Planning Level Cost Estimation

• Cost Estimation at the Planning Level
  – The current funding environment has created a critical need to ensure planning level cost estimates are both accurate and current
  – Federal / State / Local funding requires estimates to be accurate to assist with spending prioritization
  – Need to identify and account for project risks as early as possible (during the planning stage).
Previous Planning Level Cost Estimation Process

• Prior to GDOT’s Planning Level Cost Estimation Study (2010) the methods of Planning Level Cost estimation were to perform the following...
  • Determine Project type to be estimated
  • Locate a similar project in the vicinity
  • Review the previous estimates (PE, ROW, CST)
  • Calculate a per-mile estimate based off the previous project’s estimate and then apply it to the new project

• Drawbacks of previous methods:
  — Little contingency was considered
  — Project cost vary by geographic location
  — Potential environmental impacts are unknown
  — Did not take into account any changes in design standards that occurred over time
  — Scope creep
  — Lack of Documentation of planning assumptions
Cost Estimation Tools

- GDOT has developed 2 software tools that are unique to Georgia that have standardized planning level cost estimation.
  - **Cost Estimation System (CES)**
    - AASHTO software product tailored to GDOT Planning
    - Estimates CST & PE phases
  - **Right of Way and Utility Relocation Cost Estimate Tool (RUCEST)**
    - Tool created by GDOT

Cost Estimation System (CES) Planning version

- CES generates planning level estimates for construction costs using pre-made project “templates”
- Since detailed quantities are unknown at the planning stage, each template breaks the various bid-items into known and unknown categories
- Examples of known bid-items: Pavement, Earthwork, Erosion Control, Traffic Control, Signing & marking.
- CES templates calculate the items we know will be included in a project based on the project’s type and typical section
Cost Estimation System (CES) Planning version

- Templates use built-in contingency factors to capture the remaining unknown items to account for risk and uncertainty found later in scoping, concept developing, and environmental review.
- Examples of unknown items: concrete walls, culverts, landscaping, lighting, etc.
- Urban Area templates already have default assumption built-in to assume curb & gutter and bike/ped facilities.
- CES allows user to add secondary project items (bridges, traffic signals, turn lanes, etc.) as needed.

Cost Estimation System (CES) Planning version

Geographic regions built-in to software to account for typography and cost based on those regions and different contingencies are used in various areas to account for risk and uncertainty.
## Project Templates created

<table>
<thead>
<tr>
<th>Auxiliary lanes</th>
<th>Passing lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridges</td>
<td>Ramps</td>
</tr>
<tr>
<td>Frontage roads</td>
<td>Roadway (new alignment)</td>
</tr>
<tr>
<td>Intersection Imp.</td>
<td>Roundabouts</td>
</tr>
<tr>
<td>Managed lanes</td>
<td>Sidewalks</td>
</tr>
<tr>
<td>Median work</td>
<td>Turn lanes</td>
</tr>
<tr>
<td>Multi-use Trail</td>
<td><strong>Widening Projects</strong></td>
</tr>
<tr>
<td>Park and Ride Lots</td>
<td></td>
</tr>
</tbody>
</table>

## Summary of information needed to generate a planning level cost estimate...

- Items needed by planner to create an estimate:
  - Project: Length, Location, Typical Section, Alignment
  - Any secondary projects (Bridges, turn lanes, etc.)
  - Any notable environmental impacts (GIS)
  - ROW impacts or displacements
  - Utility Relocations
CES Project Screen

CES Cost Groups Screen
PE Estimation

- Developing Preliminary Engineering Estimate
  - PE currently = 8% of CST cost estimate total
  - If project has notable environmental issues will increase PE from 8% to 10%

ROW & Utility Estimating Tool (RUCEST)

- Risk is also associated in ROW and Utility Relocation as there are additional unknowns
- Challenges involved with ROW and Utility Estimating during the planning stage:
  - Land Values vary
  - Unknown Acquisition Cost (ex. Court cost)
  - How much ROW is needed for projects
  - Determining # of displacements / relocations
  - Determining location of Sub-Grade Utilities
RUCEST- ROW & Utility Estimating Tool

- Improvements RUCEST system has provided:
  - Land Value Cost for all 159 counties in Georgia
  - Assumptions on how much ROW is needed
  - Relocation cost of homes/businesses
  - Contingency cost assumptions for Damages, Administrative, Court Cost.
  - Cost assumptions for all utility items (electric, water, sewer, gas, telecom, railroad, etc.)
    - Utility contingency is 50%

Benefits of GDOT Planning Level Cost Estimation Process...

- Generate estimates that decision makers can use during the planning stage to make informed decisions on how and when a project should move forward.
- Standardized the process across various offices and agencies.
- Software assists our MPO planning partners in the updating of their financially constrained LRTPs.
- New software tools have yielded more conservative results, but have helped GDOT get cost estimates to a better starting point
- Allows GDOT to maximize our resources accordingly by managing cost and risk factors
GDOT Planning Level Cost Estimation
General Lessons Learned

• Successes
  – Better review of external partners deliverables that include cost estimates
    • MPO LRTP
    • Consultant deliverables
  – Done in-house - Improved creditability by executive management

GDOT Planning Level Cost Estimation
General Lessons Learned

• Accuracy
  – Run test estimates on recently let projects
  – Additional test involve 2-3 staff members run same estimate
  – Documentation improved
  – Estimates reviewed by SME within Planning office
GDOT Planning Level Cost Estimation
General Lessons Learned
• Challenges
  – Expertise of software tool users is limited
    • Knowledge retention / Limited training
    • Takes repeated and regular use of software to master
    • Should have dedicated 2-3 SME’s.
  – Technical Issues of external (non-GDOT) users
  – No metrics to measure success
  – No independent review or tracking cost as they move forward

Questions?

Contact info:
Dave Cox
GDOT - Office of Planning
404-631-1807
dcox@dot.ga.gov