Piatt Road Extension

Increased traffic anticipated from the new Olentangy Berlin High School and from planned residential developments in the immediately adjacent area spurred the extension of Piatt Road from Cheshire Road north to Berlin Station Road. Additionally, recent expansion of public sewers through the Glenmead Subdivision and to the High School has opened this area of the county to be even more desirable for development and interest in the adjacent properties increased immediately.

The High School, which is located at the north end of the project along Berlin Station Road was already under construction during plan development, making the schedule paramount to the project. The School district needed the northern leg of the project from Glenmead Subdivision to the High School to be opened to traffic for their opening of the school year in 2018.

The Mannik & Smith Group, Inc., provided preliminary engineering and detailed design services for construction of the new three lane Piatt Road Extension and reconstruction of the three-way intersection of Piatt Road and Cheshire Road to a modern single lane roundabout. Construction began in July 2018 with the construction of the northern section between Glenmead Subdivision and the new high school. This section of new roadway opened to traffic in September 2018. The modern roundabout and the southern section between the roundabout and Glenmead Subdivision was opened to traffic in August 2019. The total design cost was $319,800.00. Engineer's Construction costs were estimated at $3,124,949.15 with an actual cost of $2,754,871.61. Both sections of the project were completed ahead of schedule, with no safety issues, and the pavement section tolerances were all met through the paving process, making for very smooth transitions and a very comfortable ride throughout the corridor.

The approximately one mile extension of Piatt Road and the new roundabout has increased public safety, enhanced roadway connectivity, improved drainage in the area and has already helped reduce traffic congestion in the area.

Benefits to the Public

Access to the new Olentangy Berlin High School became a priority when the final site location was determined. The existing Berlin Station Road is a narrow two-lane road with graded shoulders and would have been the only access to the school. Since this new school is the furthest north in the district, many students would be travelling from the south, with the only access being South Old State Road to Berlin Station Road. The extension of Piatt Road provides a three-lane roadway with twelve-foot lanes and two additional connections from the school to public roadway.

The design included right of way and grading provisions for a future multi-use path and sidewalk along the residential development portions of the project. Crosswalks and sidewalks were constructed in the roundabout to accommodate the anticipated future pedestrian improvements.

A number of future subdivision developments are planned along the corridor, so a center two-way left turn lane was designed to accommodate expected future development along the corridor. Drainage improvements included construction of a 432,846 cubic foot stormwater quality pond to treat roadway runoff, and to serve future development needs. Additionally the roadside drainage has been improved for the residents immediately adjacent to the roundabout.

Complexity

The new roadway alignment offered both challenges and opportunities. It would have to traverse through existing farm fields, near/under high voltage, transmission power lines, and meet the already constructed intersection at Glenmead Subdivision.

Challenges:

- The new High School was just beginning construction on the first nearly 1,100 feet of the roadway alignment, which made the set point of connection more challenging as it had to bend along the power lines as it traversed to the north.
- The design of the new roadway began as plans for the new high school were complete and construction was just starting. Collaboration between roadway designers and the high school designers was important to establish access and connectivity points and coordinate drainage ditches and culverts.
- The architect/engineer for the new school designed the intersection with Berlin Station Road and the new Piatt Road without a crown and sloping towards the school property. MSG was able to transition from a superelevation to the existing cross slope for a seamless transition.
- The location of the roundabout could not move too far to the west or it would potentially interfere with future plans for a grade separation with the railroad on Cheshire Road.
- There was very flat terrain in the area of the project, which created challenges for stormwater conveyance.
- The roadway drainage systems to the new subdivision roadway that was constructed for Glenmead Subdivision had to be connected.
- Farm field access had to be developed for the farmer to maintain access across the Piatt Road extension from his farmstead on Gregory Road to the west.
- The farm field drainage tiles had to be located and connected to the stormwater system for conveyance.

Opportunities:

- The alignment incorporated the newly installed sanitary sewer, distribution water line as well as a basin outlet swale that were constructed as part of the service to allow the high school to begin construction and prior to final design.
- On the south end of the project, the roadway alignment had to maneuver between two existing residential farm lots, while avoiding an established tree line to the extent possible, but still line up with the end of existing Piatt Road to allow for the future roundabout.
- In an effort to reduce right of way requirements, curbed and open ditch sections were employed along the corridor. This reduced the cost for right of way acquisition and maintained more of the existing farm fields.
- The design team was able to coordinate with the adjoining developers to drain roadway runoff into existing ponds.

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Innovation and Unique Features

Due to the disturbed area for construction, a stormwater quality pond was required to treat project stormwater. The pond was designed to accommodate future development along the corridor, which required design for a future two-stage outlet structure that can be retro-fitted once the development occurs.

McKenzie Ditch, the receiving waters for stormwater, was located on the east side of the roundabout. Construction of the roundabout and roadway extension prevented nearly 75 acres of offsite drainage from the west side of the project from reaching McKenzie Ditch. Because this stormwater did not require treatment, we designed a separate drainage system (a 38" X 60" elliptical culvert/storm sewer) to carry as much offsite drainage through the project, directly to McKenzie Ditch to avoid unnecessary increase to the basin sizing.

As mentioned above, about 1,500 LF of treeline at the south end of the project would have been completely wiped out had we not chosen to go with a curbed section of roadway on the east side of the roadway. It is unique as we maintained the open ditch section for the west side of the roadway through this section. This allowed us to maintain approximately half of the tree line along the existing residential farm lot as well as reduce right of way takes along the eastern boundary of the project.

Aesthetics and Sustainable Features

New alignment roadways create a blank canvas for design. Creating a project that meets the needs of current and future users can be a challenge. Knowing that a new school is located on the north end of the project, the design included right of way and grading for a future multi-use path on the west side of the roadway and a sidewalk on the east. As development grows in the area, students and area residents may walk or bike to the school for events and activities. When the need arises, the County is prepared to provide safe pathways for pedestrians.

Several driveways and residential yards are located near the roundabout. The initial design placed large culvert outlets in those residential yards. In an effort to provide a mowable area without a large culvert outlet, the culvert was re-routed under the roundabout via the aforementioned 38" X 60" elliptical culvert/storm sewer and along the north side of Cheshire Road for outlet into an improved roadside ditch and then ultimately to McKenzie Ditch. This was a particular concern to residents during the public meeting and these residents were appreciative of the change.

The project had excess excavated material from roadway and pond construction. The nearby developer was going to need material to construct a buffering mound along the north side of Cheshire when future construction began. The excess material was kept on site and used as the buffering mound, thus reducing waste material and trucking costs.

Construction of new alignment roadways often removes a number of trees during construction. As mentioned above, many trees on the northeast side of the roundabout were saved by constructing a curb along the roadway to reduce the shoulder width. This allowed existing, mature trees to be spared by construction.

1. Preconstruction showing the new high school under construction.

2. Existing intersection of Piatt Road and Cheshire Road.

3. The northern section between Glenmead and Berlin Station Road opened to traffic.

4. The roundabout is nearly complete.

5. The roundabout is complete and opened to traffic.

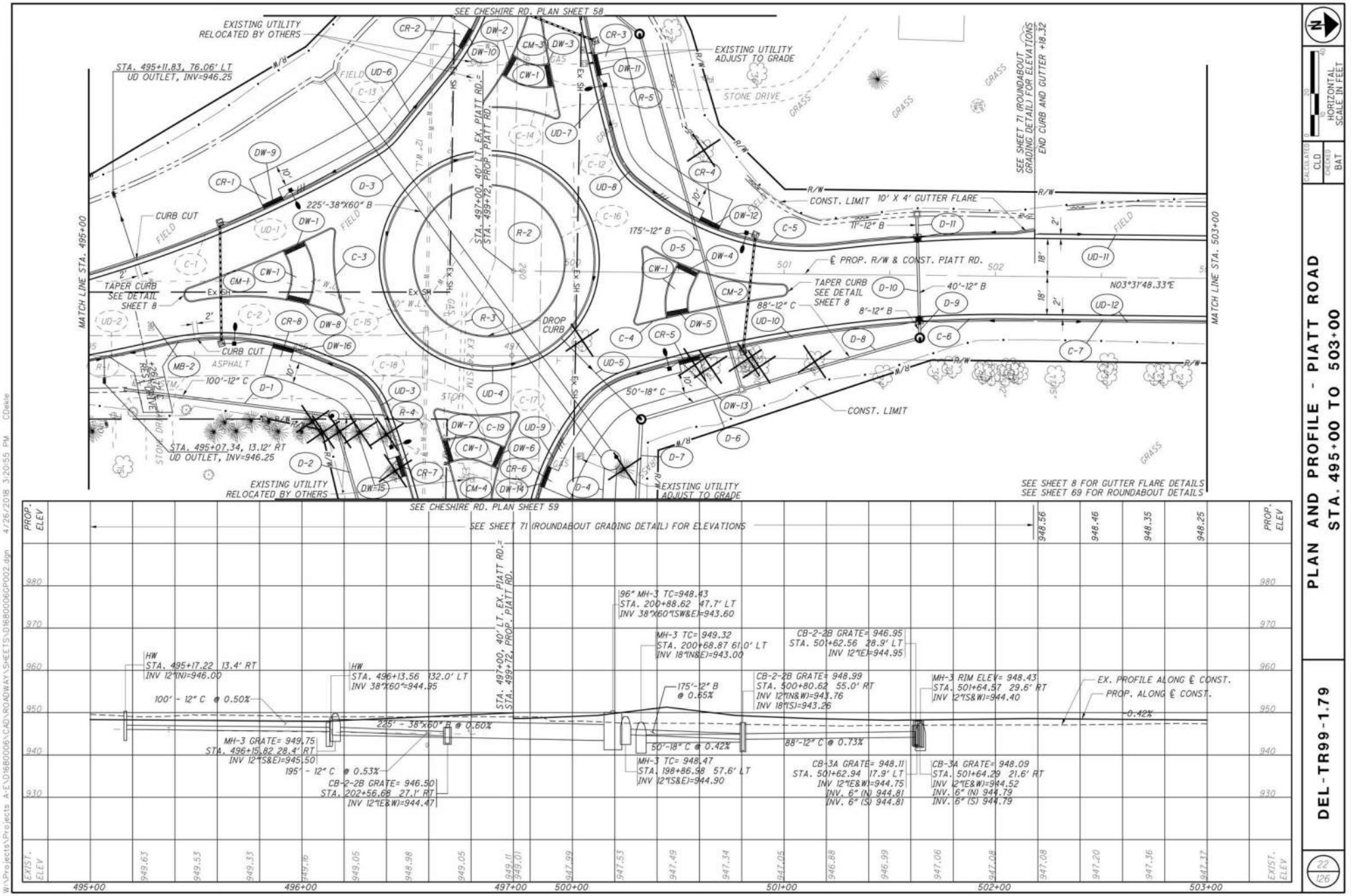
1. PRECONSTRUCTION SHOWING THE NEW HIGH SCHOOL UNDER CONSTRUCTION
   - The north tie in at the High School was paved at this point.
   - The proposed alignment is noticeable on the north end to Glenmead Subdivision due to construction of sanitary sewer, drainage swale and water lines to the school that were placed along the future alignment of Piatt Road.
   - Notice existing Piatt Road in top of the picture.

2. EXISTING INTERSECTION OF PIATT ROAD AND CHESHIRE ROAD
   - Notice the offset alignments that will accommodate reverse curves entering the roundabout.
   - Notice the curb section on the east side of the road, as utilized to limit ROW take and save trees.

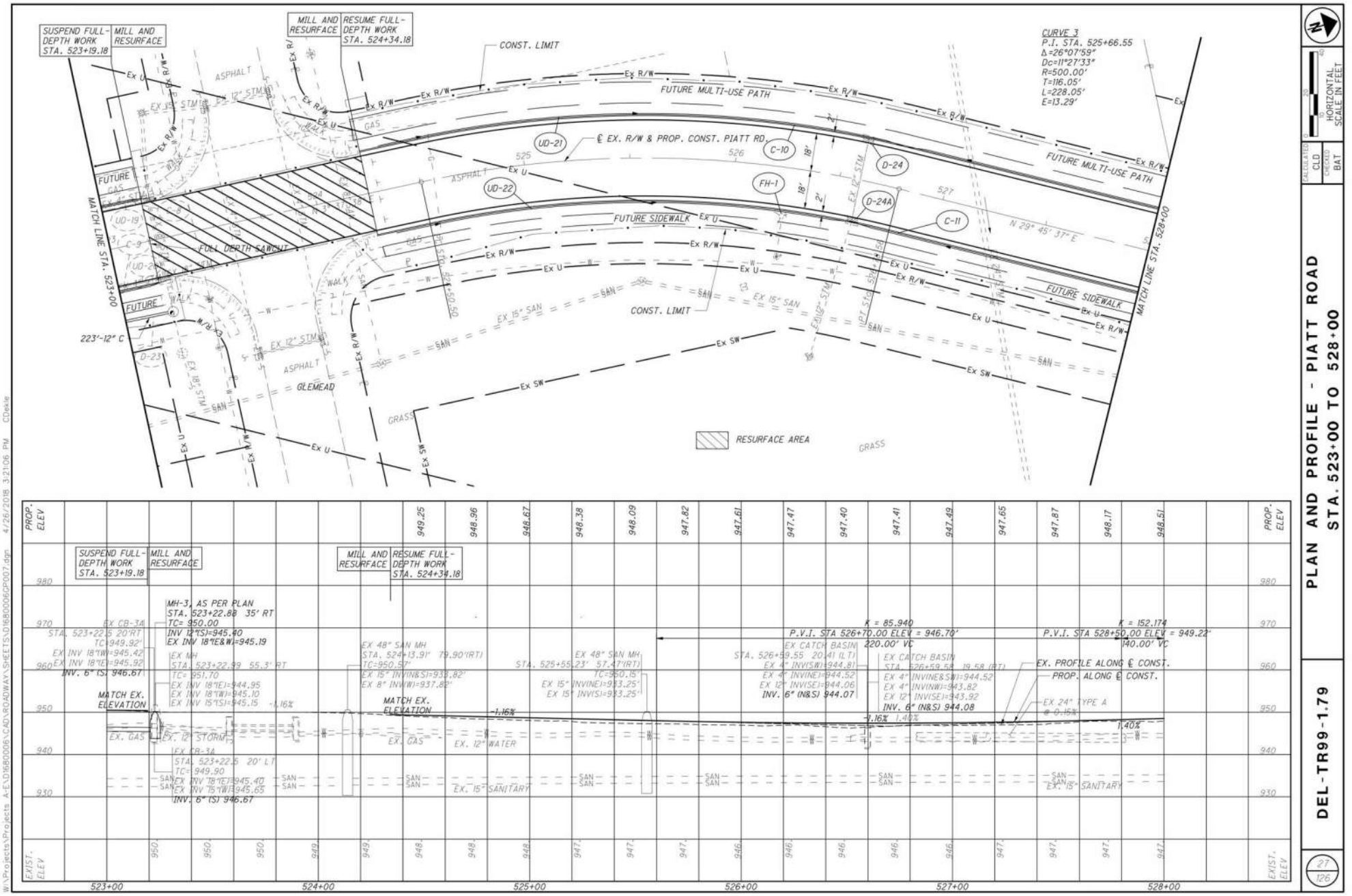
3. THE NORTHERN SECTION BETWEEN GLENMEAD AND BERLIN STATION ROAD OPEN TO TRAFFIC
   - The alignment curved to avoid the high voltage transmission power lines or towers.
   - The wide shoulders were designed to accommodate a future multi-use path on the west and a sidewalk on the east.
   - In cooperation with adjacent developers, roadway drainage was routed into developer ponds.

4. THE ROUNDABOUT IS NEARLY COMPLETE
   - Only seeding, striping and signage to be complete.
   - Sidewalks and ADA accessible ramps were incorporated for future sidewalk and multi-use path connectivity.
   - Offsite drainage was routed under the roundabout to McKenzie Ditch. The 38” X 60” elliptical culvert crosses under the roundabout from the southwest quadrant to the northeast quadrant.
   - Shoulders and yard frontages were graded flat to allow for easy mowing and maintenance.

5. THE ROUNDABOUT IS COMPLETE AND OPENED TO TRAFFIC
   - Notice the basin on the right side of the photo.
   - See the tree line saved by the curb & gutter section.



Roundabout Plan and Profile



PLAN AND PROFILE - PIATT ROAD
STA. 523+00 TO 528+00

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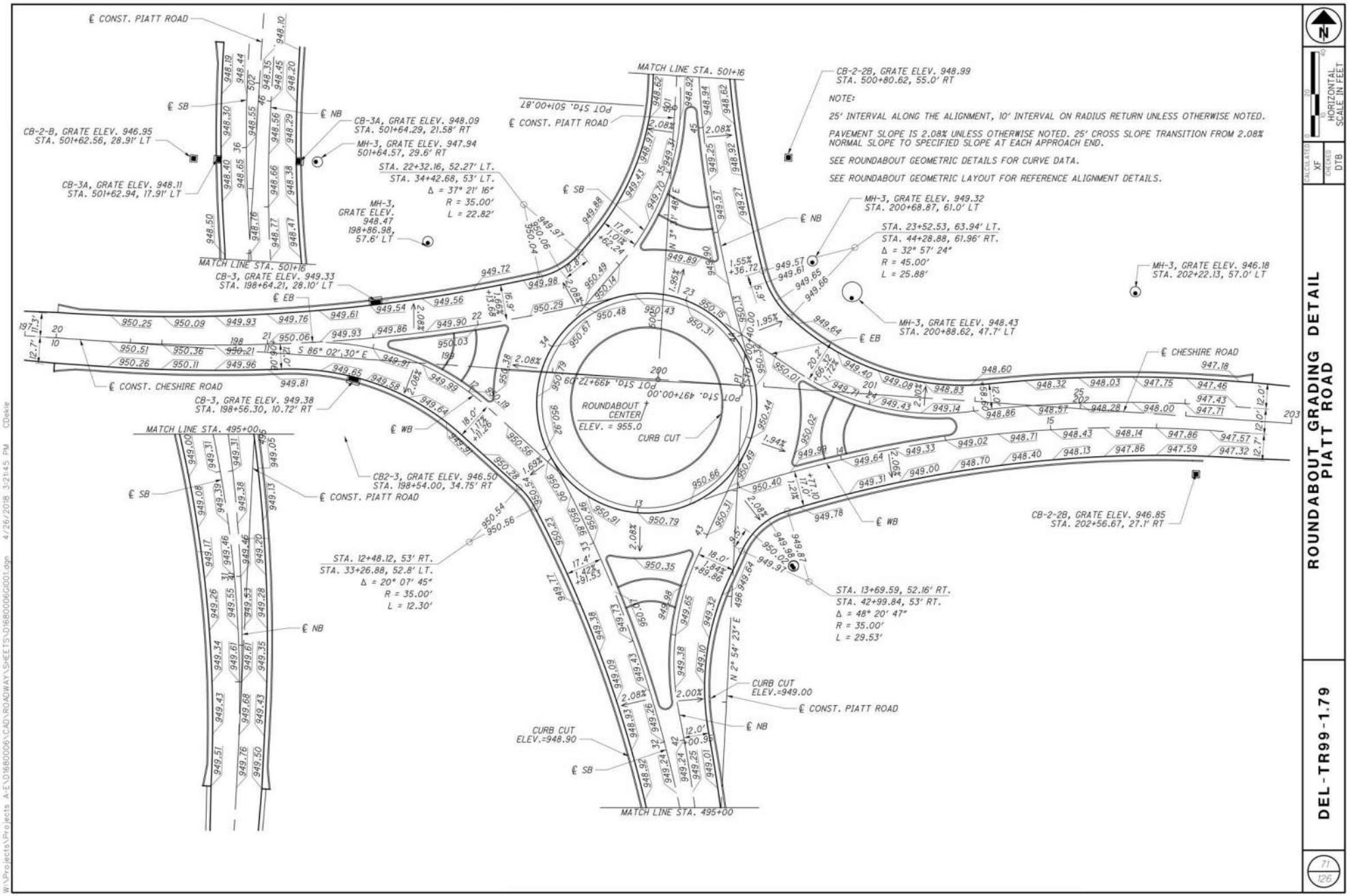
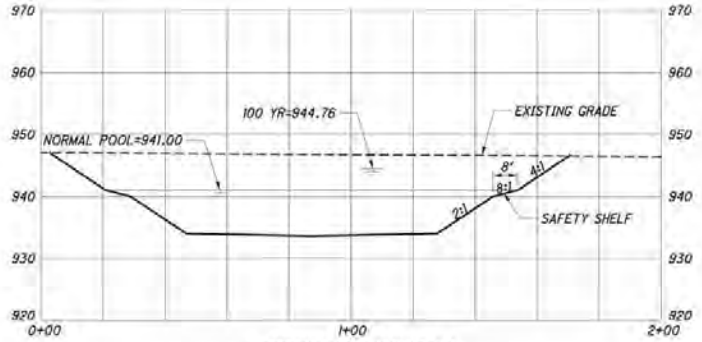
Glenmead Subdivision Intersection Plan and Profile



Roundabout Grading Detail

RELEASE RATES FOR PROPOSED BASIN

	POST-DEVELOPED PEAK FLOWS			PRE-DEVELOPED PEAK FLOWS			BASIN DESIGN		
	(A)	(B)	(C=A+B)	(D)	(E)	(F=E+A)	(MUST BE LESS THAN F)		
STORM EVENT	OFFSITE FLOW (PASS THROUGH) (CFS)	ONSITE FLOW (CFS)	TOTAL TO BASIN (CFS)	ONSITE FLOW (CFS)	ALLOWABLE ONSITE FLOW (CFS)	ALLOWABLE RELEASE INCLUDING OFFSITE (CFS)	ACTUAL RELEASE RATE (CFS)	PONDING ELEVATION (FEET)	STORAGE VOLUME (CF)
1 YEAR	19.96	13.74	33.70	11.38	11.38	31.34	4.51	941.94	267,031
2 YEAR	27.41	15.53	45.94	15.88	15.88	43.29	7.22	942.22	282,223
5 YEAR	38.56	25.62	64.18	22.68	22.68	61.24	10.11	942.69	307,882
10 YEAR	47.96	31.53	79.49	28.43	28.43	76.39	11.57	943.12	331,565
25 YEAR	61.22	39.82	101.04	36.59	36.59	97.81	12.87	943.75	366,741
50 YEAR	72.48	46.87	119.27	43.51	43.51	115.97	14.34	944.25	399,950
100 YEAR	84.15	54.04	138.19	50.72	50.72	134.87	15.89	944.76	432,846



PROPOSED BASIN SECTION A-A

QUANTITIES CARRIED TO THE GENERAL SUMMARY
ITEM 203 - EXCAVATION 19,211 CY

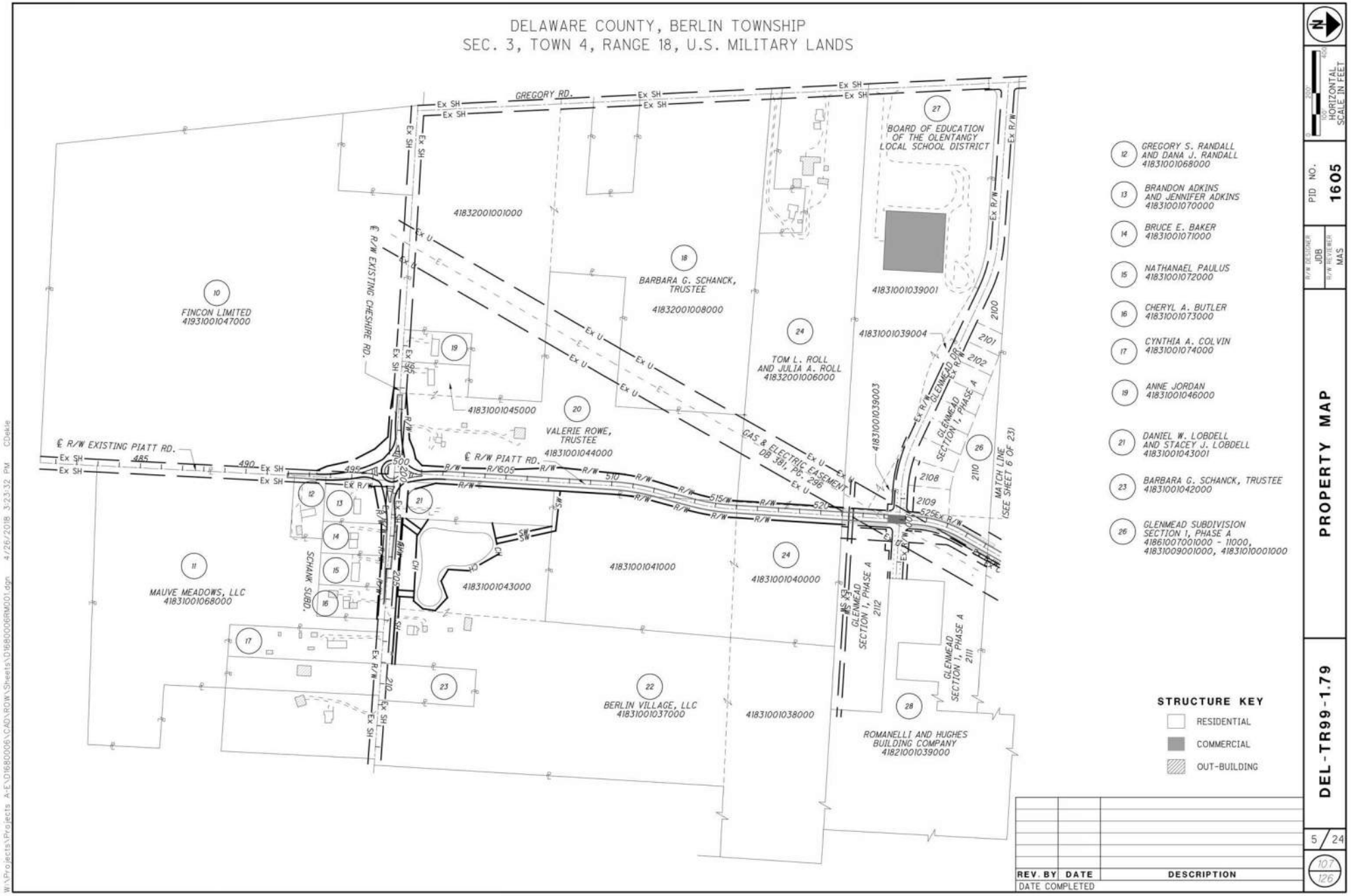
HORIZONTAL SCALE IN FEET

CLD
RLV

STORM BASIN DETAILS

DEL-TR99-1.79

Stormwater Basin Details



Cheshire Road to Glenmead Subdivision Property Map