

General

CHAK Civil Consulting designed a roundabout to replace the signalized intersection of US 127 and SR 15 with a roundabout. The intersection is located on the north side of the City of Bryan in Ohio and is greatly influenced by heavy truck traffic and daily commuters. Our objective is for the roundabout to be a traffic-calming device by reducing speed and introducing deflection into the roadway.



Data Collection & Analysis

CHAK completed a topographical map using GPS surveying which we supplemented with LiDAR from OGRIP. The topographical map was used for grading the intersection from an existing intersection to a proposed roundabout design with proper elevations.



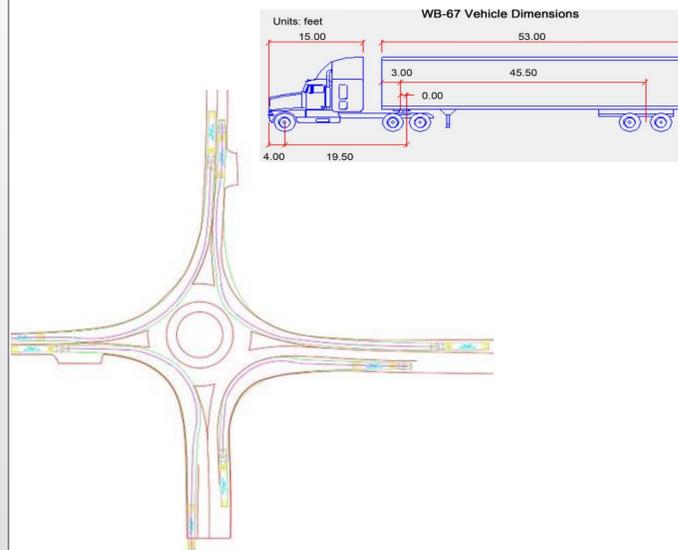
Traffic turn counts were completed for an AM and PM peak. These were from the hours of 6:30-8:30 AM and 2:30-4:30 PM. With this data we completed HCS Analysis to find the Level of Service (LOS) for the morning and afternoon peaks of the existing intersection.

Level of Service (LOS)

AM Peak	C
PM Peak	C

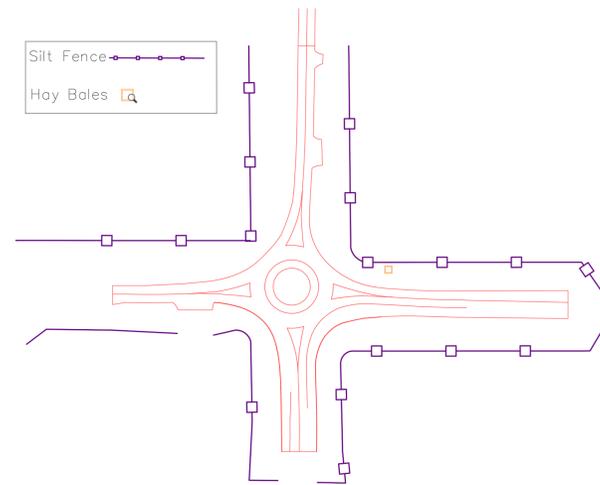
Geometric Design

The radius and location of the roundabout were determined by our goals of the roundabout to be a traffic-calming device. A slip lane will be included in the south leg of the roundabout to accommodate turning movements from south to east. The geometrics, aligning with ODOT standards were analyzed by Auto Turn software to withstand the traffic of our design truck, the WB-67.



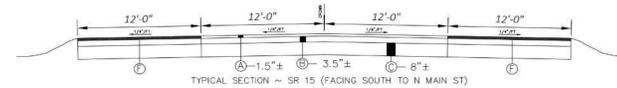
Erosion Control

CHAK created an erosion control plan to prevent sediment from entering and escaping our construction site. This will comprise of a silt fence around the boundary of the construction zone. Any inlet around the intersection will also be surrounded by hay bales.

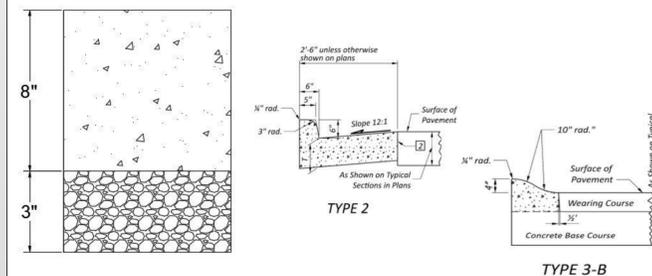


Pavement Design

Along with geotechnical reports, traffic counts obtained through ODOT were used to produce a pavement depth design that could withstand 10328 vehicles per day. CHAK calculated with an assumed 3% growth rate, that the pavement design will withstand 3,697,969 ESALs. A composite HMA section was deemed plausible for this design.

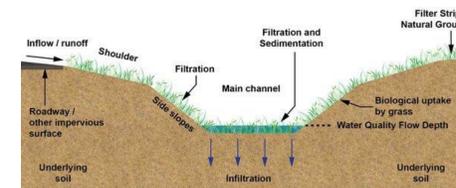


The splitter islands and truck aprons have been designed to support 50 trucks per day, if necessary. Along with an assumed 0.5% growth rate, the pavement was designed to withstand 103,528 ESALs. ODOT standards state that 8 inches of PCCP concrete is required for any portion that is to be traversed.



Low Impact Design

CHAK's plan for LID is a combination of regrading the ditches around the intersection, and design elements including a pervious center island, and solar streetlights. Exposed soil will be seeded before and after construction to prevent sedimentation loss and erosion.



Maintenance of Traffic

Permanent signage and pavement markings will adhere to the recently updated MUTCD guidelines. While closing the intersection during construction a maintenance of traffic (MOT) was created to provide a detour route to move traffic around the proposed construction.

NORTH



SOUTH



The design speed of the intersection was determined to be 25 MPH however, due to ODOT standards the posted speed for those traversing the roundabout will be 15 MPH. To accommodate MUTCD guidelines advisory signs to the speed change will be posted at the adequate distance as well as other roundabout advisory signs.

Cost

Using unit prices for each item used in the design of the roundabout a total price was computed for each section of construction. A subtotal was calculated, and a 15% engineering fee/contingency was placed in addition to the subtotal to reach a final cost estimate of \$884,730.65.

Cost Estimate	
Pavement	\$593,658.44
Signage and Pavement Markings	\$40,754.48
Earthwork, Seeding, Erosion Control	\$57,184.12
Utilities and Removal	\$77,733.96
Engineering Fee (15%)	\$115,399.65
Total	\$884,730.65