SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

GENERAL CONSULTANT SERVICES CONTRACT

ANNUAL WORK PROGRAM

Fiscal Period Ending April 30, 1985

Metro Rail Transit Consultants
DMJM/PBQD/KE/HWA

2895406.

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

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FOR

FISCAL PERIOD ENDING APRIL 30, 1985

April 6,1984

Revised

August 31, 1984

Prepared By Metro Rail Transit Consultants

DMJM/PBQD/KE/HWA

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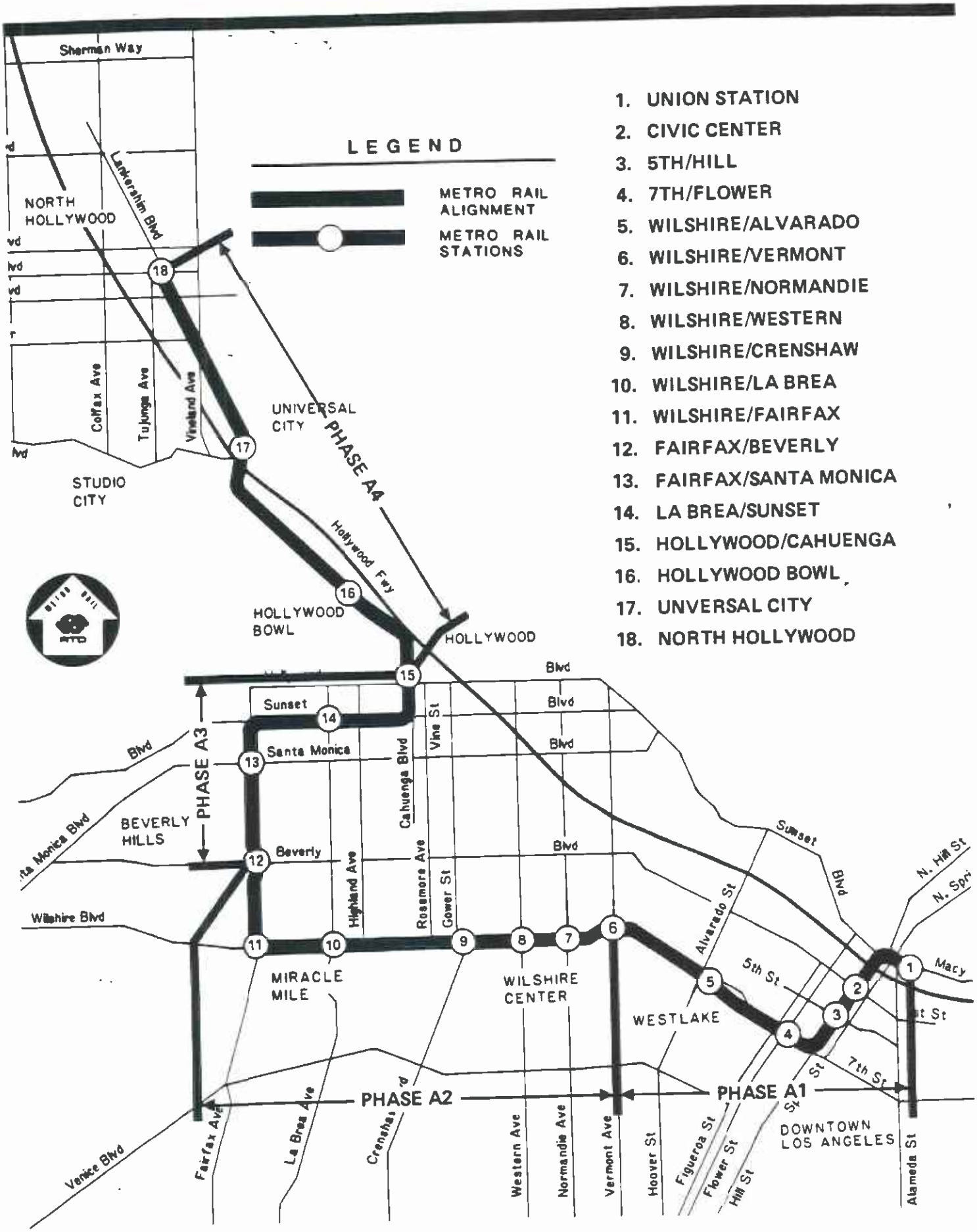
PREFACE

The Metro Rail Project involves the development of a rail rapid transit system for the Los Angeles urbanized area under direction of the Southern California Rapid Transit District. As part of the 1976 Regional Transit Development Program, the Metro Rail Project was planned to help solve the increasing transportation problems of Los Angeles' high-density urban center. The Metro Rail Project, which is the initial segment or Starter Line of the ultimate rapid transit network for the urbanized area, is a conventional heavy-rail rapid transit system 18.6 miles in length with 18 stations serving the Central Business District, Wilshire Boulevard, Fairfax, Hollywood, and North Hollywood areas. The main line alignment is to be entirely in subway configuration. Figure 1 is a route map indicating the station locations.

The Starter Line is currently in the Continuing Preliminary Engineering phase. Design was first approved for implementation and funding by the U.S. Urban Mass Transportation Administration (UMTA) in June, 1980, as a $38.8 million program designed to achieve approximately 30 percent of the total design effort. Recognition of the overriding importance of the Project to the Los Angeles area resulted in congressional appropriations to the U.S. Department of Transportation in fiscal years 1982 and 1983, which added $51.6 million to the initial authorization for Continuing

CONSTRUCTION PHASING



Preliminary Engineering to carry the Starter Line to between 50 and 85 percent design completion in order to obtain improved cost estimates and much better definition of the system. A Fiscal Year 84 authorization of $104.5 million allows the segment of the line from the Yard to the Wilshire/Alvarado station to be designed to completion; and the remaining line from Wilshire/Alvarado to North Hollywood to be designed to approximately 85% or "pre-final" design level.

Continuing Preliminary Engineering was commenced in May, 1983, under the first Annual Work Program (AWP) of the General Consultant Services Contract and will be further advanced during this AWP ending April 30, 1985. This recent authorization will permit the uninterrupted completion of design and the preparation of construction and procurement contract bid documents for the first segment of the line called MOS-1. At the close of this second AWP, overall facilities design is expected to be approximately 85% complete, and overall systems design is expected to be approximately 65% complete.

I. Introduction

I. INTRODUCTION

This document has been prepared, in accordance with provisions of Article III of the General Consultant Services Contract dated May 2, 1983, between the Southern California Rapid Transit District and DMJM/PBQD/KE/HWA -- A Joint Venture, to provide detailed data on work descriptions, deliverables, milestone schedules, and manpower allocations that form the basis of the AWP Cost Estimates for the fiscal period ending April 30, 1985, as contained in the amended Exhibit A of the Contract. The document further serves as a financial planning aid for the District in its consideration 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.

II. General Scope of Services

II. GENERAL SCOPE OF SERVICES

This section contains a 5-year forecast of the General Consultant's (GC's) estimated costs for project management, project administration, project control and scheduling, coordination of existing preliminary engineering, continuing preliminary engineering, final design and contract documents, system integration, construction procurement and installation engineering coordination, design services during construction/procurement/installation, systems procurement services, integrated test support and start-up assistance, support services and special analyses, special consultants, and other technical services. Estimated costs for these services are shown in Table II-1.

	LINE ITEM	ACTUAL FISCAL PERIOD ENDING 4/30/84	ESTIMATED FISCAL PERIOD ENDING 4/30/85	CUMULATIVE ESTIMATE TO 4/30/85	ESTIMATED FISCAL PERIOD ENDING 4/30/86	CUMULATIVE ESTIMATE 4/30/86	ESTIMATED FISCAL PERIOD ENDING 4/30/87	CUMULATIVE ESTIMATE TO 4/30/87	ESTIMATED FISCAL PERIOD ENDING 4/30/88	CUMULATIVE ESTIMATE TO 4/30/88	ESTIMATED FISCAL PERIOD ENDING 4/30/89	CUMULATIVE ESTIMATE TO 4/30/89
A	Project Management	449 414	661,000	1 110 414								
B	Project Administration	1 570 702	2,044,000	3 614,702								
C	Project Control	1 156,713	1 901 000	3 057 713								
D	Facilities Design Management (Subcontract)	1 194,160	1,480 000	2 674 160								
E	Facilities Design (G C)	3,286 617	5 094 000	8 380 617								
F	System Integration	1 194 068	1 866,000	3 060,068								
G	Systems Design (G C)	1,851 621	2 835 000	4 686 621								
H	Design Services During Const											
	Subtotal G C Services	10,703 295	15 881 000	26 584 295								
I	Subcontracts Design[2]	15 855 000	37 450 000	53 305 000								
J	Special Consultants	2,232 011	3,530 000	5 762 011								
K	Special Consultants Staff Augmentation[1]	1 768 994	3 821 000	5 589 994								
	Subtotal Subcontracts	19 856 005	44 801 000	64 657 005								
	Subtotal All Services	30 559 300	60 682 000	91 241 300								
L	Direct Reimbursable Expense	3 398 404	2 570,000	5 968 404								
M	Fixed Fee	904 740	1 478 500	2 383 240								
N	Subcontract Fee	526 860	1 026 000	1 552 860								
	Total G C Cost & Fee	35 386 304	65 756 500	101 145 804	24 000 000		17 000,000		10 500 000		8 000 000	160 646 000[4]
	Start of Year Budget	39 302 960	67 123 000	106 425 960								
	Original Forecast 1983 Dollars	39 302 960	69,997 000	109 299,960	27 000 000		7 400 000		2 700,000			146 400 000[4]

[1] Assumes staff augmentation to be subcontracted to DBE/WBE

[2] Assumes design subcontract costs for Yards and Shops and Union Station will bear an Subcontract Fee

[3] Adjusted from 1981 Forecast for inclusion of Crenshaw and Hollywood Bowl Stations

[4] Based on SCRTD Fund Source Schedule dated 8 20 84

TABLE II 1
GENERAL CONSULTANTS ESTIMATED COSTS
FOR DESIGN AND PROJECT COORDINATION
YEAR OF EXPENDITURE DOLLARS

III. Annual Work Program Elements

III. ANNUAL WORK PROGRAM ELEMENTS

This section contains a description of each element of the AWP for the second fiscal period, including the description of work to be performed and accomplished, the responsible manager(s), input data required from the District and others, deliverables, schedules, and labor and budget requirements. The estimated costs of each element include labor, payroll additives, and overhead. Estimated direct reimbursable expense is included in the Project Administration Work Element. Subconsultant estimated costs are shown in Section IV.

The District has the ultimate responsibility for project management and direction and for relations with the funding agencies. As part of its function, the District's General Manager and Metro Rail Project Management personnel will control the GC efforts and will give general policy direction regarding project management, design development, and related engineering functions of the Project that are assigned to the GC.

Project Management

ITEM: PROJECT MANAGEMENT

RESPONSIBILITY: PROJECT DIRECTOR

DESCRIPTION:

A. SCOPE

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.

2. Detailed Description of Work

a. Management Board. Responsible for overall management of GC functions. Establishes policy, gives direction to GC Project Management in the conduct of GC activities, and acts on appropriate matters brought before it by the Project Director. Reviews and evaluates progress in achieving the objectives of the Project as set forth by the District. Responds to the resource requirements of the Project through the individual GC members.

b. Project Director and Deputy Project Director. Provide 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. Project Director reports to and communicates direction from the District Assistant General Manager, Transit Systems Development, for conduct of GC activities.

c. Work Program Implementation. Implement the detailed Work Program of programmatic management functions including project control and administration; implement all technical management functions, such as design management, design, and procurement management services; and system integration.

d. Engineering and Architectural Design. Manage, direct, and coordinate the performance of design of all facilities and systems so as to deliver construction and procurement bid documents in accordance with District schedules.

3. End Product

See following Work Elements for work product delivery details, and Section V for overall schedule.

B. INPUT DATA REQUIREMENT FROM OTHERS

1. Copies of all relevant agreements, data, and correspondence prepared or received by the District.

2. Copies of all technical reports prepared by the District or other consultants to the District.

3. Copies of minutes of meetings of the District Board of Directors that contain statements of policy or guidance for the Project.

4. Timely written comments on all design submittals and other deliverables submitted to the District by the GC.

5. Copies of all Milestone reports.

6. Timely resolution of changes to locations and layouts of all fixed facilities, stations, lines, ventilation structures, pocket tracks, crossovers, yard and shops, substations, etc., in order to meet design and construction schedules.

7. Requirements of outside agencies and utility companies affected by the Project.

8. Timely notice of District-directed changes.

C. SCHEDULE OF MAJOR EVENTS AND DELIVERABLES

The Project Management function will continue throughout the duration of the GC Contract.

D. DISTRICT ACTION

District approvals where required are anticipated within 30 calendar days of submittal, unless indicated otherwise for specific actions, in order to expedite continuing work.

E. MANPOWER AND COSTS

1. Manpower

The estimated manpower for the fiscal period is 60 man-months. (See Table IV-1A for detail.)

2. Costs

The estimated costs are $661,000.

3. Subcontract Costs

Subcontract costs are shown in Section IV of this AWP.

Project Administration

ITEM: PROJECT ADMINISTRATION

RESPONSIBILITY: PROJECT ADMINISTRATION MANAGER

DESCRIPTION:

A. SCOPE

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 contract and GC subcontract administration, affirmative action, Project personnel administration, office services, Project auditing/accounting, and publications/graphics support.

2. Detailed Description of Work

a. Contract and GC Subcontract Administration. Provide procurement and administration services for obtaining and administering contracts for professional and general services and supplies. Includes the preparation of procurement packages, proposal requests, solicitation, and review and evaluation of propos-

als. Schedule, coordinate, and obtain manpower estimates for the negotiation of design fees. Coordinate preaward meetings, prepare pre- and post-award documentation, and administer contracts and/or subcontracts after award through completion and closeout. Coordinate and assemble selected construction and procurement bid documents. Distribute to prospective bidders and maintain distribution records including lists of prospective bidders.

b. 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.

c. Personnel Administration. Provide Project personnel services, including mobilization, recruitment, employee orientation, personnel records management, personnel policy development and administration, relocation processing, and travel services. Maintain MRTC staffing plan.

d. 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
5) Messenger service
6) Mail and telecommunications
7) Administrative policy development and administration.

e. Project Auditing/Accounting. Provide Project financial management services including maintenance of Project accounts and books, audit of subcontractor and vendor invoices and payment of accounts payable. Implementation and maintenance of MRTC data processing equipment and procedures. Perform pre-award and closeout audits of MRTC subcontractors excluding design subcontractors.

f. Publications/Graphics Support. Provide and coordinate editorial, graphics, word processing, and printing services needed to support publication of Project reports.

g. Other Direct Costs.

1) Office Expenses:

a) Materials and supplies

b) Communications and shipping

c) Equipment and tools

d) Insurance

2) Travel and Related Expenses

3) Personnel Costs:

a) Mobilization and relocation

b) Payroll and special taxes

c) Recruiting

d) Temporary personnel

4) Computer Services

5) Models and Renderings

6) Legal Services

7) Equipment Rental

8) Temporary Help

9) Reproduction and Printing

10) Miscellaneous

h. Work Performed By Specialty Subcontractors. Specialty subcontractors will augment the GC Project Administration staff, in the areas of DBE/WBE Compliance, Clerical/Word Processing, Personnel/ Recruiting Administration, and Publications. Specialty Subcontractors will perform the audit tasks.

3. End Products

a. Continued implementation of the Affirmative Action Plan and monthly reports.

b. Exception reports on the the application of Project Administration Procedures.

c. Amendments to Project Administration Procedures.

d. Monthly Subcontract Status Report.

e. Change Orders and Contract Amendments as required.

f. Financial and Audit Reports, and MRTC invoice preparation and processing.

g. Selected construction and procurement contract bid package compilation, assembly, and distribution to the District.

B. INPUT DATA REQUIREMENT FROM OTHERS

Not applicable.

C. SCHEDULE OF MAJOR EVENTS AND DELIVERABLES

The work involved in administration of the services will continue throughout the duration of the Contract. Individual products will be delivered as follows:

1. Affirmative Action Reports - monthly
2. Financial reports, estimates, and invoices - monthly
3. Change Orders, subcontract amendments, additional specialty contracts - as needed
4. Procedure revisions and amendments - as needed
5. Construction and procurement contract bid packages - see Section V for schedule

D. DISTRICT ACTION

District approvals, where required, are anticipated within 30 calendar days of submittal, unless indicated otherwise for specific actions, in order to expedite continuing work.

E. MANPOWER AND COSTS

1. Manpower

The estimated manpower is 408.6 man-months. (See Table IV-1A for detail.)

2. Costs

The estimated costs are $2,044,000 for labor and are as shown below for other direct costs.

Office Expenses		$ 474,000
Travel and Related Expenses		215,000
Personnel Costs		445,000
Mobilization Relocation	$ 440,112	
Recruiting	4,888	
Computer Services		175,000
Models and Renderings		10,000
Legal Services		6,000
Equipment Rental		200,000
Temporary Help		144,000
Reproduction and Printing - General		450,000
Reproduction and Printing - Construction Bid Packages		250,000
Miscellaneous		201,000
	Total	$2,570,000

3. Subcontract Costs

Subcontract costs are shown in Section IV of this AWP.

Project Control

ITEM: PROJECT CONTROL

RESPONSIBILITY: PROJECT CONTROL MANAGER

DESCRIPTION:

A. SCOPE

1. Definition of Work To Be Accomplished

Provide the management and staff needed to plan, organize, direct, supervise, control, and coordinate efforts to produce appropriate information and analyses of budget, schedule, and technical status to enable Project Management and the District to direct the Project activities towards a timely and cost-effective conclusion in accordance with the District program control requirements and the Project Master Schedule.

2. Detailed Description of Work

a. Provide assistance to the District in maintaining and updating the Level II Current Working Project Master Schedule. Provide and monitor Level III schedules in Precedence Diagram Method (PDM) format for each design package.

Current Working Project Schedules will include:

1) Engineering and architectural design
2) Utility relocation
3) Construction and procurement
4) Right-of-way requirements
5) Prerevenue testing

b. Monitor performance and prepare management information reports that evaluate:

1) Progress vs. schedule for each design package
2) Schedule and cost impact of changes
3) Impact of schedule variances and recommended corrective measures
4) Annual Work Plan performance vs. schedule

c. Prepare, and recommend to the District, Project budgets showing estimated costs for the GC and its subcontractors, construction, procurement, and installation contracts, utility relocation, right-of-way, construction management, and District expense.

d. Prepare Current Working Estimates (CWE). The Project CWE will consist of estimated costs for:

1) All engineering and support services related to design
2) Engineering services during construction
3) Systems procurement and installation
4) Construction
5) Right-of-way and relocation
6) Utility relocation
7) Construction management
8) District expenses including costs of other consultants

A contract package estimate will be assembled, reviewed, and refined for each design submittal. The Project CWE will be adjusted, as required.

e. Refine, implement, and maintain the Project Cost Trend Forecasting System. Evaluate effects of changes in design on the costs of design and construction and on schedules. Assess the impact of delays.

f. Collect, analyze, and report Project costs in accordance with the Work Breakdown Structure. Prepare management information reports for:

1) GC activities
2) Subcontractor activities
3) Special consultant activities
4) Required action items
5) Comparative cost data: budgeted/actual/forecast
6) Measurable physical progress vs. planned or forecast progress
7) Escalation and contingency evaluation
8) Exceptions (significant changes)

g. Coordinate, compile, and monitor the Annual Work Program.

h. Prepare additional management information reports for:

1) Exceptions that highlight changes in cash flow, invoiced and projected cost variances, and assessment of costs to complete
2) Change order status, trends, change requests, and engineering changes
3) Actual vs. planned manloading

3. Work Performed by Specialty Subcontractors

Provide services to assist in reviewing designer estimate submittals, as needed, during peak submittal periods.

4. End Product

a. Draft Annual Work Program

b. Updated Current Working Estimates

c. Level III schedules for each design package

d. Monthly Progress Report containing:

1) Required actions

2) Activities of GC

3) Activities of Subcontractors

4) Activities of Special Consultants

5) Cost, schedule, and budget data

6) Physical progress vs. planned or forecast progress

7) Design Services during construction

8) Summary

B. INPUT DATA REQUIREMENT FROM OTHERS

1. Procurement and construction schedule changes

2. Fund availability to establish budgets

3. Federal, state, and local requirement changes affecting costs, schedules, and budgets
4. Design progress and estimated cost/time to complete

C. SCHEDULE OF MAJOR EVENTS AND DELIVERABLES

1. Draft Annual Work Program 90 days prior to close of fiscal period
2. Monthly Progress Reports
3. Construction contract package CWE updates as required, at each design submittal point
4. Exception reports, as required

D. DISTRICT ACTION

District approvals, where required, are anticipated within 30 calendar days of submittal, unless indicated otherwise for specific actions, in order to expedite continuing work.

E. MANPOWER AND COSTS

1. Manpower

The estimated manpower for the fiscal period is 288.5 man-months. (See Table IV-1A for detail.)

2. Costs

The estimated costs are $1,901,000.

3. Subcontract Costs Subcontract costs are shown in Section IV of this AWP.

Facilities Design Management

ITEM: FACILITIES DESIGN MANAGEMENT

RESPONSIBILITY: FACILITIES DESIGN MANAGEMENT MANAGER

DESCRIPTION:

A. SCOPE

1. Definition of Work to Be Accomplished

Provide the management and staff needed to plan, organize, direct, supervise, control, and coordinate the effort necessary to manage the design of facilities. Acting through Project Managers assigned to one or more design packages, provide technical management of design packages to achieve uniform designs and maintain design quality. Provide administrative management to maintain cost and schedule control.

2. Detailed Description of Work -- Continuing Design Development

a. Technical Management. Facilities Design Management personnel will provide the following day-to-day project management support tasks:

1) Provide subcontractor firms with all necessary criteria, guide specifications, drawings, maps, building data, etc., required as input documents.

2) Establish precise lines of authority, responsibility, and communications; monitor adherence.

3) Direct and monitor subcontractor's work efforts with regard to conformance with established criteria and latest directives.

4) Provide awareness of, and assist in, the resolution of interface problems with abutting facilities design contracts and with systemwide contracts.

5) Promptly address and respond to all questions and requests for information by the Subcontractors by channeling inquiries to the proper parties for expeditious action.

6) Provide Subcontractors with timely and accurate direction in regard to latest policy and criteria matters.

7) Monitor the technical execution and progress of the work by periodic on-site visits to the Subcontractor's office.

8) Define submittals and end product schedules for Subcontractor's efforts. Measure Milestone submittals against expected levels of progress.

9) Direct Subcontractors to conform to review comments deemed necessary by the Design Reviewers.

10) Evaluate completeness of Subcontractor's efforts on a monthly basis for progress payments.

11) Monitor the design cost and progress of each Subcontractor versus his/her budget and schedule.

12) Monitor and report on status and expected progress of design work.

13) Identify problems in design work progress and assist each team in solving the problems.

14) Coordinate among Subcontractors the functional and physical interfaces between adjacent design sections for proper system integration.

15) Compare construction cost estimates at the various Milestone submittals with targets established for each design contract.

16) Coordinate the logging and distribution of Milestone submittals, when received, for multidisciplinary review.

17) Coordinate review comments, resolve conflicts in comments in conjunction with Design Reviewers, forward comments to Subcontractor, and receive action responses from Subcontractor.

18) Schedule meetings, as necessary, to clarify issues and to resolve points of apparent disagreement between Subcontractors and Reviewers.

19) Assist the District in arranging and coordinating meetings between Subcontractors, the District, City departments, railroad operators, utility agencies, and building owners, as required, to resolve design items affecting their facilities and services.

20) Support the assembly and distribution of construction bid documents.

21) Assist the District in evaluation of contractor proposals with respect to design and specifications adherence.

22) Provide ongoing design management and coordination services to the District's Construction Manager for review and processing of design changes, clarification of design intent, and resolution of other design issues during preconstruction and construction phase.

b. Project Units. The project units shown in Table III-1 will be developed in accordance with the indicated schedule.

3. Work Performed by Design Subcontractors

Design Subcontractors assigned to each project unit shall provide:

a. Project Management. Provide management of design development and production; prepare final design and construction sequencing; attend meetings with other Consultants, the District, and community agencies; report on task status.

b. Design Development. The Subcontractor for each design project unit shall provide designs to the following levels of completion, as indicated.

1) A110, A112, A114, A116, A130, A135, A136, A137, A139, A142, A144, A147, A149, A157, A159, A165, A167, A170, and A187 - design development to 100% as defined by contract and in accordance with 3 c of this section.

2) A195, A197, A220, A227, A237, A240, and A243 - design development to Pre-Final (85%) design as defined by contract, and in accordance with 3 d of this Section.

3) A245, A247, A250, A253, A275, A277, A310, A327, A347, A350, A357, A410, A425, A427, A430, A445, A447 - Design Development to an approximate Pre-Final (85%) level design as defined in 3 c of this section.

4) A415 - suspend design at a level which does not exceed 50% of the initial contract budget. Level of design to be approximately in-progress level.

c. Design Development to Completion. Complete review and application of soils report data; review, request, and utilize survey information, complete right-of-way, utility rearrangements and relocations both during and after construction, and street relocation drawings; prepare construction documents, including drawings and specifications, to completion for civil, structural including seismic criteria application, architectural, mechanical, electrical, and landscape elements; prepare detailed quantity take-offs and cost estimates of construction including preparation of underpinning and design reports.

d. Design Development to Pre-Final (85%) Level. Complete review and application of soils report data; review, request, and utilize survey information, complete right-of-way, utility rearrangements and

relocations both during and after construction, and street relocation drawings; prepare construction documents, including drawings and specifications, to completion for civil, structural including Seismic Criteria application, architectural, mechanical, electrical, and landscape elements; prepare detailed quantity take-off and cost estimates of construction including preparation of under-pinning and design reports.

At the pre-final level, the above submittal would be unchecked, unsigned, and unsealed documents. After review by G-C and the District, the Subcontractor is required to incorporate the review comments on the Stage I (civil, structural, and utilities) Submittal, check, sign, seal, and submit construction ready documents for Stage I only. The Stage II documents will be reviewed and shelved for future reactivation.

e. Design Development To Approximate Pre-Final Level of Design. As defined in the paragraph above for pre-final level of design, the documents for the Stage I

level of design will be developed to pre-final level design. The unchecked, unsigned, and the unsealed documents will be reviewed and shelved for future reactivation. The Subcontractor will be required to develop the Stage II design to the level that is required to clearly identify all the embedded items that are required for the complete installation of architectural finishes, electrical, and mechanical fixtures, equipments, conduits and cables.

4. Work Performed by Specialty Consultants.

Specialty consultants will provide reports and consultation, as required, for noise and vibration, corrosion, control, and seismic design. Deliverable schedules will be monitored, coordination effected, and progress reviewed, as required.

B. INPUT DATA REQUIREMENT FROM OTHERS

1. New and revised criteria for standard and directive drawings and construction contract specifications.

2. Track alignment data

3. Survey information

4. Right-of-Way Certifications

5. Design submittals from subconsultants

6. Review comments from MRTC disciplines and SCRTD

7. Contract drawings of primary control network

8. Data on proposed future site developments

9. Soils and geotechnical reports

10. Utility maps

C. SCHEDULE OF MAJOR EVENTS AND DELIVERABLES

The schedule of major events and deliverables is presented in Table III-1.

TABLE III-1

DESIGN SUBMITTAL SCHEDULE

		Submittals		
		InProgress (60%)	Pre-Final (85%)	Final (100%)
A110	Yard	*	*	*
A112	Shops	*	09/84	
A114	Maintenance of Way Building	*	*	
A116	Yard Storage Area	*	11/84	01/85
A130	Line and Yard Leads	*	10/84	01/85
A135	Union Station - Stage I	*	08/84	10/84
A136	Union Station - Stage II	*	09/84	11/84
A137	Central Control Facility	TBD	TBD	TBD
A139	Railroad Relocation	*	*	10/84
A142	Excavation for Civic Center Sta.	*	08/84	09/84
A144	Line Section	08/84	03/85	06/85**
A147	Civic Center Station - Stage I	08/84	03/85	06/85**
A149	Civic Center Station - Stage II	08/84	03/85	06/85**
A157	5th/Hill Station - Stage I	08/84	03/85	06/85**
A159	5th/Hill Station - Stage II	08/84	03/85	06/85**
A165	7th/Flower - Stage I	*	08/84	10/84
A167	7th/Flower - Stage II	*	08/84	10/84
A170	Wilshire/Alvarado - Stage I	*	08/84	10/84
A187	Wilshire/Alvarado - Stage II	*	09/84	11/84
A195	Wilshire/Vermont - Stage I	*	08/84	#
A197	Wilshire/Vermont - Stage II	*	09/84	#
A220	Line Section, Wilshire/Normandie & Wilshire/Western - Stage I	*	08/84	#
A227	Normandie Station - Stage II	12/84	05/85	06/85**

		In Progress (60%)	Pre-Final *(85%)	Final *(100%)
A237	Western Station - Stage II	08/84	11/84	#
A240	Wilshire/Crenshaw - Stage I	09/84	11/84	#
A243	Wilshire/Crenshaw - Stage II	09/84	11/84	#
A245	Wilshire/La Brea and Line Section - Stage I	*	09/84	#
A247	Wilshire/La Brea - Stage II	*	09/84	#
A250	Wilshire/Fairfax & Line Section	11/84	05/85**	#
A253	Wilshire/Fairfax - Stage II	11/84	05/85**	#
A275	Fairfax/Beverly - Stage I	*	09/84	#
A277	Fairfax/Beverly - Stage II		09/84	#
A310	Line Section, Fairfax/Santa Monica and La Brea/Sunset - Stage I	02/85	06/85**	#
A327	Fairfax/Santa Monica - Stage II	02/85	06/85**	#
A347	La Brea/Sunset - Stage II	02/85	06/85**	#
A350	Hollywood/Cahuenga - Stage I	09/84	01/85	#
A357	Hollywood/Cahuenga - Stage II	09/84	01/85	#
A410	Line Section	07/84	09/84	#
A415	Hollywood (50%)	09/84	***	***
A425	Universal City - Stage I	08/84	11/84	#
A427	Universal City - Stage II	08/84	11/84	#
A430	Line Section	08/84	10/84	#
A445	North Hollywood - Stage I	09/84	01/85	#
A447	North Hollywood - Stage II	09/84	01/85	#

* Submittals Delivered.
** Submittals deliverable in annual work year 1985-1986.
*** Hollywood Bowl Station design to be suspended at 50% level.
# Design to be suspended at pre-final for Stage I.

D. DISTRICT ACTION

1. District approvals and/or comments are anticipated within 10 working days of submittal, unless otherwise indicated, for design review submittals and change requests in order to expedite continuing work.

2. District action required to approve right-of-way certifications in a timely manner in accordance with Current Working Project Schedule.

3. District action required to obtain required designs from and organize meetings with city, utilities, and other affected agencies for MRTC and/or design consultants as per MRTC requests.

E. MANPOWER

1. Manpower

The estimated manpower for the Fiscal Period is 182 man-months. (See Table IV-1A for detail.)

2. Costs

The estimated costs are $1,480,000.

3. Subcontract Costs

Subcontract costs are shown in Section IV of this AWP.

Facilities Design

ITEM: FACILITIES DESIGN

RESPONSIBILITY: FACILITIES DESIGN MANAGER

DESCRIPTION:

A. SCOPE

1. Definition of Work To Be Accomplished

Provide the management and staff needed to plan, organize, direct, supervise, control, and coordinate the development, refinement, and maintenance of facilities design criteria, standard specifications, and standard and directive drawings for the Metro Rail Project. During the design development, perform design reviews of milestone submittals and conduct cost-effectiveness analyses of submitted designs. Provide support to the District for identification of right-of-way requirements. Prepare drawings and specifications for various facility systemwide items. Provide construction engineering support and coordination. Prepare demolition plans for specified structures. Develop procedures for coordination with the District's Construction Manager to clarify and interpret contract documents with regard to design intent.

2. Detailed Description of Work

a. Design Development.

1) Update the design criteria, standard specifications, standard and directive drawings, and the drafting criteria as a result of continued GC in-house reviews and feedback from GC Design Subcontractors and equipment suppliers.

2) Perform design reviews of drawings, specifications, and calculations included in prescribed Milestone submittals from Design Subcontractors and supplier firms (see Tables III-1 and III-2). Items of concern during reviews will be: conformance to established criteria; resolution of conflicts; verification of levels of completion; clarity of presentation; coordination between drawings and specifications and also among disciplines; acceptable architectural and engineering details; constructability; cost implications; and sound architectural and engineering judgment.

3) Assist the District in right-of-way acquisition by certifying right-of-way requirements, in-

cluding definition of the type and duration of space occupancy. Prepare property impact statements for all certified parcels.

4) Support the District in its property acquisition activities, including preparation of parcel descriptions, court exhibits, and other materials and services that may be required for condemnation proceedings.

5) Support the District, as required, in its evaluation of Joint Development opportunities, and in the preparation of related exhibits.

6) Identify the needs for agreements between the District and other public and quasi-public agencies by which changes to the existing structures and facilities of others may be accomplished, as required for the construction of Starter Line facilities.

7) Provide technical support to the District for their preparation of master agreements between the District and major city, railroad, and utility entities. Develop costs for design and relocation or reconstruction, treatment of

betterments, credit for salvage, provisions for service interruptions, and other related matters. Provide technical guidance to Section Designers and utility owners in preparation of utility rearrangement concepts. Provide necessary technical coordination and review services during development of utility rearrangement design to ensure economy and constructability. Integrate needs of utility work with Project construction schedules and maintenance of traffic plans.

8) Draft site-specific criteria and specification provisions of agreements for specific revision, relocation, reconstruction, restoration, and abandonment of existing city, railroad, and utility structures and facilities. Define the apparent relocation requirements.

9) Provide traffic engineering support to the District in their negotiations with LA DOT regarding phasing and staging of construction to minimize impacts on traffic circulation and street closures.

10) Provide planning and engineering support for the following construction engineering coordination items:

a) Review plans and specifications as they are being developed, and advise on the selection and availability of labor, time requirements for installation, and construction costs.

b) Assist in development of construction contract packages taking into consideration such factors as the type and scope of work to be performed, time of performance, availability of labor and material, community relations, and other pertinent criteria. Identify cost-effective opportunities for design/construct, design/fabricate/install, and joint or follow-up procurement of materials, equipment, and subsystems.

c) Review specifications to determine that they contain provisions for the temporary facilities necessary to enable a contractor to perform his work, and provisions for all of the jobsite facilities necessary to enable the construction management personnel to perform their duties.

d) Review plans and specifications for proper interfacing among contracts to avoid overlapping jurisdictions that could produce conflicts between contractors. Review for proper assignment of all phases of the work to construction contracts.

e) Provide support to the District in the conduct of prebid conferences to inform prospective contractors of requirements. Assist the District and the District's Construction Manager, as requested, in the evaluation of the capability and technical competence of prospective construction contractors, conduct bid meetings, and review abstracts and tabulation.

11) Review, confirm, consolidate, and publish facilities design criteria that cover all engineering disciplines involved in the continuing development of design.

12) Review, refine, and update standard specifications for the materials and performance activities pertaining to the construction of the line segments, stations, and yard and shops of the Metro Rail Project.

13) Review, confirm, coordinate, and print the architectural and engineering-related standard and directive drawings that are relevant for use by the GC Subcontractor firms and equipment suppliers in the preparation of their Project drawings. Produce additional standard and directive drawings as required.

14) Manage, coordinate, review, and integrate the ongoing work of selected engineering-related special consultants.

15) Conduct cost-effectiveness analyses of the proposed designs and specification provisions on a continuing basis, using comparisons among Design Subcontractor and supplier submittals, expert and industry advice, and GC in-house experience.

16) Implement and monitor applicaton of technical procedures for guidance of the Design Subcontractor and supplier firms toward their 60%, 85%, and final design submittals and for in-house use in review of Subcontractor and supplier submittals.

17) Prepare Construction and/or Procurement Drawings and Specifications for the following systemwide facility items: all trackwork-related procurements; trackwork installation; primary and secondary tunnel liners; emergency, mid-tunnel, and underplatform fans; signing; escalators and elevators; and ash and trash receptacles.

18) Undertake support services and special analyses as required in response to specific requests from the District.

19) Prepare separate contract demolition plan packages to clear existing structures as required.

20) Support Services and Special Analyses. The continuing development of the Metro Rail Project by the District may require additional support services beyond those specified in this AWP, and may, in addition, require analyses of special problems or design concepts. Such services shall be provided by the GC through the GC members or GC Design Subcontractors.

Such support services and special analyses will be provided as and when requirements are identified and approved by the District. It is anticipated that there will be continuing requests for such services throughout the duration of the Contract.

21) Specialty Subcontractors and Other Technical Services. The GC, during the course of the fiscal period, will secure the services of special consultants as GC Subcontractors, subject to need and approval by the District. The following list of services is anticipated at this time, but may be expanded as needs are determined:

a) Soils and Subsurface Investigation
b) Noise and Vibration
c) Surveying, including Photogrammatic Manuscripts
d) Corrosion Control
e) Existing Building Foundation Survey
f) Underground Support System
g) Underground Gas Survey
h) Lighting
i) Signing/Graphics
j) Model Building

These services are in addition to those that will be provided by the GC Subcontractors for design of station and line sections and the yard and shops, and also in addition to Specialty

Subcontractors that will augment the GC Facilities Design staff in various tasks.

22) Design Services During Construction.

a) Provide ongoing design support to the Construction Manager and the District including review of proposed changes, and preparation of independent estimates, preparation of drawings, clarification of design intent, and other design support services, as required, during the construction phase. In coordination with the Construction Manager, develop detailed procedures for undertaking changes to contract documents that result from actual field conditions.

b) Review contractor-prepared shop and working drawings that have potential impact on the integrity of design.

B. INPUT DATA REQUIREMENTS FROM OTHERS

1. Requirements for right-of-way certification
2. Definitions of relocation and reconstruction of existing facilities

3. Budget revisions (facilities)
4. Master Agreements with outside agencies
5. Specific Agreements for revision, relocation, reconstruction, restoration, and abandonment of existing structures and facilities owned by outside agencies.

C. SCHEDULE OF MAJOR EVENTS AND DELIVERABLES

1. Maintain and publish updated criteria, specifications, and drawings.	Continuous
2. Perform design reviews of Milestone submittals.	See Tables III-1 & III-2
3. Conduct cost-effectiveness analyses.	Continuous
4. Right-of-way certification activities.	Continuous
5. Support the preparation of master and site-specific agreements.	Continuous
6. Preparation of demolition plans.	Continuous
7. Preparation of systemwide facility designs.	See Table III-2

Table III-2

DESIGN REVIEW SUBMITTAL SCHEDULE

	30%	60%	85%	100%
Mid-Line & Station Fans	02-27-84*	-	-	04-02-84*
Tunnel Liners	02-24-84*	#08-12-84	10-20-84	12-13-84
Escalators	-	01-30-84*	04-01-84*	06-01-84
Elevators	-	03-11-84*	05-01-84	07-01-84
Signing/Graphics	04-01-84*	06-30-84	08-01-84	10-01-84
Main Line Trackwork Installation	09-01-84	01-01-85	07-01-85**	11-01-85**
Special Trackwork	06-15-84	09-01-84	11-01-84	02-01-85
Direct Fixation Fasteners	-	10-01-84	12-01-84	03-01-85
Running Rail	-	10-01-84	12-01-84	03-01-85
Timber Ties	-	10-01-84	12-01-84	03-01-85
Yard Trackwork	12-01-84	03-01-85	09-01-85**	12-01-85***

#40% Design Review Submittal
*Submittals deliverable in Annual Work Year 1983-1984
**Submittals deliverable in Annual Work Year 1985-1986

D. DISTRICT ACTION

District approvals, where required, are anticipated within 30 calendar days of submittal, unless indicated otherwise for specific actions, in order to expedite continuing work.

E. MANPOWER AND COSTS

1. Manpower - GC Activities

a. Manpower. The estimated manpower is 821 man-months. (See Table IV-1A for detail.)

b. Costs. The estimated costs are $5,094,000.

2. Manpower - Support Services and Special Analyses

An allowance is included in Item 1 above.

3. Costs - Support Services and Special Analysis

The estimated costs are included in Item 1b above.

4. Special Consultants

The estimated costs of special consultants are shown in Section IV of this AWP.

System Integration

ITEM: SYSTEM INTEGRATION

RESPONSIBILITY: SYSTEM INTEGRATION MANAGER

DESCRIPTION:

A. SCOPE

1. Definition of Work to Be Accomplished

Provide the management and staff needed to plan, organize, direct, supervise, control, and coordinate the System Integration function.

The System Integration function to be performed is accomplished through four separate, but related, areas of activity. These areas are:

- o System Safety, Assurance, and Security
- o Interface Control
- o Configuration Management
- o Operations and Maintenance Planning

These four areas of activity, in conjunction with each other, serve to:

a. Establish design criteria and plans that serve as the basis for designs.

b. Control and document the design process.

c. Determine compliance of designs with the design criteria.

d. Maintain the quality and reliability of the system.

This work will continue through final design, construction/procurement test, and acceptance.

2. Detailed Description of Work

The work to be performed by System Integration is listed below, grouped according to the four major areas discussed above.

a. System Safety, Assurance, and Security.

1) Refine project safety, security, and assurance plans
2) Refine systemwide design criteria
3) Participate in the Fire/Life Safety, Security, Elderly and Handicapped, and Maintenance

Committees for development of design criteria, monitoring designs for conformance to criteria, and criteria interpretation.

4) Develop checklists for verification of designs to system safety, assurance, and security criteria
5) Perform analyses and evaluations of designs through checklist implementation
6) Conduct quality audits of the design process to determine compliance with project management procedures
7) Perform special studies as required
8) Prepare and update System, Subsystem, and Interface Hazard Analyses
9) Prepare Fault Tree Analysis to identify safety hazards
10) Participate in formulation of safety procedures and training guidelines
11) Participate in formulation of Critical/ Catastrophic Items lists
12) Review and refine safety assurance, quality, and testing requirements for procurement and construction contracts
13) Review procurement contractor's required analyses and reports

14) Update Reliability and Maintainability Allocation and Prediction Indexes for appropriate system elements

15) Prepare test verification strategy and plan for verifying all systems performance and design requirements from component development through systems demonstration

16) Prepare a Test Management Plan that assigns and defines roles and responsibilities for all testing activities

17) Develop a Vendor/Contractor Preaward Quality Survey to determine contractor qualifications

18) Develop Quality Assurance Manual

19) Develop inspection/surveillance procedures for construction activities pursuant to the Quality Assurance Manual

20) Develop an assurance audit schedule and agenda for quality and procurement activities

21) Review and refine Safety Certification Plan

22) Develop Safety Certification Procedures pursuant to Plan

23) Develop a systemwide keying plan

b. Interface Control.

1) Implement and maintain Interface Control Program Plan including:
   a) Interface numbering system
   b) Interface identification matrices at levels I, II, and III
   c) Interface data sheets
   d) Standard program element breakdown that defines all system elements and contract limits
   e) Monitoring application of Interface Control Design Criteria
   f) Interface drawing control documentation
2) Initiate and coordinate an update of the system specification
3) Monitor implementation of interface control sections of the standard specifications
4) Participate in design reviews to verify application of design criteria and appropriate contract limits
5) Participate in change request review process to determine interface impacts
6) Review procurement contractor analyses and reports to verify proper application of interface design criteria and standard specifications

7) Perform systems analyses and special studies as required

c. Configuration Management.

1) Implement and maintain a Configuration Management Plan
2) Update procedures for configuration control
3) Administer the control and document distribution process for design reviews and other requirements for drawings and documents
4) Manage design change control process
5) Operate and maintain library for criteria, reports, policy directives, and other technical information

d. Operations and Maintenance Planning.

1) Continue support of the development of the Operations Plans through preparation of details
2) Continue support of the development of the Maintenance Plan through preparation of details
3) Supplement District's train performance analysis
4) Continue analysis and refinement of operations and maintenance staffing level planning
5) Provide input to the update of O&M cost projections

6) Initiate planning for the development of training requirements

7) Prepare procurement contract specifications for training and maintenance manuals, as required

8) Refine Yard and Shop Functional Criteria and Plan

9) Develop operational requirements for Central Control

10) Supplement and support development of a system Failure Management Plan

11) Participate in design reviews to verify inclusion of operations and maintenance planning requirements

12) Participate in Operations and Maintenance Planning Committees to resolve issues

13) Continue refinement of the maintenance equipment list

14) Develop functional requirements for operational graphics

15) Perform special analyses as required

3. Work by Specialty Subcontractors

Specialty Subcontractors will support the System Integration tasks. A brief description of their responsibilites is listed below:

a. Fire Protection. The primary task will be the review of the design for compliance to the design criteria. This will be accomplished through design review comments submitted as the design progresses. Attendance at and support of the Fire/Life Safety Committee meetings will also be required. Support will be provided to the design process through technical coordination meetings and/or special studies.

b. System Assurance. Perform, as required, specific system safety or assurance analyses, such as safety hazard analysis, review of contractor analysis, numerical assurance goal allocations, etc.

c. Operations and Maintenance Support. Perform a variety of tasks relating to operations and maintenance considerations in the design. Primary tasks will be to participate in the design review process and assist in the resolution of action items arising from such reviews. Special studies will be required to document operations and maintenance planning decisions as circumstances dictate. Participation in Operations and Maintenance Committees will also be required to assist in the resolution of issues.

d. Specialty Subcontractors will also augment the GC System Integration staff in various tasks.

B. INPUT DATA REQUIREMENTS FROM OTHERS

The major input required is the design data generated during the course of the Project and the dissemination of such data, including drawings and specifications, for purposes of review.

The responsibility for the completion of certain tasks relating directly to the functions of System Integration has been assumed by the District or assigned by the District to other consultants. The output of these tasks serves as input for performance of MRTC tasks. Key items in this category include:

- Operating Plan
- Failure Management Plan
- Maintenance Plan
- Maintenance Policies Manual Outline
- Failure Reporting, Analysis, and Corrective Action Procedures
- Updated Assurance Program Plans
- Warranty Protection Program

- o Quality Assurance Review Guidelines
- o Preliminary Hazard Analysis
- o Top level Reliability, Maintainability, and Assurance Indexes and Allocations
- o Safety Certification Plan

All other required input data are routinely generated by the ongoing design process.

C. SCHEDULE OF MAJOR EVENTS AND DELIVERABLES

The major deliverables from System Integration are listed below in Table III-3 and grouped by the four functions.

Table III-3

SCHEDULE OF MAJOR EVENTS AND DELIVERABLES

	Due Date
Safety, Assurance, and Security	
Update Design Criteria for Safety, Assurance, Security, Fire/Life Safety, and Testing	As Needed
Review and comment on Revised Program Plans for Safety, Fire/Life Safety, Security, Quality, and Testing	6/84
Update Hazard Analysis	6/84
Update Design Checklists	As Needed
Systemwide Keying System Plan	6/84
Test Management Plan	5/84
Quality Assurance Manual	10/84
Audit schedule and agenda for quality and procurement activities	10/84
Inspection/surveillance procedure for construction activities in accordance with requirements of the Quality Assurance Manual	9/84
Interface Management	
Interface Identification Report	8/84
Configuration Management	
Update and amend Configuration Management Procedures	Continuing
Operations and Maintenance Planning	
Input to Operations Plan	Continuing
Input to Maintenance Plan	Continuing
Yard and Shops Functional Requirements	6/84

D. DISTRICT ACTION

District approvals, where required, are anticipated within 30 calendar days of submittal, unless indicated otherwise for special actions, in order to expedite continuing work.

E. MANPOWER AND COSTS

1. GC Activities

a. Manpower. The estimated manpower for the fiscal period is 361.2 man-months. (See Table IV-1A for detail.)

b. The estimated cost is $1,866,000.

2. Subcontract Costs

The estimated costs of Specialty Subconsultants are shown in Section IV of this AWP.

Systems Design

ITEM: SYSTEMS DESIGN

RESPONSIBILITY: SYSTEMS DESIGN MANAGER

DESCRIPTION:

A. SCOPE

1. Definition of Work to Be Accomplished

Provide the management and staff needed to plan, organize, direct, supervise, control, and coordinate the continuing development, refinement, and maintenance of Systems Design Criteria and the continuing design development of Systems including preparation of drawings and specifications for the 100% design submittal for the following systems:

- o Automatic Train Control
- o Communications
- o Traction Power Procurement
- o Passenger Vehicles
- o Miscellaneous mechanical and electrical systems
- o Auxiliary Vehicle-Locomotive
- o Emergency Pump Equipment

Drawings and specifications will be developed and submitted for the 50/60% design review for the following systems:

- o Fare Collection
- o Traction Power Installation
- o Hi-Rail Car Mover
- o Re-Rail Equipment

The scheduled dates for the remaining submittals for these systems are shown in Table III-4.

For the following systems, the milestone submittal dates fall beyond the present work plan period and the specific dates of submittal are shown in Design Schedule Summary (Table III-4):

- o Flat Cars
- o Hi-Rail Crane
- o Tunnel Wash and Vacuum

In addition, 60% and 100% cost estimates will be performed for all the systems as per the deliverable schedule (Table III-4). Procurement and installation engineering support and coordination will be provided

continuously, as required, for construction and procurement document production.

2. Detailed Description of Work -- Design Development

a. Design Criteria. Continue to review, revise, refine, update, and initiate change requests to Systems Design Criteria developed to date.

b. Drawings and Specifications. Review, refine, and update specification and issue standard, directive, and contract drawings for the following systems and the associated major subsystem:

1) Passenger Vehicles

- o Carbody
- o Operators cab
- o Doors and door operation
- o Heating, ventilation, and air conditioning
- o Lighting
- o Couplers
- o Propulsion
- o Friction brakes
- o Auxiliary electric
- o Trucks

2) Communications

- o Radio
- o Cable Transmission Subsystem (CTS) including fiber optics and standard wire pairs, as required
- o Public Address (PA) including Station PA and Yard and Shops paging
- o Private Automatic Branch Exchange (PABX), including Emergency Telephone Service, Administrative Telephone Service, Maintenance Telephone Service, and Customer Assistance Telephone (Intercom) Service
- o Supervisory Control and Data Acquisition (SCADA or DTS), including Data Processing (DPE)
- o Closed Circuit Television (CCTV)
- o Fire and Intrusion Subsystem, including Emergency Management Panels (EMP), Fire Phone Line, Annunciator Panels, and Controlled Access
- o Consoles, Recorders, and Displays

3) Fare Collection

- o Ticket Vendors
- o Fare Gates (entry/exit)
- o Bill Changers
- o Add-Fare Machines
- o Station Control Panels
- o Revenue Carts
- o Test Equipment
- o Interface Equipment to Central Control
- o Ticket Encoders
- o Elderly/Handicapped Gates
- o Ticket Readers

4) Auxiliary Vehicles

- o Locomotive
- o Flat Car
- o Hi-Rail Car Mover
- o Hi-Rail Crane
- o Rerailing Equipment
- o Tunnel Washing and Vacuuming Equipment
- o Emergency Pumping Apparatus

5) Miscellaneous Mechanical/Electrical

- o Seismic Detection System
- o Fire Detection System
- o Gas Detection System

6) Automatic Train Control

- o Automatic Train Control Room Equipment
- o Track Circuits
- o Interlocking System
- o Wayside Equipment
- o Vehicle Equipment
- o Yard Equipment
- o Central Control Mimic Display and Interfaces

7) Traction Power

- o Traction Power auxiliary power electrical substation equipment
- o Contact Rail
- o Protective Coverboard

c. Design Task Outline. The following tasks will be performed for each of the system elements listed in 2b above, in order to achieve the specified completion points during the fiscal year:

1) Development of technical specifications
2) Further development and refinement of standard, directive, and contract drawings
3) Refinement of design criteria
4) 30%, 60%, 85%, and 100% design reviews as scheduled
5) Evaluation and incorporation of the design review comments
6) Conduct industry review
7) Conduct peer review
8) Evaluate and respond to industry and peer review comments
9) Development of contract packaging recommendation
10) Development of general and special conditions for procurement contracts
11) Organization of specifications and drawings in accordance with the contract packaging recommendations
12) Preparation of Information to Bidders
13) Develop cost estimates at 60% and 100% design review submittal milestones
14) Undertake support services and special analyses as required in response to specific requests from the District

d. Procurement/Installation Engineering Coordination.

1) Review drawings and specifications as they are being developed and advise on the selection and availability of materials and availability of labor and time requirements for manufacture and installation.

2) Recommend for purchase by the District and expedite delivery of long-lead-time procurement of machinery, equipment, materials, and supplies needed for the Project for delivery compatible with requirements. Make recommendations to the District for transfer of such items to contractors and installers where applicable.

3) Prepare a Procurement Plan for procurement and installation contract packages to include, for each package, the type and scope of work to be performed, time of performance, availability of competitive sources, method of contracting, and other pertinent criteria. Identify cost-effective opportunities for design/construct, design/fabricate/install, and joint or follow-up procurement of materials, equipment, and subsystems.

4) Review plans and specifications 1) for proper interfacing among contracts, 2) to avoid overlapping jurisdictions that would produce conflicts between manufacturers and installers, and 3) to assign all phases of the work to the proper contract.

5) Review specifications to determine that they contain: 1) provisions for the temporary facilities necessary to enable an installation contractor to perform his work and 2) provisions for all of the jobsite facilities necessary to enable the procurement management personnel to perform their duties.

6) Analyze cost reduction and value engineering proposals.

7) Develop and incorporate in the specifications provisions for implementing quality assurance requirements in accordance with the Quality Assurance Program.

8) Develop and incorporate in the specifications provisions for implementing testing requirements pursuant to applicable test plans.

9) Provide ongoing support and coordination services to the District's Construction Manager, as required.

e. Systems Procurement Activities.

Prepare plans for management of equipment and systems procurement, including continued development of a Procurement Management Manual, which encompasses the related activities of the District, Construction Manager, and GC. The Manual and other plans will provide for:

1. Assignment and definition of roles and responsibilities for all equipment and systems procurement activities.

2. Engineering review of contractor's design documents.

3. Monitoring procurement activities.

4. Monitoring and performing tests.

5. Coordinating activities of contractors.

6. Monitoring contractor's schedules.

7. Furnishing contract interpretations, reviewing contract change proposals, reviewing and preparation of related documents.

f. Special Consultants and Other Technical Services

The GC will require the services of Special Consultants to perform engineering services including, but not limited to, drawings and specifications for development of designs for:

- o Passenger Vehicles
- o Fare Collection
- o Supervisory Control Data Acquisition System (SCADA)

- o Miscellaneous Mechanical/Electrical
- o Automatic Train Control Block Layout
- o Traction Power
- o Power Utility Coordination

B. INPUT DATA REQUIREMENTS FROM OTHERS

1. All existing and updated Metro Rail Project systems design criteria, description and functional requirements

2. Definition of design procurement and installation packages

3. Current Working Project Schedule

4. Contract control budgets

5. Management information reports

6. Reports, drawings, and other data produced by the District that impact the design of systems.

C. SCHEDULE OF MAJOR EVENTS AND DELIVERABLES

	DUE DATE
1. See Design Schedule Summary, Table III-4.	
2. Procurement Plan	6/01/84
3. Procurement Management Manual	11/01/84

Table III-4
SYSTEMS DESIGN
SCHEDULE SUMMARY

	30% DESIGN REVIEW SUBMITTAL	50/60% DESIGN REVIEW SUBMITTAL	85/90% DESIGN REVIEW SUBMITTAL	100% DESIGN REVIEW SUBMITTAL	50/60% ESTIMATE	100% ESTIMATES
AUTOMATIC TRAIN CONTROL	09/16/83*	09/29/84	12/09/84	04/19/85	04/06/84*	04/19/85
POWER-PROCUREMENT	10/03/83*	04/30/84*	11/30/84	02/25/85	04/30/84*	02/25/85
POWER INSTALLATION	10/03/83*	07/01/85**	01/01/86**	04/30/86**	04/30/84*	04/30/86**
COMMUNICATIONS	03/15/84*	03/30/85	05/30/85**	07/30/85**	12/15/84	07/30/85**
PASS VEHICLES	09/01/83*	07/23/84	11/01/84	02/15/85	7/23/84	2/15/85
FARE COLLECTION	02/08/84*	11/01/84	06/01/85**	01/02/86**	11/01/84	01/02/86**
MISC. MECHANICAL	11/02/83*	08/10/84	02/01/85	04/26/85	08/10/84	04/26/85
AUX VEHICLES LOCOMOTIVE	--------	05/01/84	10/01/84	02/15/85	05/01/84	02/15/85
HI-RAIL CAR MOVER	--------	12/31/84	--------	06/30/85**	12/31/84	06/30/85**
RERAIL EQUIPMENT	--------	11/30/84	--------	05/31/85**	11/30/84	05/31/85**
EMERGENCY PUMP EQUIPMENT	--------	12/31/84	--------	04/30/85	12/31/84	04/30/85
FLAT CARS	--------	09/01/85**	--------	02/01/86**	09/01/85**	02/01/86**
HI-RAIL CRANE	--------	01/02/87**	--------	06/30/87**	01/02/87**	06/30/87**
TUNNEL WASH & VACUUM	--------	03/01/88**	--------	07/31/88**	03/01/88**	07/31/88**

* SUBMITTALS DELIVERABLE IN ANNUAL WORK YEAR 1983/84
** SUBMITTALS DELIVERABLE IN ANNUAL WORK YEAR 1985/86 AND BEYOND

D. DISTRICT ACTION

District approvals where required are anticipated within 30 calendar days of submittal, unless indicated otherwise for specific actions, in order to expedite continuing work.

E. MANPOWER AND COSTS

1. GC Activities

a. Manpower. The estimated manpower for the fiscal period is 472.6 man-months. (See Table IV-1A for detail.)

b. Cost. The estimated cost for the fiscal period is $2,835,000.

2. Subcontract Costs

a. Design Subcontracts. Estimated costs are shown in Section IV of this AWP.

b. Specialty Subcontracts. Estimated costs are shown in Secion IV of this AWP.

IV. Organization, Manpower Allocations, and Costs

IV. ORGANIZATION, MANPOWER ALLOCATIONS, AND COSTS

This section presents the overall GC organization chart* showing functional responsibilities and the peak fiscal period manpower level. Also shown in tabular form are projected manpower allocations by month for each element of the AWP. The manpower allocation as presented includes both the GC members' efforts as well as those proposed for DBE/WBE specialty subcontractors' efforts in conjunction with GC staff. The cost estimates associated with each element of the AWP, however, do not include the cost of specialty subcontractors. These costs are listed separately on the cost summaries. Cost estimates associated with the GC-projected manloading utilize actual labor rates for on-board personnel and estimated average labor rates by discipline for personnel proposed to be hired or drawn from home offices, plus projected escalation by Member Firm for each individual employee. An overtime allowance based upon 5% of straight time hours for each non-exempt and exempt employee eligible within statutory requirements or MRTC policy, factored to remove the burden from premium time, has been allocated to each organizational unit.

*See envelope on back cover.

TABLE IV-1
METRO RAIL GENERAL CONSULTANT
SUMMARY MANPOWER ALLOCATION

MONTH / GROUP	1984								1985				Total Man-Months
	M	J	J	A	S	O	N	D	J	F	M	A	
Project Management	5	5	5	5	5	5	5	5	5	5	5	5	60
Project Administration	33	33	33	34	34	34	34	34	35	35	35	35	409
Project Control	21	24	25	25	25	25	25	24	24	24	24	23	289
Facilities Design Management	17	17	17	17	17	17	16	16	14	13	11	10	182
Facilities Design (GC)	68	68	68	73	73	73	73	73	63	63	63	63	821
System Integration	26	26	29	31	31	31	31	32	31	31	31	31	361
Systems Design (GC)	37	37	41	42	44	44	43	42	38	37	34	34	473
Total Man-Months	207	210	218	227	229	229	227	226	210	208	203	201	2,595

Notes: 1) Includes specialty consultants' staff working in conjunction with GC.
2) Includes JV members' home office support.

TABLE IV-1A

DETAILED MANPOWER ALLOCATION

SUMMARY

August 31, 1984
Revision 4

ELE	SEG	RESP	TASK DESCRIPTION	MM 1984	SCHEDULE 1984 May	June	July	Aug	Sept	Oct	Nov	Dec	1985 Jan	Feb	Mar	Apr	COMMENTS
		A	Project Management	60.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
		B	Project Administration	408.6	32.8	32.8	32.8	33.8	33.8	33.8	34.8	34.8	34.8	34.8	34.8	34.8	
		C	Project Control	288.5	21.0	24.0	25.0	25.0	25.0	24.5	24.5	24.5	23.8	23.8	23.7	23.7	
		D	Facilities Design Managment	182.0	17.0	17.0	17.0	17.0	17.0	17.0	16.0	16.0	14.0	13.0	11.0	10.0	
		E	Facilities Design	821.0	68.0	68.0	68.0	73.0	73.0	73.0	73.0	73.0	63.0	63.0	63.0	63.0	
		F	System Integration	361.2	26.1	26.1	29.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	
		G	Systems Design	472.6	36.8	37.3	40.6	42.4	43.8	44.1	42.9	41.5	38.5	36.5	34.4	33.8	
TOTAL:				2,593.9	206.7	210.2	217.5	227.3	228.7	228.5	227.3	225.9	210.7	207.2	203.0	201.4	

NOTE: (1) Includes specialty consultants' staff working in conjunction with GC efforts.

(2) Estimated equivalent staff level for April, 1984 is 205.

DIVISION MANPOWER ALLOCATION

PROJECT MANAGEMENT

August 31, 1984 Revision 4

				MM	SCHEDULE 1984							SCHEDULE 1985				
ELE	SEG	RESP	TASK DESCRIPTION	1984	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	COMMENTS
P	99	A	Project Management	36.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
P	99	A	Clerical	24.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
TOTAL:				60.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	

NOTE: (1) Includes specialty consultants' staff working in conjunction with CC efforts.

(2) Estimated equivalent staff level for April, 1984 is 5.0.

DETAILED MANPOWER ALLOCATION
PROJECT ADMINISTRATION

August 31, 1984 Revision 4

ELE	SEG	RESP	TASK DESCRIPTION	MM 1984	SCHEDULE 1984 May	June	July	Aug	Sept	Oct	1985 Nov	Dec	Jan	Feb	Mar	Apr	COMMENTS
P	99	B	Management	24.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
P	99	B	Human Resources	12.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
P	99	B	Personnel	12.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
P	99	B	EFO Office	9.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
P	99	B	Clerical	12.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
P	99	B	Accounting	60.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
P	99	B	Clerical	12.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
P	99	B	Office Services	48.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
P	99	B	Clerical	12.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
P	99	B	Cont. Administration	48.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
P	99	B	Clerical	24.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
P	99	B	Publications	36.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
P	99	B	Graphics	16.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	
P	99	B	Word Processing	81.0	6.0	6.0	6.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
TOTAL:				408.6	32.8	32.8	32.8	33.8	33.8	33.8	34.8	34.8	34.8	34.8	34.8	34.8	

NOTE: (1) Includes specialty consultants' staff working in conjunction with GC efforts.
(2) Estimated equivalent staff level for April, 1984 is 36.

DETAILED MANPOWER ALLOCATION

PROJECT CONTROL

August 31, 1984 Revision 4

ELE	SEG	RESP	TASK DESCRIPTION	MH 1984	1984 May	June	July	Aug	SCHEDULE Sept	Oct	Nov	Dec	1985 Jan	Feb	Mar	Apr	COMMENTS
P	99	C	Management	17.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
P	99	C	Clerical	36.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
P	99	C	Scheduling	78.5	6.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.3	6.3	6.2	6.2	
P	99	C	Cost Engineering	59.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
P	99	C	Estimating	91.0	6.0	7.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	
P	99	C	Project Analysis	12.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
TOTAL:				288.5	21.0	24.0	25.0	25.0	25.0	24.5	24.5	24.5	23.8	23.8	23.7	23.7	

NOTE: (1) Includes specialty consultants' staff working in conjunction with GC efforts.

(2) Estimated equivalent staff level for April, 1984 is 20.

DETAILED MANPOWER ALLOCATION

FACILITIES DESIGN MANAGEMENT

August 31, 1984 Revision 4

				MM	SCHEDULE 1984								1985				
ELE	SEG	RESP	TASK DESCRIPTION	1984	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	COMMENTS
P	99	D	Management	24.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
P	V	D	Project Management	126.0	12.0	12.0	12.0	12.0	12.0	12.0	11.0	11.0	10.0	9.0	7.0	6.0	
P	99	D	Clerical	32.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	
TOTAL:				182.0	17.0	17.0	17.0	17.0	17.0	17.0	16.0	16.0	14.0	13.0	11.0	10.0	

NOTE: (1) Incudes specialty consultants' staff working in conjunction with GC efforts.

(2) Estimated equivalent staff level for April, 1984 is 16.

DETAILED MANPOWER ALLOCATION

FACILITIES DESIGN

August 31, 1984 Revision 4

(1 of 2)

				MM	SCHEDULE 1984							1985					
ELE	SEG	RESP	TASK DESCRIPTION	1984	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	COMMENTS
	E	E	Management	24.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
	F	E	Clerical	67.6	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	4.3	4.3	4.3	4.3	
	F	3	Structural	48.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
	E	1	Civil & Trackwork	95.0	6.0	6.0	6.0	9.0	9.0	9.0	9.0	9.0	8.0	8.0	8.0	8.0	
	E	E	Tunnel Design	20.4	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
	E	2	Utility	48.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
	E	5	Mechanical	48.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
	E	7	Electrical	32.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	
	E	E	Constructability	12.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
	E	0	Specifications	44.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	
	E	9	Drafting/Engineering	110.0	8.0	8.0	8.0	10.0	10.0	10.0	10.0	10.0	9.0	9.0	9.0	9.0	
	E	4	Architecture Design	56.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	
	E	4	Architecture Production	56.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	
	E	6	ROW Survey and Cerfification	84.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	

DETAILED MANPOWER ALLOCATION

FACILITIES DESIGN

August 31, 1984 Revision 4

(2 of 2)

				MM	1984 SCHEDULE						1985				
ELE	SEG	RESP	TASK DESCRIPTION	1984	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	COMMENTS
E	6		Special Studies	52.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	3.0	3.0	3.0	3.0	
E	E		Traffic Engineering	12.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
E	8		Geotechnical	12.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
TOTAL:				821.0	68.0	68.0	68.0	73.0	73.0	73.0	73.0	73.0	63.0	63.0	63.0	63.0	
			No of contracts under review.		22.0	20.0	19.0	17.0	17.0	15.0	12.0	9.0	8.0	7.0	7.0	7.0	
			Number of Facilities contract submittals for review.		7.0	6.0	4.0	7.0	8.0	7.0	12.0	6.0	4.0	9.0	5.0	-0-	

IV-9

NOTE: (1) Includes specialty consultants' staff working in conjunction with GC efforts.

(2) Estimated equivalent staff level for April, 1984 is 67.

DETAILED MANPOWER ALLOCATION

SYSTEM INTEGRATION

August 31, 1984 Revision 4

				MM	1984 SCHEDULE								1985			
ELE	SEG	RESP	TASK DESCRIPTION	1984	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	COMMENTS
P	99	F	Management	12.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
P	99	F	Clerical	24.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
P	99	F	System Analysis	36.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
P	99	F	Operations Planning	36.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
P	99	F	Maintenance Planning	12.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
P	99	F	Interface Management	24.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
P	99	F	Configuration Control	6.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
P	99	F	Change Control	36.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
P	99	F	Document Control	51.6	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	
P	99	F	Design Review Support	12.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
P	99	F	Library	8.4	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
P	99	F	Safety Engineering	16.0	0.5	0.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
P	99	F	Safety Certification	9.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
P	99	F	Security Planning	13.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
P	99	F	System Assurance Engineering	27.6	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	
P	99	F	Quality Assurance Engineer	21.4	0.2	0.2	1.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
P	99	F	Integrated Testing	16.0	0.5	0.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
TOTAL:				361.2	26.1	26.1	29.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	

NOTE: (1) Includes specialty consultants' staff working in conjunction with GC efforts.

(2) Estimated equivalent staff level for April, 1984 is 28.

DETAILED MANPOWER ALLOCATION

SYSTEMS DESIGN
(1 of 3)

August 31, 1984 Revision 4

				MM	1984				SCHEDULE			1985				
ELE	SEG	RESP	TASK DESCRIPTION	1984	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr COMMENTS
Z	99	G	Management	24.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Z	99	G	Clerical	60.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	SUBTOTAL:			84.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Communications																
Z	77	G	Contract Drawings	26.4	1.0	1.0	1.0	4.0	4.0	4.0	3.0	2.0	2.0	2.0	1.5	0.9
Z	77	G	Criteria/Specs	23.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Z	77	G	Communications Procurement Activities	6.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Z	77	G	Review & Coord.	14.7	1.4	1.4	1.4	1.4	0.9	1.4	1.4	1.4	1.0	1.0	1.0	1.0
	SUBTOTAL:			70.6	4.4	4.9	4.9	7.9	7.4	7.9	6.9	5.9	5.5	5.5	5.0	4.4
Train Control																
Z	73	G	Train Control Procurement Activities	6.0	0.2	0.3	0.5	0.6	0.9	1.0	0.9	0.7	0.4	0.2	0.2	0.1
Z	73	G	Contract Drawings	31.5	2.2	2.2	2.0	3.0	4.0	3.5	3.6	3.8	3.0	2.0	1.2	1.0
Z	73	G	Review & Coord.	6.5	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Z	73	G	Criteria/Specs	36.1	2.5	2.5	3.2	3.0	3.0	3.0	3.0	3.0	3.4	3.5	3.0	3.0
	SUBTOTAL:			80.1	5.5	5.6	6.3	7.2	8.5	8.0	8.0	8.0	7.3	6.2	4.9	4.6

DETAILED MANPOWER ALLOCATION
SYSTEMS DESIGN
(2 of 3)

August 31, 1984
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Revision 4

ELE	SEG	RESP	TASK DESCRIPTION	MM 1984	SCHEDULE 1984 May	June	July	Aug	Sept	Oct	Nov	1985 Dec	Jan	Feb	Mar	Apr	COMMENTS
Power																	
Z	72	G	Power Procurement Activities	8.2	0.6	0.6	0.6	0.8	0.8	0.8	0.8	0.8	0.6	0.6	0.6	0.6	
Z	72	G	Contract Drawings	43.5	1.8	1.9	2.3	0.6	1.5	5.2	6.0	6.0	6.4	3.8	4.0	4.0	
Z	72	G	Review & Coord.	18.4	1.5	1.5	2.0	2.5	1.7	1.5	1.2	1.0	1.5	1.5	1.5	1.5	
Z	72	G	Criteria/Specs	32.2	4.0	3.6	3.0	4.0	4.5	0.5	1.0	1.2	0.5	3.3	3.3	3.3	
	SUBTOTAL:			102.3	7.9	7.6	7.9	7.9	8.0	8.0	9.0	9.0	9.0	9.2	9.4	9.4	
Vehicles																	
Z	79	G	Vehicle Procurement Activities	5.3	0.5	0.5	0.5	0.4	0.5	1.0	1.0	0.4	0.5	0.0	0.0	0.0	
Z	79	G	Contract Drawings	7.8	1.0	1.0	4.0	0.1	0.4	0.2	0.2	0.7	0.2	0.0	0.0	0.0	
Z	79	G	Review & Coord.	3.1	0.3	0.4	0.4	0.4	0.2	0.1	0.3	0.3	0.4	0.1	0.1	0.1	
Z	79	G	Criteria/Specs	65.7	6.0	6.1	5.9	6.1	6.8	6.8	6.5	6.6	4.6	4.1	3.1	3.1	
	SUBTOTAL:			81.9	7.8	8.0	10.8	7.0	7.9	8.1	8.0	8.0	5.7	4.2	3.2	3.2	
Fare Collection																	
Z	78	G	Fare Collection Procurement Activities	1.2	0.0	0.0	0.1	0.3	0.0	0.3	0.3	0.1	0.1	0.0	0.0	0.0	
Z	78	G	Contract Drawings	13.5	1.0	1.0	1.0	2.0	2.0	2.0	1.0	0.7	0.7	0.7	0.7	0.7	
Z	78	G	Review & Coord.	2.6	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Z	78	G	Criteria/Specs	14.2	0.7	0.8	0.6	1.0	1.3	1.0	0.5	1.0	1.0	2.1	2.1	2.1	
	SUBTOTAL:			31.5	2.0	2.0	2.0	3.5	3.5	3.5	2.0	2.0	2.0	3.0	3.0	3.0	

DETAILED MANPOWER ALLOCATION

SYSTEMS DESIGN
(3 of 3)

August 31, 1984 Revision 4

				MM	1984					SCHEDULE			1985				
FLE	SEG	RESP	TASK DESCRIPTION	1984	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	COMMENTS
Mechanical/Electrical																	
Z	84	G	Mech/Elec Procurement Activities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Z	84	G	Contract Drawings	2.3	0.5	0.5	0.0	0.0	0.0	0.0	0.3	0.2	0.3	0.0	0.2	0.3	
Z	84	G	Review & Coord.	1.9	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.2	0.1	
Z	84	G	Criteria/Specs	18.0	1.5	1.6	1.5	1.7	1.3	1.5	1.6	1.2	1.6	1.2	1.5	1.8	
SUBTOTAL:				22.2	2.2	2.2	1.7	1.9	1.5	1.6	2.0	1.6	2.0	1.4	1.9	2.2	
TOTAL:				472.6	36.8	37.3	40.6	42.4	43.8	44.1	42.9	41.5	38.5	36.5	34.4	33.8	

NOTE: (1) Includes specialty consultants' staff working in conjunction with GC efforts.

(2) Estimated equivalent staff level for April, 1984 is 33.

TABLE IV-2
GENERAL CONSULTANT COST SUMMARY

	LINE ITEM	Actual Fiscal Period Ending 4-30-84	ESTIMATED FISCAL PERIOD ENDING 4-30/85
A	Project Management	$ 449,414	$ 661,000
B	Project Administration	1,570,702	2,044,000
C	Project Control	1,156,713	1,901,000
D	Facilities Design Management (Subcontracts)	1,194,160	1,480,000
E	Facilities Design (G.C.)	3,286,617	5,094,000
F	System Integration	1,194,068	1,866,000
G	Systems Design (G.C.)	1,851,621	2,835,000
H	Design Services During Construction	---------	---------
	Subtotal G.C. Services	10,703,295	15,881,000
I	Subcontracts: Design	15,855,000	37,450,000
J	Special Consultants	2,232,011	3,530,000
K	Special Consultants – Staff Augmentation	1,768,944	3,821,000
	Subtotal Subcontracts	19,856,005	44,801,000
	Subtotal All Services	30,559,300	60,682,000
L	Direct Reimbursable Expense	3,398,404	2,570,000
M	Fixed Fee	904,740	1,478,500
N	Subcontract Fee	526,860	1,026,000
	Total G.C. Cost & Fee	35,389,304	$65,756,500

TABLE IV-3
DESIGN SUBCONTRACTORS
REVISED 84/85 AWP

Design Package	Subcontractor	CWE for 100% (6/30/84)	Design Level Authorized	CWE for Design Level Authorized	Actual 83/84 Exp. (Rounded)	Revised 84/85 Exp. Budget	Total Est. Cost thru 4/30/85	Balance Estimated for 85/86
A-100	DMJM/PBQD	$ 6,098,548	100%	$ 6,098,548	$ 3,167,000	$ 2,931,548	$ 6,098,548	
A-135	HWA	3,665,530	100%	3,665,530	1,702,000	1,963,530	3,665,530	
A-140	DHA	6,595,439	100%	6,595,439	1,830,000	3,465,439	5,295,439	$1,300,000
A-165	Gannett Fleming/Dworsky	2,911,783	100%	2,911,783	1,495,000	1,416,783	2,911,783	
A-170	S & P	3,487,487	100%	3,487,487	1,754,000	1,733,487	3,487,487	
A-195	Kober/McGuire	2,471,790	85%	2,394,734	1,060,000	1,334,734	2,394,734	
A-220	Tudor/Pereira	5,139,695	85%	4,905,860	762,000	3,136,000	3,898,000	1,007,860
A-240	Turner/Chang	2,718,980	85%	2,599,240	377,000	2,222,240	2,599,240	
A-245	STV Engineers	1,940,179	85%	1,779,321	551,000	1,228,321	1,779,321	
A-250	Bechtel	4,127,837	85%	3,732,195	190,000	2,712,000	2,902,000	830,195
A-275	WDA	2,676,585	85%	2,451,585	473,000	1,978,585	2,451,585	
A-310	Carter Engineers	4,545,415	85%	4,104,473	458,000	2,983,000	3,441,000	663,473
A-350	Stull Engineers	2,410,210	85%	2,193,092	303,000	1,890,092	2,193,092	
A-410	T & TC	2,664,660	85%	2,131,944	539,000	1,592,944	2,131,944	
A-415	Gehry, Warnieke, E & K	1,017,000	50%	1,017,000	205,000	812,000	1,017,000	
A-425	Luckman	2,500,180	85%	2,259,862	448,000	1,811,862	2,259,862	
A-430	PAE/WH/S & W	2,068,766	85%	1,691,889	307,000	1,384,889	1,691,889	
A-445	H. Gibbs and D. Gibbs	2,205,006	85%	1,790,819	234,000	1,556,819	1,790,819	
	TOTAL:	$59,245,450		$55,810,801	$15,855,000	$36,154,273	$52,009,273	$3,801,528
	DESIGN DEVEOPMENT RESERVE:	3,746,981		4,457,341	---	1,295,727	1,295,727	
		$62,992,431		$60,268,142*	$15,855,000	$37,450,000	$53,305,000	

* 100% CWE less scope reductions

TABLE IV-4

SPECIALTY SUBCONTRACT BUDGET SUMMARY

PART I

(INDEPENDENT CONSULTING)

Division No.	Division Title	Assignment	FCST 83/84 Expenditures	Actual 83/84 Exp.	Revised Budget 84/85 AWP	Total Estimated thru 4/30/85	Balance Estimated for 85/86	84/85 DBE/WBE Participation
A	Management	Tunneling	$ 13,300	$ 16,495	$ 36,000	$ 52,495	$ 6,000	
		Seismic Criteria and Review	78,000	62,905	28,500	91,405		
		Seismic Special Studies	-------	-0-	200,000	200,000	700,000	
B	Project Administration	Contract Management	50,000	39,920	20,000	59,920		
		Auditing	100,000	28,959	100,000	128,959	40,000	D
C	Project Control	Estimating	-------	-0-	75,000	75,000		
D	Facilities Design Management	Noise and Vibration	30,000	38,114	77,000	115,114	40,000	
		Corrosion Control	5,000	-0-	170,000	170,000	20,000	
E	Facilities Design	Geotechnical	1,469,057	1,431,450	864,000	2,295,450	179,000	.25D
		Methane Gas Control	-------	-0-	100,000	100,000		
		Surveying	300,000	347,116	451,000	798,116	50,000	D
		Lighting	163,436	137,224	184,000	321,224	23,000	W
		CCF Design	-------	-0-	180,000	180,000	370,000	
		Graphics/Signing - General Design	10,000	9,951	50,000	59,951		
		Graphics/Signing - System Maps	-------	-0-	15,000	15,000		D
		Models	-------	-0-	50,000	50,000		
F	System Integration	Fire/Life Safety	110,000	105,859	260,000	365,859	50,000	
		Safety and Assurance	10,000	-0-	80,000	80,000	30,000	.75D
		Operations and Maint. Planning	40,000	-0-	325,000	325,000	265,000	
		Configuration Management	23,000	-0-	-0-	-0-		
G	System Design	Fare Collection System Design	120,000	14,018	60,000	74,018	43,000	
		SCADA	-------	-0-	81,000	81,000		
		Vehicle Air Conditioning	10,000	-0-	15,000	15,000		
		TOTAL:	$2,531,793	$2,232,011	$3,421,500	$5,653,511	$1,820,000	
		RESERVE:			108,500	108,500		
		BUDGET:			$3,530,000	$5,762,011		

TABLE IV-4A
SPECIALTY SUBCONTRACT BUDGET SUMMARY

PART II
(STAFF AUGMENTATION DBE/WBE)

Division No.	Division Title	Assignment	Goal 83-84	Budget 84-85	Notes
A	Management	None			
B	Project Administration	MBE/WBE Compliance Publications Clerical, Admin.		$ 496,000	DBE/WBE
C	Project Control	Estimating Clerical		$ 324,000	DBE/WBE
D	Facilities Design Mgmt.	Project Management		$ 180,500	DBE
E	Facilities Design	Drafting Civil/Arch. Engineering Specifications		$1,471,000	DBE
F	System Integration	Configuration Mgmt. Systems Assurance & Security Interface Mgmt. Operations Planning Technical Librarian		$ 827,500	DBE/WBE
G	Systems Design	Electrical Engineering Drafting		$ 522,000	DBE
		Total	$2,514,272	$3,821,000	

V. Schedules

V. SCHEDULES

The 1984/85 Annual Work Program is in consonance with the District's Level II Project Schedule, dated February 20, 1984. The Level II Project Schedule portrays the summary level activities for design, right-of-way acquisition, utility relocation, bid process, construction, procurement, and systems and systemwide element installation and testing leading to the integrated and pre-revenue testing. This schedule lists major design and contract packages; major milestones are highlighted and interfaces are indicated.