

FEDERAL TRANSIT ADMINISTRATION
PROJECT MANAGEMENT OVERSIGHT PROGRAM

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Task Order No. 5 – Sound Transit Capital Projects

Grantee: Central Puget Sound Regional Transit Authority
D.b.a. Sound Transit

Central Link Light Rail Project
University Link
Monitoring Report, Part I – August 2007

STV Incorporated
225 Park Avenue South
New York, NY 10003

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LIST OF ACRONYMS

AL	Airport Link
BCE	Baseline Cost Estimate
BFMP	Bus Fleet Management Plan
CAP	Corrective Action Plan
CCB	Change Control Board
CEO	Chief Executive Officer
CH (S)	Capital Hill (Station)
COS	City of Seattle
CP	Critical Path
CPI	Cost Performance Indices (Indicator)
CSI	Construction Specification Index
CSM	Construction Safety Manual
CSP	Construction Safety Plan
DOT	Department of Transportation
DSTT	Downtown Seattle Transit Tunnel
(D/F/S)EIS	(Draft/Final/Supplemental) Environmental Impact Statement
EMI	Electromagnetic Interference
EPBM	Earth Pressure Balance (tunneling) Machine
ERMP	Emergency Response Management Plan
EV	Earned Value
FD	Final Design
FFGA	Full Funding Grant Agreement
FLS©	Fire Life Safety (Committee)
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FTE	Full Time Equivalent
IS	Initial Segment
IS/AL	Initial Segment/Airport Link (combined)
KC(M)	King County (Metro)
LONP	Letter of No Prejudice
LRV	Light Rail Vehicle
LRT	Light Rail Transit
MIA	Master Implementation Agreement
MOU or A	Memorandum of Understanding or Agreement
MS	Master Schedule
MVET	Motor Vehicle Excise Tax
NTP	Notice to Proceed or North-Link Transit Partnership
OCIP	Owner Controlled Insurance Plan
OSHA	Occupational Safety and Health Administration
PE	Preliminary Engineering
PMOC	Project Management Oversight Consultant
PMP	Project Management Plan
PS	Project Schedule

PSST	Pine Street Stub Tunnel
QA	Quality Assurance
QC	Quality Control
Q(P)RM	Quarterly (Progress) Review Meeting
RAMP	Real (Estate) Acquisition Management Plan
RFI	Request for Information
RFP	Request for Proposal
RFMP	Rail Fleet Management Plan
ROD	Record of Decision
ROW	Right-of-Way
RTID	Regional Transportation Improvement District
SCC	Standard Cost Category
SCP	Safety Certification Program
SEM	Sequential Excavation Method(ology)
SOP	Standard Operating Procedure
SPI	Schedule Performance Index (Indicator)
SSEPP	System Security and Emergency Preparedness Plan
SSOA	State Safety Oversight Agency
SSP	System Security Plan
SSMP	Safety and Security Management Plan
SSPP	System Safety Program Plan
SSQA	Safety Security and QA
SSPS	System Safety Program Standards
ST	Sound Transit
TBM	Tunnel Boring Machine
TMOU	Technical Memorandum of Understanding
TO	Task Order
UL/U Link	University Link LRT Project
UW	University of Washington
VE (CP)	Value Engineering (Change Proposal)
WBS	Work Breakdown Structure
WSDOT	Washington State Department of Transportation
YOE	Year of Expenditure

1. EXECUTIVE SUMMARY

A. Project Description

- **General Description:** The University Link Segment (UL or U Link) is planned as an extension of the phased Central Link Light Rail Project that will add to the 13.9-mile Initial Segment (IS) and the 1.7-mile Airport Link (AL or combined IS/AL) operating segments. The entire U Link alignment is below grade in bored twin tunnels and excavated cut-and-cover stations, extending in a northerly direction from the Pine Street Stub Tunnel (PSST), transitioning beneath the Capitol Hill District of Seattle and the Lake Washington Ship Canal to its terminus located near Husky Stadium on the University of Washington (UW) campus.
- **Length:** The U Link alignment includes 3.15 miles of underground, double-tracked line.
- **Number of Stations:** The adopted alignment includes two underground stations; the University of Washington Station at the northern terminus of the alignment and an intermediate station in the Capitol Hill District of Seattle.
- **Additional Facilities:** Additional track work, tools and equipment will be added to the yards and shops to accommodate the increased fleet size.
- **Vehicles:** Twenty-seven (27) vehicles are planned for acquisition to support the demand derived from the U Link extension and revenue service system-wide.
- **Ridership Forecast:** The forecast of added patronage related to the U Link provided in the 2007 New Starts Report is 40,200 daily boardings for the U Link section of the alignment alone and an increase of 70,000 for the system related to the U Link for a total system patronage of 114,000 in operating year 2030.

B. Project Status

- The Project is in Final Design (FD).

C. Schedule

- Preliminary Engineering (PE): FTA authorized PE on December 5, 2005.
- Record of Decision: FTA issued the ROD on June 7, 2006.
- Final Design (FD): FD was authorized on December 11, 2006.
- FFGA Executed: ST anticipates execution of an FFGA in the second Quarter of 2008.
- Construction: The start of major civil construction is planned for December 2008.
- Total Project % Complete: The Project Baseline will be established with execution of the FFGA.
- Revenue Operations Date:

	FFGA ROD	FFGA as Amended	Forecast		Actual
			Grantee	PMOC	
University Link	N/A	N/A	03/31/16	N/A	N/A

- Other:
- Quarterly Progress Review Meeting: The next QPRM is scheduled for October 3, 2007.

D. Cost Data

Source: June 2006 Financial Plan and July 2007 Progress Report.

(\$ in millions)	<u>FFGA Amount</u>	<u>FFGA as Amended</u>	<u>Current Cost Estimate</u>	<u>Expenditure to Date</u>
Total Project Cost	N/A	N/A	\$1,646	\$98.9
Total FTA Share	N/A	N/A	\$750	N/A
New Starts Share	N/A	N/A	\$750	N/A
Local Share	N/A	N/A	\$896	\$98.9

Contingency: *The current Total Contingency balance is reported at \$377.3 million. In the PMOC's opinion, this is acceptable for the Preliminary Engineering stage of Project development. The PMOC recognizes that an incremental update to the Baseline Cost Estimate will be released in September 2007. ST expects that the estimate will reflect an increase.*

E. Technical Capacity Review

- **U Link Project Management Plan:** The U Link PMP is under development. ST issued its Draft Revision 0.1 in June 2007; however, the submittal was incomplete in that it did not include the required staffing plan. ST provided Staffing plans to the PMOC in July and the PMOC has initiated its review.

- **Operations Plan:** The UL Operations Plan Revision 0, dated April 24, 2006, is acceptable for the current stage of the Project with the exception of some errors in tabulated data that require correction.
- **Maintenance Plan:** The UL Maintenance Plan Revision 0, dated April 24, 2006, is acceptable for the current stage of the Project.
- **Real Estate Acquisition Plan:** The updated RAMP dated October 2006 is acceptable for this stage of the Project.
- **Quality Assurance/Quality Control (QA/QC) Plan:** The former PMOC received and reviewed the Final Design (FD) Quality Plan (Revision 2, February 2004), and the Quality Assurance Program Plan (Revision 2, September 2002), and found both to be acceptable. The PMOC recommends that ST review and update its Design Quality Plan as appropriate for initiation of FD. *The Quality Plan will require a revision to reflect ST's announced-but-yet-to-be-implemented reorganization.*
- **System Safety Program Plan (SSPP):** ST revised the Tacoma Link SSPP for consistency with the new WSDOT SSPS that became effective in late April 2006 in compliance with the revised 49 CFR Part 659. The Revised Tacoma Link SSPP was approved by WSDOT and is being used as the base to develop the Central Link SSPP, which will initially only address the IS/AL. The SSPP will be revised to address UL during the late-construction stage.
- **System Security Plan (SSP):** ST revised the Tacoma Link SSP for consistency with the new WSDOT SSPS that became effective in late April 2006 in compliance with the revised 49 CFR Part 659. The Revised Tacoma Link SSP was approved by WSDOT and is being used as the base to develop the Central Link SSP, which will initially only address the IS/AL. The SSP will be revised to address UL during the late-construction stage.
- **Safety and Security Management Plan (SSMP):** Final SSMP Revision 1, dated July 31, 2007, was formally released by ST in early August 2007 and, in the PMOC's opinion, found to be acceptable for this stage of the Project. *ST is analyzing the UW MIA for potential impact to this Plan that may drive the need for future revision.*
- **Rail Fleet Management Plan (RFMP):** *The PMOC received RFMP Revision 4, dated July 31, 2007, from ST Document Control on August 14, 2007, and will review it and issue a comment memo before the end of September.*
- **Bus Fleet Management Plan (BFMP):** The revised BFMP for ST's Regional Express, dated April 2006 and is acceptable for the current phase of the Project.

F. Safety

- See Attachment A and Section 3.E. in the PMOC Observation portion of the report.

G. Major Issues/Problems

- The U Link PMP remains under development. ST has developed staffing plans and initiated summary level reporting as well as committed to expanding that reporting to meet FTA's requirements. During June 2007, ST released another revision to the U Link PMP; however, the release did not include a staffing plan and was, therefore, incomplete. ST provided staffing plans in July 2007 and the PMOC initiated its review of the Plan in the context of ST's inventory of projects.
- The PMOC continues to be concerned that, in its opinion, ST has not had enough appropriately qualified staff to properly administer and progress its projects that are currently

in construction (IS/AL) while simultaneously designing and developing two additional mega-projects (U Link and East Link). *Additionally, planning submitted to date has shown positions, which in the PMOC's opinion require the full-time focus, being filled by a single individual with assignments on two or more projects. It should be noted that the staffing levels had been increasing as a result of new hires and consultant mobilization, although remaining substantively behind ST's published plan. ST has indicated that it will be modifying its planning information to reflect a reduction in scope and hours allocated to the FD Consultants. This should reduce the severity of the reported schedule status. In the PMOC's opinion, overcoming the late application of a proper level of resources leaves the Project with an inherently elevated level of risk at the outset. Since it is not clear that the planned staffing or level of work progress have yet to be achieved, the adequacy of the plan is yet to be demonstrated.*

- Early in 2007, the PMOC received copies of the revised ST Organization Charts, signed by the CEO on January 11, 2007. The revised organization did not provide a focused and independent Safety and Security reporting relationship. Since release of the January 2007 organization charts, a fatal jobsite accident occurred on the IS Project and ST has indicated that it was re-evaluating its structure relative to Safety, Security and Quality. The change in ST's Quality as well as Safety and Security organizational structure announced in May 2007 only partly addressed the PMOC's opinion that ST had to as rapidly as possible finalize its reorganization in a manner that provides a strong, independent Safety, Security and Quality Assurance Department that could provide the needed degree of independent oversight of both Capital Projects and ST Operations. *ST has indicated that the actual change in its organization will take place in early September with the appointment of the Chief of Safety, Security and Quality.*
- The PMOC is concerned that ST's delays in conducting Constructability-related activities will result in delays to developing the Project Schedule. A schedule for construction reflecting evidence of this type of analysis is described in FTA's Project and Construction Management Guidelines as an element of a completed Preliminary Engineering effort and is a requirement identified in 49 CFR 633 as an element of an acceptable PMP. The PMOC recommends that ST perform the construction-related analysis and translate the results into the U Link Project Schedule in a manner that will demonstrate compliance with FTA Guidelines. *Although in its opinion later than needed, the PMOC has seen evidence that some of the needed Constructability activities are beginning to take place.*

ATTACHMENT A: SAFETY CHECKLIST - Central Link LRT Project - University Link		
Areas of Focus	Y/N	Status/Comment
State Safety Oversight Agency		
Does the State have a designated State Safety Oversight Agency (SSOA) as defined in 49 CFR Part 659?	Y	Washington State Department of Transportation, Public Transportation and Rail Division, Attn: Stephanie Weber 401 Second Ave., South Suite 300 Seattle, WA 98104 weberst@wsdot.wa.gov 206 464 1290
If so, does the SSOA's authority extend to pre-revenue operations?	Y	
Has the SSOA established its System Safety Program Standards (SSPS)?	Y	The SSOA has updated the SSPS to reflect the new requirements of 49 CFR Part 659 that took effect on May 1, 2005.
Has the SSOA received, reviewed and approved the grantee's System Safety Program Plan (SSPP)?	Y	The SSPP for Tacoma Link has been approved by the SSOA. The SSPP for the Central Link IS will be submitted for review during the IS Project Start-up phase to secure approval at least 120 days prior to the planned start of revenue operations, as specified in the IGA. The SSPP in effect at the time will be updated to address UL and will have to secure WSDOT approval prior to the start of UL revenue operations.
Does SSOA participate in Project Development? Participate in things such as; review design documents, attend review meetings, and comment on how the safety aspects of the project are being addressed.	Y	Occasional attendance at Quarterly Project Review Meetings.
Has the SSOA performed a pre-revenue safety review of the grantee's project?	N	Construction is not complete.
System Safety		
Is the grantee's overall Safety Program properly documented in its Project Management Plan (PMP)?	TBD	<i>The SSMP has been brought to an acceptable level of development for FD. The PMP remains under development.</i>
Do the grantee's PMP and associated Safety Program include an appropriate safety policy adopted by its top management?	TBD	The PMP remains under development.

Do the grantee's PMP and associated Safety Program establish a specific organizational entity, and/or individual, responsible for the Safety Program?	TBD	The PMP remains under development. <i>ST has announced an organizational change that will bring the structure more in line with standard industry practice.</i>
Do the grantee's PMP and associated Safety Program specify staffing requirements, procedures and authority for the safety activities?	TBD	The PMP remains under development.
Do the grantee's PMP and associated Safety Program include a formal Safety Certification Program (SCP)?	TBD	The PMP remains under development, but will include a formal Safety and Security Certification Plan. The Safety and Security Certification Plan for IS/AL is under revision and the U Link SSCP is expected to be developed by using that plan as a model.
Do the grantee's PMP and associated Safety Program include the development/use of a Safety Design Criteria Manual or equivalent documents?	Y	The PMP remains under development. The current Design Criteria in place are based on IS/AL criteria and will be modified to reflect the technical aspect of an agreement with the UW.
Has the grantee developed, and the SSOA approved, the grantee's SSPP? What is the status of this process between the grantee and SSOA?	N	SSPP for Tacoma Link has been approved. Central Link SSPP is now under development, using the Tacoma Link SSPP as a base document. The SSOA must approve the SSPP before the IS goes into revenue operation and again prior to the start of both AL and UL operations.
Is the grantee implementing its Safety Program as defined in the PMP? Are the safety milestones being met? (Note: this assumes that the SSMP is properly referenced in the PMP.)	Y	The PMP remains under development. The Safety and Security Program is documented in the SSMP
Construction Safety		
Is the grantee's Construction Safety Program (CSP) documented in the PMP?	N	The PMP remains under development, and construction has not yet begun.
Has the grantee implemented its CSP?	Y	The CSP has been implemented on the IS Project. It is expected that the UL CSP will build on the IS/AL CSP.
How do the grantee's OSHA statistics compare to the	TBD	Construction has not started.

national average for the same type of work? If the comparison is not favorable, what actions are being taken by the grantee to improve its safety record?		
Is the grantee using wrap-up insurance on this project? Is the grantee using safety incentives/disincentives on this project?	Y	OCIP is in place on the current Project <i>and will be restructured for the U Link.</i>
Shared Track		
Does this project have shared track?	N	
Has the Grantee coordinated with FRA regarding waivers for shared track usage?	N/A	
Shared Corridor		
Does this project include shared corridor? Please describe geography of shared corridor.	N	
What is the grantee doing to specifically address safety concerns in the shared corridor portion of the project?	N/A	

2. ACTION ITEMS

PR	ITEM	IDENTIFICATION	NATURE OF PROBLEM/ISSUE	D	A	I	COMMENTS	STATUS
1	31-1 02/06	U Link Project Management Plan	A PMP that is acceptable for the current phase of the Project does not exist.	Y	Y	N	ST issued Draft Revision 6.1 in early June 2007. However, the document was not supported by a staffing plan and was, therefore, incomplete. ST issued its staffing plan in July 2007 and it will be reviewed in the context of the Agency and Project requirements.	R
1	32-1 12/06	U Link Constructability Review	FTA has instructed ST to conduct a Constructability Review for the U Link Project	Y	Y	N	The FD authorization letter requires the conduct of a Constructability Review that will lead to the finalization of the U Link Project Delivery and Contract Packaging scheme. ST has contracted for the conduct of related activities with its Civil FD Consultant. Completion of this task will require participation by CM personnel as well as designers. The FTA letter required and ST had scheduled this effort for completion by June 2007. Recent information indicates a later date. The PMOC has reviewed the conditions of FTA's FD authorization letter with ST.	R

Legend: PR = Priority: 1 = Most Critical; 2 = Critical; 3 = Least Critical.

Grantee Action: D = Remedial Action Developed; A = Remedial Action Approved; I = Remedial Action Implemented.

Status: R = Review Ongoing; C = Completed, No Further Review Required.

3. PMOC OBSERVATION REPORT AND CURRENT ISSUES

A. Budget and Funding

The tables below contain information provided by ST in its June 2006 U Link Financial Plan.

U Link Capital Costs

Standard Cost Categories	\$'s YOE (millions)	Percent Of Total
10 Guideway and Track	\$ 459	28
20 Stations	373	22
30 Yards, Shops, Supt. Facilities	8	>1
40 Site Work, Special Conditions	31	2
50 Systems	57	3
60 ROW/Real Estate	126	8
70 Vehicles	140	8
80 Professional Services	261	16
90 Unallocated Contingency	59	3
Subtotal	\$1,514	92
100 Finance Charges	\$132	8
Total Project Cost	\$1,646	100

Note: Rounding error in percentage calculations

As part of FTA's continuing evolution of its Risk Assessment and Management Program, it has established a requirement that a "Memorandum of Understanding (MOU)" be developed and executed prior to the issuance of an FFGA. As part of this process and as an essential element of the MOU, an agreed-upon Total Contingency is established. The Total Contingency resulting from the Risk Assessment process for the U Link Project is reported at \$329.3 million. The table of U Link Capital Costs, above, has been prepared in FTA's SCC format and it reflects an Unallocated Contingency of \$59 million. The FTA and PMOC have noted that ST's adopted budget as represented in the FY 2008 New Starts submittal includes \$59.0 million in Unallocated Contingency that was not properly reflected in its routine monthly cost reporting. Specifically, the table providing budget versus Incurred Costs and Estimated Final Costs did not reflect the Unallocated Contingency value. *In its June and July 2007 reports, ST included a column in the Cost Summary table for the U Link Project titled "Unallocated Contingency."* In that column ST then provides an allocation of the \$118.6 million of the "Unallocated Contingency". The table remains in a format other than the FTA's requested Standard Cost Categories. The Link project controls staff reports that it is working with ST's Information Technology (IT) Division to develop new reports in SCC format that will be generated directly from ST's financial system. This project is expected to be completed by the end of August, and Link should start reporting in SCC format in the August APR. The PMOC will continue to discuss budget reporting formats with the Project Controls staff. In its May 2007 report, ST indicated that it has identified approximately \$60 million in savings as a result of accepting six out of a total of 14 VE

initiatives. The result of accepting these VE proposals was an expansion of the Unallocated Contingency from \$59 million to approximately \$119 million, an increase of about \$60 million. *The July report indicates a reduction from \$119 million to \$110 million, a reduction of \$9 million.* Over the past several months, ST Real Estate had indicated that the cost forecast for Right of Way (ROW) should increase as a result of changes to the alignment depth. *Although ST has indicated in several meetings that these changes in alignment elevation are being adopted, the U Link Cost Forecast may not yet reflect the full impact. In its June 2007 report, ST indicated that the related impacts would be reflected in the July 2007 Project Reports. In reading the narrative, the PMOC cannot discern if the increase includes the effect of changes in elevation of the alignment. The narrative provided in the report discusses administrative content that should be addressed either in a glossary or acronym list. This would leave room for actual analytical narrative and discussion of planned management action.*

Although there is a concern with the timeliness of ST’s Contingency Status reporting, it remains the PMOC’s opinion that the reported Contingency level is adequate for the current phase of the Project.

The U Link funding profile displayed below was established in the FY 2008 New Starts Submittal. The FY 2009 submittal is due in August 2007.

U Link Funding
(\$YOE millions)

Source	Amount	Percent of Estimate
Local Tax	\$421	25
Bonds	\$464	28
New Starts	\$750	46
Other Local	\$11	1
Total	\$1,646	100

To date, there has been no change to the proposed U Link Funding profile.

B. Schedule

In its December 2006 letter authorizing FD, FTA suggested that ST “...review and update the Project Schedule”. FTA also stated its belief that while the planned overall timeframe to achieve revenue service for the U Link Project “...is feasible, the level of detail in the Master Project Schedule is not sufficient to allow ST project managers to evaluate the impacts of changes to the Project”.

ST has not yet established a baseline schedule for the U Link Project. Consequently, the latest monthly schedule updates are compared only with the past month’s update. The long-term issues and delays that affect the overall Project, therefore, remain obscured because of the lack of

a baseline schedule. The PMOC has recommended, and ST has agreed, that the July 2007 schedule update will be used as a current baseline for future schedule analysis.

The PMOC has reviewed the July 2007 update of the PS and has noted improvement in terms of content and detail; *however, in the PMOC's opinion, improvement is coming at a pace that appears to lag the need. The PMOC's opinion is based on ST's progress in performing the Constructability and other planning tasks that will lead to the formation of a well founded baseline schedule. The PMOC notes that ST disagrees with this opinion.* The PMOC expects that Schedule will continue to be enhanced as it evolves and suggests that ST place greater emphasis on this area.

Overview

FTA authorized entry into FD on December 11, 2006. At the time of ST's request to enter FD, ST provided an "Integrated Schedule" as part of its submittal. At that time, the Integrated Project Schedule was structured in the Primavera 3.0 (P3) software and was not supported by a controlled documented set of Schedule Basis and Assumptions to facilitate the PMOC's initial review. Since that time, ST has been working to enhance and re-structure the Schedule, providing additional detail for the design, construction and rail activation activities in the Master Schedule (MS), while initiating the development of documented basis and assumptions. *ST presented a complete draft of the MS for the PMOC's review in August 2007 versus in April as originally planned.* As previously noted, it is the PMOC's opinion that the overall timeframe depicted in that early version of the PS provides an adequate time allowance for Project execution, including approximately ten years for progression of the Project from PE to revenue service now planned for the first quarter of 2016. The following observations are based on reviewing *July 2007 MS update.*

Schedule Structure

The current version of the UL MS template includes four sub-projects; Final Design (FD) Civil, FD Systems, ROW, and Construction. *In its June 2007 update, ST added another sub-project for Third Party and Permits.* The FD Civil and Systems sub-projects are being maintained by the respective consultants. ROW includes activities associated with the process of property acquisition and is maintained by ST Project Controls and ROW departments. The nuances of the timelines and logical interfaces for ROW continue to be finalized. Construction includes activities associated with procurement (bidding), design management, construction management, permitting and construction sequencing. Construction is maintained by ST Project Controls. Inter-relationships are established among those sub-projects to form the basis for an integrated UL MS.

In April, the FD schedule maintained by the FD Consultant, North-Link Transit Partnership (NTP), was fully integrated into the MS and reportedly now includes NTP's entire set of deliverables. Based on our review of this schedule in June 2007 the PMOC had recommended that an activity for incorporating ST design review comments should be added to the FD schedule. *ST has incorporated the PMOC's suggestion. The System Design consultant (LTK) is also developing a schedule for its activities and ST has indicated that this schedule will be integrated with the MS in ST's August 2007 update.*

In the July 2007 MS update, milestones for the physical construction of the various contract packages have been incorporated along with the design-related submission milestones. ST has tentatively selected the design-bid-build method of Project delivery, which will require the close coordination of contractual schedule interfaces driven by assumed rates of progress. ST is in the process of including milestones in the PS that illustrate these interface points. PMOC has suggested that these interface points should be noted as milestones and the appropriate construction contracts developed that explicitly explain and define the duties, relationships and requirements for coordination of the work. These relationships must be tied to a well-developed plan for system installation, integration, test and start-up. The PMOC believes that this should be a 'Lessons Learned' taken from the IS Project. Further, the PMOC believes that these should be preliminarily established based on the results of the FTA directed Constructability Reviews that was originally planned for completion in the June 2007 timeframe. However, ST indicates that the Constructability effort was not formally initiated until late May. The PMOC is monitoring this activity and is concerned that ST's Constructability execution plans may not be as timely and comprehensive as necessary to assure proper schedule development. ST has noted its disagreement with this observation; however, from the PMOC's perspective, good industry practice as defined by the Construction Industry Institute and FTA Guidelines clearly indicate that more in depth Constructability analyses should have been performed by this point in the Project's evolution.

As part of the planning and scheduling function, the current Work Breakdown Structure (WBS) was analyzed for its ability to be used in support of an overall Project Controls Plan. *The PMOC's review indicates that the development of the WBS is progressing satisfactorily. Further development to include Bid Items, Schedule of Value, CSI Code (specification identifiers), etc., into the coding structure is required so that the future schedule management and update can be properly and efficiently facilitated. ST indicates that the planned schedule improvements are in progress and that they will be fully incorporated into the MS template by August 2007, several months later than originally planned. The PMOC had recommended that a detailed narrative on the activity coding and ID structure be developed to facilitate activity identification and support the efficient development, maintenance and assessment of the Basis and Assumptions for the MS. ST has developed such a narrative along with the Project Baseline Schedule (July 2007), and the PMOC considers it to be progressing. Continued intensive development and maintenance of the Basis and Assumptions is required through the design and bidding process until such time as the contracts have been awarded and conformed, and the contractors' baseline schedules have been accepted. At the point of acceptance of each contractor's baseline schedule, the Project Baseline Schedule should undergo a controlled revision.*

The PMOC has been urging ST to assimilate 'Lessons Learned' from the IS Project into the schedule-management function for the U Link Project. Planning for the structured/organized identification, acquisition, storage, retrieval and analysis of basic data on a disciplined basis must be implemented early in the Project. This includes assuring that the Agency/Project policies and procedures clearly define processes, responsibilities and timing of routine project and information-management activities that will result in timely, actionable management information. To be successful, the requirements for format and structure of cost and schedule data must be integrated into all aspects of the Project Operations, including, for example, the design services contracts, construction and systems contracts, and construction inspection

instructions. In the PMOC's opinion, it is critical that structure and discipline relative to the basic project-controls function must be instilled in the management team early in the Project. Failure to do so will severely limit the potential for long-term success of the Project. The PMOC has been meeting with Link Project Management and Project Controls staff to discuss management reporting. During these discussions, the U Link personnel proved to be acutely aware of the necessity to establish and maintain structure and discipline regarding data and information that will ultimately be consolidated, analyzed and presented through organizational and contractual interfaces in a manner that supports efficient Project execution. *The active involvement and emphasis by Executive Management is critical to establishing the needed focus. The PMOC notes that ST is working to implement basic information-control techniques; however, as of month-end August, the PMOC has not seen evidence that the needed level of focus on detailed review of information flow, content and structure is taking place.*

Basis and Assumptions

The PMOC suggested that the Basis and Assumptions require further development, especially with respect to production rates, resource utilization and constructability. The following evaluations are not evident and call for further discussion and clarification:

- Consistency of sequencing with expected contractor-crewing requirements and adequacy of the physical environment for efficient execution of the work based on expected contracting methods and packaging strategies;
- Logic relative to the constraints of the physical environment on the construction;
- Work efforts of a similar nature that occur concurrently are identified and reasonably sequenced in the schedule to ensure that similar work activities can be accomplished with efficient crew sizing. This will also allow for the assessment of demand versus supply in the skilled-labor marketplace;
- Float at the critical interfaces as well as assumed progress rates are both identifiable and appropriate, and are consistent with physical constraints; and
- Embedded contingencies are identified and assessed as adequate relative to Project duration.

ST presented a further developed schedule as a part of its July 2007 Update. The PMOC has reviewed the July 2007 schedule update and, based on observed progress to date, believes that a review-ready version of the PS Basis and Assumptions could be ready by the late-September-to-early-October timeframe.

Critical Path/Project-Wide Float

The current Critical Path (CP) initiates with the development of the Utility Relocation plans. The CP then transitions to the Capital Hill Station, Systems installation, test and Rail Activation. The current schedule structure provides more than 200 days of float, excluding embedded float at the contractual interfaces. Preliminarily, activities in the current CP generally are reasonable and follow a logical sequence to some degree with the exception of the Capital Hill Station Finish work. Work area segmentation connected with the planned ROW acquisition appears to provide sufficient work area(s) for efficient use of limited resources. The timing of complicated property acquisition is critical to the start of the construction, especially early civil works, i.e., advanced utility relocation and site preparation. During March 2007, ST broke down the ROW process into a substantial level of detail and established proper logic ties to civil construction.

Currently, the work-in-progress MS shows two months of delay for the Revenue Service due to the delay of the completion of FD for Contract U210 – Utilities/Site Preparation that is currently on the Critical Path. ST indicates that negotiation with the FD Consultant is underway to mitigate the delay by accelerating the design process. *This status did not change for the month of July 2007. The PMOC will continue to monitor this perceived anomaly. ST reports that mitigation of FD delay will be reflected in the new baselined PS.*

The PMOC recommends that an in-depth Quality audit of procedural implementation for the U Link Project management reporting be executed within 90 days of full NTP for each of the consultants participating in the U Link FD effort.

ROW Acquisitions

Right-of-way requirements identified during the Preliminary Design phase include a total of 264 parcels currently identified for acquisition: 22 full acquisitions and 242 subsurface (tunnel) easements. As of June 29, 2007, there were 138 required relocations identified in the Capitol Hill Station area. The business relocation that had been anticipated in the Montlake Vent Shaft area no longer is required as a result of the acceptance of a VE initiative that removes the requirement for that structure.

The majority of the full parcel acquisitions (19 parcels) and relocations required are for the Capitol Hill Station and staging area, which has the highest construction priority. Offers have been made on all parcels and acquisition and relocation activities are underway. *As of August 31, 2007, five parcels had closed, one had a signed agreement and two parcels had possession and use with December 2007 trial dates as part of the condemnation process. Of the remaining 11 parcels, condemnation has been filed on nine and condemnation will be filed on at least one additional parcel and most likely two. Thirty-eight of the 138 relocations had been completed as of August 31, 2007. Completion of acquisition and relocation activities in the Capitol Hill Station area is targeted for June 30, 2008.* The PMOC considers the schedule realistic and progress to date is generally consistent with PS requirements, although the progress of condemnation filings and relocations will need to be continually monitored.

The combined impact of a citywide rezoning that increases allowable development in the Neighborhood Commercial zones and a rezoning that increases the height limitation in the Capitol Hill area, both of which became effective in January 2007, is anticipated to increase right-of-way costs for the Capitol Hill Station by about \$11.5 million according to current ST estimates. Since the rezoning occurred after completion of the appraisals for the 19 parcels, ST is anticipating that administrative settlements (or condemnation settlements) will be required for most, if not all, of these parcels. This appears to be a correct assumption based on progress to date.

Remaining property requirements are for the University of Washington Station and tunnels. An intergovernmental agreement has been signed with the University of Washington, including approximately \$20 million in ROW costs as originally budgeted.

According to ST, VE studies have resulted in design changes that create a shallower tunnel approaching the Capitol Hill Station from Downtown, vertically impacting required tunnel easements on 122 parcels. As noted above, this along with the re-zoning in the Capitol Hill Station area will increase ROW acquisition costs for some of these parcels.

Over 200 tunnel easements have been certified by Engineering and are scheduled to go to the ST Board for approval on September 13, 2007. Appraisals will commence immediately following Board approval. Tunnel-easement acquisition activities are scheduled to be complete by September 2008, according to the current PS. Presently, the Schedule appears to allow sufficient time for the required ROW activities. The settlement study for the tunnels, required by the tunnel-easement Appraiser for his valuations, is now in progress and the preliminary findings a CP item.

The maintenance and exchange of cost and schedule information between the U Link Project and the Real Estate function, and the ultimate integration of the real-estate-related information into the PS remains a PMOC concern. The prominence of these concerns will remain until such time as routine maintenance of the project-control data has been demonstrated by individual project as well as Program-wide.

It is the PMOC's opinion that ST should revise both its forecast ROW costs and the ROW Budget as soon as possible since the current forecasts and estimates are no longer an accurate reflection of the estimated final costs. The new forecast should include the impacts of: (a) the Capitol Hill area rezoning (estimated additional cost of \$11.5 million); (b) changes in the depth of the tunnel easements under 122 properties approaching the Capitol Hill Station (ST Appraisal Manager has completed cost estimates for review by Project Controls); and (c) anticipated cost savings from elimination of the Montlake Vent Shaft (\$6.1 million, including the allocated share of administrative costs and contingency according to ST). ST informs the PMOC that updated costs are forthcoming in mid September.

Third Party Agreements:

ST reports that its FD Consultant is working in conjunction with Third Party and Permits staff to develop a comprehensive listing of permits that will be required during FD and construction. *In its June schedule update, ST incorporated a sub-project that addresses the Third-Party Permit Schedule requirements. The PMOC commends ST and its FD Consultant on this effort. The PMOC will review this addition during August 2007.* The PMOC has also suggested that ST continue to retrospectively review the current Third-Party interfaces/relationships on the IS/AL projects for potential lessons learned as these agreements are developed and/or amended to address U Link requirements.

City of Seattle (COS): Currently, ST has developed a term sheet with COS that will form the basis for the sixth supplement to an existing agreement. ST perceives that it maintains a strong, ongoing relationship with COS and that the agreement contains appropriate provisions for future modifications. During November and December 2006, ST worked with the City to further define and document the U Link Project participation by COS. ST staff reports that an agreement with COS was finalized as a supplement to the existing MOU covering City services in support of U-

Link FD through December 2008 and a further supplement has been approved by the ST Board and was scheduled to go before the City Council for further assessment in July 2007. ST and the City have agreed to further postpone finalization of the agreement until a definitive plan for permitting the design and construction of the planned pedestrian overpass near the UW Station.

University of Washington (UW): In its FD request submittal, ST provided a reference to a July 2000 MOA between UW and ST, and recites provisions for the development of future agreements. The reference also indicated that a more specific Agreement was being negotiated and should be available in the July/August 2006 timeframe. During August, ST reported that the Agreement delineating responsibilities relative to the U Link Project was scheduled to go before the ST Board for approval in November 2006. Negotiations were completed for the next in what will be a series of related agreements with the full execution of the Master Implementation Agreement (MIA) July 2007.

Based on its review of the MIA, the PMOC believes that some provisions have significant cost risk potential that will need to be considered in ST's continuing risk assessment and will likely lead to increased Contingency requirements. For example, design coordination requirements include acquiring recommendations from the University staff, the Architectural Commission and Landscape Advisory Committee, and securing final approval from the University Board of Regents. Additionally, the Agreement includes liquidated damage provisions for exceeding technical thresholds as well as construction schedule performance and phased limitations on the staging areas supporting system construction and equipment installation. The PMOC has not seen evidence in the form of a fully developed construction plan demonstrating that the related time restrictions included in the executed MIA are consistent with the demands of the construction program.

In August, ST presented its July 2007 schedule update along with which was presented a document that listed the bases and assumptions of the construction schedule. Also included was a narrative that partially addresses the impact of the UW MIA on the construction planning and duration. However, the PMOC believes that the terms of the MIA also could have significant impact on ST construction and operating costs, and recommends that ST perform an in-depth review of the potential maintenance increases that will likely be required by this Agreement. Follow-on 'Operating Agreements' are anticipated in the MIA and may be required prior to execution of an FFGA.

Value Engineering

ST performed a formal VE review in July 2007 and plans to conduct another in October. The PMOC commends the U Link Project for these efforts. The PMOC has performed a limited review of the VE Report which lists approximately ten VE initiatives that ST intends to pursue. In the PMOC's opinion, several reflect implementation of accepted industry standards and others, while still potentials, are considered to be unlikely for adoption. In general, the PMOC believes that the most viable VE initiatives represent the potential for as much as \$50 million in calculated savings. This is significant and reinforces the basic intent of the VE Program.

Constructability:

Over time, the PMOC has been monitoring ST's activities relative to the Constructability Program and noted that ST was delaying the initiation of the effort. During April 2007, the PMOC reminded ST that, in its letter authorizing the initiation of FD, FTA established a requirement for ST to conduct a complete Constructability Review within 180 days of the date that the letter was issued, implying that the effort should be complete in the early June 2007 timeframe. ST had anticipated that it would have completed Constructability studies and assessments to a degree that will allow for the release of a construction plan developed to a level appropriate for the current phase of the Project by not later than the July/August 2007 timeframe. The PMOC reiterates its position that a well-developed construction plan is an integral element of a complete PE data set. Further, a well-developed construction plan should have been in place to serve as a basis for structuring the Project delivery and contract scoping/package plans, as well as for analyzing the terms of the recently executed MIA with the University of Washington. The PMOC has seen no evidence that the facility for effective evaluation of the terms of the MIA from a construction perspective was in place at the time the Agreement was executed. *As noted earlier in this report, ST has indicated its disagreement with the PMOC's opinion and assessment, but as of month-end August, has provided no information or evidence that would allow for the PMOC to alter its observation.*

In its recent draft PMP, ST has reformulated the U Link organization chart to place the Constructability function beneath a yet-to-be-staffed Construction Manager position. ST has staffed the Constructability function with two of its IS Project Construction Managers. The individuals assigned are also responsible for the completion and closeout of two IS contracts with complex issues that must be resolved prior to contract closure. Although a claim settlement has been reached with the Contractor on one of the subject contracts, it is the PMOC's opinion that closure on these contracts will require a significant level of effort over an extended period. The other individual assigned is the Deputy Construction Manager in charge of the primary critical path tunnel contract on the IS Project. While it is surely desirable for these individuals to participate in the U Link planning and development, in the PMOC's opinion it is clear that they can not and in fact should not dedicate the time necessary to lead this critical project development effort. The U Link staffing plans reflect that one of the individuals will be available no more than twenty percent of their time until the first quarter of 2008, long after the major construction planning effort should have been complete. *In the PMOC's opinion, these issues are deficiencies in the needed technical capability and capacity of the ST organization.*

During April 2007, the PMOC provided ST with reference information that provides guidelines for implementation of a constructability program and has requested that ST provide its Constructability review plan for the U Link Project. Although requests have been made and workshops have been conducted, the PMOC has not seen a plan that depicts what the final products of ST's Constructability Program will be.

As noted in this and prior reports, the FTA's Final Design authorization letter states "...ST must conduct a complete constructability review of the project design leading to the finalization of the project delivery and contract packaging plan within 180 days of this letter." The 180 day time allocation elapsed in the late June 2007 timeframe. Although progress towards completion of

some Constructability tasks is evident, the effort remains to be completed in the form of a consolidated data set reflecting needed analysis.

C. Project Management

The following narrative is intended to provide some historical context and current status of the organizational evolution of ST, the Link Light Rail Department and the U Link Project relating to the current status of the Project and related PMP.

Organization:

During March 2006, ST provided the PMOC and FTA with a briefing that included summary level organization information for the U Link Project. From a functional perspective, the provided organizational charts gave a generally complete view of the Project structure with some exceptions. The PMOC coordinated its observations with Link management and a revised PMP was issued in August 2006 that included additional information relative to staffing. In late September 2006 however, ST announced a reorganization that had material impact on a number of its planning documents, including the SSMP and PMP.

ST reported that the announced reorganization became effective on October 1, 2006. From ST's perspective, the reorganization was designed to result in minimal changes to the Link Light Rail Department. Link's core divisions, Construction Management, Civil Engineering, Systems Engineering, Project Development, Environmental, Community Outreach, and Project Control were planned to remain unchanged. Again from its perspective, the Link Department's functionality would be enhanced with the additions of the Real Estate Acquisition and the Construction Safety programs. Additionally, a more intimate relationship with the Quality function would result, all of which ST perceives could contribute to a more seamless and efficient delivery of services in support of the Light Rail Program and the Link Department would continue to coordinate closely with other Agency departments as required. ST executives stated that future revisions to the Link PMP would reflect the described organizational changes.

In response to the announcement, the PMOC communicated that a note of caution should be exercised with respect to the reorganization until such time as it is clearly defined in a fully developed PMP that includes fully developed staffing plans. Noting its long-standing concerns and observations relative to the adequacy of the Agency's staffing and in particular for the Link Department, the PMOC highlighted that the addition of a greater span of functional responsibility without the application of an appropriate level of resources may not be in the best interests of the federally funded projects. Moreover, dispersing the Safety and Security function served to reduce the focus at the executive level and independence from those responsible for Project performance. The situation is similar for the Quality function, in that the level of independence necessary to maintain proper functional checks and balances can only be assured by a direct reporting relationship outside organizations responsible for Project or operational performance.

The PMOC has commented on the Safety and Security aspects of ST's reorganization previously and in other sections of this report. In summary, the PMOC believed that the reorganization last

Fall and as shown on the January 2007 Organization Charts represented a loss of organizational checks and balances and blurred lines of authority and responsibility. As an example, the December 2006 draft of the U Link SSMP was developed and released by the Agency QA Manager, suggesting that the intent is to add Project Safety and Security to the already full scope of the Agency Quality position. In the PMOC's opinion, the Quality function would have been seriously weakened by adding the extra responsibility of Safety and Security to the existing QA scope, given the current and planned staffing levels. Additionally, the PMOC believes that the independence of the Agency Quality function had been further diluted by the organizational alignment that placed it in a position of reporting to an organizational element with primary responsibility for Project performance. In summary, the independence necessary to maintain proper checks and balances from the Quality perspective was compromised by placing it within the Link organization. True independence for the Agency QA function can only be assured by a direct reporting relationship to the ST Executive branch, outside the organizational units that are responsible for performance. While understanding the desire to limit the span of control at the executive level as stated in the organizational announcement, the PMOC cautioned that driving a broadened span of control deeper into the organization would not achieve the balance necessary for functional effectiveness from a Quality Assurance perspective. Further, placing the QA function within the Link organization limits the benefits that should be derived across the Agency. A true commitment to Quality would be evidenced by routine audits, reviews and surveillance of all Agency functions to include its internal operations such as Contract Administration, Transit Service Delivery and other Capital Projects activity. It is clear from the staffing plans provided that any Quality Management activity outside the Link organization would be severely limited in that only two-tenths of the Agency's Quality Assurance Manager's time would be available for activity outside the Link organization. In the PMOC's opinion and given the structure as described, the necessary scope, independence and authority to effectively perform the Agency-wide or Project-focused Quality function was not evident in the U Link PMP and combined Agency reports.

The above concerns appeared to have been largely mitigated by ST's announced reorganization of the Safety, Security, and Quality Assurance (SSQA) functions, discussed above, into a single organizational unit under a Director-level manager who reports to the CEO. In the PMOC's opinion, this would be a significant step in the direction of solving the problems described above. Big steps still to be taken include searching for and recruiting the unit manager, and then adequately staffing the Safety, Security, and Quality functions to provide the required level of management and oversight of the UL Project as well as the other ST projects and operations. While ST announced the new SSQA organization, the intent appeared to be to wait until the new SSQA Senior Manager is recruited before moving very far from the status quo. The PMOC urged ST to begin centralization of SSQA as soon as possible, with use of a temporary SSQA Manager or consultant if necessary. From the CEO's decision to increase Safety staff to more closely oversee rail activation on the IS, it appeared that ST would not delay making changes that it deems needed until arrival of the SSQA Director. The PMOC was encouraged by this more timely action and suggested that consideration be given to early retention of staff to oversee (a) the quality of Safety and Security input into UL design, (b) the required Hazard Threat and Vulnerability Analyses, and (c) design safety and security certification. Such individuals would also be extremely beneficial in the needed revision of the outdated Construction Safety Manual into a Comprehensive Construction Safety and Security Manual,

and to provide needed language for contract specifications, including identification of needed Special Provisions for Safety and Security on the individual bid for the UL Project.

Over the past two months, there appear to have been setbacks in the move to improve Safety, Security and Quality. ST held interviews in July for a manager to head up the new SSQA organization with the goal of having the candidate begin work by the end of August. As of the end of August, the position has not been filled. In August, the ST Safety Manager, who had responsibility for oversight of Testing and Start-up Safety, has been reassigned away from any Central Link Safety responsibilities. Independent Safety oversight has been eliminated from the projects. The individual responsible for Construction Safety reports within the Link construction organization. The newly hired individual with Safety responsibility for Testing and Start-up reports to the Rail Activation Manager. To the PMOC's knowledge, no Safety person has oversight responsibility for UL design. To cause further concern, agreements reached over a month of negotiation with ST Safety staff, representing the CEO as discussed at a June meeting with the FTA, on a Corrective Action Plan (CAP) to address deficiencies identified in the PMOC Safety and Security Assessment Spot Report, were negated by ST in late July 2007. After meeting in early August with the Link Executive Director, the PMOC presented a revised CAP proposal in mid-August, asking for discussion and resolution. The PMOC contacted the Link Executive Director and was able to establish a meeting date (September 6, 2007). The PMOC remains hopeful that ST senior management will recognize the need to seriously address deficiencies in Safety and Security oversight, and agree to a viable CAP. The next major requirement is an individual to manage the consolidated independent SSQA organization before the end of September. ST has indicated that it is negotiating with a candidate to fill the SSQA leadership position.

In June 2007, ST issued a revised draft PMP for the U Link Project; however, the document was incomplete in that it did not include a Staffing Plan. ST issued a Staffing Plan in July 2007 and the PMOC is now evaluating its content.

Project Staffing:

In its December 5, 2005 letter authorizing entry into Preliminary Engineering, the FTA instructed ST to develop staffing plans that depict the Agency's resource plan for the conduct of its temporally overlapping projects. After several iterations, ST issued a revision to the U Link and IS PMPs, and staffing information for the projects during August 2006. The information was evaluated on a limited basis as part of the Final Design Readiness Assessment and although further revision was required to be fully consistent with FTA's Guidelines, it was found to be generally acceptable as a basis for FTA to allow advancement of the U Link Project. However, as mentioned previously, ST announced a reorganization that had material impact on the content of the August 2006 and February 2007 version of the PMP and a revision was required.

The October 2006 through July 2007 Agency Progress Reports include summary level plan-versus-actual staffing information and some limited summary level narrative. Based on the information provided, staff hours charged to the U Link Project remained significantly behind plan. *The Agency Progress Reports indicate a planned combined staffing level for the U Link Project of 118.8 full-time equivalents (FTEs) versus an actual FTE level of 94.1. ST's revised*

planning submitted in July to support the U Link PMP indicated that the staffing for the U Link Project would increase to 118.0 FTEs for the month of June 2007. The PMOC's opinion that an increase of 40 FTEs charging to the Project, although possible, was highly unlikely as borne out and material delays in the U Link Final Design Program would become evident.

The Cost Performance Indices (or Indicator, CPI) is a measure of Actual Cost versus an evaluation of the Value of Work Performed, or Earned Value (EV). Likewise, a Schedule Performance Index (or Indicator, SPI) is a measure of work performed against the plan. A CPI with a value of less than one indicates the potential for a cost overrun and a like SPI would indicate schedule slippage. For July 2007, ST reports a cumulative and incremental CPI of 1.04 and 0.99, respectively. The cumulative and incremental SPI are reported as 0.68 and 0.55, respectively. The PMOC views the SPI information and its incremental reviews of monthly schedule updates as evidence supporting their opinion with respect to schedule delays being incurred. ST has indicated that the report information is skewed by virtue of design activities, such as the elimination of the Montlake Vent Shaft, that have not been removed from the performance baseline nor addressed in the report narrative. The PMOC suggests that ST must expend the resources necessary to assure the timely maintenance of Planning, Baseline Budgets and current Forecast information to assure the accuracy and relevance of management information provided as a basis for decision making and monthly reporting to the FTA.

The PMOC's cursory review of the staffing plans provided in support of the June 2007 draft U Link PMP in conjunction with recent management reports again leaves questions with respect to the plans' adequacy and ST's intent to actually pursue the published Plan. For example, in addition to the FTE data referenced above, and as it was with the prior version, the Staffing Plan in the U Link PMP indicates a full-time dedicated Quality Manager position for the U Link Project, beginning in October of 2007. In fact, as of the end of August 2007, ST has not initiated recruitment for this position and it is identified as being "on hold" in ST's most recent Staffing Summary Report. Another position in the Quality organization that is responsible for the Safety Certification of the IS/AL, clearly a full-time requirement over the next several years, is planned as a shared resource split between the IS/AL and U Link projects. A third-but-not-final example is that the individuals slated on the U Link organization chart, apparently to carry-out the Constructability effort, are planned to charge only ten percent of their time to this critical effort from July through September 2007. FTA's Final Design authorization letter indicated that this effort should have been completed by early June 2007. As stated in prior reports, some of the resources depicted in the organization charts and staffing plans for the U Link Project are fully involved in critical and intensive activities that should receive their full attention on the IS Project and will likely not be able to give the needed focus to the U Link Project, in general, and the Constructability effort in specific terms. In its preliminary review of the Staffing Plan, the PMOC has identified at least one structural error in the spreadsheet supporting the U Link Staffing Plan for the remainder of 2007. The PMOC recommends that ST audit the spreadsheet model to assure its accuracy.

D. Quality

Final Design (FD)

In recent discussions, ST's Quality Assurance staff has indicated that it is working with the Link Design organization in developing Engineering Procedures to define requirements for the conduct and product content that result from the U Link FD effort. The PMOC fully supports and commends ST on the initiation of this effort as the completed procedures should provide a framework for the definition of the FD activities and responsibilities. Early in 2007, ST had reported that the procedure development was complete; *however the PMOC has not seen evidence that this has been finalized.* In the PMOC's opinion, the most critical procedures that should be available to the FD Consultant are those that will govern the development of the basic Design documents (calculations, specifications and drawings), Design-checking requirements (inter, intra and interface), and the Design-review process. These should ensure a closed-loop system for resolution of all comments generated throughout the evolution of the complete system design. PMOC had recommended that ST make certain that the procedures covering these functions were available prior to identification of the selected consultant firm, particularly to support the Development Consultant's cost proposal and provide reinforcement for the ensuing negotiations. *In its monitoring of ST activities, the PMOC noted that the Engineering Procedures were to have been addressed at the Change Control Board (CCB) during August. ST has indicated that the Procedures will be approved by the CCB in September 2007.*

ST reports that full NTP was given to the Facilities FD Consultant in late December 2006 and the Systems Consultant in April 2007. The scope includes the development of the Consultant's Quality Plan which has been received and accepted. The PMOC has received a copy and will review it for consistency with ST plans and procedures when they are finalized. In that these procedures would form some of the basic elements for Quality-related assessment of the engineering/design program for the U Link Project, it is an increasing concern that the FD Consultant contracts have been in place for more than *seven and three months*, respectively, and that ST's Engineering Procedures, apparently, are yet to be finalized.

E. Safety and Security

The FTA requires that the Project approach to and management of Safety and Security be detailed in a Project-specific Safety and Security Management Plan (SSMP). *Requirements were initially provided in a January 2002 set of draft guidelines and later detailed in a Proposed Circular that appeared in the October 11, 2006 Federal Register.* An acceptable SSMP is a requirement for entry into PE, an updated SSMP is a requirement for entry into FD, and again, for issuance of an FFGA. The SSMP should be updated by grantees as required during construction, testing and start-up, but the FTA may also require formal revisions to be submitted during construction and for the onset of testing and start-up. The PMOC preliminarily reviewed a December 2005 version of the UL SSMP and found that it did not meet the then FTA requirements. A formal review was done in June 2006 and a detailed comment memo was provided to ST. *A consultant-generated revised draft SSMP was received in September 2006 and returned with comments.* The departure of the Safety and Security Manager in October and the dispersing of the function to several areas within the Agency further delayed generation of a revised SSMP. While the organization was in flux, the QA Manager developed a revision of the SSMP, identified as Draft A and dated November 8, 2006. *The PMOC reviewed Draft A and found it required further revision before it would comply with FTA requirements.* The QA Manager provided an electronic copy of Draft Rev 0 of the UL SSMP, dated December 7, 2006,

in early December and the PMOC provided extensive comments and revisions on the electronic copy in January 2007, along with a checklist that ST could use to verify that the revised SSMP had all FTA-required content before re-submitting for review. SSMP Revision 0.1, dated March 14, 2007, was received and the PMOC's review found that many of the suggested edits and comments made by the PMOC on the previous revision were appropriately addressed, but many others were not. The PMOC returned a marked copy of the SSMP to indicate areas requiring correction, clarification, improvement, or addition and discussed these with the QAM on April 4, 2007, along with another copy of the compliance checklist for ST's use in verifying that the next revision of the UL SSMP has appropriate content before they submit it for review. A revised U Link SSMP was received on June 4, 2007, still identified as Revision 0, but dated May 2007. The PMOC provided comments on UL SSMP Rev 0 to ST in a memo dated July 6, 2007, which included an annotated copy of the submitted SSMP. The PMOC met with the U Link Project Director on July 10 to discuss the comments. The PMOC then received and reviewed a draft of SSMP Revision 1 and provided comments to ST. *The final SSMP Revision 1, dated July 31, 2007, was reviewed by the PMOC in early August and found to be in full compliance with FTA requirements for the FD phase of the Project, as stated in the PMOC's related Memorandum dated August 7, 2007.*

Changes in ST's Safety and Security organizational structure in late 2006 resulted in having no Safety professional assigned to participate in oversight of FD and it was not clear who would have responsibility for identifying and resolving potential hazards. The QA Manager has responsibility for Safety and Security certification of FD, but input and monitoring by a competent Safety professional, independent of the designer, was needed. The PMOC strongly urged ST to, as soon as possible, finalize its reorganization in a manner that provides a strong, independent Safety (or Safety and Security) Department that could provide the needed degree of independent oversight of both Capital Projects and ST Operations. As indicated earlier in this report, the PMOC received copies of the revised ST Organization Charts, signed by the CEO on January 11, 2007. The revised organization did not provide the hoped for strong safety and security presence. This issue was addressed in the PMOC's assessment of ST safety and security management, which was provided to ST by the FTA in late May and discussed in June, as noted above. Also, as indicated previously, ST's announced reorganization of the Safety, Security, and Quality Assurance functions into a single organizational unit under a senior-level manager who reports to the CEO was welcome. This move is supported by the PMOC and represents an important step to begin addressing the Safety and Security needs of the Agency and the UL Project. *As indicated above, however, through the end of August, ST has not yet formed the organization or identified anyone to lead it, much less begun filling the organization with staff professionals who can provide the required level of management and oversight of the UL Project. ST has committed to filling the SSQA leadership position during September 2007.*

F. Environmental

Attachment C of the June 2006 Record of Decision for the North Link is a Summary of Required Mitigation Measures. During FD, ST must see that the very general Construction Mitigation Requirements outlined in the above-referenced Summary are translated into specific requirements for incorporation into the construction, equipment and services contracts for the U Link Project. In its summary review of the RFP for FD services, the PMOC was unable to

verify the specific delineation of this task. The PMOC suggested that ST take the appropriate steps to ensure that this task is properly established in the contract scope for FD services. ST has indicated that it is addressing this subject with the selected Design Consultant as part of the negotiations process. The PMOC has reviewed elements of the conformed facilities FD consultant contract and found that the ROD and subordinate documents are referenced.

G. Issues/Areas of Concern

At this time, there are four primary concerns as follows:

- Cost and Schedule Reporting: The PMOC is concerned that while the VE savings have been incorporated in a timely manner, known forecast changes to Real Estate costs have yet to be reflected. ST Project Controls has indicated that the updated forecast would be issued in July. *Forecast changes were implemented, although it is unclear whether all known issues have been addressed in the changes.*

On a cumulative basis, ST shows a cumulative CPI of more than 1.0 as of month-end July, reflecting a continuing trend of better-than-planned cost performance for its Facilities Design Consultant. *However, the cumulative SPI for the corresponding timeframe is less than 0.7, reflecting schedule performance that is significantly less than planned.* During May and June, the PMOC met with ST and its Consultant's Project Controls representatives. In those meetings, the Project Controls personnel indicated that the Performance Baseline for cost and schedule had been developed in a manner that generally tied budget, schedule and performance measurement to planned deliverables, consistent with good industry practice. This is important in that performance or EV is generally tied to or based on tangible work products or deliverables versus how many hours were consumed or money was spent without relationship to work product. *Based on discussions with the Project Controls staff, the PMOC understands that ST is aware that the risk of delays in the FD program is increasing and has requested that the Consultant produce a recovery plan.*

The PMOC appreciates and commends ST's efforts to implement a more systematic and effective Project Controls system. However, as stated in its previous reports, the PMOC suggests that continuation of trends for more than three consecutive months or determination of cumulative indices of less than 0.85 should trigger an in-depth progress and budget review along with the development of a mitigation strategy. Earned Value Analysis literature is rife with case studies that indicate the difficulties in attempting to recover lost ground beyond 15% completion of the project. Currently the U Link FD is—or should have been—at the 15% completion stage. Trends in CPI and SPI indicate that unless proactive measures, such as top-down review of the staffing and its productivity are taken soon, there is danger that the current FD costs and schedule impacts will become unrecoverable. As an added suggestion, the PMOC believes that anomalies in EV information should be routinely and fully investigated, reconciled and/or normalized monthly in advance of report publication.

- Staffing levels to properly support the U Link Project. The PMOC continues to be concerned based on its long-held opinion that the Link Department staffing plans do not

include an adequate number of appropriately qualified personnel dedicated to the Project. *The reported staffing level does not appear to meet newly established plans, further heightening the PMOC's concern.*

- The lack of an acceptable PMP. The PMOC recognizes ST's effort in preparing the U Link PMP. ST issued Rev. 0.2 of the 'Preliminary Release' version of the U Link PMP along with additional staffing information. These *were* reviewed as part of the U Link FD Readiness Assessment. However, ST recently announced a reorganization that has a direct impact on the content of the PMP. Without a current PMP, it will be difficult for the PMOC to fully and adequately assess the technical capability and capacity of the organization. *As noted above, the PMOC notes that its cursory review of the most recent draft submittal did not include the required Staffing Plan. Additionally, the provided organization charts appear to be incomplete in that the current Agency and Link Department organization charts that reflect current personnel assignments and allocation of functional versus Project responsibility have not been made available.*
- The delay in performance of Constructability Review activities for UL during the PE. This is a concern as it is essential to validate PE design assumptions that form the foundation of FD. This effort should serve to support the development of the proposed Design Schedule and to properly coordinate and sequence the U Link FD and Construction Schedule. ST has stated its intent to conduct Constructability activities as part of the FD Consultant's early work activities. Reportedly, this effort is being initiated. However, significant actions have taken place that in part should have been supported by a thoroughly conducted Constructability Review—most importantly, the execution of the MIA with the University of Washington. The PMOC continues to be concerned with ST's apparent penchant for performing critical Project activities seemingly out of logical sequence.
- Changes in ST's Safety and Security organizational structure. This has apparently resulted in having no Safety professional assigned to participate in oversight of FD. The PMOC *recommended* that ST finalize its reorganization quickly and provide a strong, independent Safety and Security oversight of U Link Final Design. *This was not done in the final reorganization signed by the CEO on January 11, 2007, which did not provide for a strong, independent Safety and Security oversight of U Link Final Design. As indicated earlier, this was being addressed by reorganization of the Safety and Security, as well as Quality, functions into a single unit reporting directly to the CEO. Centralization and retention of a Senior Manager of SSQA will not be enough, however. Adequate staff to perform all needed Safety, Security, and QA functions under the new manager's leadership is also needed. As described above, it appears that ST action to recruit an SSQA head has been delayed and the reassignment of personnel has led to a loss of independent Safety oversight for the IS Project as well as a lack of independent Safety oversight of the UL design. ST has committed to filling the SSQA position in September 2007.*

ATTACHMENT B: SUMMARY OF CONCERNS AND RECOMMENDATIONS

ITEM NO. KEY

- 1.XX** *Technical Capability and Capacity*
- 2.XX** *Program and Project Management Plans*
- 3.XX** *Project Development and Implementation*

PRIORITY (PR)

GRANTEE ACTION

PMOC STATUS

- | | | |
|---------------------------|--------------------------------------|---|
| <i>1 – Most Critical</i> | <i>D – Remedial Action Developed</i> | <i>R – Review On-going</i> |
| <i>2 – Critical</i> | <i>A – Remedial Action Approved</i> | <i>C – Completed – No further review required</i> |
| <i>3 – Least Critical</i> | <i>I – Action Implemented</i> | |

CATEGORY OF CONCERN

- | | |
|--------------------------------------|-------------------------------|
| <u><i>S – SCOPE</i></u> | <u><i>B – BUDGET/COST</i></u> |
| <u><i>SC – SCHEDULE</i></u> | <u><i>Q – QUALITY</i></u> |
| <u><i>SS – SAFETY/SECURITY</i></u> | <u><i>F - FFGA</i></u> |
| <u><i>TC -TECHNICAL CAPACITY</i></u> | <u><i>M - MANAGEMENT</i></u> |

<u>PR</u>	<u>ITEM NO.</u>	<u>IDENTIFICATION</u>	<u>Category</u>	<u>NATURE OF CONCERN</u>	<u>PMO RECOMMENDATION</u>	<u>D</u>	<u>A</u>	<u>I</u>	<u>STATUS</u>
1	12/06	Lack of an acceptable PMP and SSMP	S, B, SC, M	Rev. 0.2 of the 'Preliminary Release' version of the U Link PMP was reviewed as part of the U Link Final Design Readiness Assessment, but ST recently announced a reorganization that has a direct impact on the content of the PMP. Without a current PMP, it will be difficult for the PMOC to fully and adequately assess the technical capability and capacity of the organization.	ST should revise the PMP and SSMP as soon as possible to reflect the changes from reorganization. <i>In an August 7, 2007, memorandum, the PMOC found that SSMP Revision 1, dated July 31, 2007, was acceptable for the FD stage of the Project. A re-submission will be required with the FFGA application. The PMP remains under development.</i>	Y	Y	N	R

Legend: Grantee Action: D = Remedial Action Developed; A = Remedial Action Approved; I = Remedial Action Implemented.
PMO Contractor Status: R = Review Ongoing; C = Completed, No Further Review Required.