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SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT  
METRO RAIL PROJECT  
GENERAL CONSULTANT SERVICES CONTRACT

ANNUAL WORK PROGRAM  
FOR  
FISCAL PERIOD MAY 1, 1987, THROUGH APRIL 30, 1988

April 1, 1987

Prepared by Metro Rail Transit Consultants

DMJM/PBQD/KE/HWA

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1.0            INTRODUCTION

This document has been prepared in accordance with the provisions of Article III of the General Consultant Services Contract dated May 2, 1983, between the Southern California Rapid Transit District (District) and Daniel, Mann, Johnson, & Mendenhall/Parsons, Brinckerhoff, Quade & Douglas/Kaiser Engineers/Harry Weese and Associates, Ltd., a Joint Venture (Metro Rail Transit Consultants), to provide detailed data on work descriptions, deliverables, milestone schedules, and manpower allocations that form the basis of the Annual Work Program (AWP) Cost Estimates for the fiscal period from May 1, 1987, to April 30, 1988, as contained in the amended Exhibit A of the Contract. The document further serves as a financial planning aid for the District in its considerations of future funding requirements for the Metro Rail Project.

The meaning of abbreviations, acronyms, and other terms contained in this document is as defined or described in the Contract.

2.0            GENERAL SCOPE OF SERVICES

During the 1987-88 AWP, the General Consultant (GC) will continue the design of the Metro Rail Project that began in prior fiscal periods. The design of the first operable segment, MOS-1 (Figure 1), will be continued by the GC during the 1987-88 AWP. The GC will also support the District in the District's bid and construction activities for this segment of the Metro Rail Project.

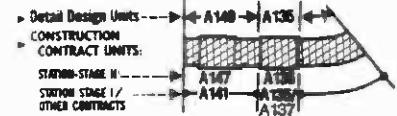
# SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

MINIMUM OPERABLE SEGMENT - 1  
ROUTE MAP

January, 1987



## METRO RAIL PROJECT PROJECT UNIT INDEX



METRO RAIL TRANSIT CONSULTANTS  
DMJM/PCD/SL/MMA

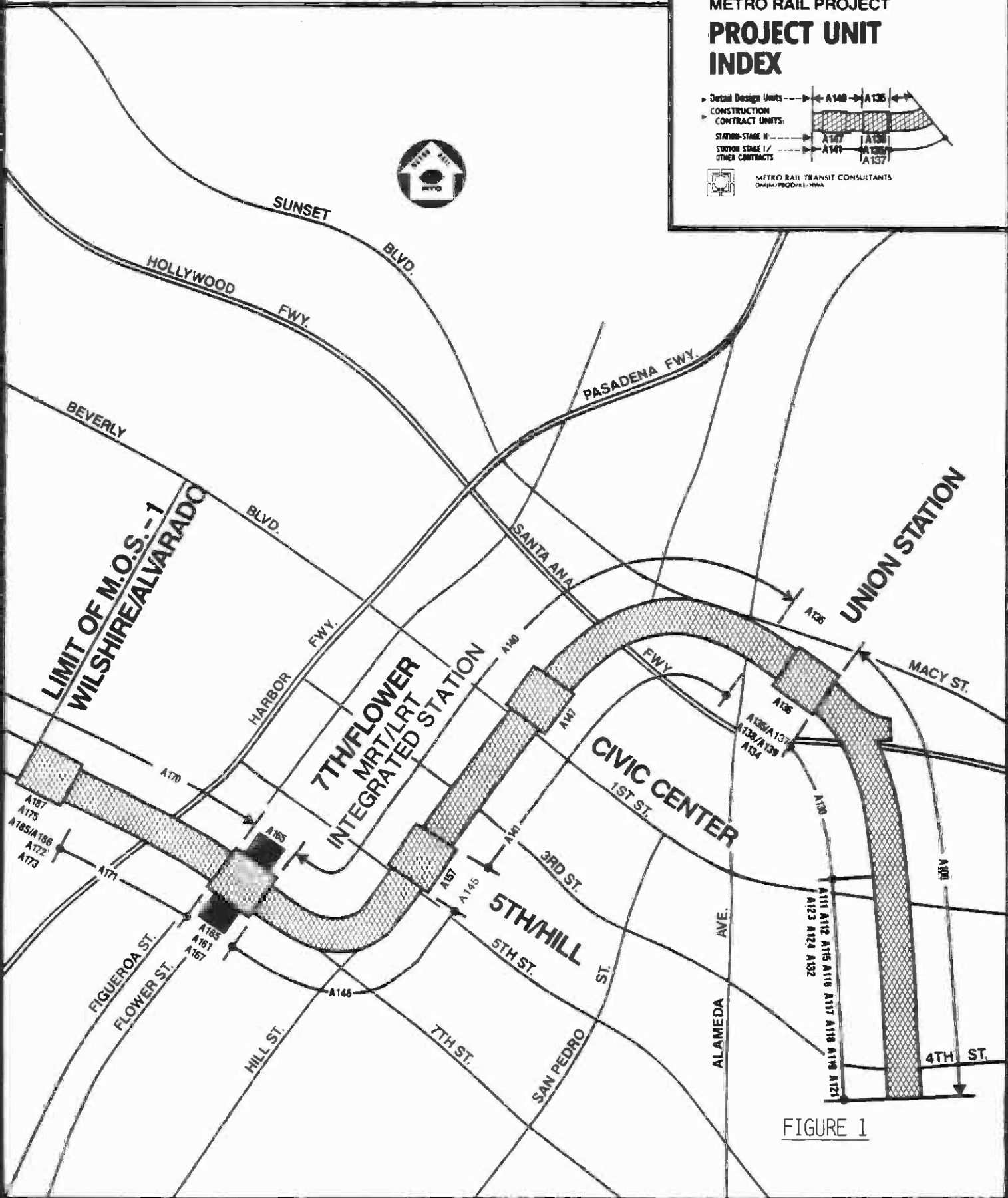


FIGURE 1

3.0 TASK DESCRIPTIONS

3.1 FACILITIES DESIGN

3.1.1 Definition of Work to be Accomplished

Facilities design tasks include: Completion of those designs that are to be advertised during the 1987-88 MOS-1 design; assisting the District in coordinating the design, including rearrangement of the utilities with the City of Los Angeles, public agencies, and utility owners; and providing design services during the procurement and construction of MOS-1. In addition to continuing the design for MOS-1, facilities design tasks include reviewing final submittal packages, incorporating comments into drawings and specifications, repackaging design drawings to conform with construction contract packaging, and modifying existing designs to accommodate adjacent Light Rail Transit (LRT) construction.

During procurement and construction of MOS-1, MRTC provides support to the District through participation at Pre-Bid conferences, evaluation of bids, review of Contractors' submittals, preparation of design changes during construction, clarification of design intent, and resolution of design issues.

3.1.2 Detailed Description of Work

A detailed description of the design work to be accomplished on Facilities follows. A summary of the status of Facilities Contracts is given in Table 1.

TABLE 1

Facilities Contract Status Summary

<u>Contract No.</u>	<u>Discipline</u>	<u>Advertisement</u>	<u>Notice to Proceed</u>
*A111	Santa Fe Ave. Restoration	04/19/89	08/25/89
A112	Main Shop Building	05/05/87	09/14/87
A115	Yard Storage Area	04/13/87	08/06/87
*A116	Yard Site Security Fencing	07/21/88	11/29/88
A117	Yard Site Lighting	03/29/88	08/04/88
*A118	Yard Site Landscaping	01/25/89	06/01/89
*A124	Ducommon St. and Jackson St. Restoration	10/21/88	03/02/89
A130	Yard Leads and Transfer Zone	01/11/88	05/06/88
A134	Demolition of Structure on Parcel A1-032	02/12/87	05/14/87
A135	Union Station: Stage I	06/01/87	10/02/87
A136	Union Station: Stage II	12/13/88	04/20/89
*A138	Union Station Sitework	02/19/90	06/26/90
*A139	Union Station Site Landscaping	03/13/91	07/19/91
A147	Civic Center Station: Stage II	05/24/89	10/02/89
A157	5th/Hill: Stage II	04/07/89	08/15/89
A165	7th/Flower Station: Stage I (MRT only)	01/30/87	06/08/87
A167	7th/Flower Station: Stage II	08/22/88	12/30/88
A175	Wilshire Alvarado Station: Stage I	03/02/87	07/10/87
*A185	Wilshire/Alvarado Station Restoration	03/07/90	07/13/90
*A186	Wilshire/Alvarado Station Site Landscaping	03/07/90	07/13/90
A187	Wilshire/Alvarado Station: Stage II	04/21/89	08/29/89
A610	Trackwork Installation	08/13/87	12/22/87
A616	Rail Fasteners Procurement (MRT/LRT)	05/11/87	08/10/87
*A760	Signs and Graphics Procurement	03/10/89	07/18/89
*A785	Fire Suppression Equipment Procurement	01/09/90	05/15/90
*A790	First Stores and Consumables Procurement	01/24/90	05/31/90

\* Design not included in 87/88 AWP.

NOTE: The above milestone dates are based on Level III, Rev. 5A Schedule.



A. MOS-1 Final Facilities Design

1. Yard and Shops

- a) Complete the redesign of sections A130 and A135 as described in the Scope of Services previously negotiated, and included herein as Appendix A and Appendix B, respectively.
- b) Develop construction contract for Contract A117, Yard lighting.

2. Union Station, Stage I

- a) West Entrance: Coordinate and review station entrance design by Los Angeles Union Passenger Terminal (LAUPT).
- b) East Entrance: Perform preliminary and final design of the East entrance and coordinate the design parameters with SCRTD and LAUPT in order to finalize the penetration location for the exhaust shafts. Based on review comments and approved preliminary design, perform detailed architectural and engineering design of the East entrance.
- c) Busway Ramp: Prepare concept of the busway ramp, from Union Station East Entrance to the new El Monte Busway. Coordinate concept with SCRTD, LAUPT, City of Los Angeles, and CALTRANS.

3. Union Station, Stage II

Incorporate 100% design review comments and all outstanding change requests into Contract A136. Revise demolition to reflect work in Contract A135 and delete fire sprinkler pipes in Under Platform Exhaust (UPE). Prepare Stage II design of the East entrance and coordinate Stage II design of the West entrance with LAUPT. Outstanding change requests to be incorporated into Contract A136 include the following:

- 5-013 Reduce Cable and Breaker Size
- 5-065A F/S Dampers
- 5-076 Conduit for TPSS Rectifier
- 5-081 Roll-up Doors
- 5-084A Continuous Ventilation
- 5-087 UPS
- 5-088 Delete Mechanical Ventilation
- 6-007 Embedded Conduit
- 6-008 Redundant Fans
- 6-014 UPS Voltage
- 6-015 Battery Room Ventilation
- 6-016 Air Pressure
- 6-020 Smoke Detectors
- 6-024 Structural Standards
- 6-025 Deluxe Auxiliary Cable Tray
- 6-030 Delete Lossy Line Holders
- 6-529 Delete Entrance
- 7-001 Fare Collection
- 7-004 Upgrade Card Access Control System.

4. Civic Center Station, Stage II

Incorporate 100% review comments that were not the responsibility of the Section Designer, and all outstanding change requests into Contract A147:

- 5-013 Reduce Cable and Breaker Size
- 5-082 Handrail Light
- 5-084A Continuous Ventilation
- 5-088 Mechanical Ventilation
- 6-008 Redundant Fans
- 6-014 UPS Voltage
- 6-015 Battery Room Ventilation
- 6-020 Smoke Detectors
- 6-024 Structural Standards
- 6-030 Delete Lossy Line Holders
- 7-001 Fare Collection
- 7-004 Upgrade Card Access Control System.

5. 5th/Hill Station, Stage II

Incorporate 100% review comments that were not the responsibility of the Section Designer, and all outstanding change requests into Contract A157:

- 5-013 Reduce Cable and Breaker Size
- 5-081 Roll-up Doors
- 5-082 Handrail Light
- 5-084A Continuous Ventilation
- 5-088 Mechanical Ventilation
- 6-008 Redundant Fans
- 6-009 Relocate Valve Rooms
- 6-011 Relocate N.E. Entrance Blast Relief Shaft
- 6-012 Relocate S.E. Entrance Blast Relief Shaft

6-014 UPS Voltage  
6-015 Battery Room Ventilation  
6-020 Smoke Detectors  
6-024 Structural Standards  
6-030 Delete Lossy Line Holders  
7-001 Fare Collection  
7-004 Upgrade Card Access Control System.

6. 7th/Flower Station, Stage II

Incorporate 100% review comments that were not the responsibility of the Section Designer, and all outstanding change requests into Contract A167:

5-013 Reduce Cable and Breaker Size  
5-081 Roll-up Doors  
5-084A Continuous Ventilation  
5-088 Mechanical Ventilation  
6-008 Redundant Fans  
6-014 UPS Voltage  
6-015 Battery Room Ventilation  
6-020 Smoke Detectors  
6-024 Structural Standards  
6-030 Delete Lossy Line Holders  
7-001 Fare Collection  
7-004 Upgrade Card Access Control System.

7. Wilshire/Alvarado Station, Stage II

Incorporate 100% review comments that were not the responsibility of the Section Designer, and all outstanding change requests into Contract A187:

5-013 Reduce Cable and Breaker Size  
5-065A F/S Dampers  
5-081 Roll-up Doors  
5-084A Continuous Ventilation  
5-088 Delete Mechanical Ventilation  
6-007 Embedded Conduit  
6-008 Redundant Fans  
6-014 UPS Voltage  
6-015 Battery Room Ventilation  
6-020 Smoke Detectors  
6-025 Delete Auxiliary Cable Tray  
6-024 Structural Standards  
6-030 Delete Lossy Line Holders  
7-001 Fare Collection  
7-004 Upgrade Card Access Control System.

8. Ventilation Study

Perform ventilation study to verify that the revised alignment in contracts A141, A135, and A130 meet the FLSC criteria requirement, and prepare a ventilation report to demonstrate that requirements are met.

9. Contract A610, Trackwork

Revise documents to reflect changes to the Wilshire/Alvarado Station crossover, add floating slab and track details, incorporate specification review comments made by SCRTD, incorporate changes because of relocation of car wash, car cleaners platform, and maintenance-of-way building and revise to conform to redesigned contracts A130 and A135. At the maintenance-of-way building, add details for

switch machines. Add details for Santa Fe connection.

10. Contract A616, Direct Fixation Rail Fastener (LRT/MRT)

Finalize technical specification and produce contract documents for combined procurement.

11. Contract A710, Escalators

Revise current document to reflect changes due to 7th and Flower LRT/MRT combined station and deferrals at 5th and Hill.

12. Contract A720, Elevators

Revise current document to reflect changes due to 7th and Flower LRT/MRT combined station and deferrals at 5th and Hill.

13. Contract A740, Fans

Revise current documents to reflect changes due to addition of the Light Rail Station at 7th and Flower streets and revisions to Contract 130.

14. Contract A745, TPSS Air Handling Equipment

Revise current documents to reflect changes due to addition of the Light Rail Station at 7th and Flower streets and the revision to Contract A130.

15. Contract A760, Edgelight

Revise current document to resolve edgelight and advertising panel lighting design.

16. Contract A795, Uninterruptible Power System

Revise current document to incorporate Light Rail 7th/Flower Station and current RCC design in the Main Shop.

17. Design Review and Agency Submittals

Review documents for conformance to outside agency comments such as City-DOT, and coordinate the documents for acceptance. Perform internal review of documents to verify compliance with all codes and standards. Review work performed by other consultants that may have effect on the Metro Rail structures.

18. ROW Certification

Based on the preliminary and detail design, provide preliminary and final right-of-way certification of properties required for the construction of the Metro Rail project. Review completed documents to verify that the structures are within the acquired property lines and the easement agreements as reflected in the contract documents.

19. Utility Coordination

Coordinate the design with the City of Los Angeles and other agencies whose utilities are

affected by the construction of the Metro Rail project. Review the designs performed by utility agencies to verify that their design is not in conflict with other utilities and that the contractor has all the information for the construction of the Metro Rail facilities.

20. Special Studies

Perform special studies, as directed by the District. The study areas may include items of work beyond MOS-1 or those that are already designed and/or under construction.

21. Project Management

Perform management of design through project managers designated to one or more design contract units. Project Manager will coordinate amongst all involved disciplines to ensure criteria and standards are met and assist the District project managers in the coordination of the design with the City of Los Angeles and outside agencies.

22. Management

The Division Manager and the Deputy Division Manager will provide day-to-day supervision of the Division's activities, including providing technical direction of disciplines, coordination with the District, and coordination with the Construction Managers. The Managers will also be responsible for maintaining and implementing cost control measures to verify that



the task-oriented designs go with the budget and meet the schedule directed by the District.

23. Tunnel Engineer

Provides technical input to the design of tunnels, reviews dewatering and treatment requirements, performs project management functions for the Geotechnical Consultants work, and assists the District in the technical matters pertaining to tunnels and dewatering.

24. Specifications

Specifications writers, with the help of the word processing operator, will write specifications for all the design contracts to be advertised. Specifications writers will coordinate with all the involved disciplines to incorporate the technical requirements for each of the design contracts. Further, the specifications writers will issue addendum change notice and change orders to the advertised contracts and to the contracts that are already in construction.

25. Clerical

Provide day-to-day clerical support to the managers and other technical staff in the Division, in addition to maintaining the correspondence files and assisting the managers in the operation of the Division.

26. Special Consultants

Secure and manage the services of special consultants to provide engineering services, as directed by the District, in such areas as:

a) Soils and Subsurface Investigation

Exploratory borings, including soil, rock, and water samples for laboratory analysis. Prepare reports detailing findings, and provide geotechnical design input for Contracts A130 and A135 realignment design.

b) Water Treatment

Consulting and conceptual design of water treatment systems as required for Contracts A130 and A135 realignment design. Detailed review and analysis of final water treatment designs submitted by contractors.

c) Dewatering

Consulting and conceptual design of dewatering systems as required for Contracts A130 and A135 realignment design. Detailed review and analysis of final dewatering designs submitted by contractors.

d) Special Structural Consulting (Including Underpinning)

Structural consulting and design for special conditions, including underpinning,

compaction grouting, tunneling techniques, and soil stabilization.

e) Noise and Vibration

Review of the Stage II design of the MOS-1 stations to verify that the selected materials and finishes meet the required noise levels, and that the construction methods used will not be affected by vibration. The consultant will also be required to review, as needed, shop drawings pertaining to noise attenuation measures in the stations.

f) Corrosion Control

Review of corrosion control measures for the contracts to be advertised, and review of shop drawings, if required, from the contractors for contracts which are under construction.

g) Baggage Handling

Prepare special study to determine feasible means of relocating Amtrak facilities to the south portion of the existing Union Station.

h) Station Lighting

Review platform edge light, backlighted signs, and advertising/artwork lighting to resolve and implement fixture designs meeting all applicable criteria.

B. Contract A130 Realignment

1. Facilities

As previously negotiated in the A130 and A135 realignment scopes, included herein respectively as Appendixes A and B, Facilities will develop engineering plans for the realignment of contracts A130 and A135. Submittals for review will be made at the 30%, 60%, 85%, and 100% levels of design.

2. Systems

The Traction Power, Communications Train Control contract drawings will be revised to update conduit layouts and to present accurate interface alignments. The activities will be twofold:

- a) Revise systems contract drawings for contracts A631, A620, and A640
- b) Provide input for revision of facilities drawings for Contract A130.

C. Modification to Contract A135

Modify current Contract A135 documents to reflect design changes as a result of the Contract A130 realignment.

D. Facilities Design Support Services During Procurement and Construction

Use the knowledge and expertise gained through the development of criteria, specifications, and design of MOS-1 to support the District in the procurement and construction of the MOS-1 facilities and equipment. As requested by the District designee, services shall include:

1. Design support during Bid Period (prior to Notice to Proceed), as follows:
  - a) Modify drawings and specifications for amendments/addenda that involve design changes
  - b) Provide responses to bidders' inquiries that require answers from designer
  - c) Attend Pre-bid Conferences to explain scope of work and answer design-related technical questions
  - d) Participate in bid review and evaluation.
2. Design support during construction/procurement:
  - a) Review specific shop drawings in coordination with CM
  - b) Review technical submittals when design intent or change is involved
  - c) Clarify design intent when requested by CM

- d) Provide technical support for Change Orders involving design intent or change, or requiring knowledge of evolution of design concept
- e) Provide technical support on procurement contracts involving design change or intent
- f) Review waiver/substitution requests involving performance specifications and/or functional or systems safety considerations
- g) Provide technical assistance as required for certification or recertification of right-of-way
- h) Review Value Engineering proposals submitted by construction contractors related to design
- i) Review construction progress for compatibility and design intent of plans and specifications
- j) Produce design change notices to incorporate approved changes to the contract drawings and specifications.

3.2 PROJECT CONTROL

3.2.1 Definition of Work to be Accomplished

Project control tasks include: Prepare engineer's estimates for each contract prior to bid opening; assist in the review of design/construction schedules, construction estimates.

3.2.2 Detailed Description of Work

A. Estimating: Provide estimating assistance to the District by providing the following services:

1. Prepare 100% cost estimates and bid forms for facility, systems, and procurement contracts in support of the District's master schedule
2. When preparing 100% estimates, prepare constructibility review of drawings and specifications
3. Perform estimate reviews of MOS-1 contracts with SCRTD and MRTC management and engineering team
4. Prepare Engineer's Estimate for contract packages that are advertised by incorporating comments to final estimates and addenda, with due consideration to current market conditions
5. Prepare estimates for change requests and/or engineering studies
6. With prior approval of the District, secure and manage the services of special estimating consultants.

B. Scheduling: Assist the District with project scheduling by performing the following tasks:

1. Monthly review and update of System Design schedule versus AWP

2. Monthly review and update of Facility Design efforts versus AWP
3. Monthly design control register update for contracts A130 and A135 realignment.
4. Review of contract-specific schedules to ensure that schedule and Engineer's Estimates are coordinated
5. Special study schedules for engineering options and changes, as requested.

C. Cost Engineering: Collect, analyze, and report actual and forecasted project costs in accordance with the tasks of the AWP and the Work Breakdown Structure. Cost engineering activities include:

1. Prepare monthly MRTC Progress Reports, including monitoring of man-hour expenditures and forecast-to-complete by AWP task
2. Prepare revisions to the Contract Unit Descriptions Book as required
3. Continue to issue special studies and forecasts on request.

### 3.3 SYSTEMS DESIGN

#### 3.3.1 Definition of Work to be Accomplished

Provide the management and staff needed to plan, organize, direct, supervise, control, and coordinate in the areas of systems equipment design and design



services during procurement and construction for MOS-1.

A. Systems Equipment Design Summary

1. The following contracts will be advertised during the latter part of the 1986-87 AWP period. During the 1987-88 AWP, addenda will be issued as needed, proposals will be received, and, after evaluation, recommendations leading to Award of Contract will be made. The Contract will be awarded and Notice to Proceed will be issued by the District.

- o Passenger Vehicle (Contract A650)
- o Communications (Contract A640).

2. For the following contract, the final (100%) milestone submittal has been achieved during the 1986-87 AWP program. During the 1987-88 AWP period, the contract will be advertised, addenda will be issued as needed, bids will be received, and, after evaluation, recommendations leading to Award of Contract will be made, contract will be awarded and Notice to Proceed will be issued by the District.

- o Automatic Train Control (Contract A620).

3. For the following contracts, the final (100%) milestone submittals have been achieved during earlier AWP's. During the 1987-88 AWP period, the specifications, drawings, and other associated documents will be updated to include incorporation of change requests and to reflect current design leading to contract packages

ready for advertising. All of these contracts will be advertised during the forthcoming AWP period. Award of Contract A630 will be made during that time. Support will be needed for evaluation of proposals for Contract A630.

- o Traction Power Procurement (Contracts A612, A615, and A630).

4. For the following contract, the final (100%) package for the barrier type system will be completed and stored on the shelf for possible future use.

- o Barrier Type Fare Collection System (Contract A660).

In accordance with the SCRTD Board decision, the Fare Collection design staff will work closely with the Southern California Rail Consultants, the Los Angeles County Transportation Commission, and District staffs to provide design support for procurement and installation of a barrier free system for the MOS-1 stations under the following contract:

- o Barrier Free Fare Collection System (Contract H840).

5. Auxiliary Vehicles and Miscellaneous Shop and Maintenance Equipment

- a) For the following contract, the final (100%) milestone submittal has been achieved during an earlier AWP program. Further development of the procurement

documents has been held in abeyance since that milestone was achieved, pending direction from SCRTD. The contract will be advertised during the 1988-89 AWP period, and development of the procurement documents will be resumed during the 1987-88 AWP period.

- o Locomotive (Contract A671).

- b) Further development of procurement documentation for equipment to be procured under the following contract will be initiated and substantially completed during the 1987-88 AWP period.

- o Shop Equipment--Fixed (Contract A730).

- c) The following contracts will be advertised during the 1989-90 AWP period, and development of the procurement documents will not be resumed until the 1988-89 AWP period.

- o Flat Cars (Contract A672)

- o Crane for Flat Car (Contract A675)

- o Shop Equipment--Freestanding (Contract A735)

- o Rubber-tired Vehicles (Contract A770)

- o Mobile Emergency and Maintenance Equipment (Contract A775).

6. The following contract will not be advertised, but the necessary signage will be manufactured by the District Facilities Maintenance Department during the 1989-90 AWP period. Development of the design documents will take place during the 1989-90 AWP period.

- o Operational Graphics (Contract A680).

7. Final (100%) cost estimates have previously been prepared for all major equipment items. Engineer's cost estimates will be prepared during this AWP year to support bid openings and cost proposals for:

- o Passenger Vehicles (Contract A650)
- o Communications (Contract A640)
- o Automatic Train Control (Contract A620)
- o Traction Power Procurement (Contract A630).

B. Design Support Services During Procurement and Construction

For the Facilities and Systems procurement contracts which have been or will be advertised during the 1987-88 AWP year, procurement support coordinated with the District staff will be provided as needed for contract terms and conditions, procurement methods and procedures, negotiations, bid/proposal evaluation, and meetings with technical staff and/or contractor personnel as requested. Changes in procurement terms will be tracked and incorporated into all affected procurement contract packages as listed and scheduled in Table 2.

TABLE 2

Systems Contract Status Summary

<u>Contract No.</u>	<u>Discipline</u>	<u>Advertisement</u>	<u>Notice to Proceed</u>
A612	Contact Rail	04/18/88	08/24/88
A615	Coverboard	04/18/88	08/24/88
A630	Traction Power Equipment	01/04/88	05/09/88
A631	Traction Power Installation	06/06/88	10/13/88
A620	Automatic Train Control	07/01/87	12/31/87
A640	Communication	04/15/87	02/04/88
A650	Passenger Vehicles	03/16/87	01/20/88
A660	Fare Collection Barrier Type	06/20/88	03/21/89
H840	Fare Collection Barrier Free	05/15/87	12/31/87
A671	Locomotive	11/24/88	04/03/89
A672	Flat Cars	05/30/89	10/05/89
A675	Crane for Flat Car	05/30/89	10/05/89
A680	Operational Graphics	See Note 2	04/29/90
A730	Shop Equipment--Fixed	08/02/88	12/02/88
A735	Shop Equipment--Free-Standing	06/07/89	10/01/89
A770	Rubber-Tired Vehicles	06/21/89	10/27/89
A775	Mobile Emergency and Maintenance Equip.	12/11/89	04/18/90
A780	Furniture	07/02/90	11/07/90
A790	First Stores and Consumables	01/24/90	06/31/90
A745	TPSS Air Handling Equipment	06/11/87	10/19/87
A740	Fans	06/22/87	10/28/87
A710	Escalators	10/26/87	03/04/88
A720	Elevators	03/21/88	07/27/88
A795	Uninterruptible Power System	10/21/88	03/02/89

NOTE: 1. The above milestone dates are based on Level III, Rev. 5A Schedule.

2. Operational Graphics signs will be manufactured in RTD workshop, hence no need for advertising.

C. Support Services Staff

Clerical, drafting, and contract document editing staff will be provided as needed to meet the requirements of the Systems Division.

D. Specialty Consultants

Consultants will be retained to provide specialty services in support of the Passenger Vehicle, Supervisory Control and Data Acquisition Subsystem, Radio Subsystem, and Fire Protection Review and Analysis.

3.3.2 Detailed Description of Work

The following items of work will be performed for each of the systems elements listed. Work will be performed to meet the milestones shown in Table 2 and in support of the Level III, Rev. 5A construction schedule.

A. Systems Equipment Design

1. Communications

The Communications system Contract A640 package has been completed and advertised. During the 1987-88 AWP period, efforts related to the Communications system will be expended primarily in the following areas:

- o Design Support
- o Procurement Support.

a) Design Support: The following design-related activities will be performed by the Communications staff during this AWP period:

- (1) Prepare Engineer's Cost Estimate for Contract A640
- (2) Continue interface review and coordination between Contract A640 and all other contracts
- (3) Review changes to Facilities contract drawings included as Reference Drawings in the Communications system Procurement Documents for impact on Contract A640
- (4) Assist in resolving problems related to conduit and Communications system cable routing in Facilities Stage I contracts
- (5) Review Facilities Stage II design submittals for Communications system interface compatibility
- (6) Develop detailed interface definition between the District's telephone contract with NTI and Contract A640
- (7) Amend Communications system Procurement Documents to accommodate anticipated, but as yet undefined, communications requirements related to

the Los Angeles Fire Department and the SCRTD Headquarters building

- (8) Prepare Contract Documents to conform the Specifications Book to the executed Contract A640
- (9) Participate in planning for Systems Integration Test
- (10) Provide assistance to the Operations and Maintenance Committee, as requested by the District
- (11) Assist in resolving issues related to the Communications system design which may arise from the California Public Utilities Commission (PUC).

b) Procurement Support: The following procurement-related activities will be performed by the Communications staff during this AWP period:

- (1) Attend Communications system procurement coordination meetings and other meetings, as requested by the District
- (2) Provide assistance during pre-proposal conference
- (3) Prepare written responses to questions submitted by potential proposers/suppliers



- (4) Prepare addenda as necessary to supplement Contract A640 Request for Proposals and Contract Documents
- (5) Participate in evaluation of proposals
- (6) Support the District in discussions/negotiations with proposers/suppliers, as requested
- (7) Participate in evaluation of Best and Final Offers, as requested by the District
- (8) Participate in pre-award survey, as requested by the District
- (9) Respond to District/Construction Manager inquiries related to the Communications system design basis
- (10) Prepare responses to Contractor inquiries related to design issues and intent of Technical Provisions
- (11) Review Contractor CDRL submittals scheduled during this AWP period, including but not limited to:
  - o Design Review schedule
  - o Conceptual Design Review package
  - o Interface data
  - o Quality Assurance procedures

- o Software Quality Assurance Plan
- o SCADA Training Seminar material
- o SCADA Training Schedule

(12) Review Contractor cost reduction/Value Engineering submittals, as requested by the District

(13) Prepare for and attend technical meetings with Construction Manager/ Contractor, as requested by the District

(14) Provide engineering support to the Construction Manager, as requested by the District.

## 2. Passenger Vehicle

The Passenger Vehicle Contract A650 package has been completed and advertised. During the 1987-88 AWP period, efforts related to Passenger Vehicle will be expended primarily in the following areas:

- o Design Support
- o Procurement Support.

a) Design Support: The following design-related activities will be performed by the Passenger Vehicle staff during this AWP period:

- (1) Prepare Engineer's Cost Estimate for Contract A650
  - (2) Continue interface review and coordination between Contract A650 and all other contracts
  - (3) Prepare Contract Documents to conform the Specifications Book to the executed Contract A650
  - (4) Review and comment on draft Contract A655 for Passenger Vehicle testing services at the Transportation Test Center, prepared by the District
  - (5) Participate in planning for Systems Integration Test
  - (6) Assist in resolving issues related to the Passenger Vehicle design which may arise from the PUC.
- b) Procurement Support: The following procurement-related activities will be performed by the Passenger Vehicle staff during this AWP period:
- (1) Attend Passenger Vehicle procurement coordination meetings and other meetings, as requested by the District
  - (2) Provide assistance during pre-proposal conference

- (3) Prepare written responses to questions submitted by potential proposers/suppliers
- (4) Prepare addenda as necessary to supplement Contract A650 Request for Proposals and Contract Documents
- (5) Participate in evaluation of proposals
- (6) Support the District in discussions/negotiations with proposers/suppliers, as requested
- (7) Participate in evaluation of Best and Final Offers, as requested by the District
- (8) Participate in pre-award survey, as requested by the District
- (9) Respond to District/Procurement Manager inquiries related to the Passenger Vehicle design basis
- (10) Prepare responses to Contractor inquiries related to design issues and intent of Technical Provisions
- (11) Review Contractor CDRL submittals scheduled during this AWP period, including but not limited to:
  - o Design Review Schedule
  - o Conceptual Design Review package

- o Quality Assurance procedures
  - o Software Quality Assurance Plan
  - o Management Plan
  - o Human Factors Report
  - o Interface Data Requirements Form
  - o Weight Statement
  - o System Support Plan
- (12) Review Contractor cost reduction/Value Engineering submittals, as requested by the District
  - (13) Prepare for and attend technical meetings with Procurement Manager/ Contractor, as requested by the District
  - (14) Provide engineering support to the Procurement Manager, as requested by the District.

### 3. Traction Power

The following contracts comprise the design and procurement related to the Traction Power discipline:

- o Contact Rail Procurement - Contract A612

- o Protective Coverboard Procurement - Contract A615
- o Substation Equipment Procurement - Contract A630
- o Traction Power Installation - Contract A631.

During the 1987-88 AWP, design discipline efforts will be divided between design support and procurement support as three of the contracts (A612, A615, and A630) are advertised for bid.

a) Design Support: Design support by the Traction Power staff will include the following activities:

- (1) Review Facilities Stage II design submittals to verify conduit schedule accuracy and interfaces with Traction Power
- (2) Track changes made to original facility reference drawings and evaluate impacts on traction power documents
- (3) Revise Contract A631 installation bid documents to include the DWP requirements at the Yard substation
- (4) Prepare the Engineer's Estimate for Contract A630

- (5) Review Level III construction schedule changes
  - (6) Provide interface assistance to DWP and prepare drawings with the detailed DWP requirements for inclusion in the station contract documents
  - (7) Update contract documents and reference drawing packages prior to contract advertising
  - (8) Assist in resolving problems related to Traction Power conduit routing in Facilities Stage I contracts.
- b) Procurement Support: The MRTC Traction Power staff will participate in the following procurement-related activities:
- (1) Obtain legal/technical sign-off of contract documents
  - (2) Prepare written responses to bidder questions
  - (3) Prepare for and attend pre-bid and bidder conferences as requested by the District
  - (4) Evaluate technical material submitted with bids
  - (5) Provide technical service related to construction activities as requested by the District

(6) Prepare addenda as may be required during the bid period

(7) Participate in pre-award survey as requested by the District.

4. Automatic Train Control

The Automatic Train Control (ATC) Contract A620 package will be completed and advertised for procurement during the 1987-88 AWP period. A sealed bid process will be followed, and bids will be accompanied by supplemental information related to bidder responsibility. Efforts related to the ATC system will be expended primarily in the following areas:

o Design Support

o Procurement Support.

a) Design Support: The following design-related activities will be performed by the ATC staff during this AWP period:

(1) Incorporate changes since Final Design Review into the ATC system Procurement Documents and distribute for Legal/Technical review

(2) Incorporate changes resulting from Legal/Technical review into the ATC system Procurement Documents and distribute for Advertisement of Contract A620



- (3) Prepare Engineer's Cost Estimate for Contract A620
- (4) Continue interface review and coordination between Contract A620 and all other contracts
- (5) Review changes to Facilities contract drawings included as Reference Drawings in the ATC system Procurement Documents for impact on Contract A620
- (6) Review Facilities Stage II design submittals for ATC system interface compatibility
- (7) Prepare Contract Documents to conform the Specifications Book to the executed Contract A620
- (8) Participate in planning for Systems Integration Test
- (9) Provide assistance to the Operations and Maintenance Committee, as requested by the District
- (10) Assist in resolving issues related to the ATC system design which may arise from the PUC
- (11) Assist in resolving problems related to conduit and ATC system cable routing in Facilities Stage I contracts.

b) Procurement Support: The following procurement-related activities will be performed by the ATC staff during this AWP period:

- (1) Attend ATC system procurement coordination meetings and other meetings, as requested by the District
- (2) Provide assistance during pre-bid conference
- (3) Prepare written responses to questions submitted by potential bidders/suppliers
- (4) Prepare addenda as necessary to supplement Contract A620 Invitation to Bid and Contract Documents
- (5) Participate in evaluation of supplemental material
- (6) Support the District in meetings with bidders/suppliers, as requested
- (7) Participate in pre-award survey, as requested by the District
- (8) Respond to District/Construction Manager inquiries related to the ATC system design basis
- (9) Prepare responses to Contractor inquiries related to design issues and intent of Technical Provisions

(10) Review Contractor CDRL submittals scheduled during this AWP period, including but not limited to:

- o Design Review schedule
- o Conceptual Design Review package
- o ATC equipment room drawings
- o ATC equipment rack drawings
- o Rack grounding details
- o Interface Management Plan
- o Vehicle interface connector details
- o ATP receiver coil details
- o Test Plan
- o Management Plan
- o Schedule
- o Configuration Management Plan
- o Drawings List
- o Interface Data Requirements Form
- o System Assurance Program Plan
- o System Safety Program Plan

- o Reliability Analyses
  - o Reliability Demonstration Plan
  - o Maintainability Analyses
  - o Maintainability Demonstration Plan
  - o Quality Assurance Program and procedures
  - o Statistical Sampling Plan
  - o Quality Assurance Program audit procedure and schedule
  - o System Support Plan
  - o Training Program Plan
- (11) Review Contractor cost reduction/Value Engineering submittals, as requested by the District
- (12) Prepare for and attend technical meetings with Construction Manager/ Contractor as requested by the District
- (13) Provide engineering support to the Construction Manager as requested by the District.

5. Fare Collection

- a) Barrier Free Fare Collection System LACTC  
(Contract H840)

The Fare Collection equipment procurement for a barrier free system is being structured as a competitive negotiation. LACTC specifications and drawings will include the Metro Rail Fare Collection equipment quantities as part of the Light Rail procurement. During the 1987-88 AWP period, MRTC will provide limited design assistance to the District in the following areas of activity:

- o The contract addenda will be reviewed for compatibility with stations and the Communications System.
- o Participation in meetings will be provided to resolve interface problems as requested by the District.
- o The Facility Stage II submittals will be reviewed for Fare Collection equipment interface compatibility.
- o The Barrier Free Fare Collection Contractor submittals will be reviewed for station and Communication system compatibility as requested by the District.

b) Barrier Type Fare Collection System (Contract A660)

The Fare Collection specification for a barrier type system will be completed and placed on the shelf for possible future use. The following activities during the 1987-88 AWP are planned:

- o Complete responses to comments on Industry Review specifications
- o Update criteria
- o Determine equipment quantity revisions required as a result of approved criteria revisions
- o Participate in meetings to resolve problems related to possible future incorporation of a barrier system
- o Incorporate comment resolutions into the specification.

6. Auxiliary Vehicles and Miscellaneous Shop and Maintenance Equipment

Development of procurement documentation for Auxiliary Vehicles and Miscellaneous Shop and Maintenance Equipment will be resumed as directed by the District to support Level III, Rev. 5A schedules.

MRTC will incorporate changes since Final Design Review into the Locomotive Procurement

Documents, distribute them for Legal/Technical review, and incorporate changes resulting from Legal/Technical review into the Procurement Documents for Contract A671.

MRTC will develop Procurement Documents for Shop Equipment--Fixed, distribute them for a Pre-Final Design Review, and incorporate changes resulting from Pre-Final Design Review into the procurement documents for Contract A730.

7. Miscellaneous Mechanical/Electrical

The procurement and installation requirements for gas and seismic detection and monitoring are included in Communications Contract A640. The various activities for 1987-88 AWP have been described in 3.3.2.A.1, Communications.

B. Support Services Staff

Provide drafting, clerical, editing, and word processing support as needed for completion of specifications, drawings, and other documents in a timely manner to meet the contract document schedules shown in Table 2.

D. Specialty Consultants and Other Technical Services

MRTC will retain the existing services of Special Consultants to perform engineering services, including but not limited to preparation of drawings, specifications, and proposal reviews for:

1. Supervisory Control and Data Acquisition Subsystem (Macro Corp.)
2. Passenger Vehicle Heating, Ventilation, and Air Conditioning Subsystem (C. Richards)
3. Fire Protection (Rolf Jensen)
4. Radio (Terry Collins Associates).

3.4 SYSTEMS ASSURANCE, SAFETY, AND OPERATIONS AND MAINTENANCE

3.4.1 Definition of Work to be Accomplished

A. Systems Assurance and Safety Engineering

All equipment and construction contracts will be reviewed prior to advertisement to verify compliance with safety, security, and system assurance criteria, through development and use of checklists. In addition, participation will be maintained in fire/life safety and security committees for maintaining criteria and monitoring conformance with design criteria.

B. Operations and Maintenance

Operations and maintenance personnel will continue to provide support for development and refinement of operations and maintenance plans, and participate in operations and maintenance planning committees to resolve outstanding issues.



### 3.4.2 Detailed Description of Work

#### A. Systems Assurance Safety and Security

The following ongoing activities will continue to be performed in support of facilities and system equipment contracts:

##### 1. Safety Certification

As required by the SCRTD Safety Certification Plan, the Criteria Conformance Verification Checklists and Specification Conformance Checklists for all Facilities and Systems contracts will continue to be prepared in support of Level III, Rev. 5A schedules. This work will be performed in accordance with the procedures contained in the Safety Certification Plan, and the product will provide part of the basis for Safety Certification of the Metro Rail system.

##### a) Criteria Conformance Verification

A review of final bid-ready contract drawings and specifications will be performed, utilizing Criteria Conformance Checklists, to verify compliance with fire/life safety, system safety, security, and system assurance design criteria. Safety/assurance-related comments documented during the design review process will be reviewed to ascertain that acceptable resolution of comments has been incorporated in the contract documents. Any remaining open issues will be identified,

documented, and tracked to final resolution. Assistance in resolution of open issues will be provided. Checklists, design review comments, and related documentation will be compiled into a single package for submittal to the SCRTD Safety Certification Review Team for audit and execution of the Criteria Conformance Certificate.

b) Specification Conformance Checklists

The final bid-ready specifications, addenda, and change orders will be reviewed to identify those contract requirements pertaining to safety, assurance, and security. The requirements will be listed in tabular format, utilizing the Specification Conformance Checklist. Draft checklists will be submitted to the SCRTD for review and comment and the checklists will be revised as required. In conjunction with the SCRTD Supervisor, Safety and System Assurance, the verification responsibility and stage of the project/contract at which the information that verifies compliance will be available is determined and included on the checklist. The checklist will be utilized throughout execution of the contract to document satisfactory completion and verification of the requirements.

2. Safety Engineering

a) As detailed in the SCRTD System Safety and Security Program Plan and the SCRTD Hazard Resolution Program, the following hazard analyses will be completed and/or updated in accordance with the Guidelines for the Preparation of Safety and System Assurance Analyses, SCRTD 5-001. The analyses will form part of the basis for Safety Certification.

(1) Subsystem Hazard Analyses: The Subsystem Hazards Analysis (SHA) is used to determine hazards that could adversely affect the safe operation of each system. The SHA identifies components and lower-level elements whose performance, degradation, functional failure, or inadvertent functioning can cause a hazard.

(2) Interface Hazard Analyses: The Interface Hazard Analysis (IHA) is performed concurrently with the Subsystem Hazard Analysis and is used to update the Preliminary Hazard Analysis performed by others.

(3) Critical/Catastrophic Items List: The Critical/Catastrophic Items List (C/CIL) is used to compile hazards that could affect the safe operation of the total system. The C/CIL places in one master list all the Category I & II hazards (those which could cause

death, serious injury, major disruption, etc.) that have not been resolved.

b) The Safety Engineering staff will:

- (1) Participate in the evaluation of technical proposals submitted by contractors/vendors for systems contracts such as Passenger Vehicles, Communications, etc.
- (2) Participate in fire/life safety committee and other committee meetings and respond to action items generated. Provide assistance in determining acceptable resolution of concerns identified by the fire/life safety committee and tracking of action items to completion.
- (3) Participate as requested in special studies regarding unique hazards identified during the design, construction, or procurement of Metro Rail facilities and systems.

### 3. Systems Assurance

As detailed in the SCRTD System Assurance Program Plan and the SCRTD Hazard Resolution Program, the following documents will be prepared and/or updated in accordance with the Guidelines for the Preparation of Safety and System Assurance Analyses, SCRTD 5-001. These

documents will form part of the basis for Safety Certification. They are:

- a) Subsystem Reliability and Maintainability Numerical Requirements: This document, which formed the basis for all reliability and maintainability values shown in system specifications, will be updated.
- b) Single-Point Failure Summaries: A list will be prepared of single-point failures which could result in significant delays to service or critical/catastrophic safety hazards based on review of failure modes and effects analyses provided by contractors/vendors or others. Single-point failures that cannot be resolved by design will need to be mitigated by operating procedures.

#### 4. Security

As detailed in the SCRTD System Safety and Security Program Plan, design support and review of designs for compliance with SCRTD System Design Criteria and Standards will be provided. Reviews will be completed using design review checklists which form a part of the overall Safety Certification documentation.

Participation in the SCRTD Security Committee and other committee meetings and response to action items generated will be provided.

B. Operations and Maintenance

MRTC will participate in the formatting of the Standard Operating Procedures manual. It will participate in the Operations and Maintenance committee, providing input to special studies (such as passenger flow), and reviewing Facilities Stage II design submittals. The Operations and Maintenance staff will assist in the preparation of contract addenda and review of contractor submittals as requested.

3.5 CONFIGURATION MANAGEMENT AND DOCUMENT CONTROL

3.5.1 Definition of Work To Be Accomplished

Provide the management and staff needed to plan, organize, direct, supervise, control, and coordinate configuration control, contract administration, document control, and bid package sales.

3.5.2 Detailed Description of Work

A. Configuration Control

1. Continue to maintain change control system, publish change status report, provide data to document control for configuration status report, and maintain tracking system to assure closeout of all approved change actions.
2. Provide support efforts to review all packages for quality, coordinate with design activity to affect corrections, maintain design review action list, and act as focal point for distribution of comments, responses, and review

schedules. Assist in all document control efforts required to issue drawings for revision and check incoming drawings for procedural compliance.

B. Contract and GC Subcontract Administration

Provide procurement and administration services for obtaining, administering, and closing GC subcontracts for professional and general services and supplies, including the preparation of procurement documents and proposal requests. Coordinate and support compilation, assembly, and disposition of print-ready MOS-1 construction and procurement bid packages.

C. Document Control

1. Continue to maintain the baseline documents and data
2. Continue to provide secured storage for MOS-1 and post-MOS-1 design data
3. Control reproduction and distribution of baseline data and for the system, including design data
4. Provide microfilm storage of design data
5. Continue to maintain disaster vault
6. Store project historical design data
7. Provide correspondence control.

D. Bid Package Sales

1. Microfilm contract packages addenda
2. Store and maintain official contract and addenda packages and change notices
3. Reproduce/sell bid and supporting documents to potential bidders
4. Maintain records of bid document recipients
5. Distribute bid documents and addenda
6. Maintain and manage an official bidder document review area
7. Assist in coordinating responses to bidders' questions, distribute copies of all responses to questions to all bidders, and maintain logs of the distribution.

3.6 MANAGEMENT

3.6.1 Definition of Work to be Accomplished

The GC will provide the overall project management needed to plan, organize, direct, and coordinate the work to be performed in support of the Metro Rail Project. Project Management will direct and control the efforts of the GC, including its staff and subcontractors.



3.6.2 Detailed Description of Work

A. Management Board

The Management Board is responsible for overall management of GC functions. It establishes policy, gives direction to GC Project Director in the conduct of GC activities, and acts on appropriate matters brought before it by the Project Director. It reviews and evaluates progress in achieving the objectives of the Project as set forth by the District, and responds to the resource requirements of the Project through the individual GC members.

B. Project Director

The Project Director provides the day-to-day overall direction to and management of the GC activities in carrying out services to the District in support of the Project. He reports to and communicates directives from the District Assistant General Manager, Transit Systems Development, for conduct of GC activities.

3.7 PROJECT ADMINISTRATION

3.7.1 Definition of Work To Be Accomplished

Provide the management and staff needed to plan, organize, direct, supervise, control, and coordinate the administrative aspects of the GC efforts, including affirmative action, Project personnel administration, office services, Project auditing/accounting, and publications/graphics support.

3.7.2 Detailed Description of Work

A. Affirmative Action

Coordinate, monitor, evaluate, enforce, and report on all matters of Equal Employment Opportunity (EEO), Disadvantaged Business Enterprise (DBE), and Women Business Enterprise (WBE) of the GC and its subcontractors in accordance with UMTA regulations and the objectives and goals set forth by the District. Assist the District in evaluating and implementing the EEO/DBE/WBE program and its compliance for the GC responsibilities of the Metro Rail Project.

B. Personnel Administration

Provide Project personnel services for mobilization and demobilization, recruitment, relocation administration, employee orientation, personnel records management, personnel policy development and administration, and travel services. Maintain MRTC staffing plan in accordance with the AWP.

C. Office Services

Provide a wide range of centralized services to the GC organization in support of the Project, including but not limited to:

1. Coordination of furniture and equipment
2. Purchasing and supplies
3. Coordination of space utilization and maintenance

4. Receptionist/clerk
5. Messenger service
6. Mail and telecommunications
7. Administrative policy development.

D. Project Auditing/Accounting

Provide Project financial management services, including maintenance of Project accounts and books, audit of invoices of selected subcontractors and vendors, and payment of all accounts payable. Implement and maintain of MRTC data processing equipment and procedures. Support pre-award, interim, and closeout audits of MRTC and its subcontractors.

E. Publications/Graphics Support

Provide and/or coordinate editorial, graphics, word processing, and printing services needed to support publication of project reports and specifications.

4.0            MANPOWER ALLOCATIONS

The GC has projected its monthly manpower needs based on the work defined and tasks described in Section 3.0. These projections are shown both in summary form and in detail in Tables 3 and 4. Included in the projections are the staff of the GC firms and that of DBE/WBE specialty subcontractors being employed to augment the GC's efforts.

TABLE 3

SUMMAN

SUMMARY MANPOWER ALLOCATION  
(MAN-MONTHS)

April 1, 1987

TASK DESCRIPTION	1987 MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	1988 JAN	FEB	MAR	APR	TOTAL
FACILITIES DESIGN:													
Final Design MOS-1	36.00	48.00	48.00	44.00	36.50	36.50	31.50	29.50	45.00	41.00	40.00	25.00	461.00
Contract A130/A135 Realign.	29.00	22.00	22.00	22.00	17.00	16.00	16.00	16.40	2.00	2.00	2.00		166.40
SUBTOTAL FACILITIES DESIGN	65.00	70.00	70.00	66.00	53.50	52.50	47.50	45.90	47.00	43.00	42.00	25.00	627.40
SYSTEMS DESIGN:													
Final Design MOS-1	20.50	20.40	19.90	19.20	19.20	19.20	16.30	16.30	16.50	15.50	15.50	14.00	211.50
Contract A130/A135 Realign.	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20					17.60
SUBTOTAL SYSTEMS DESIGN	22.70	22.60	22.10	21.40	21.40	20.40	18.50	18.50	16.50	15.50	15.50	14.00	229.10
PROJECT CONTROL:													
Final Design MOS-1	19.00	18.00	15.00	13.00	11.00	12.00	8.00	8.00	9.00	9.00	12.00	12.00	146.00
Contract A150/A135 Realign.				2.00	4.00		3.00	4.00	4.00	4.00			21.00
SUBTOTAL PROJECT CONTROL	19.00	18.00	15.00	15.00	15.00	12.00	11.00	12.00	13.00	13.00	12.00	12.00	167.00
PROJECT MANAGEMENT	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	27.00
ACCOUNTING	5.00	5.00	5.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	51.00
CONFIGURATION MANAGEMENT	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	28.00
DOCUMENT CONTROL & PLAN ROOM	8.00	8.00	8.00	8.00	8.00	8.00	7.00	7.00	7.00	7.00	7.00	7.00	90.00
CONTRACTS	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00	2.00	2.00	30.00
PERSONNEL/EEO/OFF SERV/PUB.	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	84.00
SUBTOTAL FINAL DESIGN MOS-1	103.75	114.65	111.15	103.45	92.95	92.95	80.05	78.05	94.75	89.75	91.75	75.25	1128.50
SUBTOTAL A130/A135 REALIGN.	31.20	24.20	24.20	26.20	23.20	18.20	21.20	22.60	6.00	6.00	2.00	0.00	205.00
TOTAL GC SERVICES	134.95	138.85	135.35	129.65	116.15	111.15	101.25	100.65	100.75	95.75	93.75	75.25	1333.50

TABLE 4-A  
 DETAILED MANPOWER ALLOCATION

April 1, 1987

FACILITIES DESIGN  
 Page 1 of 2

	(MAN-MONTHS)												TOTAL
	1987 MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	1988 JAN	FEB	MAR	APR	
-----													
A. FINAL DESIGN:MOS-1	-----												
A117								2.00	2.00				4.00
A135 E. Entrance Design	5.00	5.00	5.00	5.00	5.00	5.00							30.00
Revised Ventilation Rep.					1.50	1.50	1.50	1.50					6.00
A136 (Includes realign.)		14.00	14.00	14.00									42.00
A147					5.00	5.00	5.00						15.00
A157									6.00	6.00	6.00		18.00
A167									6.00	6.00	5.00		17.00
A187									4.00	4.00	4.00		12.00
A610		2.00	2.00										4.00
A616	1.00												1.00
A710			2.00	1.00									3.00
A720								2.00	1.00				3.00
A740	2.00												2.00
A745	2.00	2.00											4.00
A760					1.00	1.00	1.00	1.00	1.00				5.00
A795	1.00	1.00	1.00										3.00
-----													
SUBTOTAL (FINAL DESIGN)	11.00	24.00	24.00	20.00	12.50	12.50	7.50	6.50	20.00	16.00	15.00	0.00	169.00
-----													
B. DESIGN SERVICES DURING CONSTRUCTION	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	96.00
-----													
TOTAL	19.00	32.00	32.00	28.00	20.50	20.50	15.50	14.50	28.00	24.00	23.00	8.00	265.00
-----													

8712B

59

0059.0.0

8712R

60

0060.0.0

## DETAILED MANPOWER ALLOCATION

April 1, 1987

FACILITIES DESIGN  
Page 2 of 2

	(MAN-MONTHS)												TOTAL
	1987 MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	1988 JAN	FEB	MAR	APR	
C. DESIGN REVIEW/AGENCY SUBMITTALS	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	24.00
D. R.O.W. CERTS.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.00
E. UTILITY COORD.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.00
F. SPECIAL STUDIES	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	24.00
G. PROJECT MANAGEMENT	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	24.00
H. MANAGEMENT	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	24.00
I. TUNNEL ENGINEER	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	16.00
J. SPECIFICATIONS	4.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	36.00
K. CLERICAL	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	24.00
SUBTOTAL (OTHER)	17.00	16.00	16.00	16.00	16.00	16.00	16.00	15.00	17.00	17.00	17.00	17.00	196.00
GRAND TOTAL (FACILITIES DESIGN)	36.00	48.00	48.00	44.00	36.50	36.50	31.50	29.50	45.00	41.00	40.00	25.00	461.00

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TABLE 4-B  
DETAILED MANPOWER ALLOCATION  
SYSTEMS DESIGN  
(MAN-MONTHS)

April 1, 1987

TASK DESCRIPTION	1987								1988				TOTAL
	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	
Management	2.00	2.00	2.00	1.50	1.50	1.50	1.50	1.50	1.50	1.00	1.00	1.00	18.00
Clerical	2.00	2.00	2.00	1.50	1.50	1.50	1.50	1.50	1.50	1.00	1.00	1.00	18.00
Drafting	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	11.50
Word Processing/Editing	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.00
Communications (Incl. Misc. Mech/Elect)	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	17.00
Automatic Train Control	2.00	2.00											4.00
Traction Power	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	6.00
Passenger Vehicles/ Aux Veh/Maint Equip	1.50	1.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	13.00
Security/Assurance/ Safety Engineering	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	36.00
Operations/Maint.	0.50	0.40	0.40	0.40	0.40	0.40							2.50
Design Services During Construction/Procurement:													
Procurement Engineering Support	1.50	1.50	1.50	1.50	1.50	1.50	1.00	1.00	1.00	1.00	1.00	1.00	15.00
Communications (Incl. Misc. Mech/Elect)	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	23.00
Fare Collection	0.50	0.50	0.50	0.30	0.30	0.30	0.30	0.30					3.00
Automatic Train Control			2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	14.00
Traction Power	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	1.00	1.00	1.00	1.00	8.00
Passenger Vehicles/ Aux Veh/Maint Equip	0.50	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.50
TOTAL (SYSTEMS DESIGN)	20.50	20.40	19.90	19.20	19.20	18.20	16.30	16.30	16.50	15.50	15.50	14.00	211.50

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TABLE 4-D  
DETAILED MANPOWER ALLOCATION

April 1, 1987

	(MAN-MONTHS)												TOTAL
	1987 MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	1988 JAN	FEB	MAR	APR	
MANAGEMENT/CLERICAL	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	24.00
WORD PROCESSING	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.00
SCHEDULING/COST ENGINEERING	4.00	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	42.00
ESTIMATING	12.00	11.00	8.00	6.00	4.00	5.00	2.00	2.00	3.00	3.00	6.00	6.00	68.00
TOTAL	19.00	18.00	15.00	13.00	11.00	12.00	8.00	8.00	9.00	9.00	12.00	12.00	146.00

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TABLE 4-E  
 DETAILED MANPOWER ALLOCATION April 1, 1987  
 PROJECT ADMINISTRATION

TASK DESCRIPTION	(MAN-MONTHS)												TOTAL
	MAY	JUN	1987				1988				APR		
			JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR		
Management	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.00
Accounting	5.00	5.00	5.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	51.00
Configuration Mgmt.	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	28.00
Document Control & Plan Room	8.00	8.00	8.00	8.00	8.00	8.00	7.00	7.00	7.00	7.00	7.00	7.00	90.00
Contracts	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00	2.00	2.00	30.00
Personnel/EEO/Office Services/Publications	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	72.00
<b>TOTAL</b>	<b>26.00</b>	<b>26.00</b>	<b>26.00</b>	<b>25.00</b>	<b>24.00</b>	<b>24.00</b>	<b>22.00</b>	<b>22.00</b>	<b>22.00</b>	<b>22.00</b>	<b>22.00</b>	<b>22.00</b>	<b>283.00</b>

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TABLE 4-F													
A130 DETAILED MANPOWER ALLOCATION April 1, 1987													
A130/A135 REALIGNMENT DESIGN													
(MAN-MONTHS)													
TASK DESCRIPTION	1987 MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	1988 JAN	FEB	MAR	APR	TOTAL
-----													
Facilities Design:													
A130 Realignment	14.00	14.00	14.00	14.00	16.00	16.00	16.00	15.40					119.40
A130 Realignment (New work)	1.00	1.00	1.00	1.00	1.00								5.00
A135 Realignment	14.00	5.00	5.00	5.00									29.00
A130 Design Services during procurement (New work)									2.00	2.00	2.00		6.00
A135 Design Services during procurement (New work)		2.00	2.00	2.00									6.00
Specification writer								1.00					1.00
-----													
SUBTOTAL (FACILITIES)	29.00	22.00	22.00	22.00	17.00	16.00	16.00	16.40	2.00	2.00	2.00	0.00	166.40
-----													
Systems Design:													
Traction Power	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60					12.80
Auto. Train Control	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30					2.40
Communications	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30					2.40
-----													
SUBTOTAL (SYSTEMS)	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20					17.60
-----													
Estimating				2.00	4.00		3.00	4.00	4.00	4.00			21.00
-----													
GRAND TOTAL (A130/A135 REALIGNMENT DESIGN	31.20	24.20	24.20	26.20	23.20	18.20	21.20	22.60	6.00	6.00	2.00	0.00	205.00
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5.0            COST OF SERVICES

The following tables provide estimates of the costs of the services provided by the GC and its subconsultants. Table 5 summarizes the estimated costs of the GC and its subconsultants for the 87/88 AWP. Line items for the GC's services include direct labor, payroll additives, and overhead. Line items for cost of subconsultants include direct labor, payroll additives, overhead, and fees.

Table 6 summarizes the cost of subconsultants employed by the GC to provide technical reports and perform studies.

Table 7 summarizes the cost of DBE/WBE specialty subconsultants whose services are employed to augment GC's staff.

Table 8 summarizes the direct reimbursable expenses.

TABLE 5

## METRO RAIL TRANSIT CONSULTANTS

April 1, 1987

## FORECAST OF EXPENDITURES FOR 1987/1988 ANNUAL WORK PROGRAM

	MOS-1 FINAL DESIGN		TOTAL
	Balance of MOS-1 design and services during construction	Contract A130/A135 realignment design	
A. Facilities Design	3,134,800	1,131,520	4,266,320
B. Systems Design	1,438,200	119,680	1,557,880
C. Project Management	183,600		183,600
D. Project Control	992,800	142,800	1,135,600
E. Accounting	346,800		346,800
F. Configuration Mgmt	190,400		190,400
G. Document Control and Plan Room	612,000		612,000
H. Contracts	204,000		204,000
I. Personnel/EEO/Office Services/Publications	571,200		571,200
Subtotal GC Services	7,673,800	1,394,000	9,067,800
J. Special Consultants	275,000	235,000	510,000
K. Special Consultants- (Staff Augmentation)	1,918,450	348,500	2,266,950
Subtotal Subcontracts	2,193,450	583,500	2,776,950
L. Direct Reimbursible Expense	1,130,000	200,000	1,330,000
TOTAL GC COST	10,997,250	2,177,500	13,174,750
FIXED FEE			850,000
GRAND TOTAL GC COST AND FIXED FEE			14,024,750

April 1, 1987

SPECSUB

TABLE 6

## SPECIALTY SUBCONTRACT BUDGET SUMMARY

ASSIGNMENT	CONSULTANT	87/88 BUDGET
STRUCTURAL/SEISMIC	PECK, BREKKE	8,000
STRUCTURAL/UNDERPINNING	DEGENKOLB	10,000
NOISE & VIBRATION	WILSON THRIG	30,000
CORROSION CONTROL	PSG WATERS	30,000
SOILS & SUBSURFACE INVESTIGATION	GEOTECHNICAL	225,000
WATER TREATMENT	ENGINEERING SCIENCES	50,000
DEWATERING	R.Y. BUSH CONSULTING ENGINEER	15,000
FIRE/LIFE SAFETY	ROLF JENSEN	40,000
SCADA SYSTEM	MACRO	65,000
PASSENGER VEHICLES/HVAC	RICHARDS	2,000
BAGGAGE HANDLING	KENNARD DESIGN GROUP	15,000
STATION LIGHTING	MARLENE LEE	10,000
RADIO COMMUNICATIONS	TERRY COLLINS	10,000
TOTAL		\$ 510,000

STAFFAUG

TABLE 7  
SPECIALTY SUBCONTRACT BUDGET SUMMARY

April 1, 1987

(STAFF AUGMENTATION DBE/WBE)  
YEAR OF EXPENDITURE DOLLARS

ASSIGNMENT	CONSULTANT	ESTIMATE OF EXPENDITURES 87/88 AWP
FACILITIES ENGINEERING	KDG	
DRAFTING	JAYKIM	
DRAFTING	ACG	
UTILITIES ENGINEERING	JAYKIM	
CLERICAL	SHARON CLARK	
ELECTRICAL ENGINEERING	ACG	
R.O.W. ENGINEERING	JAYKIM	
SYSTEMS ENGINEERING	ACG	
ASSURANCE ENGINEERING	GARDNER-HOLMAN	
DRAFTING	ENVIRONMENTAL COLLABORATIVE	
TOTAL		\$2,266,950



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TABLE 8

## DIRECT REIMBURSABLE EXPENSE BUDGET SUMMARY

April 1, 1987

YEAR OF EXPENDITURE DOLLARS

ITEM	ESTIMATE OF EXPENDITURES 87/88 AWP
OFFICE EXPENSES	
MATERIALS & SUPPLIES	
COMMUNICATIONS & SHIPPING	60,000
EQUIPMENT & TOOLS	100,000
INSURANCE	3,000
AUTOMOBILE COSTS	
CONFERENCES & MEETINGS	12,000
PUBLICATIONS & SUBSCRIPTIONS	
MAINTENANCE AGREEMENTS	15,000
PERSONNEL COSTS	40,000
TRAVEL & SUBSISTENCE	
RELOCATION & DEMOBILIZATION	75,000
COMPUTER SERVICES	30,000
MODELS & RENDERINGS	30,000
LEGAL SERVICES	1,000
EQUIPMENT RENTAL	10,000
TEMPORARY PERSONNEL	74,000
REPRODUCTION & PRINTING	
FACILITIES CAPITAL COST OF MONEY	700,000
GROSS RECEIPTS TAX	100,000
MISCELLANEOUS	60,000
	20,000
TOTAL	\$1,330,000

APPENDIX A

SCRTD METRO RAIL PROJECT  
SCOPE OF SERVICES  
FOR  
ENGINEERING DESIGN  
FOR THE  
REALIGNMENT OF THE YARD LEADS  
AND TRANSFER ZONE FOR CONTRACT A-130

1.0.0 Description of Work

1.1.0 General

2.0.0 Scope of Services

- 2.1.0 Coordination Assistance
- 2.2.0 Survey Information
- 2.3.0 Right-Of-Way Information
- 2.4.0 Civil Design
- 2.5.0 Utility Design
- 2.6.0 Structural Design
- 2.7.0 Electrical Design
- 2.8.0 Corrosion Control
- 2.9.0 Acoustical Design
- 2.10.0 Systems Design
- 2.11.0 Construction Cost Estimates
- 2.12.0 Mechanical Design
- 2.13.0 Specification

## 1.0.0 DESCRIPTION OF WORK

### 1.1.0 General

Consultants' services will include the preparation of construction documents in accordance with the criteria to redesign for construction the cut-and-cover structure required for realignment around a contaminated area in the vicinity of the Yard Leads. The services will include redesign of the cut-and-cover structures, open cut structures, demolition, grading, groundwater control, the design of 220' of two-track mined tunnel below freeway and the provision of area and specification for design and construction of a passenger vehicle car wash. The services will also include the review, revision and modification of existing utility, mechanical and electrical design and appropriate drawings and the incorporation into construction documents of additional design and drawings as described below. Services will also include modifications as required to systemwide procurement/installation contract documents that are affected by this re-alignment including traction power, communications and automatic train control and required interfacing with facilities design. Prepare construction cost estimates to include material quantity take-offs, and review the existing specifications and revise to incorporate or omit data pertinent to this realignment. The work is to be undertaken in three stages.

## 2.0.0 SCOPE OF SERVICES

2.1.0 Coordination Assistance. In its performance of services authorized and required under the Agreement, Consultant shall assist the District in coordination activities with the LAUPT and other governmental, public and private agencies as required and requested by the SCRTD.

### 2.2.0 Survey Information

2.2.1 Review survey information provided by the SCRTD.

2.2.2 Prepare and submit to the SCRTD requests for additional survey information, for the properties known as the Viertel property, Maier Brewing property, Center Street, Commercial Street and the crossing at the Santa Ana Freeway.

2.2.3 Prepare and submit to the SCRTD a list of horizontal and vertical control monuments

which are likely to be impacted by construction activity, including those monuments which are in such proximity to the construction sites that may be disturbed by construction operations.

2.3.0 Right-of-Way Plans. Revise the right-of-way plans, for permanent and temporary acquisition of properties that are impacted by the realignment and required for the construction. Make recommendations and delineate right-of-way requirements for type of acquisition, duration of temporary construction easements, and construction methods as they affect the property acquisition. Ensure right-of-way information presented on the plans is adequate to enable the contractors to establish in the field limits of areas available for the construction purposes.

2.3.1 Revise property identification maps to identify properties that will be impacted by the realignment. SCR TD will then provide title reports based on the consultants recommendations.

2.3.2 Perform right-of-way computations and revise right-of-way maps and parcel plats.

2.3.3 Prepare property impact statements describing existing conditions, construction activities, and permanent and temporary real estate requirements.

2.3.4 Certify or recertify property acquisition requirements.

2.3.5 Prepare legal descriptions of properties to be acquired.

2.4.0 Civil Design. Review the current design, reuse or redo the existing drawings to accommodate the facilities as required for the realigned Yard Leads and Yard transfer tracks. Perform the final civil design to the levels specified in paragraph 1.1.0 above, including preparation of Contract Documents, required for the site work as authorized. Said design shall be in accordance with applicable criteria and standards, unless otherwise noted and shall provide for incorporation of components, equipment and systems design by others. Design shall include but not be limited to the following:

2.4.1 Existing Conditions. Review the current general plans indicating the existing site topography and showing items to be

demolished. The base mapping is on standard single sheets of the job site at a scale of 1"=20'. This mapping consists of existing site topography which may or may not have been updated by field survey. Where field survey is required for accurate dimensioning or verification, the consultant shall request a survey in writing. Reuse existing backgrounds for frames 19, 20, and 21, however conditions that have changed since originally done will necessitate revisions. Provide an additional four drawings for this work.

2.4.2 Survey Control. Revise the plan showing existing survey monument control required for field layout.

2.4.3 Horizontal and Vertical Track Alignment.

a. Confirm the alignment of tracks to remain and mathematize the alignment and grade for the realigned tracks within the transfer zone and the yard leads.

b. Deviations to criteria proposed for final design, will be submitted to SCRTD, with recommendation for specific approval.

c. Prepare alignment drawing with sufficient data for field layout in accord with design criteria.

2.4.4 Drawings. Prepare drawings in accordance with design criteria, unless otherwise noted, showing, but not limited to: contract limits, limits of work, limits of various construction items, roadway modifications, related work to be performed by others, surface restoration, political subdivisions, and existing street right-of-way.

2.4.5 Track Profiles. Prepare profiles for tracks showing, but not limited to top of rail with grades and elevations, existing ground, station and line structures, overpasses, crossing utility lines and contract limits.

2.4.6 Typical Sections. Prepare typical pavement sections showing thickness of different courses, types of curb and gutters

sidewalk thickness, and miscellaneous details which are necessary for the construction.

- 2.4.7 Grading, Paving and Drainage. Revise and reuse or redo current paving plans which show surface drainage. Provide additional design information for those elements of construction such as car wash, portal, retaining walls, parking areas, roadway intersections and other construction features requiring greater definition. Show also the subsurface storm drain piping on these drawings including but not limited to track drainage, storm drains and pump sumps.
- 2.4.8 Storm Drain System. Review and reuse, revise or redo the current storm drainage system. The plans will be incorporated in the Grading, Paving and Drainage Plans and profiles prepared separately. Drainage details shall be used as appropriate from current drawings.
- 2.4.9 Cross Sections. Review and reuse, revise or redo cross sections at appropriate intervals, not greater than 100 feet, to indicate construction details and limits of construction. Cross sections shall include, but not be limited to identification of features, such as: fences, street center lines, walls, permanent and temporary needs lines, building lines, building substructures, and other information to satisfactorily depict conditions. In the areas where the details and dimensions change, or clarification are required due to site conditions, draw additional cross sections at shorter intervals or on an as required basis.
- 2.4.10 Traffic Control. Prepare two standard drawings at 1"=40'-0" scale to show traffic detour information at the intersection of Center and Commercial Streets that are based on City of Los Angeles input for temporary and permanent traffic, signalization, traffic signs, pavement markings, and street lighting. SCRTD will be responsible for the timely and one time coordination and input from the City of Los Angeles.

Worksite Traffic Control Standard Notes will be revised as necessary by LADOT.

- 2.4.11 Miscellaneous.
  - a) Prepare roadway profiles, sections and details necessary to define construction requirements.
  - b) Review and reuse, revise or redo sequence of construction drawing relative to existing AT & SF tracks and relocated Banning spur.
  - c) Prepare required documentation to support request for encroachment permit at Metro Rail crossing of the CALTRANS Santa Ana Freeway.
- 2.4.12 Standards. Review the SCRTD's Standard Civil Drawings, determine those that will be included in the Contract Documents and make recommendations, if required, of modifications to be made to standards.
- 2.4.13 Final Design. Based on the review comments from SCRTD on the various milestone design submittals, incorporate the comments and update the drawings to the final level of completion. Assist SCRTD, as required, in the technical presentation of the design and to other agencies.
- 2.5.0 Utility Design. Review, revise and modify existing utility plans and details and add new sheets as documented below and in the negotiations to complete the Contract Documents required for construction. The redesign and modifications required by the realignment shall include the following:
  - 2.5.1 Composite of Existing Utilities. Reuse three Composite Existing Utility drawings for areas between 1st Street and Jackson Street. Prepare four new Composite Existing Utility drawings using new Civil drawings as base maps to show existing utilities from Jackson Street to the interface with Contract A135.
  - 2.5.2 Composite Utility Rearrangement Plans. Reuse three Composite Rearrangement Plans for areas between 1st Street and Jackson Street. Produce screened copies of four Composite Existing Utility drawings and add the rearrangement of utilities from



Jackson Street to the interface with Contract A135.

- 2.5.3 Water Mains. Show domestic water and fire service facilities on Composite Utility Rearrangement Plans. Verify vertical clearances at critical points and provide top of pipe elevations. Reuse previous details and modify as necessary. Profiles are not included in this Scope.

Rearrange two water mains, one in Ducommun and one in Commercial Street. Replace with parallel welded steel mains in the immediate vicinity of the crossing of the subway box. Provide profiles on a single drawing and use Dept. of Water and Power Details. Provide one drawing of additional details and notes as required.

- 2.5.4 Storm Drains. Provide combined plan and profile drawing showing existing 36" storm drain in Center Street and 45" storm drain adjacent to the Santa Ana Freeway temporarily realigned and supported during construction and replacement to match at the existing alignment and profile during backfill operations. Provide drawing for Ducommun Street storm drain showing overall plan and section dimensions, definition of the transition sections and location of the structure in support of the structural design.

Storm drains for the RTD right-of way and the pumping station will be provided under Civil section of this scope.

- 2.5.5 Sanitary Sewers. Provide notes and symbols on Composite Utilities Rearrangement Plans for existing sanitary sewers terminating west of the Metro Rail right-of-way. Profiles are not included.

Provide design for one new sanitary sewer crossing the Metro Rail box at Aliso Street and one in Commercial Street. The sewers are to be reconstructed to match the existing alignment and profile during backfill operations. Provide one drawing of Sanitary Sewer details.

- 2.5.6 Gas. Provide design for gas rearrangement immediately adjacent and parallel to the existing mains at the crossing of the

Metro Rail box. The gas mains to be rearranged are two parallel High Pressure gas mains South of Commercial Street and a two inch distribution main in Commercial Street. Provide one drawing to show profiles.

- 2.5.7 Telephone. Show existing telephone ductbank located in Center Street on one combined plan and profile drawing for support intact.
- 2.5.8 Electrical. Show existing electrical power ductbank in Center Street on one combined plan and profile drawing for support intact.
- 2.5.9 Street Lighting and Traffic Signals. The Bureau of Street Lighting and the Los Angeles Dept. of Transportation will prepare necessary plans for insertion into this Contract.
- 2.5.10 Standards. Add title block information to existing standards.
- 2.5.11 Coordination. Perform data gathering for existing utility plans and prepare conceptual design for utility rearrangements. Incorporate comments after design approval obtained by SCRTD from the utility owners.
- 2.6.0 Structural Design. Perform final structural design including preparation of construction documents required for construction in the redesign of the cut-and-cover structure caused by the realignment around the contaminated soil area. Said redesign shall be in accordance with applicable criteria, codes and standards and shall provide for incorporation of components, equipment and systems designed by others and shall include the design of structures within the limits of the description of work. The realignment and redesign shall include a 350 foot two-level crossover structure to incorporate trainway and power substation, 4-track flared section to Yard Leads and future extension 200 feet of mined tunnel below the Santa Ana Freeway, 1100'-0" of two-cell cut-and-cover box structure leading to mainline at a new portal and 700 feet of open-cut section leading to mainline at grade.
- 2.6.1 Soils Data. Perform geotechnical studies to ascertain the soil properties along the realignment for a maximum of (5) five

borings. Data and recommendations will be provided by the Geotechnical consultant. The Consultant will provide field supervision, coordination and incorporate the boring log data and recommendations into the structural plans.

- 2.6.2 Foundation Plans. Prepare foundation plans of all facilities showing location, type, size, and reinforcement, including where appropriate structural base slabs.
- 2.6.3 Framing Plans. Prepare framing plans of all facilities showing designation of structural members and arrangements of columns, girders and beams.
- 2.6.4 Schedules. Prepare schedule drawings, where appropriate, in a tabular form approved by the SCRTD showing basic data necessary for the construction of structural elements.
- 2.6.5 Sections. Prepare longitudinal and transverse sections to complement the plans and in sufficient number to define the structural components of all facilities.
- 2.6.6 Details. Prepare details to define construction requirements.
- 2.6.7 Protection of Existing Structures. Evaluate the need to protect adjacent buildings, bridges and other structures which are within the zone of influence and which may be affected by the construction. It is anticipated that the protection will fall into one of the following categories:
  - a. Structures requiring underpinning or a protection wall system or combination thereof are to be designed by Consultant.
  - b. Structures requiring protection which are to be designed by contractor. The Consultant shall outline the design parameters.
  - c. Structures which do not require special protection. The Consultant shall outline on the drawings the caution and care required by the contractor during the construction.

- 2.6.8 Pipe Bridge. Review, update and modify existing drawings to raise pipe bridge approximately 2'-0".
- 2.6.9 Mined Tunnel. Perform an evaluation, case history review and provide design and construction documents for approximately 200' of mined tunnel under the active Santa Ana Freeway. Generally evaluate geology and prepare study of five alternate possible methods for tunnel driving. Thoroughly evaluate two of those methods considered to have merit. Complete a detailed design of the method selected as being the most applicable including geotechnical, structural and seismic analyses. The design to include applicable methods of groundwater control, protection of freeway structure, access, traffic control, and construction sequence. Provide report to SCRTD summarizing the studies and documenting the conclusions and recommended solutions. Provide a report for submittal to Caltrans based upon the foregoing report. Prepare and complete thirteen estimated drawings for construction, including specifications.
- 2.6.10 Instrumentation Program
- Prepare the plan layout for the instrumentation program on the Metro Rail Standard drawing.
- 2.6.11 Standards. Review the Metro Rail's Standard Structural Drawings, determine those that will be included in the Contract Documents and develop, if required, modifications to be made.
- 2.6.12 Directives. Utilize the Metro Rail's directive Drawings for assistance and guidance for design and drafting.
- 2.6.13 Final Design. Based on the review comments from SCRTD on the various milestone design submittals, incorporate the comments and update the drawings to the final level of completion. Assist SCRTD, as required, in the technical presentation of the design to the other agencies.
- 2.7.0 Electrical Design. Review update and re-use existing electrical design where applicable and perform

necessary revisions to existing contract documents required for construction. Said re-design shall be in accordance with applicable criteria and shall provide, when necessary, for incorporation of components, equipment and systems designed by others. Review location of electrical elements with other disciplines and resolve conflicts. Re-design shall include, the following:

2.7.1 East Cross-over portion of Union Station.

2.7.1.1 Power. Review and revise existing plans, sections, details, diagrams and schedules for facilities primary and auxiliary power systems including Uninterrupted Power Supply but excluding traction power, showing all elements of the distribution systems, interfaces and locations and sizes of all equipment from distribution point(s) to approximately five feet from the facility.

2.7.1.2 Lighting. Review and revise existing plans, details, diagrams and schedules for normal and emergency facility lighting including fixtures, distribution systems, interfaces and other elements of the lighting systems.

2.7.1.3 Communications. Review and revise existing plans, details and schedules for communications conduits including those for security telephones, maintenance telephones, line emergency telephones, public address system, gas monitoring system.

2.7.1.4 Supervision and Control. Review and revise existing drawings of the control system including elementary wiring diagram of all fans and pump stations connection diagrams up to the interface point inside the Communication Interface Cabinet.

2.7.1.5 Train Control. Review and revise existing plans, details, diagrams and schedules for train control conduits. As a minimum,

revise drawings to depict routings, elevations and bends of conduits and locations of pull-boxes and manholes.

- 2.7.1.6 Traction Power. Review and revise existing plans and details for traction power conduits. As a minimum revise drawings to depict exact locations of stub-ups with dimensions.
- 2.7.1.7 34.5 KV System. Review and revise existing plans and details for dedicated 34.5 KV cable to and from Traction Power room including necessary handholes and termination boxes.
- 2.7.1.8 Fire and Intrusion. Review and revise existing drawings showing embedded conduits for the fire and intrusion alarm system based on design data provided by the SCRTD. Consultant shall review lay out conduit routings to avoid conflicts with other system.
- 2.7.1.9 Grounding. Review and revise existing sections and details of the grounding system including lightning protection based on data supplied by the SCRTD.
- 2.7.1.10 Standard and Directives. Review the SCRTD's Standard and Directive Electrical Drawings, determine those Standards that are included in the existing contract documents.
- 2.7.2 Tunnel Portion. Prepare three new electrical composite drawings for all subsystem listed under paragraph 2.7.0, excluding supervisory control system.
- 2.7.3 Yard Leads Portion. Prepare three new electrical composite drawings for power, control, grounding communications, train control, traction power, 34.5KV system and yard lighting system at the yard lead portion from the tunnel portal to the contract limit interfaced with CCU A115. Review and update existing plans manhole/hand hole details and prepare three new

profile drawings of underground duct banks, location of yard lighting, interface with car wash structure, pump station, Fire Department connection, and ductbanks connected to construction Contract Unit A115.

2.7.3.1 Final Design. Based on the review comments from SCRTD on the final design submittal, incorporate the comments and update the drawings to the final level of completion.

2.8.0 Corrosion Control. Incorporate into structural, electrical and utility plans and specifications measures necessary to comply with the SCRTD's requirements for corrosion control. Such measures will include the SCRTD's standard drawings and specifications as appropriate, but may also require preparation of additional details to define non-standard situations. Corrosion control recommendations will be prepared by the Corrosion Control Consultant. Detailed corrosion control requirements, if any, will be furnished to the SCRTD. Final drawings shall be updated to include the comments from SCRTD on the final submittal.

2.9.0 Acoustical Design. Incorporate into the structural mechanical and architectural plans and specifications any design for measures to control noise and vibration in accordance with applicable criteria, and recommendations from the Acoustical Consultant. Noise and vibration control recommendations will be prepared by the Acoustical Consultant based on the preliminary plans. Final drawings shall be updated to include the comments from Acoustical Consultant.

2.10.0 System Design - General. Revise the affected systemwide procurement/installation contract documents, including that for traction power, communications and automatic train control. Relocate systems equipment currently located in the emergency exit and vent structure which is being deleted. Provide assistance to facilities design group in re-design of underground duct banks, manholes and conduit stub-ups for systems wiring as well as in re-design of trackwork installation. Review facilities drawings and coordinate interfaces. Perform systems assurance, safety and security review.

2.10.1 Traction Power. Revise A630/A631 contract documents to relocate equipment currently located in the emergency exit and vent structure, and to modify contract rail and

running rail power connections affected by the realignment. Revise A612/A615 contract documents to reflect changes in contact rail/coverboard length as required. Revise affected A610 trackwork installation drawings pertaining to contact rail/coverboard installation. Redesign underground duct banks, manholes and conduit stub-ups for traction power, communications and automatic train control wiring affected by the realignment. Review facilities drawings and coordinate interfaces.

2.10.2 Communications. Revise A640 contract documents to relocate equipment currently located in the emergency exit and vent structure, and to modify SCADA connections as necessary to reflect changes in traction power, automatic train control and facilities contracts. Review facilities drawings and coordinate interfaces.

2.10.3 Automatic Train Control. Revise A620 contract documents to modify affected track plans, route and aspect chart for Union Station, Yard locking chart and SCADA connections. Review facilities drawings and coordinate interfaces.

2.10.4 System Assurance, Safety & Security. Review all facilities and systems drawings and specifications, revised due to the realignment, to verify compliance with safety, security and the assurance criteria and standards.

2.10.5 Trackwork. Revise A610 contract documents to modify affected track plans including new special trackwork designs for transfer zone (No. 6 turnout and crossovers) and revisions to cross-over design in Yard Lead approach at Union Station. Review and coordinate with interfaces.

2.11.0 Construction Cost Estimate. Consultant shall prepare project construction cost estimates. Estimates shall be prepared and be submitted within four weeks after submittal of drawings for in-progress design, 90% percent design and final design.

2.11.1 Quantity Take-Off. Quantity take-offs shall be prepared for each estimate on 8 1/2 inch by 11 inch sheets, as used for



design computations and shall have the same provisions at the top for the required identification. Quantity takeoff sheets shall show the procedures and state the supplementary assumptions used. Submittal of quantity takeoffs shall include the summary sheet(s) as well as pertinent backup computation sheets. Sheets shall be neatly and clearly prepared to permit legible reproduction. Summary sheets will be in bid list form including standard quantity items. The Consultant shall complete every quantity item shown on the proposal form.

2.11.2 Pricing. Prices for each quantity item will be inserted on the bid list form and items extended and footed to a total estimated construction cost for the contract. Quantity item prices will be current day dollars. The consultant will provide a separate estimate of escalation to the scheduled midpoint of construction that is additive to the total of the bid list quantity prices to obtain the total of the Project Construction Cost Estimate. Assumptions and calculations made to establish quantity item prices and escalate will be provided by the consultant.

2.12.0 Mechanical Design. Review, update and reuse existing mechanical design where applicable and perform necessary revisions to the existing contract documents required for construction. The redesign shall include:

2.12.1 Ventilation. Review existing ventilation systems and redesign as required for ancillary areas. Prepare plans, sections, details and equipment schedules for ventilation systems. Indicate interface with Contracts A135 and A136. Reuse control diagrams to the extent possible and make revisions where required. Coordinate findings of a projected new ECS run that will be undertaken to account for changes in system elements that may affect emergency ventilation requirements in MOS-1. Size shafts terminating at grade.

2.12.2 Fire Protection. Review and redesign the wet standpipe system throughout the realigned tunnel including location of fire hose valves, anchors and expansion

joints for piping excluding schematic fire protection diagram. Verify locations of utility mains and make required changes to water service connections. Relocate Fire Department connections to a suitable location, provide Fire Protection Valve Pit for valving only if surface mounting is not feasible. Provide fire protection details for mined tunnel portion of the alignment. Revise existing details for cut-and-cover tunnel. Use screened mylars of structural tunnel drawings for back-ground.

Prepare plans, sections, details and schedules for fire protection systems within the structure for the crossover ventilation and TPSS area.

2.12.3 Plumbing and Drainage. Review and redesign plumbing and drainage in the relocated structures and tunnel. Verify locations of utility mains and make connections to water service, storm and sanitary drains to approximately 5 feet from the facility structure. Redesign Pump Drainage Station at portal. Reuse existing plumbing details.

2.13.0 Specification. Review existing specification documents due to this modification and revise as necessary.

APPENDIX B

SCR TD METRO RAIL PROJECT  
SCOPE OF SERVICES  
FOR  
ENGINEERING DESIGN  
FOR THE  
RELOCATION OF UNION STATION STAGE I AND REALIGNMENT  
OF TRACK FOR CONTRACT A135

1.0.0 Description of Work

1.1.0 General

2.0.0 Scope Of Services

- 2.1.0 Coordination Assistance
- 2.2.0 Right-Of-Way
- 2.3.0 Survey Information
- 2.4.0 Civil Design
- 2.5.0 Utility Design
- 2.6.0 Structural Design
- 2.7.0 Mechanical Design
- 2.8.0 Electrical Design
- 2.9.0 Architectural Design
- 2.10.0 Systems Design
- 2.11.0 Construction Cost Estimates
- 2.12.0 Specifications

1.0.0 Description of Work

1.1.0 General. Consultant's services include relocation of Union Station, as identified in the negotiations, which is related to the realignment of the A130 Contract to avoid a contaminated area in the vicinity of the Yard Leads. The final product of this Scope of Services is the preparation of final contract documents suitable for bidding on Stage I of the station structure, including revision to drawings, specifications, construction cost estimates, including material quantity take-offs, and providing the necessary and related professional services in connection with the design work as specified in Paragraph 2.0.0. The work is to be completed in two stages.

2.0.0 Scope of Services - Consultant shall perform the following work tasks.

2.1.0 Co-ordination Assistance. In its performance of services authorized and required under the Agreement, Consultant shall assist the District in co-ordination activities with the LAUPT and other governmental, public and private agencies as required and requested by the SCRTD.

2.2.0 Right-Of-Way. Revise the right-of-way plans, for permanent and temporary acquisition of properties that are required for the construction. Make recommendations and delineate right-of-way requirements for type of acquisition, duration of temporary construction easements, and construction methods as they affect the property acquisition. Ensure right-of-way information presented on the plans is adequate to enable the contractors to establish, in the field, limits of areas available for the construction purposes.

2.2.1 Revise property identification maps to identify properties that will be impacted. SCRTD will then provide title reports based on the consultants recommendations.

2.2.2 Perform right-of-way computations and prepare right-of-way maps and parcel plats.

2.2.3 Prepare property impact statements describing existing conditions, construction activities, and permanent and temporary real estate requirements.

2.2.4 Certify or recertify acquisition requirements.

2.2.5 Prepare legal descriptions of properties to be acquired.

### 2.3.0 Survey Information

- 2.3.1 Review survey information provided by the SCRTD.
- 2.3.2 Prepare and submit to the SCRTD requests for additional survey information, as required.
- 2.3.2 Prepare and submit to the SCRTD a list of horizontal and vertical control monuments which are likely to be impacted by construction activity, including those monuments which are in such proximity to the construction sites that may be disturbed by construction operations.

### 2.4.0 Civil Design

Review the drawings within the current contract and revise and replace as required to accommodate the revised realignment. Perform the final civil design, including preparation of Contract Documents, required for the site work as authorized. Said design shall be in accordance with applicable criteria and standards and shall provide for incorporation of components, equipment and systems design by others. To allow for continued use of Union Station, the Consultant will prepare the documents, described below, to accommodate the construction being undertaken in two stages. Design shall include but not be limited to the following:

- 2.4.1 Existing Conditions. Prepare a general plan indicating the existing site topography. Base mapping on a standard single sheet of the job site at a scale of 1' = 40' will be used by the Consultant. This mapping will consist of existing site topography which has not been updated by field survey. Where field survey is required for accurate dimensioning or verification, the consultant shall request a survey in writing. Consultant shall prepare 1"=20' existing conditions plan for the areas affected by cut and cover construction to supplement the 1" = 40' scale mapping on an as required basis. This mapping to be used as a background for grading and drainage drawings.
- 2.4.2 Survey Control. Revise plan showing existing survey monument control required for field layout.
- 2.4.3 Horizontal and Vertical Track Alignment.
  - a. Redesign the alignment and grade furnished in the current final contract

drawings for both tracks. (AL & AR). Include layouts for crossovers at each end of the station.

- b. During design and checking of horizontal and vertical alignment, submit any deviation from applicable criteria to the SCRTD for comments and approval. Deviations proposed due to final design, must be submitted to SCRTD, with recommendation for specific approval.
- c. Prepare alignment drawings with sufficient data for field layout in accordance with design criteria.

2.4.4 Drawings. Prepare drawings in accordance with design criteria showing, but not limited to: contract limits, limits of work, limits of various construction items, roadway modifications, related work to be performed by others, surface restoration, political subdivisions, and existing street right-of-way.

2.4.5 Grading and Drainage Plans. Review current grading plans which show surface drainage as well as subsurface drainage. Revise these plans to reflect relocation of the station.

2.4.6 Storm Drainage. Provide profiles for storm drains as required by the revisions to storm drains.

2.4.7 Union Passenger Terminal Trackwork. Review and revise details as necessary to maintain continued operation of the passenger platform at the terminal. To include demolition and reconstruction of trackwork canopies and platforms. Review the current contract plans of the Union Passenger Terminal Trackwork and revise and redo these sheets to accommodate the relocation of the Metro Rail Structure.

2.4.8 Miscellaneous. Review miscellaneous civil drawings, profiles sections and details and revise as necessary to define construction requirements.

2.4.9 Standards. Review the SCRTD's Standard Civil Drawings, determine those that will be included in the Contract Documents and make recommendations, if required, of modifications to be made to standards.

2.4.10 Final Design. Based on review comments from SCRTD on the various milestone design submittals, incorporate the comments and update the drawings to the final level of completion.

2.5.0 Utility Design.

Revise final utility design, including the preparation of Contract Documents, required for the site. Said design shall be in accordance with all applicable criteria and standards and shall provide for incorporation of components, equipment and systems designed by others. Design shall include the following:

2.5.1 Plans of Existing Utilities. Verify existing utilities information shown in the A135 Contract and revise according to data collected.

2.5.2 Sewer Design. The Consultant shall design one relocation of those sewers affected by the construction.

2.5.3 Maintenance of Utility Service. Revise and submit to SCRTD recommended solutions for relocation, abandonment, temporary support, or other dispositions of affected utilities for coordination with utility owners. Included with this presentation shall be the method of accommodating utilities during construction including service connections.

2.5.4 Composite Utility Rearrangement Plans. For the areas where utilities are affected by cut and cover construction, prepare composite utility rearrangement plans showing existing utilities and rearrangements. Clearly identify the work to be done by others and details and notes pertaining to the rearrangements should be placed on these plans and developed to the degree that assures no conflicts exist and adequate space is available for construction. Coordinate the design with the Composite Utility Rearrangement Plans from the adjoining contracts. Coordination with the franchised utility companies, The City of Los Angeles, and LAUPT has been or will be handled by the SCRTD. the consultant shall identify those utilities that will be affected by construction and make recommendation for remedial work prior to start of the construction.



- 2.5.5 Utility Profiles. Revise profiles of utility rearrangements as required for clarity, and profiles of utility relocations to be performed by other than the construction contractor for this section.
  - 2.5.6 Standards. Review the SCRTD's Standard Utility Drawings, determine those that will be included in the contract documents and develop recommendations, if required, of modifications to be made.
  - 2.5.7 Final Design. Based on the review comments from SCRTD on the various milestone design submittal, incorporate the comments and update the drawings to the final level of completion. Assist SCRTD, when required, in the technical presentation of the design to other agencies.
- 2.6.0 Structural Design
- 2.6.1 Soils Data. Perform geotechnical studies modify geotechnical report for a maximum of (4) four borings. Data and recommendations will be provided by the Geotechnical Consultant. The Consultant will provide field supervision, coordination and incorporate the boring log data and recommendations into the structural plan.
  - 2.6.2 Foundation Plans. Investigate foundation plans as required to determine adequacy of location, type, size, and reinforcement.
  - 2.6.3 Framing Plans. Investigate framing plans as required to determine adequacy of structural members and arrangements of columns, girders and beams.
  - 2.6.4 Schedules. Update and revise schedule drawings, where appropriate, in a tabular form approved by the SCRTD showing basic data necessary for the construction of structural elements.
  - 2.6.5 Sections. Review longitudinal and transverse sections for compatibility with investigation of framing plans.
  - 2.6.6 Details. Revise details to define knock-out panels and wall openings and revise beam and column details as required.
  - 2.6.7 Protection of Existing Structures. Evaluate the need to protect the remaining portion of the Express building and railroad facilities

which are within the zone of influence and which may be affected by the construction. It is anticipated that the protection will fall into one of the following categories:

- a. Structures requiring underpinning or a protection wall system or combination thereof are to be designed by Consultant.
- b. Structures requiring protection which are to be designed by contractor. The Consultant shall outline the design parameters.
- c. Structures which do not require special protection. The Consultant shall outline on the drawings the caution and care required by the contractor during the construction.

2.6.8 Excavation Support

- a. Review and evaluate locations and types of excavation support systems as required and provide additional conceptual preliminary designs if necessary.
- b. Excavation support systems for use in construction are to be designed by the Contractor, based on Standard Criteria and submitted to the SCRTD for review and approval.

2.6.9 Instrumentation Program

Revise the plan layout for the instrumentation program on the Metro Rail's Standard drawing to conform to the revised alignment.

2.6.10 Passenger Tunnel, Platform Ramps & Platforms

Prepare contract drawing for demolition of part of the existing Passenger Tunnel. The Consultant shall analyze, design, detail and prepare drawings for construction for the restoration of the Tunnel.

Prepare drawings for the demolition of (10) ten platform ramps and the partial demolition of (10) platforms. The Consultant will prepare drawings and details for the restoration of these ramps and platforms.

2.6.11 Standards. Review the Metro Rail's Standard Structural Drawings, determine those that

will be included in the Contract Documents and develop if required, modifications to be made.

2.6.12 Directives. Utilize the Metro Rail's directive Drawings for assistance and guidance for design and drafting.

2.6.13 Final Design. Based on the review comments from SCRTD on the various milestone design submittals, incorporate the comments and update the drawings to the final level of completion. Assist SCRTD, as required, in the technical presentation of the design to the other agencies.

#### 2.7.0 Mechanical Design

Coordinate and revise track and platform level plumbing, drainage and fire protection due to changes of piping invert elevations. Verify locations of utility mains and make required changes to water service, storm and sanitary drain connections. Correct top of rail elevations and stationing throughout. Add new duplex sump pump at the east end of the station, and provide drainage for the new Passenger Tunnel.

Review finish contract HVAC and plumbing/fire protection drawings in the appropriate areas for possible changes due to revisions in A135.

2.8.0 Electrical Design. Revise 100% electrical design, including preparation of contract documents. Work shall include, but not be limited to the following:

2.8.1 Union Station shell structure construction. Modify existing electrical contract drawings to incorporate all reference to the track alignment, including the new locations of Fire Department connection and public telephone connection. The station structure shall be equipped with knock-out panels for future addition of station entrances.

2.8.2 Temporary relocation of existing electrical tunnel and passenger tunnel per requirement of the construction work sequence. Work includes field investigation, preparation of contract drawings for the relocation per requirements of the owner. Coordination with the owner will be under the direction of SCRTD.

2.8.3 Temporary Trackwork. Work shall include special study and definition of the scope of temporary work for lighting at the platforms

and 480 V power supply to the trains in the areas effected by the construction of Union Station under Paragraph 2.6.1. Coordination with the owner will be made under the direction of SCRTD.

- 2.9.0 Architectural Design. Perform final architectural design modifications for the realigned station within the limits of the structural box, including revisions to Contract Documents. Said design modifications shall be in accordance with criteria and standards and shall provide for the incorporation of components, equipment and systems designed by others. Design for entrances, vent shafts, exit stairs, and other provisions outside the structural box are excluded from this scope of work.
- 2.10.0 Systems Design. Review facilities drawings and coordinate traction power, communications and ATC interfaces with facilities. Review the drawings and specifications, revised due to the realignment prior to bidding, to verify compliance with safety, security and the assurance criteria and standards.
- 2.11.0 Construction Cost Estimates. Consultant shall review accuracy of quantity take-offs, and provide construction cost estimates to SCRTD.
- 2.12.0 Specifications. Consultant shall review existing specifications due to this modification and revise as required.