NEXTON PARKWAY INTERCHANGE
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Instructor: Jeff Mulliken, Michael Meadows “DOP”
ECIV 470 Senior Design Project - University of South Carolina - Spring 2018

Site Description

- Objective: Improve connectivity in a rapidly developing area to accommodate growing traffic volume
- Project Statement: To design a new interchange that will provide access between I-26 and Nexton Parkway
- Project Goals:
  - Interchange design must safely and effectively accommodate projected traffic volume in project design year 2038
  - Minimize environmental and social impact of new construction on project site vicinity
  - Adequate hydrological plan to convey runoff from roadway facilities to appropriate outfalls
- Not Within Project Scope: design specifications for highway overpass bridge, intersection signaling at frontage road junctions

Traffic Analysis

Traffic Analysis for 2038 Design Year:
- Based on projected traffic growth rate; residential, commercial and industrial development in the area
- “No Build” Alternative: HCS Traffic Analysis Software indicates that adjacent interchanges on I-26 will fail in serviceability (LOS) from traffic volume growth by 2038
- “Build” Alternative: HCS Analysis indicates that connectivity provided by new interchange will maintain safe and efficient level of service at adjacent interchanges with anticipated traffic growth

Traffic Analysis

- Traffic growth projections for 2038 design year to justify project need and ensure adequate project design
- Interchange Design Criteria
  - Traffic volume
  - Project site limitations
  - Safe tie-in to existing facilities
  - Minimizing environmental and social impacts of project
  - Design criteria in accordance with 2017 SCDOT Roadway Design Manual

Permitting

- United States Army Corps of Engineers (USACE) general permit for wetlands and waterway impacts
- South Carolina Department of Health and Environmental Control (SCDHEC) National Pollutant Elimination System (NPDES) general permit, Stormwater Pollution Prevention Plan (SWPPP)

Hydrology

- Pre and post development stormwater runoff calculated to assess impact of new construction on existing watershed
- Peak runoff estimated using 10 & 25 year design storm data
- Open, longitudinal ditch system designed and sized to adequately convey runoff from impervious surfaces to appropriate outfalls
- Runoff estimation and stormwater conveyance systems designed in accordance with SCDOT Requirements of Hydraulic Design Studies

Estimated Project Cost Breakdown

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td>Mobilization</td>
<td>$3.7</td>
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<tr>
<td>Excavation and grading</td>
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<td>Paving materials</td>
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<td>Hydrology control measures</td>
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<td>Traffic Control</td>
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<td>Total</td>
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</tr>
</tbody>
</table>

*Estimated project cost prior to completion. All quantities in millions.

References

- “Web Soil Survey” USDA
- SCDOT Standard Drawings