



July 31, 2014,

Mr. Derek Slocum, PE
Town of Harrisburg
Town Engineer
4100 Main Street
Suite 101
Harrisburg, NC 28075

RE: *Harrisburg Double Track Coordination*

Dear Mr. Slocum:

At the request of the Town of Harrisburg, Kimley-Horn has prepared the following letter to outline interim (during construction) and long term (after construction) recommendations to mitigate the impact of the proposed double rail track improvements currently under construction by the North Carolina Department of Transportation (NCDOT). Our findings and recommendations are summarized below.

Background

Under TIP project P-5208 the NCDOT is currently constructing railroad improvements to accommodate a second track through Harrisburg, NC. The purpose of the improvements is to increase track capacity for both passenger and freight service, improve safety through the corridor by grade separating and/or eliminating at grade crossings which in-turn will improve the efficiency of the rail and roadway corridors. The separation or removal of the at-grade crossings will eliminate the conflict point between trains and automobiles, improving the safety for both modes of travel. This section of the railroad corridor is part of the federally designated Southeast High Speed Rail Corridor (SEHSR) connecting the northeast to the southeast. The railroad projects listed below will aid in the long-term improvement of this entire rail corridor.

Within the Town of Harrisburg the following crossings are being improved or closed as a part of this TIP project:

- Pharr Mill Road – *grade separation of existing crossing*
- Shamrock Road – *closing of existing crossing*
- Roberta Road – *new grade separated crossing*
- Hickory Ridge Road – *closing of existing crossing*
- Robinson Church Road – *closing of existing crossing*
- Caldwell Road – *grade separation of existing crossing*

In addition to these crossing improvements, the following intersection improvements are being constructed or improved in conjunction with the crossing improvements:

1. Roberta Road at Stallings Road
 - Installation of a traffic signal
 - Installation of a WB right-turn lane
 - Installation of a EB left-turn lane

2. Hickory Ridge Road at Stallings Road
 - Installation of a stop-signs on Hickory Ridge Road
 - Installation of a NB right-turn lane on Hickory Ridge Road
 - Installation of a WB left-turn lane

3. Robinson Church Road at Stallings Road
 - Modification of the intersection geometry (radius) to make the movement from NB Robinson Church Road to EB Stallings Road and vice-versa the primary movement and not require traffic to stop.
 - Installation of a stop sign for the SB leg of the intersection between Robinson Church Road and Stallings Road.

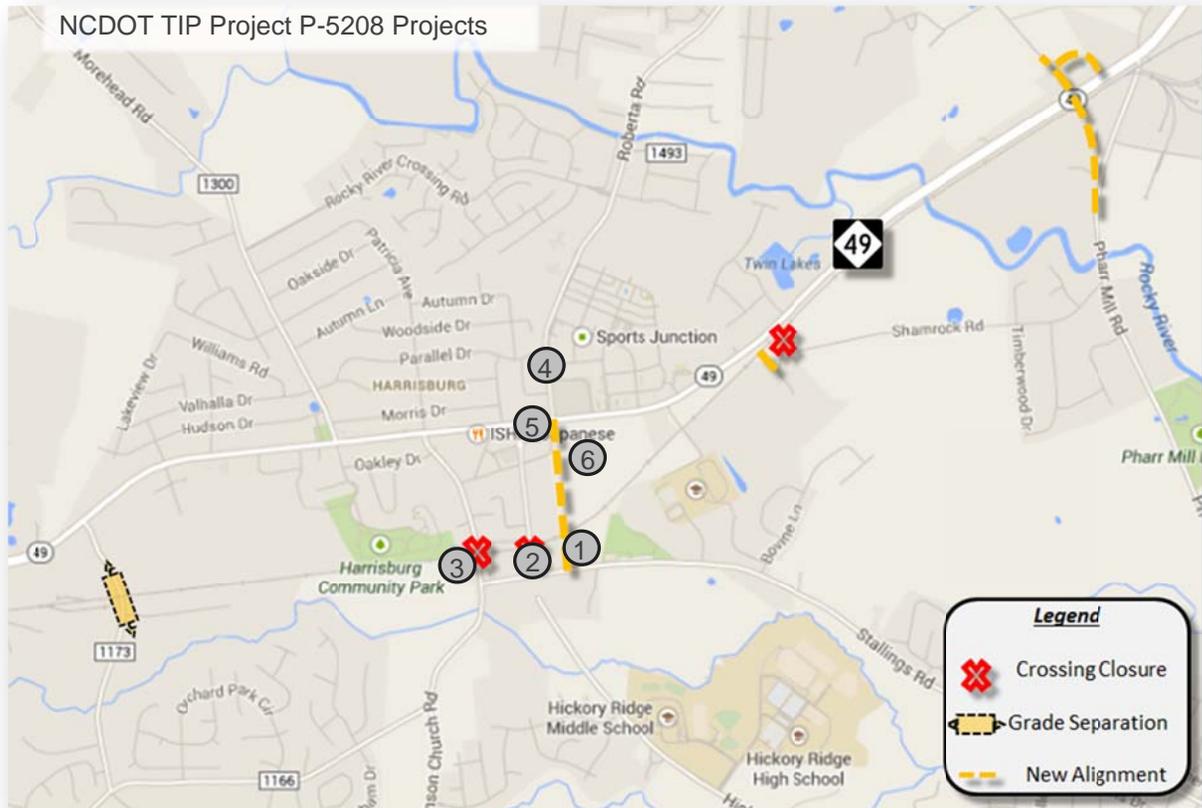
4. Roberta Road at NC 49
 - Installation of an EB right-turn lane on NC 49
 - Installation of a NB left-turn lane on Roberta Road Extension
 - Installation of a NB right-turn lane on Roberta Road Extension

5. School Circle and Roberta Road
 - Installation of a direction crossover allowing left-turns from Roberta Road Extension to School Circle, but restricting lefts from School Circle to Roberta Road Extension

6. Roberta Road Extension
 - Four (4) lane bridge grade separation
 - Bike lanes
 - 5 ft sidewalks on both sides

Figure 1, on the following page, summarizes the proposed projects and their location. The combination of the grade separations and intersection improvements will have a significant impact to the traffic circulation and mobility during construction, but also long term for Harrisburg. While the TIP project is significantly improving the infrastructure around each of the crossings, there will still be a need for additional roadway improvements to accommodate the anticipated traffic redistribution due

to the closing of the existing crossings as well as the current and anticipated growth within the Town.



Lasting Impact

TIP project P-5208 will have a lasting impact on the Town of Harrisburg. The removal of the at-grade crossings will improve the safety and efficiency by removing the conflict between the motor vehicles and rail traffic. In addition, motorists will no longer be impacted by the 30 Norfolk Southern freight trains and eight (8) passenger trains that use this section of railway daily. However, with the closure of both Hickory Ridge and Robinson Church Roads, north-south mobility will be reduced by a factor of two. No longer will either of these two roadways have a direct connection to NC 49. Rather motorist will be required to make a series of turns to access NC 49.



To quantify the impact of these closures, the regional travel demand model (RTDM) was utilized to depict these changes in mobility through the projection of future, horizon year traffic volumes along critical roadways. Furthermore, the RTDM was utilized to validate existing travel patterns.

Currently, residents south of the railroad have two options to access NC 49, Robinson Church Road and Hickory Ridge Road. Both of these intersections are currently signalized with NC 49. Extracting the daily traffic volumes from the model for the 2015 horizon year without the railroad crossing closures indicates that Robinson Church Road carries a significantly higher volume than compared to Hickory Ridge Road south of the School Circle intersection. At the intersection of Robinson Church Road and School Circle, a majority of the daily traffic on Robinson Church Road uses School Circle to access NC 49. The daily model volumes without the railroad closures are shown to the right. With the closure of both the Hickory Ridge Road and Robinson Church Road railroad crossings, all traffic south of the railroad wanting to access



NC 49 will be required to use Stallings Road to access the new Roberta Road Extension. The daily traffic volumes shown below, indicates that for the 2015 horizon year traffic volumes will increase by over 3,000 daily trips on the section of Roberta Road between the railroad and NC 49. Without the railroad closures this section of roadway is projected to carry 11,700 vehicles per day. With the railroad closures and the extension of Roberta Road, this section of roadway is projected to carry 15,100 vehicles per day. It is important to note that the sections of Robinson Church Road, Hickory Ridge Road and School Circle north of the railroad all become regionally insignificant with the crossing closures, carrying only local traffic serving the residential homes and commercial businesses located in the area.

In review of the regional travel demand model it is important to note that the current 2015 model does not have the Roberta Road extension to Stallings Road in the model file. Coordination with the Cabarrus-Rowan Metropolitan Planning Organization (CRMPO) is recommended to make sure this network change is coded correctly to accurately reflect the model impact.

To accommodate the changes in the roadway network and traffic volumes, NCDOT is constructing the following roadway and intersection improvements as shown in the graphic to the right.

During the construction of the additional rail line, installation of the Roberta Road Extension grade separation and the intersection improvements the need for temporary roadway closures is necessary. Given the magnitude of these improvements and necessary sequencing, this is the only practical way to complete these improvements.



In a June 2014 press release by NCDOT and based on coordination with NCDOT, the following streets and railroad crossings will be closed to allow for the construction of the roadway and railroad improvements for the following time periods:

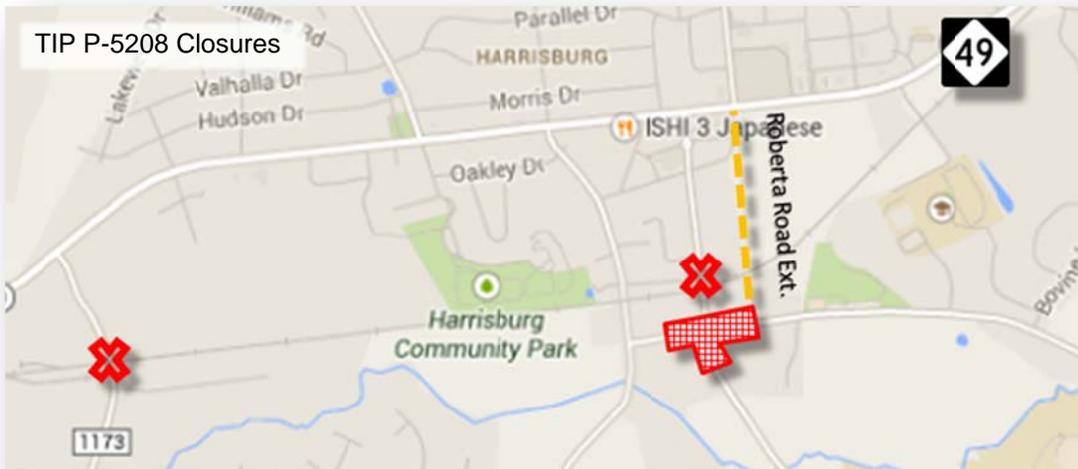
- Hickory Ridge Road railroad crossing – permanently closed June 2014
- Stallings Road – June 16, 2014 for 120 days
- Hickory Ridge Road and Stallings Road intersection – June 16, 2014 for 60 days
- Caldwell Road – closed till Spring of 2015
- Shamrock Road railroad crossing – upon completion of new Saddle Creek crossing (2015)
- Pharr Mill Road crossing – upon completion of new grade separated crossing (2015)

Based on the published press release time frames, the intersection of Hickory Ridge Road and Stallings Road is anticipated to open back up to traffic on or around the 14th of August, 2014.

Stallings Road is anticipated to open up on or around the 13th of October, 2014.

The most impactful closings are currently in affect, which include the closure of Caldwell Road, Hickory Ridge Road, and Stallings Road. As shown below, the planned closure of Stallings Road, which is required to raise the Stallings Road approximately six (6) feet to match grade with the new Roberta Road Extension, will be disruptive to motorists. This closure will likely increase traffic volumes on Rocky River Road as motorists detour to access the Robinson Church Road crossing which is the only open crossing in the area. Based on conversations with NCDOT, the Robinson Church Road railroad crossing will remain open until the new Roberta Road extension grade separation is complete.

The intersection of Stallings Road and Hickory Ridge Road not only accommodates commuting traffic, but also provides a critical connection to three schools; Harrisburg Elementary School on Stallings Road and Hickory Middle and High Schools on Hickory Ridge Road. Based on the current schedule, the closure of Stallings Road is anticipated to reopen prior to the start of school which occurs on August 25, 2014 according to Cabarrus County Public School. The current street closure



schedule allows for approximately 2 weeks of buffer to complete the road work prior to the opening of school. However, this buffer in the schedule does not account for the return of staff prior to the start of school. The importance of the Stallings Road and Hickory Ridge Road intersection in the local transportation network cannot be stressed enough, especially as it relates to the accessibility for the three (3) schools located along these roads.

Should the intersection of Stallings Road and Hickory Ridge Road remain closed at the opening of the new school year, traffic will be required to detour, using Rocky River Road to access both Hickory Ridge and Stallings Roads. Because Baybrooke Lane and Bridge Point Drive connects Robinson Church Road to Hickory Ridge Road, school traffic has the potential to use these residential streets to access both the Middle and High Schools. These local residential streets are not designed to facilitate the traffic demand that would be placed on these streets. For this reason and to protect the residents living on these streets, restrictions should be placed to limit traffic to local, resident traffic only.

Because the intersections of Hickory Ridge Road and Robinson Church Road with Rocky River Road are both signalized, the increase in traffic associated with the roadway closures should not create undue delay for these intersections. However, to maintain efficient operations at the intersections, the intersection operations should be monitored and timings should be adjusted should they be warranted.

Since all traffic accessing Harrisburg Elementary School must use Stallings Road, it is likely that the intersection of Stallings Road and Rocky River Road will experience increased AM peak hour delay. To help mitigate this impact, an officer is recommended at the intersection to control traffic. There is also the potential for cut-through traffic on Quail Hollow Drive, Deer Drive and Craighead Road given the connectivity that they provide between Stallings Road and Rocky River Road. Monitoring of traffic volumes and the potential restriction to local traffic only should be considered. Of the three roads it is likely that Quail Hollow Drive has the highest potential for traffic volume increases given the perceived travel time savings it could offer to motorists.

With Robinson Church Road being the only open crossing in Harrisburg, the need for positive traffic control at Tom Query Road and Robinson Church Road will be necessary. Based on previous coordination between the Town of Harrisburg and NCDOT, a traffic signal has been approved for installation at this intersection. However, funding for this signal installation has not been identified at this time. Therefore, the need for officer control of the intersection in peak hours will remain.

Should the intersection improvements at Stallings Road and Hickory Ridge Road not be completed prior to the opening of school, additional offsite mitigation should be considered. The following mitigation should be considered for implementation to aid in managing the anticipated temporary traffic demands.

Stallings Road at Rocky River Road

- Officer control of intersection during AM school peak hour

Baybrooke Lane/Bridge Point Drive

- Close roadway to local traffic only.

Robinson Church Road at Rocky River Road

- Monitor and adjust traffic signal timings to accommodate temporary changes in traffic patterns

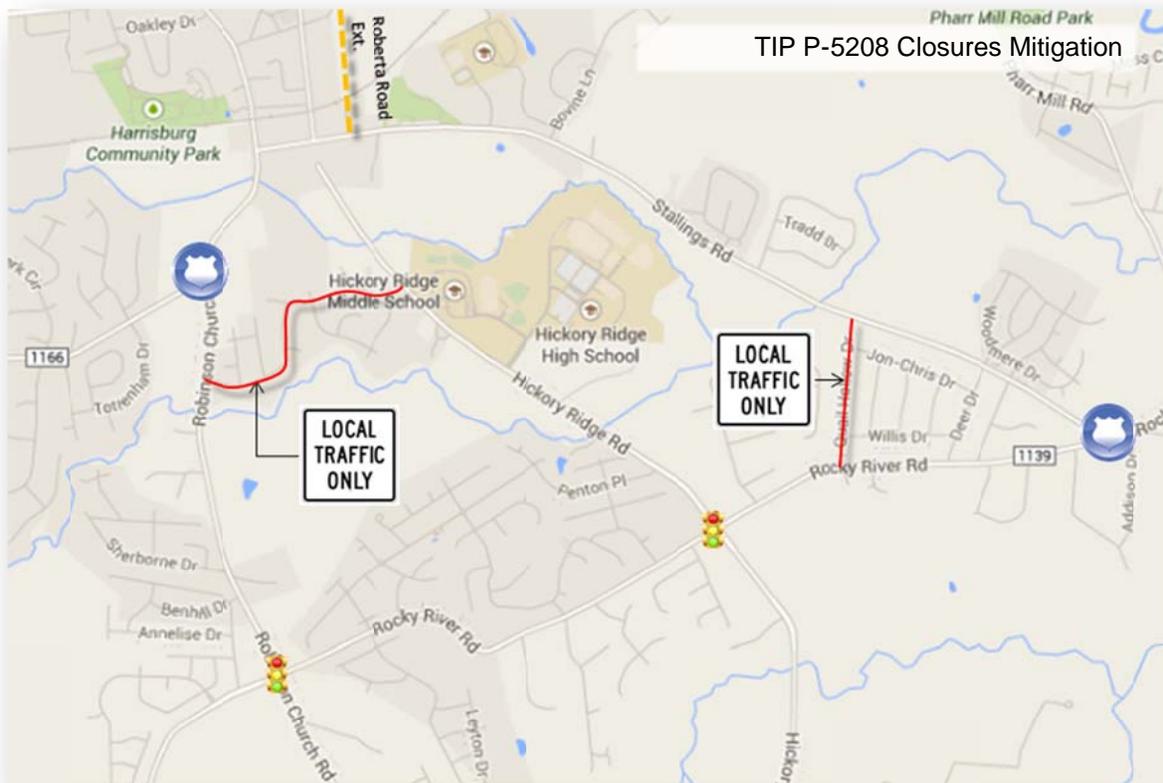
Hickory Ridge Road at Rocky River Road

- Monitor and adjust traffic signal timings to accommodate temporary changes in traffic patterns

Robinson Church Road at Tom Query Road

- Officer control of intersection during peak hours

The improvements listed above are graphically summarized below.



Long Term

Upon completion of the railroad and roadway improvements associated with the double rail project (P-5208) mobility will still be constricted. While the improvements under P-5208 will help to mitigate the impact associated with the two railroad closures, additional roadway improvements will likely be needed. The fractured roadway network north and south of the railroad will need to be reconfigured to improve mobility and accessibility for the community. It is important to note that these improvements are likely beyond the scope of TIP project P-5208. However, partnership with the CRMPO, NCDOT and the Town of Harrisburg to see these improvements through planning, design, funding and construction will be critical.

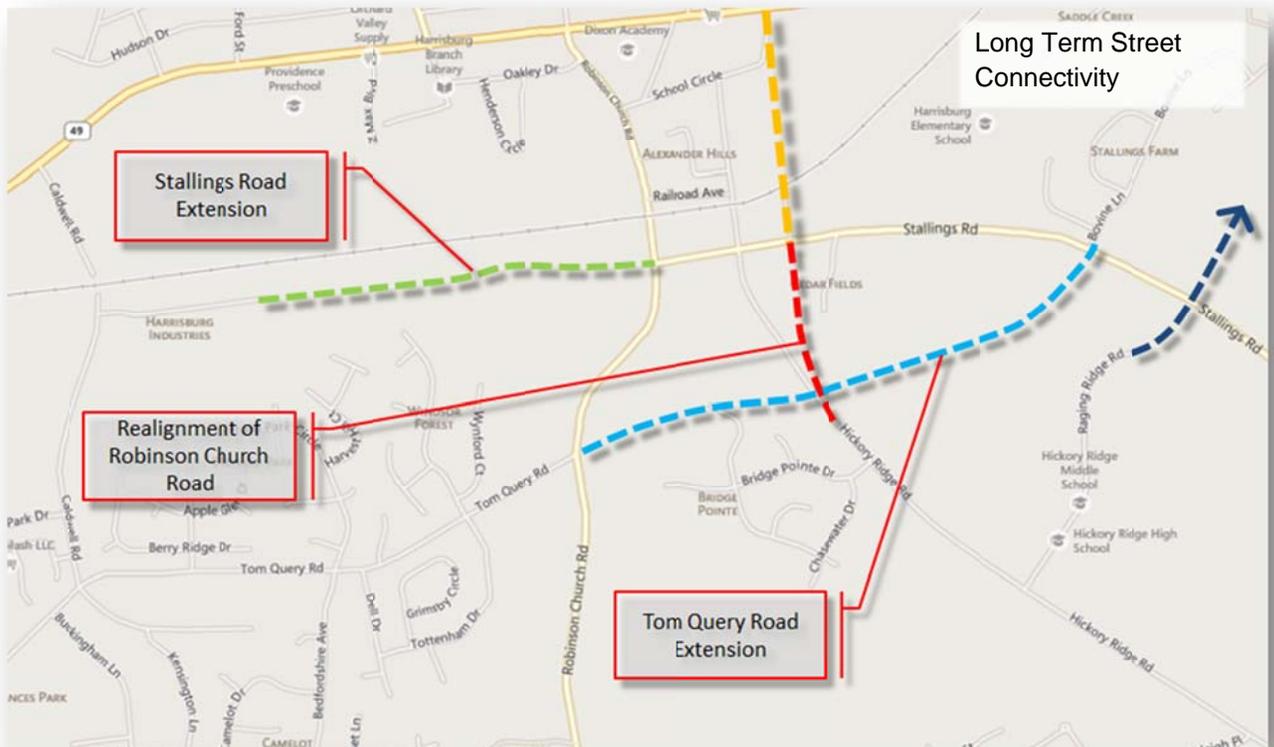
As discussed previously, the construction of the Roberta Road Extension grade separation creates an offset in the roadway network requiring additional turning movements for motorists traveling between NC 49 and destinations south of the railroad. Based on NCDOT traffic projections, 29,400 vehicles per day will be making this movement. Considering that the majority of this daily volume will be processed during the peak hours, significant, unnecessary congestion will be present at these intersections. To alleviate or remove some of these turning movements a realignment of Hickory Ridge Road intersecting with the new Stallings Road and Roberta Road extension intersection is recommended. This will alleviate unnecessary turning movements, latent congestion, as well as facilitating improved accessibility to the Middle and High Schools and the residents along Hickory Ridge Road with NC 49. This project should be considered Harrisburg’s top mid-term priority project.



In the interim, while the offset roadway network is in place, the Town needs to work with NCDOT to proactively manage traffic congestion for the section of Stallings Road between Hickory Ridge Road and Roberta Road Extension. Based on traffic projections, it is likely that this intersection will see heavy peak hour congestion and delay to the point of needing positive traffic control. This traffic control may take on the form of an office controlling the intersection or more permanent measures

including the installation of a traffic signal at the intersection of Stallings Road and Hickory Ridge Road. At just over 600 feet between the Roberta Road Ext. and the Hickory Ridge Road intersections with Stallings Road, while tight, these intersections could both be signalized. If this were to occur, the signals could operate under one controller. Furthermore, once the realignment of Hickory Ridge Road occurs, the signal would be removed between Stallings Road and Hickory Ridge Road.

Equally important for community connectivity south of the railroad is the extension of Tom Query Road. Given the connectivity and degree of use Tom Query Road currently facilitates in the roadway network, its extension and ultimate connectivity between Hickory Ridge Road and Stallings Road is critical. Furthermore, the extension of Stallings Road to connect with Harrisburg Industrial Park Drive needs to be evaluated and considered for implementation. With the implementation of the grade separations at Caldwell Road and Roberta Road Ext., connectivity to and from these railroad crossings will be important for long term mobility and accessibility. These connections are highlighted below.



The importance of maintaining long term connectivity will be importance for the viability of the schools and residences located south of the railroad. The ease at which motorists will be able to access the two grade separations at Caldwell Road and Roberta Road will determine the pace at which

development continues to occur south of the railroad as well as the viability of the development that had already occurred.

As with the Roberta Road Ext. crossing, the Caldwell Road crossing will likely see an increase in traffic being one of two, grade separated crossings of the railroad located within the core of downtown. Compounding this issue is the increase in development that is occurring along Caldwell Road. ACE Prep Academy Charter School is proposing a 750 student maximum school at an existing building opposite Caldwell Park Drive. In addition, the Aston Properties development located at NC 49 and Caldwell Road, currently under development, will be adding approximately 150,000 sf of retail development. The increase in traffic from these planned developments along with the truck traffic from Builders First Source, combined with increase in traffic utilizing the grade separation have the potential to necessitate the installation of a traffic signal at the intersection of Caldwell Road and Tom Query Road. In review of the traffic impact analysis prepared for the charter school, the analysis shows an impact at the subject intersection, resulting in LOS F operations for the WB approach to the intersection with a loading of only 350 students. Appropriate mitigation was not recommended at the intersection to mitigate the impact of the development. Under a full loading of 750 students, significant delay will be present at this intersection. Continued monitoring of the intersection once the Caldwell Road is opening back to normal traffic operations should occur.

Moving Forward

Improvements to the roadway network within the Town of Harrisburg will require careful planning and the collaboration of multiple agencies to ensure that traffic maintenance occurs during construction and long term mobility once the project is completed.

From the highest level the Town of Harrisburg needs to continue to actively engage the NCDOT regarding the construction of the double rail project. Coordination between the contractor and the Town is also recommended. Below is a summary of coordination points that will be critical between now and the 1st quarter of 2015:

- Stallings Road
 - Weekly schedule updates regarding the progress of the grade change on Stallings Road
 - Public notice update regarding the status of the road closure from NCDOT

- Stallings Road at Hickory Ridge Road
 - Timing of intersection opening and status of roadway improvements
 - Public notice update regarding the status of the road closure from NCDOT

- Raging Ridge Road Extension
 - Updates regarding the current design, permitting and construction schedule for the roadway extension.

- Caldwell Road Closure
 - Timing of roadway opening
 - Public notice update regarding the status of the road closure from NCDOT
- Stallings Road at Hickory Ridge Road
 - Coordination with NCDOT regarding the potential signalization of the intersection
- School Mitigation pending Stallings Road reopening
 - Coordination with NCDOT and the railroad contractor to develop and implement a mitigation plan should Stallings Road not open prior to school opening
 - Coordination with NCDOT and the railroad contractor to develop and implement a public notification plan regarding the detour routes and mitigation being set in place

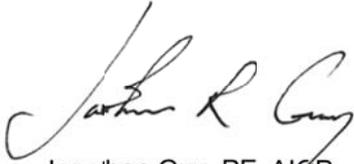
Looking forward the Town will need to continue to engage NCDOT and the CRMPO to preserve long term mobility, accessibility and connectivity for the street network south of the railroad. These priority projects include:

- Collector Street Plan
 - The Town should work with the CRMPO to develop a collector street plan for the area south of the railroad to ensure accessibility to the two grade separations is maintained and enhanced.
- Hickory Ridge Road
 - The Town should partner with NCDOT and CRMPO to prepare a feasibility study to determine the impacts and potential alignment associated with the Hickory Ridge Road realignment. This will be necessary to move this project forward with federal monies.
 - The Town should engage the CRMPO to determine why this project was not considered in the recent project prioritization with NCDOT.
 - The Town should engage the CRMPO to update the regional travel demand model to reflect the extension of Roberta Road.
- Stallings Road Extension
 - The Town should partner with NCDOT and CRMPO to prepare a feasibility study to determine the impacts and potential alignment associated with the Stallings Road Extension.
- Tom Query Road at Caldwell Road
 - Monitoring of the operations of the intersection to determine the need for auxiliary turn lanes and or the installation of a traffic signal.

- Tom Query Road Extension
 - The Town should partner with NCDOT and CRMPO to prepare a feasibility study to determine the impacts and potential alignment associated with the Stallings Road Extension.

Please contact me at (704) 488-3055 or jonathan.guy@kimley-horn.com should you have any questions regarding this information. I look forward to discussing this further with the Town of Harrisburg.

Sincerely,



Jonathan Guy, PE, AICP
Associate