

Independent Cost Estimate (ICE)

INDEPENDENT COST ESTIMATE SUMMARY FORM

Project Name:	All Stations Accessibility Program – St. Charles Streetcar
Project Number:	2023-FL-04
Date of Estimate:	6-30-2025
Description of Goods/Services:	Architectural and engineering services for construction of accessible stops at up to 46 stop pairs along the St. Charles streetcar. Additional services include traffic analysis, surveying and utility mapping, outreach assistance, cost estimating, safety and hazards analysis, NEPA assistance, and resident engineering.

☐ New Procurement

☒ Contract Modification (Change Order – task order for on-call contract)

☐ Exercise of Option

Method of Obtaining Estimate:

☐ Published Price List (attach source and date)

☐ Historical Pricing (attach copy of documentation from previous PO/Contract)

☐ Comparable Purchases by Other Agencies (attach email correspondence)

☐ Engineering or Technical Estimate (attach)

☐ Independent Third-Party Estimate (attach)

☒ Other (specify) **typical market value of A&E contracts in relation to capital costs** attach documentation

☐ Pre-established pricing resulting from competition (Contract Modification only)

Attach additional documentation such as previous pricing, documentation, emails, internet screen shots, estimates on letterhead, etc.

Summary of Method: The starting point for this estimate is the total estimated cost of construction for All Stations Accessibility Program (ASAP) improvements from the RTA's 2024 ASAP Grant application to the Federal Transit Administration. The total cost of construction is estimated to be \$5,602,931 including contingency. Basic architectural and engineering (A&E) services for commercial or infrastructure projects are typically estimated as a percentage of construction cost. Two resources—one from the

City/County of San Francisco and a second from the Riverside County (CA) Transportation Department—provide a range of A&E costs as a percentage of total project cost. The former cited a standard range of 7-15% of capital costs, while the latter cited a range of 8-12%. While California typically sees construction costs that are higher than other areas of the country, there is no indication that A&E costs as a relative percentage of capital costs are exceptional in California markets. We therefore saw these figures as credible ranges.

Given the \$5.6 MM estimated cost of RTA's 2024 ASAP project, the above percentages would yield total A&E costs ranging from \$392,205 on the low end and \$840,440 on the high end, with an average figure of \$588,308. We used this average figure as the starting point for basic A&E services.

However, the A&E scope for this project includes many other design and consulting services that are not typically captured in a base A&E fee and scope. These additional services are:

- Completing a detailed current conditions assessment including a traffic analysis at each of the future stop locations
- Assisting in public outreach efforts
- Evaluating the possibility of consolidating streetcar stops in coordination with RTA staff
- Preparing cost estimates
- Completing a safety and hazards analysis
- Assisting a National Environmental Policy Act (NEPA) consultant with assembling materials necessary for NEPA review and clearance
- Completing detailed surveys including topographic surveys and utility mapping
- Resident engineer services during the construction phase

Using an estimated number of hours for each of these tasks and an hourly billable rate of \$200 per hour for these services (see attached table for a detailed breakdown and attached resources as backup), we calculated these additional services to come to \$746,632.

Adding these additional services to the basic services estimate of \$588,308 yields a total estimate of \$1,334,940, which we rounded up to \$1,350,000.

Through the method(s) stated above, it has been determined the estimated total cost of the goods/services is \$1,350,000.

The preceding independent cost estimate was prepared by:

Rafe Rabalais, Director of Capital Projects

Name

A handwritten signature in black ink, appearing to read 'Rafe Rabalais', written over a horizontal line.

Signature

New Orleans Regional Transit Authority

Project Name Unlimited Streetcar Access
Project # tbd

as of: 1/29/2024

Detailed Budget Estimate

Component	Sub-Component	Qty	Unit	Cost/unit	Cost	Federal Match	Local Match	20%
Transit stop rebuild	Construct ADA pads	40	ea	\$85,000	\$3,400,000			
	Curb ramps	60	ea	\$2,000	\$120,000			
	Pavement restoration & repair	5000	SY	\$110	\$550,000			
	Striping and markings	42000	LF	\$8	\$336,000			
	Subtotal				\$4,406,000			
Other Construction	Traffic Control	3%			\$132,180			
	Mobilization & Demobilization	10%			\$440,600			
	Subtotal				\$572,780			
Construction Total					\$4,978,780	\$3,983,024		\$995,756
Pre-Engineering	Detailed survey	45	ea	\$1,500	\$67,500			
	Community Engagement	1.5%			\$74,882			
	Traffic study				\$75,000			
Design/Engineering	Engineering Fees (10%)	10%			\$497,878			
	Construction Management Fees	3%			\$149,363			
Admin	Resident Inspection	5%			\$248,939			
	Project administration	3%			\$149,363			
	Subtotal				\$1,262,726	\$1,010,180		\$252,545
Construction & Fees Total					\$6,241,506			
Other	Contingency (10%)	10%			\$624,151	\$499,320		\$124,830
TOTAL					\$6,865,656	\$5,492,525		\$1,373,131

\$5,602,931

2 chargers

\$5,602,931 for capital cost

Noted at 5%, but actually calculated at 3%

Budget Estimate Summary

Component	Federal (ASAP)	Local (RTA)	Total
Administration	\$119,491	\$29,873	\$149,363
Pre-Engineering	\$173,745	\$43,436	\$217,182
Design/PM/CM	\$716,944	\$179,236	\$896,180
Construction	\$3,983,024	\$995,756	\$4,978,780
Contingency	\$499,320	\$124,830	\$624,151
Total	\$5,492,525	\$1,373,131	\$6,865,656

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Board of Supervisors

6. Capital Project Design Costs

- The Department of Public Works incurs increased construction costs for project design errors and omissions. Design errors and omissions, a preventable occurrence, accounted for \$2.1 million in increased construction contract costs for 49 construction contracts completed in 2004 and 2005, or approximately 2.9 percent of total construction costs of \$72.5 million.
- Despite the impact of design errors and omissions on construction costs, the Department does not measure the impact. Although the Bureau of Engineering previously had a performance goal to limit construction contract cost increases due to design errors and omissions to 3 percent, the Bureau does not currently measure such increases. The Budget Analyst found that more than 22 percent of contracts exceeded this goal. Eleven of the 49 construction contracts, or 22.4 percent, had cost increases of 3 percent or more due to design errors and omissions.
- The Department's Bureaus of Architecture and Engineering have project design quality assurance and control programs, but the Bureau of Engineering has not fully implemented their program. Further, the Department formed a task force to assess capital project quality assurance procedures but has not moved forward in evaluating or implementing the task force recommendations for the Department as a whole.
- Several common occurrences have contributed to the increased construction costs resulting from design errors and omissions. Projects designed by consultants can incur high costs. For example, the recently completed Juvenile Hall construction project, designed by a consultant, is expected to incur \$9.3 million in additional costs due to design problems, equal to 18 percent of the \$51.7 million construction contract. Although the Department intends to pursue a claim for professional liability against the architectural and engineering design contractor, in many contracts the City and not the consultant pays the increased costs.
- The Department also needs to better coordinate with the Department of Building Inspection to ensure sign-off of construction projects and prevent delays.
- The Department needs to look at the costs of increasing site visits by the project designer and site testing during the design phase compared to the costs of contract change orders due to unforeseen site conditions to ensure that project designs are cost-effective.

Management of Capital Projects

The Department of Public Works manages most of the City's General Fund capital projects. The Charter authorizes the City's enterprise departments – the Port, the Airport, the Public Utilities Commission, and the Municipal Transportation Agency – and the Recreation and Park Department to manage their own capital projects. The Department of Public Works manages the capital projects of the remaining departments, including street and other projects under the jurisdiction of the Department of Public Works, and provides engineering, architectural, and construction management services to the enterprise as well as the General Fund departments.

The Department of Public Works' engineers and architects serve as project managers for capital projects. The project designer serves as project manager for single discipline projects, such as electrical or structural engineering projects. The Department has also formed a project management group, which assigns engineers and architects as project managers for a limited tenure.

Management of the Capital Project Design Process

The planning and design of projects is the key stage in determining the scope and costs of the capital project. The project designer drafts the construction specification documents that form the basis of the construction bid. The Department prepares construction cost estimates in-house or hires consultants specializing in construction contract estimation, depending on the type of project.

Client departments participate in planning most capital projects. The Department of Public Works' role is to support the planning process and execute the project plan. The Department's engineering and architecture staff design most of the Department's projects, although the Department will hire design consultants to design complex or specialized projects, such as health care or corrections facilities. The project design is the basis of the construction documents and construction cost estimates.

According to interviews with the Department of Public Works' engineers and architects, the capital project design is intended to meet Americans with Disabilities Act and building code requirements and industry standards. The designer needs to balance the client's project plans, code requirements and other standards, and cost restraints. The goal is to achieve a project design that balances design requirements and reduces the need for change orders during the construction phase of the project.

The Bureaus of Engineering and Architecture are responsible for the Department of Public Work's capital project design. Although project design can be complex and varies significantly by the type of project, design efficiency can be measured in part by the cost of the design compared to total construction costs, and the number of construction contract change orders attributed to design errors and omissions.

Capital Project Design Costs

Generally, the Bureaus of Architecture and Engineering senior architects and engineers are responsible for meeting with clients, developing the scope of work, and assigning design work to staff within their sections. The Bureau of Architecture has a pool of consultants to assign design work in addition to the Department of Public Works' architecture staff. The Department also contracts with outside consultants to design complex or specialized projects.

The Department of Public Works encounters specific issues when managing design costs as a portion of overall project costs. As a public agency, the Department lacks the budget constraints of a private firm that must absorb excess labor costs. The Department must pay for all labor hours charged to a project. Conversely, the Department cannot offer pay incentives or retain funds for delivering the project at lower than budgeted costs. The Department also encounters higher design costs due to the higher regulatory and design standards for many public projects.

The Department must balance the need to cost-efficiently design projects while ensuring design thoroughness to avoid later construction change order costs for design errors and omissions.

The Department of Public Works' engineers and architectures expect design costs to make up approximately 7 percent to 15 percent of a project's costs, as a general rule. Design costs constitute a larger percentage of small projects. Specific types of projects, such as curb ramp construction, have a higher percentage of design costs due to the special issues encountered in designing the curb ramp, such as the location of utilities and street lights, basements, and other structures.

Benchmarking Design Costs

Seven California agencies, including the San Francisco Department of Public Works, have been participating in an ongoing capital improvement program benchmarking study. The *California Multi-Agency CIP Benchmarking Study – Update 2005* found that, for projects completed between January 1, 1999, and January 1, 2005, the project delivery costs as a percentage of total construction costs increased over time. The *Study* considered that the increased project delivery costs resulted from improved data collection, which identified project delivery costs more accurately, greater community involvement and coordination, and more stringent regulatory requirements.

When compared to the *Study's* benchmarks, the Department of Public Works project planning and design costs as a percentage of total construction costs are not high.

Table 6.1

The Department of Public Works' Capital Project Planning and Design Costs as a Percentage of Total Construction Costs for Capital Projects Completed in 2005

Department of Public Works	
Average Costs for Department of Public Works Projects Completed in 2005	
Average Planning and Design Costs	
Average Total Construction Costs	
Planning and Design as Percent of Total Construction Costs	
<u>Sewer Projects</u>	
Sewer Projects Less than \$500,000	
	\$83,143
	\$451,788

Source:

Riverside County (CA)
Transportation Dept.

Estimating Guides

Contents

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 - Estimate Stages
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 - Engineer Estimate Template *(MS Excel)*
 - Engineer Estimate Template (Segmented) *(MS Excel)*

Introduction

The philosophy of project cost estimating is to produce the best cost estimates reflective of the project risks using the most accurate and complete project and pricing information available at the time the estimate is prepared.

It is difficult to generate cost estimates for transportation projects that remain accurate throughout the entire project life cycle, particularly when comparing early conceptual estimates to the actual final cost of the completed project. Project cost estimates, in a way, are never really completed; they essentially are continually being updated to keep them current. However, developing quality estimates that can be relied on is important for many reasons:

- RCTD's programming and budgeting depends on reasonable project estimates.
- The Transportation Improvement Program has limited funding and budgets all available dollars. Overruns on one project forces something else to be unfunded. Underruns leaves funding in the bank thereby neglecting potential important improvements.
- County budgeting affects local and regional planning.
- Budget estimates are widely circulated to the Board, media and public.
- Poor estimates can cause a loss of credibility

Applying consistent formatting and standardized processes to each estimate enhances the efficiency, accuracy, reliability, and credibility of cost estimates. It also improves the ability to review and compare estimates at different stages of the project life cycle. In the current economic climate of greater-than-ever strains on public funds, the pressure to accurately estimate the ultimate cost of a project is increasing. An accurate and complete cost estimate goes a long way toward supporting the successful delivery of a project within its approved budget.

In summary, good engineering estimates are important. Take the time to do a quality estimate, consistent with the need, and everyone benefits.

determine the need for mitigation. Estimates for the cost of preparing environmental documentation can be developed when a project has been field reviewed and it has been determined what type of environmental document is necessary and what special studies will be needed.

Design costs are calculated in various ways. Sometimes design budgets are created as a percentage of construction. Sometimes they are prepared by determining the number of plan sheets and assigning a cost per sheet. Sometimes a detailed list of tasks is prepared along with the man-hours required and an associated cost per man-hour applied. Using a percentage of construction is obviously easier than creating a list of tasks, however, when time permits it is recommend that costs be determined using the task/man-hour method. This is also consistent with the requirement of consultants submitting cost proposals in response to RCTD's Requests for Proposals.

Typical ranges for design costs as a percentage of construction.

- Total engineering: 8% to 12% of total construction cost
- Preliminary design: 1% to 3% of total construction cost
- Grading: 5% to 8% of estimated grade construction cost
- Paving: 4% to 7% of estimated paving construction cost
- Structures: 6% to 9% of estimated structural construction cost
- Geotechnical: can be a further 0.5% to 1.25% of total construction

Engineer's Estimates

The Project Engineer's Estimate of Cost serves two primary purposes:

- It estimates the fair and reasonable price RCTD should expect to pay for each of the items of work to be performed.
- It provides the ability to validate the adequacy of available funding.

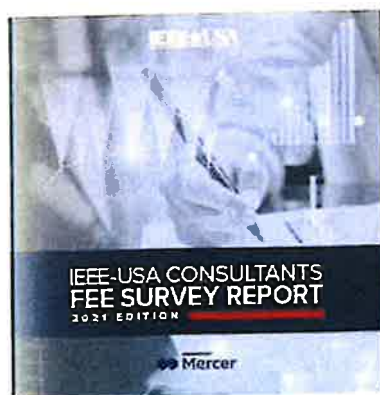
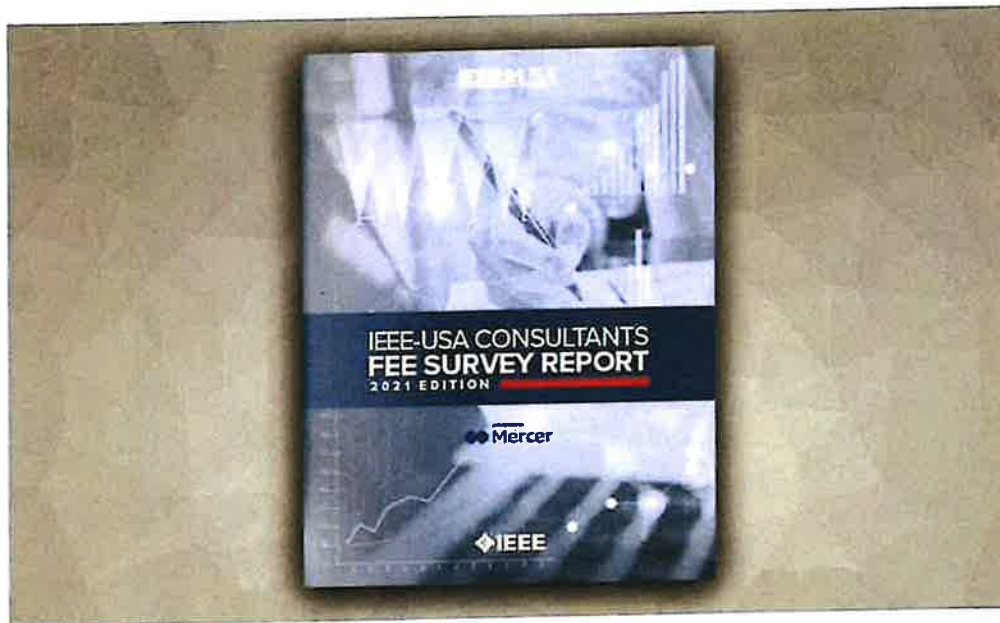
There are two methods commonly used for estimating prices to be used in Engineer's Estimates. One method is to use previous bid prices as a basis for

Consulting Products & Services

2021 IEEE-USA Consultants Fee Survey Report – Median Billable Rates Up, Covid Affecting Short- and Long-Term Business

By Paul Lief Rosengren

🕒 19 October 2021 💬 0 🔥 5,772 📖 3 minutes read



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IEEE-USA Consultants Fee Survey
Report – 2021 Edition

MORE INFO

IEEE-USA has released its **2021 Consultants Fee Survey**, focusing on the compensation of consultants, as well as on the impact of COVID-19 on members who earn at least half of their income from engineering consulting. Starting in 1998, this survey has been conducted every other year – through 2008; and annually, starting in 2009.

Despite COVID-19, there was a rise in the amount that respondents to the survey were billing as consultants. ~~The~~ average consultant billing was \$170 per hour, up \$20 over the previous survey. This rate was consistent, regardless of years of experience – except for those with less than 15 years of experience, whose median hourly rate was \$158 an hour. The share of respondents with hourly rates at, or above, \$200 per hour increased to 36.4%, up from 32.1% in 2020.

Educational differences in billing rates were consistent with the 2020 survey. Having a Ph.D. translated into a \$45 higher median billing rate (\$215 an hour), with 17.5% of respondents holding a Ph.D., or its equivalent. There is virtually no difference in hourly rate between those with a

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CPI Inflation Calculator

CPI Inflation Calculator

in year1 month May ▼ year1 year 2021 ▼

has the same buying power as

in year2 month May ▼ year2 year 2025 ▼

adjusted for inflation
to \$203/hr.

About the CPI Inflation Calculator

The CPI inflation calculator uses the [Consumer Price Index](#) for All Urban Consumers (CPI-U) U.S. city average series for all items, not seasonally adjusted. [This data](#) represents changes in the prices of all goods and services purchased for consumption by urban households.

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March 16, 2020

Large ROI from subsurface utility engineering (SUE) for highway construction projects

Return on investment (ROI) studies of subsurface engineering utility engineering (SUE) surveys applied to highway construction projects conducted since the late 1990s have consistently revealed a large return-on-investment from conducting SUE surveys as part of highway construction projects.

One of the first in 1999 by Purdue University and sponsored by the US DOT Federal Highway Administration (FHWA) identified 21 categories of cost savings that could result from including a subsurface utility engineering (SUE) survey in construction projects. Only some of these could be quantified and it was estimated that the qualitative benefits exceeded those that could be quantified. It was estimated that SUE surveys resulted in a construction savings of at least 1.9 percent over the traditional approach of relying on as-builts and (above-ground) site surveys for identifying underground utilities. Using the national expenditure in 1998 of \$51 billion for highway construction (FHWA), it was calculated that requiring SUE on road construction projects could result in a national savings of at least \$1 billion per year.

A subsequent reanalysis of the same Purdue data estimated that the ROI was \$12.23 for every \$1 spent on SUE. Furthermore the cost of conducting a SUE survey was estimated at 1.39% of total project costs. In 2007 a study for PennDOT and USDOT found an ROI of 22.21 : 1.

The most recent ROI analysis sponsored by PennDOT differed from previous analyses by including both SUE and non-SUE projects. It calculated an ROI of 11.39 : 1. The largest contributor to the cost savings attributed to SUE was a 40.33% reduction in utility relocation costs. Utility relocations were avoided or reduced by providing engineers/designers with accurate underground information in the early stages of design. The second largest savings was 29.46% in reduced construction and design costs. SUE enables designers to design efficiently and accurately with reliable information, so that design time can be saved and unnecessary construction work can be avoided or reduced. The cost of conducting a SUE survey was estimated to be 1.65% of project cost.

These ROI studies show that SUE can provide accurate utility information with important project benefits at reasonable cost.

Year	ROI	Cost of SUE (% of project cost)	Description	Sponsoring agency	Source
2012	11.39:1	1.65%	Study of 22 SUE and 8 non-SUE projects	PennDOT	Yeun J. Jung, Evaluation of subsurface utility engineering for highway projects: Benefit–cost analysis, pages 111-122 in Tunnelling and Underground Space Technology Volume 27, Issue 1 Pages 1-168 (January 2012)
2012	16:1		Study of one SUE project	Region of Lombardy	

would have been avoided by SUE can be considered as SUE benefits. The results of the study revealed that \$11.39 can be saved for every \$1 spent on SUE on road projects.

The top cost savings that were found are as follows:

1. 40.33% reduction in project relocation cost by providing accurate underground information in the early stages of design
2. 29.46% reduction in construction and design costs - SUE enables designers to design efficiently and accurately with reliable information, so that design time can be saved and unnecessary construction work can be avoided or reduced.
3. 9.59% reduction in redesign costs
4. 9.08% reduction in delay costs due to relocation
5. 6.81% reduction in delay costs caused by emergencies
6. 1.41% reduction in delay costs caused by unexpected utilities
7. 1.41% reduction in information gathering and verification cost
8. 1.04% reduction in restoration cost

It was concluded that SUE can provide accurate utility information with important project benefits at reasonable cost. A ratio of 1.65% was determined as the ratio of SUE cost to total project cost. The study also showed that the greater the complexity level of buried utilities, the higher the SUE benefits.

Region of Lombardy, Italy 2012

A pilot project was undertaken to map all underground infrastructure on the site of Expo Milano in preparation for the 2015 event in Milan. All underground infrastructure in the project area (230 000 square meters) including electric power, water, sewers, gas, district heating, street lighting, and telecommunication were mapped by combining historical records and IDS GeoRadar ground penetrating radar (GPR) technology. A key objective of the project was an economic analysis of the costs and benefits of applying GPR to detect the location of underground infrastructure. The analysis estimated that the return on investment is about €16 for every euro invested in improving the reliability of information about underground infrastructure. The analysis emphasized that there were other important, but non-quantifiable, benefits including better safety for both workers and the public as well as fewer traffic disruptions.

Pennsylvania Department of Transportation 2007

This study conducted by Penn State and sponsored by the Pennsylvania Department of Transportation (PennDOT) and the U.S. DoT, Federal Highway Administration (FHWA) performed a benefit-cost analysis of 10 SUE highway projects from different PennDOT districts. The case studies were investigated by conducting interviews with utility engineers, SUE consultants, and project engineers. Site visits, analyses of project data, and detailed individual studies of the 10 SUE highway projects were also performed for this research. These projects were selected randomly from a list of projects that utilized SUE quality level A and/or B. The projects investigated in this study involved road construction and bridge replacement in urban, suburban, and rural areas. PennDOT project managers and engineers, utility owners, SUE consultants, designers, and contractors were interviewed. A savings of \$22.21 for every \$1.00 spent on SUE was estimated based on the analysis of the 10 projects. These projects had a total project cost (including both design and construction cost) in excess of \$120 million. The costs of conducting SUE (to ASCE QL A or B) on these 10 projects were less than 0.6 percent of the total project costs. The benefit was cost savings of 15% over traditional approach relying on ASCE QL C and D utility data.

Project costs ranged from \$2 million to \$63 million. The quality of the utility records for these projects was poor or fair. The cost of conducting SUE ranged from \$20,000 to \$141,000 for these projects. The ratio of SUE cost to the total project cost ranged from 0.22% to 2.8%, with an average of 1.15%. SUE resulted in cost savings ranging from \$65,000 to \$4.5 million. The benefit-cost ratio ranged from 3.25 to 33.93, with an average of 22.21. In other words \$22.21 can be saved for every \$1 spent on SUE. The costs of conducting SUE on these 10 projects were less than 0.6 percent of the total project cost. Furthermore the analysis revealed a strong relationship between benefit of SUE and utility complexity. The benefit derived from performing a SUE survey increases as the underground utility complexity increases.

Ontario Sewer and Watermain Contractors Association 2004

In 2004 in Canada, the Ontario Sewer and Watermain Contractors Association commissioned the University of Toronto to investigate the practice of using SUE on large infrastructure projects in Ontario. Osman and El-Diraby (2005) analyzed nine

All Stations Accessible Program - Budget Breakdown					
Total Capital Cost (including contingency)	\$	5,602,931			
Typical A&E percentage for large infrastructure projects	7 - 15%				
Base cost low (7%)	\$	392,205.14			
Base cost high (15%)	\$	840,439.58			
Alternative base cost low (8%)	\$	448,234.44			
Alternative base cost high (12%)	\$	672,351.67			
Additional Services		Estimated Hours	Hourly Rate	Total Cost	Notes
Current Conditions Assessment		690	\$200	\$138,000	Assumes detailed current conditions assessment, including site visits and traffic analyses for 75% of the 46 stop pair locations to be analyzed.
Outreach Assistance		262	\$200	\$52,400	Assumes a 43 week design period--4 hours per week in FTE commitment over the course of the design process plus heavier commitment for each of three public meetings (3 FTEs at 10 hours per FTE)
Stop Consolidation Evaluation		240	\$200	\$48,000	Working with RTA Planning and Scheduling Staff to determine opportunities for stop consolidation. Assumes 3 weeks of work for 2 FTEs (engineer and PM)
Cost Estimates		180	\$200	\$36,000	Preparation of Cost Estimates at the 30%, 60%, and 90% stages; assumes 60 hours of work for 1 FTE per design deliverable (30/60/90)
Safety and Hazards Analysis		60	\$200	\$12,000	40 hours for 1.5 FTE to review plans for safety and hazard risk and prepare a summary report
NEPA Assistance		80	\$200	\$16,000	80 hours for 1 FTE to prepare materials from design drawings for NEPA consultant
Topographical surveys		n/a	n/a	\$79,350	Assumes \$2300 cost per stop pair location (75% of 46 stop pairs)
Surveys - utility mapping		n/a	n/a	\$156,882	Estimated 2.8% of estimated cost of project for subsurface utility engineering; used high end of estimated range given location in a congested urban area
Resident Engineering		1040	\$200	\$208,000	Assumes four hour per day commitment of 1 FTE for resident engineering services over the course of a 52 week construction period
TOTAL				\$746,632	
Average range of basic A&E services	\$	588,307.71			
Plus additional services	\$	1,334,939.76			