Breakout D:
Drought Planning & Operational Readiness

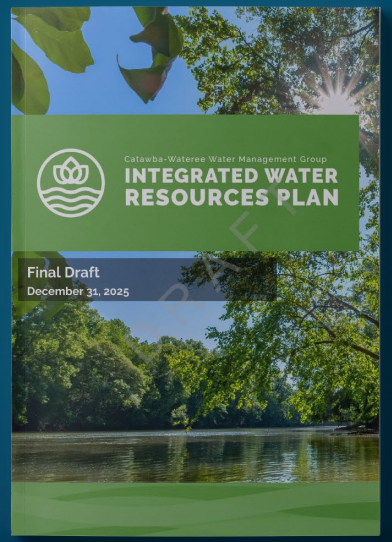
RECOMMENDATIONS

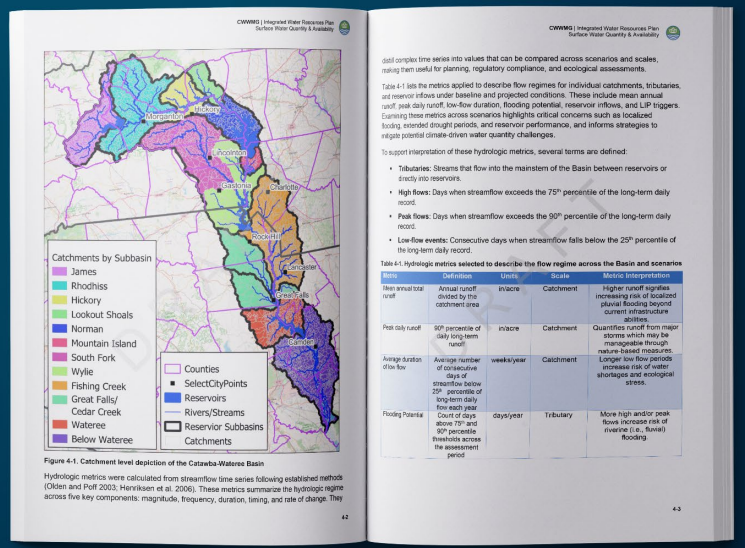
D.3 Raw Water Intake Modifications

Recommendations:

a. Assess ability to lower intake elevations for critical facilities.

b. Use probability-based evaluations to prioritize operational vs. capital solutions.





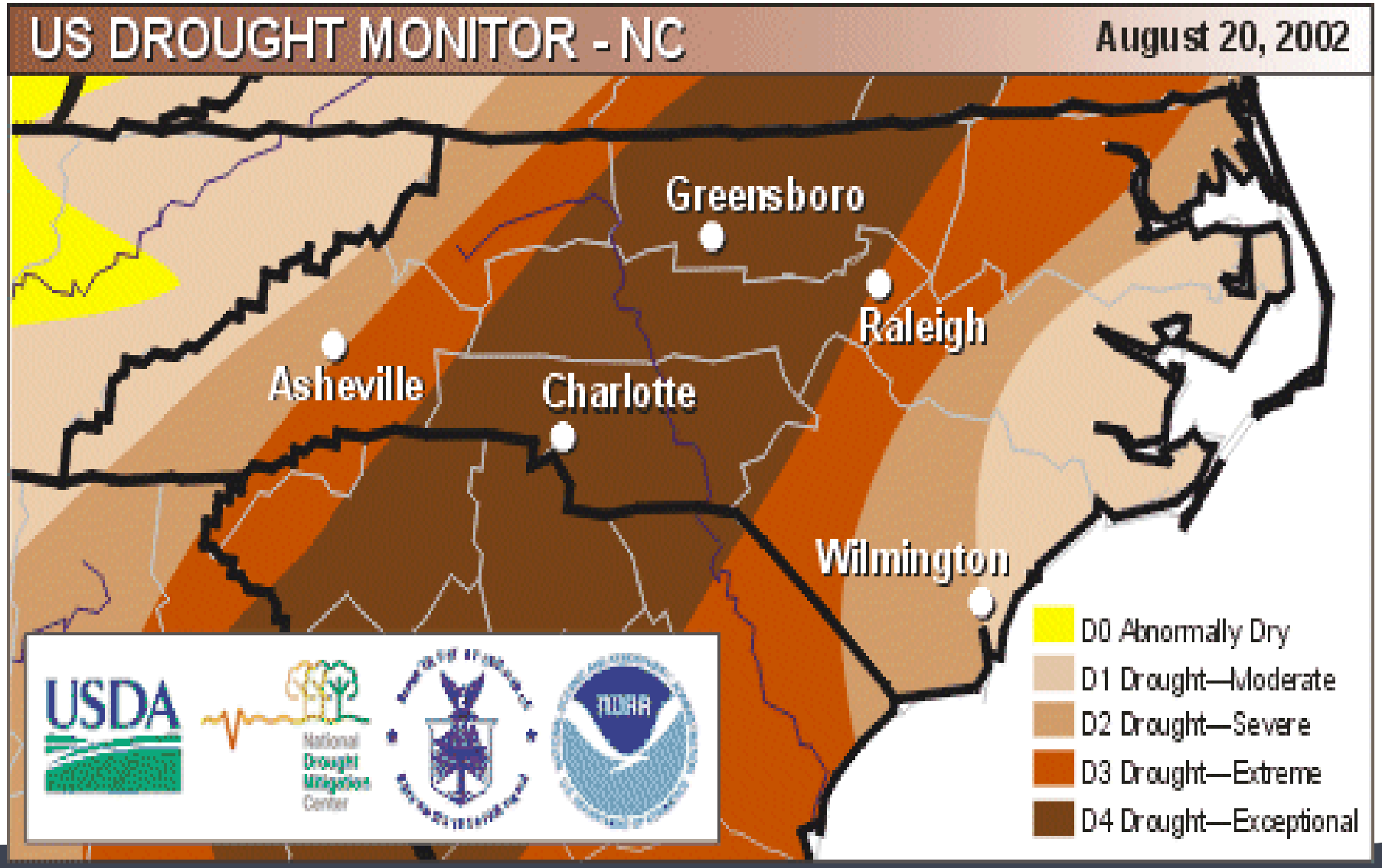
Drought Planning & Operational Readiness

Jeff Lineberger, PE
Duke Energy

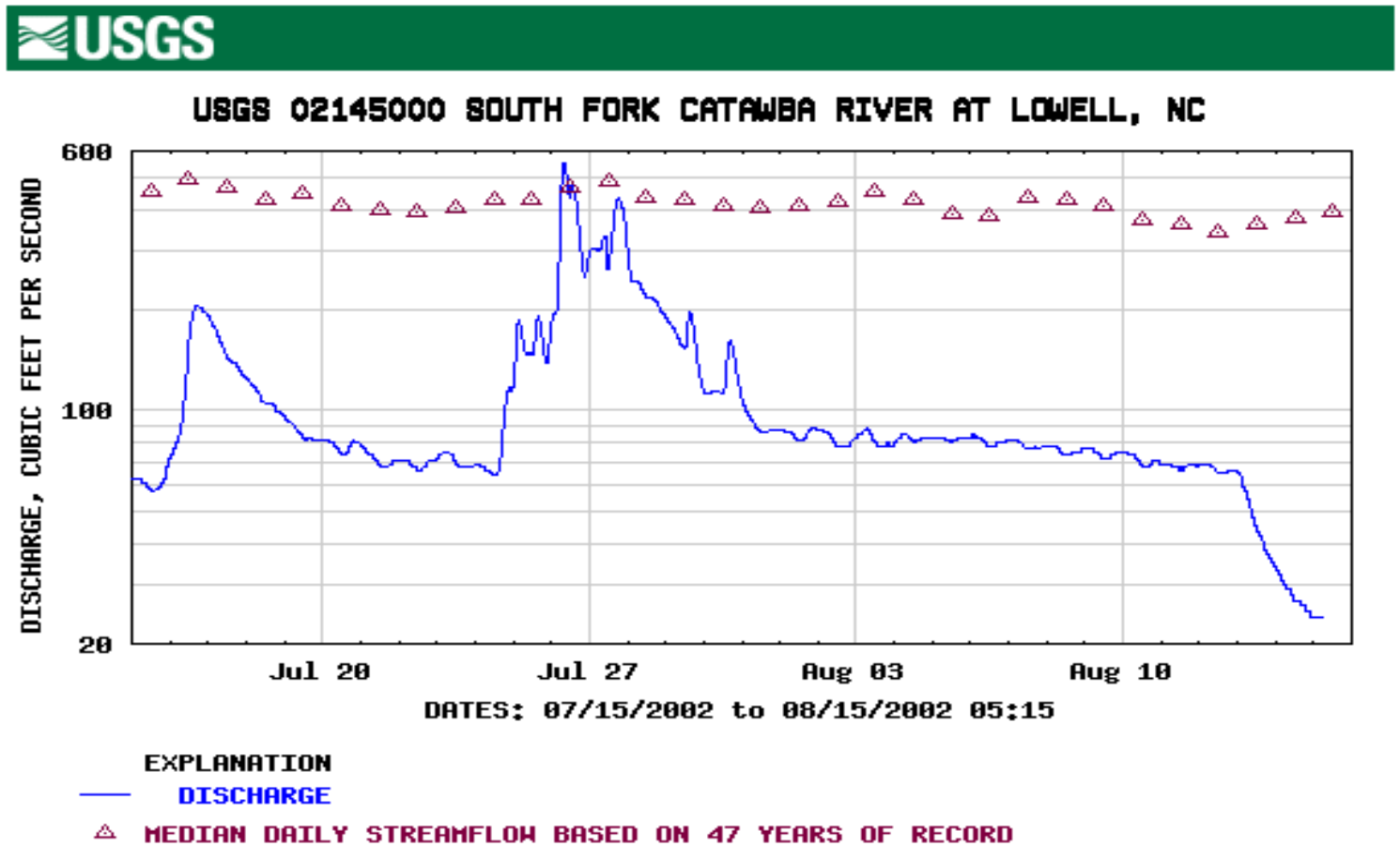
Jennifer Gibson, ORC
City of Belmont

CATAWBA WATEREE
WATER MANAGEMENT GROUP

Do you Remember Your Worst Day at Work?



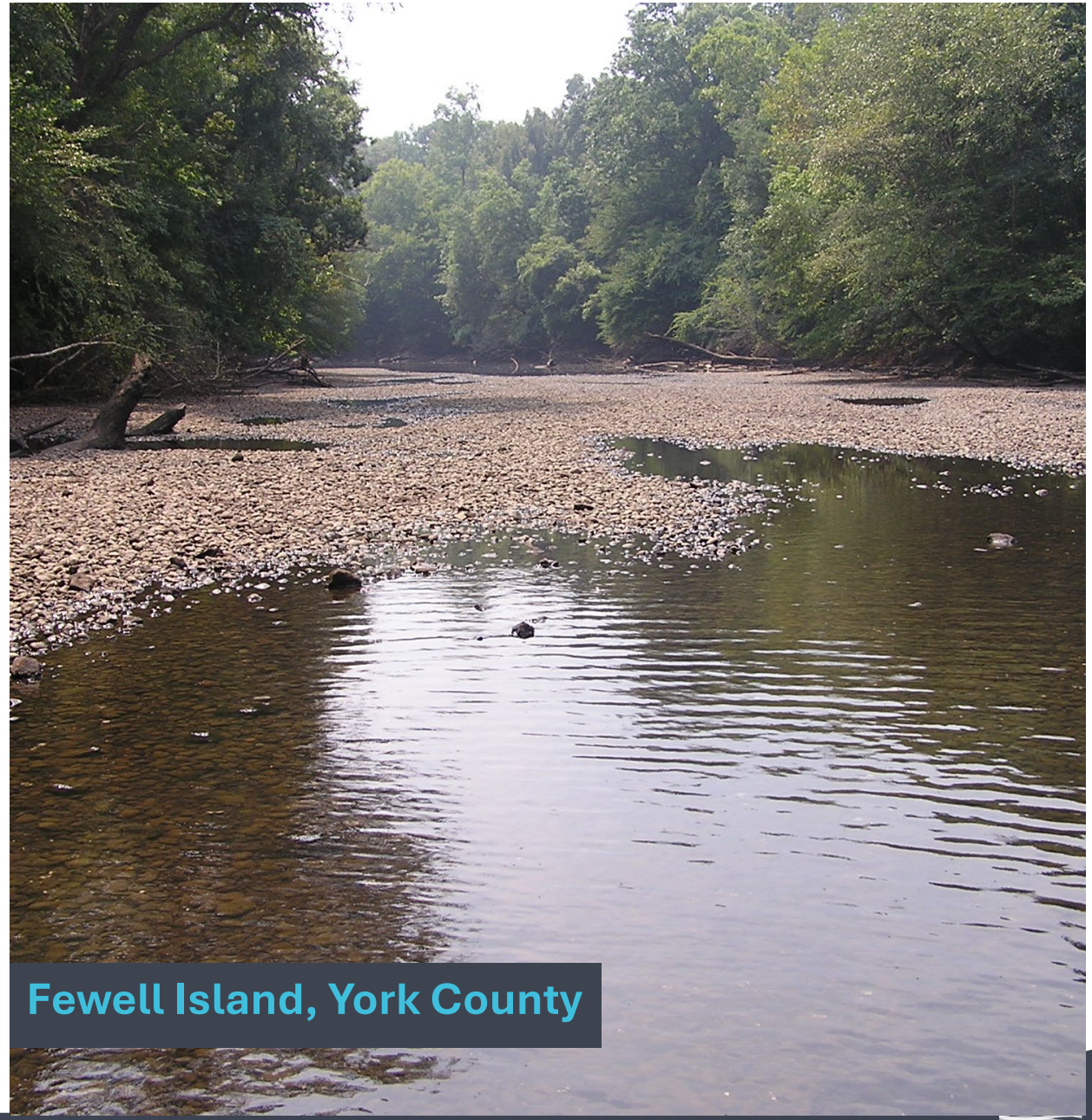
The South Fork River had Dried Up



Provisional Data Subject to Revision

Low Inflow Protocol (LIP)

- 2006 - Established procedures for reductions in water use during periods of low inflow in the Catawba-Wateree Basin
- Goal is to delay the point at which the 11-lake system's available water storage inventory is fully depleted
  - Provides additional time for precipitation to restore stream flow, reservoir levels and groundwater levels to normal ranges



Fewell Island, York County

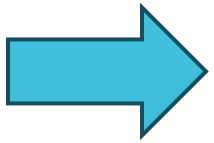
CATAWBA WATEREE
WATER MANAGEMENT GROUP

How the LIP Works

Based on Drought Stage, Drought Management Advisory Group (DMAG) Members Take Action

Drought Stage (severity) is determined based on 3 indicators

1. Storage - How much water is in the reservoirs compared to target
2. Inflow - How much water is flowing into the reservoirs compared to long-term avg.
3. U.S. Drought Monitor - a government site that indicates areas experiencing a drought and the drought's severity, weighted by area



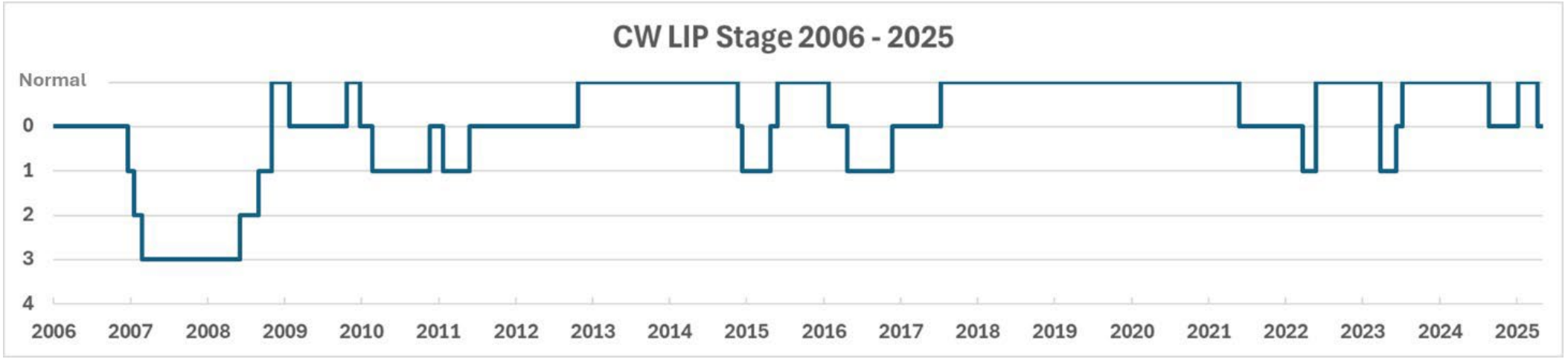
Levers to Pull

- Water withdrawal / use reductions (*voluntary / mandatory / emergency*)
- Modified Reservoir Operations
  - Releases at dams
  - Recreational flows
  - Reservoir elevation minimums

Currently 41 CW-DMAG Member Organizations

CATAWBA WATEREE WATER MANAGEMENT GROUP

First 19 Years of Operation with an LIP



- LIP has been initiated regularly over the past two decades
- Water Use Restrictions – Stage 0 (none), Stage 1 (Voluntary), Stages 2 & 3 (Mandatory), Stage 4 (Emergency)
- LIP is constantly reviewed and monitored for enhancement, last updated in 2022
- Modeling the LIP consistently demonstrates it extends water accessibility by decades through its water use reductions and operational modifications

CATAWBA WATEREE
WATER MANAGEMENT GROUP

Do You Remember Your Best Day at Work?

Inaugural Meeting of the CWWMG – December 6, 2007

CITY OF BELMONT'S PUBLIC WATER INTAKE

Catawba River excavation project

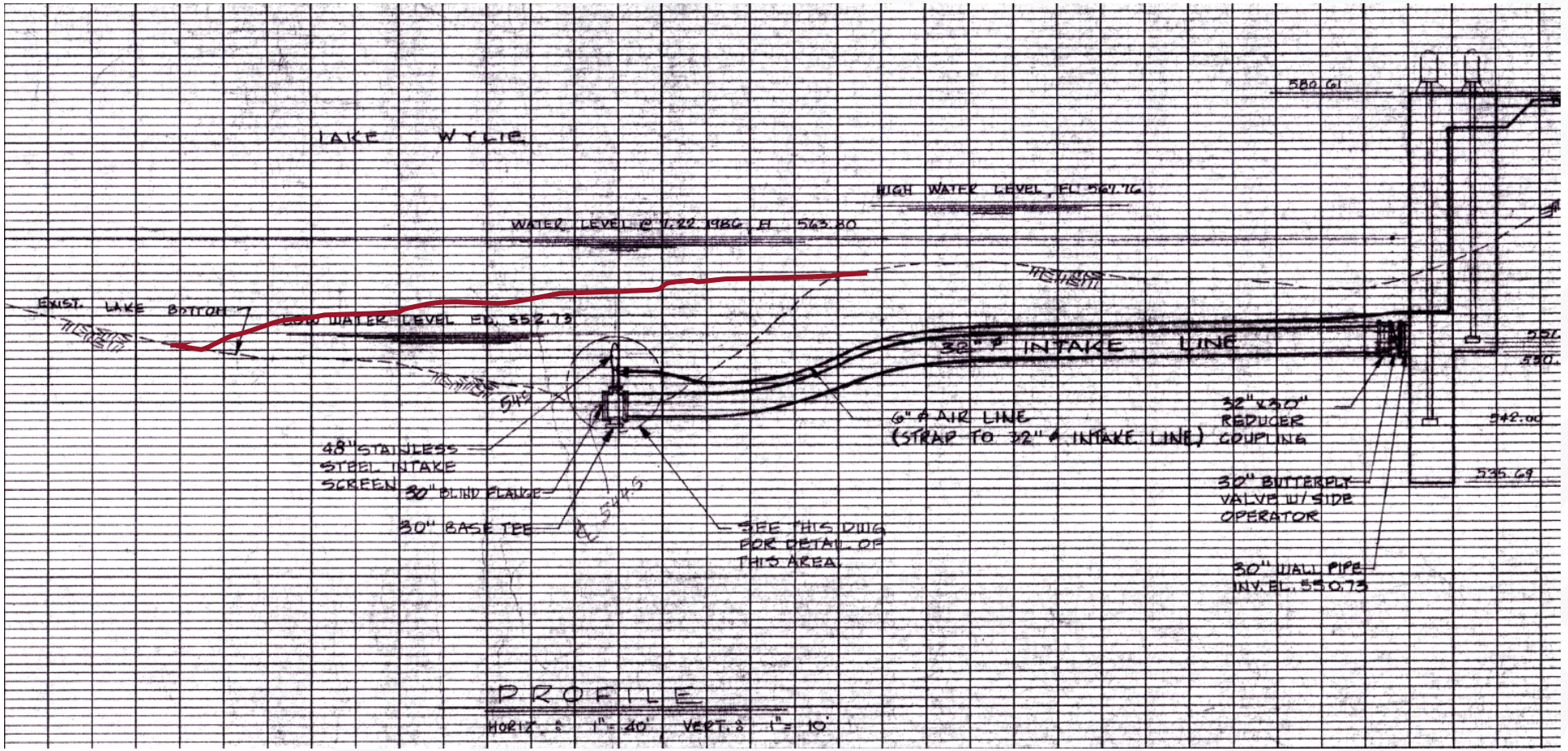
BACKGROUND, PLANS, NEXT STEPS

BELMONT
NORTH CAROLINA

LOCATION


Belmont Skatepark
City of Belmont
Water Treatment
13th St
9th St
Old NC 277 Rd
Old State
12th St
Unity Baptist
Church of Belmont
Linestowe Dr
Abercromby Ln
Adair Ln
N 10th St
E Catawba St
S 10th St
11th St
Brook St
Laye St
Last Minute Lawn Care
& Outdoor Services
River Dr
Volk St
Catawba River
Catawba River

Water intake pipe and screen



Water intake pump house

- Constructed in 1950s without the intake pipe
- Houses raw water pumps
- Currently intaking water through sluice gates not through the submerged intake pipe

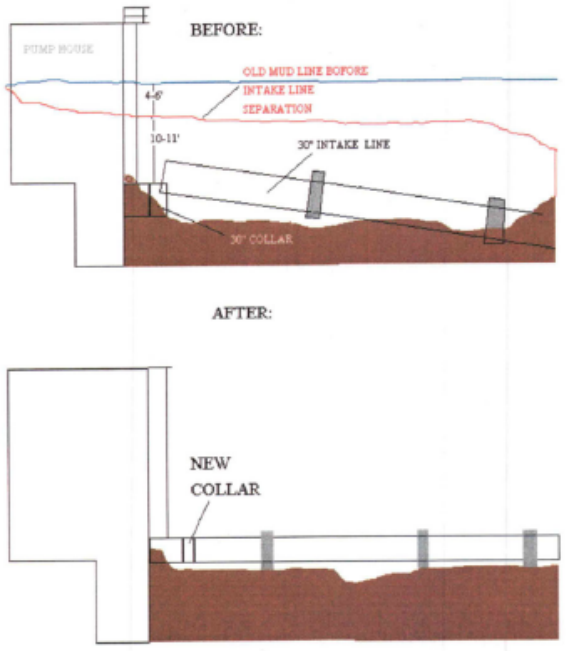
Water intake pipe and screen

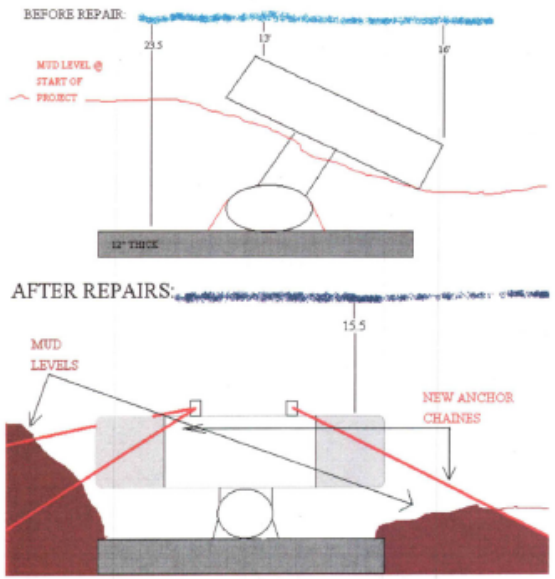
- Constructed in 1987
- 48” diameter T-screen
- 30” diameter intake pipe approx. 330 LF from Intake Pump House
- Currently not intaking water
- Accumulated approx. 5 feet of sediment over top of screen

Previous repair projects on intake

August 1996- In Water Services

Made repairs to the screen because it had tilted and the line broke away from the pumphouse. Cleaned the wet well, there was lots of trash and sediment. They also moved sediment around the intake screen. It was noted that there was 15.5 feet from the top of the screen to the surface of the water.



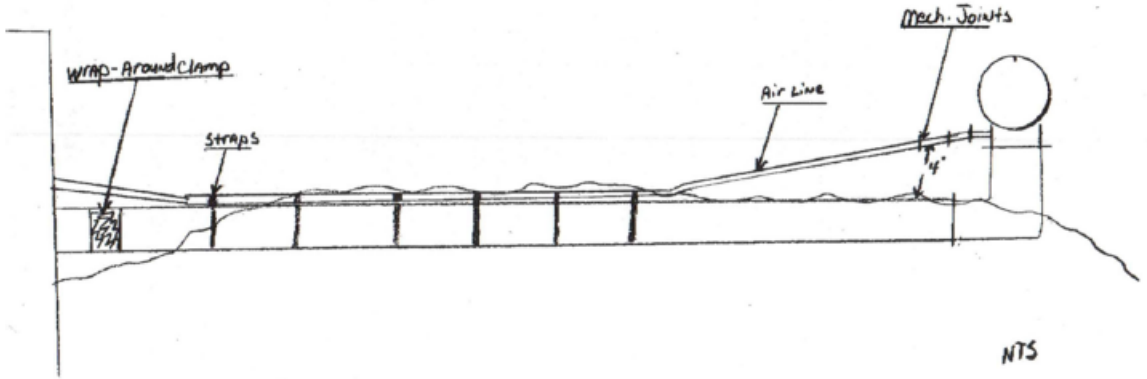


June 1998-Underwater Services Corporation

Inspected the intake line and cleaned the screen.

March 2001-Intercoastal Diving

Inspected the intake line. There was no dredging done. It was noted there was 4 ft clearance between the bottom of the screen and the river bottom.



Previous repair projects on intake

June 2011-Glenn Underwater Services

Inspected the intake. The screen was visible. Not covered by sediment and no damage or debris was found. Noted there was 1 ft clearance between the intake screen and the river bottom. Below is a rendering of the intake screen in the inspection report.

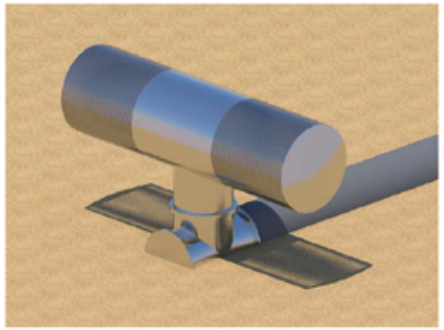


Image 2 - 3D image of 48" raw water intake screen

November 2014-The sediment was measured inside the raw pumphouse, along the intake line, and around the intake screen.

At the time, the anchors holding the chains that secured the screen were covered in sediment. The condition of the screen and chains was good and there was no build up of sediment on the intake screen.

September 2018-Glenn Underwater Services Found PO 22721 dated 9/14/2018 for "Dredge Intake Pipe and River, Remove Sediment, Inspect Pipeline"

Called Glenn and they sent Inspection Reports for 2014 and 2018

The 2018 report mentions that 75% of the screen was visible. There were some depths mentioned, but no pictures. It also mentioned that the diver removed 18" soft sediment and 6" compacted sediment over the area where the line tees into the screen.

February 20, 2020- Glenn Industrial Group

Inspection of Raw Water Sluice Gate Unable to find inspection report.

November 4th 2022- Glenn Industrial Group

Dive Inspection done for sediment depth study of the area surrounding the pumphouse so we could plan for sluice gate repair/replacement.

Table 1 Inspection Data

Location:	Depth of Water:	Probe Depth:
A1	6'	6'
A2	7'	5.5'
A3	8'	6'
B1	5'	4.5'
B2	7'	7'
B3	8'	8'
C1	6'	5.5
C2	6'	4'
C3	4'	5'
Sluice Gate	6'	4'

Figure-1 Inspection Locations

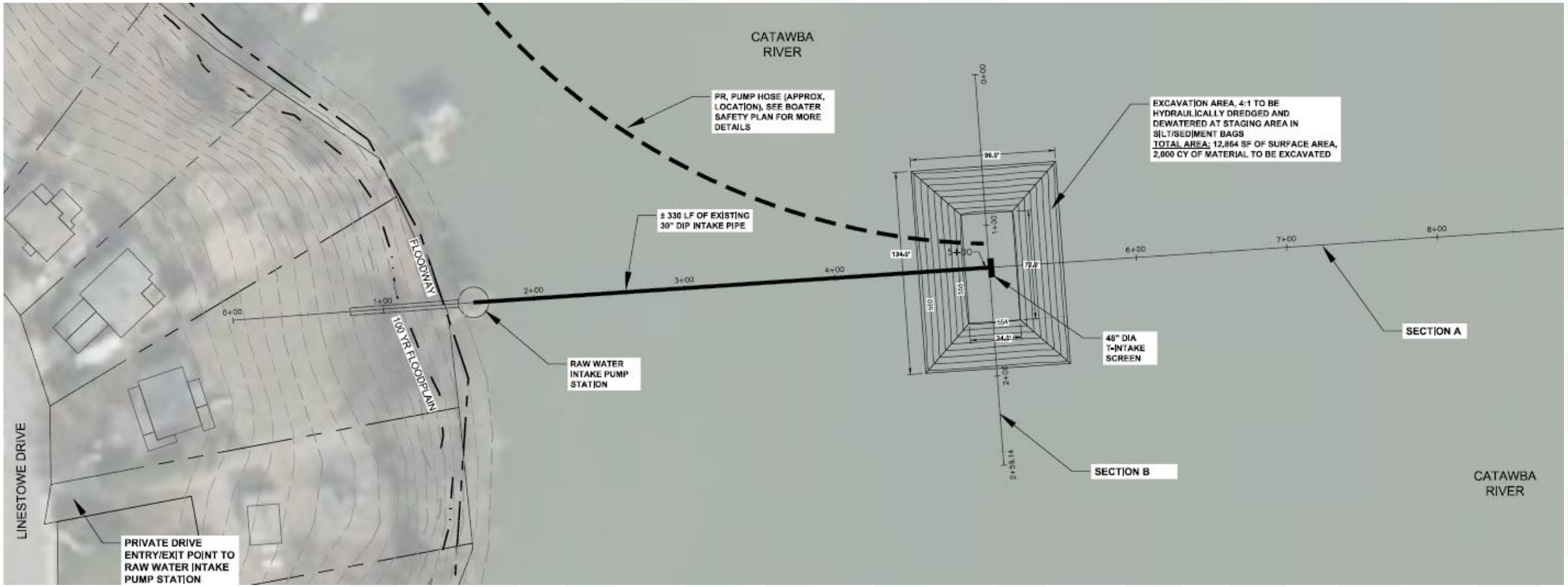
February 2023-Mainstream Commercial Diving

A dive inspection was done to measure gates and proximity to each other and to sediment. After that, Garver did the design for the gates and also structural repairs that need to be done on the pumphouse. They have not started the bidding process because the sluice gates may be the only way we are getting water to the raw water pumps.

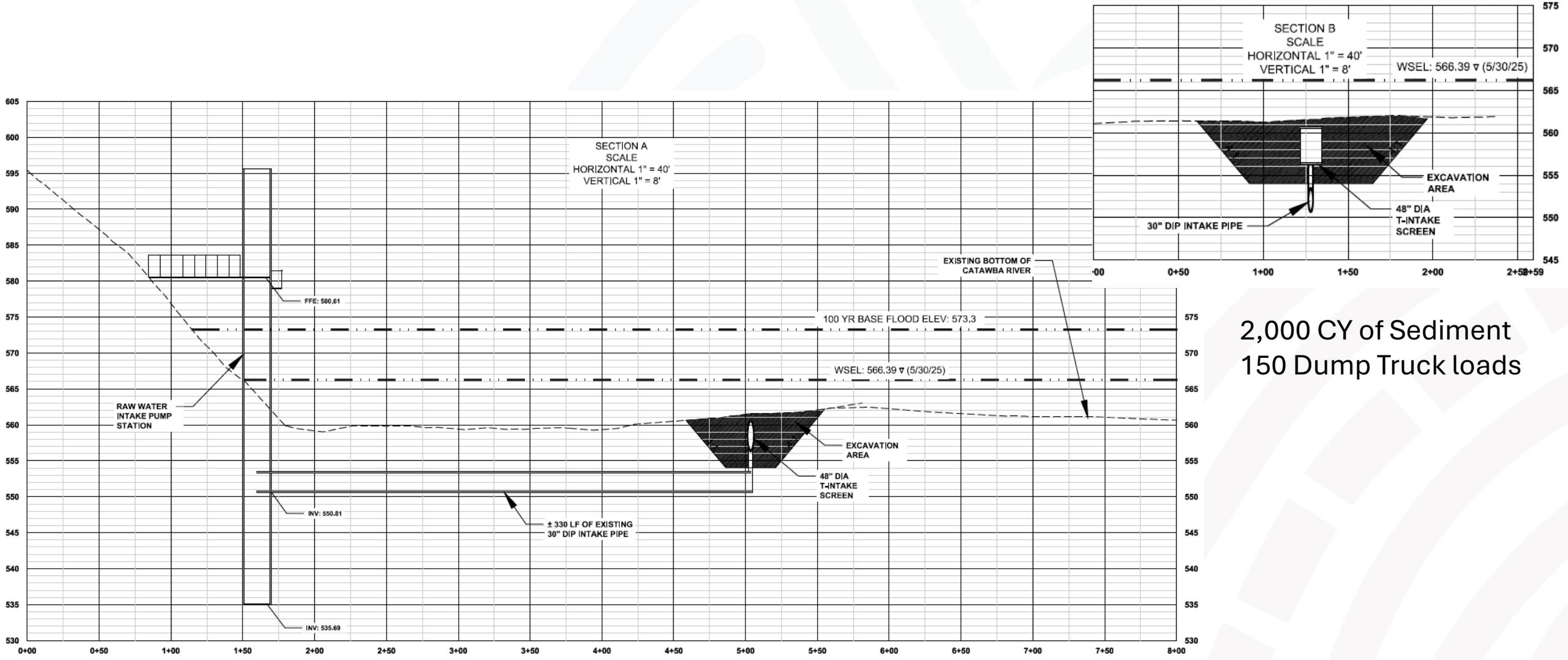
Rudimentary Bathymetry survey

- The City of Belmont conducted its own survey to estimate the amount of sediment that needs to be removed.
- Water depths were measured in strategic locations around the intake screen and along the intake pipe.
- GIS coordinates were assigned to each depth measurement using an ESRI field map app.
- GPS points were transferred into AutoCAD with the corresponding depths and a 3D surface drawing was created.

Current excavation project on intake

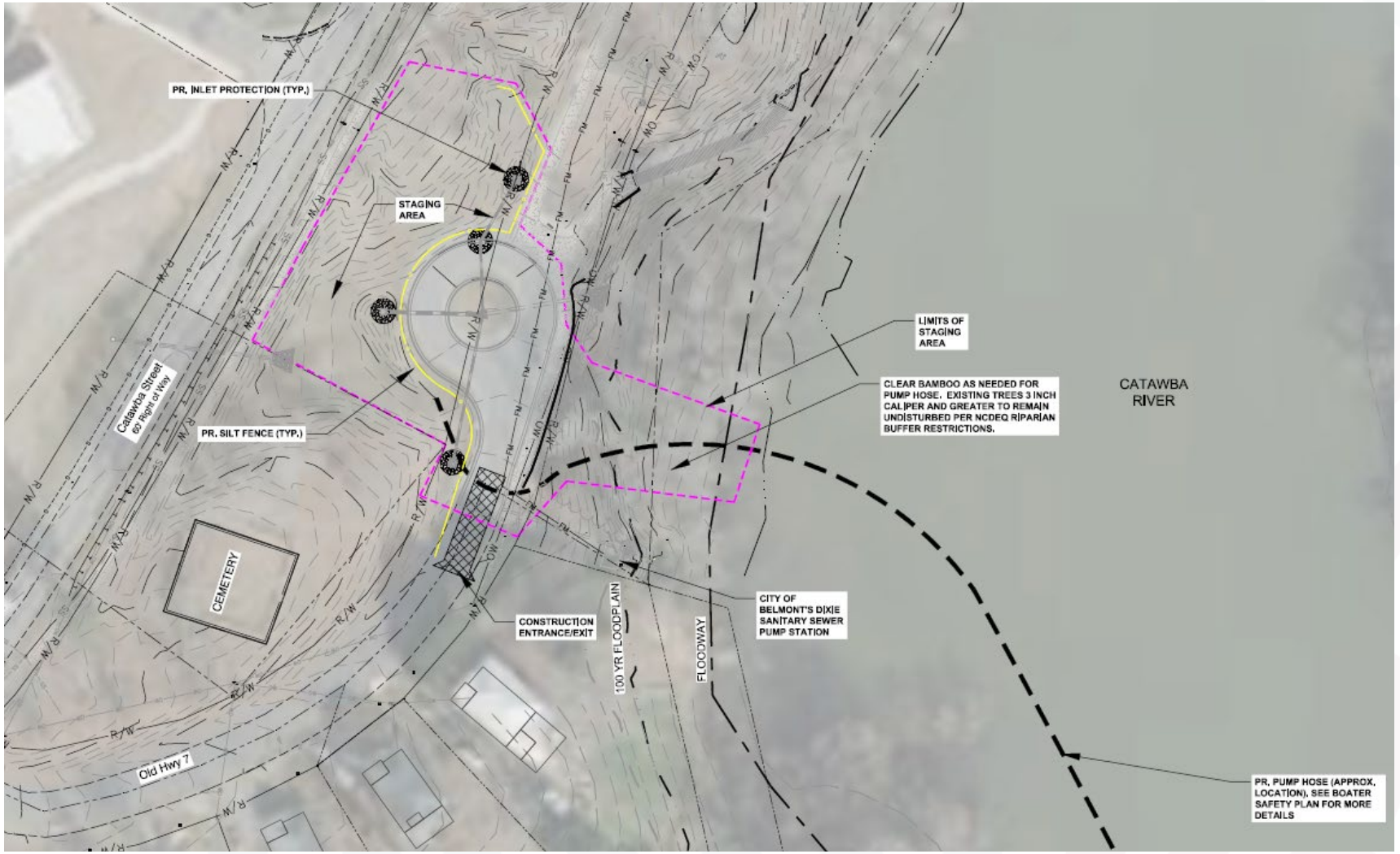


Current excavation project on intake

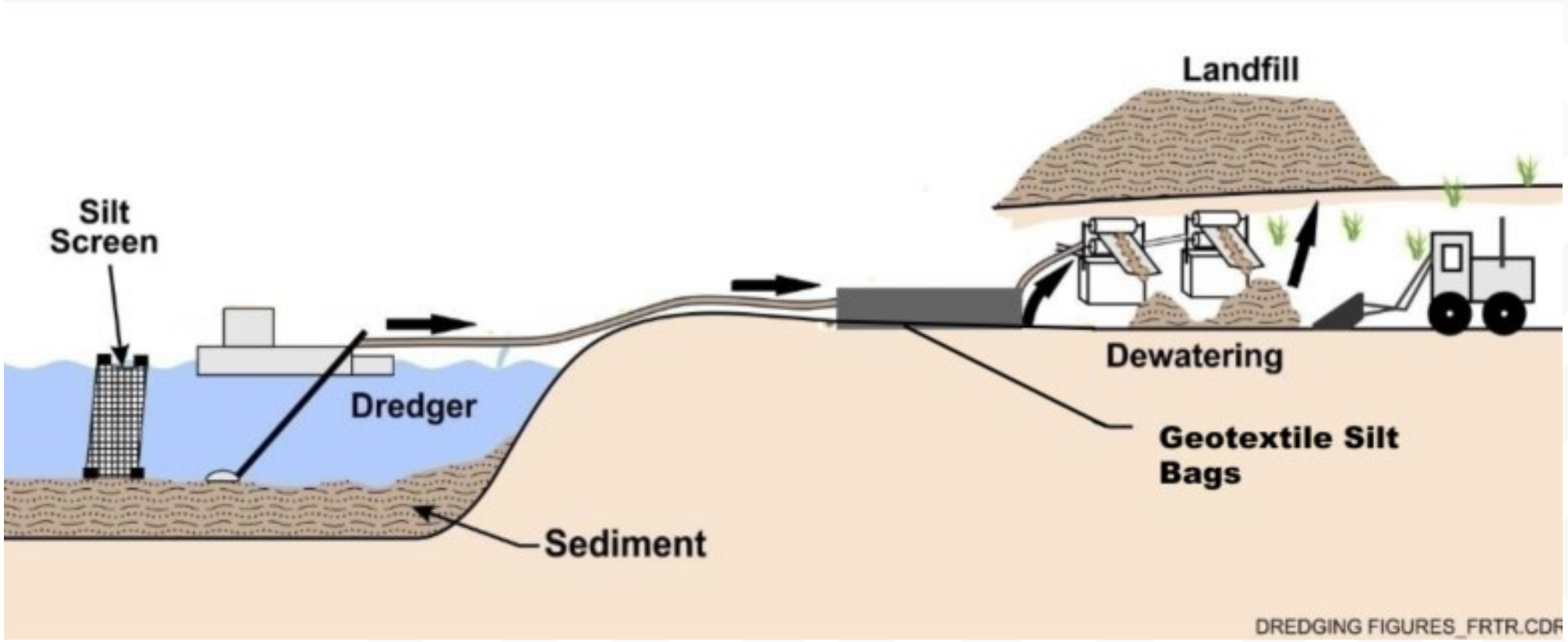


2,000 CY of Sediment
150 Dump Truck loads

Current excavation project on intake



Dredging overview



Dredging operation

Dewatering Bags

Dewatering bags separate water from sediment in a compact footprint. Crews connect the discharge line set the bag on a prepared pad and allow the fabric to hold solids while clear water returns to the site. Bags swap quickly so flow keeps moving and small jobsites can continue to dewater.

Spoil site


1417
E CATAWBA ST
BELMONT
OLD NC 277 RD
1322
1320
1318
1316
1304

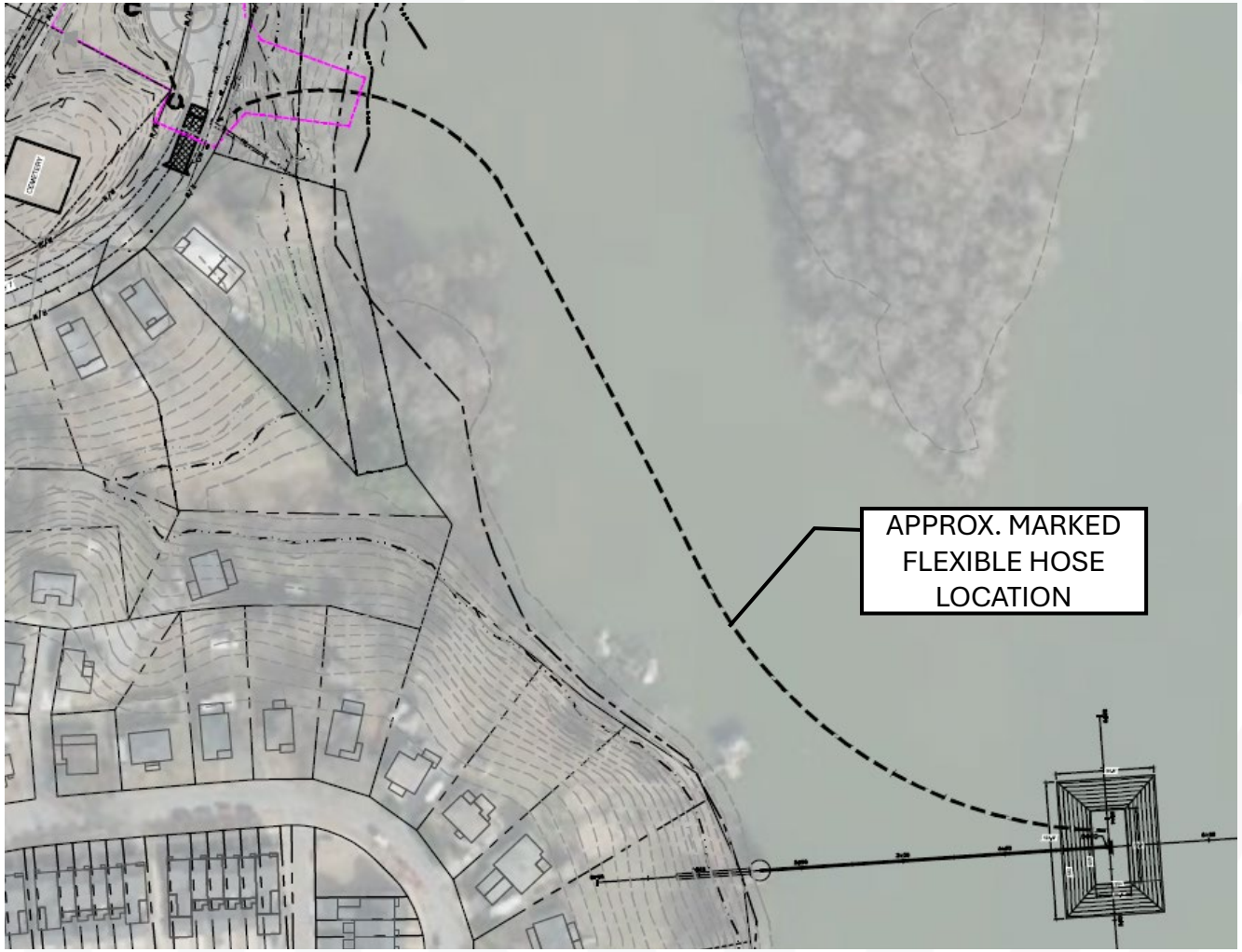

Google Maps

Spoil Site Selection

- City owned property would be ideal because this is a long-term project.
- Dewatering bags must be 50 ft from shore on all sides.
- Ease of running barge or equipment from dredge site to spoil site.
- Clearance of vegetation and restrictions for preserving riparian buffers.
- Ease of access of dump trucks that will be transporting sediment.
- Consider disturbance the dump trucks will have on traffic and nearby residents.

Boater safety

Boater safety



Permits

- Duke Energy Review – approval to proceed with permitting as of 10/24/25. Boater safety plan approved.
- Catawba Indian Nation Tribal Historic Preservation Office – Notification and concurrence approval received as of 11/20/25
- NCDEQ Division of Water Resources – 401 Water Quality Certification coverage/approval as of 11/20/25
- NC Wildlife Resources Commission – Notification and review of Boater Safety Plan (revisions to comply to USCG standards underway)
- Lake Wylie Marine Commission – Notification and review of Boater Safety Plan

Funding

- Missed FEMA deadlines to request assistance because we weren't aware of the problem.
- The Division of Water Infrastructure recommended Belmont be awarded funding for our intake dredging project.
- On February 18th the recommendation was considered and approved by the State Water Infrastructure Authority.
- Belmont is awaiting the intent to fund letter.

Next steps

- Finalize permitting
- Publicly post project for invitation to bid
- Bid process takes approximately 30 days as long as multiple bids are received
- City selects lowest bid or extends bid if necessary
- City awards project at next City Council meeting
- Contract is executed with contractor and project schedule is set
- Project begins
- Considerations for a long-term solution, i.e. extending intake screen into deeper part of channel vs relocation

Lessons learned

- Collaboration is key.
- Internal -WTP Superintendent, Public Works Director, City Engineer
- External- CWWMG, Duke Energy, NCDEQ, LWMC, Wildlife Commission, Catawba Indian Nation Tribal Historic Preservation
- The importance of historical record accuracy and maintaining records well for future use.
- Routine intake inspections are a must.
- No matter how long you think it’s going to take, it will take longer.


BELMONT
MANY THREADS, ONE COMMUNITY