2017 ESOS
May 18, 2017

Eastbound and Down: Rapid Response to the 2016 Drought



Smith Seckman Reid, Inc.

Good morning.

TDEC has reached out to me searching for a portable water treatment plant that can do at least 0.5 MGD. There is a small system near us that is out of water at their intake.

I was wondering if you knew of location of any skid mount pilot plants or something similar that might be available in our area.

Thanks,

Dorothy Rader
Supervisor, Water Quality & Environmental Compliance Tennessee American Water

See question below from TDOC? They will be at the office tomorrow from 10am until 12 and would like to discuss water at Their Bledsoe county facility. I have no background on the facility. If you all have someone that can sit in, let me know.
David Bradford

The boss is wanting a gameplan for the following by COB tomorrow:

What if the BCCX water supply was completely lost?

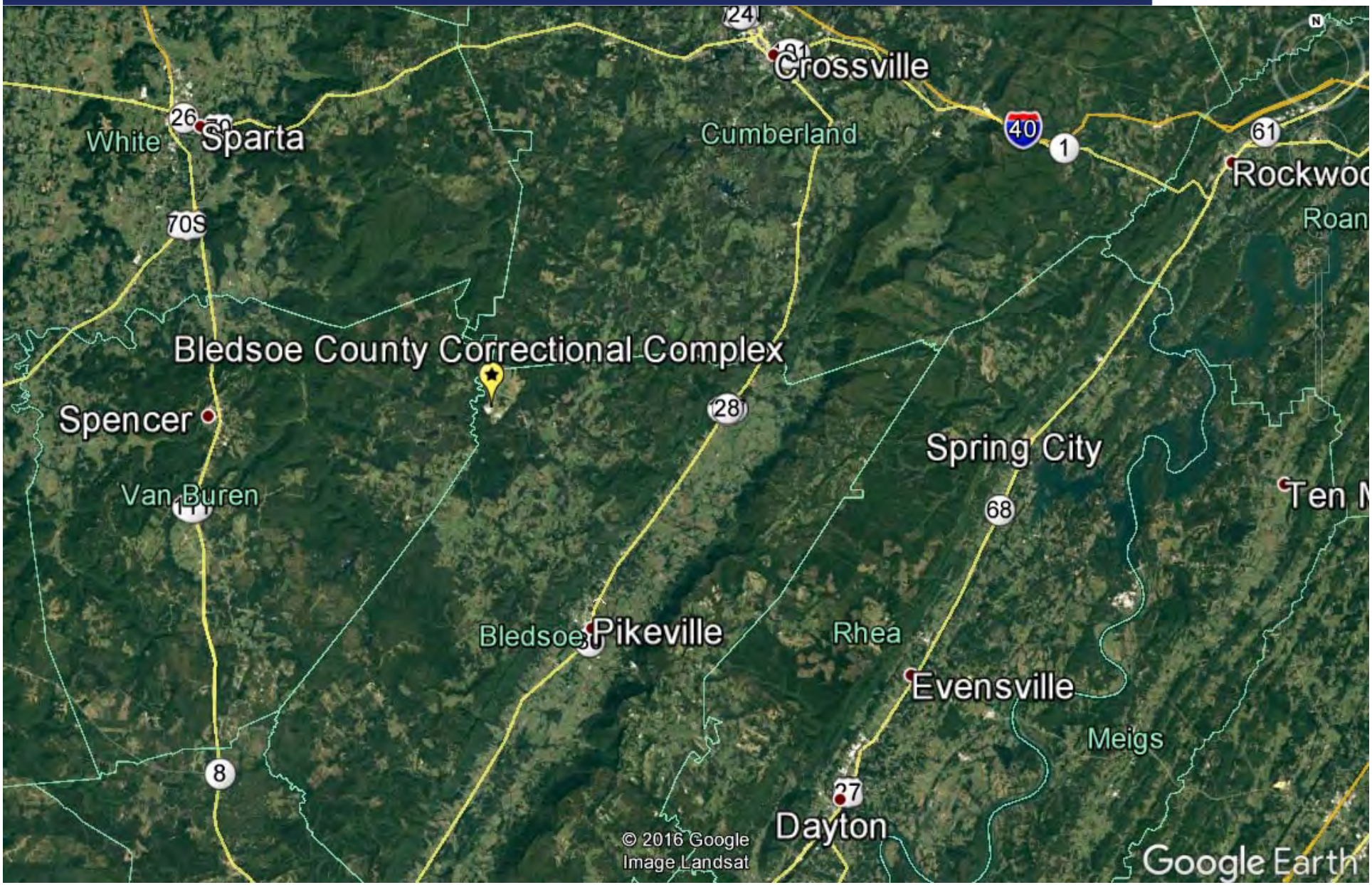
My initial list:

1. Drinking water - Truck it in. The National Guard has water trucks made for this purpose. I am sure Roger knows all about that. Will need to contact Military and determine their capability to provide them at the capacity needed for the population.
2. Toilets/Showers - Similar use of NG capability? An FOB setup in the yard?
3. Kitchen - Not much choice but to do the same(?) Any other ideas? Perhaps using a different type of truck that what the Guard uses to pipe in water to the kitchen?
4. Laundry - Collect and send to MCCX(?) Is that feasible? Another location better?
5. Fire protection - MUST have a minimum supply in the water tank - what amount?
6. Reduce population to the greatest extent possible.

What is the long term plan for water delivery and usage at BCCX?

1. Water conservation - Water control devices, water efficient equipment, water capture, etc. What can we list out to put in Site 2?
2. Inefficiencies corrections - Site 2 using twice the volume of Site 1. I&I investigation status?
3. Increase of supply - Best idea so far is bringing line from Tennessee River from the south and up the Sequatchie Valley. Pikeville plant can produce right now 2.4mm gallons a day. I think it is Beth Jones with the SE TN Development District that can provide a study for this line. Joe, I know your boss knows her as well as I. See if you or George can get hold of her pronto.

David Bradford: We will have to highjack part or all of your agenda and put our heads together on this. Anyone of yours available in the office that can be of help that can attend would be most appreciated.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Pikeville
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Dayton
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Image Landsat
Google Earth


Lonewood Rd
Glade Creek Rd
Bledsoe County Correctional Complex
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Lantana Rd
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© 2016 Google
Google Earth

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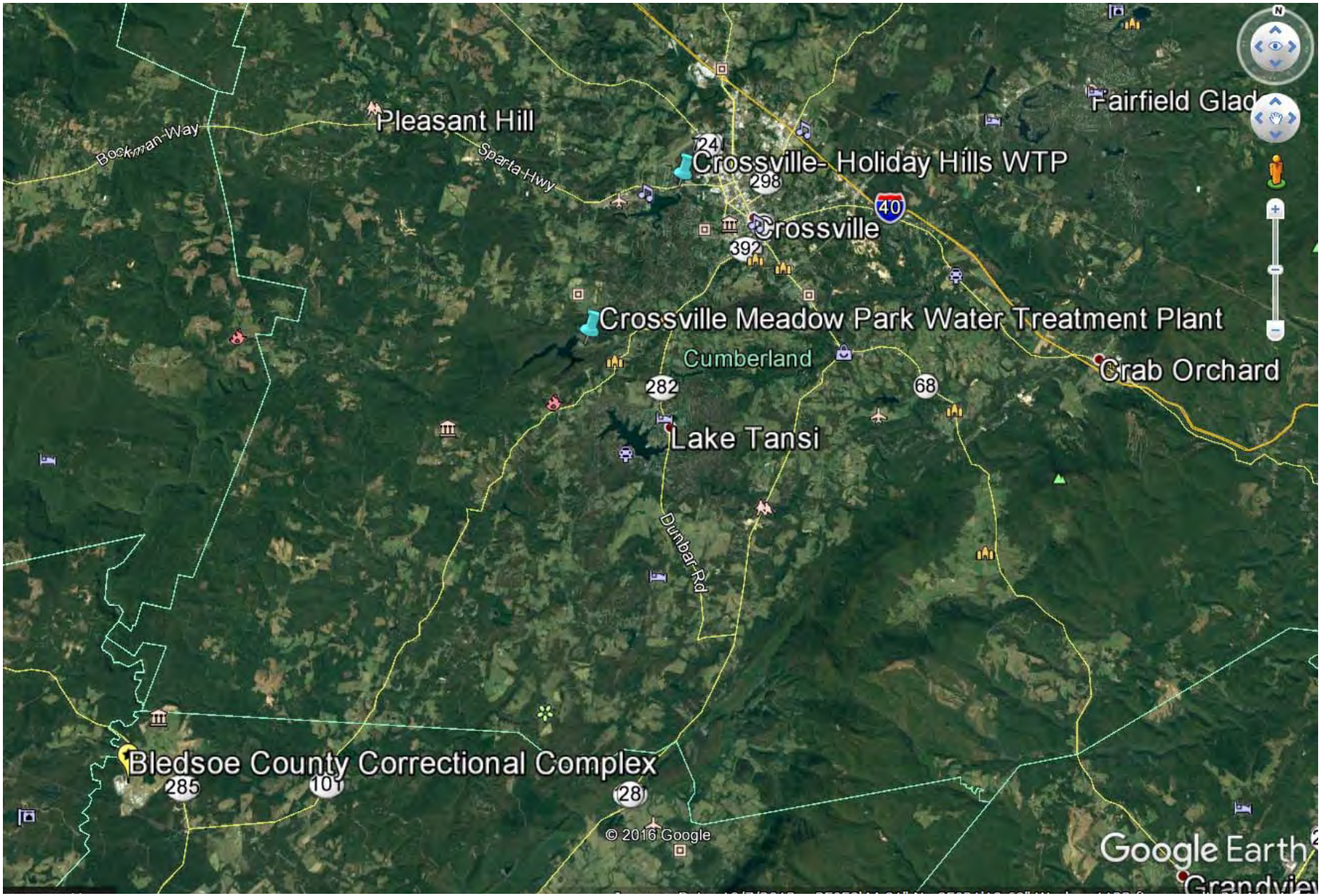

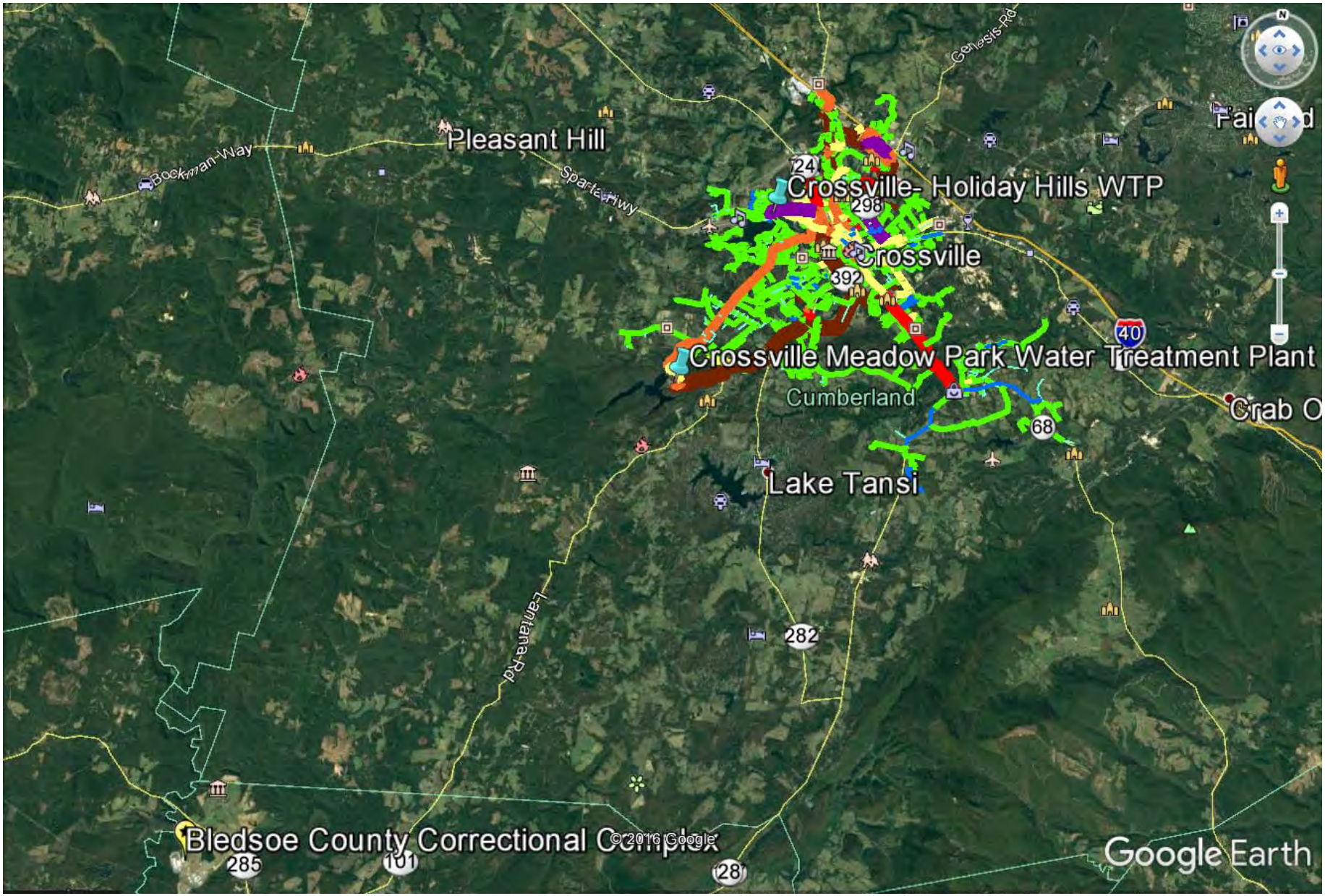
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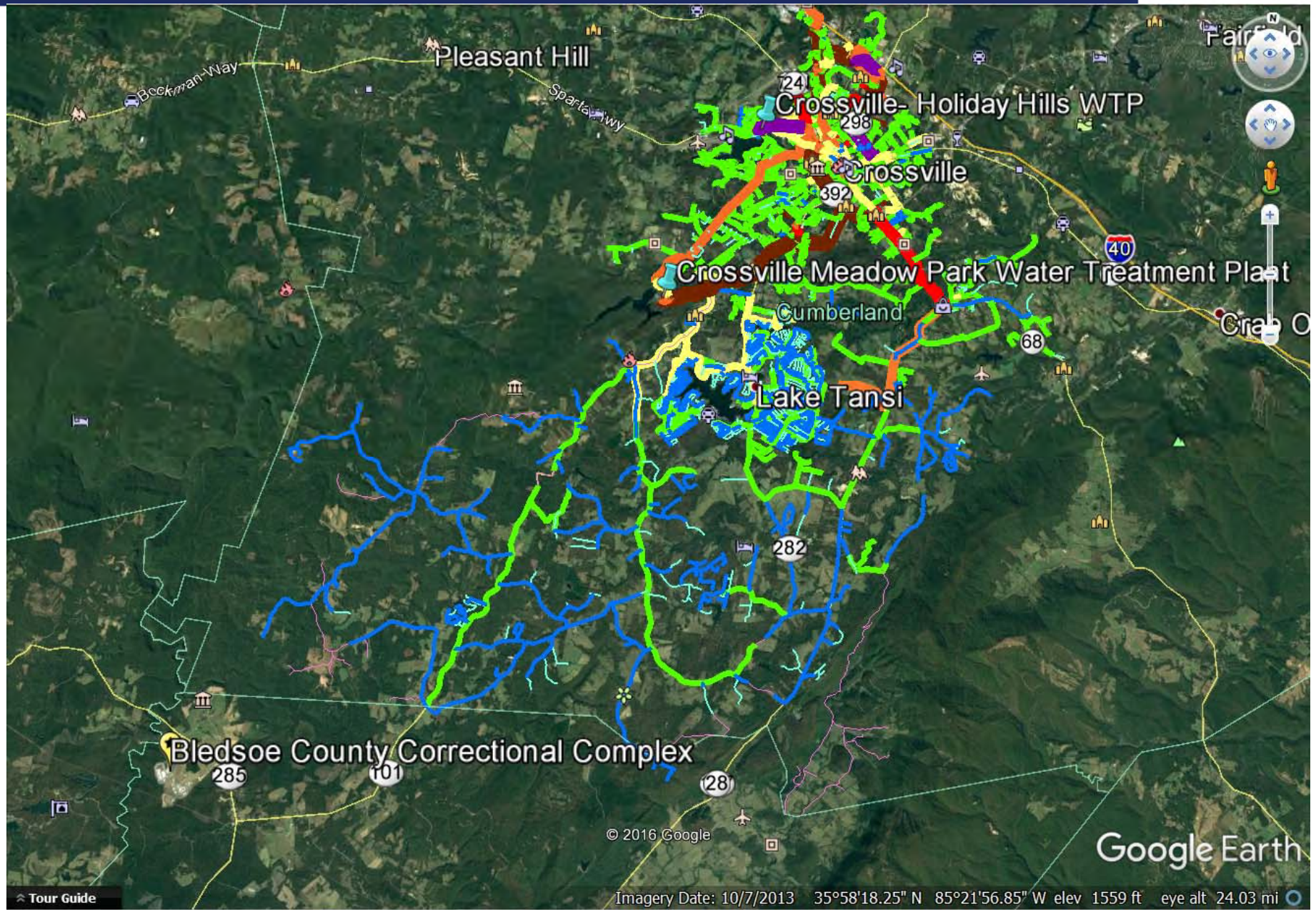
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© 2016 Google
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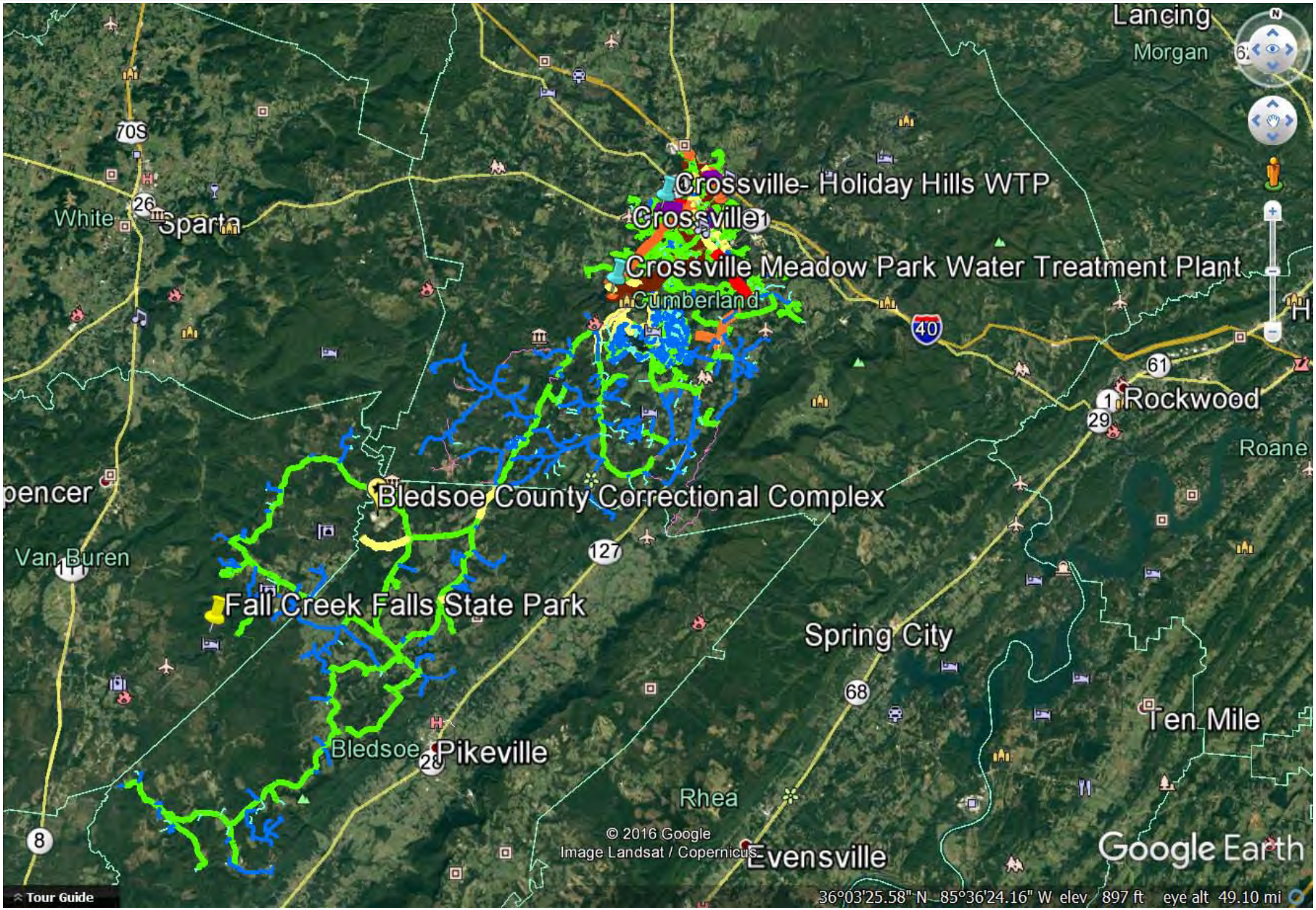
Tour Guide
Imagery Date: 10/7/2013 35°58'18.25" N 85°21'56.85" W elev 1559 ft eye alt 24.03 mi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Crossville- Holiday Hills WTP
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Crossville Meadow Park Water Treatment Plant
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29
Roane
Bledsoe County Correctional Complex
127
Van Buren
Fall Creek Falls State Park
Spring City
68
Ten Mile
Bledsoe
Pikeville
Rhea
Evensville
8
© 2016 Google
Image Landsat / Copernicus
Google Earth
Tour Guide
36°03'25.58" N 85°36'24.16" W elev 897 ft eye alt 49.10 mi

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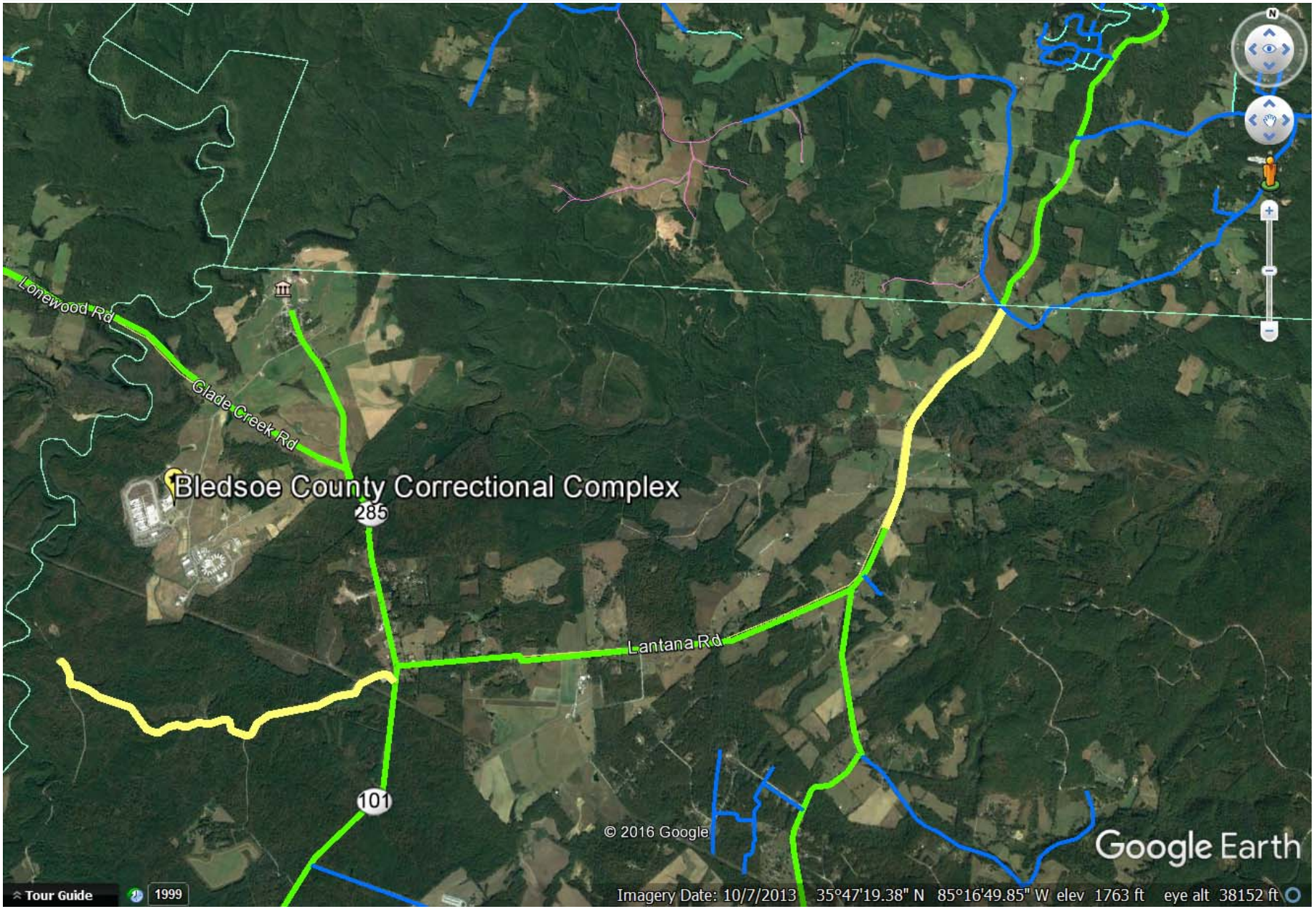

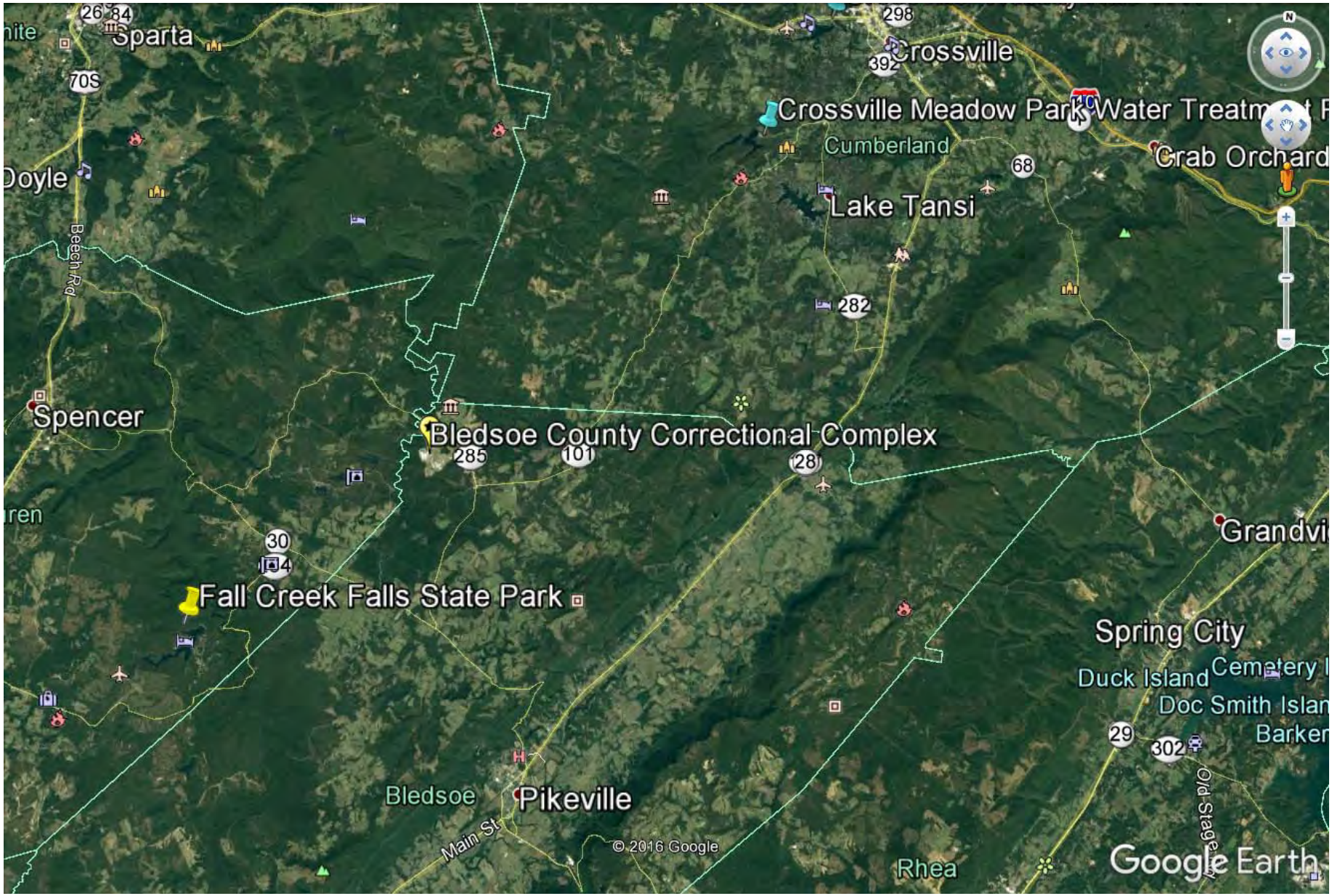
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Barker
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Pikeville
Main St
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© 2016 Google
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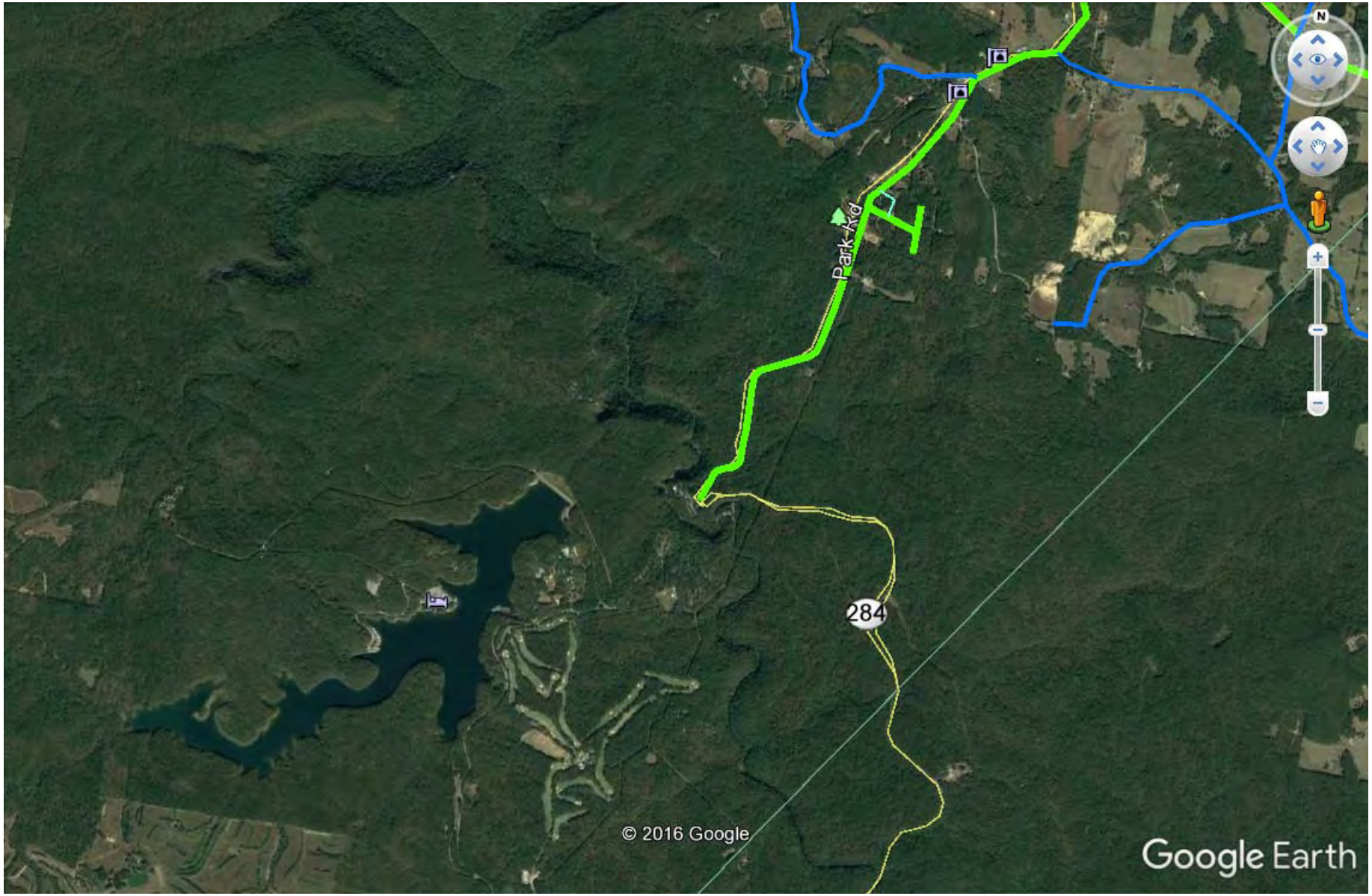
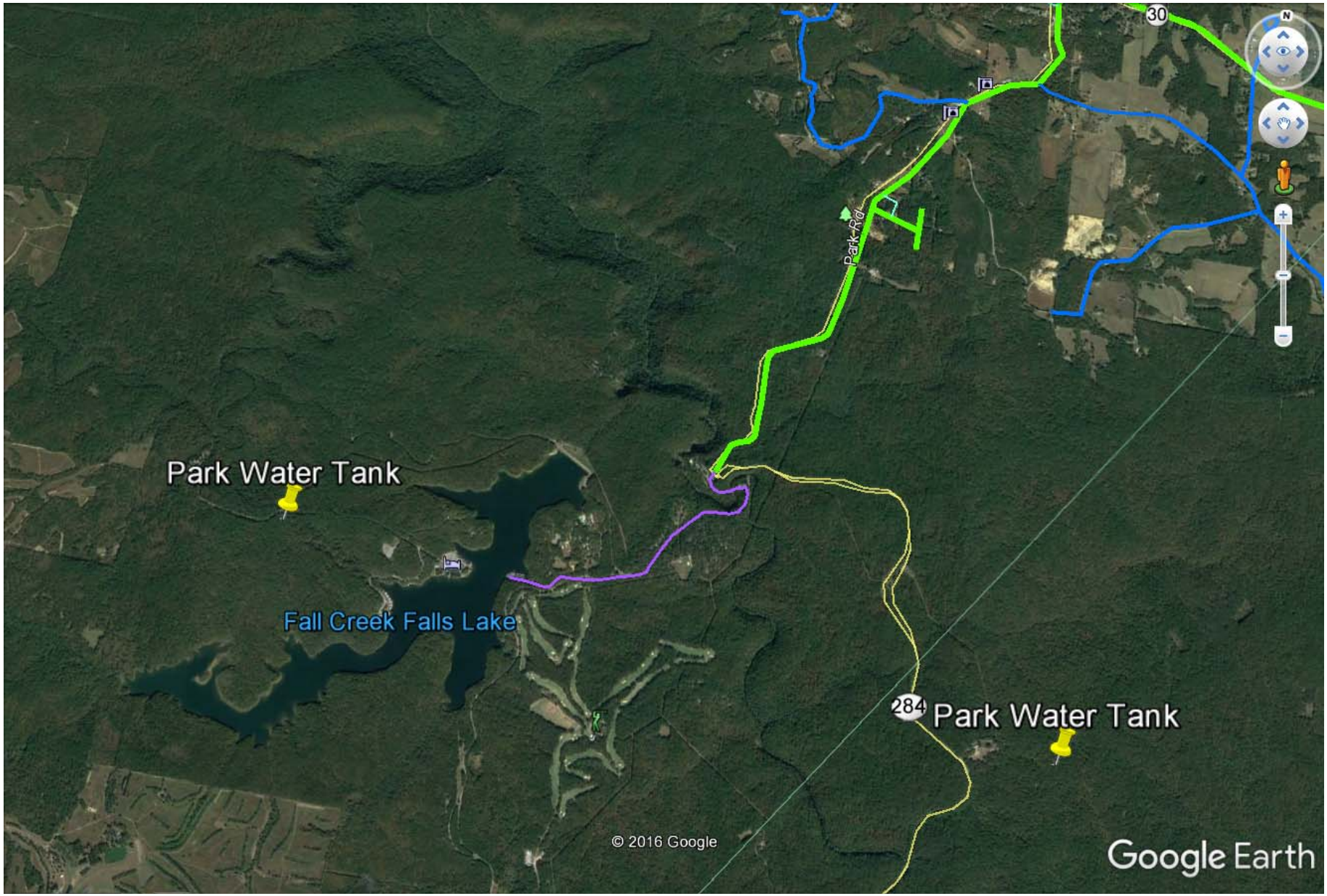

Park Rd
284
© 2016 Google
Google Earth


Park Water Tank
Fall Creek Falls Lake
Park Rd
30
284
Park Water Tank
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October 20, 2016- NOAA

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Drought

Drought will likely persist through the winter in many regions currently experiencing drought, including much of California and the Southwest

Drought is expected to persist and spread in the southeastern U.S. and develop in the southern Plains.

New England will see a mixed bag, with improvement in the western parts and persistence to the east.

Drought improvement is anticipated in northern California, the northern Rockies, the northern Plains and parts of the Ohio Valley.

http://www.noaa.gov/media-release/us-winter-outlook-predicts-warmer-drier-south-and-cooler-wetter-north

December 15, 2016- NWS

Latest Seasonal Assessment - Although there have been regional changes in intensity, the areas covered by drought have not changed significantly in the past 30 days. There's been some improvement along the northern tier of New England, in parts of the interior Southeast where extreme to exceptional drought was observed, across eastern Texas and the adjacent lower Mississippi Valley, and through the northern sections of both South Dakota and New Mexico. In contrast, drought expanded or deteriorated in southern New England and the interior mid-Atlantic region, the Ohio Valley, the eastern and southern periphery of the Southeastern drought region, portions of the south-central and western Plains, and some leeward sections of the Hawaii.

The seasonal drought outlook valid from December 15, 2016 to March 31, 2017 largely follows the 3-Month Precipitation Outlook, with adjustments made for climatology, the time of year, and expected conditions during the last half of December. **A general pattern of improvement or removal is forecast for the north side of areas experiencing drought, with conditions persisting or worsening farther south.**

http://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_summary.php

Alternatives

Presented 10/26/16

Trucking Water from Crossville

	Cost/Unit	Units	Estimated Qty	Total Cost
Davis Water Standard Rate	250	$/hour/truck	6480	1,620,000.00
Crossville Water Rate	8.02	$/1000 gals	9900	79,398.00
TOTAL				**1,699,398.00**
Cost/1000 gals				**37.76**

Pall Skids

	Cost/Unit	Units	Estimated Qty	Total Cost
Rental Trailer	35000	$/month	3	105,000.00
Rental Raw PS	3000	$/month	3	9,000.00
Rental HSPS	7000	$/month	3	21,000.00
Rental Generator	18000	$/month	3	54,000.00
Fuel for Genators and Pumps	3	$/gal	90720	272,160.00
Bleach	2	$/gal	1876.5	3,753.00
Phosphate	4	$/gal	375.3	1,501.20
Cleaning Chemicals	?			500.00
TOTAL				**466,914.20**
Cost/1000 gals				**10.38**

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October

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

November

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

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SIGER
SunTRACKER
SIGSAUER

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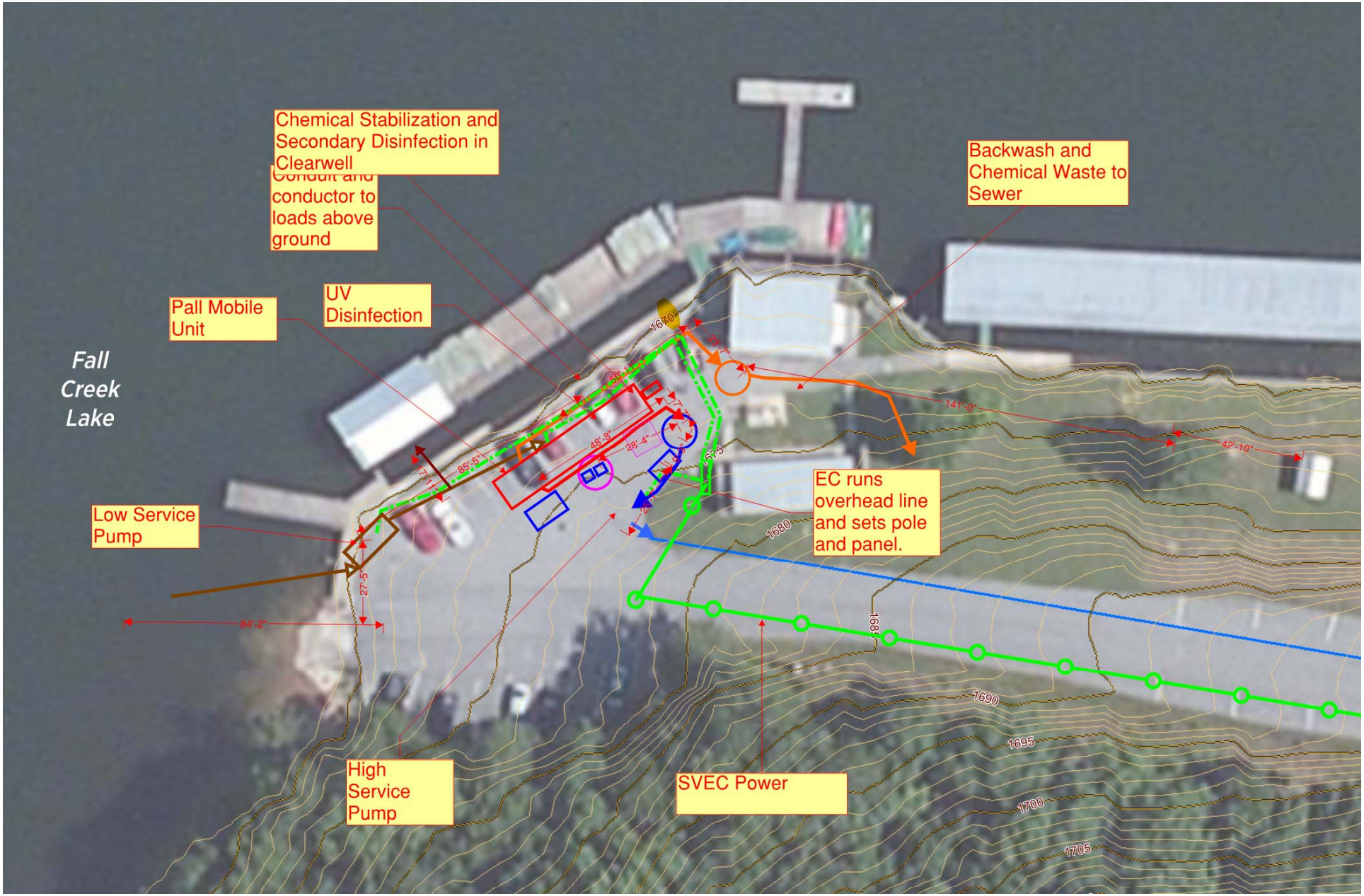
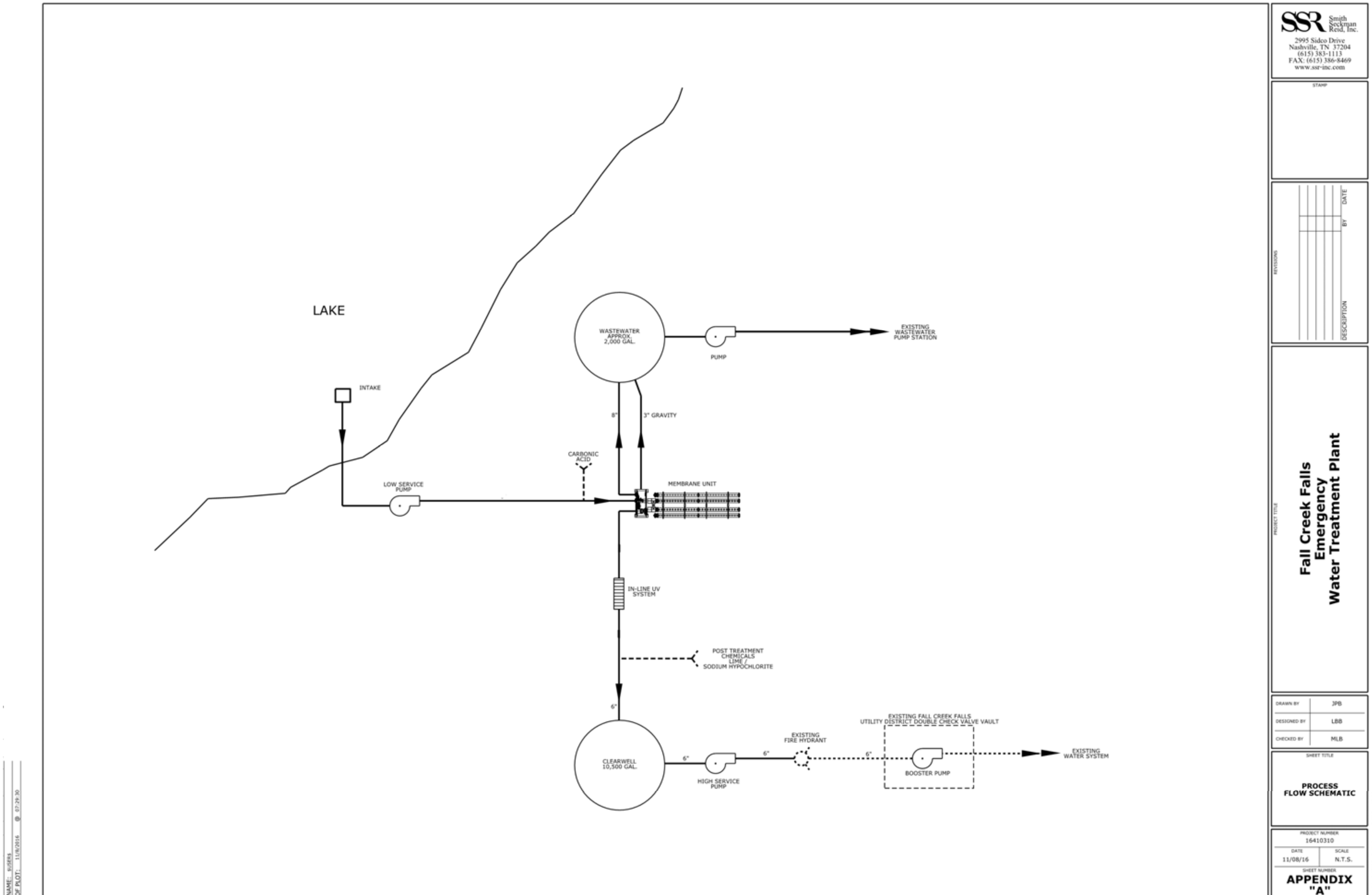
Site Layout


Chemical Stabilization and Secondary Disinfection in Clearwell
conductor to loads above ground
Backwash and Chemical Waste to Sewer
Pall Mobile Unit
UV Disinfection
Fall Creek Lake
Low Service Pump
EC runs overhead line and sets pole and panel.
High Service Pump
SVEC Power
1670
1680
1690
1695
1700
1705
141'-0"
42'-10"
85'-5"
48'-8"
28'-4"
27'-5"
84'-2"

Process Flow Schematic




JH-20


ALUMINUM
CHLOROHYDRATE


ALUMINUM
CHLOROHYDRATE


PALL
Water Processing
www.pall.com/water
PALL Water Processing
PallAria
Mobile Water Treatment System

Bill of Materials

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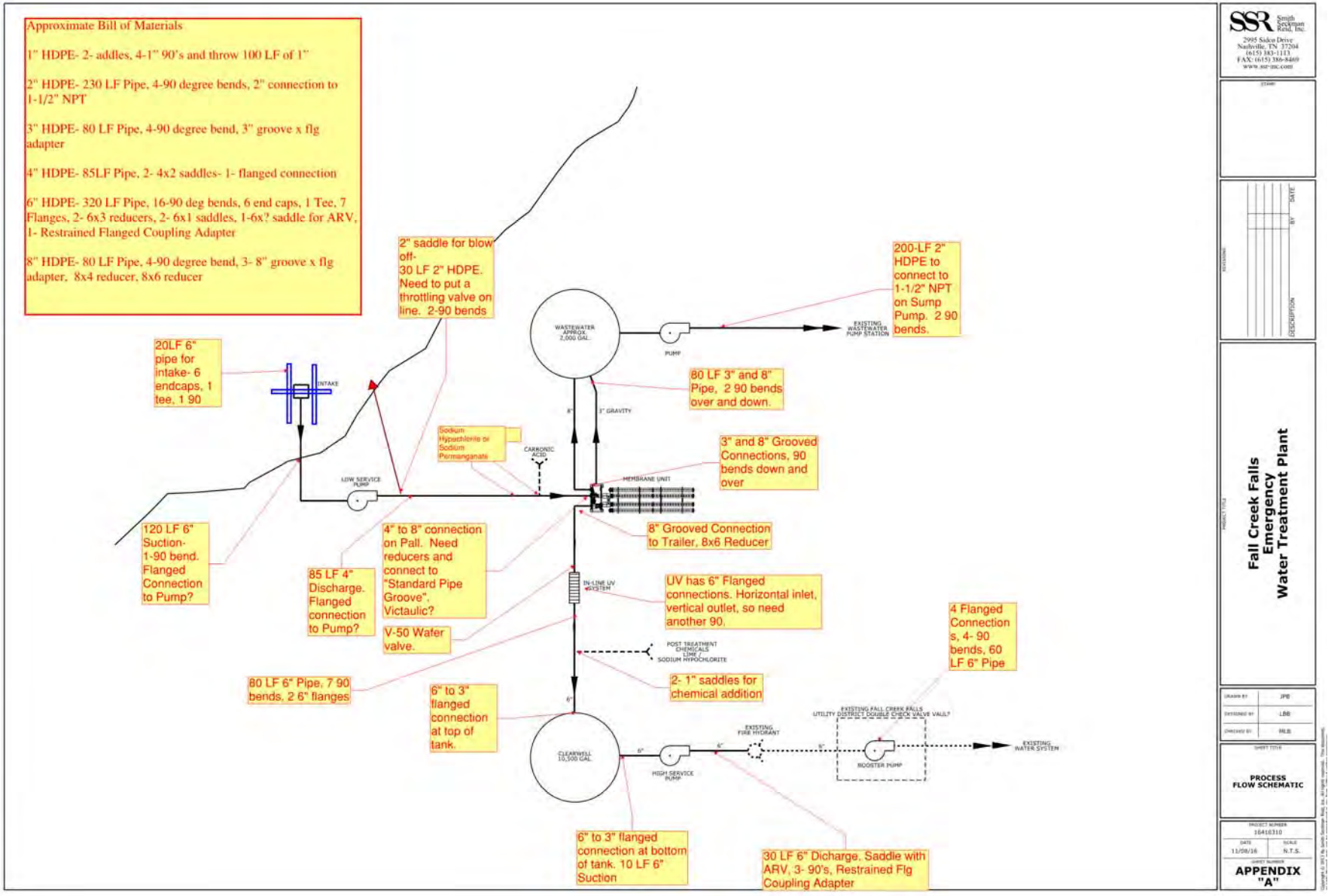


Mobile Water Treatment System
TROJANUV
ALUMINUM
CHLOROHYDRATE
uni-loader
CASE
1840
Mid-Southern
Equipment Corp
OFFICIAL
USE
ONLY


STOP
PAP8652


PALL
Water Processing
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033

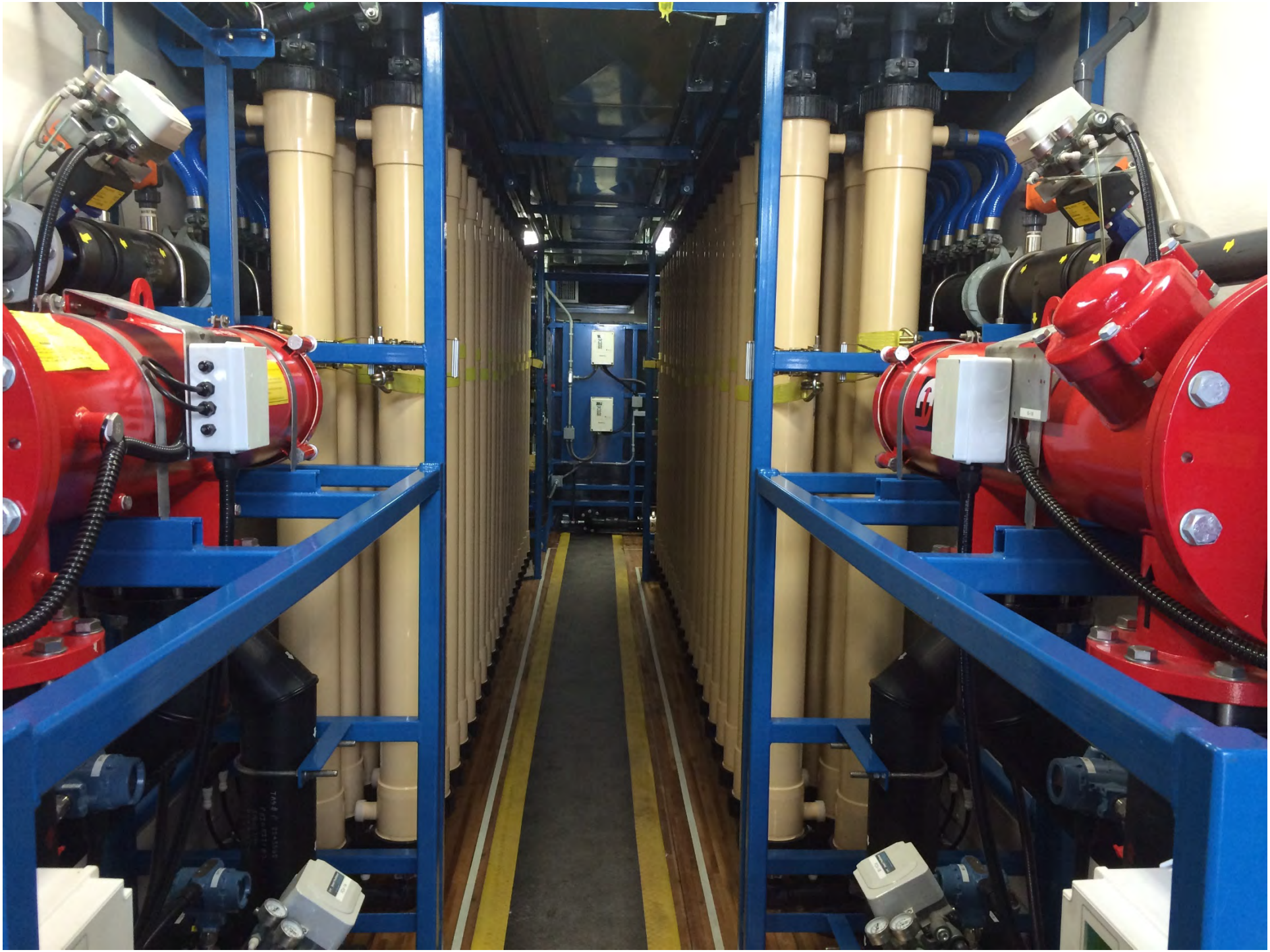
SSR Smith Seckman Reid, Inc.


PANEL B
HIGH SERVICE MAIN
ON
OFF
gedwin VFD


Water Treatment System


CD100M DRI PRIME


CHART
CARBON DIOXIDE
REFRIGERATED LIQUID
UN 2187
REMOVE BEFORE INSTALLATION

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Water Processing
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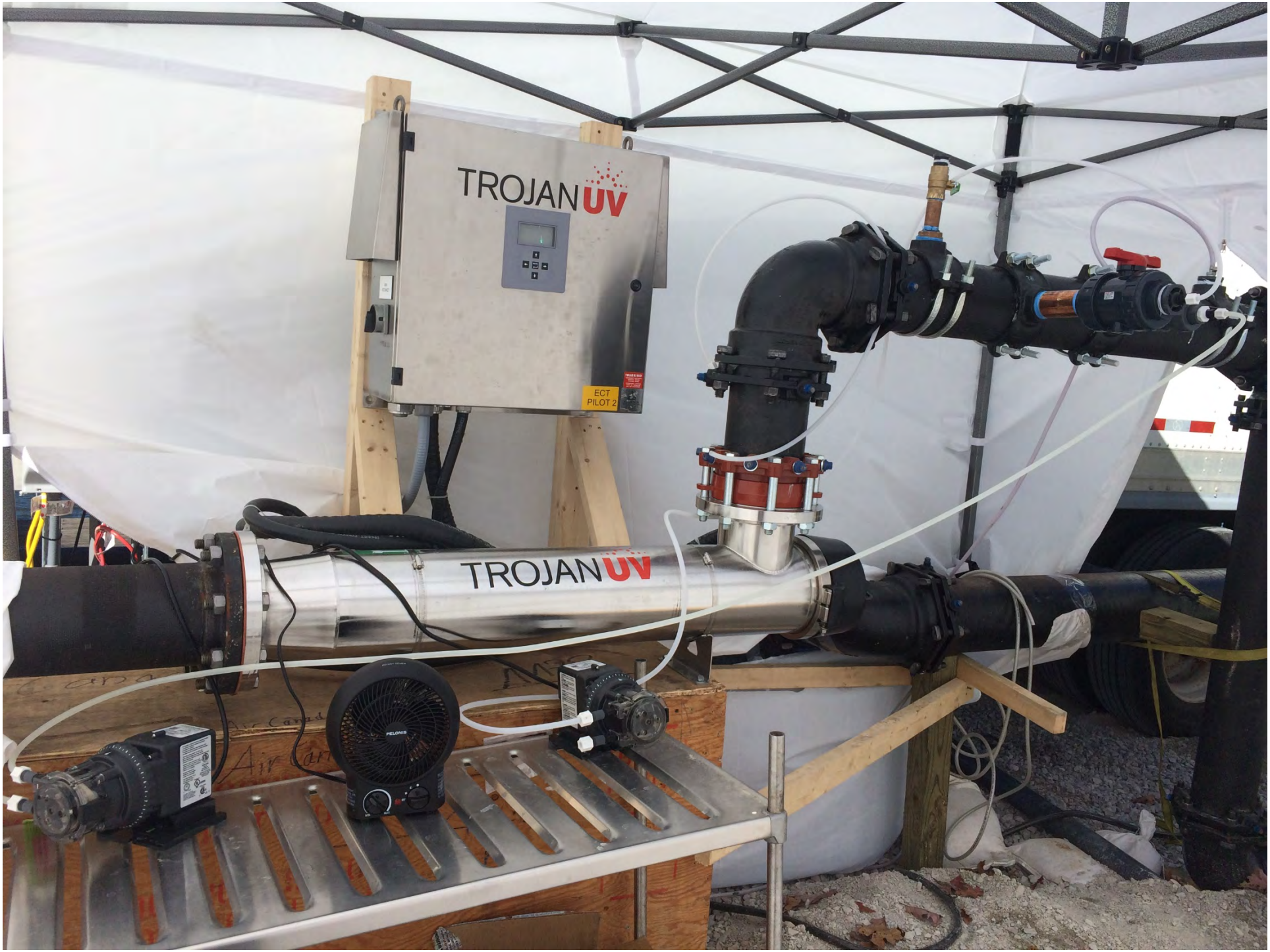
TROJAN UV
ECT
PILOT 2
TROJAN UV


ALUMINUM
CHLOROHYDRATE
3430MAX
MAX


godwin VFD
PALL
Water Processing
Pall Aria™
AIR-RIDE EQUIPPED

Smith Seckman Reid, Inc.


godwin


Southeast
Tennessee
Drought
Study
DROUGHT


5
1/2
4
1/2
3
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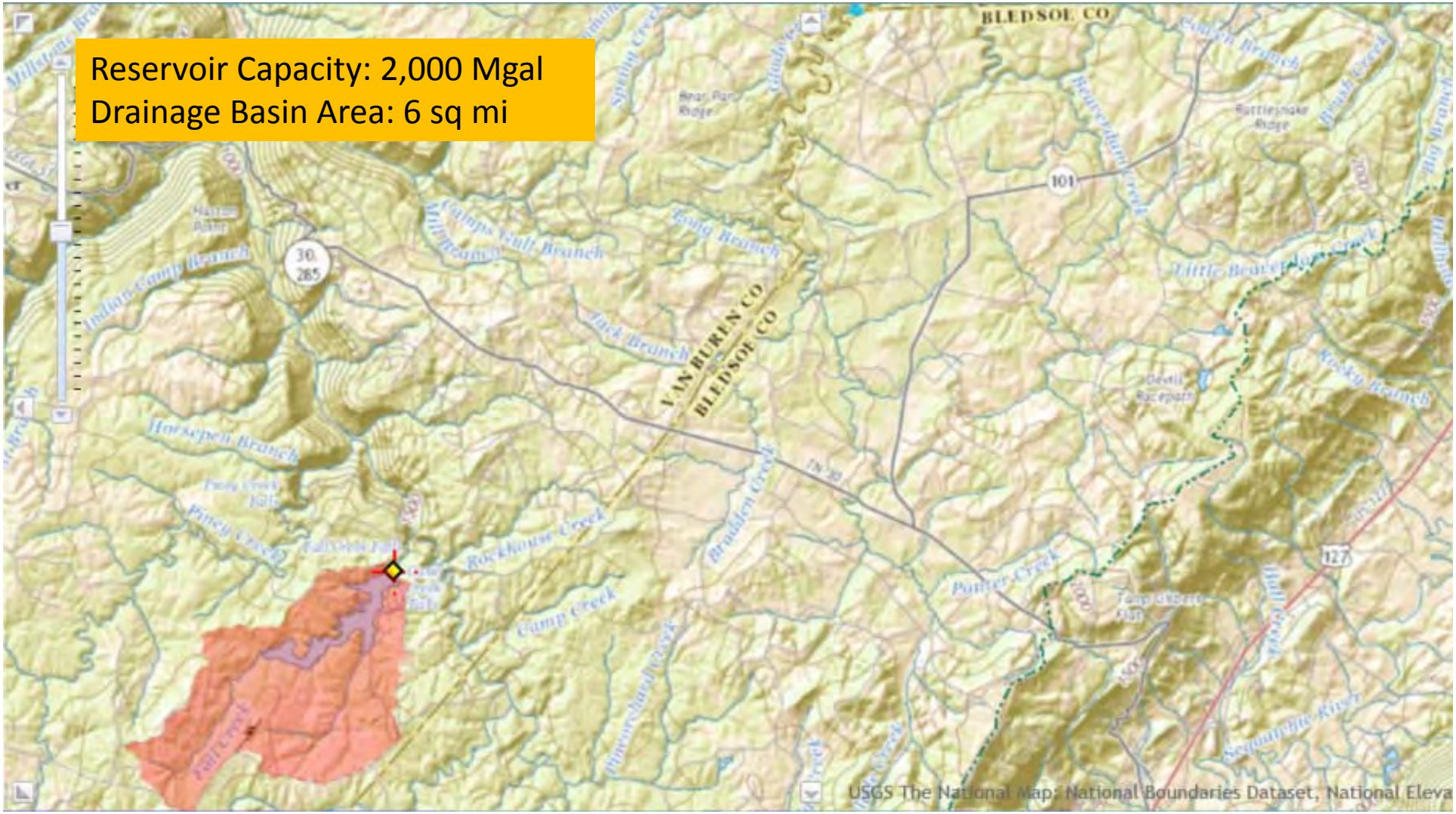
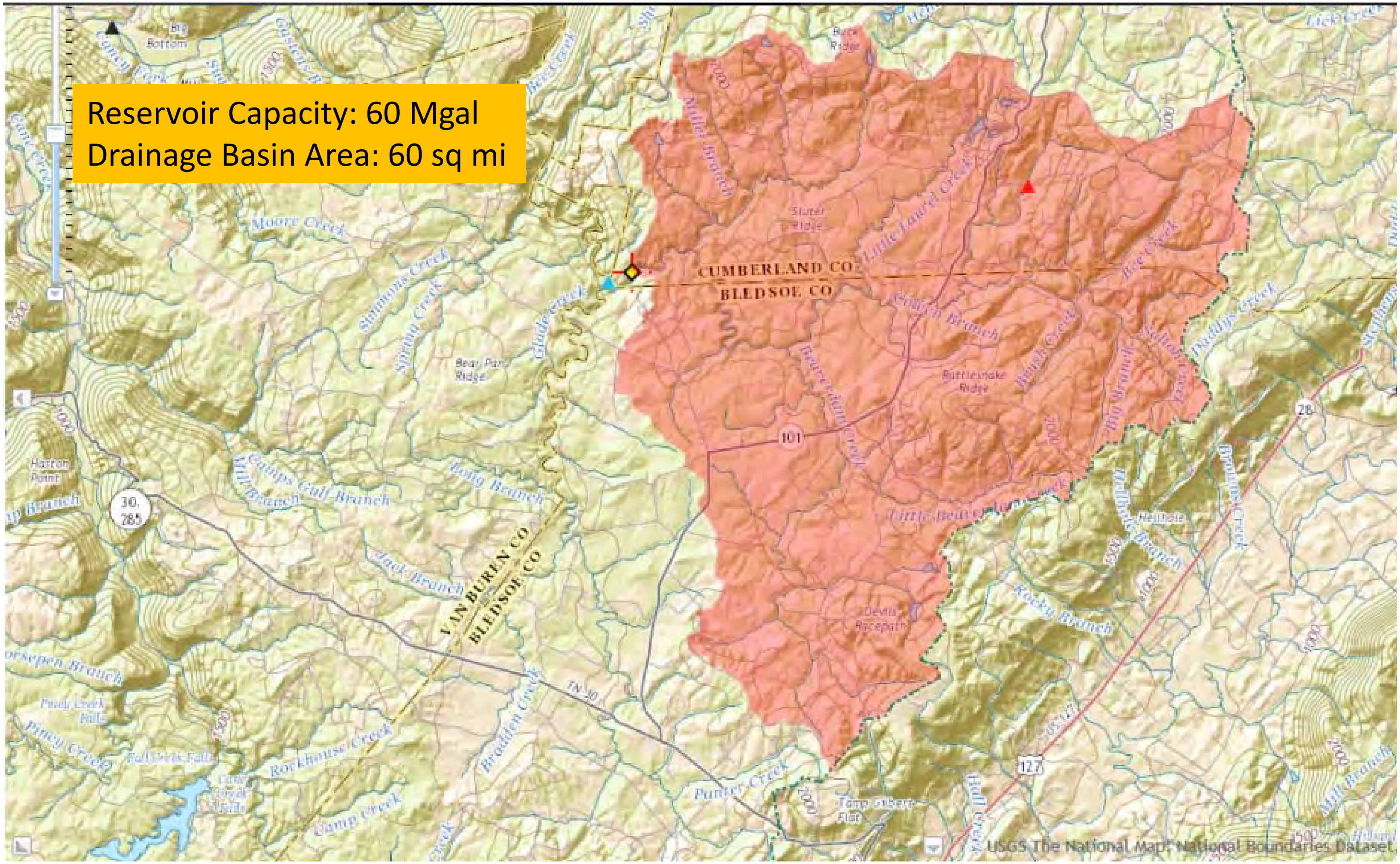
1

SSR Smith Seckman Reid, Inc.


Reservoir Capacity: 2,000 Mgal
Drainage Basin Area: 6 sq mi
BLEDSOE CO
VAN BUREN CO
BLEDSOE CO
101
127
USGS The National Map: National Boundaries Dataset, National Eleva

Reservoir Capacity: 60 Mgal
Drainage Basin Area: 60 sq mi



I simply want to thank all of the people who helped make this happen. TDEC, TDOC, TDOT, utility companies, manufacturers, even my competitors all working together for the common good. I might've been raised a Virginia gentleman, but I've never been prouder to be a Volunteer. What we did in three weeks is astounding.

Thank you to everyone who contributed.

SSR Smith Seckman Reid, Inc.

We had a long way to go and a short time to get there, but we did what they said can't be done.

TN Department of Environment & Conservation

TN Department of Correction

TN TDOT Department of Transportation

SSR

James C. Hailey & Co.

City of Alcoa

CPWS

MR Systems

PALL Pall Corporation

TrojanUV Water Confidence™

HACH Be Right™

Garney Construction Advancing Water

xylem Let's Solve Water

Burnett Inc. Steadfast Performance

DYCHO

SVEC Sequachee Valley Electric Cooperative Your Touchstone Energy Cooperative

Service Electric Co. Chattanooga, Tennessee A Quanta Services Company

Morgan Electric Electrical Contractors

Questions

Questions?

Mike Bernard
615-210-5349
MBernard@ssr-inc.com