD acceptable due to low duplicate and sample concentrations.

RPD(s) for Serial Dilution for Beryllium, Selenium, Silver, Chromium, Copper, Iron, Manganese, Nickel, Zinc are outside control limits for sample MP28425-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

MP28425-SD1 for Manganese: Serial dilution indicates possible matrix interference.

MP28425-SD1 for Iron: Serial dilution indicates possible matrix interference.

MP28425-SD1 for Copper: Serial dilution indicates possible matrix interference.

Metals By Method SW846 6010C

Matrix: SO **Batch ID:** MP28425

MP28425-SD1 for Chromium: Serial dilution indicates possible matrix interference.
MP28425-SD1 for Zinc: Serial dilution indicates possible matrix interference.
MP28425-SD1 for Nickel: Serial dilution indicates possible matrix interference.
FA21035-3 for Lead: Elevated reporting limit(s) due to matrix interference.

FA21035-3 for Manganese: Elevated reporting limit(s) due to matrix interference.

FA21035-3 for Arsenic: Elevated reporting limit(s) due to matrix interference.

FA21035-2 for Silver: Elevated reporting limit(s) due to matrix interference.

FA21035-3 for Nickel: Elevated reporting limit(s) due to matrix interference.

FA21035-2 for Selenium: Elevated reporting limit(s) due to matrix interference.

FA21035-3 for Copper: Elevated reporting limit(s) due to matrix interference.

FA21035-3 for Thallium: Elevated reporting limit(s) due to matrix interference.

FA21035-3 for Antimony: Elevated reporting limit(s) due to matrix interference.

FA21035-2 for Zinc: Elevated reporting limit(s) due to matrix interference.

FA21035-3 for Silver: Elevated reporting limit(s) due to matrix interference.

FA21035-3 for Selenium: Elevated reporting limit(s) due to matrix interference.

FA21035-2 for Thallium: Elevated reporting limit(s) due to matrix interference.

FA21035-2 for Nickel: Elevated reporting limit(s) due to matrix interference.

FA21035-2 for Manganese: Elevated reporting limit(s) due to matrix interference.

FA21035-2 for Lead: Elevated reporting limit(s) due to matrix interference.

FA21035-2 for Copper: Elevated reporting limit(s) due to matrix interference.

FA21035-2 for Chromium: Elevated reporting limit(s) due to matrix interference.

FA21035-2 for Cadmium: Elevated reporting limit(s) due to matrix interference.

FA21035-2 for Arsenic: Elevated reporting limit(s) due to matrix interference.

FA21035-3 for Iron: Elevated reporting limit(s) due to matrix interference.

FA21035-3 for Zinc: Elevated reporting limit(s) due to matrix interference.

FA21035-3 for Beryllium: Elevated reporting limit(s) due to matrix interference.

FA21035-3 for Cadmium: Elevated reporting limit(s) due to matrix interference.

FA21035-3 for Chromium: Elevated reporting limit(s) due to matrix interference.

FA21035-2 for Antimony: Elevated reporting limit(s) due to matrix interference.

Metals By Method SW846 7471B

Matrix: SO **Batch ID:** MP28410

All samples were digested within the recommended method holding time.

All samples were analyzed within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) FA21067-46MS, FA21067-46MSD, FA21067-46SDL, FA21067-46DUP were used as the QC samples for metals.

RPD(s) for Duplicate for Mercury are outside control limits for sample MP28410-D1. RPD acceptable due to low duplicate and sample concentrations.

RPD(s) for Serial Dilution for Mercury are outside control limits for sample MP28410-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

Wet Chemistry By Method EPA 300/SW846 9056A

Matrix: SO **Batch ID:** GP25246

All samples were prepped within the recommended method holding time.

All samples were analyzed within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) FA21035-3MS, FA21035-3MSD were used as the QC samples for Nitrogen, Nitrate and Sulfate.

Matrix Spike Recovery(s) for Nitrogen, Nitrate are outside control limits. Spike recovery indicates possible matrix interference. % RPD was within control limits in MS/MSD. For method performance in a clean matrix, refer to Blank Spike.

Matrix Spike Recovery(s) for Sulfate are outside control limits. Spike recovery indicates possible carry-over from previous sample. For method performance in a clean matrix, refer to Blank Spike.

RPD(s) for MSD for Sulfate are outside control limits for sample GP25246-S4. High RPD due to possible carry-over on matrix spike.

Wet Chemistry By Method EPA 350.1 M

Matrix: SO **Batch ID:** GP25276

All samples were prepped within the recommended method holding time.

All samples were analyzed within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) FA21035-2MSD, FA21035-2MS were used as the QC samples for Nitrogen, Ammonia.

GP25276-S1 for Nitrogen, Ammonia: Spike recovery indicates possible matrix interference. % RPD was within control limits in MS/MSD. For method performance in a clean matrix, refer to Blank Spike.

Wet Chemistry By Method SM19 2540G

Matrix: SO **Batch ID:** GN64639

Sample(s) FA21067-2DUP was used as the QC sample for Solids, Percent.

Accutest Laboratories Southeast (ALSE) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALSE and as stated on the COC. ALSE certifies that the data meets the Data Quality Objectives for precision, accuracy and completeness as specified in the ALSE Quality Manual except as noted above. This report is to be used in its entirety. ALSE is not responsible for any assumptions of data quality if partial data packages are used.

Narrative prepared by:

_____ Date: January 9, 2015

Kim Benham, Client Services (signature on file)

Laboratory Report Glossary

Client Sample ID: Normally refers to a point of collection – a monitoring well, discharge outfall, treatment facility intake, soil core grid location and depth, or any other identification client assigns to a sample.
Lab Sample ID: Letter prefix identifies one of Accutest laboratories and the rest is a consecutive number of the job (or SDG) received. Number after dash is a sample number and it is unequivocally linked in the LIMS to the Client Sample ID (see above).
Matrix (Matrix Code):

- **AQ- Water Samples**
- **SO- Soil/Solid Samples**
- **LIQ- Non-Water Liquid Samples**
- **OIL- Oil Samples**

Matrix Type:

- **SW for Surface Water**
- **SO for Soil/Sediment**
- **GW for Ground Water**
- **DW for Drinking Water**

All available definitions are found on Chain of Custody form.

Deg. C: Degrees Celsius, measurement of temperature.
Method: Analytical and preparation methods used for the analysis, with the version or revision identified.
Date Sampled: This information is entered from Chain of Custody at the time of login for every sample.
Date Received: When the job was received by Accutest Laboratories.
Percent Solids: Applicable only to SO matrix. For other matrices this field defaults to "n/a".
Run #: Provides information how many attempts were made in the analysis of the sample. LIMS can merge information from several attempts and lists all of them, including dilution, confirmation, etc. #1 designation is assigned to the analytical run with majority of analytes reported from it, not necessarily in chronological order.
File ID: Actual instrument data acquisition file that produced the final result. Letter prefix identifies the instrument; the rest is a consecutive injection number for that instrument.
DF (Dilution Factor): Most common reasons are either to fit into the range of the calibration, or alleviate matrix interference. DF other than 1 are accompanied with a comment at the end of the sample report.
Analyzed: Date of analysis.
By: Field Technician or Analyst uniquely identified by initials.
Prep Date: Date of sample preparation. If hold time is 72 hours or less, time of preparation is also indicated.
Prep Batch: Letter prefix OP followed by a consecutive number. For VOC analysis preparation happens at the time of analysis, therefore analytical batch and preparation batch are the same. Size of prep batch is limited to 20 field samples of similar matrix and the entire batch should be completed within 12 hour time.
Analytical Batch: Letter prefix identifies the instrument and is followed by a consecutive number. Not limited by a number of samples.
Initial Weight or Initial Volume: Raw sample size used for preparation.
Final Volume: Final volume of extract. If different from method-prescribed volume, reasons are reflected in the comments at the end of the report form.
CAS Number: *Chemical Abstracts Service* (CAS), a division of the *American Chemical Society*.
Compound: Most commonly used names of chemical compounds.
Result: Depending on project requirements, this field could be set up as text, such as ND (for Non Detected) or a number. The number may be reported with a qualifier.
MDL (Method Detection Limit): This value is defined as 99% probability that analyte above this concentration is positively (qualitatively) identified.
RL (Reporting Limit): This value is supported by the low calibration standard and defines lowest point of quantitative identification of analyte.
DL (Detection Limit): The smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration with 99% confidence. At the DL, the false positive rate (Type I error) is 1%.
LOD (Limit of Detection): The smallest concentration of a substance that must be present in a sample in order to be detected at the DL with 99% confidence. At the LOD, the false negative rate (Type II error) is 1%.
LOQ (Limit of Quantitation): The smallest concentration that produces a quantitative result with known and recorded precision and bias.

Units: ug/l (micrograms per liter) for aqueous samples and ug/kg (micrograms per kilogram) for solids (or ppb – parts per billion). The units could be set according to project or state-specific requirements, such as mg/l (milligrams per liter), or mg/kg (milligrams per kilogram).

Qualifiers (Q): Definitions of most often used qualifiers are found at the bottom of each result page. Applied depending on the program – state-specific (Florida A.C. 62-160), CLP-like, AFCEE, DOD QSM, etc.

Tentatively Identified Compound (TIC): Used when client requests a search for analytes that are not part of instrument calibration. Unknown peaks are compared with published spectral libraries and best match is reported as TIC.

Surrogate (S1, S2, S3 etc.): are positive controls that are used in most organics methods to ascertain preparation efficiency and matrix effect in individual samples. These chemicals mimic common method constituents but are unlikely to be found in real samples. Recoveries can be reported for every analytical run used in the analysis.

IS (Internal Standard IS1, IS2, IS3, etc): quantitative reference used to adjust for instrument performance fluctuations.

Area (of chromatographic peak): signal intensity directly related to compound concentration.

RT (Retention Time): time required for analyte to traverse the length of analytical column. Used for compound identification.

ICAL (Initial Calibration): Must pass calibration criteria established by method.

ICV (Independent Calibration Verification): Used to verify ICAL preparation and concentration of calibration points.

CCV (Continuing Calibration Verification): Used to assess calibration status of the instrument and must recover within established acceptance criteria.

MB (Method Blank): is a negative batch control. MB is an aliquot of matrix free of analyte of interest (either ASTM Type II water or appropriate solid substance) that is put through all the preparation and possible clean-up steps alongside investigative (field) samples. MB should be free of interferences above a set level.

BS (Blank Spike, Laboratory Fortified Blank - LFB, Laboratory Control Sample - LCS): is a positive control used to determine method accuracy - in clean matrix, i.e. matrix free of analytes of interest.

BSD (Blank Spike Duplicate): Used to assess recovery reproducibility - method precision – per analytical method requirement. %Recovery and Relative Percent Difference (%RPD) are compared with the established acceptance criteria.

MS and/or **MSD (Matrix Spike and Matrix Spike Duplicate):** positive batch controls which indicate matrix effect on the precision and accuracy of the method in given sample matrix. Results are expressed in %Recovery and Relative Percent Difference (%RPD), and compared with the established acceptance criteria.

DUP (Matrix Duplicate): Positive batch control, a way of assessing laboratory's precision; however, the composition of the samples is unknown and may not yield meaningful results.

REC (Recovery in Percent): expresses method accuracy.

RPD (Relative Percent Difference): expresses method precision.

Limits: Recovery limits for surrogates and spikes

Summary of Hits

Job Number: FA21035
Account: URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC
Collected: 12/23/14

3

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
FA21035-1	**B-6 2-4**					
Arsenic		31.4	0.60	0.12	mg/kg	SW846 6010C
Beryllium		0.34	0.30	0.030	mg/kg	SW846 6010C
Chromium		17.8	0.60	0.060	mg/kg	SW846 6010C
Copper		29.9	1.5	0.060	mg/kg	SW846 6010C
Iron		26500	18	1.5	mg/kg	SW846 6010C
Lead		12.9	1.2	0.097	mg/kg	SW846 6010C
Manganese		254	0.90	0.030	mg/kg	SW846 6010C
Mercury		0.055	0.051	0.0051	mg/kg	SW846 7471B
Nickel		7.6	2.4	0.030	mg/kg	SW846 6010C
Selenium		1.2	1.2	0.18	mg/kg	SW846 6010C
Silver		0.30 J	0.60	0.039	mg/kg	SW846 6010C
Zinc		22.5	1.2	0.18	mg/kg	SW846 6010C
Nitrogen, Ammonia		16.1	1.6	0.35	mg/kg	EPA 350.1 M
Sulfate		23.1 J	27	8.1	mg/kg	EPA 300/SW846 9056A
FA21035-2	**B-7 4-6**					
Arsenic [a]		29.0	1.1	0.23	mg/kg	SW846 6010C
Beryllium		0.24 J	0.28	0.028	mg/kg	SW846 6010C
Chromium [a]		35.1	1.1	0.11	mg/kg	SW846 6010C
Copper [a]		34.9	2.8	0.11	mg/kg	SW846 6010C
Iron		43800	34	2.8	mg/kg	SW846 6010C
Lead [a]		12.5	2.3	0.18	mg/kg	SW846 6010C
Manganese [a]		132	1.7	0.057	mg/kg	SW846 6010C
Mercury		0.054	0.047	0.0047	mg/kg	SW846 7471B
Nickel [a]		5.7	4.5	0.057	mg/kg	SW846 6010C
Selenium [a]		1.5 J	2.3	0.34	mg/kg	SW846 6010C
Zinc [a]		16.9	2.3	0.34	mg/kg	SW846 6010C
Nitrogen, Ammonia		11.5	1.4	0.30	mg/kg	EPA 350.1 M
FA21035-3	**B-8 4-6**					
Caprolactam		23.0 J	180	19	ug/kg	SW846 8270D
Arsenic [a]		21.5	5.2	1.0	mg/kg	SW846 6010C
Chromium [a]		92.2	5.2	0.52	mg/kg	SW846 6010C
Copper [a]		39.1	13	0.52	mg/kg	SW846 6010C
Iron [a]		44400	160	13	mg/kg	SW846 6010C
Lead [a]		7.9 J	10	0.84	mg/kg	SW846 6010C
Manganese [a]		482	7.9	0.26	mg/kg	SW846 6010C
Mercury		0.011 J	0.042	0.0042	mg/kg	SW846 7471B
Nickel [a]		69.3	21	0.26	mg/kg	SW846 6010C
Zinc [a]		72.6	10	1.6	mg/kg	SW846 6010C
Nitrogen, Ammonia		1.9	1.2	0.26	mg/kg	EPA 350.1 M

Summary of Hits

Job Number: FA21035
Account: URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC
Collected: 12/23/14

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Sulfate		15.9 J	22	6.5	mg/kg	EPA 300/SW846 9056A

(a) Elevated reporting limit(s) due to matrix interference.

Southeast ACCUTEST LABORATORIES

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	B-6 2-4		
Lab Sample ID:	FA21035-1	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
Method:	SW846 8260B	**Percent Solids:**	74.0
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Y17822.D	1	12/26/14	AD	n/a	n/a	VY781
Run #2							

	Initial Weight
Run #1	5.46 g
Run #2	

VOA TCL (SOM01.1) List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	62	19	ug/kg	
71-43-2	Benzene	ND	6.2	1.2	ug/kg	
74-97-5	Bromochloromethane	ND	6.2	2.4	ug/kg	
75-27-4	Bromodichloromethane	ND	6.2	1.2	ug/kg	
75-25-2	Bromoform	ND	6.2	1.3	ug/kg	
108-90-7	Chlorobenzene	ND	6.2	1.2	ug/kg	
75-00-3	Chloroethane	ND	6.2	2.8	ug/kg	
67-66-3	Chloroform	ND	6.2	1.4	ug/kg	
75-15-0	Carbon disulfide	ND	6.2	1.2	ug/kg	
56-23-5	Carbon tetrachloride	ND	6.2	1.7	ug/kg	
110-82-7	Cyclohexane	ND	6.2	1.3	ug/kg	
75-34-3	1,1-Dichloroethane	ND	6.2	1.2	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	6.2	1.2	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	6.2	2.6	ug/kg	
106-93-4	1,2-Dibromoethane	ND	6.2	2.2	ug/kg	
107-06-2	1,2-Dichloroethane	ND	6.2	1.2	ug/kg	
78-87-5	1,2-Dichloropropane	ND	6.2	1.2	ug/kg	
123-91-1	1,4-Dioxane	ND	250	66	ug/kg	
124-48-1	Dibromochloromethane	ND	6.2	1.2	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	6.2	1.6	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	6.2	1.2	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	6.2	1.2	ug/kg	
541-73-1	m-Dichlorobenzene	ND	6.2	1.2	ug/kg	
95-50-1	o-Dichlorobenzene	ND	6.2	1.2	ug/kg	
106-46-7	p-Dichlorobenzene	ND	6.2	1.4	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	6.2	1.7	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	6.2	1.2	ug/kg	
100-41-4	Ethylbenzene	ND	6.2	1.2	ug/kg	
76-13-1	Freon 113	ND	6.2	1.6	ug/kg	
591-78-6	2-Hexanone	ND	31	6.1	ug/kg	
98-82-8	Isopropylbenzene	ND	6.2	1.2	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	31	6.2	ug/kg	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B-6 2-4		
Lab Sample ID:	FA21035-1	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
Method:	SW846 8260B	**Percent Solids:**	74.0
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

VOA TCL (SOM01.1) List

CAS No.	Compound	Result	RL	MDL	Units	Q
79-20-9	Methyl acetate	ND	31	6.2	ug/kg	
74-83-9	Methyl bromide	ND	6.2	2.3	ug/kg	
74-87-3	Methyl chloride	ND	6.2	2.5	ug/kg	
108-87-2	Methylcyclohexane	ND	6.2	1.2	ug/kg	
75-09-2	Methylene chloride	ND	12	5.0	ug/kg	
78-93-3	Methyl ethyl ketone	ND	31	9.3	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	6.2	1.2	ug/kg	
100-42-5	Styrene	ND	6.2	1.2	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	6.2	1.2	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.2	1.7	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	6.2	2.0	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	6.2	1.5	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	6.2	1.4	ug/kg	
127-18-4	Tetrachloroethylene	ND	6.2	1.6	ug/kg	
108-88-3	Toluene	ND	6.2	1.2	ug/kg	
79-01-6	Trichloroethylene	ND	6.2	1.3	ug/kg	
75-69-4	Trichlorofluoromethane	ND	6.2	1.2	ug/kg	
75-01-4	Vinyl chloride	ND	6.2	1.3	ug/kg	
	m,p-Xylene	ND	12	2.0	ug/kg	
95-47-6	o-Xylene	ND	6.2	1.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%		75-124%
2037-26-5	Toluene-D8	103%		75-126%
460-00-4	4-Bromofluorobenzene	115%		71-133%
17060-07-0	1,2-Dichloroethane-D4	111%		72-135%

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B-6 2-4		
Lab Sample ID:	FA21035-1	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
Method:	SW846 8270D SW846 3550C	**Percent Solids:**	74.0
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	X037754.D	1	01/06/15	MV	01/02/15	OP54465	SX1764
Run #2							

	Initial Weight	Final Volume
Run #1	29.9 g	1.0 ml
Run #2		

ABN TCL (SOM01.1) List

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	230	23	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	230	23	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	230	23	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	230	25	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	1100	230	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	450	90	ug/kg	
95-48-7	2-Methylphenol	ND	230	23	ug/kg	
	3&4-Methylphenol	ND	230	45	ug/kg	
88-75-5	2-Nitrophenol	ND	230	23	ug/kg	
100-02-7	4-Nitrophenol	ND	1100	180	ug/kg	
87-86-5	Pentachlorophenol	ND	1100	180	ug/kg	
108-95-2	Phenol	ND	230	23	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	230	23	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	230	29	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	230	23	ug/kg	
83-32-9	Acenaphthene	ND	230	29	ug/kg	
208-96-8	Acenaphthylene	ND	230	23	ug/kg	
98-86-2	Acetophenone	ND	230	23	ug/kg	
120-12-7	Anthracene	ND	230	23	ug/kg	
1912-24-9	Atrazine	ND	230	23	ug/kg	
100-52-7	Benzaldehyde	ND	1100	230	ug/kg	
56-55-3	Benzo(a)anthracene	ND	230	23	ug/kg	
50-32-8	Benzo(a)pyrene	ND	230	23	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	230	23	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	230	23	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	230	25	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	230	23	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	230	45	ug/kg	
92-52-4	1,1'-Biphenyl	ND	230	23	ug/kg	
105-60-2	Caprolactam	ND	230	24	ug/kg	
91-58-7	2-Chloronaphthalene	ND	230	27	ug/kg	
106-47-8	4-Chloroaniline	ND	230	23	ug/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B-6 2-4		
Lab Sample ID:	FA21035-1	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
Method:	SW846 8270D SW846 3550C	**Percent Solids:**	74.0
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

ABN TCL (SOM01.1) List

CAS No.	Compound	Result	RL	MDL	Units	Q
86-74-8	Carbazole	ND	230	23	ug/kg	
218-01-9	Chrysene	ND	230	23	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	230	23	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	230	23	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	230	24	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	230	34	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	26	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	25	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	230	23	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	230	23	ug/kg	
132-64-9	Dibenzofuran	ND	230	23	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	450	45	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	230	45	ug/kg	
84-66-2	Diethyl phthalate	ND	450	45	ug/kg	
131-11-3	Dimethyl phthalate	ND	230	45	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	450	45	ug/kg	
206-44-0	Fluoranthene	ND	230	23	ug/kg	
86-73-7	Fluorene	ND	230	23	ug/kg	
118-74-1	Hexachlorobenzene	ND	230	23	ug/kg	
87-68-3	Hexachlorobutadiene	ND	230	23	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	230	23	ug/kg	
67-72-1	Hexachloroethane	ND	230	23	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	230	23	ug/kg	
78-59-1	Isophorone	ND	230	23	ug/kg	
91-57-6	2-Methylnaphthalene	ND	230	23	ug/kg	
88-74-4	2-Nitroaniline	ND	230	45	ug/kg	
99-09-2	3-Nitroaniline	ND	230	45	ug/kg	
100-01-6	4-Nitroaniline	ND	230	45	ug/kg	
91-20-3	Naphthalene	ND	230	23	ug/kg	
98-95-3	Nitrobenzene	ND	230	23	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	230	23	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	230	23	ug/kg	
85-01-8	Phenanthrene	ND	230	23	ug/kg	
129-00-0	Pyrene	ND	230	23	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	230	23	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	53%		40-102%
4165-62-2	Phenol-d5	61%		41-100%

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B-6 2-4		
Lab Sample ID:	FA21035-1	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
Method:	SW846 8270D SW846 3550C	**Percent Solids:**	74.0
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

ABN TCL (SOM01.1) List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
118-79-6	2,4,6-Tribromophenol	55%		42-108%
4165-60-0	Nitrobenzene-d5	55%		40-105%
321-60-8	2-Fluorobiphenyl	56%		43-107%
1718-51-0	Terphenyl-d14	78%		45-119%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B-6 2-4		
Lab Sample ID:	FA21035-1	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
		Percent Solids:	74.0
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Antimony	0.12 U	1.2	0.12	mg/kg	1	01/07/15	01/07/15	LM	SW846 6010C [2]	SW846 3050B [4]
Arsenic	31.4	0.60	0.12	mg/kg	1	01/07/15	01/07/15	LM	SW846 6010C [2]	SW846 3050B [4]
Beryllium	0.34	0.30	0.030	mg/kg	1	01/07/15	01/07/15	LM	SW846 6010C [2]	SW846 3050B [4]
Cadmium	0.030 U	0.24	0.030	mg/kg	1	01/07/15	01/07/15	LM	SW846 6010C [2]	SW846 3050B [4]
Chromium	17.8	0.60	0.060	mg/kg	1	01/07/15	01/07/15	LM	SW846 6010C [2]	SW846 3050B [4]
Copper	29.9	1.5	0.060	mg/kg	1	01/07/15	01/07/15	LM	SW846 6010C [2]	SW846 3050B [4]
Iron	26500	18	1.5	mg/kg	1	01/07/15	01/07/15	LM	SW846 6010C [2]	SW846 3050B [4]
Lead	12.9	1.2	0.097	mg/kg	1	01/07/15	01/07/15	LM	SW846 6010C [2]	SW846 3050B [4]
Manganese	254	0.90	0.030	mg/kg	1	01/07/15	01/07/15	LM	SW846 6010C [2]	SW846 3050B [4]
Mercury	0.055	0.051	0.0051	mg/kg	1	01/02/15	01/02/15	JL	SW846 7471B [1]	SW846 7471B [3]
Nickel	7.6	2.4	0.030	mg/kg	1	01/07/15	01/07/15	LM	SW846 6010C [2]	SW846 3050B [4]
Selenium	1.2	1.2	0.18	mg/kg	1	01/07/15	01/07/15	LM	SW846 6010C [2]	SW846 3050B [4]
Silver	0.30 J	0.60	0.039	mg/kg	1	01/07/15	01/07/15	LM	SW846 6010C [2]	SW846 3050B [4]
Thallium	0.090 U	0.60	0.090	mg/kg	1	01/07/15	01/07/15	LM	SW846 6010C [2]	SW846 3050B [4]
Zinc	22.5	1.2	0.18	mg/kg	1	01/07/15	01/07/15	LM	SW846 6010C [2]	SW846 3050B [4]

(1) Instrument QC Batch: MA12138
(2) Instrument QC Batch: MA12148
(3) Prep QC Batch: MP28410
(4) Prep QC Batch: MP28425

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID:	B-6 2-4		
Lab Sample ID:	FA21035-1	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
		Percent Solids:	74.0
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Nitrogen, Ammonia	16.1	1.6	0.35	mg/kg	1	01/06/15 15:09	JC	EPA 350.1 M
Nitrogen, Nitrate	0.68 U	1.4	0.68	mg/kg	1	12/29/14 18:44	VK	EPA 300/SW846 9056A
Solids, Percent	74			%	1	12/26/14 16:22	TF	SM19 2540G
Sulfate	23.1 J	27	8.1	mg/kg	1	12/29/14 18:44	VK	EPA 300/SW846 9056A

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID:	B-7 4-6		
Lab Sample ID:	FA21035-2	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
Method:	SW846 8260B	**Percent Solids:**	82.4
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Y17823.D	1	12/26/14	AD	n/a	n/a	VY781
Run #2							

	Initial Weight
Run #1	4.60 g
Run #2	

VOA TCL (SOM01.1) List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	66	20	ug/kg	
71-43-2	Benzene	ND	6.6	1.3	ug/kg	
74-97-5	Bromochloromethane	ND	6.6	2.5	ug/kg	
75-27-4	Bromodichloromethane	ND	6.6	1.3	ug/kg	
75-25-2	Bromoform	ND	6.6	1.4	ug/kg	
108-90-7	Chlorobenzene	ND	6.6	1.3	ug/kg	
75-00-3	Chloroethane	ND	6.6	3.0	ug/kg	
67-66-3	Chloroform	ND	6.6	1.5	ug/kg	
75-15-0	Carbon disulfide	ND	6.6	1.3	ug/kg	
56-23-5	Carbon tetrachloride	ND	6.6	1.8	ug/kg	
110-82-7	Cyclohexane	ND	6.6	1.4	ug/kg	
75-34-3	1,1-Dichloroethane	ND	6.6	1.3	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	6.6	1.3	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	6.6	2.8	ug/kg	
106-93-4	1,2-Dibromoethane	ND	6.6	2.4	ug/kg	
107-06-2	1,2-Dichloroethane	ND	6.6	1.3	ug/kg	
78-87-5	1,2-Dichloropropane	ND	6.6	1.3	ug/kg	
123-91-1	1,4-Dioxane	ND	260	70	ug/kg	
124-48-1	Dibromochloromethane	ND	6.6	1.3	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	6.6	1.7	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	6.6	1.3	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	6.6	1.3	ug/kg	
541-73-1	m-Dichlorobenzene	ND	6.6	1.3	ug/kg	
95-50-1	o-Dichlorobenzene	ND	6.6	1.3	ug/kg	
106-46-7	p-Dichlorobenzene	ND	6.6	1.5	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	6.6	1.8	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	6.6	1.3	ug/kg	
100-41-4	Ethylbenzene	ND	6.6	1.3	ug/kg	
76-13-1	Freon 113	ND	6.6	1.7	ug/kg	
591-78-6	2-Hexanone	ND	33	6.5	ug/kg	
98-82-8	Isopropylbenzene	ND	6.6	1.3	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	33	6.6	ug/kg	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B-7 4-6		
Lab Sample ID:	FA21035-2	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
Method:	SW846 8260B	**Percent Solids:**	82.4
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

VOA TCL (SOM01.1) List

CAS No.	Compound	Result	RL	MDL	Units	Q
79-20-9	Methyl acetate	ND	33	6.6	ug/kg	
74-83-9	Methyl bromide	ND	6.6	2.5	ug/kg	
74-87-3	Methyl chloride	ND	6.6	2.6	ug/kg	
108-87-2	Methylcyclohexane	ND	6.6	1.3	ug/kg	
75-09-2	Methylene chloride	ND	13	5.3	ug/kg	
78-93-3	Methyl ethyl ketone	ND	33	9.9	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	6.6	1.3	ug/kg	
100-42-5	Styrene	ND	6.6	1.3	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	6.6	1.3	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.6	1.9	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	6.6	2.1	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	6.6	1.6	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	6.6	1.5	ug/kg	
127-18-4	Tetrachloroethylene	ND	6.6	1.7	ug/kg	
108-88-3	Toluene	ND	6.6	1.3	ug/kg	
79-01-6	Trichloroethylene	ND	6.6	1.3	ug/kg	
75-69-4	Trichlorofluoromethane	ND	6.6	1.3	ug/kg	
75-01-4	Vinyl chloride	ND	6.6	1.3	ug/kg	
	m,p-Xylene	ND	13	2.1	ug/kg	
95-47-6	o-Xylene	ND	6.6	1.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		75-124%
2037-26-5	Toluene-D8	105%		75-126%
460-00-4	4-Bromofluorobenzene	113%		71-133%
17060-07-0	1,2-Dichloroethane-D4	114%		72-135%

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B-7 4-6		
Lab Sample ID:	FA21035-2	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
Method:	SW846 8270D SW846 3550C	**Percent Solids:**	82.4
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	X037755.D	1	01/06/15	MV	01/02/15	OP54465	SX1764
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

ABN TCL (SOM01.1) List

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	200	20	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	200	20	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	200	21	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	200	22	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	1000	200	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	400	80	ug/kg	
95-48-7	2-Methylphenol	ND	200	20	ug/kg	
	3&4-Methylphenol	ND	200	40	ug/kg	
88-75-5	2-Nitrophenol	ND	200	20	ug/kg	
100-02-7	4-Nitrophenol	ND	1000	160	ug/kg	
87-86-5	Pentachlorophenol	ND	1000	160	ug/kg	
108-95-2	Phenol	ND	200	20	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	200	20	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	200	26	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	200	20	ug/kg	
83-32-9	Acenaphthene	ND	200	25	ug/kg	
208-96-8	Acenaphthylene	ND	200	20	ug/kg	
98-86-2	Acetophenone	ND	200	20	ug/kg	
120-12-7	Anthracene	ND	200	20	ug/kg	
1912-24-9	Atrazine	ND	200	20	ug/kg	
100-52-7	Benzaldehyde	ND	1000	200	ug/kg	
56-55-3	Benzo(a)anthracene	ND	200	20	ug/kg	
50-32-8	Benzo(a)pyrene	ND	200	20	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	200	20	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	200	20	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	200	22	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	200	20	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	200	40	ug/kg	
92-52-4	1,1'-Biphenyl	ND	200	20	ug/kg	
105-60-2	Caprolactam	ND	200	21	ug/kg	
91-58-7	2-Chloronaphthalene	ND	200	24	ug/kg	
106-47-8	4-Chloroaniline	ND	200	20	ug/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B-7 4-6		
Lab Sample ID:	FA21035-2	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
Method:	SW846 8270D SW846 3550C	**Percent Solids:**	82.4
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

ABN TCL (SOM01.1) List

CAS No.	Compound	Result	RL	MDL	Units	Q
86-74-8	Carbazole	ND	200	20	ug/kg	
218-01-9	Chrysene	ND	200	20	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	200	20	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	200	20	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	200	21	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	200	30	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	23	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	22	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	200	20	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	200	20	ug/kg	
132-64-9	Dibenzofuran	ND	200	20	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	400	40	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	200	40	ug/kg	
84-66-2	Diethyl phthalate	ND	400	40	ug/kg	
131-11-3	Dimethyl phthalate	ND	200	40	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	400	40	ug/kg	
206-44-0	Fluoranthene	ND	200	20	ug/kg	
86-73-7	Fluorene	ND	200	20	ug/kg	
118-74-1	Hexachlorobenzene	ND	200	20	ug/kg	
87-68-3	Hexachlorobutadiene	ND	200	20	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	200	20	ug/kg	
67-72-1	Hexachloroethane	ND	200	20	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	200	20	ug/kg	
78-59-1	Isophorone	ND	200	20	ug/kg	
91-57-6	2-Methylnaphthalene	ND	200	20	ug/kg	
88-74-4	2-Nitroaniline	ND	200	40	ug/kg	
99-09-2	3-Nitroaniline	ND	200	40	ug/kg	
100-01-6	4-Nitroaniline	ND	200	40	ug/kg	
91-20-3	Naphthalene	ND	200	20	ug/kg	
98-95-3	Nitrobenzene	ND	200	20	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	200	20	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	200	20	ug/kg	
85-01-8	Phenanthrene	ND	200	20	ug/kg	
129-00-0	Pyrene	ND	200	20	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	200	20	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	64%		40-102%
4165-62-2	Phenol-d5	73%		41-100%

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B-7 4-6		
Lab Sample ID:	FA21035-2	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
Method:	SW846 8270D SW846 3550C	**Percent Solids:**	82.4
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

ABN TCL (SOM01.1) List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
118-79-6	2,4,6-Tribromophenol	64%		42-108%
4165-60-0	Nitrobenzene-d5	64%		40-105%
321-60-8	2-Fluorobiphenyl	65%		43-107%
1718-51-0	Terphenyl-d14	82%		45-119%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B-7 4-6		
Lab Sample ID:	FA21035-2	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
		Percent Solids:	82.4
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Antimony [a]	0.23 U	2.3	0.23	mg/kg	2	01/07/15	01/08/15	LM	SW846 6010C [3]	SW846 3050B [5]
Arsenic [a]	29.0	1.1	0.23	mg/kg	2	01/07/15	01/08/15	LM	SW846 6010C [3]	SW846 3050B [5]
Beryllium	0.24 J	0.28	0.028	mg/kg	1	01/07/15	01/07/15	LM	SW846 6010C [2]	SW846 3050B [5]
Cadmium [a]	0.057 U	0.45	0.057	mg/kg	2	01/07/15	01/08/15	LM	SW846 6010C [3]	SW846 3050B [5]
Chromium [a]	35.1	1.1	0.11	mg/kg	2	01/07/15	01/08/15	LM	SW846 6010C [3]	SW846 3050B [5]
Copper [a]	34.9	2.8	0.11	mg/kg	2	01/07/15	01/08/15	LM	SW846 6010C [3]	SW846 3050B [5]
Iron	43800	34	2.8	mg/kg	2	01/07/15	01/08/15	LM	SW846 6010C [3]	SW846 3050B [5]
Lead [a]	12.5	2.3	0.18	mg/kg	2	01/07/15	01/08/15	LM	SW846 6010C [3]	SW846 3050B [5]
Manganese [a]	132	1.7	0.057	mg/kg	2	01/07/15	01/08/15	LM	SW846 6010C [3]	SW846 3050B [5]
Mercury	0.054	0.047	0.0047	mg/kg	1	01/02/15	01/02/15	JL	SW846 7471B [1]	SW846 7471B [4]
Nickel [a]	5.7	4.5	0.057	mg/kg	2	01/07/15	01/08/15	LM	SW846 6010C [3]	SW846 3050B [5]
Selenium [a]	1.5 J	2.3	0.34	mg/kg	2	01/07/15	01/08/15	LM	SW846 6010C [3]	SW846 3050B [5]
Silver [a]	0.074 U	1.1	0.074	mg/kg	2	01/07/15	01/08/15	LM	SW846 6010C [3]	SW846 3050B [5]
Thallium [a]	0.17 U	1.1	0.17	mg/kg	2	01/07/15	01/08/15	LM	SW846 6010C [3]	SW846 3050B [5]
Zinc [a]	16.9	2.3	0.34	mg/kg	2	01/07/15	01/08/15	LM	SW846 6010C [3]	SW846 3050B [5]

(1) Instrument QC Batch: MA12138
(2) Instrument QC Batch: MA12148
(3) Instrument QC Batch: MA12150
(4) Prep QC Batch: MP28410
(5) Prep QC Batch: MP28425

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID:	B-7 4-6		
Lab Sample ID:	FA21035-2	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
		Percent Solids:	82.4
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Nitrogen, Ammonia	11.5	1.4	0.30	mg/kg	1	01/06/15 15:08	JC	EPA 350.1 M
Nitrogen, Nitrate	0.61 U	1.2	0.61	mg/kg	1	12/29/14 19:01	VK	EPA 300/SW846 9056A
Solids, Percent	82.4			%	1	12/26/14 16:22	TF	SM19 2540G
Sulfate	7.3 U	24	7.3	mg/kg	1	12/29/14 19:01	VK	EPA 300/SW846 9056A

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID:	B-8 4-6		
Lab Sample ID:	FA21035-3	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
Method:	SW846 8260B	**Percent Solids:**	92.6
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Y17824.D	1	12/26/14	AD	n/a	n/a	VY781
Run #2							

	Initial Weight
Run #1	5.38 g
Run #2	

VOA TCL (SOM01.1) List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	50	15	ug/kg	
71-43-2	Benzene	ND	5.0	1.0	ug/kg	
74-97-5	Bromochloromethane	ND	5.0	1.9	ug/kg	
75-27-4	Bromodichloromethane	ND	5.0	1.0	ug/kg	
75-25-2	Bromoform	ND	5.0	1.1	ug/kg	
108-90-7	Chlorobenzene	ND	5.0	1.0	ug/kg	
75-00-3	Chloroethane	ND	5.0	2.3	ug/kg	
67-66-3	Chloroform	ND	5.0	1.1	ug/kg	
75-15-0	Carbon disulfide	ND	5.0	1.0	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.0	1.4	ug/kg	
110-82-7	Cyclohexane	ND	5.0	1.1	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.0	1.0	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.0	1.0	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	5.0	2.1	ug/kg	
106-93-4	1,2-Dibromoethane	ND	5.0	1.8	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.0	1.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.0	1.0	ug/kg	
123-91-1	1,4-Dioxane	ND	200	53	ug/kg	
124-48-1	Dibromochloromethane	ND	5.0	1.0	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	5.0	1.3	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.0	1.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	1.0	ug/kg	
541-73-1	m-Dichlorobenzene	ND	5.0	1.0	ug/kg	
95-50-1	o-Dichlorobenzene	ND	5.0	1.0	ug/kg	
106-46-7	p-Dichlorobenzene	ND	5.0	1.1	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.0	1.3	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	1.0	ug/kg	
100-41-4	Ethylbenzene	ND	5.0	1.0	ug/kg	
76-13-1	Freon 113	ND	5.0	1.3	ug/kg	
591-78-6	2-Hexanone	ND	25	4.9	ug/kg	
98-82-8	Isopropylbenzene	ND	5.0	1.0	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	25	5.0	ug/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B-8 4-6		
Lab Sample ID:	FA21035-3	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
Method:	SW846 8260B	**Percent Solids:**	92.6
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

VOA TCL (SOM01.1) List

CAS No.	Compound	Result	RL	MDL	Units	Q
79-20-9	Methyl acetate	ND	25	5.0	ug/kg	
74-83-9	Methyl bromide	ND	5.0	1.9	ug/kg	
74-87-3	Methyl chloride	ND	5.0	2.0	ug/kg	
108-87-2	Methylcyclohexane	ND	5.0	1.0	ug/kg	
75-09-2	Methylene chloride	ND	10	4.0	ug/kg	
78-93-3	Methyl ethyl ketone	ND	25	7.5	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	5.0	1.0	ug/kg	
100-42-5	Styrene	ND	5.0	1.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.0	1.0	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	1.4	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.0	1.6	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	5.0	1.2	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	1.2	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.0	1.3	ug/kg	
108-88-3	Toluene	ND	5.0	1.0	ug/kg	
79-01-6	Trichloroethylene	ND	5.0	1.0	ug/kg	
75-69-4	Trichlorofluoromethane	ND	5.0	1.0	ug/kg	
75-01-4	Vinyl chloride	ND	5.0	1.0	ug/kg	
	m,p-Xylene	ND	10	1.6	ug/kg	
95-47-6	o-Xylene	ND	5.0	1.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		75-124%
2037-26-5	Toluene-D8	98%		75-126%
460-00-4	4-Bromofluorobenzene	110%		71-133%
17060-07-0	1,2-Dichloroethane-D4	116%		72-135%

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Report of Analysis

Client Sample ID:	B-8 4-6		
Lab Sample ID:	FA21035-3	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
Method:	SW846 8270D SW846 3550C	**Percent Solids:**	92.6
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	X037756.D	1	01/06/15	MV	01/02/15	OP54465	SX1764
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

ABN TCL (SOM01.1) List

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	180	18	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	18	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	18	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	20	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	890	180	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	360	72	ug/kg	
95-48-7	2-Methylphenol	ND	180	18	ug/kg	
	3&4-Methylphenol	ND	180	36	ug/kg	
88-75-5	2-Nitrophenol	ND	180	18	ug/kg	
100-02-7	4-Nitrophenol	ND	890	140	ug/kg	
87-86-5	Pentachlorophenol	ND	890	140	ug/kg	
108-95-2	Phenol	ND	180	18	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	180	18	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	23	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	18	ug/kg	
83-32-9	Acenaphthene	ND	180	23	ug/kg	
208-96-8	Acenaphthylene	ND	180	18	ug/kg	
98-86-2	Acetophenone	ND	180	18	ug/kg	
120-12-7	Anthracene	ND	180	18	ug/kg	
1912-24-9	Atrazine	ND	180	18	ug/kg	
100-52-7	Benzaldehyde	ND	890	180	ug/kg	
56-55-3	Benzo(a)anthracene	ND	180	18	ug/kg	
50-32-8	Benzo(a)pyrene	ND	180	18	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	180	18	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	180	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	180	19	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	180	18	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	180	36	ug/kg	
92-52-4	1,1'-Biphenyl	ND	180	18	ug/kg	
105-60-2	Caprolactam	23.0	180	19	ug/kg	J
91-58-7	2-Chloronaphthalene	ND	180	21	ug/kg	
106-47-8	4-Chloroaniline	ND	180	18	ug/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B-8 4-6		
Lab Sample ID:	FA21035-3	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
Method:	SW846 8270D SW846 3550C	**Percent Solids:**	92.6
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

ABN TCL (SOM01.1) List

CAS No.	Compound	Result	RL	MDL	Units	Q
86-74-8	Carbazole	ND	180	18	ug/kg	
218-01-9	Chrysene	ND	180	18	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	180	18	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	180	18	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	180	19	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	180	27	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	180	20	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	180	20	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	180	18	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	180	18	ug/kg	
132-64-9	Dibenzofuran	ND	180	18	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	360	36	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	180	36	ug/kg	
84-66-2	Diethyl phthalate	ND	360	36	ug/kg	
131-11-3	Dimethyl phthalate	ND	180	36	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	360	36	ug/kg	
206-44-0	Fluoranthene	ND	180	18	ug/kg	
86-73-7	Fluorene	ND	180	18	ug/kg	
118-74-1	Hexachlorobenzene	ND	180	18	ug/kg	
87-68-3	Hexachlorobutadiene	ND	180	18	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	180	18	ug/kg	
67-72-1	Hexachloroethane	ND	180	18	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	180	18	ug/kg	
78-59-1	Isophorone	ND	180	18	ug/kg	
91-57-6	2-Methylnaphthalene	ND	180	18	ug/kg	
88-74-4	2-Nitroaniline	ND	180	36	ug/kg	
99-09-2	3-Nitroaniline	ND	180	36	ug/kg	
100-01-6	4-Nitroaniline	ND	180	36	ug/kg	
91-20-3	Naphthalene	ND	180	18	ug/kg	
98-95-3	Nitrobenzene	ND	180	18	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	180	18	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	18	ug/kg	
85-01-8	Phenanthrene	ND	180	18	ug/kg	
129-00-0	Pyrene	ND	180	18	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	180	18	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	64%		40-102%
4165-62-2	Phenol-d5	73%		41-100%

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B-8 4-6		
Lab Sample ID:	FA21035-3	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
Method:	SW846 8270D SW846 3550C	**Percent Solids:**	92.6
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

ABN TCL (SOM01.1) List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
118-79-6	2,4,6-Tribromophenol	64%		42-108%
4165-60-0	Nitrobenzene-d5	65%		40-105%
321-60-8	2-Fluorobiphenyl	67%		43-107%
1718-51-0	Terphenyl-d14	86%		45-119%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B-8 4-6		
Lab Sample ID:	FA21035-3	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
		Percent Solids:	92.6
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Antimony [a]	1.0 U	10	1.0	mg/kg	10	01/07/15	01/08/15	LM	SW846 6010C [2]	SW846 3050B [4]
Arsenic [a]	21.5	5.2	1.0	mg/kg	10	01/07/15	01/08/15	LM	SW846 6010C [2]	SW846 3050B [4]
Beryllium [a]	0.26 U	2.6	0.26	mg/kg	10	01/07/15	01/08/15	LM	SW846 6010C [2]	SW846 3050B [4]
Cadmium [a]	0.26 U	2.1	0.26	mg/kg	10	01/07/15	01/08/15	LM	SW846 6010C [2]	SW846 3050B [4]
Chromium [a]	92.2	5.2	0.52	mg/kg	10	01/07/15	01/08/15	LM	SW846 6010C [2]	SW846 3050B [4]
Copper [a]	39.1	13	0.52	mg/kg	10	01/07/15	01/08/15	LM	SW846 6010C [2]	SW846 3050B [4]
Iron [a]	44400	160	13	mg/kg	10	01/07/15	01/08/15	LM	SW846 6010C [2]	SW846 3050B [4]
Lead [a]	7.9 J	10	0.84	mg/kg	10	01/07/15	01/08/15	LM	SW846 6010C [2]	SW846 3050B [4]
Manganese [a]	482	7.9	0.26	mg/kg	10	01/07/15	01/08/15	LM	SW846 6010C [2]	SW846 3050B [4]
Mercury	0.011 J	0.042	0.0042	mg/kg	1	01/02/15	01/02/15	JL	SW846 7471B [1]	SW846 7471B [3]
Nickel [a]	69.3	21	0.26	mg/kg	10	01/07/15	01/08/15	LM	SW846 6010C [2]	SW846 3050B [4]
Selenium [a]	1.6 U	10	1.6	mg/kg	10	01/07/15	01/08/15	LM	SW846 6010C [2]	SW846 3050B [4]
Silver [a]	0.34 U	5.2	0.34	mg/kg	10	01/07/15	01/08/15	LM	SW846 6010C [2]	SW846 3050B [4]
Thallium [a]	0.79 U	5.2	0.79	mg/kg	10	01/07/15	01/08/15	LM	SW846 6010C [2]	SW846 3050B [4]
Zinc [a]	72.6	10	1.6	mg/kg	10	01/07/15	01/08/15	LM	SW846 6010C [2]	SW846 3050B [4]

(1) Instrument QC Batch: MA12138
(2) Instrument QC Batch: MA12150
(3) Prep QC Batch: MP28410
(4) Prep QC Batch: MP28425

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID:	B-8 4-6		
Lab Sample ID:	FA21035-3	**Date Sampled:**	12/23/14
Matrix:	SO - Soil	**Date Received:**	12/24/14
		Percent Solids:	92.6
Project:	OWASA; Rodgers Rd, Chapel Hill, NC		

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Nitrogen, Ammonia	1.9	1.2	0.26	mg/kg	1	01/06/15 15:10	JC	EPA 350.1 M
Nitrogen, Nitrate	0.54 U	1.1	0.54	mg/kg	1	12/29/14 19:18	VK	EPA 300/SW846 9056A
Solids, Percent	92.6			%	1	12/26/14 16:22	TF	SM19 2540G
Sulfate	15.9 J	22	6.5	mg/kg	1	12/29/14 19:18	VK	EPA 300/SW846 9056A

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Southeast ACCUTEST LABORATORIES

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody
- Analyst Legend

Accutest Laboratories Southeast
Chain of Custody

ACCUTEST LABORATORIES

4405 Vineland Road, Suite C-15 Orlando, Fl 32811
TEL. 407-425-6700 • FAX: 407-425-0707
www.accutest.com

FA21035

Accutest JOB # PAGE 1 OF 1

Accutest Quote # SKIFF#

Client / Reporting Information

Company Name URS
Address 1600 PERIMETER PARK DR
City MORRISVILLE State NC Zip 27560
Project Contact COREY SCHEIF E-mail
Phone# 919 461 1100
Sampler(s) Name(s) (Printed) COREY SCHEIF

Project Information

Project Name BWARSA ROGERS ROAD
Street
City CHAPEL HILL State NC
Project #
Fax #
Client Purchase Order #

Analytical Information

Accutest Sample #	Field ID / Point of Collection	Date	Time	Sampled By:	Matrix	Total # of Bottles	Other	None	HCl	NaOH	HNO3	H2SO4	NaOH+ZnAc	DI Water	MeOH	TCLP VOC/SVOC	METALS	Hg	AMMONIA	SULFATE/NITRATE	% SOLIDS						Matrix Codes / LAB USE ONLY
1	B-6 2-4	11/23	1100	CS	S	5		2						2	1	X	X	X	X	X	X						
2	B-7 4-6	11/23	1120	↓	↓	↓		2						2	1	↓	↓	↓	↓	↓	↓						
3	B-8 4-6	11/22	1500	↓	↓	↓		2						2	1	↓	↓	↓	↓	↓	↓						

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL - Sludge; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe

TURNAROUND TIME (Business Days) — Approved By: / Rush Code

- [x] 10 Days Standard
- [ ] 7 Day RUSH
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY
- [ ] OTHER

Emergency or Rush T/A Data Available VIA Email or Lablink

Data Deliverable Information

- [ ] COMMERCIAL "A" (RESULTS ONLY)
- [ ] COMMERCIAL "B" (RESULTS PLUS QC)
- [ ] REDT1 (EPA LEVEL 3)
- [ ] FULT1 (EPA LEVEL 4)
- [ ] EDD'S

Comments / Remarks

COPY MARTHA.MEYERS-LEE@URS.COM ON ALL DELIVERABLES

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished by:	Date Time:	Received By:
1	12/23/14 1230	2 FX	3 FX	11/24/14 11:30	4 ALSE
Relinquished by: 5	Date Time:	Received By: 6	Relinquished by: 7	Date Time:	Received By: 8

Lab Use Only: Custody Seal in Place: Y N Temp Blank Provided: Y N Preserved where Applicable: Y N Total # of Coolers: Cooler Temperature (s) Celsius: 2.4

5.1 5

FA21035: Chain of Custody
Page 1 of 3

ACCUTEST LABORATORIES SAMPLE RECEIPT CONFIRMATION

ACCUTEST'S JOB NUMBER: FA21035 CLIENT: URS CORP. PROJECT: BWASA ROGERS RD

DATE/TIME RECEIVED: 12/24/14 11:30 {MM/DD/YY 24:00} NUMBER OF COOLERS RECEIVED: 1

METHOD OF DELIVERY: (FEDEX) UPS ACCUTEST COURIER DELIVERY OTHER:

AIRBILL NUMBERS: 7723 7630 2870

COOLER INFORMATION

- [ ] CUSTODY SEAL NOT PRESENT OR NOT INTACT
- [ ] CHAIN OF CUSTODY NOT RECEIVED (COC)
- [ ] ANALYSIS REQUESTED IS UNCLEAR OR MISSING
- [ ] SAMPLE DATES OR TIMES UNCLEAR OR MISSING
- [ ] TEMPERATURE CRITERIA NOT MET

TEMPERATURE INFORMATION

- [ ] IR THERM ID #3 CORR. FACTOR -0.2
- [ ] OBSERVED TEMPS: 2.6
- [ ] CORRECTED TEMPS: 2.4

TRIP BLANK INFORMATION

- [X] TRIP BLANK PROVIDED
- [ ] TRIP BLANK NOT PROVIDED
- [X] TRIP BLANK NOT ON COC
- [X] TRIP BLANK INTACT
- [ ] TRIP BLANK NOT INTACT
- [ ] RECEIVED WATER TRIP BLANK
- [X] RECEIVED SOIL TRIP BLANK

SAMPLE INFORMATION

- [ ] INCORRECT NUMBER OF CONTAINERS USED
- [ ] SAMPLE RECEIVED IMPROPERLY PRESERVED
- [ ] INSUFFICIENT VOLUME FOR ANALYSIS
- [ ] DATES/TIMES ON COC DO NOT MATCH SAMPLE LABEL
- [ ] ID'S ON COC DO NOT MATCH LABEL
- [ ] VOC VIALS HAVE HEADSPACE (MACRO BUBBLES)
- [ ] BOTTLES RECEIVED BUT ANALYSIS NOT REQUESTED
- [ ] NO BOTTLES RECEIVED FOR ANALYSIS REQUESTED
- [ ] UNCLEAR FILTERING OR COMPOSITING INSTRUCTIONS
- [ ] SAMPLE CONTAINER(S) RECEIVED BROKEN
- [ ] 5035 FIELD KITS NOT RECEIVED WITHIN 48 HOURS
- [ ] BULK VOA SOIL JARS NOT RECEIVED WITHIN 48 HOURS
- [ ] % SOLIDS JAR NOT RECEIVED
- [ ] RESIDUAL CHLORINE PRESENT LOT#

{APPLICABLE TO EPA 600 SERIES OR NORTH CAROLINA ORGANICS}

MISC. INFORMATION

NUMBER OF ENCORES ? 25-GRAM 5-GRAM

NUMBER OF 5035 FIELD KITS ? 3+TB

NUMBER OF LAB FILTERED METALS ?

pH PAPER LOT#s WIDE RANGE A036122 NARROW RANGE HC421754 OTHER (specify) 405-230010

SUMMARY OF COMMENTS:

TECHNICIAN SIGNATURE/DATE 12/24/14 REVIEWER SIGNATURE/DATE 12-24-14

NF 10/14 receipt confirmation 102914.xls

5.1 5

FA21035: Chain of Custody
Page 2 of 3

From: (407) 425-6700
Randy Sheilds
Accutest Labs Southeast
4405 Vineland Rd.
Suite C
ORLANDO, FL 32811

Origin ID: TIXA

FedEx Express

J142214092303uv

Ship Date: 23DEC14
ActWgt: 5.0 LB
CAD: 9855222/INET3550

Delivery Address Bar Code

SHIP TO: (407) 425-6700 BILL SENDER

Randy Shields
Accutest Labs Southeast
4405 VINELAND RD STE C15

ORLANDO, FL 32811

Ref #
Invoice #
PO #
Dept #

WED - 24 DEC 10:30A
PRIORITY OVERNIGHT

TRK# 0201 7723 7630 2870

33 TIXA

32811
FL-US
MCO

522G2/DC758A09

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

/templates/components/dotcom_label_contents/WarningsOriginalLabel/en/Folding_warning.html loading...
/templates/components/dotcom_label_contents/TnCDom/us/en/TC_dom.html loading...

Analyst Legend

Job Number: FA21035
Account: URSNCM URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Initials	Full Name	Analysis Type
AD	Angie Diaz	GC/MS Volatiles
MV	Martha Valls	GC/MS Semi-volatiles
JL	James Laureano	Metals Analysis
LM	Luis Mir	Metals Analysis
JC	Juan Cueto	General Chemistry
TF	Tatiana Fedotova	General Chemistry
VK	Vesna Kuzet	General Chemistry

Southeast ACCUTEST LABORATORIES

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: FA21035
Account: URSNCM URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VY781-MB	Y17819.D	1	12/26/14	AD	n/a	n/a	VY781

The QC reported here applies to the following samples: **Method:** SW846 8260B

FA21035-1, FA21035-2, FA21035-3

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	50	15	ug/kg	
71-43-2	Benzene	ND	5.0	1.0	ug/kg	
74-97-5	Bromochloromethane	ND	5.0	1.9	ug/kg	
75-27-4	Bromodichloromethane	ND	5.0	1.0	ug/kg	
75-25-2	Bromoform	ND	5.0	1.1	ug/kg	
108-90-7	Chlorobenzene	ND	5.0	1.0	ug/kg	
75-00-3	Chloroethane	ND	5.0	2.3	ug/kg	
67-66-3	Chloroform	ND	5.0	1.1	ug/kg	
75-15-0	Carbon disulfide	ND	5.0	1.0	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.0	1.4	ug/kg	
110-82-7	Cyclohexane	ND	5.0	1.1	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.0	1.0	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.0	1.0	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	5.0	2.1	ug/kg	
106-93-4	1,2-Dibromoethane	ND	5.0	1.8	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.0	1.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.0	1.0	ug/kg	
123-91-1	1,4-Dioxane	ND	200	53	ug/kg	
124-48-1	Dibromochloromethane	ND	5.0	1.0	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	5.0	1.3	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.0	1.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	1.0	ug/kg	
541-73-1	m-Dichlorobenzene	ND	5.0	1.0	ug/kg	
95-50-1	o-Dichlorobenzene	ND	5.0	1.0	ug/kg	
106-46-7	p-Dichlorobenzene	ND	5.0	1.1	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.0	1.3	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	1.0	ug/kg	
100-41-4	Ethylbenzene	ND	5.0	1.0	ug/kg	
76-13-1	Freon 113	ND	5.0	1.3	ug/kg	
591-78-6	2-Hexanone	ND	25	4.9	ug/kg	
98-82-8	Isopropylbenzene	ND	5.0	1.0	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	25	5.0	ug/kg	
79-20-9	Methyl acetate	ND	25	5.0	ug/kg	
74-83-9	Methyl bromide	ND	5.0	1.9	ug/kg	
74-87-3	Methyl chloride	ND	5.0	2.0	ug/kg	
108-87-2	Methylcyclohexane	ND	5.0	1.0	ug/kg	

Method Blank Summary

Job Number: FA21035
Account: URSNCM URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VY781-MB	Y17819.D	1	12/26/14	AD	n/a	n/a	VY781

The QC reported here applies to the following samples: **Method:** SW846 8260B

FA21035-1, FA21035-2, FA21035-3

CAS No.	Compound	Result	RL	MDL	Units	Q
75-09-2	Methylene chloride	ND	10	4.0	ug/kg	
78-93-3	Methyl ethyl ketone	ND	25	7.5	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	5.0	1.0	ug/kg	
100-42-5	Styrene	ND	5.0	1.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.0	1.0	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	1.4	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.0	1.6	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	5.0	1.2	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	1.2	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.0	1.3	ug/kg	
108-88-3	Toluene	ND	5.0	1.0	ug/kg	
79-01-6	Trichloroethylene	ND	5.0	1.0	ug/kg	
75-69-4	Trichlorofluoromethane	ND	5.0	1.0	ug/kg	
75-01-4	Vinyl chloride	ND	5.0	1.0	ug/kg	
	m,p-Xylene	ND	10	1.6	ug/kg	
95-47-6	o-Xylene	ND	5.0	1.1	ug/kg	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	106%	75-124%
2037-26-5	Toluene-D8	103%	75-126%
460-00-4	4-Bromofluorobenzene	111%	71-133%
17060-07-0	1,2-Dichloroethane-D4	110%	72-135%

Blank Spike Summary

Job Number: FA21035
Account: URSNCM URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VY781-BS	Y17818.D	1	12/26/14	AD	n/a	n/a	VY781

The QC reported here applies to the following samples: **Method:** SW846 8260B

FA21035-1, FA21035-2, FA21035-3

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
67-64-1	Acetone	250	214	86	61-152
71-43-2	Benzene	50	53.3	107	76-126
74-97-5	Bromochloromethane	50	52.9	106	77-120
75-27-4	Bromodichloromethane	50	54.4	109	74-130
75-25-2	Bromoform	50	53.7	107	76-127
108-90-7	Chlorobenzene	50	56.7	113	81-129
75-00-3	Chloroethane	50	59.1	118	68-133
67-66-3	Chloroform	50	54.3	109	72-123
75-15-0	Carbon disulfide	50	60.7	121	72-122
56-23-5	Carbon tetrachloride	50	58.0	116	78-133
110-82-7	Cyclohexane	50	51.7	103	73-126
75-34-3	1,1-Dichloroethane	50	52.5	105	73-125
75-35-4	1,1-Dichloroethylene	50	57.9	116	81-136
96-12-8	1,2-Dibromo-3-chloropropane	50	48.3	97	70-137
106-93-4	1,2-Dibromoethane	50	52.2	104	77-126
107-06-2	1,2-Dichloroethane	50	54.3	109	74-128
78-87-5	1,2-Dichloropropane	50	50.6	101	74-125
123-91-1	1,4-Dioxane	1000	933	93	56-152
124-48-1	Dibromochloromethane	50	55.3	111	76-127
75-71-8	Dichlorodifluoromethane	50	60.0	120	68-168
156-59-2	cis-1,2-Dichloroethylene	50	52.6	105	74-126
10061-01-5	cis-1,3-Dichloropropene	50	52.4	105	80-123
541-73-1	m-Dichlorobenzene	50	58.7	117	81-129
95-50-1	o-Dichlorobenzene	50	57.8	116	80-129
106-46-7	p-Dichlorobenzene	50	52.9	106	76-130
156-60-5	trans-1,2-Dichloroethylene	50	52.5	105	70-127
10061-02-6	trans-1,3-Dichloropropene	50	57.0	114	75-131
100-41-4	Ethylbenzene	50	55.0	110	77-123
76-13-1	Freon 113	50	53.1	106	71-129
591-78-6	2-Hexanone	250	212	85	72-133
98-82-8	Isopropylbenzene	50	60.4	121	80-136
108-10-1	4-Methyl-2-pentanone	250	224	90	76-132
79-20-9	Methyl acetate	250	266	106	67-137
74-83-9	Methyl bromide	50	61.2	122	65-139
74-87-3	Methyl chloride	50	51.6	103	71-144
108-87-2	Methylcyclohexane	50	57.2	114	75-128

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA21035
Account: URSNCM URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VY781-BS	Y17818.D	1	12/26/14	AD	n/a	n/a	VY781

The QC reported here applies to the following samples: **Method:** SW846 8260B

FA21035-1, FA21035-2, FA21035-3

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
75-09-2	Methylene chloride	50	51.8	104	74-137
78-93-3	Methyl ethyl ketone	250	212	85	75-137
1634-04-4	Methyl Tert Butyl Ether	50	50.8	102	77-120
100-42-5	Styrene	50	55.5	111	78-125
71-55-6	1,1,1-Trichloroethane	50	55.1	110	70-129
79-34-5	1,1,2,2-Tetrachloroethane	50	48.7	97	71-126
79-00-5	1,1,2-Trichloroethane	50	48.7	97	74-124
87-61-6	1,2,3-Trichlorobenzene	50	53.2	106	77-128
120-82-1	1,2,4-Trichlorobenzene	50	55.4	111	78-130
127-18-4	Tetrachloroethylene	50	57.8	116	79-130
108-88-3	Toluene	50	53.0	106	76-124
79-01-6	Trichloroethylene	50	53.0	106	75-128
75-69-4	Trichlorofluoromethane	50	63.8	128	73-145
75-01-4	Vinyl chloride	50	56.4	113	76-141
	m,p-Xylene	100	114	114	80-128
95-47-6	o-Xylene	50	57.7	115	80-132

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	107%	75-124%
2037-26-5	Toluene-D8	104%	75-126%
460-00-4	4-Bromofluorobenzene	103%	71-133%
17060-07-0	1,2-Dichloroethane-D4	103%	72-135%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA21035
Account: URSNCM URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
FA21037-1MS [a]	Y17832.D	1	12/26/14	AD	n/a	n/a	VY781
FA21037-1MSD [a]	Y17833.D	1	12/26/14	AD	n/a	n/a	VY781
FA21037-1 [b]	Y17826.D	1	12/26/14	AD	n/a	n/a	VY781

The QC reported here applies to the following samples: **Method:** SW846 8260B

FA21035-1, FA21035-2, FA21035-3

CAS No.	Compound	FA21037-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
67-64-1	Acetone	2100	U	10300	9590	93	10300	9440	92	2	61-152/27
71-43-2	Benzene	210	U	2050	2080	101	2050	2070	101	0	76-126/26
74-97-5	Bromochloromethane	210	U	2050	2100	102	2050	2080	101	1	77-120/24
75-27-4	Bromodichloromethane	210	U	2050	2130	104	2050	2100	102	1	74-130/25
75-25-2	Bromoform	210	U	2050	2280	111	2050	2250	110	1	76-127/26
108-90-7	Chlorobenzene	210	U	2050	2180	106	2050	2180	106	0	81-129/29
75-00-3	Chloroethane	210	U	2050	1900	93	2050	1850	90	3	68-133/29
67-66-3	Chloroform	210	U	2050	2020	98	2050	2130	104	5	72-123/26
75-15-0	Carbon disulfide	210	U	2050	2550	124*	2050	2520	123*	1	72-122/29
56-23-5	Carbon tetrachloride	210	U	2050	1970	96	2050	1970	96	0	78-133/29
110-82-7	Cyclohexane	210	U	2050	1570	76	2050	1570	76	0	73-126/32
75-34-3	1,1-Dichloroethane	210	U	2050	2100	102	2050	2140	104	2	73-125/27
75-35-4	1,1-Dichloroethylene	210	U	2050	2400	117	2050	2370	115	1	81-136/28
96-12-8	1,2-Dibromo-3-chloropropane	210	U	2050	2280	111	2050	2260	110	1	70-137/29
106-93-4	1,2-Dibromoethane	210	U	2050	2110	103	2050	2110	103	0	77-126/26
107-06-2	1,2-Dichloroethane	210	U	2050	2120	103	2050	2120	103	0	74-128/23
78-87-5	1,2-Dichloropropane	210	U	2050	2020	98	2050	2010	98	0	74-125/25
123-91-1	1,4-Dioxane	8200	U	41100	45700	111	41100	14200	35*	105*	56-152/37
124-48-1	Dibromochloromethane	210	U	2050	2210	108	2050	2190	107	1	76-127/27
75-71-8	Dichlorodifluoromethane	210	U	2050	1460	71	2050	1420	69	3	68-168/29
156-59-2	cis-1,2-Dichloroethylene	210	U	2050	2120	103	2050	2080	101	2	74-126/26
10061-01-5	cis-1,3-Dichloropropene	210	U	2050	2110	103	2050	2090	102	1	80-123/26
541-73-1	m-Dichlorobenzene	210	U	2050	2210	108	2050	2190	107	1	81-129/33
95-50-1	o-Dichlorobenzene	210	U	2050	2240	109	2050	2170	106	3	80-129/32
106-46-7	p-Dichlorobenzene	210	U	2050	2130	104	2050	2080	101	2	76-130/32
156-60-5	trans-1,2-Dichloroethylene	210	U	2050	2140	104	2050	2110	103	1	70-127/27
10061-02-6	trans-1,3-Dichloropropene	210	U	2050	2310	113	2050	2290	112	1	75-131/28
100-41-4	Ethylbenzene	210	U	2050	2170	106	2050	2150	105	1	77-123/31
76-13-1	Freon 113	210	U	2050	1590	77	2050	1580	77	1	71-129/30
591-78-6	2-Hexanone	1000	U	10300	10200	99	10300	10300	100	1	72-133/26
98-82-8	Isopropylbenzene	210	U	2050	2300	112	2050	2300	112	0	80-136/32
108-10-1	4-Methyl-2-pentanone	1000	U	10300	10400	101	10300	10500	102	1	76-132/26
79-20-9	Methyl acetate	1000	U	10300	11400	111	10300	11200	109	2	67-137/30
74-83-9	Methyl bromide	210	U	2050	2400	117	2050	2320	113	3	65-139/31
74-87-3	Methyl chloride	210	U	2050	1940	94	2050	1890	92	3	71-144/27
108-87-2	Methylcyclohexane	210	U	2050	1530	75	2050	1560	76	2	75-128/31

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA21035
Account: URSNCM URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
FA21037-1MS [a]	Y17832.D	1	12/26/14	AD	n/a	n/a	VY781
FA21037-1MSD [a]	Y17833.D	1	12/26/14	AD	n/a	n/a	VY781
FA21037-1 [b]	Y17826.D	1	12/26/14	AD	n/a	n/a	VY781

The QC reported here applies to the following samples: **Method:** SW846 8260B

FA21035-1, FA21035-2, FA21035-3

CAS No.	Compound	FA21037-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
75-09-2	Methylene chloride	410	U	2050	2240	109	2050	2240	109	0	74-137/28
78-93-3	Methyl ethyl ketone	1000	U	10300	10000	97	10300	10100	98	1	75-137/25
1634-04-4	Methyl Tert Butyl Ether	210	U	2050	2150	105	2050	2170	106	1	77-120/24
100-42-5	Styrene	210	U	2050	2270	111	2050	2260	110	0	78-125/30
71-55-6	1,1,1-Trichloroethane	210	U	2050	1980	96	2050	2010	98	2	70-129/27
79-34-5	1,1,2,2-Tetrachloroethane	210	U	2050	2090	102	2050	2020	98	3	71-126/30
79-00-5	1,1,2-Trichloroethane	210	U	2050	2120	103	2050	2100	102	1	74-124/28
87-61-6	1,2,3-Trichlorobenzene	210	U	2050	2600	127	2050	2610	127	0	77-128/35
120-82-1	1,2,4-Trichlorobenzene	210	U	2050	2610	127	2050	2520	123	4	78-130/34
127-18-4	Tetrachloroethylene	210	U	2050	2130	104	2050	2080	101	2	79-130/31
108-88-3	Toluene	210	U	2050	2070	101	2050	2100	102	1	76-124/30
79-01-6	Trichloroethylene	210	U	2050	2040	99	2050	1980	96	3	75-128/27
75-69-4	Trichlorofluoromethane	210	U	2050	1840	90	2050	1750	85	5	73-145/31
75-01-4	Vinyl chloride	210	U	2050	2140	104	2050	2150	105	0	76-141/27
	m,p-Xylene	410	U	4110	4480	109	4110	4470	109	0	80-128/30
95-47-6	o-Xylene	210	U	2050	2260	110	2050	2270	111	0	80-132/30

CAS No.	Surrogate Recoveries	MS	MSD	FA21037-1	Limits
1868-53-7	Dibromofluoromethane	102%	105%	107%	75-124%
2037-26-5	Toluene-D8	105%	105%	100%	75-126%
460-00-4	4-Bromofluorobenzene	103%	99%	102%	71-133%
17060-07-0	1,2-Dichloroethane-D4	101%	101%	113%	72-135%

(a) Soil vials were not received within 48 hours of sampling; results are considered minimum value.
(b) Soil vials were not received within 48 hours of sampling; results are considered minimum values.

* = Outside of Control Limits.

Southeast ACCUTEST LABORATORIES

GC/MS Semi-volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: FA21035
Account: URSNCM URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP54465-MB	X037740.D	1	01/05/15	MV	01/02/15	OP54465	SX1764

The QC reported here applies to the following samples: **Method:** SW846 8270D

FA21035-1, FA21035-2, FA21035-3

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	170	17	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	17	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	17	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	18	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	830	170	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	330	67	ug/kg	
95-48-7	2-Methylphenol	ND	170	17	ug/kg	
	3&4-Methylphenol	ND	170	33	ug/kg	
88-75-5	2-Nitrophenol	ND	170	17	ug/kg	
100-02-7	4-Nitrophenol	ND	830	130	ug/kg	
87-86-5	Pentachlorophenol	ND	830	130	ug/kg	
108-95-2	Phenol	ND	170	17	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	170	17	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	21	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	17	ug/kg	
83-32-9	Acenaphthene	ND	170	21	ug/kg	
208-96-8	Acenaphthylene	ND	170	17	ug/kg	
98-86-2	Acetophenone	ND	170	17	ug/kg	
120-12-7	Anthracene	ND	170	17	ug/kg	
1912-24-9	Atrazine	ND	170	17	ug/kg	
100-52-7	Benzaldehyde	ND	830	170	ug/kg	
56-55-3	Benzo(a)anthracene	ND	170	17	ug/kg	
50-32-8	Benzo(a)pyrene	ND	170	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	170	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	170	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	170	18	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	170	17	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	170	33	ug/kg	
92-52-4	1,1'-Biphenyl	ND	170	17	ug/kg	
105-60-2	Caprolactam	ND	170	18	ug/kg	
91-58-7	2-Chloronaphthalene	ND	170	20	ug/kg	
106-47-8	4-Chloroaniline	ND	170	17	ug/kg	
86-74-8	Carbazole	ND	170	17	ug/kg	
218-01-9	Chrysene	ND	170	17	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	170	17	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	170	17	ug/kg	

Method Blank Summary

Job Number: FA21035
Account: URSNCM URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP54465-MB	X037740.D	1	01/05/15	MV	01/02/15	OP54465	SX1764

The QC reported here applies to the following samples: **Method:** SW846 8270D

FA21035-1, FA21035-2, FA21035-3

CAS No.	Compound	Result	RL	MDL	Units	Q
108-60-1	bis(2-Chloroisopropyl)ether	ND	170	17	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	170	25	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	170	19	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	170	18	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	170	17	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	170	17	ug/kg	
132-64-9	Dibenzofuran	ND	170	17	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	330	33	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	170	33	ug/kg	
84-66-2	Diethyl phthalate	ND	330	33	ug/kg	
131-11-3	Dimethyl phthalate	ND	170	33	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	330	33	ug/kg	
206-44-0	Fluoranthene	ND	170	17	ug/kg	
86-73-7	Fluorene	ND	170	17	ug/kg	
118-74-1	Hexachlorobenzene	ND	170	17	ug/kg	
87-68-3	Hexachlorobutadiene	ND	170	17	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	170	17	ug/kg	
67-72-1	Hexachloroethane	ND	170	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	170	17	ug/kg	
78-59-1	Isophorone	ND	170	17	ug/kg	
91-57-6	2-Methylnaphthalene	ND	170	17	ug/kg	
88-74-4	2-Nitroaniline	ND	170	33	ug/kg	
99-09-2	3-Nitroaniline	ND	170	33	ug/kg	
100-01-6	4-Nitroaniline	ND	170	33	ug/kg	
91-20-3	Naphthalene	ND	170	17	ug/kg	
98-95-3	Nitrobenzene	ND	170	17	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	170	17	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	17	ug/kg	
85-01-8	Phenanthrene	ND	170	17	ug/kg	
129-00-0	Pyrene	ND	170	17	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	170	17	ug/kg	

CAS No.	Surrogate Recoveries		Limits
367-12-4	2-Fluorophenol	66%	40-102%

Method Blank Summary

Job Number: FA21035
Account: URSNCM URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP54465-MB	X037740.D	1	01/05/15	MV	01/02/15	OP54465	SX1764

The QC reported here applies to the following samples: **Method:** SW846 8270D

FA21035-1, FA21035-2, FA21035-3

CAS No.	Surrogate Recoveries		Limits
4165-62-2	Phenol-d5	75%	41-100%
118-79-6	2,4,6-Tribromophenol	65%	42-108%
4165-60-0	Nitrobenzene-d5	66%	40-105%
321-60-8	2-Fluorobiphenyl	69%	43-107%
1718-51-0	Terphenyl-d14	85%	45-119%

Blank Spike Summary

Job Number: FA21035
Account: URSNCM URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP54465-BS	X037739.D	1	01/05/15	MV	01/02/15	OP54465	SX1764

The QC reported here applies to the following samples: **Method:** SW846 8270D

FA21035-1, FA21035-2, FA21035-3

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
95-57-8	2-Chlorophenol	1670	1010	61	48-104
59-50-7	4-Chloro-3-methyl phenol	1670	1350	81	52-108
120-83-2	2,4-Dichlorophenol	1670	1210	73	51-105
105-67-9	2,4-Dimethylphenol	1670	1320	79	43-96
51-28-5	2,4-Dinitrophenol	3330	3090	93	40-119
534-52-1	4,6-Dinitro-o-cresol	3330	3000	90	64-121
95-48-7	2-Methylphenol	1670	1180	71	46-107
	3&4-Methylphenol	3330	2460	74	44-111
88-75-5	2-Nitrophenol	1670	1090	65	49-104
100-02-7	4-Nitrophenol	3330	2930	88	56-116
87-86-5	Pentachlorophenol	3330	3010	90	61-114
108-95-2	Phenol	1670	1120	67	45-110
58-90-2	2,3,4,6-Tetrachlorophenol	1670	1360	82	61-108
95-95-4	2,4,5-Trichlorophenol	1670	1420	85	58-112
88-06-2	2,4,6-Trichlorophenol	1670	1350	81	56-109
83-32-9	Acenaphthene	1670	1360	82	56-109
208-96-8	Acenaphthylene	1670	1370	82	56-106
98-86-2	Acetophenone	1670	1170	70	48-107
120-12-7	Anthracene	1670	1420	85	61-110
1912-24-9	Atrazine	1670	1360	82	60-112
56-55-3	Benzo(a)anthracene	1670	1430	86	66-111
50-32-8	Benzo(a)pyrene	1670	1410	85	59-104
205-99-2	Benzo(b)fluoranthene	1670	1400	84	67-113
191-24-2	Benzo(g,h,i)perylene	1670	1600	96	67-113
207-08-9	Benzo(k)fluoranthene	1670	1480	89	67-114
101-55-3	4-Bromophenyl phenyl ether	1670	1130	68	62-110
85-68-7	Butyl benzyl phthalate	1670	1470	88	65-113
92-52-4	1,1'-Biphenyl	1670	1350	81	53-106
105-60-2	Caprolactam	1670	1470	88	40-110
91-58-7	2-Chloronaphthalene	1670	1220	73	53-106
106-47-8	4-Chloroaniline	1670	1240	74	30-115
86-74-8	Carbazole	1670	1450	87	60-111
218-01-9	Chrysene	1670	1520	91	65-112
111-91-1	bis(2-Chloroethoxy)methane	1670	1180	71	48-105
111-44-4	bis(2-Chloroethyl)ether	1670	914	55	46-103
108-60-1	bis(2-Chloroisopropyl)ether	1670	963	58	40-110

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA21035
Account: URSNCM URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP54465-BS	X037739.D	1	01/05/15	MV	01/02/15	OP54465	SX1764

The QC reported here applies to the following samples: **Method:** SW846 8270D

FA21035-1, FA21035-2, FA21035-3

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
7005-72-3	4-Chlorophenyl phenyl ether	1670	1330	80	58-106
121-14-2	2,4-Dinitrotoluene	1670	1380	83	59-109
606-20-2	2,6-Dinitrotoluene	1670	1370	82	61-107
91-94-1	3,3'-Dichlorobenzidine	1670	1350	81	36-114
53-70-3	Dibenzo(a,h)anthracene	1670	1550	93	68-115
132-64-9	Dibenzofuran	1670	1370	82	57-108
84-74-2	Di-n-butyl phthalate	1670	1460	88	63-108
117-84-0	Di-n-octyl phthalate	1670	1390	83	64-119
84-66-2	Diethyl phthalate	1670	1420	85	61-109
131-11-3	Dimethyl phthalate	1670	1390	83	59-108
117-81-7	bis(2-Ethylhexyl)phthalate	1670	1450	87	64-115
206-44-0	Fluoranthene	1670	1430	86	60-108
86-73-7	Fluorene	1670	1420	85	58-109
118-74-1	Hexachlorobenzene	1670	1210	73	59-111
87-68-3	Hexachlorobutadiene	1670	973	58	41-108
77-47-4	Hexachlorocyclopentadiene	1670	955	57	49-110
67-72-1	Hexachloroethane	1670	829	50	40-105
193-39-5	Indeno(1,2,3-cd)pyrene	1670	1440	86	66-116
78-59-1	Isophorone	1670	1220	73	42-89
91-57-6	2-Methylnaphthalene	1670	1210	73	47-106
88-74-4	2-Nitroaniline	1670	1420	85	56-123
99-09-2	3-Nitroaniline	1670	1370	82	41-111
100-01-6	4-Nitroaniline	1670	1420	85	54-113
91-20-3	Naphthalene	1670	1100	66	44-104
98-95-3	Nitrobenzene	1670	1040	62	43-108
621-64-7	N-Nitroso-di-n-propylamine	1670	1230	74	48-108
86-30-6	N-Nitrosodiphenylamine	1670	1390	83	62-110
85-01-8	Phenanthrene	1670	1420	85	63-111
129-00-0	Pyrene	1670	1440	86	65-115
95-94-3	1,2,4,5-Tetrachlorobenzene	1670	1220	73	46-101

CAS No.	Surrogate Recoveries	BSP	Limits
367-12-4	2-Fluorophenol	57%	40-102%
4165-62-2	Phenol-d5	75%	41-100%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA21035
Account: URSNCM URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP54465-BS	X037739.D	1	01/05/15	MV	01/02/15	OP54465	SX1764

The QC reported here applies to the following samples: **Method:** SW846 8270D

FA21035-1, FA21035-2, FA21035-3

CAS No.	Surrogate Recoveries	BSP	Limits
118-79-6	2,4,6-Tribromophenol	75%	42-108%
4165-60-0	Nitrobenzene-d5	62%	40-105%
321-60-8	2-Fluorobiphenyl	75%	43-107%
1718-51-0	Terphenyl-d14	91%	45-119%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA21035
Account: URSNCM URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP54465-MS	X037745.D	1	01/06/15	MV	01/02/15	OP54465	SX1764
OP54465-MSD	X037746.D	1	01/06/15	MV	01/02/15	OP54465	SX1764
FA20914-7	X037744.D	1	01/06/15	MV	01/02/15	OP54465	SX1764

The QC reported here applies to the following samples: **Method:** SW846 8270D

FA21035-1, FA21035-2, FA21035-3

CAS No.	Compound	FA20914-7 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
95-57-8	2-Chlorophenol	180 U		1840	1140	62	1810	1160	64	2	48-104/26
59-50-7	4-Chloro-3-methyl phenol	180 U		1840	1280	70	1810	1300	72	2	52-108/21
120-83-2	2,4-Dichlorophenol	180 U		1840	1200	65	1810	1200	66	0	51-105/27
105-67-9	2,4-Dimethylphenol	180 U		1840	1310	71	1810	1330	74	2	43-96/23
51-28-5	2,4-Dinitrophenol	910 U		3670	1470	40	3610	1380	38*	6	40-119/32
534-52-1	4,6-Dinitro-o-cresol	370 U		3670	2140	58*	3610	1960	54*	9	64-121/29
95-48-7	2-Methylphenol	180 U		1840	1190	65	1810	1220	68	2	46-107/24
	3&4-Methylphenol	180 U		3670	2430	66	3610	2460	68	1	44-111/24
88-75-5	2-Nitrophenol	180 U		1840	1140	62	1810	1160	64	2	49-104/27
100-02-7	4-Nitrophenol	910 U		3670	2770	75	3610	2700	75	3	56-116/23
87-86-5	Pentachlorophenol	910 U		3670	2680	73	3610	2650	73	1	61-114/23
108-95-2	Phenol	180 U		1840	1150	63	1810	1170	65	2	45-110/24
58-90-2	2,3,4,6-Tetrachlorophenol	180 U		1840	1260	69	1810	1270	70	1	61-108/21
95-95-4	2,4,5-Trichlorophenol	180 U		1840	1400	76	1810	1390	77	1	58-112/22
88-06-2	2,4,6-Trichlorophenol	180 U		1840	1310	71	1810	1290	71	2	56-109/25
83-32-9	Acenaphthene	180 U		1840	1330	72	1810	1330	74	0	56-109/23
208-96-8	Acenaphthylene	180 U		1840	1370	75	1810	1370	76	0	56-106/23
98-86-2	Acetophenone	180 U		1840	1220	66	1810	1250	69	2	48-107/27
120-12-7	Anthracene	180 U		1840	1440	78	1810	1400	78	3	61-110/21
1912-24-9	Atrazine	180 U		1840	1350	74	1810	1280	71	5	60-112/21
56-55-3	Benzo(a)anthracene	36.7	J	1840	1410	75	1810	1400	76	1	66-111/23
50-32-8	Benzo(a)pyrene	47.9	J	1840	1390	73	1810	1380	74	1	59-104/23
205-99-2	Benzo(b)fluoranthene	71.9	J	1840	1430	74	1810	1420	75	1	67-113/24
191-24-2	Benzo(g,h,i)perylene	53.1	J	1840	1360	71	1810	1330	71	2	67-113/21
207-08-9	Benzo(k)fluoranthene	180 U		1840	1470	80	1810	1440	80	2	67-114/22
101-55-3	4-Bromophenyl phenyl ether	180 U		1840	1130	62	1810	1090	60*	4	62-110/21
85-68-7	Butyl benzyl phthalate	180 U		1840	1490	81	1810	1470	81	1	65-113/20
92-52-4	1,1'-Biphenyl	180 U		1840	1340	73	1810	1330	74	1	53-106/24
105-60-2	Caprolactam	180 U		1840	1400	76	1810	1440	80	3	40-110/22
91-58-7	2-Chloronaphthalene	180 U		1840	1230	67	1810	1230	68	0	53-106/23
106-47-8	4-Chloroaniline	180 U		1840	1100	60	1810	1150	64	4	30-115/30
86-74-8	Carbazole	180 U		1840	1500	82	1810	1440	80	4	60-111/19
218-01-9	Chrysene	45.4	J	1840	1510	80	1810	1480	79	2	65-112/25
111-91-1	bis(2-Chloroethoxy)methane	180 U		1840	1170	64	1810	1190	66	2	48-105/24
111-44-4	bis(2-Chloroethyl)ether	180 U		1840	1060	58	1810	1080	60	2	46-103/27
108-60-1	bis(2-Chloroisopropyl)ether	180 U		1840	1120	61	1810	1140	63	2	40-110/25

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA21035
Account: URSNCM URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP54465-MS	X037745.D	1	01/06/15	MV	01/02/15	OP54465	SX1764
OP54465-MSD	X037746.D	1	01/06/15	MV	01/02/15	OP54465	SX1764
FA20914-7	X037744.D	1	01/06/15	MV	01/02/15	OP54465	SX1764

The QC reported here applies to the following samples: **Method:** SW846 8270D

FA21035-1, FA21035-2, FA21035-3

CAS No.	Compound	FA20914-7 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
7005-72-3	4-Chlorophenyl phenyl ether	180 U		1840	1260	69	1810	1250	69	1	58-106/21
121-14-2	2,4-Dinitrotoluene	415		1840	1310	49*	1810	1300	49*	1	59-109/20
606-20-2	2,6-Dinitrotoluene	37.0	J	1840	1310	69	1810	1300	70	1	61-107/22
91-94-1	3,3'-Dichlorobenzidine	180 U		1840	1370	75	1810	1330	74	3	36-114/28
53-70-3	Dibenzo(a,h)anthracene	180 U		1840	1320	72	1810	1350	75	2	68-115/23
132-64-9	Dibenzofuran	180 U		1840	1320	72	1810	1320	73	0	57-108/22
84-74-2	Di-n-butyl phthalate	370 U		1840	1460	80	1810	1420	79	3	63-108/19
117-84-0	Di-n-octyl phthalate	180 U		1840	1500	82	1810	1480	82	1	64-119/21
84-66-2	Diethyl phthalate	370 U		1840	1350	74	1810	1360	75	1	61-109/20
131-11-3	Dimethyl phthalate	180 U		1840	1340	73	1810	1310	73	2	59-108/20
117-81-7	bis(2-Ethylhexyl)phthalate	370 U		1840	1480	81	1810	1480	82	0	64-115/23
206-44-0	Fluoranthene	37.2	J	1840	1390	74	1810	1390	75	0	60-108/25
86-73-7	Fluorene	180 U		1840	1370	75	1810	1370	76	0	58-109/21
118-74-1	Hexachlorobenzene	180 U		1840	1200	65	1810	1170	65	3	59-111/21
87-68-3	Hexachlorobutadiene	180 U		1840	1130	62	1810	1130	63	0	41-108/27
77-47-4	Hexachlorocyclopentadiene	180 U		1840	798	43*	1810	719	40*	10	49-110/31
67-72-1	Hexachloroethane	180 U		1840	1020	56	1810	1020	56	0	40-105/32
193-39-5	Indeno(1,2,3-cd)pyrene	47.4	J	1840	1290	68	1810	1250	67	3	66-116/22
78-59-1	Isophorone	180 U		1840	1170	64	1810	1170	65	0	42-89/22
91-57-6	2-Methylnaphthalene	180 U		1840	1160	63	1810	1220	68	5	47-106/27
88-74-4	2-Nitroaniline	180 U		1840	1370	75	1810	1400	78	2	56-123/24
99-09-2	3-Nitroaniline	180 U		1840	1270	69	1810	1260	70	1	41-111/25
100-01-6	4-Nitroaniline	180 U		1840	1340	73	1810	1330	74	1	54-113/22
91-20-3	Naphthalene	180 U		1840	1190	65	1810	1190	66	0	44-104/27
98-95-3	Nitrobenzene	180 U		1840	1130	62	1810	1130	63	0	43-108/25
621-64-7	N-Nitroso-di-n-propylamine	180 U		1840	1230	67	1810	1220	68	1	48-108/27
86-30-6	N-Nitrosodiphenylamine	115	J	1840	1430	72	1810	1390	71	3	62-110/21
85-01-8	Phenanthrene	180 U		1840	1420	77	1810	1400	78	1	63-111/22
129-00-0	Pyrene	35.9	J	1840	1490	79	1810	1480	80	1	65-115/25
95-94-3	1,2,4,5-Tetrachlorobenzene	180 U		1840	1180	64	1810	1200	66	2	46-101/24

CAS No.	Surrogate Recoveries	MS	MSD	FA20914-7	Limits
367-12-4	2-Fluorophenol	60%	61%	63%	40-102%
4165-62-2	Phenol-d5	70%	71%	73%	41-100%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA21035
Account: URSNCM URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP54465-MS	X037745.D	1	01/06/15	MV	01/02/15	OP54465	SX1764
OP54465-MSD	X037746.D	1	01/06/15	MV	01/02/15	OP54465	SX1764
FA20914-7	X037744.D	1	01/06/15	MV	01/02/15	OP54465	SX1764

The QC reported here applies to the following samples: **Method:** SW846 8270D

FA21035-1, FA21035-2, FA21035-3

CAS No.	Surrogate Recoveries	MS	MSD	FA20914-7	Limits
118-79-6	2,4,6-Tribromophenol	68%	67%	68%	42-108%
4165-60-0	Nitrobenzene-d5	61%	62%	66%	40-105%
321-60-8	2-Fluorobiphenyl	67%	68%	71%	43-107%
1718-51-0	Terphenyl-d14	83%	81%	86%	45-119%

* = Outside of Control Limits.

Southeast ACCUTEST LABORATORIES

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: FA21035
Account: URSNCM - URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

QC Batch ID: MP28410
Matrix Type: SOLID

Methods: SW846 7471B
Units: mg/kg

Prep Date: 01/02/15

Metal	RL	IDL	MDL	MB raw	final
Mercury	0.042	.0025	.0042	0.0014	<0.042

Associated samples MP28410: FA21035-1, FA21035-2, FA21035-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

8.1.1
8

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: FA21035
Account: URSNCM - URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

QC Batch ID: MP28410
Matrix Type: SOLID

Methods: SW846 7471B
Units: mg/kg

Prep Date:	01/02/15						01/02/15		
Metal	FA21067-46 Original	DUP	RPD	QC Limits	FA21067-46 Original	MS	Spikelot HGFLWS1	% Rec	QC Limits
Mercury	0.0067	0.0050	29.1 (a)	0-20	0.0067	0.27	0.235	111.9	80-120

Associated samples MP28410: FA21035-1, FA21035-2, FA21035-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) RPD acceptable due to low duplicate and sample concentrations.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: FA21035
Account: URSNCM - URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

QC Batch ID: MP28410 Methods: SW846 7471B
Matrix Type: SOLID Units: mg/kg

Prep Date: 01/02/15

Metal	FA21067-46 Original	MSD	Spikelot HGFLWS1	% Rec	MSD RPD	QC Limit
Mercury	0.0067	0.28	0.239	114.3	3.6	20

Associated samples MP28410: FA21035-1, FA21035-2, FA21035-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: FA21035
Account: URSNCM - URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

QC Batch ID: MP28410
Matrix Type: SOLID

Methods: SW846 7471B
Units: mg/kg

Prep Date: 01/02/15

Metal	BSP Result	Spikelot HGFLWS1	% Rec	QC Limits
Mercury	0.25	0.25	100.0	80-120

Associated samples MP28410: FA21035-1, FA21035-2, FA21035-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

8.1.3

8

SERIAL DILUTION RESULTS SUMMARY

Login Number: FA21035
Account: URSNCM - URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

QC Batch ID: MP28410
Matrix Type: SOLID

Methods: SW846 7471B
Units: ug/l

Prep Date: 01/02/15

Metal	FA21067-46 Original	SDL 1:5	%DIF	QC Limits
Mercury	0.0852	0.00	100.0(a)	0-10

Associated samples MP28410: FA21035-1, FA21035-2, FA21035-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

8.1.4

8

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: FA21035
Account: URSNCM - URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

QC Batch ID: MP28425
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date: 01/07/15

Metal	RL	IDL	MDL	MB raw	final
Aluminum	10	.75	1.6		
Antimony	1.0	.1	.1	0.035	<1.0
Arsenic	0.50	.1	.1	-0.055	<0.50
Barium	10	.05	.05		
Beryllium	0.25	.025	.025	0.0	<0.25
Cadmium	0.20	.025	.025	0.0	<0.20
Calcium	250	2.5	2.5		
Chromium	0.50	.05	.05	0.035	<0.50
Cobalt	2.5	.025	.025		
Copper	1.3	.05	.05	0.015	<1.3
Iron	15	.85	1.3	1.4	<15
Lead	1.0	.055	.08	-0.015	<1.0
Magnesium	250	2.5	2.5		
Manganese	0.75	.025	.025	0.015	<0.75
Molybdenum	2.5	.025	.03		
Nickel	2.0	.025	.025	0.025	<2.0
Potassium	500	10	10		
Selenium	1.0	.12	.15	0.12	<1.0
Silver	0.50	.033	.033	-0.010	<0.50
Sodium	500	25	25		
Strontium	0.50	.02	.025		
Thallium	0.50	.075	.075	-0.075	<0.50
Tin	2.5	.035	.035		
Titanium	0.50	.045	.045		
Vanadium	2.5	.025	.025		
Zinc	1.0	.15	.15	0.080	<1.0

Associated samples MP28425: FA21035-1, FA21035-2, FA21035-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: FA21035
Account: URSNCM - URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

QC Batch ID: MP28425
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date:			01/07/15					01/07/15	
Metal	FA21151-1 Original	DUP	RPD	QC Limits	FA21151-1 Original	MS	Spikelot MPFLICP2	% Rec	QC Limits
Aluminum	anr								
Antimony	0.0	0.0	NC	0-20	0.0	8.4	22.1	38.1N(b)	80-120
Arsenic	0.86	0.94	8.9	0-20	0.86	86.6	88.3	97.1	80-120
Barium	anr								
Beryllium	0.034	0.036	5.7	0-20	0.034	2.2	2.21	98.1	80-120
Cadmium	0.0	0.0	NC	0-20	0.0	2.1	2.21	95.2	80-120
Calcium	anr								
Chromium	3.7	4.0	7.8	0-20	3.7	12.6	8.83	100.8	80-120
Cobalt	anr								
Copper	2.2	2.4	8.7	0-20	2.2	13.3	11	100.6	80-120
Iron	2240	2490	10.6	0-20	2240	3310	1150	93.2	80-120
Lead	5.1	5.2	1.9	0-20	5.1	28.0	22.1	103.8	80-120
Magnesium	anr								
Manganese	5.2	5.5	5.6	0-20	5.2	27.3	22.1	100.1	80-120
Molybdenum									
Nickel	1.5	1.5	0.0	0-20	1.5	24.1	22.1	102.4	80-120
Potassium	anr								
Selenium	0.27	0.28	3.6	0-20	0.27	85.0	88.3	96.0	80-120
Silver	0.047	0.032	38.0 (a)	0-20	0.047	2.1	2.21	93.0	80-120
Sodium	anr								
Strontium									
Thallium	0.0	0.0	NC	0-20	0.0	88.2	88.3	99.9	80-120
Tin									
Titanium									
Vanadium	anr								
Zinc	7.3	7.2	1.4	0-20	7.3	29.9	22.1	102.4	80-120

Associated samples MP28425: FA21035-1, FA21035-2, FA21035-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) RPD acceptable due to low duplicate and sample concentrations.
(b) Spike recovery indicates possible matrix interference and/or sample non-homogeneity.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: FA21035
Account: URSNCM - URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

QC Batch ID: MP28425
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date: 01/07/15

Metal	FA21151-1 Original	MSD	Spikelot MPFLICP2	% Rec	MSD RPD	QC Limit
Aluminum	anr					
Antimony	0.0	8.3	21.6	38.5N(a)	1.2	20
Arsenic	0.86	85.1	86.3	97.7	1.7	20
Barium	anr					
Beryllium	0.034	2.2	2.16	100.4	0.0	20
Cadmium	0.0	2.1	2.16	97.4	0.0	20
Calcium	anr					
Chromium	3.7	12.7	8.63	104.3	0.8	20
Cobalt	anr					
Copper	2.2	13.5	10.8	104.8	1.5	20
Iron	2240	3520	1120	114.2	6.1	20
Lead	5.1	27.5	21.6	103.9	1.8	20
Magnesium	anr					
Manganese	5.2	29.0	21.6	110.4	6.0	20
Molybdenum						
Nickel	1.5	23.9	21.6	103.9	0.8	20
Potassium	anr					
Selenium	0.27	83.6	86.3	96.6	1.7	20
Silver	0.047	2.2	2.16	99.8	4.7	20
Sodium	anr					
Strontium						
Thallium	0.0	87.2	86.3	101.1	1.1	20
Tin						
Titanium						
Vanadium	anr					
Zinc	7.3	29.5	21.6	103.0	1.3	20

Associated samples MP28425: FA21035-1, FA21035-2, FA21035-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike recovery indicates possible matrix interference and/or sample non-homogeneity.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: FA21035
Account: URSNCM - URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

QC Batch ID: MP28425
Matrix Type: SOLID

Methods: SW846 6010C
Units: mg/kg

Prep Date: 01/07/15

Metal	BSP Result	Spikelot MPFLICP2	% Rec	QC Limits
Aluminum	anr			
Antimony	24.5	25	98.0	80-120
Arsenic	99.8	100	99.8	80-120
Barium	anr			
Beryllium	2.6	2.5	104.0	80-120
Cadmium	2.5	2.5	100.0	80-120
Calcium	anr			
Chromium	10.3	10	103.0	80-120
Cobalt	anr			
Copper	12.7	12.5	101.6	80-120
Iron	1350	1300	103.8	80-120
Lead	24.3	25	97.2	80-120
Magnesium	anr			
Manganese	25.4	25	101.6	80-120
Molybdenum				
Nickel	25.5	25	102.0	80-120
Potassium	anr			
Selenium	98.2	100	98.2	80-120
Silver	2.4	2.5	96.0	80-120
Sodium	anr			
Strontium				
Thallium	98.3	100	98.3	80-120
Tin				
Titanium				
Vanadium	anr			
Zinc	24.8	25	99.2	80-120

Associated samples MP28425: FA21035-1, FA21035-2, FA21035-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: FA21035
Account: URSNCM - URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

QC Batch ID: MP28425
Matrix Type: SOLID

Methods: SW846 6010C
Units: ug/l

Prep Date: 01/07/15

Metal	FA21151-1 Original	SDL 1:5	%DIF	QC Limits
Aluminum	anr			
Antimony	0.00	0.00	NC	0-10
Arsenic	20.0	19.6	2.0	0-10
Barium	anr			
Beryllium	0.800	0.00	100.0(a)	0-10
Cadmium	0.00	0.00	NC	0-10
Calcium	anr			
Chromium	86.0	96.6	12.3*(b)	0-10
Cobalt	anr			
Copper	51.4	61.8	20.2*(b)	0-10
Iron	52400	58600	12.0*(b)	0-10
Lead	120	121	0.7	0-10
Magnesium	anr			
Manganese	122	136	11.4*(b)	0-10
Molybdenum				
Nickel	34.7	41.9	20.7*(b)	0-10
Potassium	anr			
Selenium	6.30	0.00	100.0(a)	0-10
Silver	1.10	0.00	100.0(a)	0-10
Sodium	anr			
Strontium				
Thallium	0.00	0.00	NC	0-10
Tin				
Titanium				
Vanadium	anr			
Zinc	170	214	25.5*(b)	0-10

Associated samples MP28425: FA21035-1, FA21035-2, FA21035-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).
(b) Serial dilution indicates possible matrix interference.

POST DIGESTATE SPIKE SUMMARY

Login Number: FA21035
Account: URSNCM - URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

QC Batch ID: MP28425
Matrix Type: SOLID

Methods: SW846 6010C
Units: ug/l

Prep Date: 01/07/15

Metal	Sample ml	Final ml	FA21151-1 Raw	Corr.**	PS ug/l	Spike ml	Spike ug/ml	Spike ug/l	% Rec	QC Limits
Aluminum										
Antimony	9.8	10			98.4	0.2	5	100	98.4	80-120
Arsenic	9.8	10	20	19.6	121.1	0.2	5	100	101.5	80-120
Barium										
Beryllium	9.8	10	.8	.784	49.6	0.2	2.5	50	97.6	80-120
Cadmium	9.8	10			49.6	0.2	2.5	50	99.2	80-120
Calcium										
Chromium	9.8	10	86	84.28	133.3	0.2	2.5	50	98.0	80-120
Cobalt										
Copper	9.8	10	51.4	50.372	151.2	0.2	5	100	100.8	80-120
Iron	9.8	10	52370	51322.6	53840	0.2	150	3000	83.9	80-120
Lead	9.8	10	120.2	117.796	170.5	0.2	2.5	50	105.4	80-120
Magnesium										
Manganese	9.8	10	122.3	119.854	168.7	0.2	2.5	50	97.7	80-120
Molybdenum										
Nickel	9.8	10	34.7	34.006	137.4	0.2	5	100	103.4	80-120
Potassium										
Selenium	9.8	10	6.3	6.174	103	0.2	5	100	96.8	80-120
Silver	9.8	10	1.1	1.078	47.2	0.2	2.5	50	92.2	80-120
Sodium										
Strontium										
Thallium	9.8	10			97.4	0.2	5	100	97.4	80-120
Tin										
Titanium										
Vanadium										
Zinc	9.8	10	170.4	166.992	420.6	0.2	12.5	250	101.4	80-120

Associated samples MP28425: FA21035-1, FA21035-2, FA21035-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(**) Corr. sample result = Raw * (sample volume / final volume)
(anr) Analyte not requested

Southeast ACCUTEST LABORATORIES

General Chemistry

QC Data Summaries

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: FA21035
Account: URSNCM - URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Nitrogen, Ammonia	GP25276/GN64723	1.2	0.0	mg/kg	28.8	30.7	106.4	80-120%
Nitrogen, Nitrate	GP25246/GN64657	1.0	0.0	mg/kg	25	25.4	101.5	90-110%
Sulfate	GP25246/GN64657	20	0.0	mg/kg	501	543	108.5	90-110%

Associated Samples:
Batch GP25246: FA21035-1, FA21035-2, FA21035-3
Batch GP25276: FA21035-1, FA21035-2, FA21035-3
(*) Outside of QC limits

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: FA21035
Account: URSNCM - URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Solids, Percent	GN64639	FA21067-2	%	97.5	98.2	0.7	0-5%

Associated Samples:
Batch GN64639: FA21035-1, FA21035-2, FA21035-3
(*) Outside of QC limits

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: FA21035
Account: URSNCM - URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Nitrogen, Ammonia	GP25276/GN64723	FA21035-2	mg/kg	11.5	35.7	42.4	86.6(a)	80-120%
Nitrogen, Nitrate	GP25246/GN64657	FA21035-3	mg/kg	0.54 U	26.9	29.8	110.6N(a)	90-110%
Sulfate	GP25246/GN64657	FA21035-3	mg/kg	15.9	539	1010	184.5N(b)	90-110%

Associated Samples:
Batch GP25246: FA21035-1, FA21035-2, FA21035-3
Batch GP25276: FA21035-1, FA21035-2, FA21035-3
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(a) Spike recovery indicates possible matrix interference.
(b) Spike recovery indicates possible carry-over from previous sample.

MATRIX SPIKE DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

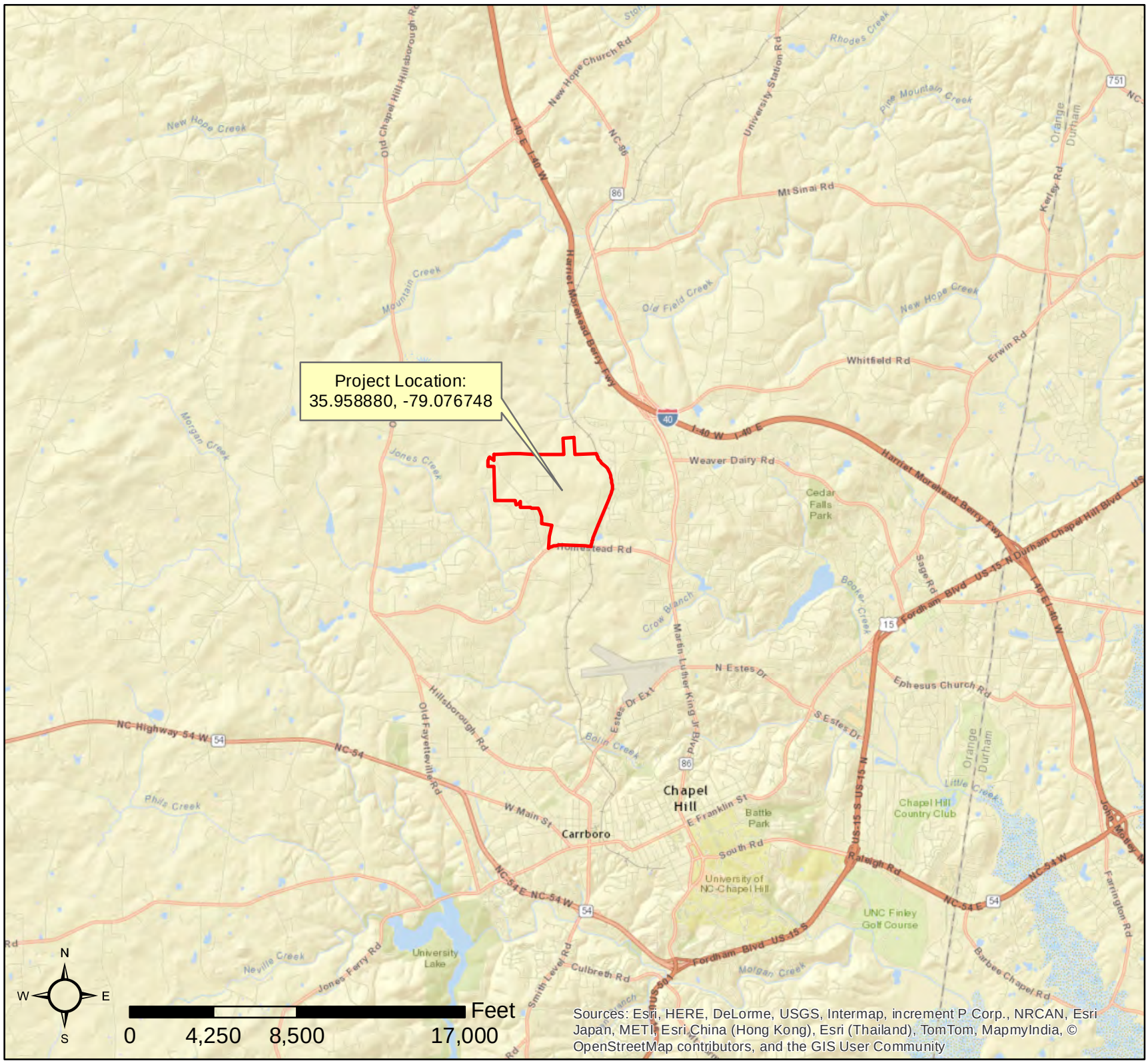
Login Number: FA21035
Account: URSNCM - URS Corporation
Project: OWASA; Rodgers Rd, Chapel Hill, NC

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MSD Result	RPD	QC Limit
Nitrogen, Ammonia	GP25276/GN64723	FA21035-2	mg/kg	11.5	36.4	43.1	1.6	30%
Nitrogen, Nitrate	GP25246/GN64657	FA21035-3	mg/kg	0.54 U	27	28.0	6.2	20%
Sulfate	GP25246/GN64657	FA21035-3	mg/kg	15.9	540	585	53.3*(a)	20%

Associated Samples:
Batch GP25246: FA21035-1, FA21035-2, FA21035-3
Batch GP25276: FA21035-1, FA21035-2, FA21035-3
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(a) High RPD due to possible carry-over on matrix spike.

Appendix F

Environmental Impacts Investigations



OWASA

Rogers Road Sewer Expansion

URS Project No. 31829996

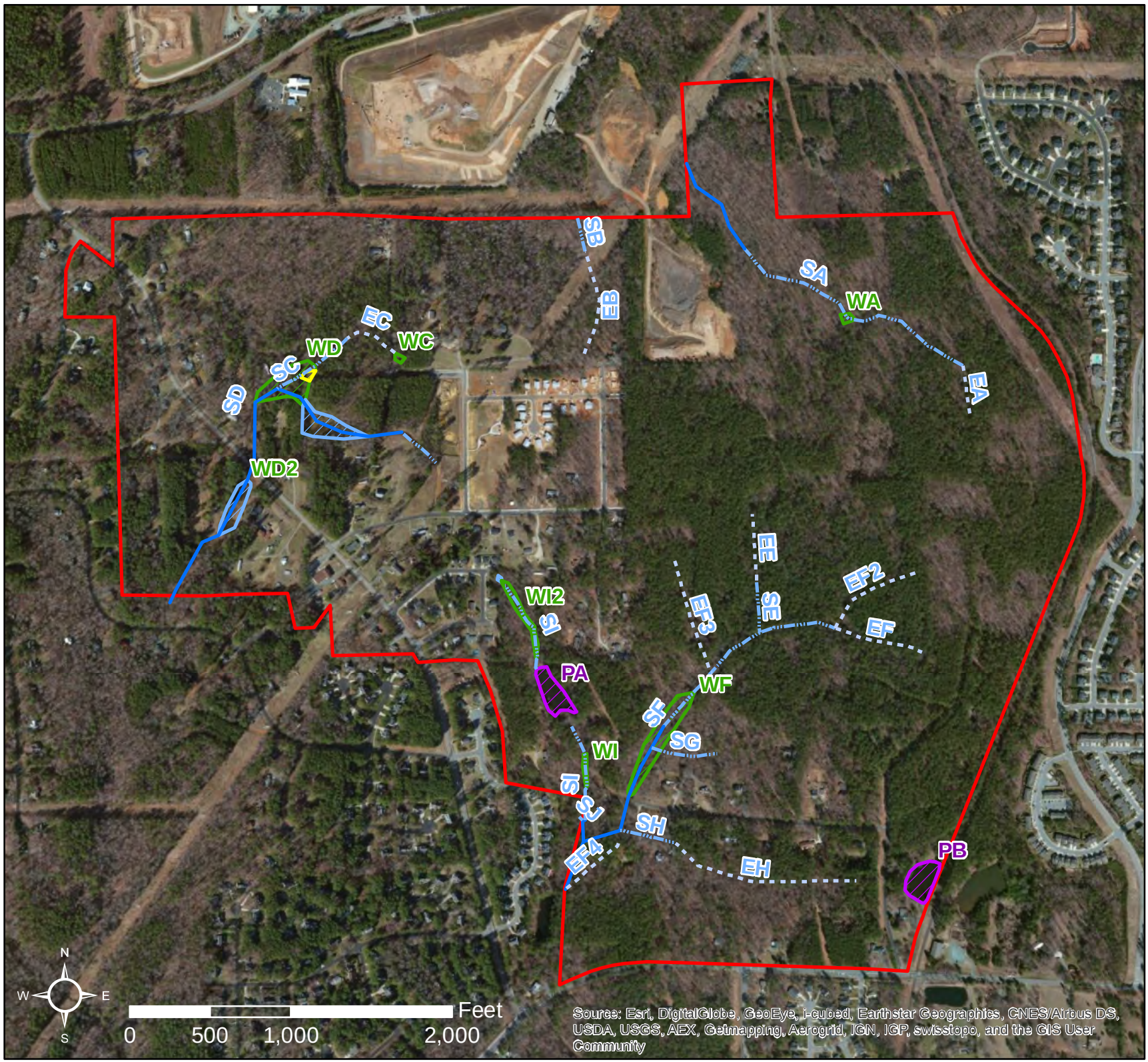
COUNTY

Orange

Haw Watershed
HUC - 03030002

Figure 1
Project location

January 2015
NAD83 State Plane NC 3200 feet
This map is for reference only.



OWASA

Rogers Road Sewer Expansion

URS Project No. 31829996

Legend

- Study area
- Ponds

Streams

- Ephemeral
- Intermittent
- Perennial

Wetlands

- PEM
- PFO
- POW

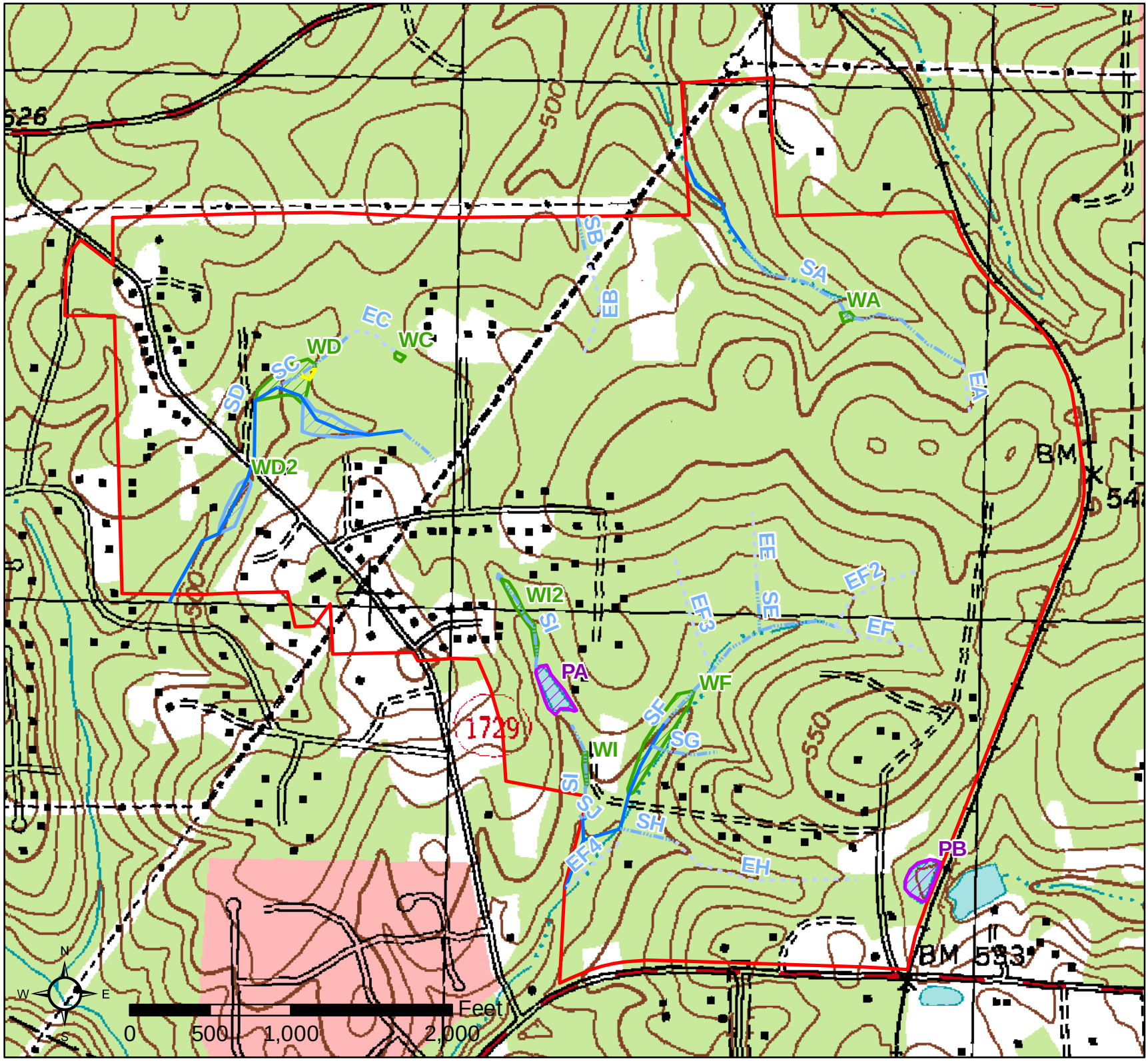
COUNTY

- Orange

Haw Watershed
HUC - 03030002

Figure 2
Aerial Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.



OWASA

Rogers Road
Sewer Expansion

URS Project No. 31829996

Legend

- Study area
- Ponds

Streams

- Ephemeral
- Intermittent
- Perennial

Wetlands

- PEM
- PFO
- POW

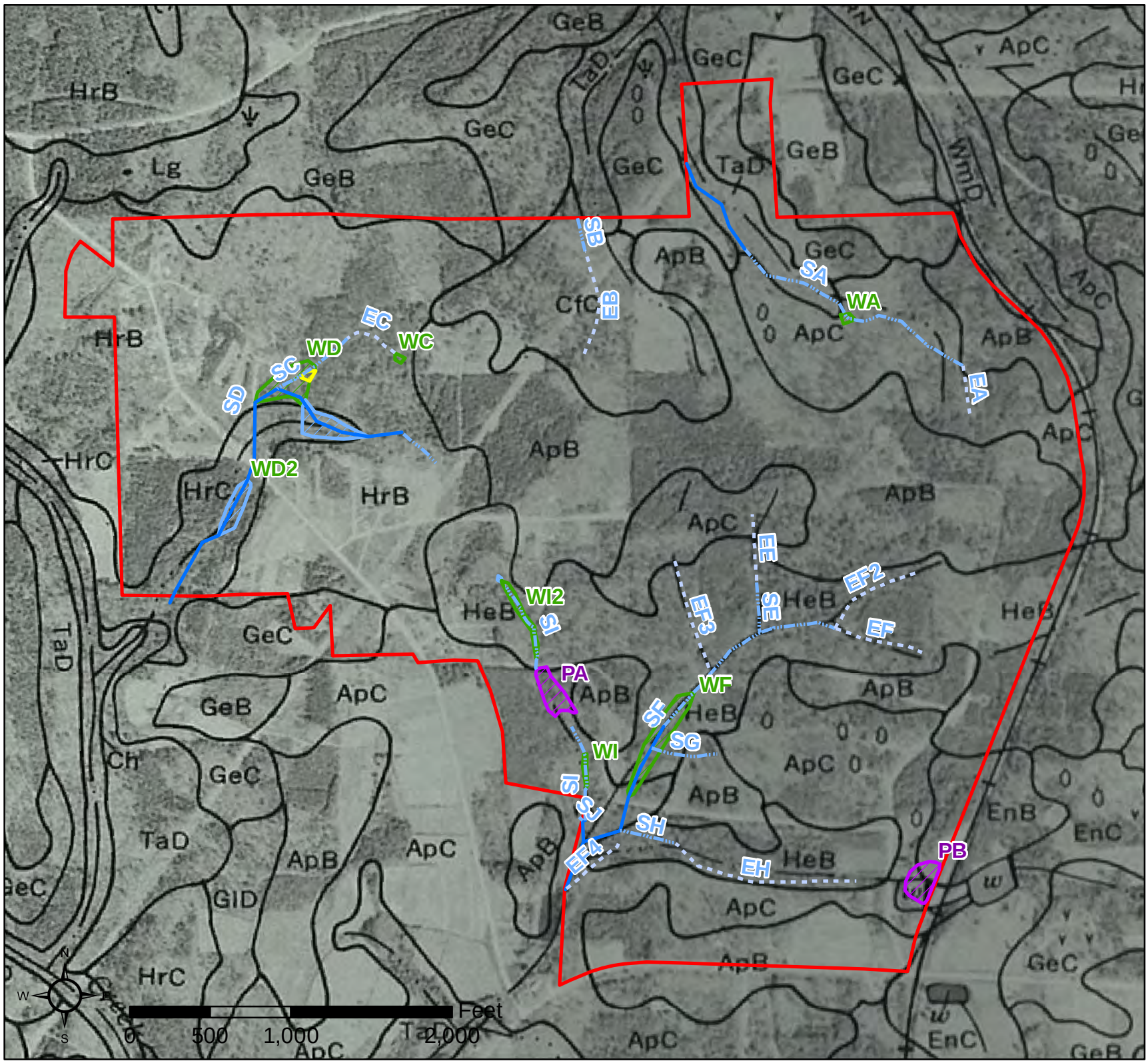
COUNTY

- Orange

Haw Watershed
HUC - 03030002

Figure 3
USGS Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.



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Rogers Road Sewer Expansion

URS Project No. 31829996

Legend

- Study area
- Ponds

Streams

- Ephemeral
- Intermittent
- Perennial

Wetlands

- PEM
- PFO
- POW

COUNTY

- Orange

Haw Watershed
HUC - 03030002

Figure 4
Soils Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.

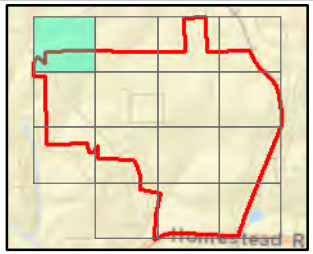
OWASA

Rogers Road
Sewer Expansion

URS Project No. 31829996

Legend

- Photos
- Study area
- **Streams**
  - Ephemeral
  - Intermittent
  - Perennial
- Ponds
- **Wetlands**
  - PEM
  - PFO
  - POW



COUNTY

Orange

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Figure 5A
WOUS Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.

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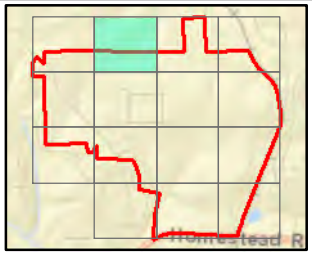
Rogers Road
Sewer Expansion

URS Project No. 31829996

Legend

- Photos
- Study area
- **Streams**
  - Ephemeral
  - Intermittent
  - Perennial
- Ponds
- **Wetlands**
  - PEM
  - PFO
  - POW



COUNTY

Orange

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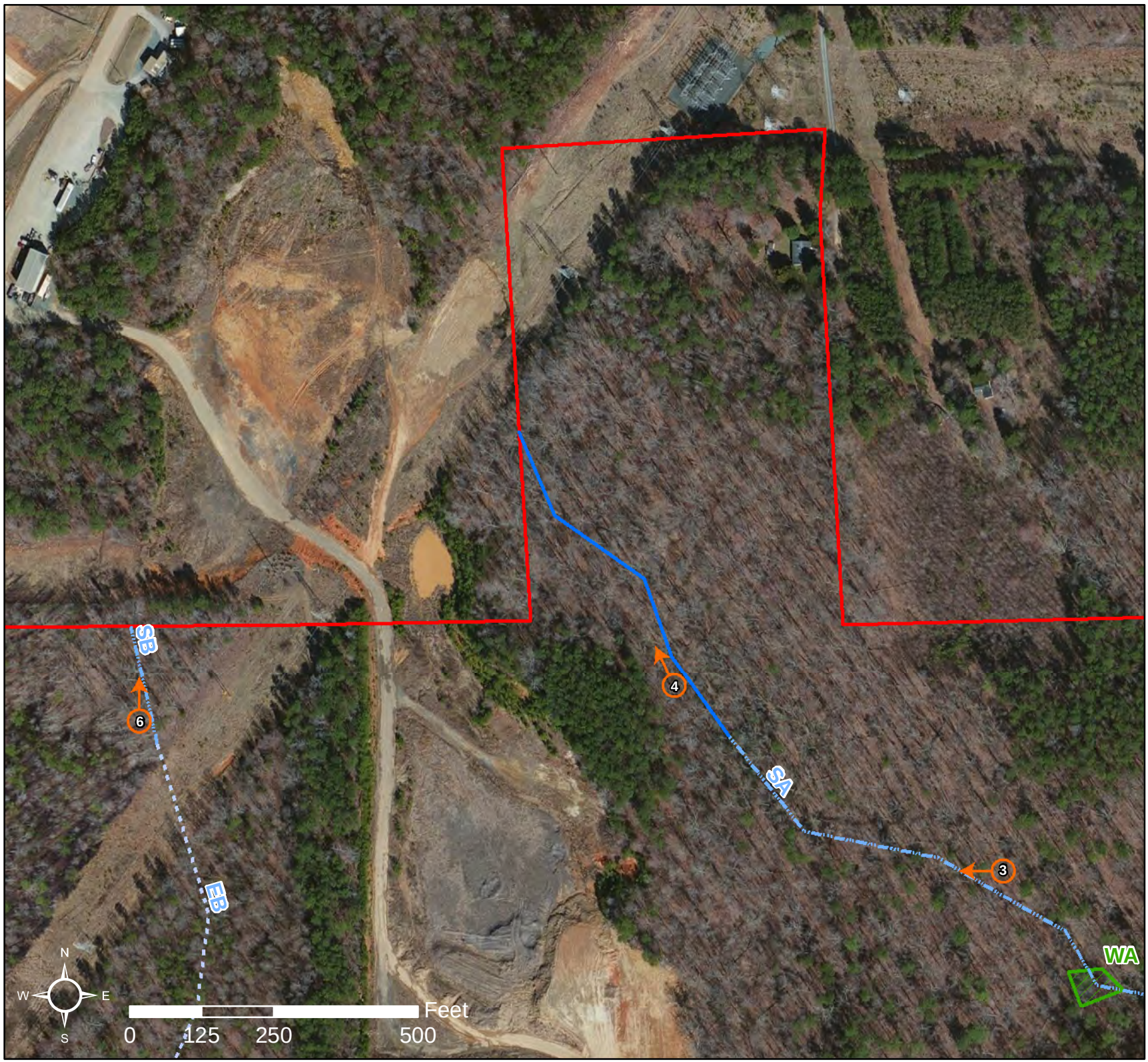
Figure 5B
WOUS Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.



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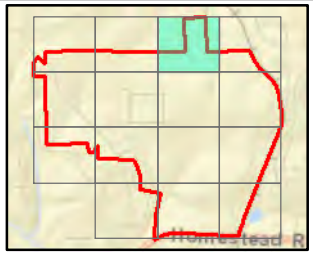
Rogers Road
Sewer Expansion

URS Project No. 31829996

Legend

- Photos
- Study area
- Streams
  - Ephemeral
  - Intermittent
  - Perennial
- Ponds
- Wetlands
  - PEM
  - PFO
  - POW



COUNTY

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Figure 5C
WOUS Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.

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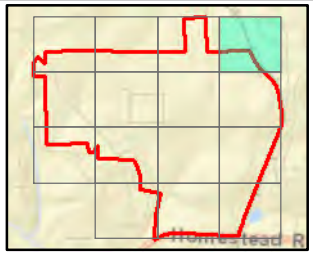
Rogers Road
Sewer Expansion

URS Project No. 31829996

Legend

- Photos
- Study area
- **Streams**
  - Ephemeral
  - Intermittent
  - Perennial
- Ponds
- **Wetlands**
  - PEM
  - PFO
  - POW



COUNTY

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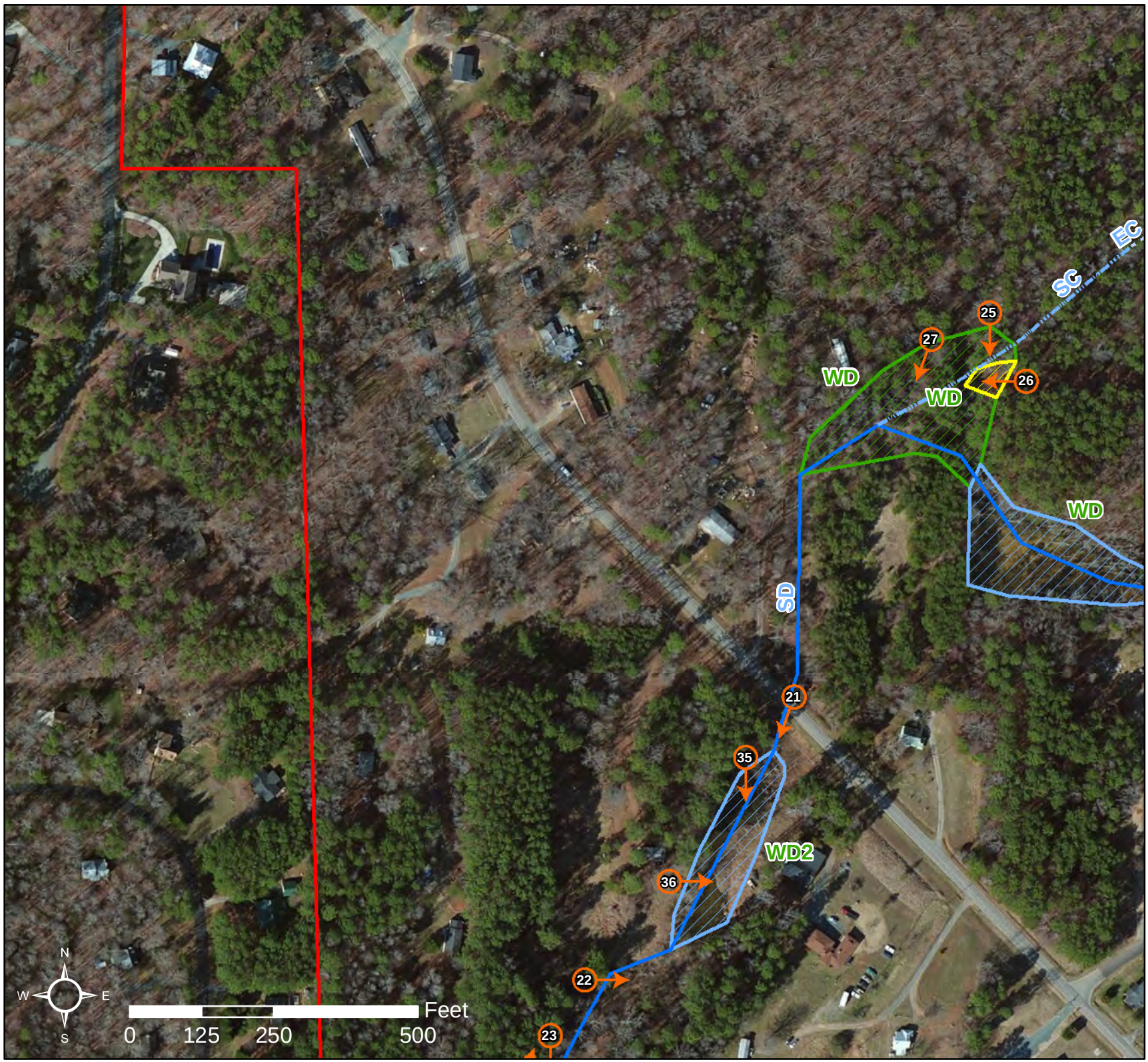
Figure 5D
WOUS Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.



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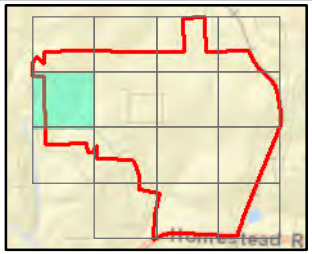
Rogers Road Sewer Expansion

URS Project No. 31829996

Legend

- Photos
- Study area
- Streams
  - Ephemeral
  - Intermittent
  - Perennial
- Ponds
- Wetlands
  - PEM
  - PFO
  - POW



COUNTY

Orange

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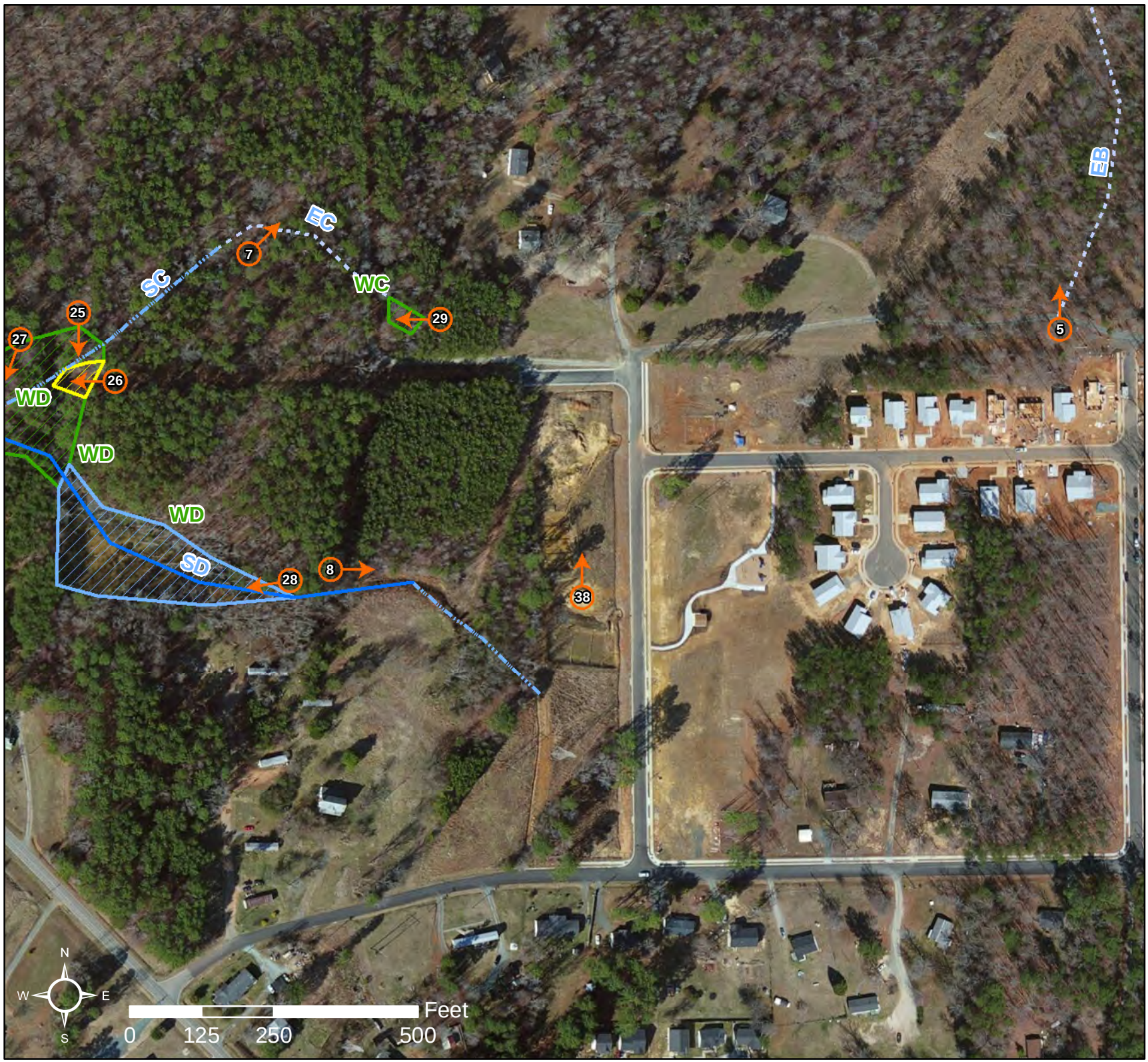
Figure 5E
WOUS Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.



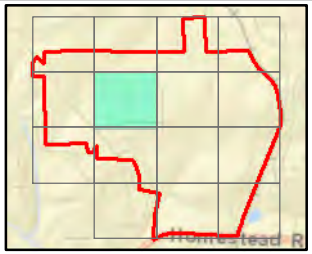
OWASA

Rogers Road Sewer Expansion

URS Project No. 31829996

Legend

- Photos
- Study area
- **Streams**
  - Ephemeral
  - Intermittent
  - Perennial
- Ponds
- **Wetlands**
  - PEM
  - PFO
  - POW



COUNTY

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Haw Watershed
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Figure 5F
WOUS Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.

OWASA

Rogers Road Sewer Expansion

URS Project No. 31829996

Legend

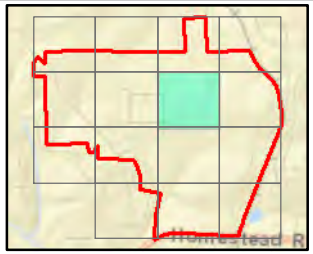
- Photos
- Study area
- Ponds

Streams

- Ephemeral
- Intermittent
- Perennial

Wetlands

- PEM
- PFO
- POW



COUNTY

Orange

Haw Watershed
HUC - 03030002

Figure 5G
WOUS Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.

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Rogers Road
Sewer Expansion

URS Project No. 31829996

Legend

- Photos
- Study area

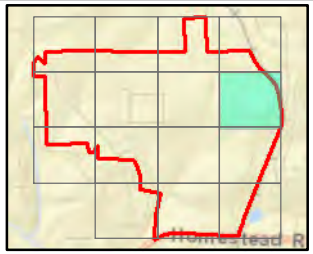
Streams

- Ephemeral
- Intermittent
- Perennial

- Ponds

Wetlands

- PEM
- PFO
- POW



COUNTY

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Haw Watershed
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Figure 5H
WOUS Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.

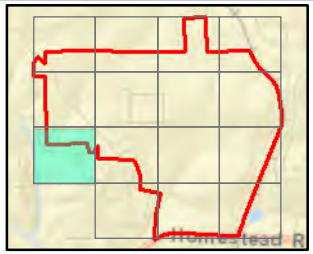
OWASA

Rogers Road Sewer Expansion

URS Project No. 31829996

Legend

- Photos
- Study area
- **Streams**
  - Ephemeral
  - Intermittent
  - Perennial
- Ponds
- **Wetlands**
  - PEM
  - PFO
  - POW



COUNTY

Orange

Haw Watershed
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Figure 5I
WOUS Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.

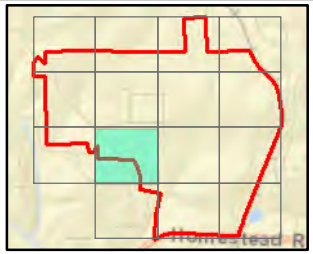
OWASA

Rogers Road Sewer Expansion

URS Project No. 31829996

Legend

- Photos
- Study area
- **Streams**
  - Ephemeral
  - Intermittent
  - Perennial
- Ponds
- **Wetlands**
  - PEM
  - PFO
  - POW



COUNTY

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Haw Watershed
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Figure 5J
WOUS Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.

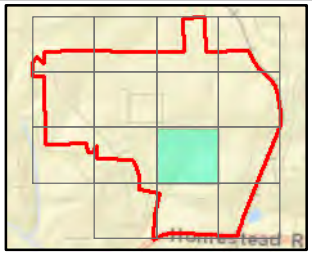
OWASA

Rogers Road Sewer Expansion

URS Project No. 31829996

Legend

- Photos
- Study area
- **Streams**
  - Ephemeral
  - Intermittent
  - Perennial
- Ponds
- **Wetlands**
  - PEM
  - PFO
  - POW



COUNTY

Orange

Haw Watershed
HUC - 03030002

Figure 5K
WOUS Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.

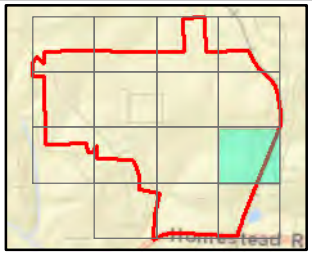
OWASA

Rogers Road Sewer Expansion

URS Project No. 31829996

Legend

- Photos
- Study area
- **Streams**
  - Ephemeral
  - Intermittent
  - Perennial
- Ponds
- **Wetlands**
  - PEM
  - PFO
  - POW



COUNTY

Orange

Haw Watershed
HUC - 03030002

Figure 5L
WOUS Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.

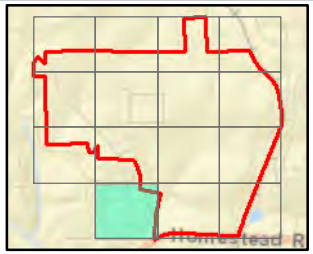
OWASA

Rogers Road
Sewer Expansion

URS Project No. 31829996

Legend

- Photos
- Study area
- **Streams**
  - Ephemeral
  - Intermittent
  - Perennial
- Ponds
- **Wetlands**
  - PEM
  - PFO
  - POW



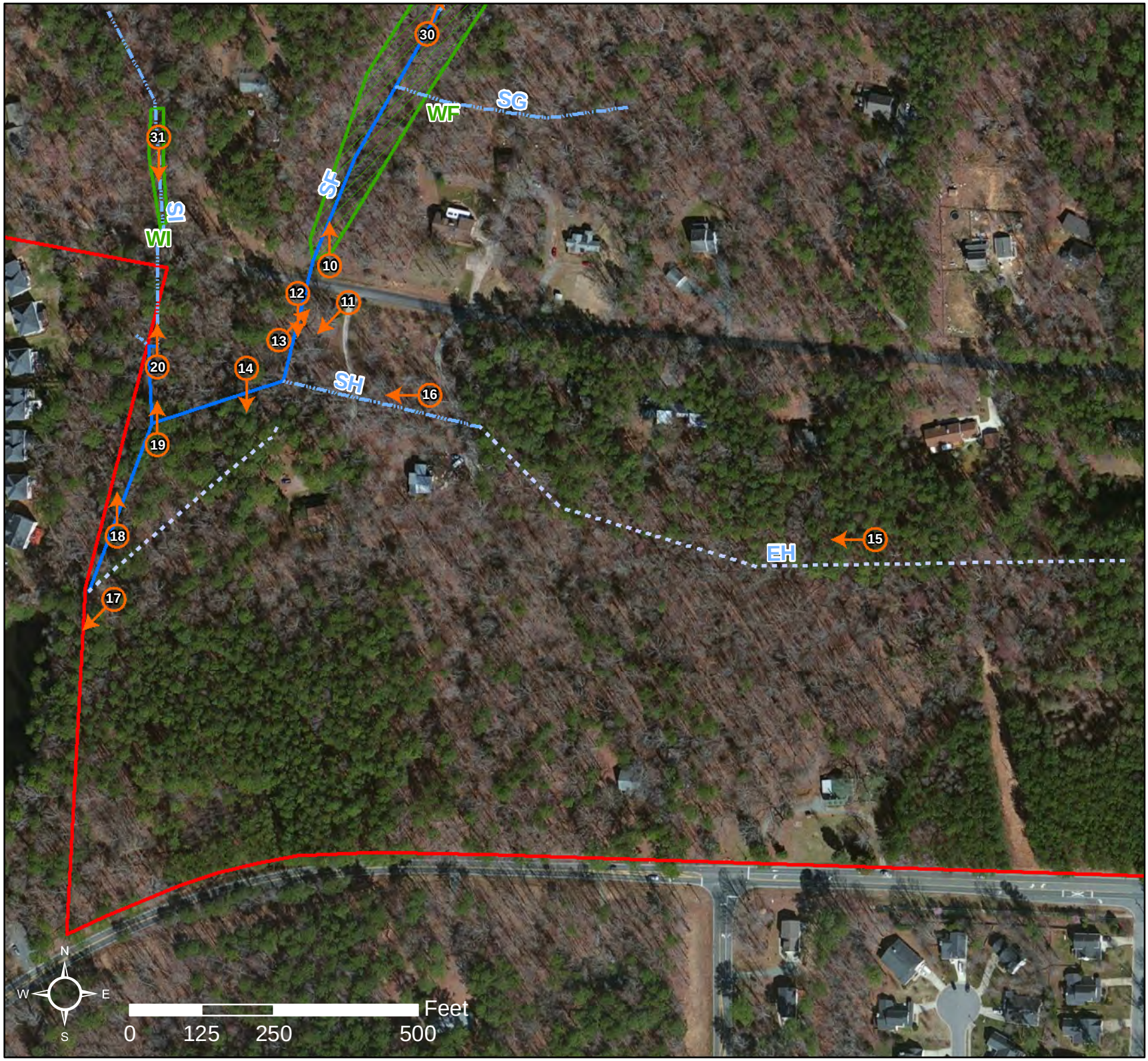
COUNTY

Orange

Haw Watershed
HUC - 03030002

Figure 5M
WOUS Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.



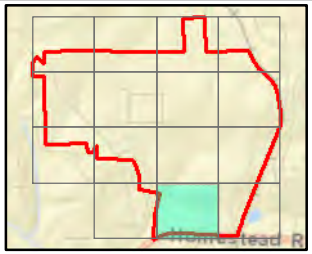
OWASA

Rogers Road Sewer Expansion

URS Project No. 31829996

Legend

- Photos
- Study area
- **Streams**
  - Ephemeral
  - Intermittent
  - Perennial
- Ponds
- **Wetlands**
  - PEM
  - PFO
  - POW



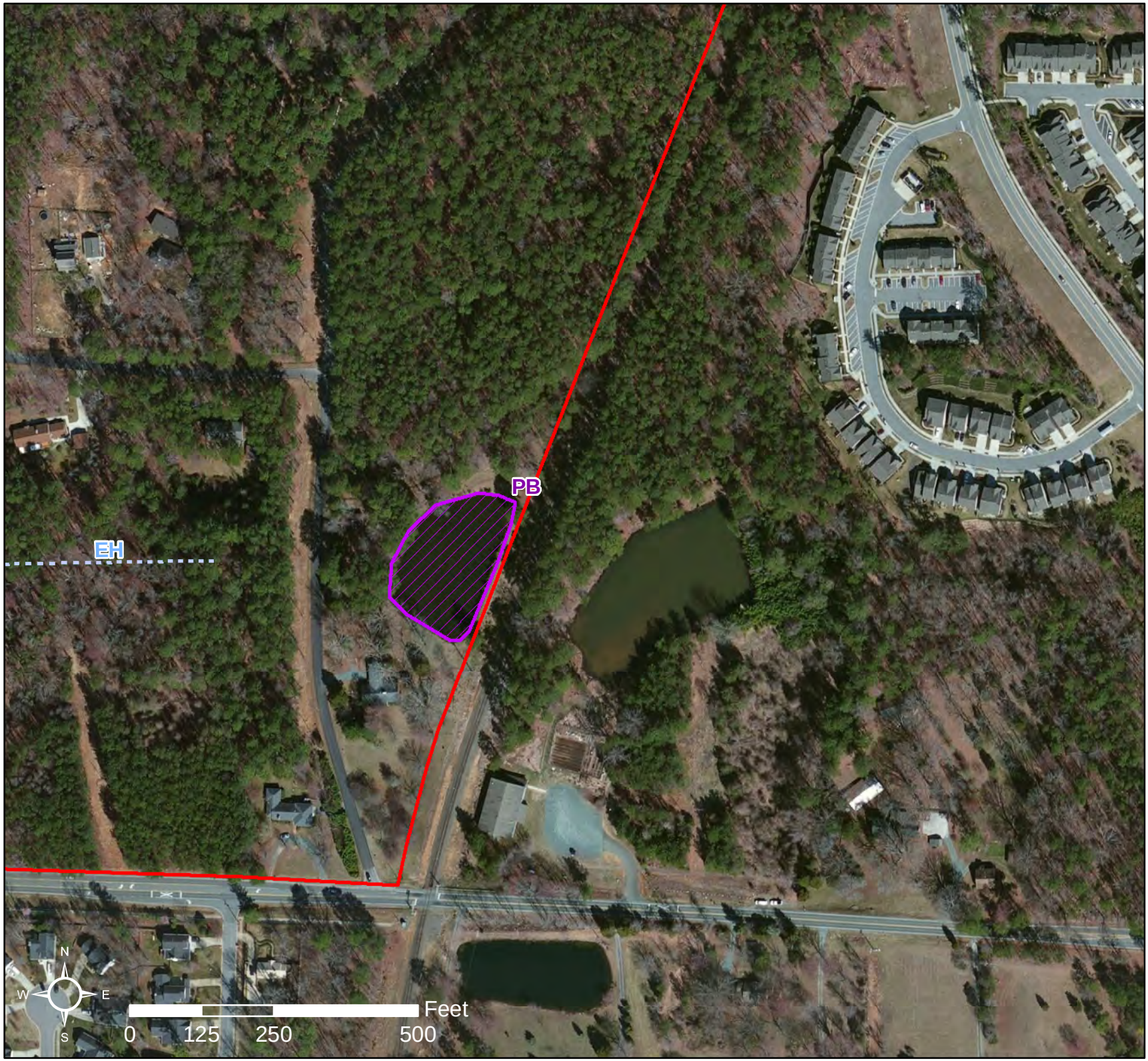
COUNTY

Orange

Haw Watershed
HUC - 03030002

Figure 5N
WOUS Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.



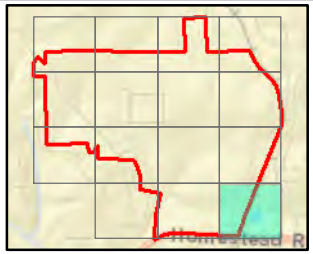
OWASA

Rogers Road Sewer Expansion

URS Project No. 31829996

Legend

- Photos
- Study area
- **Streams**
  - Ephemeral
  - Intermittent
  - Perennial
- Ponds
- **Wetlands**
  - PEM
  - PFO
  - POW



COUNTY

Orange

Haw Watershed
HUC - 03030002

Figure 5O
WOUS Map

January 2015
NAD83 State Plane NC 3200 feet
Stream and wetland locations are approximate.
No formal delineation was conducted.
This map is for reference only.

Photograph 1: Looking southeast at start of ephemeral stream EA

Photograph 2: Looking south, showing head cut at start of stream SA

Photograph 3: Looking west at intermittent portion of stream SA

Photograph 4: Looking northwest at perennial portion of stream SA

Photograph 5: Looking north at start of ephemeral stream EB

Photograph 6: Looking north at intermittent stream SB

Photograph 7: Looking northeast at ephemeral stream EC

Photograph 8: Looking east at perennial stream SD

Photograph 9: Looking south at start of ephemeral stream EE

Photograph 10: Looking north at perennial portion of stream SF and wetland SF

Photograph 11: Looking southwest at perennial stream SF at culvert

Photograph 12: Looking south at perennial stream SF

Photograph 13: Looking northeast at perennial stream SF, showing deep incision.

Photograph 14: Looking south at perennial stream SF

Photograph 15: Looking west at ephemeral stream EH

Photograph 16: Looking west at intermittent stream SH, showing culvert under driveway

Photograph 17: Looking southwest at SF where it exits the study area and where ephemeral EF4 joins

Photograph 18: Looking north at perennial stream SF

Photograph 19: Looking north at confluence of perennial streams SF and SI

Photograph 20: Looking north at confluence of perennial stream SF and intermittent stream SJ

Photograph 21: Looking southwest at perennial stream SD with WD2 in background

Photograph 22: Looking east at perennial stream SD past WD2, showing erosion.

Photograph 23: Looking south at perennial stream SD

Photograph 24: Looking north at SD floodplain.

Photograph 25: Looking south at wetland WD

Photograph 26: Looking west at PEM portion of WD

Photograph 27: Looking southwest at WD

Photograph 28: Looking west at where perennial stream SD flows into POW portion of WD

Photograph 29: Looking west at small wetland WC

Photograph 30: Looking northeast at wetland WF

Photograph 31: Looking south at wetland WI, showing intermittent stream SI

Photograph 32: Looking south at POW portion of wetland WI2

Photograph 33: Looking southeast at PFO portion of wetland WI2

Photograph 34: Looking southeast at pond PA

Photograph 35: Looking south at POW wetland WD2

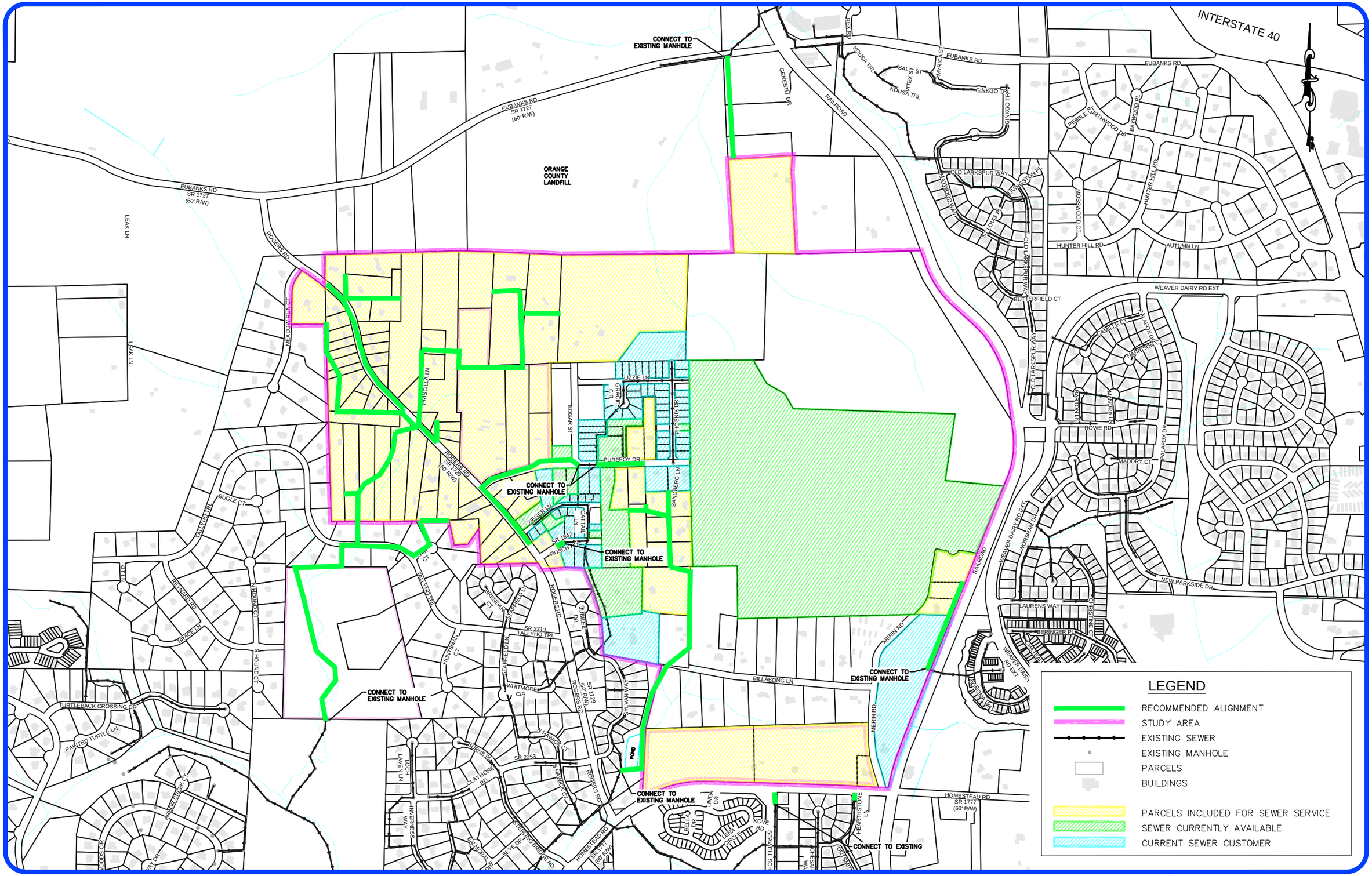
Photograph 36: Showing old beaver activity next to wetland WD2

Photograph 37: Looking north at upland near landfill borrow site

Photograph 38: Looking north at Habitat for Humanity stormwater area

Exhibit 1

URS Recommended Sewer Alignment



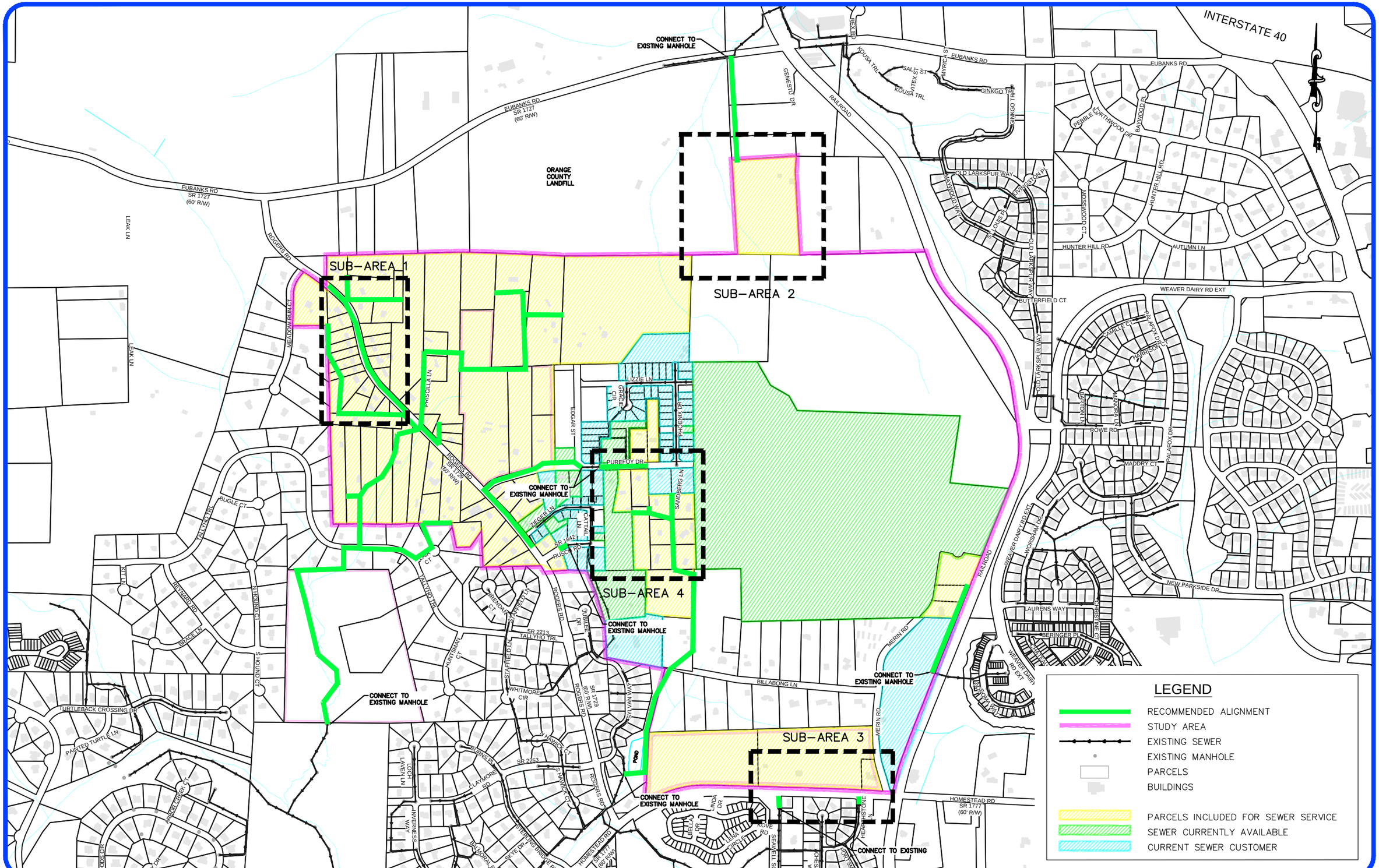
RECOMMENDED ALIGNMENT

EXHIBIT 1 - NOT TO SCALE

OWASA URS

Exhibit 2

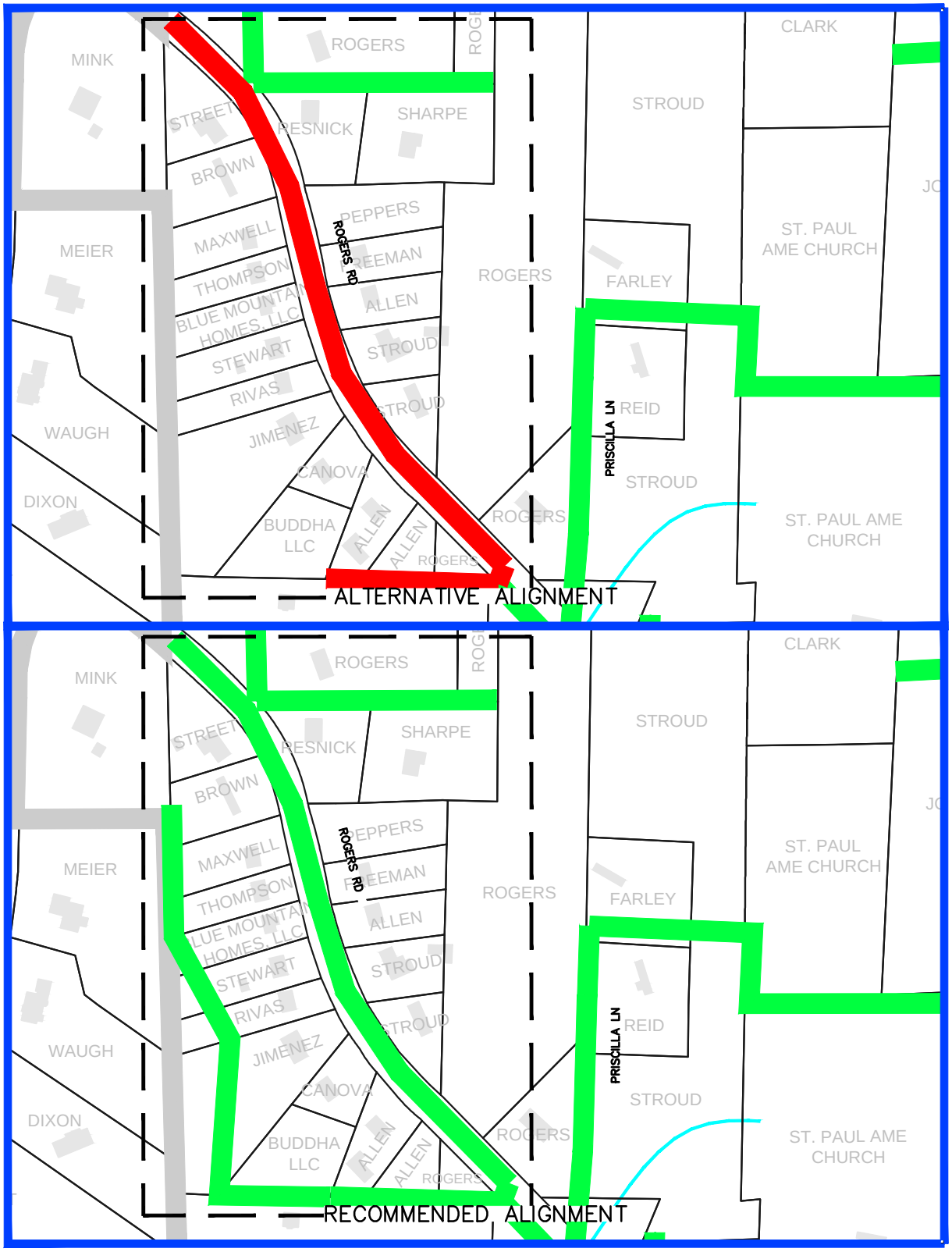
Sub-Areas



SUB-AREAS

EXHIBIT 2 - NOT TO SCALE

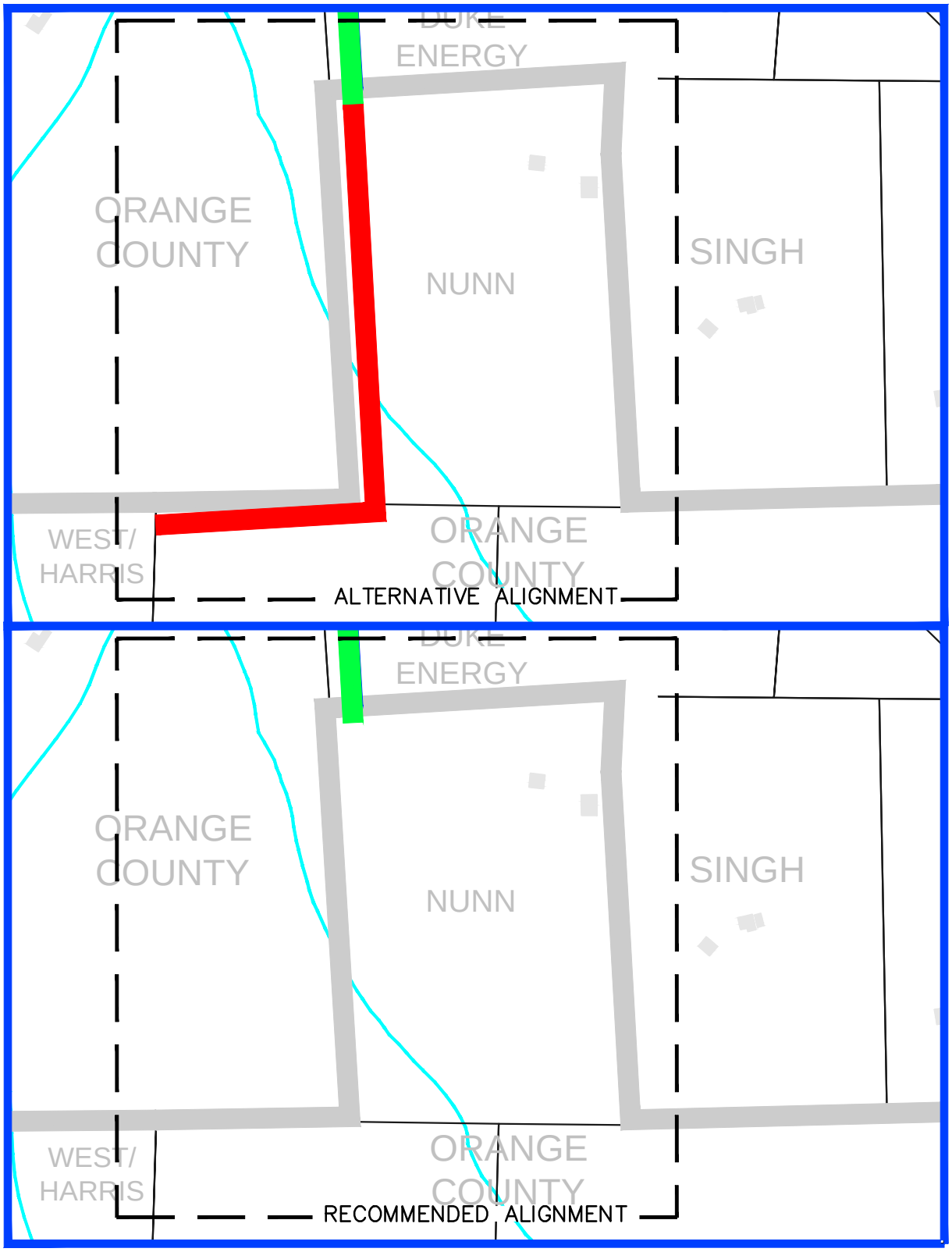
OWASA URS



SUB-AREA 1

EXHIBIT 2A - NOT TO SCALE

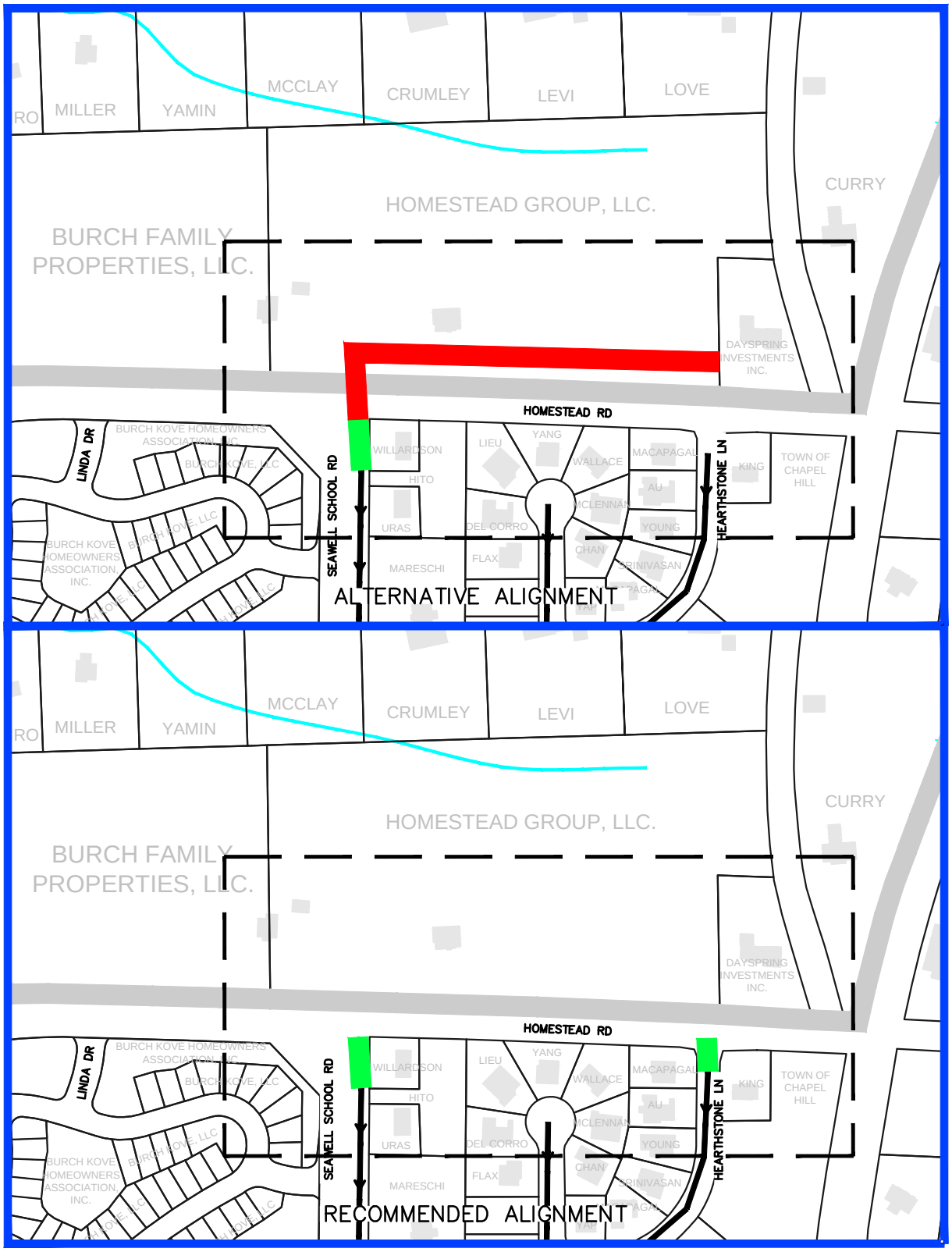
OWASA URS



SUB-AREA 2

EXHIBIT 2B - NOT TO SCALE

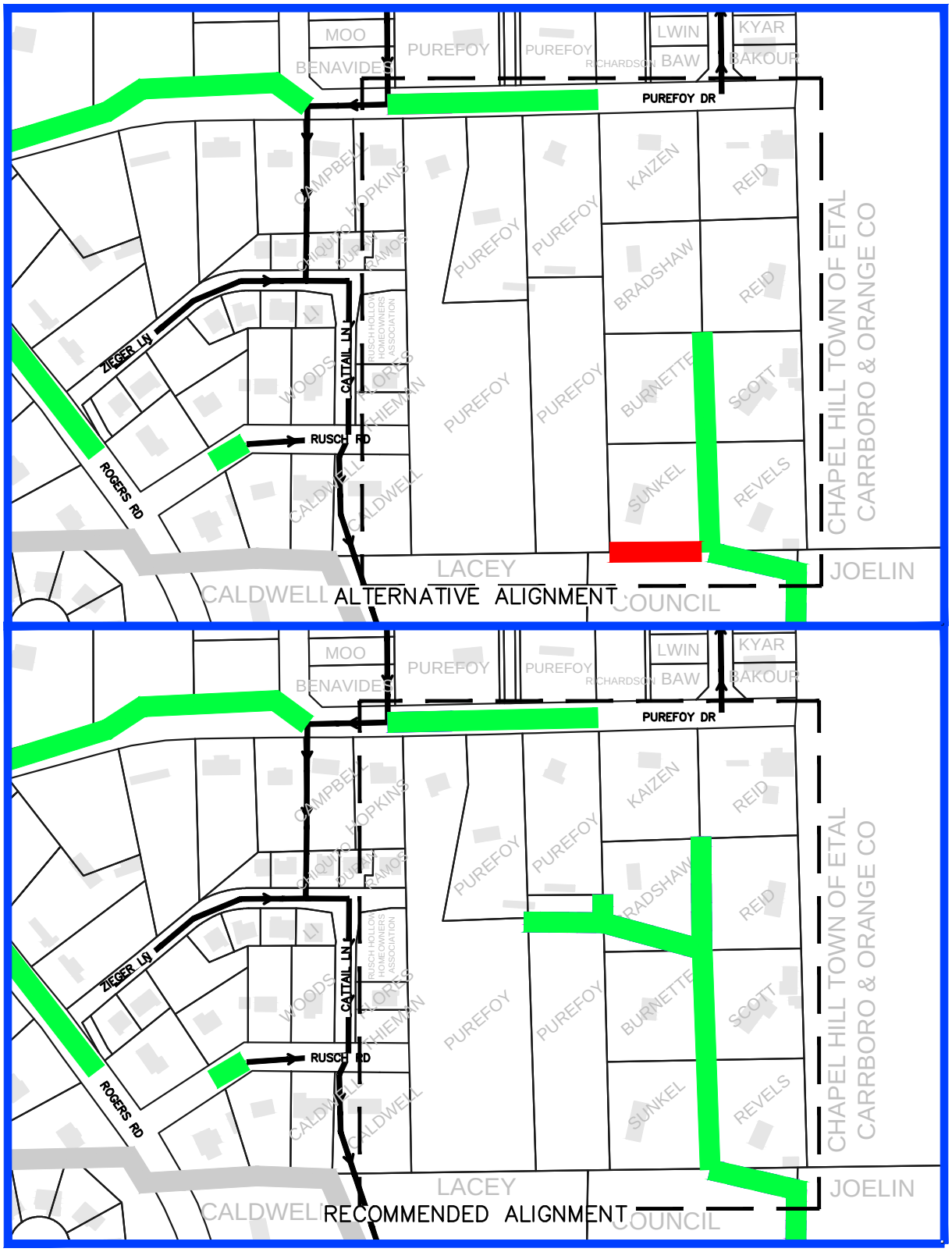
OWASA URS



SUB-AREA 3

EXHIBIT 2C - NOT TO SCALE

OWASA URS



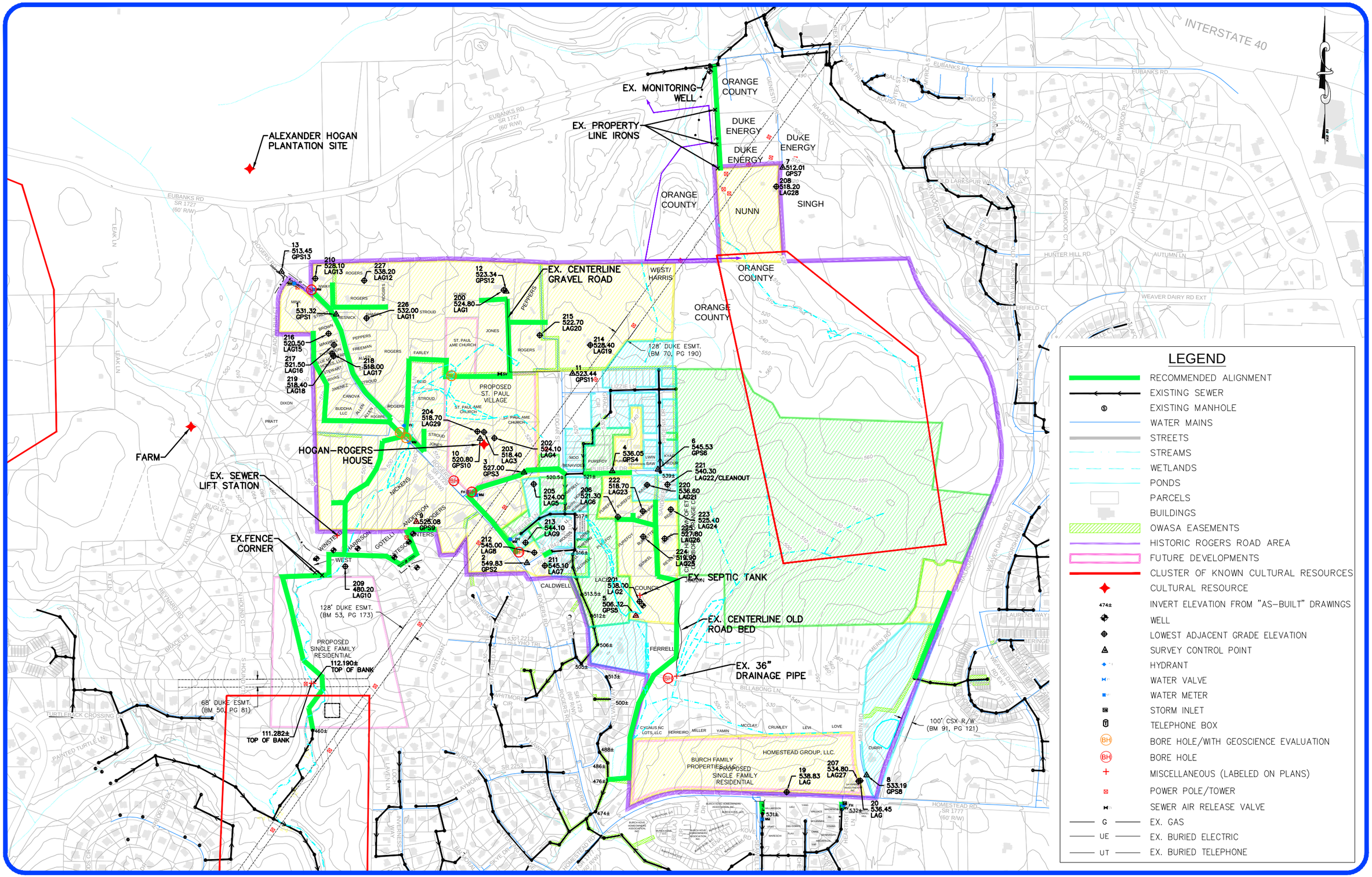
SUB-AREA 4

EXHIBIT 2D - NOT TO SCALE

OWASA URS

Exhibit 3

Field Investigations



FIELD INVESTIGATION

EXHIBIT 3 - NOT TO SCALE

URS

Exhibit 4

Budget Level Total Project Cost Estimate

OPINION OF PROBABLE CONSTRUCTION COSTS 17-Mar-15

				Recommended Sanitary Sewer Alignment	
ITEM	DESCRIPTION	UNIT	UNIT PRICE	QUANTITY	TOTAL
1	Clearing and Grubbing	AC	$ 7,500	8	60,000
2	Erosion Control Devices and Maintenance	AC	$ 5,000	6	30,000
3	Temporary Accessibility Structures	EA	$ 10,000	4	40,000
4	Traffic/Pedestrian Control	JOB	$ 50,000	1	50,000
5	Rock Excavation	CY	$ 70	7,500	525,000
6	Suitable Fill Material	CY	$ 35	7,500	262,500
7	Bore and Jack, 16" Steel Encasement	LF	$ 180	120	21,600
8	8" D.I. Carrier Pipe	LF	$ 195	140	27,300
9	8" Sanitary Sewer (0'-10')	LF	$ 80	10,240	819,200
10	8" Sanitary Sewer (11'-18')	LF	$ 125	5,360	670,000
11	8" Sanitary Sewer (19'-26')	LF	$ 150	620	93,000
12	12" Sanitary Sewer (0'-12')	LF	$ 100	2,220	222,000
13	4' Sanitary Sewer Manhole	EA	$ 4,000	90	360,000
14	5' Sanitary Sewer Manhole	EA	$ 7,000	15	105,000
15	4" Sewer Service with Cleanout	EA	$ 2,500	83	207,500
16	4" Sewer Bored Sewer Service	EA	$ 9,500	3	28,500
17	Driveway Replacement	EA	$ 750	41	30,750
18	Roadway Replacement (Gravel)	SY	$ 40	5,000	200,000
19	Roadway Replacement (Asphalt)	SY	$ 90	1,500	135,000
20	Connection to Existing Sewer Mains	EA	$ 3,500	9	31,500
21	Seeding and Mulching	AC	$ 3,500	8	28,000
22	Mobilization				95,203
		Total Rounded Construction Cost			$ 4,040,000

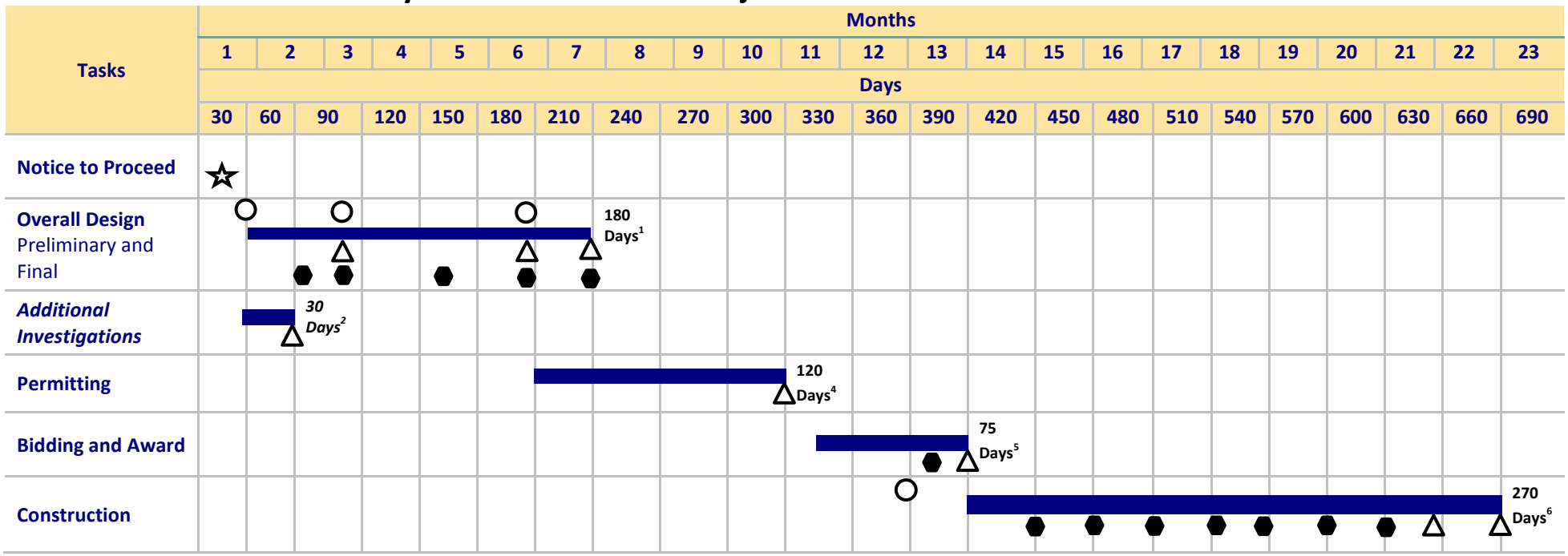
Preliminary Cost Opinion	$ 3,787,456
Budget Cost Opinion (03/17/2015)	$ 4,040,000
Difference	$ 252,544

6% Percent Difference Between Preliminary and Current

Exhibit 5

Project Schedule

OWASA HRRA Sanitary Sewer Extension – Project Schedule



- ☆ Notice to Proceed
- ○ Public Outreach Meetings
- △ Deliverable
- ⬢ Review Meetings

1. Time may vary due to additional investigations, review, collaboration, and final corridor alignment selection.
2. Time may vary due to the number of additional soil investigations, buffer and wetland delineation, and additional historical/archaeological investigations required.
3. Time may vary due to easement acquisition and land appraisals (if needed).
4. Time may vary due to permitting agency approval process and if unusual permitting issues arise.
5. Time may vary due to rebid (if needed) or if legal issues arise.
6. Construction time could change due to unknown excavation issues and abnormal weather issues.