

**City and County of San Francisco
Municipal Transportation Agency
One South Van Ness 7th Floor
San Francisco, California 94107**

**Amendment Two to
Agreement between the City and County of San Francisco and
AnsaldoBreda Inc.
LRV Doors and Steps Reconditioning and Systems Rehabilitation**

This Amendment is made this 23rd day of OCTOBER, 2014, in the City and County of San Francisco, State of California, by and between: AnsaldoBreda Inc., a Delaware corporation ("Contractor"), and the City and County of San Francisco, a municipal corporation ("City"), acting by and through its Municipal Transportation Agency ("SFMTA") (collectively, the "Parties").

Recitals

A. On or about October 29, 2009, City and Contractor entered into Contract No. APT 591-01 for reconditioning the doors and steps and rehabilitating systems in 143 of SFMTA's light rail vehicles ("Contract" or "Agreement").

B. On June 2, 2010, City and Contractor entered into Amendment One to Agreement to rehabilitate 34 car sets of trucks.

C. The Parties wish to amend the Contract to remove the doors and steps and air supply unit scope of work from the Contract, eliminate the maintenance training requirement, alter the spare parts requirements, and rehabilitate 41 additional car sets of trucks with options for up to 71 more, and extend the term of the Contract by 11 months to allow for extra work and procurement of parts required to perform the work.

NOW, THEREFORE, Contractor and the City agree as follows:

1. Section 2 of Agreement (Term of the Agreement) is amended to read as follows:

2. Term of the Agreement

Subject to Section 1, this Agreement shall commence on the Effective Date and terminate no later than October 31, 2018 (should all Options be exercised as provided in Section 70).

2. Section 5.1 (Amount of Contract) is deleted and replaced with the following:

5. Compensation

5.1 **Amount of Contract.** In no event shall the amount of this Agreement exceed Seventy-Four Million, Six Hundred Forty-Nine Thousand, Six Hundred Fourteen Dollars (\$74,649,614).

3. Section 66.1 (Delivery Rate) is amended to read as follows:

66.1 **Delivery Rate.** Vehicle deliveries shall be in accordance with the Project Delivery Schedule (Exhibit B). SFMTA cannot have more than five LRVs out of service at any one time for rehabilitation work and related activities, including pre-inspection, transit, rehabilitation, testing or commissioning. Option deliveries shall be in accordance with the

Project Delivery Schedule (Exhibit B). SFMTA cannot have more than five sets of trucks out of service at any one time for rehabilitation work and related activities, including pre-inspection, transit, or rehabilitation.

4. A new Section 70 is added to the Agreement to read as follows:

70. Options for Rehabilitation of Additional Trucks

At the option of the City, Contractor shall perform rehabilitation of additional trucks (See Options 1, 2 and 3, Items 2.3, 2.4 and 2.5 on the Payment Schedule - Exhibit C). Exercise of these options is subject to availability of funds, as certified by the Controller, and is within the sole and exclusive discretion of the Director of Transportation.

5. Exhibit B of the Agreement is deleted and replaced by a new Exhibit B, attached to this Amendment and incorporated by reference as though fully set forth.

6. Exhibit C of the Agreement is deleted and replaced by a new Exhibit C, attached to this Amendment and incorporated by reference as though fully set forth.

7. The Technical Specifications are amended to replace Section TP05M1 (Truck and Suspension Systems) with a new Section TP05M1 (Truck and Suspension Systems), which is attached to this Amendment and incorporated by reference as though fully set forth.

8. Contractor acknowledges and agrees that the amounts agreed for the work described above, and/or the extension of time granted herein, with or without cost, shall be full accord and satisfaction for all past, current and prospective costs incurred in connection with Contractor's performance of all work under the contract up to and including the work covered under this Amendment Two, without limitation. Said costs may include, but are not limited to, costs for labor, materials, equipment, disruption, lost productivity, escalation, delay, extended overhead, administration and extended performance time. Contractor releases the City from all claims for which full accord and satisfaction is hereby made, as set forth above.

9. **Effective Date.** Each of the modifications set forth above shall be effective on and after all parties have signed the Amendment.

10. **Legal Effect.** Except as expressly modified by this Amendment, all of the terms and conditions of the Agreement shall remain unchanged and in full force and effect.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the day first mentioned above.

CITY

CONTRACTOR

Municipal Transportation Agency

AnsaldoBreda Inc.



Edward D. Reiskin
Director of Transportation



Municipal Transportation Agency

Mauro Melani

Board of Directors

General Manager

Resolution No. 14-134

1461 Loveridge Road

Dated: 8-19-14

Pittsburg, CA 94565


Attest: 

Roberta Boomer, Secretary

City vendor number: 41208

Approved as to Form:

Dennis J. Herrera
City Attorney

By 

Robin M. Reitzes
Deputy City Attorney

Board of Supervisors

Resolution No. 382-14

Dated: 10-15-2014

Attest: 

Angela Calvillo, Clerk of the Board

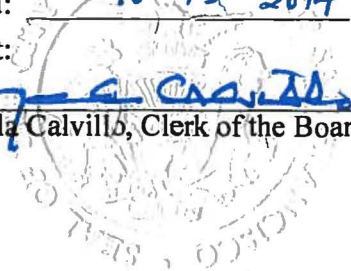


EXHIBIT B
PROJECT DELIVERY SCHEDULE

Delivery of 143 Rehabilitated Light Rail Vehicles and Associated Deliverables

DELIVERY MILESTONE	No. of Days	AFTER NTP
a. Acceptance of Management Work Plan, Master Baseline Schedule	+30	30 days
b. Delivery of Pilot LRV ready for acceptance testing no later than	+150	180 days
c. Delivery of successful testing and Conditional Acceptance of the Pilot Car no later than	+30	210 days
d. Completion of successful testing and Conditional Acceptance of Second car	+60	270 days
e. Completion of successful testing and Conditional Acceptance of 143 rd car	+1341	1611 days
f. Option 1	+170	1781 days
g. Option 2	+170	1951 days
h. Option 3	+170	2121 days

Milestone requirements are detailed in Section 67 of the Contract and in Section TP01.08 of the Technical Provisions.

Note: 231 working days (*i.e.*, 11 months) have been added to the Schedule for the extra work (transom joint work) and for procurement of parts, including long-lead items, required to perform the work under Amendment Two. The new completion date for the Contract (without options) is October 18, 2016. Each Option has time added for the extra work and for procurement of materials. The completion date for Option 1 is June 18, 2017; the completion date for Option 2 is February 18, 2018; and the completion date for Option 3 is October 18, 2018.

**EXHIBIT C
PRICE SCHEDULE**

FOR SFMTA REHABILITATION OF IDENTIFIED SUBSYSTEMS FOR 143 LRVs

Item No.	Description	Qty.	Unit Price	Total Price
1.1	Rehabilitated couplers (electrical and mechanical) complete assembly (A)	143	\$53,500	\$7,650,500
1.2	Rehabilitated doors and steps complete assembly (B)	86	\$203,963	\$17,540,818
1.3	Replacement PSC-2 Wiring Harness (C)	143	\$6,860	\$980,980
1.4	Re-designed new articulation wiring and harnesses complete assembly (D)	143	\$37,306	\$5,334,758
1.5	Rehabilitated air supply units complete assembly (E)	86	\$24,003	\$2,064,258
1.6	Replacement of Center Pins and Traction Motor Bearings (F)	143	\$11,210	\$1,603,030
1.7	Program Management, Engineering, QA Support (G)	1	\$2,813,410	\$2,813,410
Subtotal of Item 1 – Rehabilitation of Couplers, Air Supply Units, Doors and Steps, Articulation Wiring and harnesses for 143 LRVs, CDRLs, Transport of Vehicle to Contractor facility and return to SFMTA facility, Site Support & Warranty				\$37,987,754
2.1	Rehabilitate Motored and Non-Motored Trucks of the LRVs	34	\$334,223	\$11,363,582
2.2	Rehabilitate Motored and Non-Motored Trucks of the LRVs	41	\$365,848	\$14,999,768
Subtotal of Item 2 – Rehabilitation of Motored and Non-Motored Trucks				\$26,363,350
3.1	Re-designed new articulation wiring and harness: a. Jumper Cables b. Bulkhead Connectors c. Articulation Wiring Spares	10	\$21,871	\$218,710
3.2	Gearbox Spares (Axle Quill assembly)	29	\$113	\$3,277
3.3	Gearbox Spares (117 Teeth Gear)	29	\$3,518	\$102,022
3.4	Gearbox Spares (Pinion Shaft)	29	\$1,192	\$34,568
3.5	Brake Caliper Spares (Large Lever Arm)	151	\$626	\$94,526
3.6	Brake Caliper Spares (Complete Caliper)	18	\$15,501	\$279,018
3.7	Coupler Spares (Complete Coupler)	4	\$128,779	\$515,116

Item No.	Description	Qty.	Unit Price	Total Price
3.8	Coupler Spares (Pneumatic Hoses)	116	\$452	\$52,432
3.9	Coupler Spares (Bridge)	205	\$3,696	\$757,680
3.10	Traction Motor Spares (Fan)	10	\$1,180	\$11,800
3.11	Traction Motor Spares (Speed Sensors)	25	\$709	\$17,725
Subtotal of Item 3 - Spares				\$2,086,874
4.	Allowance for latent or unforeseen mechanical conditions			\$2,250,000
5.	Sales tax on materials (reimbursable)			\$3,810,593
6.	Termination Costs (cost of parts remaining in inventory and on order due to reduction of doors and steps quantity from 143 to 86 – a list of said parts is attached as Exhibit C-1)			\$1,957,831
7	Termination Costs (cost of parts remaining in inventory and on order due to reduction of air supply units quantity from 143 to 86 – a list of said parts is attached as Exhibit C-2)			\$193,212
Contract Total (1+2+3+4+5+6+7)				\$74,649,614

In addition to the scope of work listed in the above, the project also includes three options to rehabilitate the remaining 71 car sets of LRV. The options may be exercised by SFMTA depending on the availability of funds. The price schedule for the options is listed below:

**EXHIBIT C (OPTIONS)
PRICE SCHEDULE
FOR SFMTA REHABILITATION OF TRUCKS**

Item No.	Description	Qty.	Unit Price	Total Price
8.1	Option 1 – Rehabilitate Motored and Non-Motored Trucks of the LRVs (expiration June 2015)	24	\$402,654	\$9,663,696
8.2	Option 2 – Rehabilitate Motored and Non-Motored Trucks of the LRVs (expiration December 2015)	24	\$410,272	\$9,846,528
8.3	Option 3 – Rehabilitate Motored and Non-Motored Trucks of the LRVs (expiration June 2016)	23	\$418,045	\$9,615,035
9.	Sales tax on materials for option trucks			\$488,481
Total for Option Trucks				\$29,613,740

Exhibit C-1

Vapor Stone Parts Inventory List

<i>Part Number</i>	<i>Description</i>	<i>Inventory Total</i>	<i>Extended Termination Cost Total</i>
57311553	TUBE AIR .25X.179 NYLON BLK	9,946	\$ 339.79
58110850	INSULATOR - SWITCH	-	\$ -
58611088	LEVER ACTUATOR	341	\$ 1,686.25
84251837	SCR PH FL100 HD 1/4-20X.50 STL ZN	50	\$ 14.93
84254410	SCR SL PN HD 2-56X1.000 SS	1,300	\$ 52.69
84254662	SCR SL PN HD SEMS EX 6-32X.875 STL ZN	-	\$
84257993	SCR HX HD 3/8-16X.75 STL GR5 ZN	1,080	\$ 62.81
84279761	SLEEVE BEARING .503X.690X.50 BRZ SINTERED	996	\$ 406.87
84282813	TIE CABLE S/LOCK .300X14.50 NYL UV BLK	-	\$ -
84283206	TUBING HEAT SHK 1/4 POLYOLEFIN BLK	-	\$ -
84290105	SHRINKABLE TUBING 3/16" WHITE	1,416	\$ 72.32
84293008	CABLE 2X0.93MM 250V 19X0.26 SHLD BLK NFF63808-NFF16101	-	\$ -
89241311	SCR HX HD FT M6X20 STL YZN PER 881322 FE/ZN8 TYPE 2	146	\$ 92.40
97211125	DIODE,1N4247	-	\$ -
200320639	BLOCK STOPPER	118	\$ 266.39
200320640	J BRACKET	27	\$ 148.32
201010296	KIT OVERHAUL CYLINDER 1-1/8X3-3/8	192	\$ 596.50
201010849	HANDLE PULL ASSY	407	\$ 4,484.63
842100314	THRUST BEARING .510X1.000X.063 BRZ SINTERED	-	\$ -
842100443	FLANGE BEARING .502X.627X.375 .875X.063 BRZ SINTERED	821	\$ 520.72
842100444	FLANGE BEARING .502X.627X.50 .875X.063 BRZ SINTERED	3,612	\$ 135.90
1551715819	GROMMET .188X.313X.125 EPT BLK	-	\$ -
1581613718	STRIP TIE POINT	-	\$ -
1621611333	RESISTOR-FIXED	-	\$ -
1701003023	HARNESS WRAP(ROLL) 3/8 OD(BLK)	36,644	\$ 1,386.28

<i>Part Number</i>	<i>Description</i>	<i>Inventory Total</i>	<i>Extended Termination Cost Total</i>
1741039400	RECTIFIER ,SIL (1N3880)	441	\$ 1,436.45
4561610400	BEARING, BALL	1,920	\$ 3,405.60
5002121800	SPACER CABLE	418	\$ 1,685.06
5003153301	ARM ASSY. FIXED WELDED 36"	104	\$ 9,765.73
5011049501	HARNESS ADA HOOK-UP 47" & 54" DOORS	215	\$ 1,375.19
5601000733	BEARING FLANGE	3,712	\$ 1,037.50
5601000755	FLANGE BEARING .1895X.314X.375 .438X.063 BRZ	771	\$ 530.45
5721257600	TUBING (500 FT. COIL)	36,667	\$ 2,093.06
5731232804	BEAR.,NYLON DOU.FLAN.1/4 NOM.	345	\$ 356.04
5741021577	WASHER SPECIAL	1,416	\$ 2,511.63
5741062302	SPACER	18	\$ 116.10
5752092310	CONNECTOR PLUG CPC 24 POS 23-24 FR HG	3	\$ 9.03
5782630461	LABEL IDENT.	472	\$ 294.29
5782630462	LABEL IDENT.	472	\$ 400.85
5831030102	TUBING-POLYURETHANE (PURC.)	-	\$ -
5871085900	BEARING BALL (REAR)	176	\$ 331.10
5892039721	SWITCH-PRESSURE WAVE	152	\$ 7,120.97
5902478402	BEARING - SPHERICAL	1,774	\$ 55,399.80
5911014625	LABEL,IDENT. (LSIA)	700	\$ 511.70
5911014626	LABEL,IDENT. (LS1B)	1,111	\$ 489.08
5921624300	SPACER	3	\$ 19.35
5921625100	COLLAR	15	\$ 225.75
5921625800	BEARING-BALL 5/16 IDX7/8 OD	1,585	\$ 3,595.18
5921625900	TURN BUCKLE	32	\$ 683.53
5922095504	CYLINDER	1	\$ 560.08
5922095505	CYLINDER	11	\$ 5,273.95
5922611700	LINK-CONNECTING	20	\$ 333.25
5922611701	LINK-CONNECTING	3	\$ 172.94
5922611702	LINK-CONNECTING	5	\$ 499.88

<i>Part Number</i>	<i>Description</i>	<i>Inventory Total</i>	<i>Extended Termination Cost Total</i>
5922611900	LINK-LIFT	1	\$ 28.75
5922612701	PLATE-NUT	5	\$ 18.76
5922614100	STUD-BEARING	1,525	\$ 7,573.91
5922615500	SPACER-CLEVIS	86	\$ 336.52
5922623000	TRACK-BEARING	6	\$ 558.12
5922623001	TRACK BEARING	2	\$ 100.38
5922623900	STUD-BEARING	1,538	\$ 5,456.06
5922624100	STUD-LINK	1,513	\$ 6,912.52
5922626200	BRACKET-VALVE	5	\$ 209.79
5922626300	VALVE-DOUBLE SOLENOID 4 WAY	215	\$ 40,678.00
5922627400	PLATE-COVER	11	\$ 243.44
5924611800	ARM-LIFT	5	\$ 2,085.77
5924614500	INSERT-TRACK	1,457	\$ 23,885.69
5924619001	ARM-LIFT	5	\$ 6,908.54
5931053800	PLATE RETAINER	10	\$ 645.00
5931054400	PIN ADAPTOR	4	\$ 301.00
5931103700	PLATE - SWITCH	10	\$ 164.05
5931111204	TUBING SHRINKABLE 1/4 BLACK	10	\$ 30.06
5931138000	BUSHING	437	\$ 2,052.92
5931625800	ARM	5	\$ 430.00
5931625900	ROD-COILED CORD GUIDE	7	\$ 278.95
5931625901	ROD-COILED CORD GUIDE	2	\$ 165.30
5931625902	ROD-COILED CORD GUIDE	2	\$ 94.54
5931626100	U-PROFILE	5	\$ 195.72
5931626201	STUD BOLT	1,262	\$ 5,765.76
5931626500	SPACER	15	\$ 50.63
5931626501	STANDOFF HX 1/2 M6X.709 SS 303	9	\$ 94.33
5931626502	SPACER	8	\$ 92.45
5931636300	SPRING COMP 1.625X.125X7.01 STL 17-7 ELECTROLESS NICKEL PLATED	423	\$ 3,733.29

<i>Part Number</i>	<i>Description</i>	<i>Inventory Total</i>	<i>Extended Termination Cost Total</i>
5931636400	PULLEY-CABLE	566	\$ 2,957.07
5931636700	RING	280	\$ 966.12
5931636702	RING	472	\$ 2,283.30
5931636800	BUSHING	390	\$ 1,530.26
5931636900	SHAFT	422	\$ 5,670.63
5931637200	BOLT-SHOULDERED	99	\$ 372.49
5931637800	ROLLER	740	\$ 7,955.00
5931637900	SHAFT-ROLLER	729	\$ 5,955.93
5931638100	SHAFT	3	\$ 135.45
5931638101	SHAFT	20	\$ 112.88
5931638200	PIN-STOP	733	\$ 3,601.05
5931638300	WHEEL-GEAR	2	\$ 451.50
5931638700	SHAFT,DIN	15	\$ 598.56
5931638900	SHAFT	4	\$ 322.50
5931639000	SHAFT	157	\$ 794.43
5931641700	BRACKET-SPRING	6	\$ 296.70
5931656100	ROLLER BEARER	469	\$ 2,596.50
5931660300	PLATE END	10	\$ 94.06
5931660301	PLATE-END	17	\$ 159.91
5931660302	PLATE-END WITH HOLE	16	\$ 44.30
5931661100	CAM	9	\$ 725.63
5931661200	SUPPORT-CABLE	7	\$ 141.47
5931661500	ROD THRD 6-32x5.32 SS 18-8	867	\$ 2,050.46
5931661700	STRIP-COUPLING, 47"/54"	5	\$ 108.08
5931686500	NUT CARRIER-SPINDLE	114	\$ 3,370.13
5931686700	BRACKET 36"	6	\$ 28.38
5931686800	NUT-SPINDLE, LH THREAD	79	\$ 1,893.83
5931687000	BRACKET 47"/54"	9	\$ 113.39
5931688100	RETAINER-SPRING	77	\$ 765.67

<i>Part Number</i>	<i>Description</i>	<i>Inventory Total</i>	<i>Extended Termination Cost Total</i>
5931695100	BEARING FLANGE 14X16X12MM IGLIDE G300	449	\$ 506.81
5931695200	BEARING FLANGE 16X18X12 IGLIDE G300	3,361	\$ 1,878.80
5931695300	RACE-INNER (METRIC)	399	\$ 2,702.23
5931695500	BEARING BALL 15X40X11 SR SHIELD	1,345	\$ 11,075.40
5931695600	BEARING-BALL (METRIC)	168	\$ 5,566.09
5931695700	BEARING BALL 10X32X9 SR RDL	165	\$ 1,236.30
5931695800	BEARING BALL 25X37X7MM SR DEEP GROOVE	474	\$ 2,797.43
5931695900	BEARING BALL 35X47X7MM SR	408	\$ 1,552.64
5931719800	CLAMP-CABLE	826	\$ 2,379.71
5931719900	TUBING-SHRINKABLE	1,962	\$ 219.74
5931720300	WASHER NON METALLIC 8.1MM ID	1,888	\$ 761.10
5931720400	SPACER RD .756X1.339X.059 NYLON	826	\$ 511.46
5931720500	SPRING TORSION .38X.028 1.56 LEG 155DEG	472	\$ 228.33
5931720800	NUT-CLAMP	826	\$ 121.56
5931721000	CAM-SPLIT	10	\$ 467.63
5932054600	BRACKET MTG.	17	\$ 748.03
5932056999	VALVE SOLENOID (4 WAY)	352	\$ 58,406.04
5932074100	INDUCTOR	12	\$ 889.03
5932102100	PLATE-RETAINING	6	\$ 167.06
5932102200	PAD-NYLON	393	\$ 532.32
5932114700	SPACER	11	\$ 413.64
5932624800	CABLE-FLEXBALL TYPE 5S	21	\$ 9,824.19
5932637700	FLANGE BEARING	312	\$ 8,116.68
5932638500	PULLEY-CABLE,MAIN EMERGENCY	21	\$ 498.46
5932639202	SHAFT-SPLINE EXTENSION	1	\$ 150.50
5932657400	SEAL-PORTAL 36"/47"-R/54"	571	\$ 9,514.29
5932657700	SEAL-PORTAL	75	\$ 1,088.44
5932658100	SEAL PORTAL	118	\$ 1,902.75
5932662100	PLATE-MTG TERMINAL	4	\$ 21.89

<i>Part Number</i>	<i>Description</i>	<i>Inventory Total</i>	<i>Extended Termination Cost Total</i>
5932687700	TOOTHED-FLANGE	4	\$ 160.66
5932692900	CONNECTOR 4 POS M SERIES ROHS	1,652	\$ 834.67
5932693202	BOLT-SHOULDERED	236	\$ 1,002.12
5932693203	BOLT-SHOULDERED	391	\$ 1,471.14
5932693205	BOLT SHOULDERED	944	\$ 3,450.32
5932693206	BOLT SHOULDERED	1,576	\$ 3,981.37
5932694400	PLATE (RH)	20	\$ 190.71
5933055400	SWITCH-ROTARY	229	\$ 17,283.95
5933620600	ROLLER GUIDE-RIGHT	13	\$ 4,829.76
5933620700	ROLLER GUIDE-LEFT	16	\$ 5,944.32
5933626300	SHAFT,UN-PLUG	3	\$ 351.69
5933642001	SPINDLE	6	\$ 1,193.25
5933643500	BRACKET	5	\$ 28.86
5933643501	BRACKET	4	\$ 23.09
5933643600	BRACKET	5	\$ 228.62
5933643601	BRACKET	5	\$ 132.52
5933653500	GUIDE ASSY-RAIL WELDED 47"R	13	\$ 580.38
5933653600	GUIDE ASSY-RAIL WELDED 47"L	19	\$ 848.25
5933653700	GUIDE ASSY RAIL WELDED 54"R	16	\$ 769.70
5933653800	GUIDE ASSY-RAIL WELDED 54"L	15	\$ 721.59
5933672500	SEAL ASSY-SENS EDGE 47"R/54"R	147	\$ 12,642.00
5933672600	SEAL ASSY-SENS EDGE 47L/54L/36	197	\$ 15,883.13
5933673700	BRACKET	8	\$ 193.84
5933673701	BRACKET	5	\$ 112.02
5933692300	CORD-COILED	54	\$ 1,004.85
5933692301	CORD-COILED	248	\$ 3,468.47
5934113100	ARM-OFF-SET LIFT	5	\$ 1,688.88
5934620900	ROLLER CARRIAGE TYPE 4 47"/54"	3	\$ 2,451.00
5934621000	ROLLER CARRIAGE TYPE 6 (36")	9	\$ 5,756.63

<i>Part Number</i>	<i>Description</i>	<i>Inventory Total</i>	<i>Extended Termination Cost Total</i>
5934621100	ROLLER CARRIAGE TYPE 5 (36")	10	\$ 6,396.25
5941032600	LINK-CONNECTING	10	\$ 383.78
5941640800	PLUNGER-SPRING	944	\$ 3,794.54
5942020400	LINK WELDMENT	10	\$ 1,182.50
5942020602	PIVOT WELDMENT-RH	10	\$ 1,290.00
5942020603	PIVOT WELDMENT-LH	0	\$ 1,290.00
5942026801	BRACKET-SWITCH (LH)	20	\$ 493.43
5943055000	SEAL-DOOR,47"R	38	\$ 1,634.00
5943055001	SEAL-DOOR,54"R	113	\$ 5,344.90
5943055100	SEAL-DOOR 36"	58	\$ 2,805.75
5943055101	SEAL-DOOR,47"L	111	\$ 4,773.00
5943055102	SEAL-DOOR,54"L	110	\$ 5,203.00
5951086400	BUMPER	174	\$ 1,870.50
5951086800	BUMPER 36"	118	\$ 367.87
5951096800	BRACKET PANEL	51	\$ 246.71
5951096810	BRACKET PANEL	102	\$ 763.03
5951096811	BRACKET PANEL	257	\$ 1,922.53
5951097100	STRIP MARKER	485	\$ 1,564.13
5951636900	SPACER	10	\$ 245.78
5951637500	HOUSING ROLLER	278	\$ 12,970.09
5951639900	PIN STABILIZER	708	\$ 4,947.15
5952020562	LABEL IDENT. (LS7)	40	\$ 119.97
5952096700	FUSE & LEAD ASSY.	6	\$ 164.11
5952096711	RELAY FUSE & LEAD ASSY LH	16	\$ 666.59
5952615400	SEAL-RUBBER STRIP 36"	68	\$ 365.50
5952615401	SEAL-RUBBER STRIP 47"	52	\$ 314.16
5952615402	SEAL-RUBBER STRIP 54"	58	\$ 342.93
5952637100	ROD HINGE 36"	63	\$ 1,537.36
5952637101	ROD HINGE 47"	72	\$ 1,470.60

<i>Part Number</i>	<i>Description</i>	<i>Inventory Total</i>	<i>Extended Termination Cost Total</i>
5952637102	ROD HINGE 54"	183	\$ 3,737.78
5952637201	BLOCK TAPPING CENTER LH	5	\$ 752.29
5952637300	BLOCK TAPPING SIDE RH	5	\$ 156.41
5952637301	BLOCK TAPPING SIDE LH	4	\$ 125.13
5953633500	SUPPORT HINGE INSIDE 47" RH	10	\$ 975.98
5953633501	SUPPORT HINGE INSIDE 47" LH	3	\$ 329.71
5953633600	SUPPORT HINGE OUTSIDE -47"	65	\$ 32,775.57
5953633800	HINGE UPPER 47"DOOR	150	\$ 18,011.63
5953633900	HINGE LOWER 47"R DOOR	145	\$ 31,173.44
5953633901	HINGE LOWER 47"L DOOR	28	\$ 6,832.70
5953634400	SUPPORT ASSY. S ROLLER (LH)47"	4	\$ 903.00
5953634500	SUPPORT ASSY. S ROLLER (RH)47"	27	\$ 6,095.25
5953635000	BEARING LINEAR ASSY.47"	137	\$ 94,142.60
5953635300	HINGE UPPER 36" DOOR	81	\$ 11,998.94
5953635400	HINGE LOWER 36" DOOR	70	\$ 13,582.63
5953635500	HINGE UPPER 54" DOOR	235	\$ 28,420.31
5953635600	HINGE LOWER 54"R DOOR	221	\$ 36,253.95
5953635601	HINGE LOWER 54"L DOOR	49	\$ 10,621.91
5953635700	SUPPORT HINGE OUTSIDE 36"	28	\$ 16,834.93
5953635800	SUPPORT HINGE OUTSIDE 54"	1	\$ 682.67
5953635900	SUPPORT ASSY. S ROLLER 36"	18	\$ 4,621.17
5953636100	SUPPORT ASSY. S ROLLER LH 54"	58	\$ 13,093.50
5953636200	SUPPORT ASSY. S ROLLER RH 54"	48	\$ 22,962.00
5953637600	BEARING LINEAR RH 54"	286	\$ 245,308.21
5953637700	BEARING LINEAR ASSY 36"	52	\$ 48,068.97
5953642401	ARM ASSY. FIXED 47"/54" R WELD	157	\$ 14,435.33
5953642501	ARM ASSY. FIXED WELD 47/54 LH	71	\$ 6,528.08
5954079200	ARM OFFSET LIFT	5	\$ 1,694.72
5961011100	COIL CORD END PIECE	123	\$ 8,026.06

<i>Part Number</i>	<i>Description</i>	<i>Inventory Total</i>	<i>Extended Termination Cost Total</i>
5961075000	TURNBUCKLE	9	\$ 222.53
5961080700	PINION	187	\$ 2,080.61
5961140000	BELLOW	884	\$ 9,503.00
5962065301	SHAFT CLEVIS	9	\$ 419.99
5962065303	SHAFT CLEVIS	9	\$ 419.99
5971085000	FLANGE BEARING .258X.378X.233 .50X.063 BRZ	846	\$ 1,064.06
5971087102	BRACKET DIODE	10	\$ 104.81
5972067500	SENSOR INDUCTIVE PROXIMITY PNP	245	\$ 7,184.87
5972126700	SEAL-EXTRUSION PROFILE	7,600	\$ 2,553.13
5973126900	GLASS-WINDOW 47" (UPPER)	15	\$ 1,364.69
5973126901	GLASS-WINDOW 47" (LOWER)	15	\$ 693.35
5973126902	GLASS-WINDOW 54"	16	\$ 1,141.54
5973126903	GLASS-WINDOW 36"	7	\$ 797.65
5981720000	NUT CARRIER SPINDLE	117	\$ 4,056.24
5983721000	MOTOR ASSY. ELECTRIC	464	\$ 123,792.18
5991011400	HOUSING COUPLING	340	\$ 3,837.75
5991011500	HOUSING COUPLING	348	\$ 3,647.48
5991012300	BRACKET SENSOR	30	\$ 672.41
5991045500	HOOK	235	\$ 2,943.04
5991059600	CONTACT, SOCKET, 20-16 AWG	-	\$ -
5991063501	RECTIFIER, 1N3673RA, REV.POL.	439	\$ 1,939.61
5991619300	BLOCK GUIDE	118	\$ 2,029.60
5991620400	BUSHING	1,467	\$ 3,453.68
5991621100	CAP-WELDED	-	\$ -
5992033800	PLATE	5	\$ 120.68
5992040000	PLATE	1	\$ 21.43
5992041500	SPRING EXT .30X.037X1.50 STL 5.2LB/IN	222	\$ 713.56
5992041600	SPRING EXT .25X.031X1.13 STL 4.6LB/IN	708	\$ 1,369.98
5992045400	PLATE CAM	2	\$ 45.15

<i>Part Number</i>	<i>Description</i>	<i>Inventory Total</i>	<i>Extended Termination Cost Total</i>
5992051700	SPRING EXT .30X.043X2.25 STL 6.50LB/IN	341	\$ 399.57
5992053200	STEP MAT MOLDED	19	\$ 2,305.94
5992053402	STEP MAT MOLDED	22	\$ 1,799.53
5992053500	PLATE SWITCH	199	\$ 1,140.22
5993046200	PLATE GUIDE (RH)	472	\$ 3,348.84
5993046201	PLATE GUIDE (LH)	171	\$ 1,516.56
5993605900	CABLE EMERGENCY 54"	77	\$ 2,337.57
5993605903	CABLE EMERGENCY 36"	114	\$ 3,514.73
5993619500	PLATE MTG. PINCH POINT MIT 36"	15	\$ 511.79
5993619501	PLATE MTG. PINCH POINT MIT 47L	16	\$ 484.83
5993619502	PLATE MTG. PINCH POINT MIT 54L	20	\$ 633.35
5993619503	PLATE MTG. PINCH POINT MIT 47R	20	\$ 638.06
5993619504	PLATE MTG. PINCH POINT MIT 54R	20	\$ 660.23
5993619600	BLOCK NUT 36"	16	\$ 438.60
5993619601	BLOCK NUT 47"	32	\$ 146.00
5993619602	BLOCK NUT 54"	40	\$ 935.25
5993619700	BUMPER RUBBER 36"	51	\$ 411.19
5993619701	BUMPER RUBBER 47"	195	\$ 1,236.79
5993619702	BUMPER RUBBER 54"	254	\$ 1,911.35
6711125800	BOLT SPECIAL	569	\$ 2,275.43
6711125801	BOLT SPECIAL	236	\$ 1,428.33
6712103809	SCR HX SKT BTN HD 1/4-20x.50 STL ZN	-	\$ -
6712107415	SCR HX HD IND 10-32X.50	368	\$ 15.82
6712120220	SCR SH HX SOC HD .75X5.50 5/8-11X.75 STL OX	231	\$ 1,904.75
6712122700	SCR FLT HD HX SKT M8x16mm	5,521	\$ 271.83
6712122702	SCR FLT HD HX SKT M6x16	6,726	\$ 373.09
6712122703	SCR FLT HD HX SOC M8 X 20MM	3,776	\$ 291.45
6712122809	WSHR-PLN(METRIC DIN7349)12MM	826	\$ 289.12
6712122900	NUT HEX JAM M12	1,652	\$ 455.16

<i>Part Number</i>	<i>Description</i>	<i>Inventory Total</i>	<i>Extended Termination Cost Total</i>
6712123500	SCR HX SKT BTN HD M4 x 8mm	7,080	\$ 654.55
6712123700	SCR SH HX SOC HD .50X1.25 3/8-16X.40 SS	2,136	\$ 7,242.21
6712124801	SCR SH SL HD .187X1.50 8-32X.187 SS 420	440	\$ 4,677.97
6712305500	NUT HX LOCK 3/8-16 STL ZN 3 PT DEFLEXION TORQUE PATCH	426	\$ 1,488.47
9501002836	FUSE 15A 65A 3AB VFAST CER .25X1.25	944	\$ 2,638.48
9502097165	SLEEVE BEARING .253X.377X.375 BRZ SINTERED	308	\$ 2,897.13
9601601317	STRIP TERMINAL 17 TERMS	46	\$ 267.03
9652002924	TUBING SHRINKABLE (POLYOLEFIN)	1,467	\$ 727.95
9761042302	NUT HEX LK CAP 8-32	135	\$ 40.88
9912610018	FTG-NYL TUBE (BRS) M.CONN 3/8	809	\$ 1,888.06
9912610020	FTG-NYL TUBE (BRS) M.CONN 3/8	502	\$ 1,066.35
9912610022	FTG-NYL TUBE (BRS) UN.TEE 3/8	428	\$ 1,964.63
9912610030	FTG-NYL TUBE (BRS) M.EL 3/8	449	\$ 1,127.53
9912610033	FTG-NYL TUBE (BRS) F.EL 3/8	215	\$ 2,942.22
9912610052	FTG-NYL TUBE(BRS)MALE EL 3/8	103	\$ 673.21
9912610314	FTG-PIPE AUTO (BRS) L.NIP 1/8	219	\$ 125.25
9921086000	RECTIFIER-FULL WAVE BRIDGE	862	\$ 3,549.07
20072066205	RETAINING RING INT .938 SS INVERTED	-	\$ -
20101091101	PIN SHORT	50	\$ 900.31
20101091102	PIN LONG	50	\$ 900.31
20112004108	CABLE CLAMP .25X.50 STL GALV CUSH VINYL	826	\$ 157.70
2003W0843	SPRING EXT .437X.047X1.88 STL ZN	258	\$ 310.63
2004W0094	CONTACT SOC 24-20AWG GOLD SEL TYPE III+ CPC SERIES 1 G M SERIES	478	\$ 192.69
2010W0154	BEARING BALL 45X58X7MM OPEN ENDS NO SEALS	1,497	\$ 30,318.74
2010W0155	BEARING NEEDLE 7X16X7.8MM OPEN ENDS NO SEALS	3,080	\$ 23,673.65
2010W0156	BEARING BALL 12X30X8MM OPEN END 2 SEALS	730	\$ 8,184.94
2010W0369	WIPER ROD WIPER 35MM NITRILE NBR 90A	826	\$ 1,935.73
2010W0370	GUIDING ELEMENT 35MM ROD 40MM BORE BRZ FILLED PTFE 60%	1,652	\$ 5,150.11
5922095502R	CYLINDER 10" STROKE, REFURBISHED	25	\$ 7,283.13

<i>Part Number</i>	<i>Description</i>	<i>Inventory Total</i>	<i>Extended Termination Cost Total</i>
5922095503R	CYLINDER 8.75" STROKE, REFURBISHED	24	\$ 6,991.80
75W287	ROD END BEARING	165	\$ 1,007.49
75W288	BEARING,ROD END	113	\$ 619.52
80W037	LUG RING 22-16AWG #4 NYL COP TIN .140 INS DIA X .218 OD	1,484	\$ 476.99
84W213	CONNECTOR MALE 1/4TX1/8NPT BRS	293	\$ 434.67
89W003	GROMMET EDGING .128-.192 X 12.75 NYLON SLOTTED	2,124	\$ 2,674.89
90W162	LUG FASTON MALE 22-18AWG .25X.032 FULL INS NYLON BRS TIN	-	\$ -
93W240	MUFFLER SPEED CONTROL +	1,459	\$ 7,340.23
95W208	CONTACT PIN 18-16AWG GOLD SEL TYPE III+ CPC SERIES 1 G M SERIES	-	\$ -
97W323	CONTACT PIN 24-18AWG GOLD MNL	-	\$ -
57616490	SWITCH & BRACKET ASSY LH	3.58	\$ -
57616532	SWITCH & BRACKET ASSY R.H.	4.58	\$ -
58710125	CAP,FASTON TAB NYLON	0.02	\$ -
5922095502R	CYLINDER 10" STROKE, REFURBISHED	25	\$ 7,825.13
5922095503R	CYLINDER 8.75" STROKE, REFURBISHED	18	\$ 5,634.09
5922095505	CYLINDER	27	\$ 14,067.90
5932056999	VALVE SOLENOID (4 WAY)	74	\$ 13,192.29
5933692301	CORD-COILED	32	\$ 480.85
5943055001	SEAL-DOOR,54"R	48	\$ 2,439.36
5952615401	SEAL-RUBBER STRIP 47"	24	\$ 155.79
5961080700	PINION	225	\$ 2,689.71
5972067500	SENSOR INDUCTIVE PROXIMITY PNP	192	\$ 6,049.61
9502097165	SLEEVE BEARING .253X.377X.375 BRZ SINTERED	122	\$ 1,232.96
9912610018	FTG-NYL TUBE (BRS) M.CONN 3/8	550	\$ 1,379.13
Subtotal for Parts			\$ 1,616,347.19

Item	Description	Amount
Article 21	Vapor Overhead and Invoice preparation	\$ 113,160.81
Article 21	Vapor Lost Profit	\$ 86,475.40
Article 21	Vapor Material Handling	\$ 5,255.00
Article 21	Subtotal for Vapor	\$ 1,821,238.40
Article 21	AnsaldoBreda Overhead 7.5% of Subtotal	\$ 136,592.88
Article 21	Grand Total	\$ 1,957,831

Note: Decimals are dropped in the Grand Total

Exhibit C-2

Knorr Parts Inventory List

OVERHAUL KIT STU14536/H 31 PCS IN STOCK	\$78,324.60
OVERHAUL KIT STU14536/H 39 PCS ON ORDER AND TOO LATE TO CANCEL	\$98,537.40
TWO AIR DRYERS OVERHAUL COMPLETE FROM GW	\$2,869.72
Subtotal	\$179,731.72
AnsaldoBreda Overhead 7.5% of Subtotal	\$13,479.88
Grand Total	\$193,212

Note: Decimals are dropped in the Grand Total

**TECHNICAL SPECIFICATIONS
(TECHNICAL PROVISIONS)**

SECTION TP05M1

**CONTRACT MODIFICATION #1 FOR
TRUCKS AND SUSPENSION SYSTEMS**

March 1, 2014
Rev. 0

Section TP05M1: Table of Contents

SECTION TP05M1
TRUCK AND SUSPENSION SYSTEMS

TABLE OF CONTENTS

Section	Page
<u>TP05M1: TRUCKS AND SUSPENSION SYSTEMS</u>	1
<u>TP05M1.01 GENERAL</u>	1
<u>TP05M1.02 SCOPE OF WORK</u>	1
<u>TP05M1.03 OVERHAUL REQUIREMENTS</u>	1
<u>A. Terminology</u>	1
<u>B. Hardware/Fasteners</u>	1
<u>C. Labels</u>	2
<u>D. Overhaul Criteria</u>	2
<u>E. Disassembly, Cleaning & Storage</u>	2
<u>F. Structural Inspection and repair</u>	2
<u>TP05M1.04 NEW COMPONENTS AND/OR ASSEMBLIES</u>	2
<u>A. 100% Replacement</u>	2
<u>B. As- Needed Replacement</u>	3
<u>TP05M1.05 OVERHAULED COMPONENTS AND ASSEMBLIES</u>	3
<u>A. Motors (power truck)</u>	3
<u>B. Gear units and coupling (power truck)</u>	3
<u>C. SAV valves</u>	3
<u>D. Brake calipers</u>	4
<u>E. Track brakes springs and guides</u>	4
<u>TP05M1.06 PIPING</u>	4
<u>TP05M1.07 ODOMETER</u>	4
<u>TP05M1.08 PAINT</u>	4
<u>TP05M1.09 REPLACEMENT OF SUSPENSION COMPONENTS</u>	4
<u>TP05M1.10 MISSING PARTS</u>	4
<u>TP05M1.11 ASSEMBLY, INSTALLATION & ADJUSTMENT, AND TESTING OF EQUIPMENT</u>	4
<u>A. Assembly</u>	4
<u>B. Installation & Adjustment</u>	5
<u>C. Testing</u>	5
1. <u>Pre-Possession Test</u>	5
2. <u>Acceptance Testing</u>	5
<u>D. First Article Inspection</u>	5
<u>TP05M1.12 CONTRACT DELIVERABLE REQUIREMENTS LIST</u>	5

TP05M1: TRUCKS AND SUSPENSION SYSTEMS

TP05M1.01 GENERAL

The work described in this section shall apply only to 112 LRVs and shall be in addition to the work required in Section TP05 – Truck Assemblies of the original Contract.

TP05M1.02 SCOPE OF WORK

The Contractor shall remove, disassemble, inspect, repair, replace, overhaul, reassemble, test and reinstall the components of the trucks and suspension systems of the LRVs as specified herein. These specifications apply to both motored and non-motored trucks of the LRV.

TP05M1.03 OVERHAUL REQUIREMENTS

A. Terminology

Whenever the term “overhaul” is used herein, it shall mean the level of effort designated for a component or assembly, including, but not limited to, cleaning, refinishing, repair, or replacement.

Whenever the term “replace in kind” is used herein, it shall mean replacement with identical OEM parts, or SFMTA-approved equal. The SFMTA is not obligated to accept other than OEM parts, unless the OEM part is obsolete, and may require the Contractor to perform whatever reasonable verification activities as needed in order to demonstrate that the alternative is acceptable based on its being equivalent or superior to the OEM part per Section 1.04.C.1 of these Technical Provisions.

The costs associated with proving that an alternative is equivalent or superior to an OEM part shall be borne by the Contractor.

Whenever the term “replace” is used herein, it shall mean replacement with components compliant with applicable material and workmanship standards. This term is utilized primarily for hardware, where compliance with applicable standards is sufficient to demonstrate equivalence to the OEM part.

Whenever the term “reuse” is used herein, it shall mean disassemble, clean, inspect, verify, refinish and lubricate as needed, reassemble, and reinstall onto the overhauled assemblies; this term reflects estimation that none will require replacement, unless otherwise specified.

B. Hardware/Fasteners

All hardware and fasteners, including, but not limited to, screws, bolts, nuts, clips, washers, lock-washers, shrink wrap, c-clips, tie straps, shaft-keys, springs, shrinkable tubing, cotter pins, retaining rings, bushings, roll pins, clips, gaskets, and etc., on, or in, overhauled assemblies, components, or parts, shall be replaced unless identified for reuse herein.

C. Labels

The Contractor shall apply labels to the truck, gearbox and traction motor to indicate when it was overhauled. The labels shall be of the same type as the OEM labels currently installed on the equipment. The quantity and locations of labels shall be similar to the original labeling arrangement, per the labeling requirement in TP1.07.O of these Technical Specifications.

D. Overhaul Criteria

The Contractor shall follow the truck repair and overhaul criteria of the San Francisco Muni LRV2 Heavy Repair and Workshop Manual, Section 3 "Trucks and Suspension."

The Contractor shall follow the traction motor overhaul criteria of section 4, "Propulsion and Electronic Controls."

The Contractor shall follow the track brake overhaul criteria of section 16 "Brakes."

E. Disassembly, Cleaning & Storage

The Contractor shall disassemble the truck and clean all reusable components. Non reusable components shall be properly disposed of.

Parts waiting reassembly shall be tagged and properly stored.

F. Structural Inspection and Repair

The Contractor shall strip/clean down to clean paint and visually inspect the truck frame, bolster beam, connecting rods, axles and hubs for dimensional accuracy and inspect for cracks. All cracks found shall be documented in the truck history book and repaired as provided below.

The Contractor shall inspect all mating surfaces of the truck frame, threaded attachment points, and permanently affixed brackets for damage. All damage found shall be documented in the truck history book and repaired as provided below.

The Contractor shall notify and obtain SFMTA approval prior to performing any repairs under this Section. Such repairs shall be deemed as extra work under Section 48.2 of the Agreement.

TP05M1.04 New Components and/or Assemblies

The Contractor shall remove, replace in-kind, and install the following components or assemblies on all LRVs under Amendment Nos. One and Two to the Agreement.

A. 100% Replacement

1. Journal axle bearings
2. Shock absorbers
3. Grounding cables
4. Primary suspension (latest configuration)
5. Secondary suspension (air bags)

6. Brake caliper suspension bushings
7. Pilot bar/antenna bar mounts (latest configuration)
8. Leveling valve and hardware
9. Air hoses (Knorr)
10. Knorr test fittings (cut-out cock)
11. Wiring harnesses
12. Traction rod rubber element
13. Flexible pads (GE)
14. Connecting rod rubber elements GE
15. Miscellaneous rubber components
16. Lateral bump stop
17. Slewing Ring
18. Lubrication
19. Truck cleaning and waste disposal
20. Transom joint pin, spherical bearing, retaining flanges, seal, shims, hardware retainers, and hardware.

B. As- Needed Replacement

The Contractor shall remove, replace in-kind, and install the following components and assemblies. The number in parenthesis (##) indicates the percentage of vehicles the components or assemblies of which are estimated to be replaced under this Amendment. If the quantity of components replaced is less than the estimated quantity, Contractor shall deliver the unused quantity to SFMTA, and title to those components shall pass to the SFMTA. If the quantity of components replaced is more than the estimated quantity, the SFMTA will provide those components to the Contractor or compensate Contractor for the additional cost of the components.

1. Steel tires, rubber isolators and shunts (50% - the steel tires shall be replaced when the diameter is below 26.75 inches). The tires for the first 41 carsets of trucks under this amendment will be provided by SFMTA.
2. Ground brush assemblies (10%)
3. Gear unit coupling (both halves and sleeves) (35%)
4. Antenna receiver/transmitter (Alcatel) (10%)
5. Tachometers (10%)
6. Brake disc (15%)
7. Drive axles (10%)
8. Idler axles (10%)
9. Aluminum wheel centers (10%)
10. Miscellaneous hardware replacement (35%)
11. Air tanks (2%)
12. Air fittings and piping (25%)

The Contractor shall provide usage reports of the materials listed under paragraph B. The report shall indicate, at a minimum; material name, part number, vehicle number, truck serial numbers, amount used, and amount remaining. The Contractor shall provide a monthly report to the Engineer to satisfy this requirement [CDRL 5-002].

TP05M1.05 Overhauled Components and Assemblies

The Contractor shall remove, overhaul, and reinstall the following truck components and assemblies.

Rebuilt components shall meet the requirements for adjustment and testing of section 3, "Trucks and Suspension," of the LRV2 Heavy Repair and Workshop Manual, except for the traction motors, which shall meet the requirements of section 4, "Propulsion and Electronic Controls," and the track brake, which shall be rebuilt according to section 16 "Brakes."

- A. Motors (power truck)**
- B. Gear units and coupling (power truck)**
- C. SAV valves**
- D. Brake calipers**
- E. Track brakes springs and guides**

TP05M1.06 Piping

The Contractor shall clean, inside and out, and reuse piping that is not damaged. The Contractor shall replace damaged piping with new piping.

TP05M1.07 Paint

The Contractor shall touch-up paint, low gloss black, the truck frame, bolster beam, air tanks, vertical bump stop brackets, pilot/antenna bar brackets, derail alarm sensor bracket, and journal box caps where bare metal is exposed.

TP05M1.08 Replacement of Suspension Components

The Contractor shall replace suspension-related components with the identical original replacement component, if available, or an upgraded version that has been used in existing SFMTA trucks. If the original-type component is not available, the Contractor shall source a substitute part which still meets the suspension requirements of the LRV conformed specification # 309 for leveling, natural frequency, motion damping-ride quality, displacement criteria-body roll, and load weigh adjustment. The motor and trailer truck primary suspensions shall be replaced with the part identified on Breda drawings J19/J20 2.55.300 sheet 1 of 3, Pirelli p/n FR-201108-F (motor truck) and Pirelli p/n FR-201109-F (trailer truck). If these part numbers are no longer available, the Contractor shall source alternative parts with the approval of the SFMTA.

TP05M1.19 Assembly, Installation & Adjustment, and Testing of Equipment

Refer to TP10 Inspection and Testing for the detailed requirements for the test and inspection program, as well as the CDRLs associated with the inspection and testing of the trucks and suspension system.

A. Assembly

The overhauled equipment shall be assembled using procedures developed in accordance with the HRWM manuals. Assembly procedures shall include any intermediate testing

and/or functional verifications required to ensure that the assembled components will function properly. Each assembly shall have sign-off sheets for workers to document that their efforts were conducted in accordance with applicable procedures, and aid in failure and/or quality assurance investigations; pass/fail entries shall be required in the sign-off sheet for all required intermediate tests and/or functional verifications performed by the assembler, including the proper application of torque marks. Multiple components may be included on tabulated sign-off sheets with approval of the Authority. Sign off sheets [CDRL 5-001] shall be submitted for inclusion in the Car History Book.

B. Installation & Adjustment

The overhauled equipment shall be installed and adjusted using procedures developed in accordance with the HRWM manuals. Each installation shall have sign-off sheets for workers to document that their efforts were conducted in accordance with applicable procedures, and aid in failure and/or quality assurance investigations; pass/fail entries shall be required in the sign-off sheet for all required intermediate tests and/or functional verifications performed by the installer.

C. Testing

1. Pre-Possession Test

The Contractor shall confirm before taking possession of the vehicle that the two Automatic Train Control (ATCS) Receive Antennae, the two ATCS Transmit Antennae, the truck tachometers and the truck caliper brake release switches are functioning by conducting an ATCS Yard Departure Test on the SFMTA's Track 1 at the Green facility. This test shall be Incorporated into the pre-overhaul test procedure and report referenced in TP10 of these Technical Provisions.

SFMTA personnel will operate the LRV during the test, and the Contractor shall conduct the test. All testing activities and documentation shall be compliant with TP10 Inspection and Testing section of these Technical Specifications.

2. Acceptance Testing

Upon redelivery of the LRV to the SFMTA, the LRV shall be subject to acceptance tests as required by Section TP10 of these Technical Specifications, including identification of CDRLs. After passing the test, the Contractor shall provide and sign an acceptance test report.

TP05M1.10 CONTRACT DELIVERABLE REQUIREMENTS LIST

CDRL #	Title	Reference Paragraph
5-001	Sign-off Sheets	TP05M1.11A
5-002	Monthly Material Usage Report	TP05M1.04B

End of Section