

To: Members of Dublin City Council

From: Dana L. McDaniel, City Manager

Date: August 31, 2016

Initiated By: Megan O'Callaghan, PE, Director of Public Works
Paul A. Hammersmith, PE, Director of Engineering/City Engineer
Jean-Ellen M. Willis, PE, Engineering Manager – Transportation

Re: SR 161/Riverside Drive Traffic Operations Follow Up

Background

At City Council's August 22, 2016 meeting, Council requested additional information regarding traffic operations at the SR 161/Riverside Drive roundabout. The SR 161/Riverside Drive roundabout opened to traffic in the early hours of August 13, 2016. The standard practice when traffic operations are modified is Engineering staff actively monitors traffic in the area. It is difficult to anticipate precisely how traffic will adjust to a change in traffic operations so this monitoring is an important component of the implementation. As a result, improvements with the signs, pavement markings, signal timing, etc. are oftentimes implemented as traffic adjusts to the modification.

Staff has observed the SR 161/Riverside Drive intersection since the opening of the roundabout. This is to watch whether the intersection is operating as intended and to determine if any operational improvements could be made. During the site visits, staff observed a few items, including potential improvements to signs and pavement markings.

It is important to note that although the roundabout is open, the roundabout is part of an active construction zone. As has been communicated to the driving public, the current condition of the roundabout is an interim solution while the southbound bypass lane is rebuilt and improved for vehicular and bicycle traffic. Because the bypass lane is closed, all of the southbound traffic must use the roundabout, causing the roundabout not to operate as intended. This is primarily the cause of the southbound backups that are occurring, particularly during the morning rush. Final operations will not be in effect until the project is complete and the bypass is open later this fall.

Signs

One of the essential operating characteristics of a roundabout is the yield on entry concept. Since three of the four approaches to the roundabout have multiple lanes in the circulatory roadway on entry, it should be emphasized that the yield condition applies to all lanes in the roundabout. Therefore, the YIELD signs at the yield bar will be modified to read: YIELD TO ALL LANES IN ROUNDABOUT, as shown in Figure 1 on the next page:

This sign assembly will be added to the driver's left to emphasize the yield condition. To the driver's right, the sign assembly will be added, but without the ONE WAY placard beneath TO ALL LANES IN ROUNDABOUT sign.

This sign assembly will be added on the northbound, westbound, and southbound approaches for consistency and because there are multiple lanes in the circulatory roadway at these entrances. On the eastbound approach, there is only one lane in the circulatory roadway, so the existing sign arrangement will remain. The sign faces will also be lowered for easier viewing at the yield bar. There is a three to four week lead time to have the signs and backings fabricated and installed after final direction is given to the contractor.

Staff has also heard concerns from drivers regarding the size of the overhead signs being too small. These are temporary signs and will be replaced with much larger signs that will be lit. The temporary overhead signs are about 4-feet wide by 4-feet tall. The permanent overhead signs will be 19-feet wide by 8.5-feet tall, as pictured in Figure 2 on the right. Staff expects the permanent signs to be installed mid to late September.

In addition, the message displayed on the portable message board signs that are placed in advance of the roundabout on all approaches has been changed from ROUNDABOUT NOW OPEN; NEW TRAFFIC PATTERN AHEAD to read: ROUNDABOUT AHEAD; USE CAUTION; YIELD.

Staff is also working on other sign adjustments, including the lane assignment sign on Riverside Drive, just north of Bridge Park Avenue. The sign shows two through lanes at the STOP bar for the traffic signal at Bridge Park Avenue. Feedback received via social media suggests this sign is causing some confusion as south of Bridge Park Avenue, the lane assignments change, so that the left lane is a shared left/through lane and the right lane becomes a right turn only lane. This sign will be covered until the bypass lane is opened and the final operating condition is in place.



Figure 1: Revised YIELD Sign Assembly

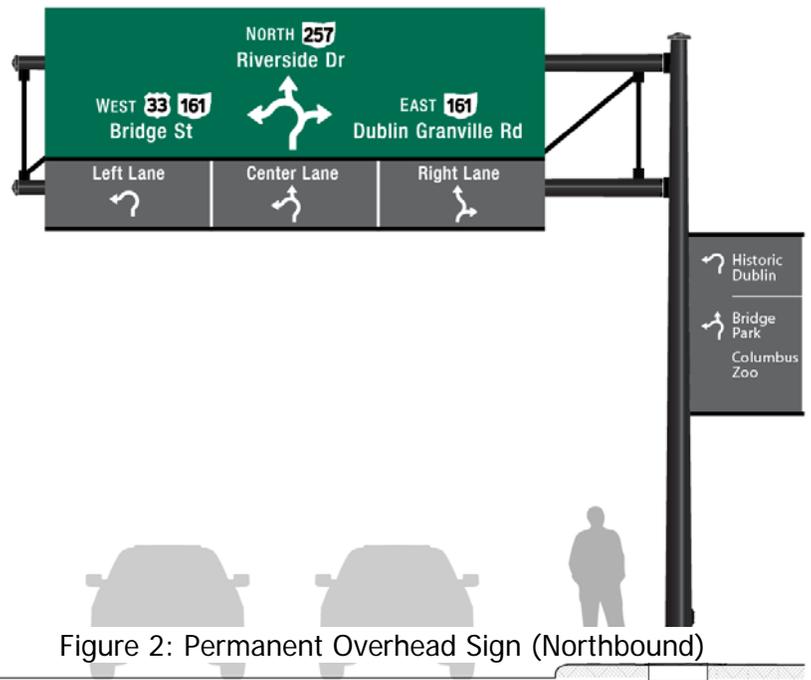


Figure 2: Permanent Overhead Sign (Northbound)

Pavement Markings

Since the yield on entry concept is essential to the operational success of any roundabout, staff determined there should be more emphasis placed on the yield condition, particularly in the northbound direction. As such, the word YIELD was added to the pavement in each lane at the YIELD bar, as shown in Figure 3 below. While observing the intersection operation, staff also noticed that another set of lane arrow markings on the northbound and southbound approaches, and an additional right turn arrow for the westbound approach, would give more advance notice of which lane to choose prior to entering the roundabout. All of this work was completed on August 29, 2016.

Figure 3 to the right provides an overview of the changes to the northbound approach.

Figure 5 provides an overview of the changes to the southbound approach and Figure 6 shows the changes to the westbound approach.

If drivers still show hesitation choosing the correct lane prior to entry to the roundabout, staff has a few more tools that could be implemented, such as placing the destination street name in each lane as a pavement marking, adding an additional set of lane arrows, or other marking enhancements as the dedicated left turn lane develops. In addition, message boards can also be used to highlight certain conditions.

It should also be noted the current maintenance of traffic phase only has one northbound lane with the roadway opening up to the three lanes approaching the roundabout. The final condition will have two northbound lanes opening up to the three lanes approaching the roundabout so there will be more opportunity for drivers to choose the proper lane for their intended destination. This is shown in Figure 4 below.

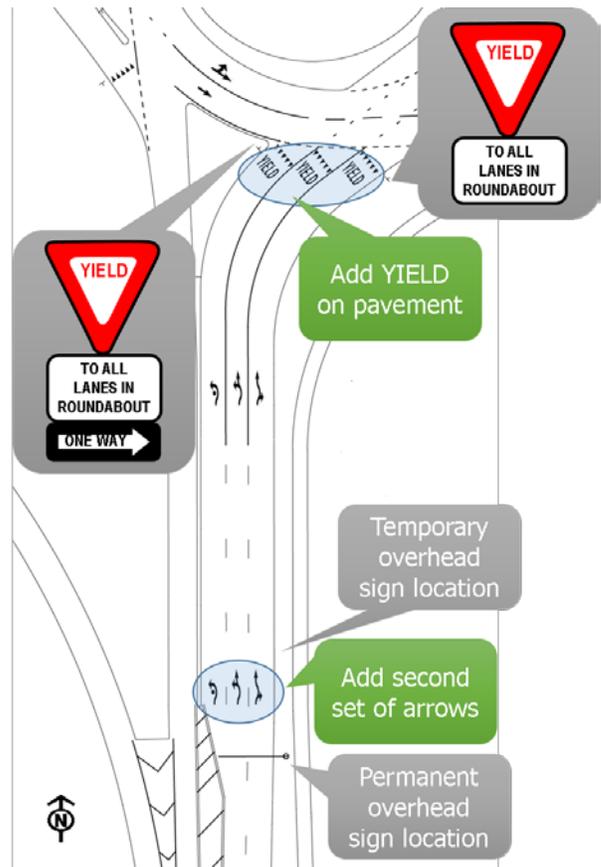


Figure 3: Proposed Changes to the Northbound Approach

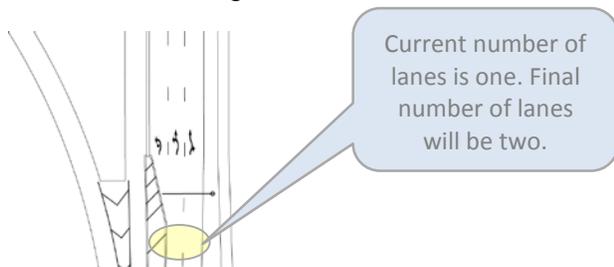


Figure 4: Number of Northbound Lanes Available

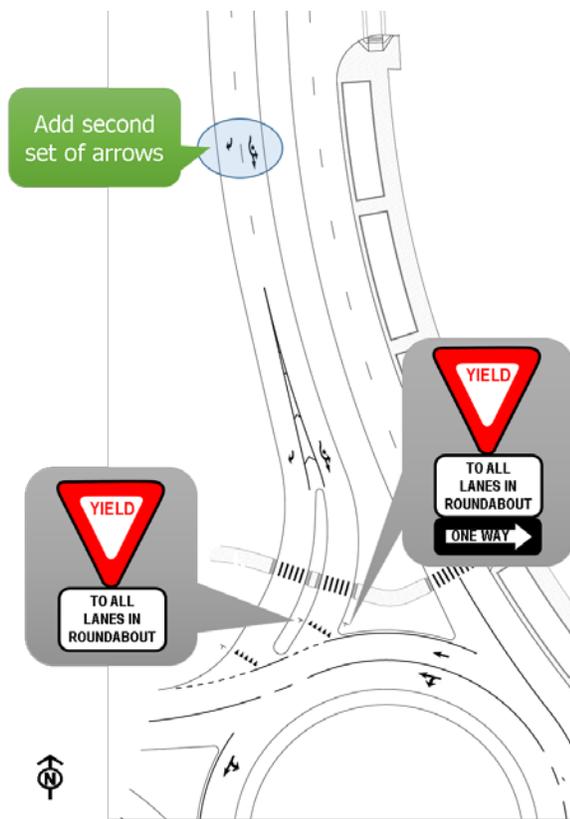


Figure 5: Proposed Changes to the Southbound Approach

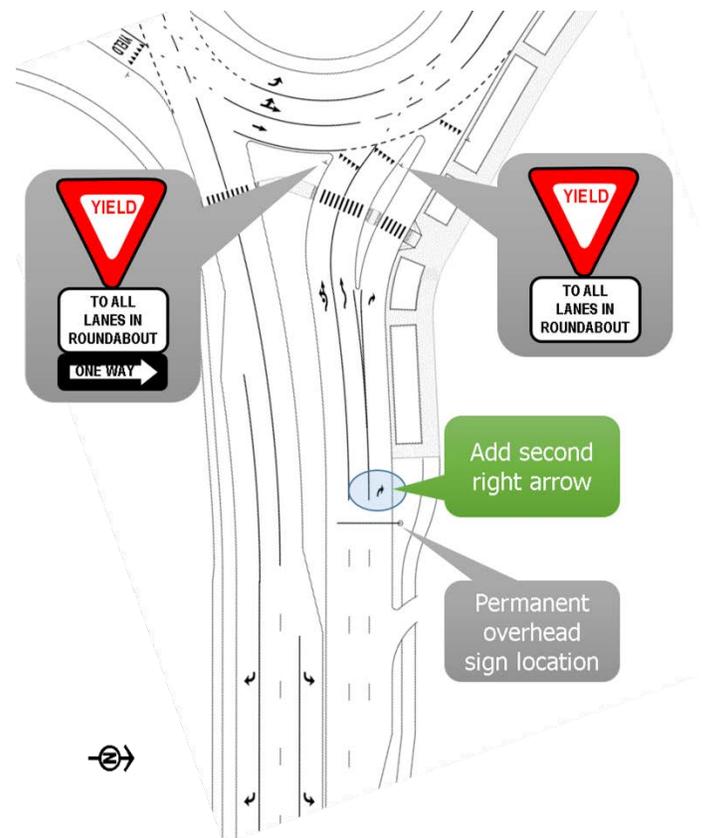


Figure 6: Proposed Changes to the Westbound Approach

Signal Timings

Additional work has been done with regard to the signal timings in the vicinity of the roundabout. Staff has made several adjustments to the signal timings, cycle lengths, and phasing to adapt to the traffic flow. We will continue to monitor and make changes as needed to support the safe and effective movement of traffic through the corridor.

Traffic Incidents

As of August 26, 2016, a total of fifteen calls for service had occurred, which resulted in nine reported crashes. Seven of the nine reports indicate the crash occurred on the northbound approach into the roundabout and the remaining two occurred on the southbound approach.

In seven of the nine crash reports, the at-fault driver was cited for failure to yield to traffic in the roundabout, and in one, the driver from northbound SR 161 was cited for improper lane change within the roundabout. The final crash was a hit-skip, where a southbound driver stopped in the circulatory roadway for a truck in the inside lane continuing through, and the vehicle behind her hit her rear bumper. All resulted in property damage only and no injuries were reported.

Eight of the nine crashes occurred during busy times of the day, with six occurring during the afternoon peak period, and two during the morning peak period. Stated speeds of drivers in the crashes range from 10 mph to 35 mph. The advisory speed for travel within the roundabout is 25 mph. Given the stated speeds of drivers and the fact that all collisions to date have resulted in property damage only, it is reasonable to conclude that driver speeds are within the normal

operating range. Since the speeds of the vehicles in the crash reports are stated speeds by the drivers, and to better understand how drivers are traveling through the intersection, the Police Department will collect speed data of drivers in the roundabout using a hand held laser gun. This will give us a better understanding of driver behavior here. Another effort that the Police Department will make will be to cite for failure to yield on northbound approach. This will encourage compliance with the yield condition and should help to reduce this type of crash.

Table 1 summarizes the documented crashes to date and contributing factors:

Table 1: Riverside Drive & SR 161 Roundabout (Opened Aug. 13, 2016)

Count	Date	Report Number	Severity	Time	Description	Citation
1	Aug-16-2016	16-2017	PDO	4:32 PM	NB driver in center lane attempted a right turn, striking a NB vehicle in the right lane.	Improper lane change
2	Aug-17-2016	16-2026	PDO	4:22 PM	NB driver failed to yield to EB through vehicle.	Failure to Yield
3	Aug-17-2016	16-2027	PDO	5:42 PM	NB driver failed to yield to EB through vehicle.	Failure to Yield
4	Aug-19-2016	16-2044	PDO	6:04 PM	NB driver failed to yield to EB through vehicle.	Failure to Yield
5	Aug-21-2016	16-2060	PDO	5:44 PM	NB driver failed to yield to EB through vehicle.	Failure to Yield
6	Aug-22-2016	16-2065	PDO	8:12 AM	NB driver failed to yield to EB through vehicle.	Failure to Yield
7	Aug-22-2016	16-2066	PDO	9:10 AM	NB driver failed to yield to EB through vehicle.	Failure to Yield
8	Aug-22-2016	16-2078	PDO	2:00 PM	SB driver rear-ended a SB vehicle on entry	Unsolved
9	Aug-23-2016	16-2081	PDO	6:27 PM	SB driver failed to yield to a WB through vehicle.	Failure to Yield

As a comparison, staff examined the crashes that occurred at the SR 161/Eiterman Road roundabout. Since this roundabout opened ten months ago, there have been 20 crashes. Of these crashes, ninety percent, or eighteen of the crashes, have been property damage only and ten percent, or two, have resulted in injuries. There was not an apparent peak of crashes at this intersection upon opening. In September 2015, there was one crash reported. During the subsequent winter months, however, there were up to four crashes reported per month. Striping and sign location modifications were made near the end of May 2016, and since then, fewer crashes have been reported.

Another roundabout location used for comparison is the Avery-Muirfield Drive and Post Road intersection. This location actually experienced a rise in frequency of crashes after the roundabout was opened in 2008. Since that time, however, the number of crashes dropped from thirty-four in a three-year period to twenty-four in the same amount of time, and has remained steady for the

past few years. This experience indicates there is an acclimation period while drivers adjust to the new conditions and are able to anticipate and react better.

Public Education Efforts

In addition to the above, there has been a concerted effort by Community Relations to educate the public regarding the opening of the roundabout and how to properly navigate it. In summary, these efforts have been:

- Community Relations staff delivered Roundabout Guide brochures and posters to businesses in the Dublin Plaza, Historic Dublin and Shoppes at River Ridge to help educate their customers.
- Community Relations staff worked with Economic Development to send e-communication to all seven business district distribution lists, and Community Relations directly shared with communication contacts at Dublin City Schools, Cardinal Health, Wendy's, the Dublin Chamber and OCLC.
- Along with the full page ads in the Dublin Villager, Community Relations also placed a full page ad in the High School Football Preview Guide, which is delivered in Columbus and its suburbs.
- Staff accommodated interviews with news media, including 10TV and ABC6, as a way of reaching the broader driving public.
- The "Drive Like a Dubliner" and "Roundabout Simulation" videos were widely shared via social media, reaching well beyond the Dublin borders.
- Various eNews communications were sent to more than 2,600 subscribers through our distribution groups, including the 270/33 interchange group, which has a broad reach. The eNews communications have included repeated education that drivers must yield and follow signs and lane markings, while also serving as reminders that the project is not finished, particularly in regard to the bypass closure and construction.
- Community Relations provided extensive and ongoing web updates and social media posts before and after the roundabout opening.

Recommendation

Staff is providing this information as requested by Council.