



Figure 73. Fontaine Existing Conditions, Tile G4

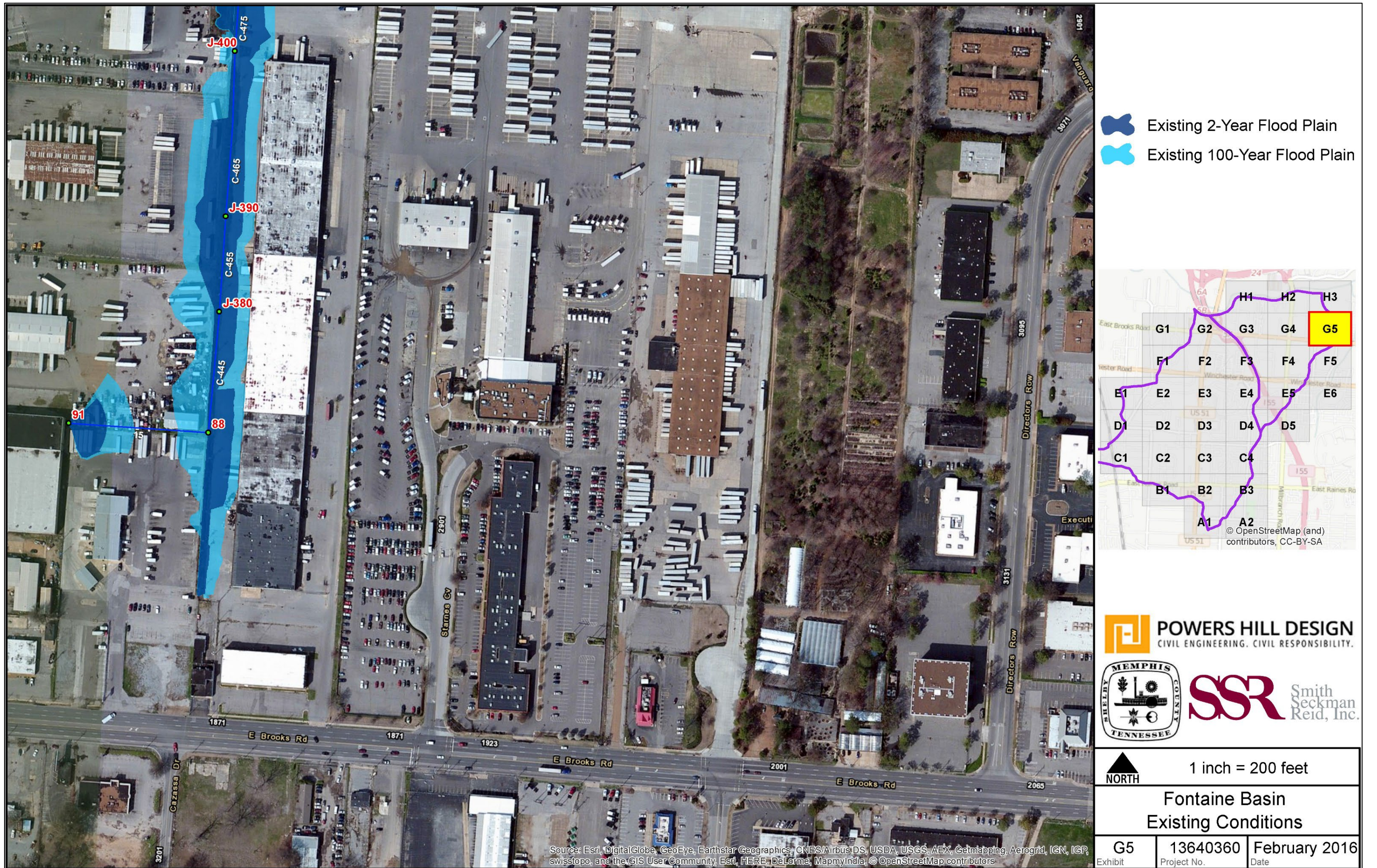


Figure 74. Fontaine Existing Conditions, Tile G5

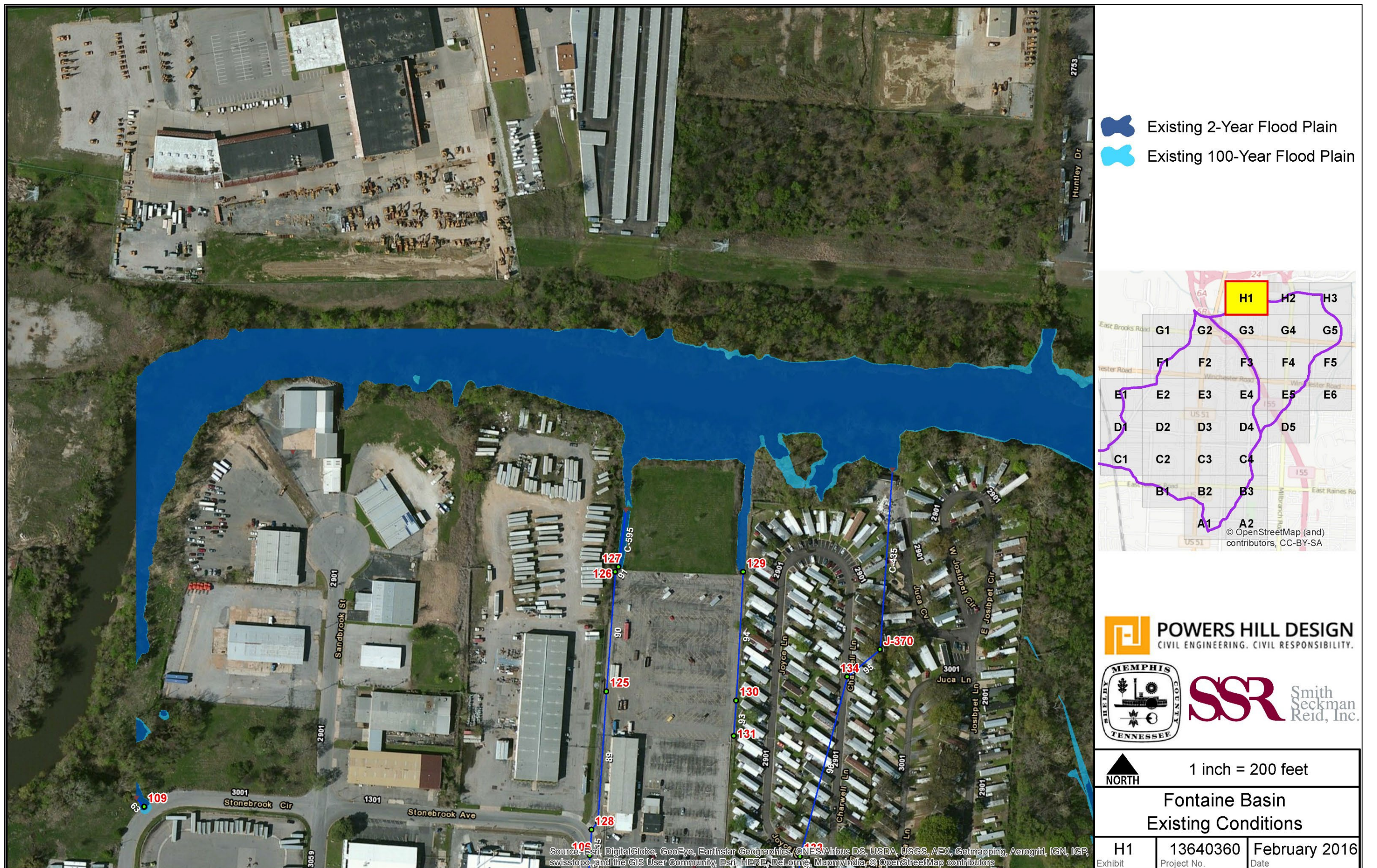


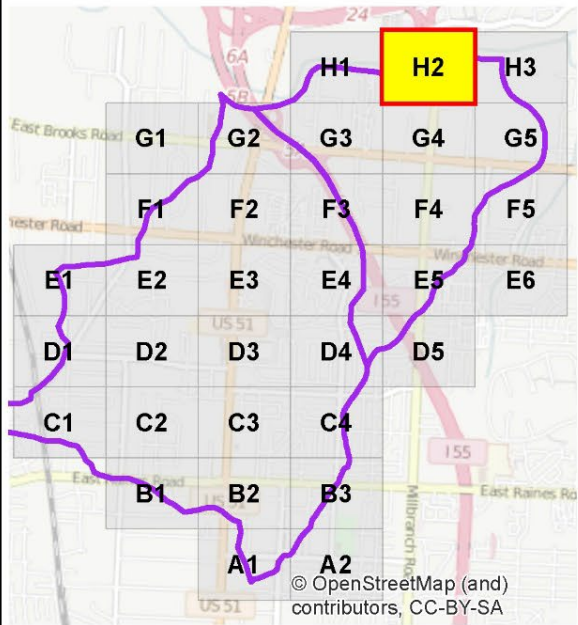


Figure 75. Fontaine Existing Conditions, Tile H1



-  Existing 2-Year Flood Plain
-  Existing 100-Year Flood Plain



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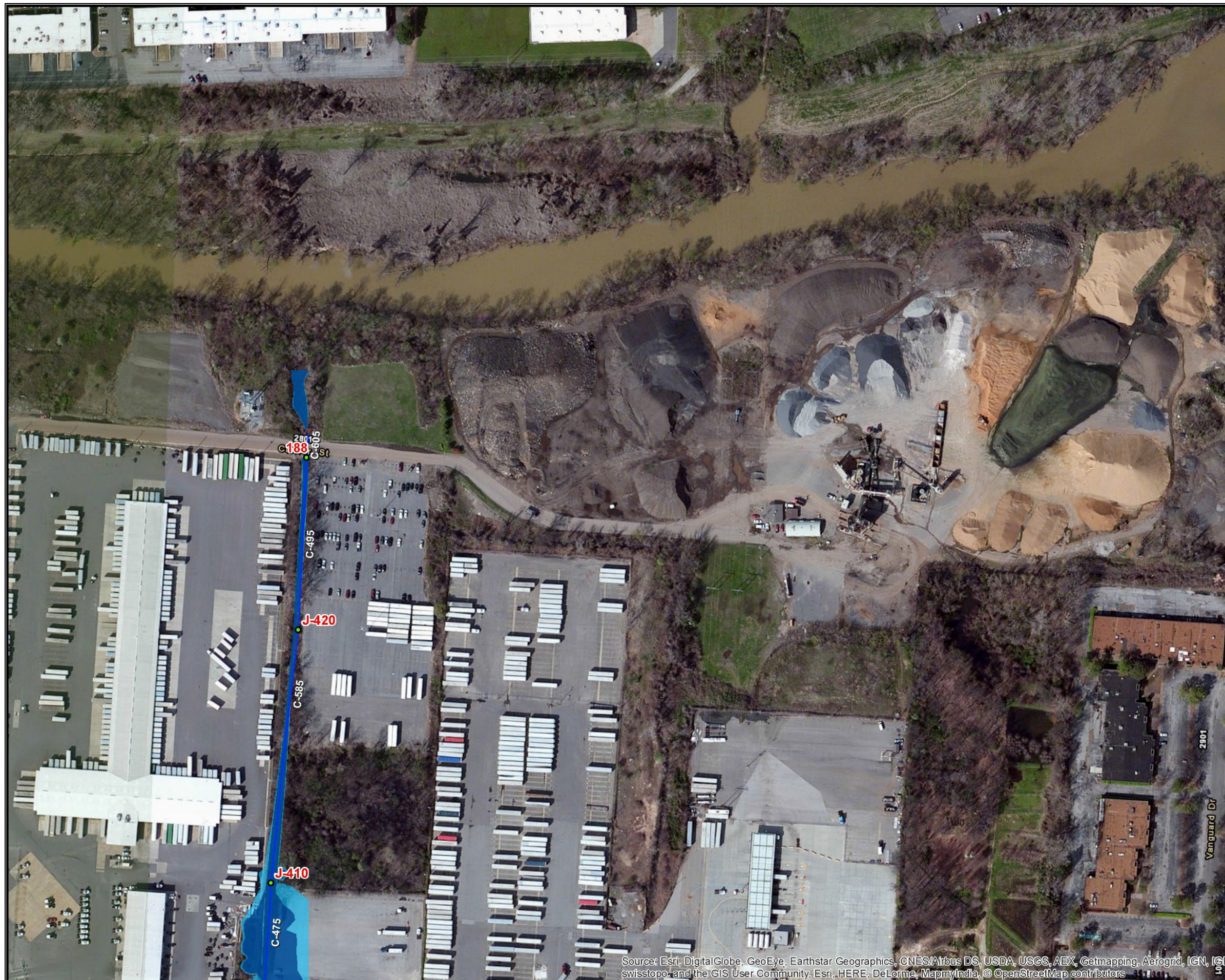


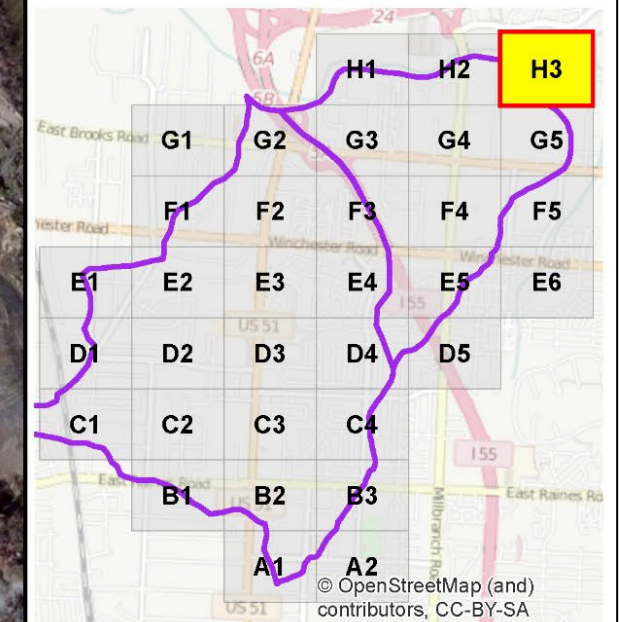
 1 inch = 200 feet		
Fontaine Basin Existing Conditions		
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Figure 76. Fontaine Existing Conditions, Tile H2



-  Existing 2-Year Flood Plain
-  Existing 100-Year Flood Plain




 1 inch = 200 feet		
Fontaine Basin Existing Conditions		
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Figure 77. Fontaine Existing Conditions Tile H3

4.3 Modeled Improvements to Address Flooding

Whitehaven Scenarios: The modeler prepared and ran a total of 20 scenarios for the Whitehaven basin. Based on the City's requirements for scenario modeling, the alternatives analyzed were based on containing the 100-year storm event within existing channels. This section provides descriptions of these scenarios and conclusions reached.

EX100YEARWITHPARKIMPROVEMENTS: Existing conditions scenario with culvert improvements in Polly Williams Park (a 72" concrete pipe replaced with a 12' x 5.25' concrete box culvert; Conduit ID: 327) and the 102" pipe restriction downstream of Winchester Grove Apartments in place (Conduit ID: CDT-1787). Subcatchment data set is 1 percent recurrence interval storm. The Polly Williams Park improvements did not affect the major flooding areas in the basin.

EX100: Existing conditions scenario with culvert improvements in Polly Williams Park (a 72" concrete pipe replaced with a 12' x 5.25' concrete box culvert; Conduit ID: 327) and the 102" pipe restriction downstream of Winchester Grove Apartments removed (Conduit ID: CDT-1787). Subcatchment data set is 1 percent recurrence interval storm. The removal of the 102" pipe restriction provided some improvement to the Winchester Grove Apartments flooding conditions, but did not fully address the issue.

BLUEBIRDREDIROCK: Proposed improvements scenario with culvert improvements in Polly Williams Park (Conduit ID: 327), the natural channels downstream of Bluebird Road improved to 27' wide channels with Mechanically Stabilized Earth (MSE) sidewalls and a natural channel bottom (Conduit ID's: CDT-1709, CDT-1779 & CDT-1705) and the 102" pipe restriction downstream of Winchester Grove Apartments removed (Conduit ID: CDT-1787). The entrance and exit losses at the bridge crossing of Bluebird Road were also improved in this scenario (Junction ID's: JCT-1701 & JCT-1703). Subcatchment data set is 1 percent recurrence interval storm.

BLUEBIRDREDIROCK2: Proposed improvements scenario with culvert improvements in Polly Williams Park (Conduit ID: 327), the natural channels downstream of Bluebird Road improved to 27' wide channels with MSE sidewalls and a natural channel bottom (Conduit ID's: CDT-1709, CDT-1779 & CDT-1705). The entrance and exit losses at the bridge crossing of Bluebird Road were also improved in this scenario (Junction ID's: JCT-1701 & JCT-1703). The restriction under Winchester Road upstream of the Winchester Grove Apartments (a double 14' x 13' box culvert flowing into a double 10.5' x 9.5' box culvert (Conduit ID: CDT-1715)) was changed to a continuous double 14' x 13' box culvert crossing. The bridge crossing inside Winchester Grove Apartments has also been improved from a double 12' x 10' box culvert to a double 20' x 10' box culvert (Conduit ID: 1625). The 102" pipe restriction downstream of Winchester Grove Apartments removed (Conduit ID: CDT-1787). Subcatchment data set is 1 percent recurrence interval storm.

BLUEBIRDREDIROCK3: Proposed improvements scenario with culvert improvements in Polly Williams Park (Conduit ID: 327), the natural channels downstream of Bluebird Road improved to 27' wide channels with MSE sidewalls and a natural channel bottom (Conduit ID's: CDT-1709, CDT-1779 & CDT-1705). The entrance and exit losses at the bridge crossing of Bluebird Road were also improved in this scenario (Junction ID's: JCT-1701 & JCT-1703). The restriction under Winchester Road upstream of the Winchester Grove Apartments (a double 14' x 13' box culvert flowing into a double 10.5' x 9.5' box culvert (Conduit ID: CDT-1715)) was changed to a continuous double 14' x 13' box culvert crossing. The bridge crossing inside Winchester Grove Apartments has also been improved from a double 12' x 10' box culvert to a double 18' x 10' box culvert (Conduit ID: 1625). Approximately 469' of the channel upstream (Conduit ID: CDT-1719) and 472' of the channel downstream (Conduit ID: CDT-1622) of this bridge crossing were modeled as a 36' wide channel with MSE sidewalls and a natural channel bottom. The 102" pipe restriction downstream of Winchester Grove Apartments removed (Conduit ID: CDT-1787). Subcatchment data set is 1 percent recurrence interval storm. **THIS SCENARIO WAS THE FINAL RECOMMENDATION OF IMPROVEMENTS FOR WHITEHAVEN.**

102INCHANDJUNCTIONIMPROVED: Proposed conditions scenario with culvert improvements in Polly Williams Park (a 72" concrete pipe replaced with a 12' x 5.25' concrete box culvert; Conduit ID: 327) and the 102" pipe restriction downstream of Winchester Grove Apartments removed (Conduit ID: CDT-1787). The entrance and exit losses were removed to model an improved junction of the concrete channel and natural channel on the north side of the Winchester Grove Apartments (Junction ID: 1616). Subcatchment data set is 1 percent recurrence interval storm.

BLUEBIRDBRIDGEIMPROVEMENTS: Proposed improvements scenario with culvert improvements in Polly Williams Park (Conduit ID: 327), the natural channels downstream of Bluebird Road improved to 27' wide channels with MSE sidewalls and a natural channel bottom (Conduit ID's: CDT-1709, CDT-1779 & CDT-1705), and the 102" pipe restriction downstream of Winchester Grove Apartments removed (Conduit ID: CDT-1787). The entrance and exit losses at the bridge crossing of Bluebird Road were also improved in this scenario (Junction ID's: JCT-1701 & JCT-1703). Subcatchment data set is 1 percent recurrence interval storm.

BLUEBIRDREDIROCKIMPROVEMENTS: Proposed improvements scenario with culvert improvements in Polly Williams Park (Conduit ID: 327). The natural channels downstream of Bluebird Road improved to 27' wide channels with MSE sidewalls and a natural channel bottom (Conduit ID's: CDT-1709, CDT-1779 & CDT-1705). The entrance and exit losses at the bridge crossing of Bluebird Road were also improved in this scenario (Junction ID's: JCT-1701 & JCT-1703). The 102" pipe restriction downstream of Winchester Grove Apartments remains in place in this scenario (Conduit ID: CDT-1787). Subcatchment data set is 1 percent recurrence interval storm.

BLUEBIRDREDIROCKTOHEARTBREAK: Proposed improvements scenario with culvert improvements in Polly Williams Park (Conduit ID: 327). The natural channels downstream of the Heartbreak Hotel and downstream of Bluebird Road were improved to 27' wide channels with MSE sidewalls and a natural channel bottom (Conduit ID's: CDT-1602, CDT-1709, CDT-1779 & CDT-1705). The entrance and exit losses at the bridge crossing of Bluebird Road were also improved in this scenario (Junction ID's: JCT-1701 & JCT-1703). The 102" pipe restriction downstream of Winchester Grove Apartments remains in place in this scenario (Conduit ID: CDT-1787). Subcatchment data set is 1 percent recurrence interval storm.

HUDPOND: Proposed improvements scenario with culvert improvements in Polly Williams Park (Conduit ID: 327) and a 4' deep detention pond that is 630,000 square feet in area at the top of bank that would provide approximately 92,000 cubic yards of detention storage. This pond was modeled at the location of the HUD property just south of Heartbreak Hotel, northwest of the intersection of Craft Road and Elvis Presley Boulevard (Storage ID: STOR-3; Conduit ID's: CDT-1790 & CDT-1791). Since this detention scenario is located in the upper third of the Whitehaven Basin, the modeled detention pond did not improve flooding at Bluebird. (This site has been developed since the initial modeling was done.)

JUNCTION1015IMPROVED: Proposed conditions scenario with culvert improvements in Polly Williams Park (a 72" concrete pipe replaced with a 12' x 5.25' concrete box culvert; Conduit ID: 327) and the 102" pipe restriction downstream of Winchester Grove Apartments in place (Conduit ID: CDT-1787). The Bluebird Road bridge crossing was improved by modeling an improved entrance loss coefficient (Junction ID's: JCT-1701 & JCT-1703). The 90-degree junction of the 60" pipe and the concrete channel southwest of Laudeen Drive and Hermitage Drive (Junction ID: 1015) was improved by lowering the exit loss coefficient of the 60" pipe. Subcatchment data set is 1 percent recurrence interval storm.

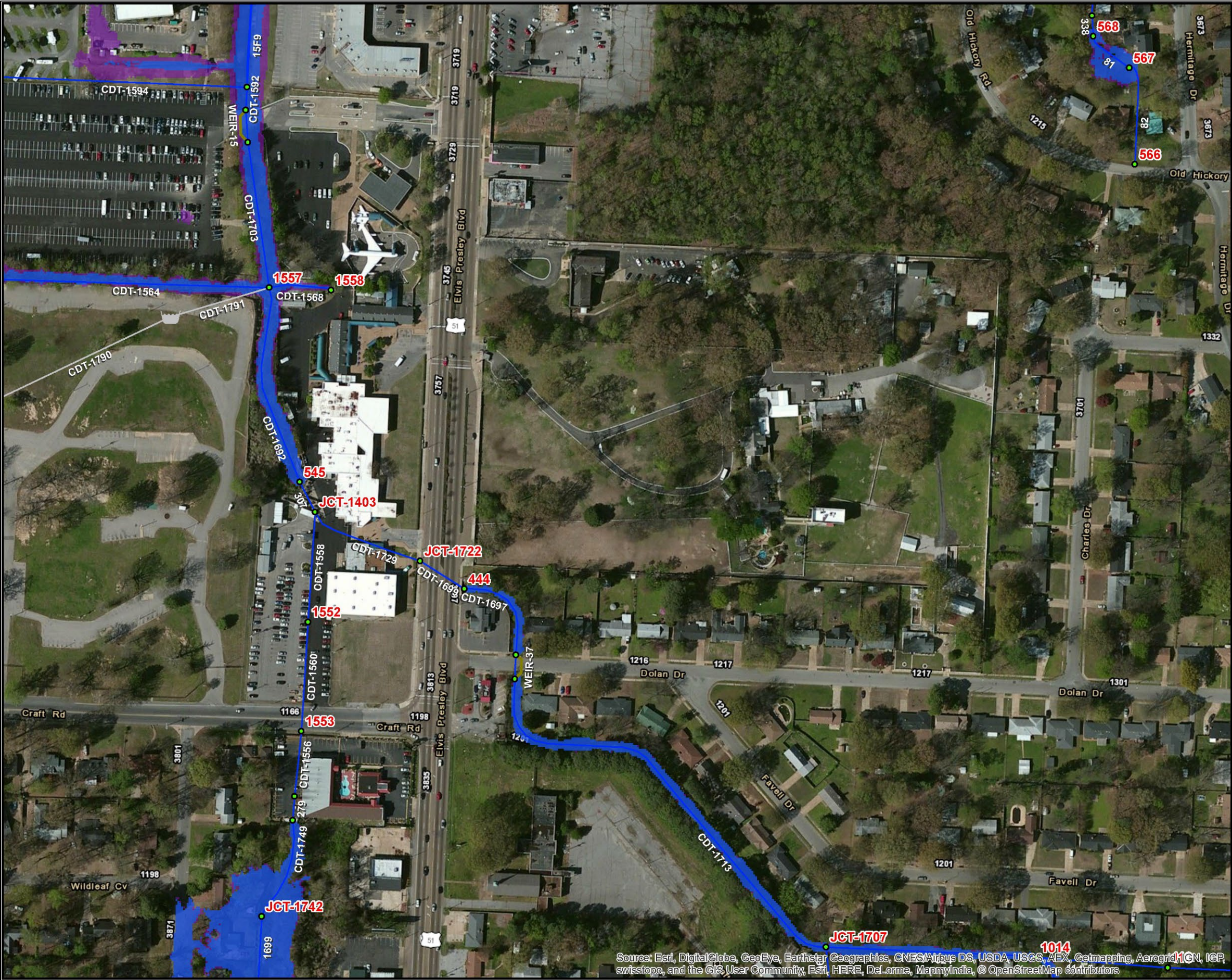
JUNCTION1616IMPROVED: Proposed conditions scenario with culvert improvements in Polly Williams Park (a 72" concrete pipe replaced with a 12' x 5.25' concrete box culvert; Conduit ID: 327). The Bluebird Road bridge crossing was improved by modeling an improved entrance loss coefficient (Junction ID's: JCT-1701 & JCT-1703). An improved junction of the concrete channel and natural channel on the north side of the Winchester Grove Apartments was modeled by lowering the exit loss of the concrete channel (Junction ID: 1616). The entrance loss coefficient was lowered to model an improved transition from the natural channel to the 102" pipe restriction downstream of Winchester Grove Apartments (Junction ID: JCT-1776). Subcatchment data set is 1 percent recurrence interval storm.

Fontaine Scenarios: The modeler prepared and ran a total of 9 scenarios for the Fontaine basin. This section provides descriptions of these scenarios. Based on the City's requirements for scenario modeling, the alternatives analyzed were based on containing the 100-year storm event within existing channels. This section provides descriptions of these scenarios and conclusions reached.

TRANSITIONANDBOXESIMPROVED: Proposed conditions scenario with culvert improvements beginning south of Millbranch Road and Lochearn Road by increasing 542' of concrete box culvert from 9' x 5' to 16' x 5' (Conduit ID's: 121, 122 & C-105). The entrance loss at the transition from a natural channel to a restricted 8' x 7' concrete channel was eliminated (Junction ID: 280). The channel downstream of this transition was increased to a 16' x 6.5' concrete channel (Conduit ID: C-275). The concrete channel that crosses Brooks Road was increased from 7' x 6.5' to 14' x 6.5' (Conduit ID: 6). The concrete box culvert downstream of this channel crossing Brooks Road was improved by increasing an 8' x 5' box to a 14' x 6.5' box culvert (Conduit ID's: 5 & 99). Subcatchment set is the 1 percent recurrence interval storm. **THIS WAS THE FINAL RECOMMENDATION OF IMPROVEMENTS FOR FONTAINE BASIN.**

TRANSITIONIMPROVED: Proposed conditions scenario by eliminating entrance loss at the transition from a natural channel to a restricted 8' x 7' concrete channel (Junction ID: 280). Subcatchment set is the 1 percent recurrence interval storm.

Figure 78 through Figure 96 on the following pages depict the comparison between existing conditions and the recommended alternatives to accommodate the 100-year storm.



Whitehaven Scenario 1:
Improvements at Bluebird Road and Cambridge Creek Apartments

Existing 100-Year Flood Plain
 Improved 100-Year Flood Plain

Note:
102" pipe near outfall is in place for Existing Scenario and removed for Proposed Scenario

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NORTH

1 inch = 200 feet

**Whitehaven Basin
Proposed Conditions**

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Figure 78. Whitehaven Proposed Conditions, Scenerio 0, Tile D3

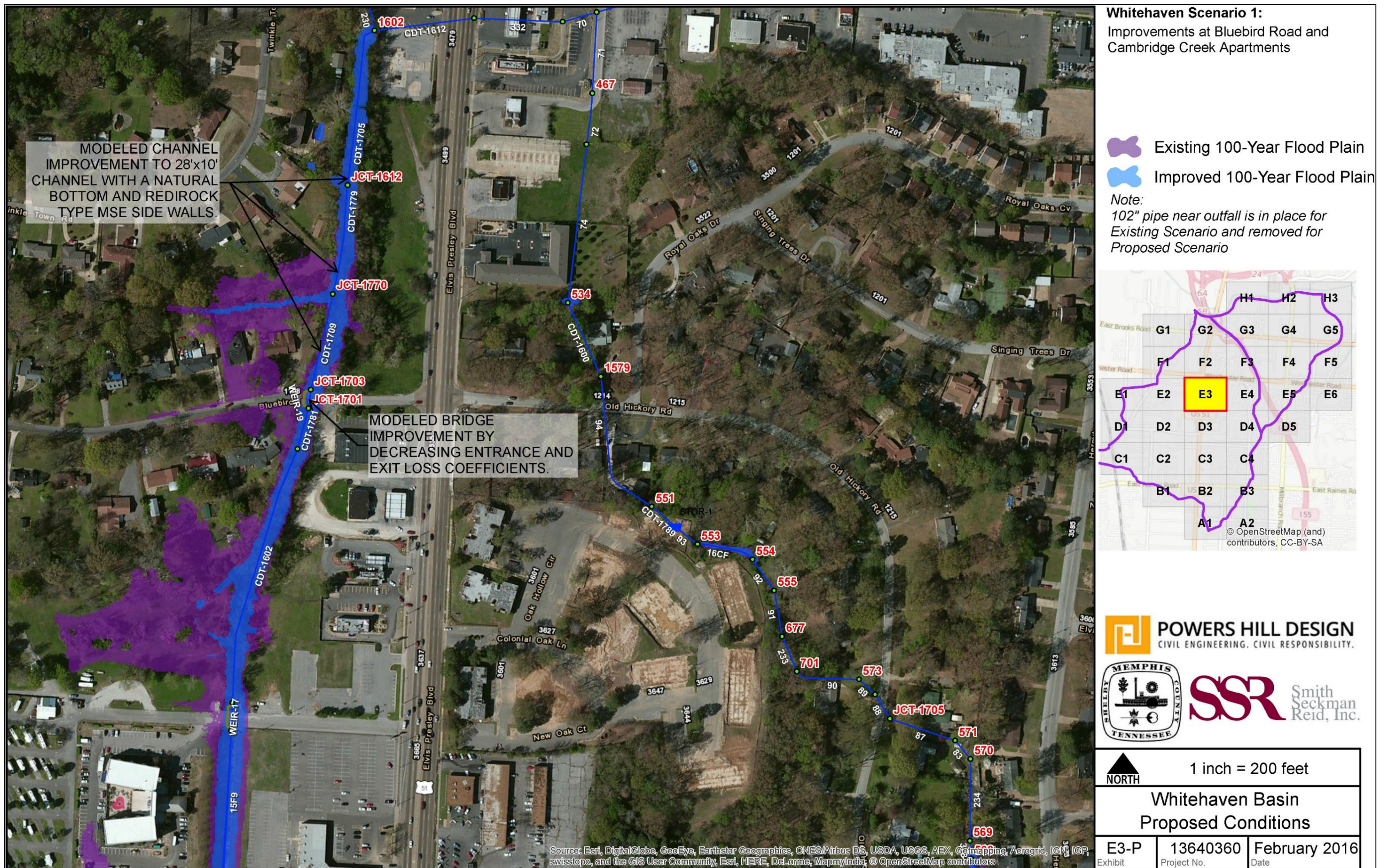


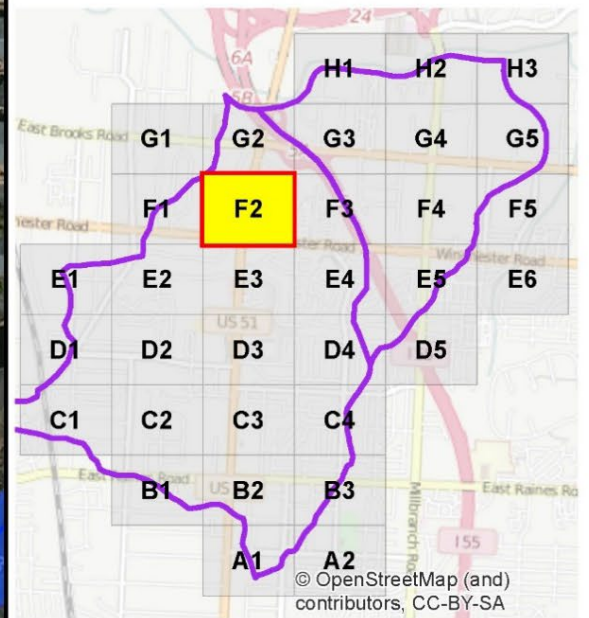
Figure 79. Whitehaven Proposed Conditions, Scenerio 0, Tile E3



Whitehaven Scenario 1:
Improvements at Bluebird Road and Cambridge Creek Apartments

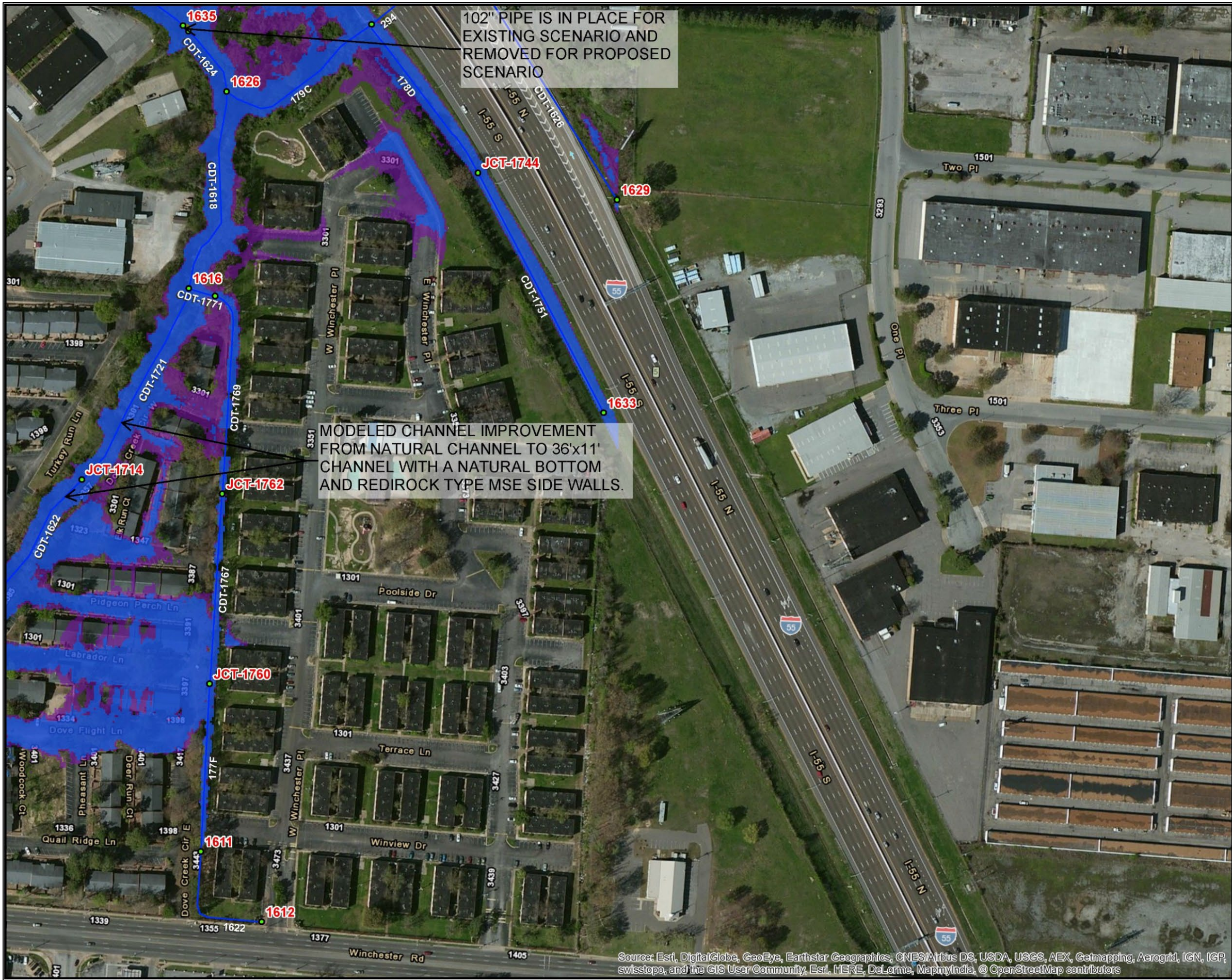
Existing 100-Year Flood Plain
 Improved 100-Year Flood Plain

Note:
102" pipe near outfall is in place for Existing Scenario and removed for Proposed Scenario



1 inch = 200 feet		
Whitehaven Basin Proposed Conditions		
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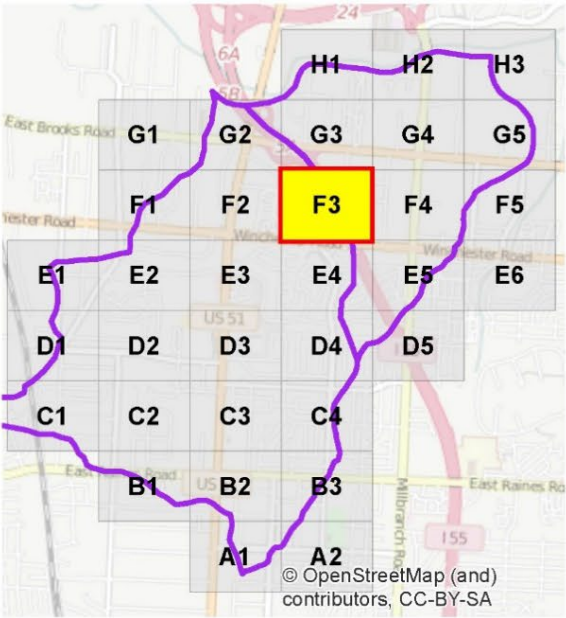
Figure 80. Whitehaven Proposed Conditions, Scenerio 0, Tile F2



Whitehaven Scenario 1:
Improvements at Bluebird Road and Cambridge Creek Apartments

Existing 100-Year Flood Plain
 Improved 100-Year Flood Plain

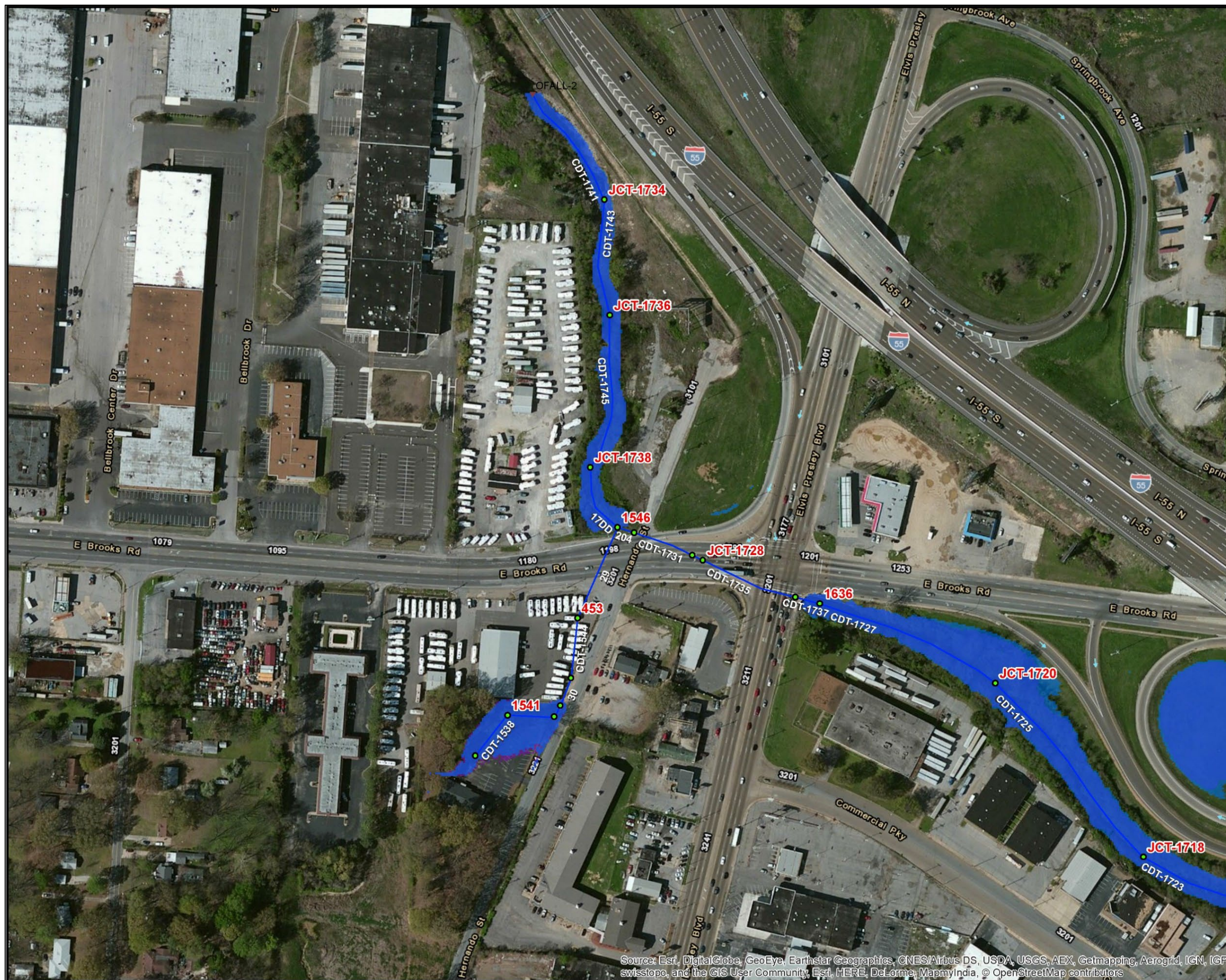
Note:
102" pipe near outfall is in place for Existing Scenario and removed for Proposed Scenario



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1 inch = 200 feet		
Whitehaven Basin Proposed Conditions		
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Figure 81. Whitehaven Proposed Conditions, Scenerio 0, Tile F3



Whitehaven Scenario 1:
Improvements at Bluebird Road and Cambridge Creek Apartments

Existing 100-Year Flood Plain
 Improved 100-Year Flood Plain

Note:
102" pipe near outfall is in place for Existing Scenario and removed for Proposed Scenario

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NORTH 1 inch = 200 feet

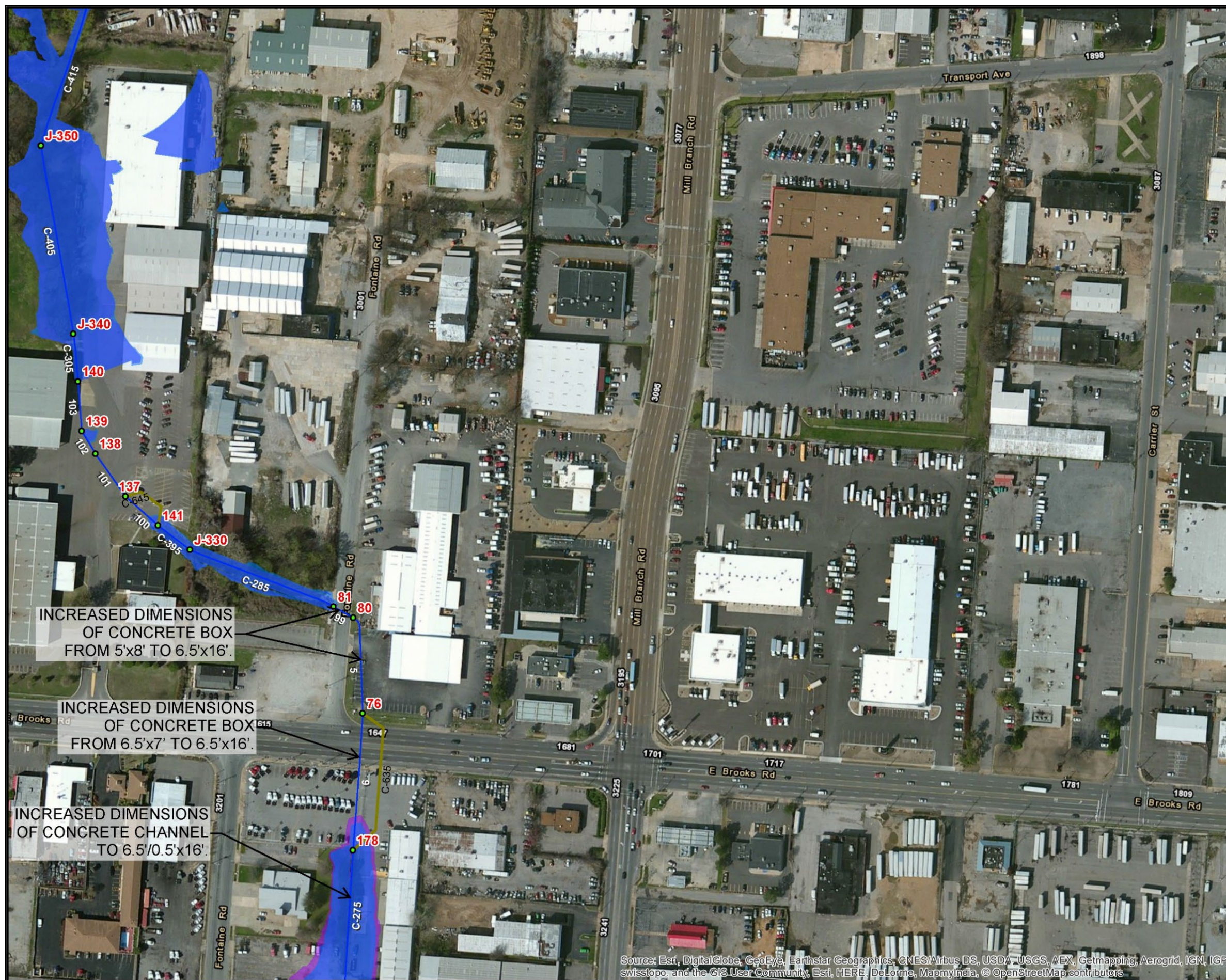
**Whitehaven Basin
Proposed Conditions**

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Figure 82. Whitehaven Proposed Conditions, Scenerio 0, Tile G2



Figure 83. Fontaine Proposed Conditions, Scenerio 1, Tile F4



Fontaine Scenario 1:
Improved Transition, Improved Channels and Culverts Upstream and Downstream of Junction J-280

Existing 100-Year Flood Plain
 Improved 100-Year Flood Plain

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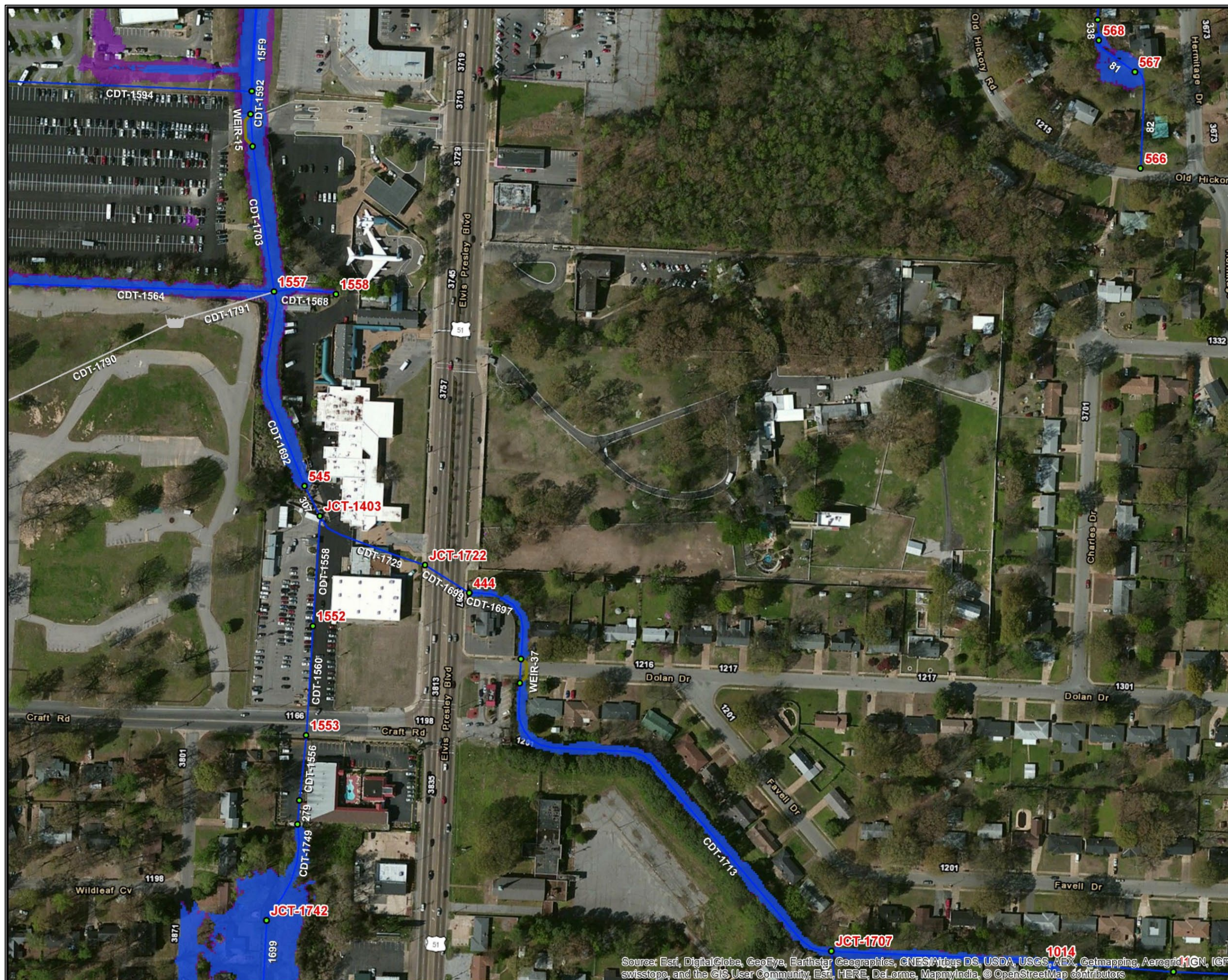
NORTH 1 inch = 200 feet

Fontaine Basin
Proposed Conditions



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors

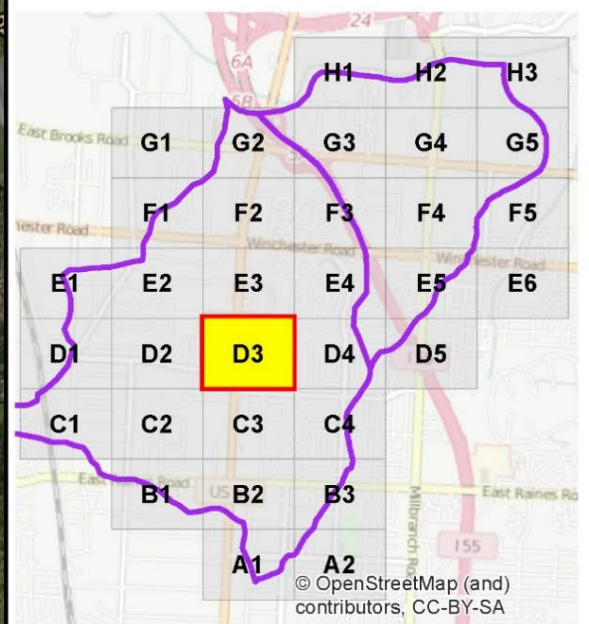
Figure 84. Fontaine Proposed Conditions, Scenerio 1, Tile G4



Whitehaven Scenario 2:
Improvements at Bluebird Road and Cambridge Creek Apartments

 Existing 100-Year Flood Plain
 Improved 100-Year Flood Plain

Note:
102" pipe near outfall is removed for both Existing Scenario and Proposed Scenario



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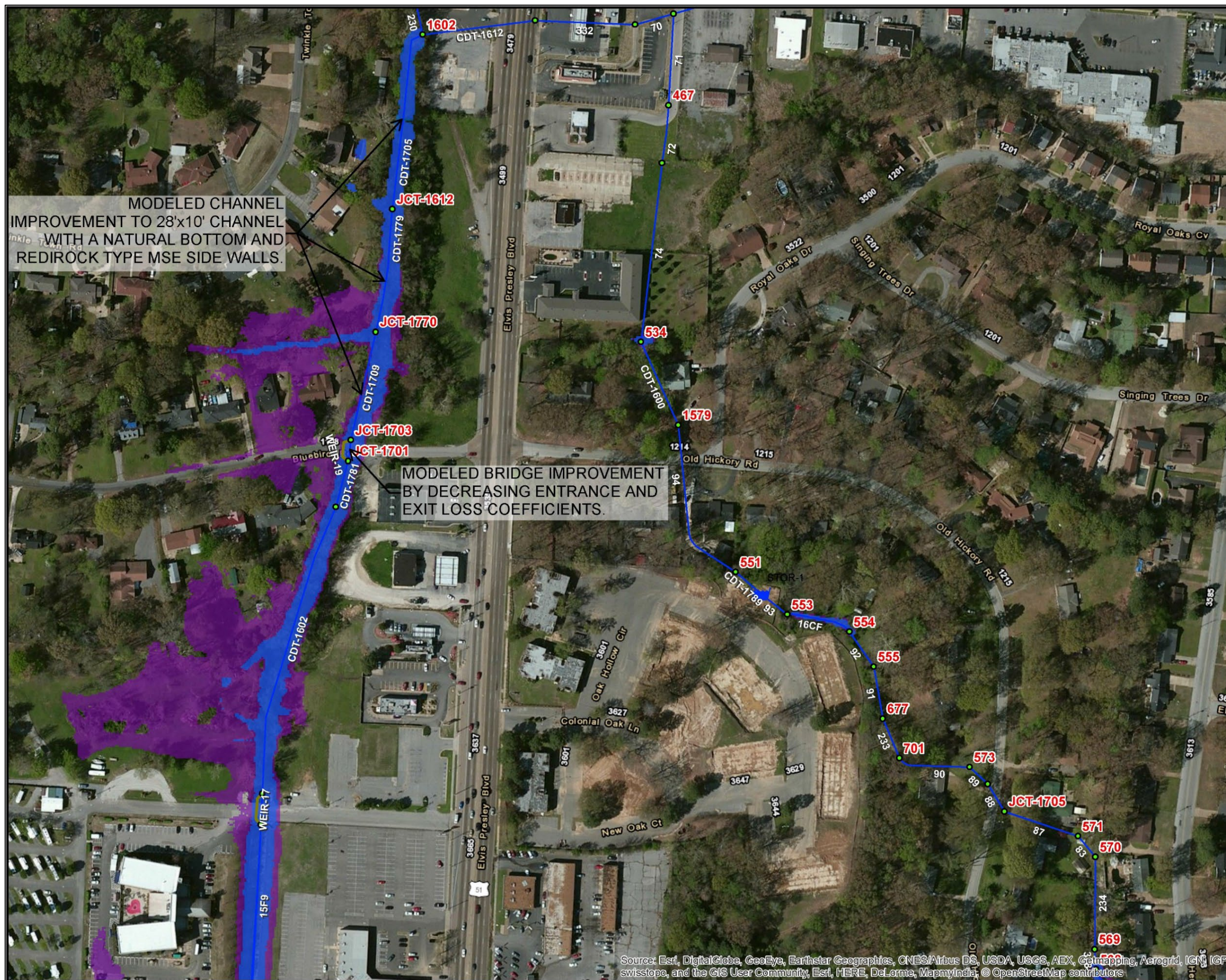
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Whitehaven Basin Proposed Conditions		
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Exhibit	Project No.	Date

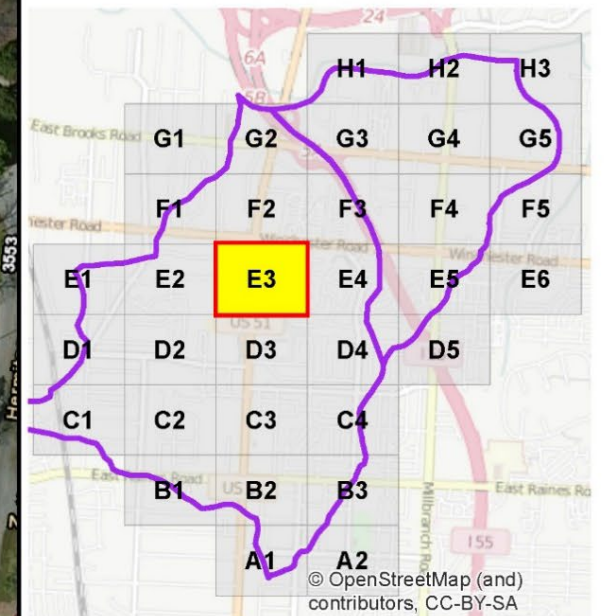
Figure 85. Whitehaven Proposed Conditions, Scenerio 2, Tile D3



Whitehaven Scenario 2:
Improvements at Bluebird Road and Cambridge Creek Apartments

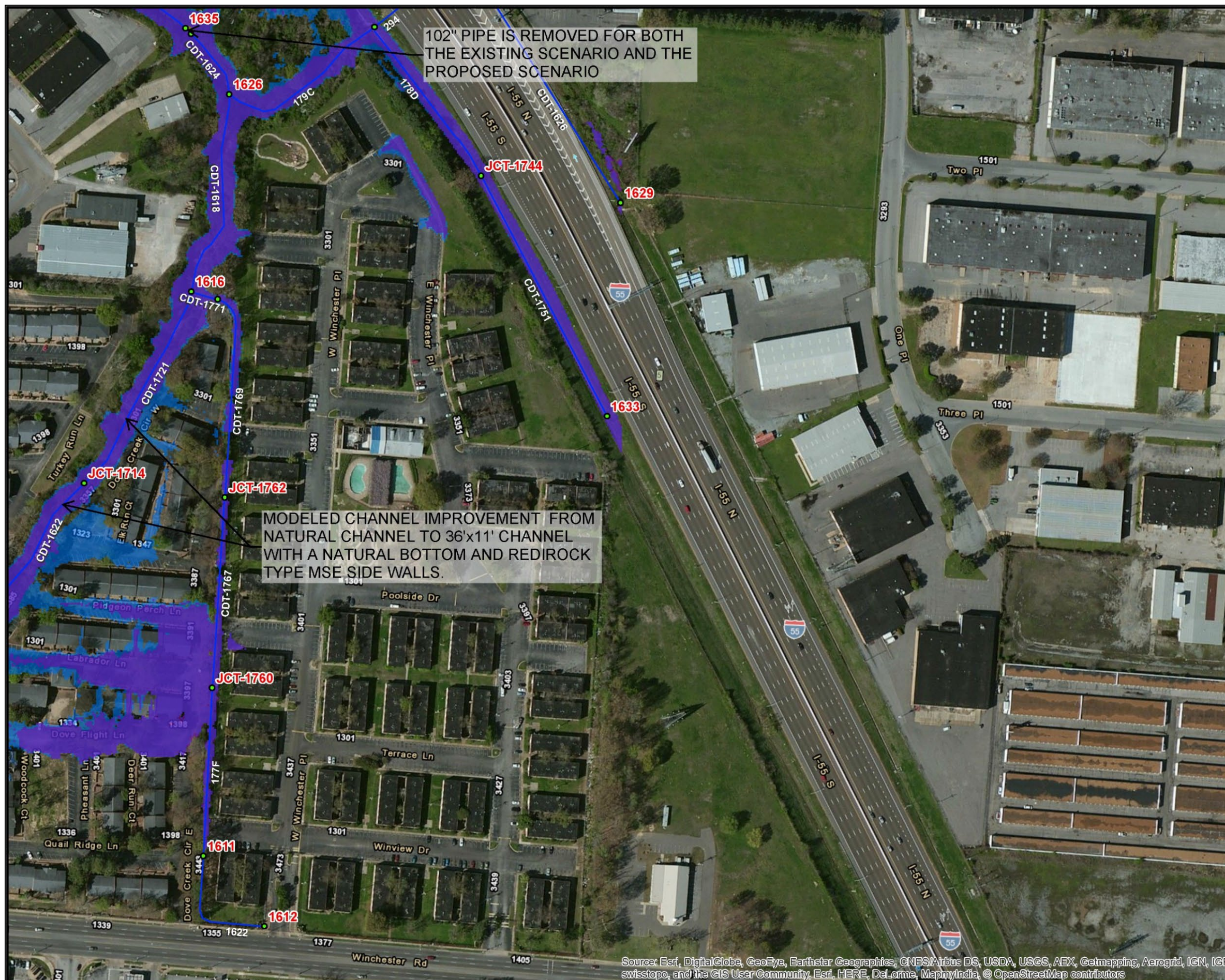
Existing 100-Year Flood Plain
Improved 100-Year Flood Plain

Note:
102" pipe near outfall is removed for both Existing Scenario and Proposed Scenario



<div> 1 inch = 200 feet </div>		
<div> Whitehaven Basin Proposed Conditions </div>		
<div> E3-P2 Exhibit </div>	<div> 13640360 Project No. </div>	<div> February 2016 Date </div>

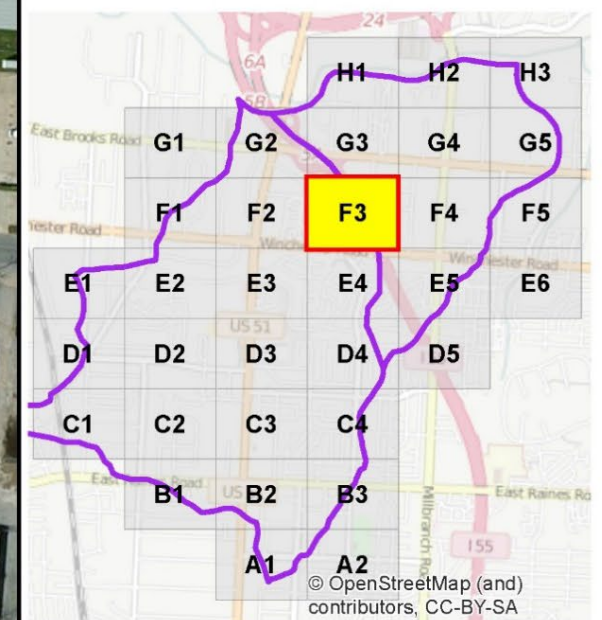
Figure 86. Whitehaven Proposed Conditions, Scenerio 2, Tile E3



Whitehaven Scenario 2:
Improvements at Bluebird Road and Cambridge Creek Apartments

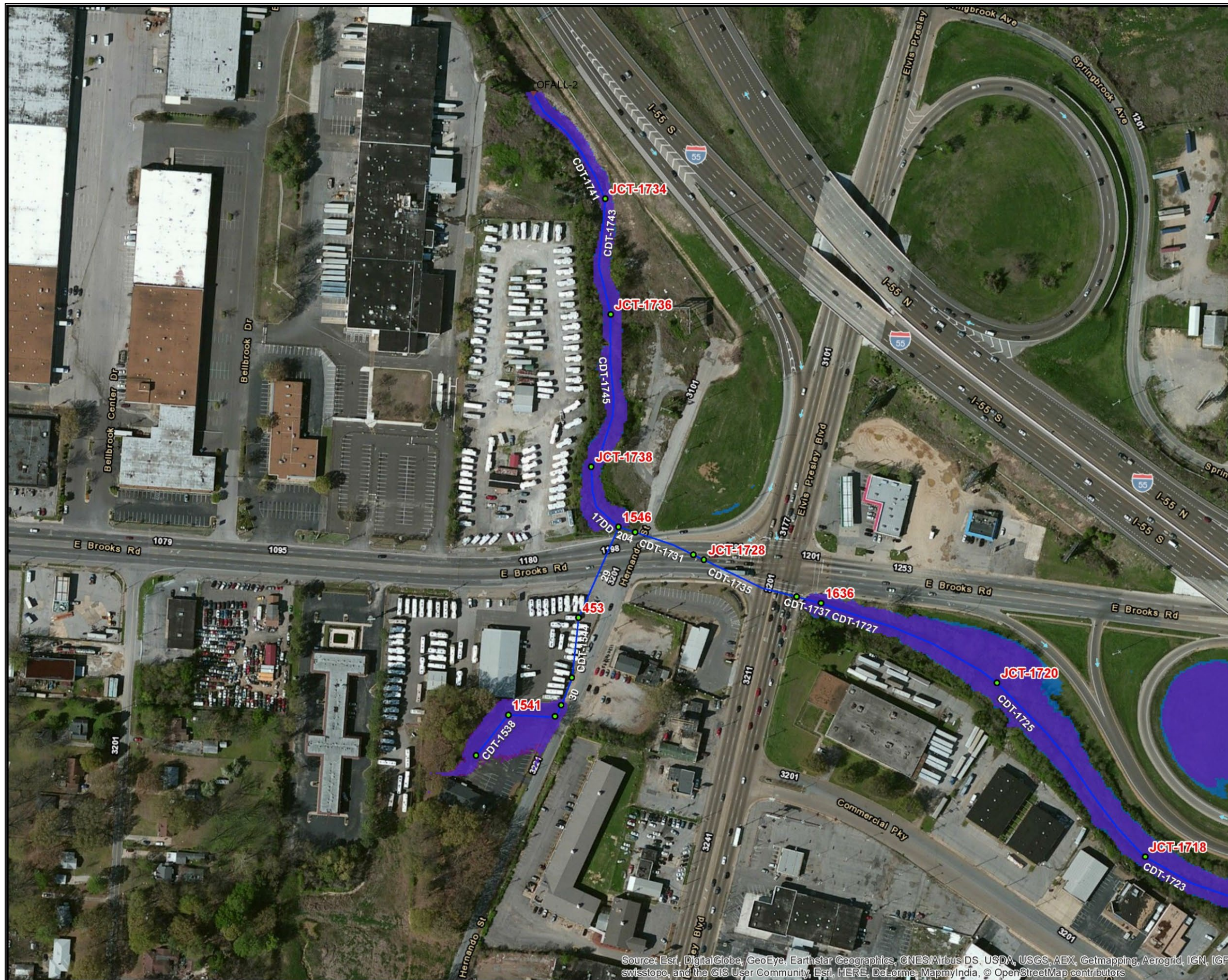
Existing 100-Year Flood Plain
 Improved 100-Year Flood Plain

Note:
102" pipe near outfall is removed for both Existing Scenario and Proposed Scenario



1 inch = 200 feet		
Whitehaven Basin Proposed Conditions		
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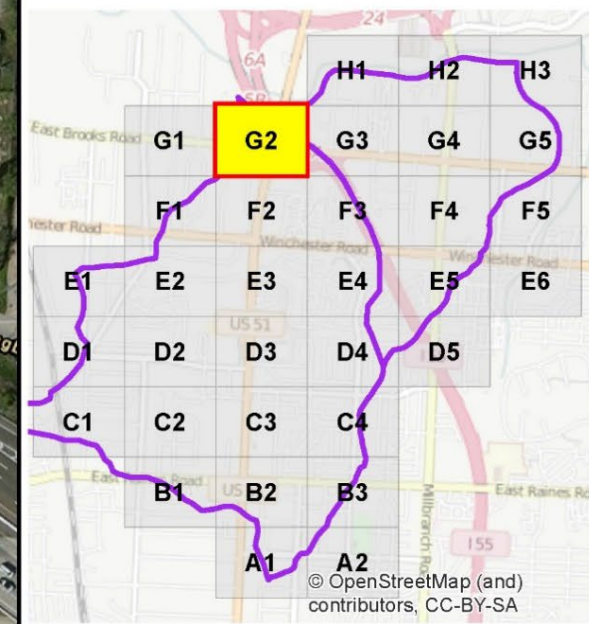
Figure 88. Whitehaven Proposed Conditions, Scenerio 2, Tile F3



Whitehaven Scenario 2:
Improvements at Bluebird Road and Cambridge Creek Apartments

Existing 100-Year Flood Plain
 Improved 100-Year Flood Plain

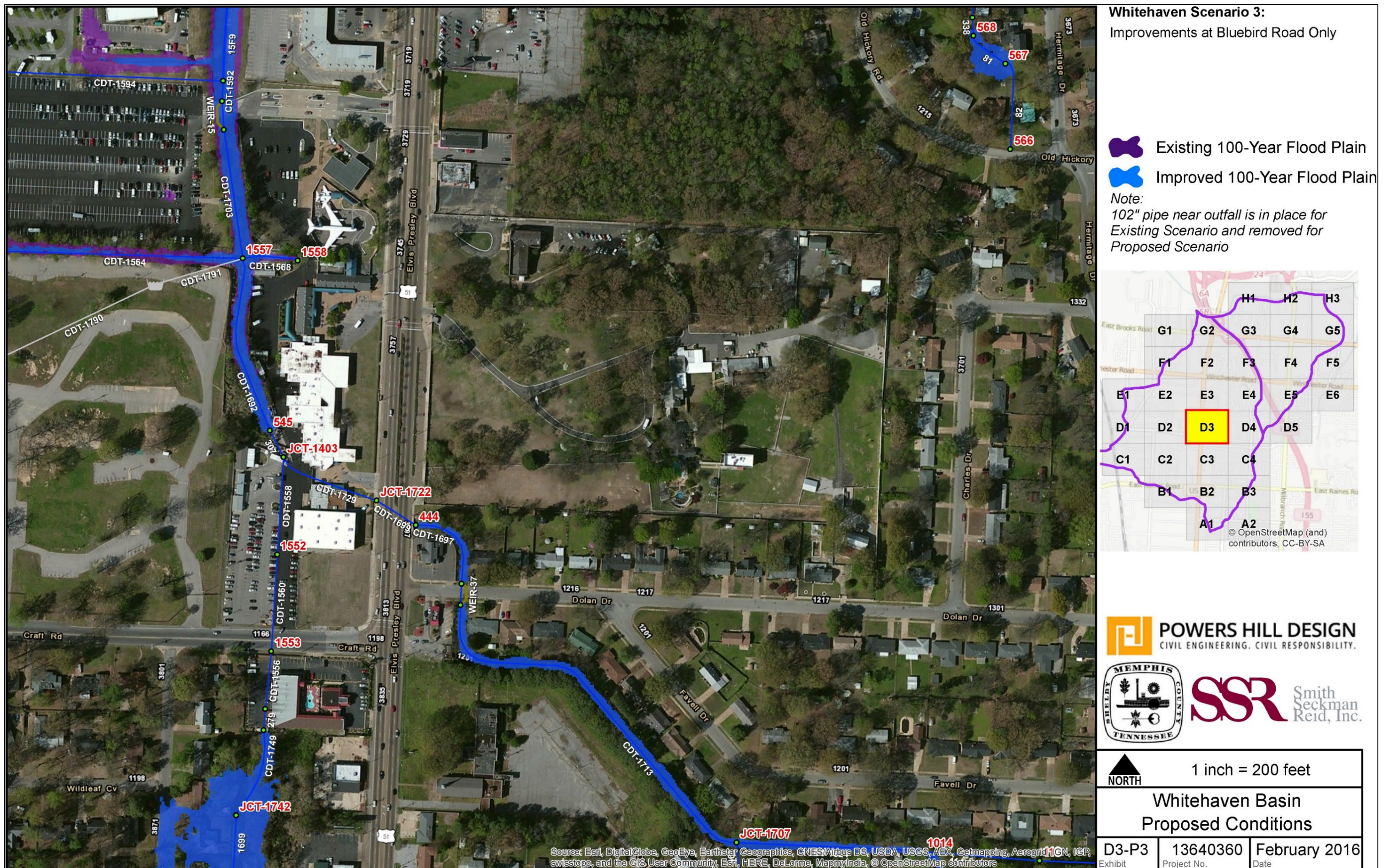
Note:
102" pipe near outfall is removed for both Existing Scenario and Proposed Scenario



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1 inch = 200 feet Whitehaven Basin Proposed Conditions		
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Figure 89. Whitehaven Proposed Conditions, Scenerio 2, Tile G2



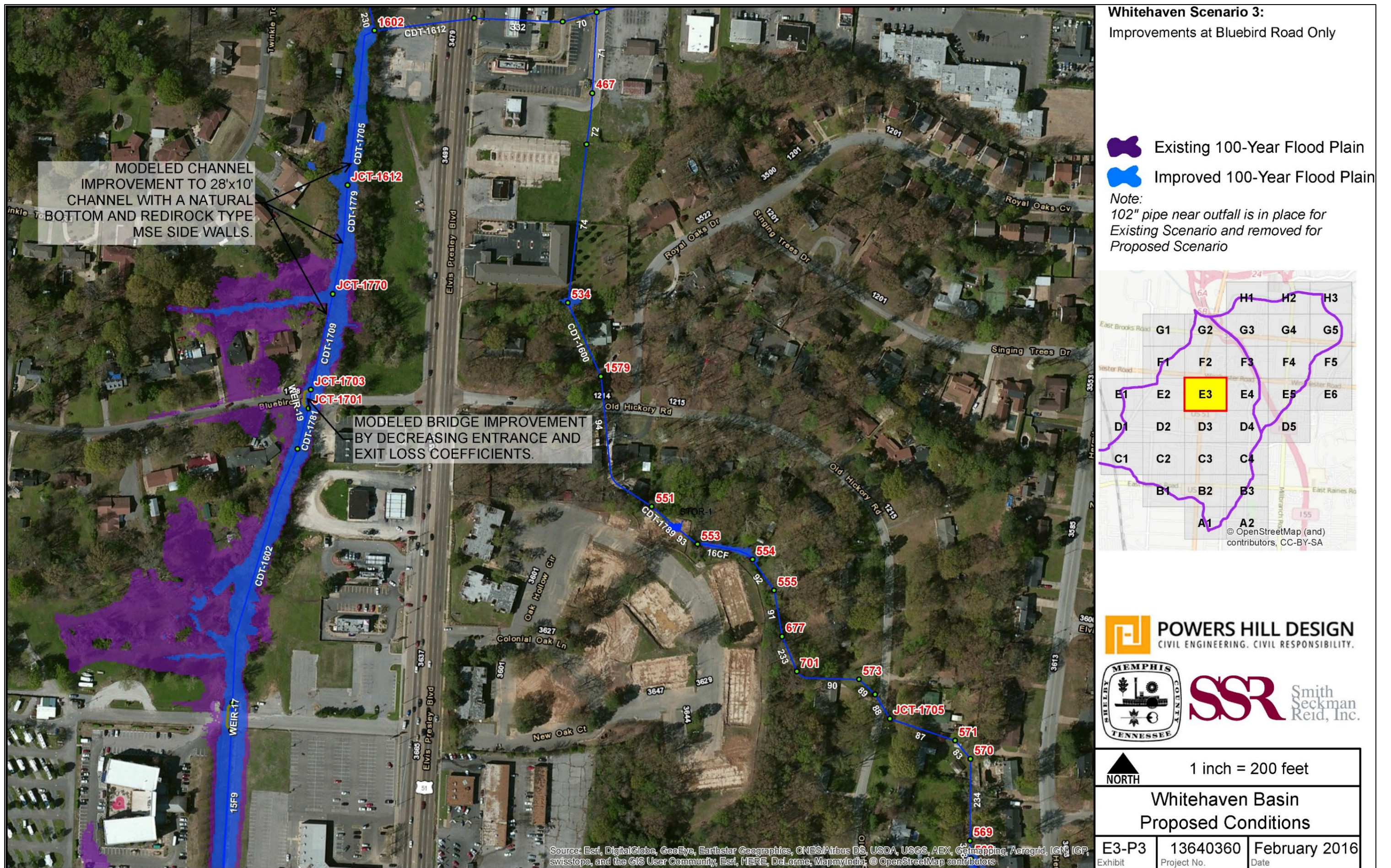




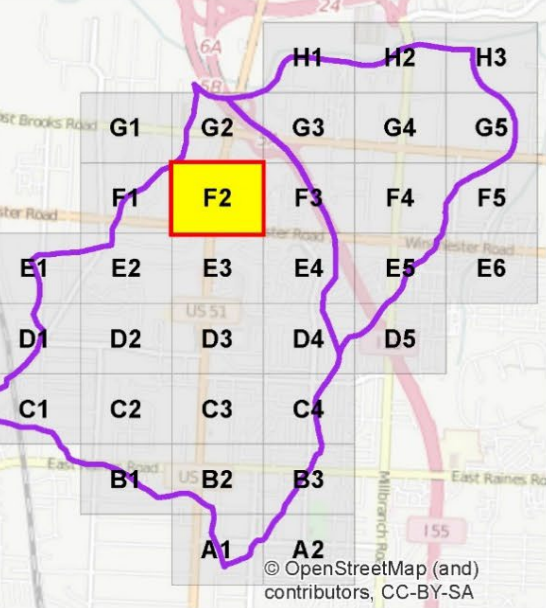
Figure 91. Whitehaven Proposed Conditions, Scenerio 3, Tile E3




Whitehaven Scenario 3:
Improvements at Bluebird Road Only


 Existing 100-Year Flood Plain
 Improved 100-Year Flood Plain


Note:
102" pipe near outfall is in place for Existing Scenario and removed for Proposed Scenario



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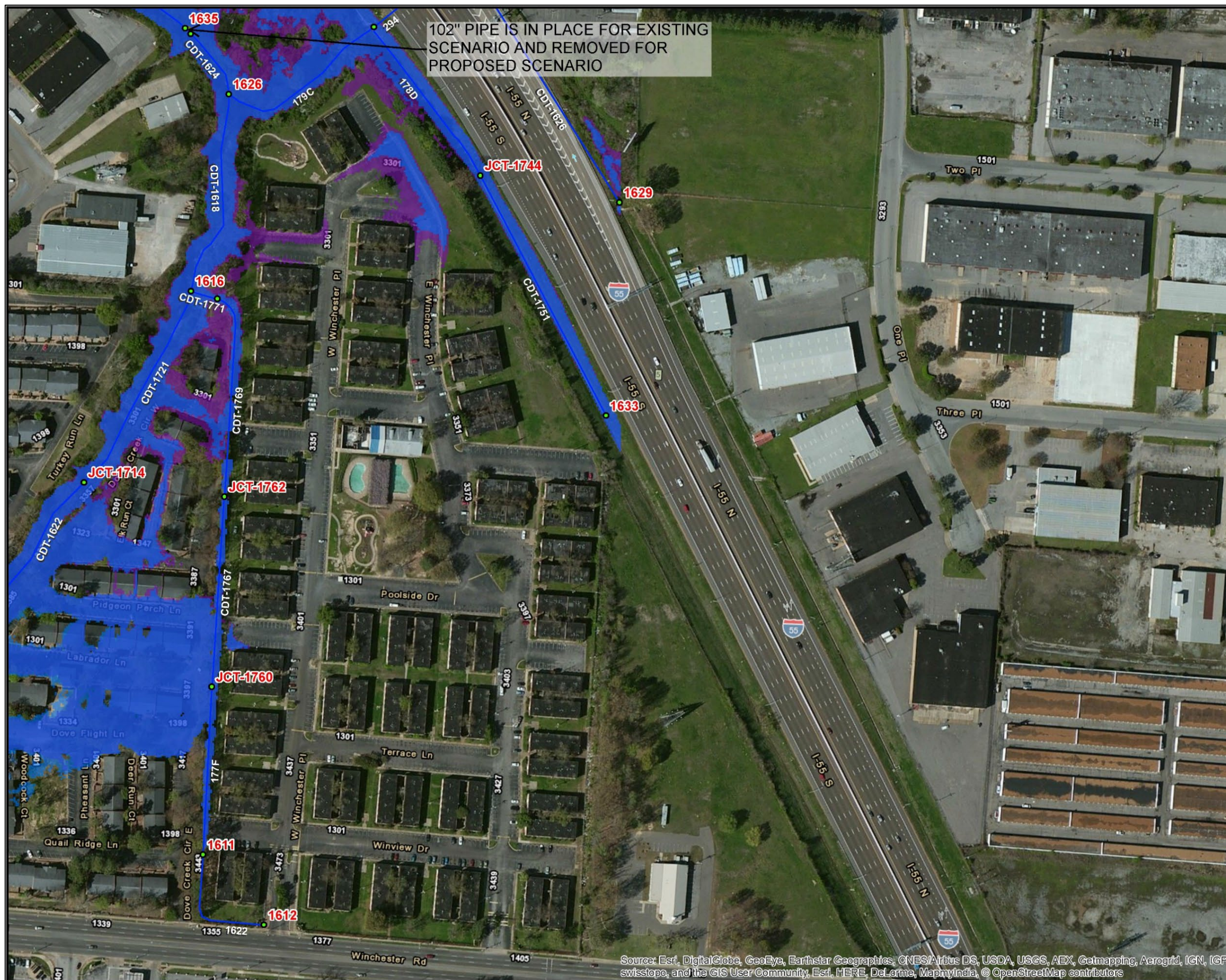
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 1 inch = 200 feet
Whitehaven Basin
Proposed Conditions

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Figure 92. Whitehaven Proposed Conditions, Scenerio 3, Tile F2



Whitehaven Scenario 3:
Improvements at Bluebird Road Only

Legend:

- Existing 100-Year Flood Plain
- Improved 100-Year Flood Plain

Map Grid Labels: H1, H2, H3, G1, G2, G3, G4, G5, F1, F2, **F3**, F4, F5, E1, E2, E3, E4, E5, E6, D1, D2, D3, D4, D5, C1, C2, C3, C4, B1, B2, B3, A1, A2

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MEMPHIS COUNTY
TENNESSEE

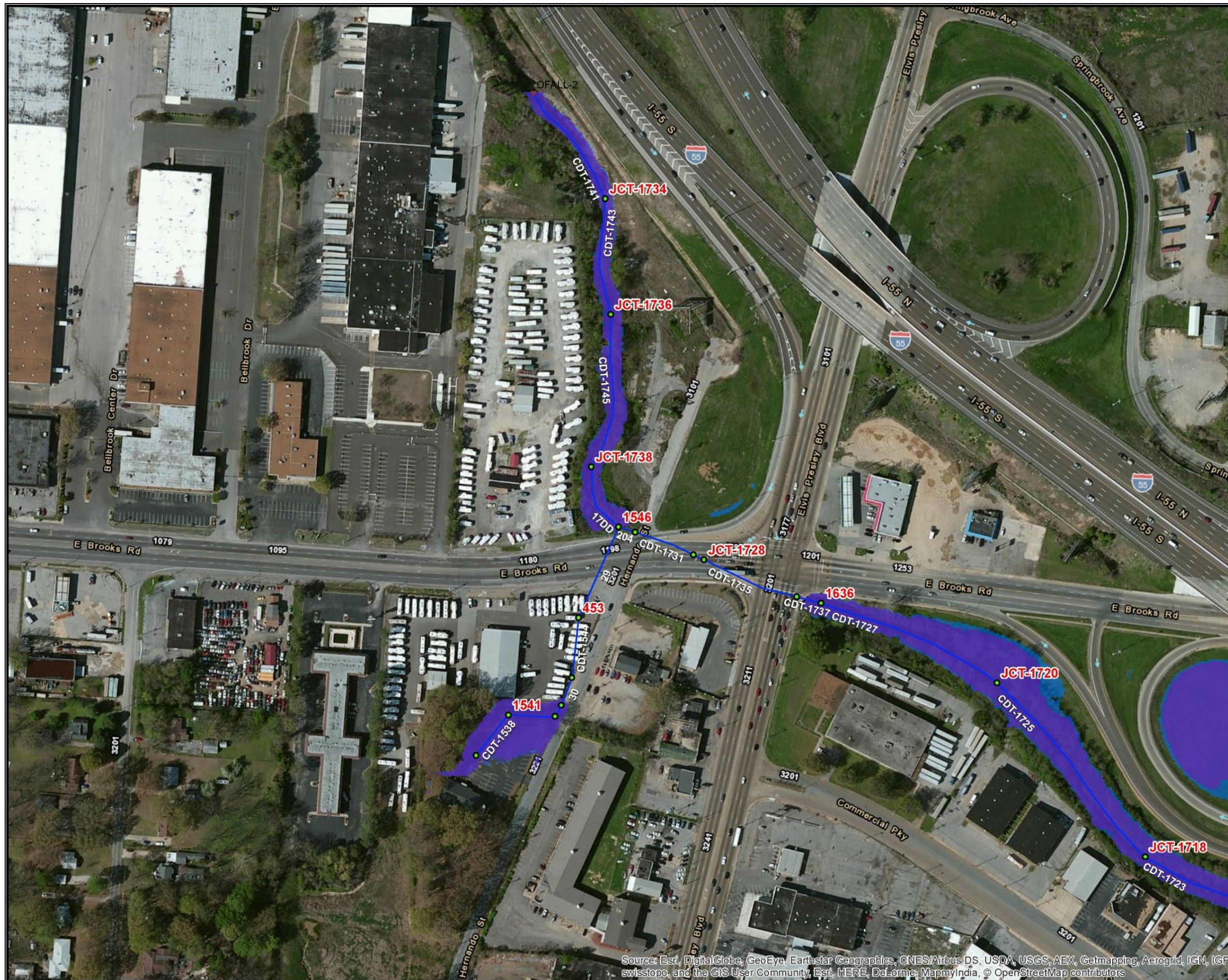
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Whitehaven Basin
Proposed Conditions



1 inch = 200 feet

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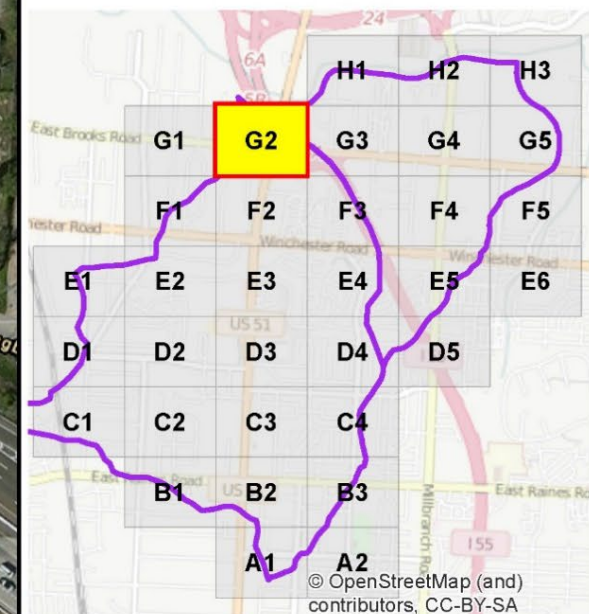
Figure 93. Whitehaven Proposed Conditions, Scenerio 3, Tile F3



Whitehaven Scenario 3:
Improvements at Bluebird Road Only

 Existing 100-Year Flood Plain
 Improved 100-Year Flood Plain

Note:
102" pipe near outfall is in place for Existing Scenario and removed for Proposed Scenario




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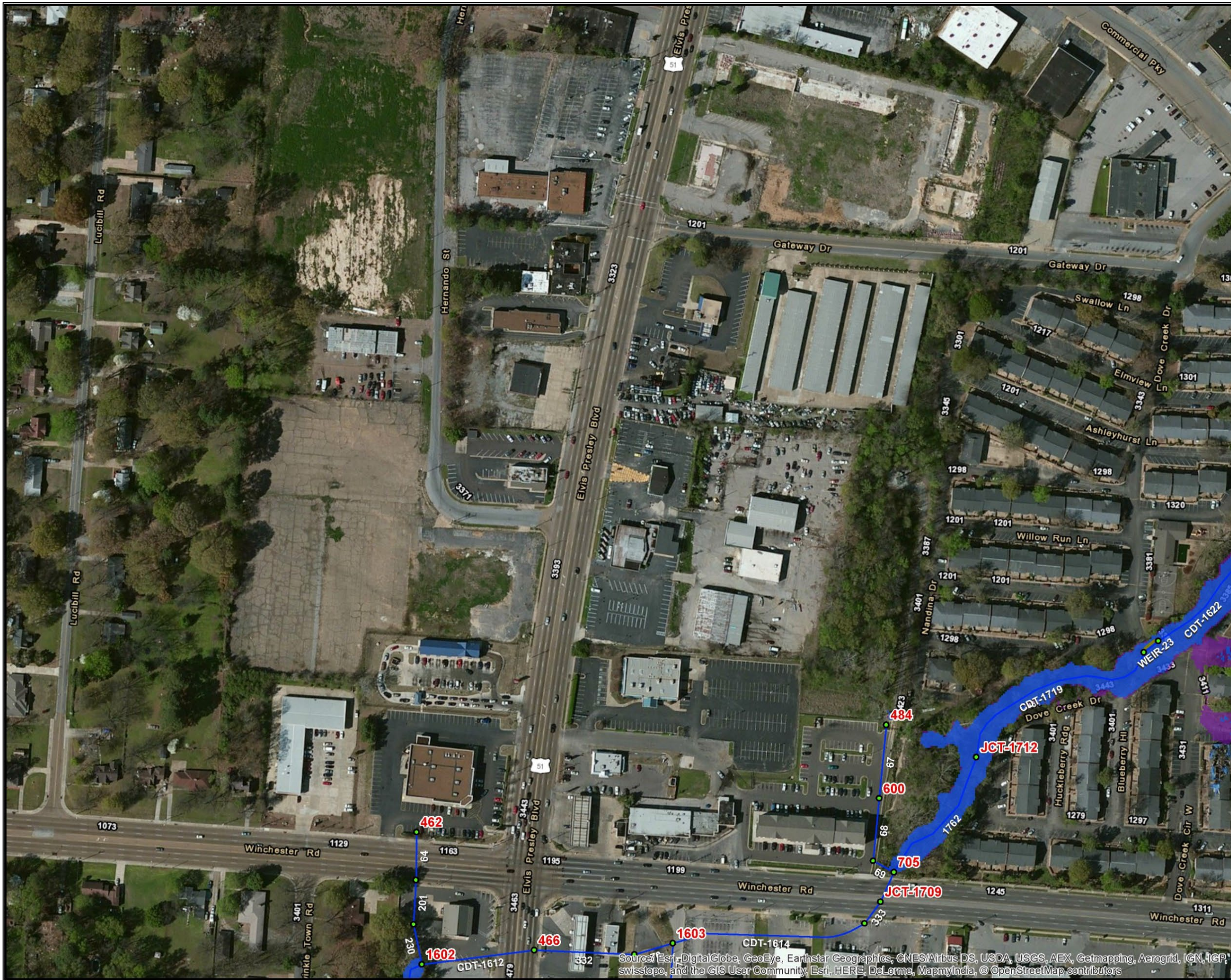


 1 inch = 200 feet		
Whitehaven Basin Proposed Conditions		
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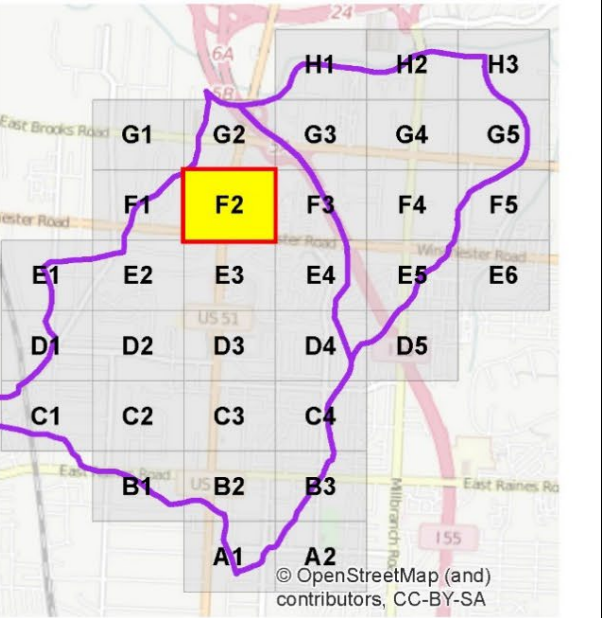
Figure 94. Whitehaven Proposed Conditions, Scenerio 3, Tile G2






Whitehaven Scenario 4:
Removal of 102" Pipe Restriction Only


 Existing 100-Year Flood Plain
 Improved 100-Year Flood Plain

Note:
102" pipe near outfall is in place for Existing Scenario and removed for Proposed Scenario




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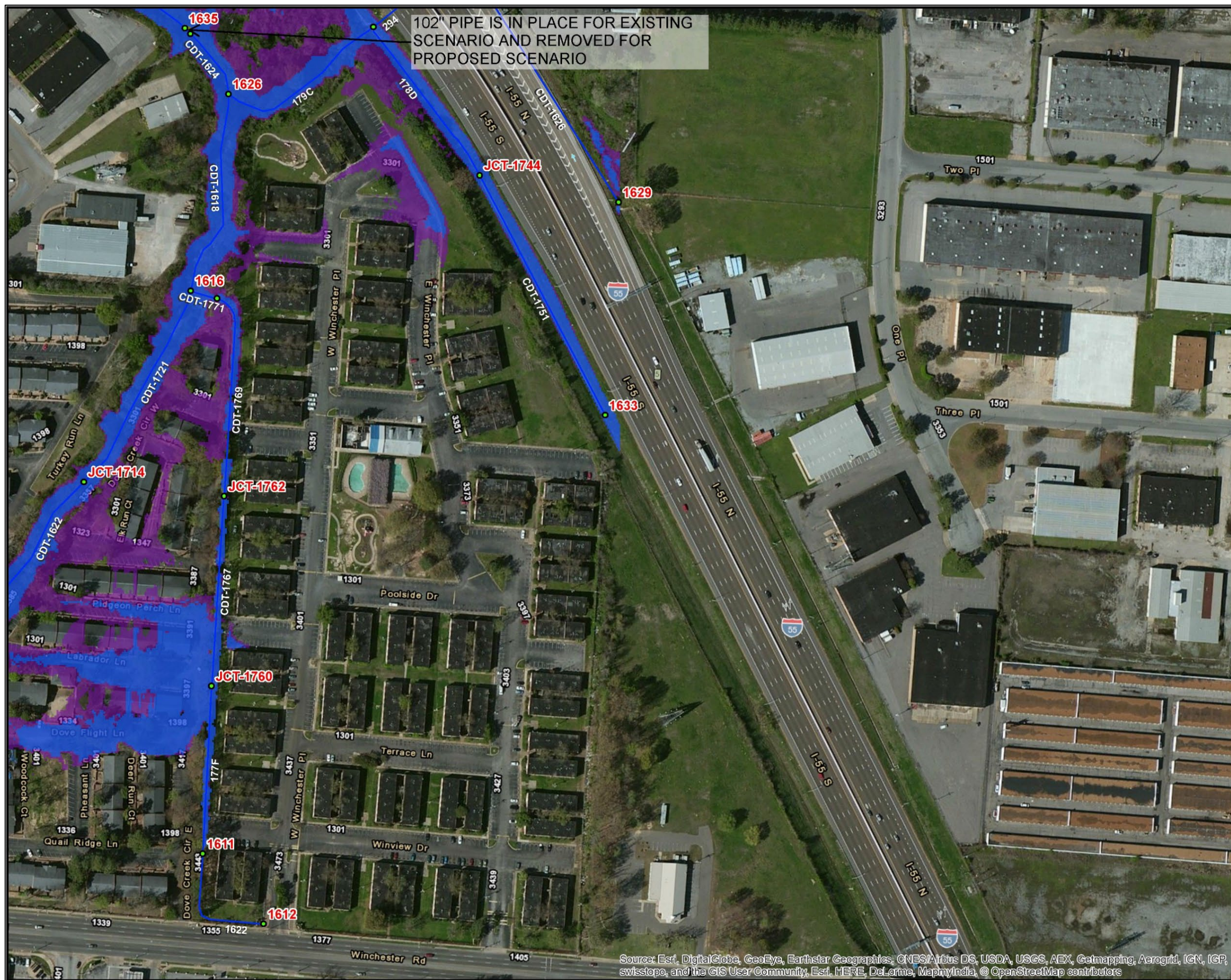


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 1 inch = 200 feet



Whitehaven Basin
Proposed Conditions

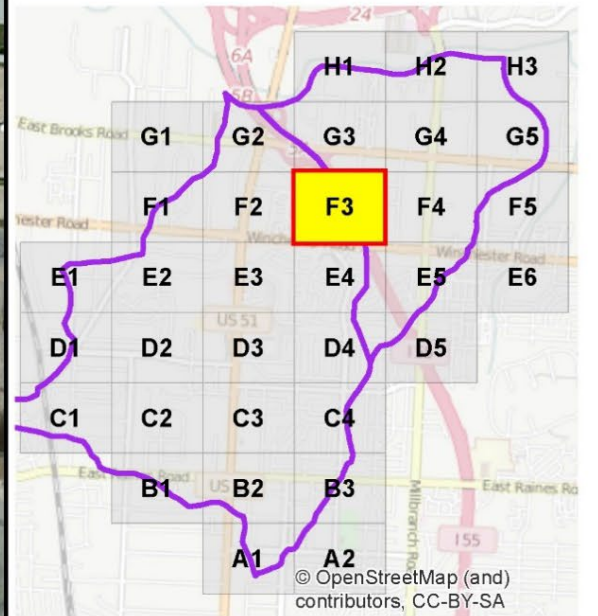
F2-P4	13640360	February 2016
Exhibit	Project No.	Date

Figure 95. Whitehaven Proposed Conditions, Scenerio 4, Tile F2



Whitehaven Scenario 4:
Removal of 102" Pipe Restriction Only

-  Existing 100-Year Flood Plain
-  Improved 100-Year Flood Plain



 1 inch = 200 feet		
Whitehaven Basin Proposed Conditions		
F3-P4 Exhibit	13640360 Project No.	February 2016 Date

Figure 96. Whitehaven Proposed Conditions, Scenerio 4, Tile F3