M E M O R A N D U M

DATE: April 27, 2005

TO: Mr. Kim C. Traver

FROM: John Lackey, P.E.

SUBJECT: O&M Cost Breakdown

PROJECT: Spokane Light Rail Project

PROJECT NO: STAA0000-0002

COPIES: Dick Wall, Kerri Olson

SUMMARY

The following is a summary of the O&M (Operations and Maintenance) costs, and operational details. These were based on the alternatives, as listed DEIS Chapter 2, dated 10/01/04, with the design criteria shown in the tables for each alternative.

The details in this memo are identical to those presented to the Spokane Regional Light Rail Steering Committee on March 3, 2005.

Alignment / Route		Separate Track to Liberty Lake	Shared Track to Liberty Lake	BRT to Liberty Lake		MOS to University City BRT to Liberty Lake	
				via Sprague	via Trent		
Alignment / Train / BRT Operational Details	Alternative	LRT Electric	LRT Diesel	n/a	n/a	LRT Diesel	BRT
	Headway - Minutes	10	15	15	15	15	15
	Time per Trip - Minutes	36	37	43	46	22	25
	Number of Vehicles / Train	2	2	n/a	n/a	1	1
	Total Procured Vehicles	22	15	9	10	6	5
	Alignment - Miles	16.1	15.5	15.5	16	7.9	
	Way Maintenance - Miles	32.8	20	n/a	n/a	9.1	n/a
	Revenue Vehicle Hours per Year	70,577	52,474	38,165	41,480	15,600	20,948
Total O & M Costs / Year (Millions 2004$)		$16.6	$10.3	$3.7	$4.0	$3.8	$2.0

COST BACKGROUND

BRT and Light Rail O&M Costs unit costs were generated from different sources.

BRT unit costs were based on STA (Spokane Transit Authority) actual costs per RVH (Revenue Vehicle Hour) for buses currently in service with STA.

Light rail unit costs were based on APTA (American Public Transportation Association) published unit costs. unit costs for both options were inflated to provide an estimate for total O&M costs for 2004.

Bus Rapid Transit (BRT)

Costs were based on the following:

- STA unit costs provided for STA bus operations - per RVH (Revenue Vehicle Hour)
- General & Administrative Costs - these were included in the STA unit cost
- Assumes BRT vehicles cost 10% more to operate/maintain.
  This was an estimated added premium to operate and maintain vehicles, which are more expensive to purchase and more complex to maintain than regular buses currently being operated by STA.
  It should be noted that there is not a great deal of industry information on actual BRT costs since there is little BRT operational history published.

- No Other Contingency included

Light Rail Transit (LRT)

Light rail costs were based on the following:

- APTA published data - this was deemed to be the most comprehensive unit cost breakdown for light rail costs.
  Unit costs were developed for:
  - Transportation - per RVH (Revenue Vehicle Hour)
  - Equipment Maintenance - per Light Rail Vehicle
  - Maintenance of way - per single track mile

- Unit costs developed for 2004 dollars
- Maintenance of way allowance reduced for DMU (no catanary, etc.)
- General & Administrative Costs - added as % of total
- Contingency (20%) added

Notes: The overall costs compared favorably with other cities when labor costs for Spokane were included. No cost premium was added for using single car trains since it was deemed to be included in the APTA unit costs.

Headways

Separate Track Light Rail (Electric)

Mon – Sat	5.00 am to 7.00 am	30 Minutes
	7.00 am to 8.00 pm	10 Minutes
	8.00 pm to 11.00 pm	30 Minutes
Sunday	5.00 am to 11.00 pm	30 Minutes

All Other Alternatives (Light Rail & BRT)

Mon – Sat	5.00 am to 7.00 am	30 Minutes
	7.00 am to 8.00 pm	15 Minutes
	8.00 pm to 11.00 pm	30 Minutes
Sunday	5.00 am to 11.00 pm	30 Minutes

Operational Details for the Alternatives

The analysis was based on DEIS Chapter 2 - dated 10/01/04, with the design criteria outlined in the table for each alternative.

Separate Track

The Separate Track Light Rail Transit (LRT) Alternative would operate at the frequency of operations shown below and would provide passenger rail service between The Plaza Transit Center in downtown Spokane and the Liberty Lake Transit Center (Molter Rd), over a route 16.4 miles long. Travel time between The Plaza and Liberty Lake Transit Center would be an estimated 36 minutes.

Shared Track

The Shared Track LRT Alternative would operate at the frequency of operations shown below and provide passenger rail service between The Plaza in downtown Spokane and the Liberty Lake Transit Center (Signal Rd), over a route of 15.5 miles. It is a scaled-back version of the Separate Track LRT Alternative described above. Travel time between The Plaza and Liberty Lake Transit Center would be an estimated 37 minutes, under existing conditions.

O&M COSTS AND DETAILS ON ALTERNATIVES

1) LRT Separate Track (Electric) and Shared Track (Diesel)

The analysis was based on DEIS with the design criteria outlined below for each alternative.

ALTERNATIVE		LRT Electric SEPARATE Track (Molter Rd)	LRT Diesel SHARED Track (Signal Rd)
Alignment / Train Operational Details	Headway - Minutes	10	15
	Time per Trip - Minutes	36	37
	Number of Vehicles / Train	2	2
	Total Number of Procured Vehicles	22	15
	Alignment - Miles	16.1	15.5
	Way Maintenance - Miles	32.8	20
	Revenue Vehicle Hours per Year	70,577	52,474
Total O & M Costs / Year (Millions 2004$)		$16.6	$10.3

2) BRT (Bus Rapid Transit)

The BRT Alternative would operate on either the Sprague or Trent routes based on the design criteria shown.

3) MOS

The MOS Alternative includes the MOS (LRT Diesel) from Spokane to University City with continued service using BRT from University City to Liberty Lake.

Alignment / Train / BRT Operational Details	ALTERNATIVE	LRT Diesel	BRT
	Headway - Minutes	15	
	Number of Vehicles / Train	1	n/a
	Total Number of Procured Vehicles	6	5
	Alignment - Miles	7.9	8.5
	Way Maintenance - Miles	9.1	n/a
	Revenue Vehicle Hours per Year	15,600	20,948
Total O & M Costs / Year (Millions 2004$)		$3.8	$2.0

4) Single Track Alternatives

While single car trains were not identified, specifically as a line item in the DEIS, single track alternatives were also analyzed as options from Spokane to University City and from Spokane to Liberty Lake. The single-track option is similar to the shared track option with single car trains, smaller stations and fewer miles of passing track.

DESTINATION		University City	Liberty Lake
Alignment / Train / BRT Operational Details	Train:	LRT Diesel	
	Headway - Minutes	15	
	Time per Trip - Minutes	22	37
	Number of Vehicles / Train	1	1
	Total Number of Procured Vehicles	6	8
	Alignment - Miles	7.9	15.5
	Way Maintenance - Miles	9.1	16.9
	Revenue Vehicle Hours per Year	15,600	26,237
Total O & M Costs / Year (Millions 2004$)		$3.8	$6.2