Capital District
Transportation Committee January 15, 2003

Unit Costs for Non-State Highway Reconstructions with Federal Funds

There is a large difference between what a local government would pay to resurface a road on its own and what it would cost to resurface the same road with federal-aid funds. There are several reasons for this, the greatest of which probably is that if federal funds are used, much more substantial repairs are done than a local government would do on its own. These more substantial repairs include enhanced design features and, in most cases, reconstruction rather than resurfacing.

Therefore, CDTC has developed estimated unit costs to reflect these facts. These costs will be applied to any candidate projects before evaluation or inclusion on the TIP. They are also being applied to existing TIP projects for which no design work has yet yielded an updated cost. Since these costs are intended to be averages, they are expected to reasonably predict the costs for rehabilitation of roads on a system-wide basis. However, it is the nature of an average that it doesn't reflect any exceptions to any given project. So if there are particular features of a given project that would increase or decrease the cost, CDTC may be able to incorporate adjustments to the cost for that project, if these adjustments can be properly defended. For example, in a rare case of a non-state road already satisfying state design standards, if core samples of pavement indicate that resurfacing will last ten years (the minimum federal requirement), then CDTC might apply a unit cost for resurfacing instead of reconstruction.

Projects have been broken into four types based on the character (not necessarily location) of the road as follows:

Urban Core: These include projects in downtown areas which include extensive sewer and utility work caused by the road repair. It's also expected that sanitation and storm sewers are combined and need to be separated. The work includes reconstruction of the road, sidewalks, transit amenities, street lighting, and intersections, but not intersection widening.

Other Urban: The differences between these roads and the Urban Core roads are that these already have separated sewers and require less extensive utility relocations. These roads have storm drainage by a closed system exclusively.

Suburban: These roads are more suburban in nature. They may or may not already include curbs and sidewalks. If sanitary sewers exist, they are separated from the storm sewers and often the sanitary sewers and water lines are newer and not located under the driving pavement. Some conversion from open to closed drainage may be required. If they don’t include sidewalks and multi-use paths, they likely would be upgraded to include either or both. Intersection work would be an additional cost.

Rural: These roads aren't in heavily populated areas. Bicycle and pedestrian accommodations

are assumed to be provided through the use of shoulders. There are no sanitary sewers or closed storm sewers. Intersection work would be an additional cost.

The costs in the charts below include 12% for supervision of construction and 18% for engineering. Right-of-Way cost is assumed to be negligible except in the cases of intersection widening and new sidewalks/multi-use paths in which case it is included, and in the case of realignment for which it is not estimated. The length of any extensive turn lanes or ramps should be included in the lane-mileage. An inflationary factor of approximately 10% is included to reflect expected construction prices in 2006 or 2007.

Reconstruction Unit Costs By Road Type

Road Type	**Cost/Ln-Mi**
Urban Core	$4.9M
Other Urban	$1.8M
Suburban (Sidewalks/Multi-Use Path Exist)	$1.3M
Suburban (Sidewalks/Multi-Use Path Don't Exist)	$1.8M
Rural	$0.7M

Costs For Additional Treatments

Additional Treatment	**Cost**
Realignment	Contact NYSDOT Region 1 for cost estimation case-by-case.
Intersection Widening	$0.5M per Intersection Approach

Addendum Regarding Unit Costs for Urban Core Projects

Introduction

With the large cost difference between these two categories of roads, CDTC staff has undertaken the task of refining the costs of urban road reconstruction, so as not to overestimate or underestimate the cost of projects that fall between these two categories.

Rather than examine as many projects as possible with recent lettings, CDTC studied in greater detail four projects with recent lettings for which specific information could be obtained. These projects are A334 (Pearl Street Phase 3), R110 (Third Street and Third Avenue), R155 (Congress Street) and S144 (State Street Streetscape).

Procedure for Comparing Project Scope

The scope of these four projects were checked for the inclusion of 38 different improvements. These improvements are split into six categories Pavement/Operations (16), Pedestrian (7), Bicycle (2), Transit (2), Drainage/Utilities (7) and Streetscape/Aesthetics (4). The scopes of the projects were compared and the differences noted.

Procedure for Comparing Project Cost

Unit costs for these projects were calculated, using a slightly greater accuracy than previously. Lengths and lanes (used to calculate lane-miles) were taken from documents used in the engineering phases of these projects. One of the factors that increased the costs of urban reconstructions has been the inclusion of a small amount of side streets in the reconstruction. These numbers were available and can be used to calculate the true unit costs of these projects. However, when a project is added to the TIP, side streets are not considered in the cost. Therefore, the unit costs used here are calculated using only the mileage for the mainline road. They will then be applicable to the mileage of candidate projects. Any costs for work or right-of-way that are not part of a normal urban reconstruction were removed from the total project cost first.

Matching Project Scope and Cost

The scopes of project R155 and A334 were similar. They differed in few minor improvements, which tended toward a net difference of zero. Another difference in the scopes of these projects was the magnitude of some of the improvements that were made to both projects. The only way this could be known to CDTC was by interviewing someone with detailed knowledge of both projects, in this case, consultants. Ultimately, the scope for A334 was slightly greater in magnitude and had a slightly greater cost, greater by 15%.

S144 was about 20% higher in cost than these two projects. It was difficult to determine any cause for the difference in cost, since the scopes appeared to be similar. Superpave was used in the cost for all three projects. Perhaps the difference is in the extent of some of the more expensive improvements. Unlike R155 and A334, the difference in degree of these repairs could not readily be known. The aggregate unit cost of these three projects was calculated weighing each cost by the lane-miles. The total unit cost is $5.1M per lane-mile.

The scope of project R110 was less substantial, differing in a few costly categories. Its cost was less by about a factor of two. The total unit cost is $2.2M per lane-mile.

Conclusion

This research has revealed that not all Urban Core projects are the same in cost or scope. Some of these differences in scope can be determined by examining the scope for the presence of the 38 different construction items shown on the next page.

It is therefore assumed that all or most candidate projects will either be similar to one of these (A334/R155/S144 or R110) or in between them in scope. Therefore, a reasonable cost can be assigned to each candidate that's consistent with other projects, either $2.2M or $5.2M per lane-mile or something in between.

This research also revealed that even among projects with seemingly the same construction items in their scope, there can be variance in the cost due to the extent of the work for specific items. In retrospect, these differences could be determined with more research, and the costs refined further. However, it would be impractical to attempt to obtain information for candidate projects that would enable their scope to be refined to that extent. Thus, there is known uncertainty in these cost estimates.

List of Possible Improvements for Urban Reconstruction

Pavement/Operations
Reconstruction
Resurfacing
Shoulder/ Lane Widening
Curve Realignment
Center Turn Lane
Raised Median
Intersection Operational
Improvements
Signals
Traffic Signs
Driveway Access
ROW Purchase
Curb
Safety Widening
Guiderail
Geometric Improvements
Clear Zone

Pedestrian
Sidewalk
Retaining Wall
Crosswalks
Textured Crosswalks
Pedestrian Signals
Pedestiran Island
Pedestrian Facilities (ADA curb cuts, etc.)

Bicycle
Bike Lanes
Bicycle Facilities

Transit
Bus Shelters
Bus Turnouts

Drainage/Utilities
Closed Drainage
Drainage/Storm Water/Sewer Improvements
Paved Gutters
Major Culvert Reconstruction
Storm Water/Sewer Main Separation
Water Main Improvements
Utility Improvements/Relocations

Streetscape/Aesthetics
Street Trees/Landscaping
Lighting
Streetscape (brick pavers, street printing, benches, bollards, etc.)
Traffic Calming Devices (bulb outs, etc.)