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Southern California Rapid Transit District
Metro Rail Project

A130 REALIGNMENT SUMMARY REPORT

Prepared by:

Southern California Rapid Transit District
Transit Systems Development

May 1987

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TABLE OF CONTENTS

	<u>Page No.</u>
EXECUTIVE SUMMARY	i
1 INTRODUCTION	1
2 METRO RAIL PROJECT DESCRIPTION	2
3 HISTORY OF THE A130 REALIGNMENT	5
3.1 Caltrans Discovery of Contaminated Soil	5
3.2 Retention of The Earth Technology Co.	6
3.3 SCRTRD Action	7
4 COST ANALYSIS	11
4.1 Contract A130	11
4.2 Contract A135	16
4.3 Contract A141	16
4.4 Contracts A132, A134 and A136	19
5 SCHEDULE IMPACT ANALYSIS	20
5.1 Contract A130	20
5.2 Contract A135	24
5.3 Contract A141	25
5.4 Contracts A132, A134, A136	26
6 RESOLUTION OF ISSUES	27

LIST OF TABLES

<u>Table</u>	<u>Page No.</u>
1 - Overall Cost Impact for Modified Alignment	12
2 - Cost Impact to Contract A130	13
3 - Cost Impact to Contract A135	17
4 - Cost Impact to Contract A141	18

LIST OF FIGURES

<u>Figure</u>	<u>Page No.</u>
1 - MOS-1 Map	3
2 - Realignment Drawing (2 pages)	9
3 - A130 Contract Schedule	21
4 - A135 Contract Schedule	22
5 - A141 Contract Schedule	23
6 - Soil Sample Boring Hole Locations	33

ERRATA

- P. ii, Paragraph 2, Line 1: "Transit" should read "Transportation".
- P. 7, Paragraph 4, Line 3: "estimate" should read "estimates".
- P. 7, Paragraph 6, Line 6: Delete "construction of the".
- P. 12, Right column, First subtotal: "<\$2,915,000" should read "<\$26,578,000>".
- P. 19, Paragraph 2, Line 5: "\$22,000 in 1985" should read "\$23,000 in escalated".
- P. 20, Paragraph 2, Line 1: "indicatd" should read "indicated".
- P. 24, Paragraph 2, Line 5: "assumpted" should read "assumed".

EXECUTIVE SUMMARY

In April 1986, in the vicinity of Los Angeles Union Passenger Terminal (LAUPT), contaminated soil was discovered by a Caltrans contractor during excavation for the construction of the El Monte Busway Extension. The site of the discovery was in the immediate vicinity of the route of the Metro Rail Project. Consequently, the Southern California Rapid Transit District (SCRTD) retained a geological consultant in July of 1986 to determine the nature and extent of the contamination.

The consultant subsequently determined that toxic contaminants were present within the A130 Contract area of the Metro Rail alignment. The consultant estimated that if the original alignment were constructed, approximately 24,000 cubic yards of contaminated soil would need to be treated and/or removed. These remedial action alternatives were estimated to require between 10 and 30 months to complete and cost between \$6 and \$12 million. The geological consultant, also identified a third alternative: modification of the route alignment to avoid the contaminated site.

Preliminary analysis by MRTC indicated that the delay to the Revenue Operation Date (ROD) caused by removal of the contaminated soil would be approximately one year. The analysis also indicated that, by adopting a revised alignment south of the contaminated area, delay to ROD could be limited to two months and an estimated cost savings of \$19.8 million could be achieved.

Based on these findings, documented in the geological consultant's Draft Remedial Action Plan dated January 30, 1987, and Metro Rail Transit Consultants' (MRTC) Alignment Modification Evaluation Report dated February 19, 1987, the SCRTD Board of Directors, acting on a staff recommendation, adopted the alignment change on February 26, 1987.

Detailed analyses undertaken to confirm the preliminary analyses have substantiated that the decision to adopt the alignment change was appropriate, should enable the scheduled ROD to be attained and could result in a reduction of approximately \$26.6 million to the Metro Rail Project MOS-1 Budget for the work in the affected area. In addition, the realignment will allow several piers of the El Monte Busway Extension, which had been redesigned to accommodate Metro Rail, to be constructed as originally designed. This will result in a reduction in the planned \$3.3 million cost for the modified piers, a cost which the Los Angeles County Transportation Commission (LACTC) had agreed to reimburse to Caltrans.

LACTC, Caltrans and the U.S. Urban Mass Transit Administration (UMTA), in response to a written request by SCRTD for comment on the Draft Remedial Action Plan and the Alignment Modification Evaluation Report, have raised several questions regarding the decision to adopt the realignment. All of the questions that have been raised are addressed in Section 6 of this report.

SECTION 1

INTRODUCTION

The contaminated soil discovered in the alignment of the Metro Rail Project in the vicinity of Los Angeles Union Passenger Terminal could have resulted in major adverse impacts on both the cost and construction schedule of the Metro Rail Project. To mitigate the negative impacts, a decision was made to modify the Metro Rail alignment to avoid the area of known contamination. This report is written to fulfill three purposes regarding the realignment decision:

- 1) To document the process that lead to the realignment decision.
- 2) To provide a summary analysis of the cost and schedule impacts of the realignment.
- 3) To address questions raised by LACTC, Caltrans, UMTA and others concerning the realignment.

This report is organized into 6 sections. Following this introductory section, Section 2 gives a brief description of the Metro Rail Project. Section 3 traces the series of events that resulted in the decision to modify the Metro Rail alignment. Sections 4 and 5 respectively, provide an analysis of the cost and schedule impacts of both the original and revised alignments. Section 6 discusses the issues raised by UMTA, Caltrans, LACTC and others.

SECTION 2

METRO RAIL PROJECT DESCRIPTION

The Metro Rail Project is a rail rapid transit system being constructed by SCRTD from downtown Los Angeles via the Wilshire District to the San Fernando Valley. This line is planned to be the core element of a regional rail transit system.

The first 4-1/2 miles of the line have been identified as the Minimum Operable Segment, MOS-1. This initial segment consists of double-track, in subway configuration from Union Station to the Wilshire/Alvarado Station, including three intermediate stations with additional track connecting to the Yard and Shop facilities southeast of Union Station. A map of the MOS-1 route is provided in Figure 1.

Three major Metro Rail construction contracts will be undertaken in the vicinity of the Los Angeles Union Passenger Terminal. These contracts are as follows:

A130 - Yard leads and a portion of the Yard north of First Street and east of Union Station.

A135 - Union Station Stage I and a portion of the double crossover structure west of Union Station.

A141 - The westerly 107 feet of the crossover structure west of Union Station, the tunnel structure from Union Station to 5th/Hill Station and construction of Civic Center Station.

Other Metro Rail contracts closely related to these major contracts are as follows:

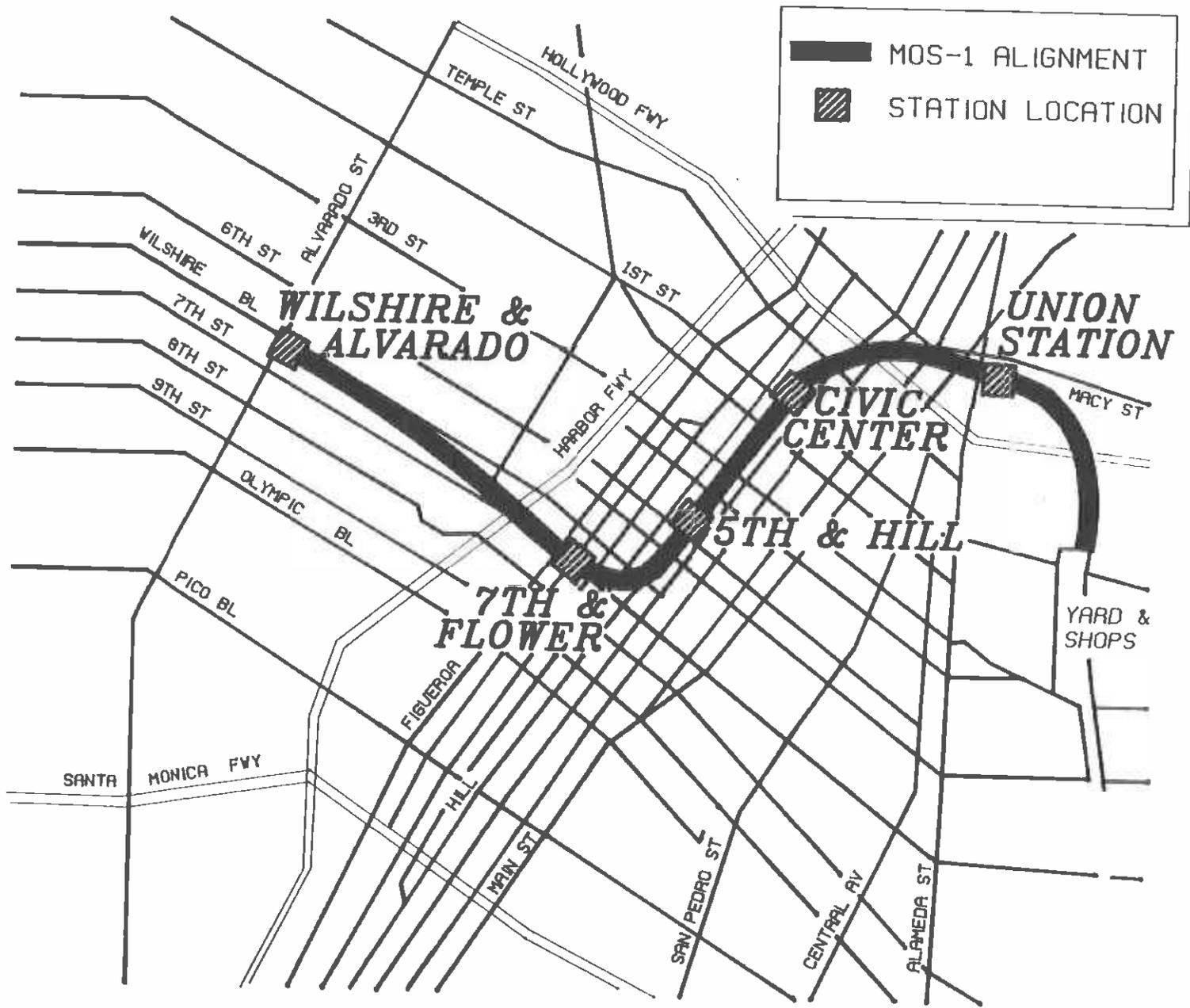


FIGURE 1 : METRO RAIL INITIAL SEGMENT

A132 - Demolition of a building located at 530 Ramirez Street (Denny's Restaurant). This demolition will no longer be necessary as a result of the realignment.

A134 - Demolition of a building located at 719 Vignes Street. The realignment has no impact on contract A134.

A136 - Union Station and west crossover Stage II construction. This contract is essentially unchanged by the realignment.

SECTION 3

HISTORY OF THE A130 REALIGNMENT

This section discusses the history of the realignment in three phases: the discovery of the contamination; the study of the contamination to determine its origin, character and extent; and the actions taken by SCRTD to mitigate the contaminated problem.

3.1 Caltrans Discovery of Contaminated Soil

Caltrans initiated construction of an extension of the El Monte Busway in March 1986. A portion of the project is located along the alignment of a portion of Metro Rail Contract Unit A130. In April 1986, during excavation for Busway piers 6 through 10, Caltrans' contractor, C. C. Myers Incorporated, encountered contaminated soil and subsequently Woodward-Clyde Consultants were retained to characterize the contamination. Based upon the Consultant's findings, and as directed by the California Department of Health Services, Caltrans suspended work pending approval of a Remedial Action Plan for dealing with the contaminated soil.

The findings of Woodward-Clyde Consultants were the first indication of the presence of toxic contaminated soil in this area. Subsurface investigations for the engineering phase of the Busway Project had been conducted in the area between 1981 and 1983, and additional investigations had been conducted in the same general area between 1981 and 1984 for the Metro Rail Project by SCRTD's geological consultant, Converse Consultants. These investigations had revealed only oily material and petroleum odor in the vicinity of Vignes and Keller Streets which is within the Contract Unit A130 area.

3.2 Retention of The Earth Technology Co.

Shortly after learning of the contaminated soil encountered along the alignment of the Caltrans Busway Project, SCRTD initiated a comprehensive effort to learn more about the origin and extent of the contamination. This effort included exploring options for remedial action and estimation of the associated cost and schedule impacts. In July 1986, The Earth Technology Corporation (TETC) was retained to perform a subsurface investigation in the identified contaminated area and to determine the nature and extent of the soil contamination. TETC was also directed to prepare a Remedial Action Plan and a Site Health and Safety Plan.

Study of the history of the soil contamination site by TETC revealed the source of the contamination. Between the years 1870 and 1941, the Southern California Gas Company and the Los Angeles Gas and Electric Company operated a coal and oil gasification plant at the site. Between 1943 and 1946, the Southern California Gas Company converted the plant to the production of butadiene. Subsequently, the plant lay idle until it was dismantled in the early 1950's. TETC reported that "the types of contamination detected at the site and the relative proportion of contaminants to each other are typical of those reported at other coal gasification sites... [or] are known to be byproducts from the manufacture of butadiene..."

TETC's preliminary finding was that approximately 24,000 cubic yards of contaminated soil would be encountered during excavation for Contract Unit A130.

To mitigate the impact caused by the presence of the contaminated soil, nine alternatives were investigated by TETC. Of these nine, TETC deemed the following three to be feasible:

- o Removal of contaminated soil to either an existing Class I disposal facility or to a new landfill dedicated to the disposal of waste from the A130 corridor.
- o On-site incineration of contaminated soil.
- o Alignment modification to avoid the area of contamination.

The Consultant's preliminary cost estimates of either treatment or removal and disposal were between \$6 and \$12 million. Preliminary estimate of the duration of remedial procedures were between 10 and 30 months.

TETC did not evaluate the cost or duration of the alignment modification alternative.

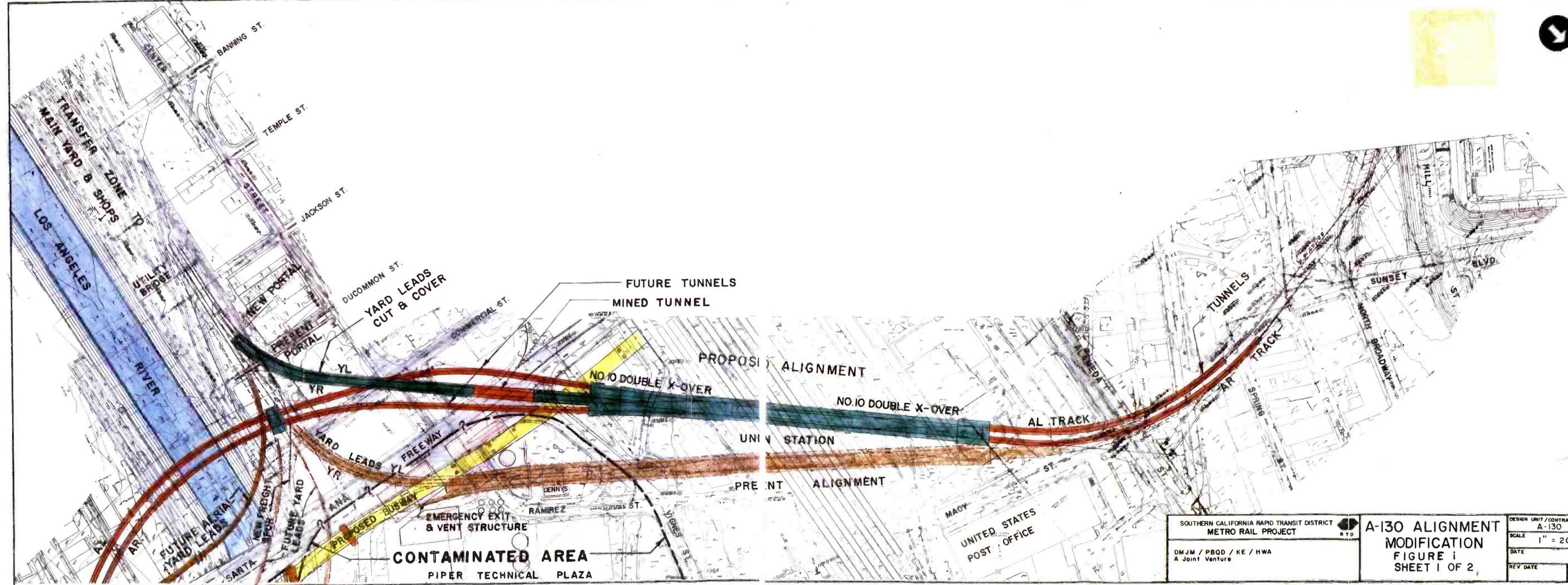
3.3 SCRTD Action

SCRTD staff met with the South Coast Air Quality Management District (SCAQMD) on December 22, 1986, and the State Department of Health Services, Toxic Substances Control Division (CADHS-TSCD) on December 23, 1986, to ascertain permit and approval requirements for the handling of the construction of the contaminated materials. SCAQMD indicated that a permit would not be required for site excavation but that SCAQMD Rules 402 (Nuisance) and 403 (Fugitive Dust) would apply. A permit would be required only for the on-site incineration alternative. SCRTD was advised by CADHS that the site was not an EPA-designated Superfund site or a State priority clean-up site.

On January 30, 1987, TETC submitted the Draft Remedial Action Plan, and subsequently, the Health and Safety Plan. The Phase I Subsurface Investigation Report (Original

Alignment) was submitted on February 10, 1987, followed by the Vignes Street construction site and New Alignment Reports on February 12.

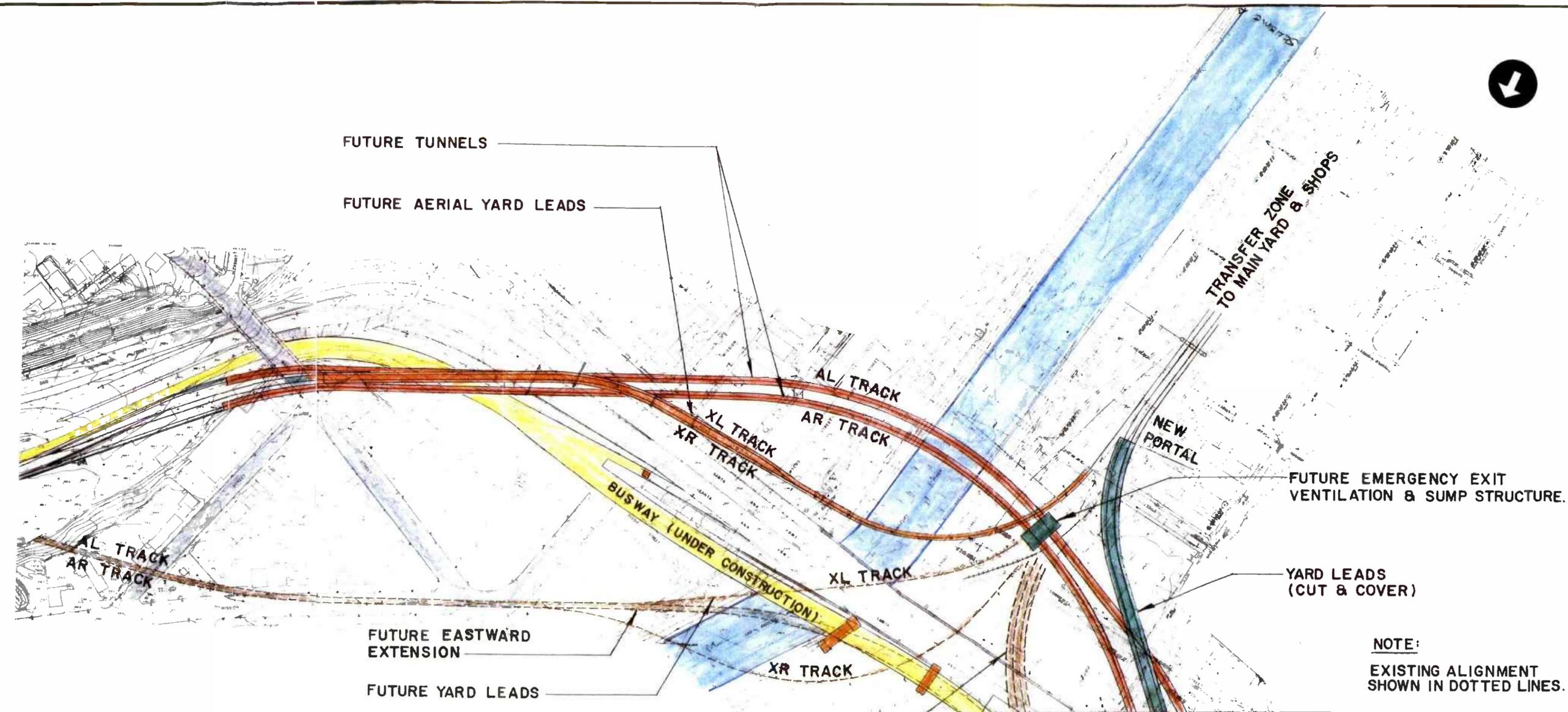
Based on the information contained in the documents, MRTC prepared a preliminary design for a revised alignment. This modified alignment, illustrated in Figure 2, was discussed in the MRTC Draft Alignment Modification Evaluation Report, submitted on February 16, 1987. Subsequently, SCRTD requested that UMTA, Caltrans and LACTC review and comment on the Draft Remedial Action Plan and the Draft Alignment Modification Evaluation Report. Comments received from the agencies are addressed in Section 6 of this report. In the interim, on February 19 the MRTC Alignment Modification Evaluation Report was completed.



SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
 METRO RAIL PROJECT
 DMJM / PBQD / KE / HWA
 A Joint Venture

**A-130 ALIGNMENT
 MODIFICATION
 FIGURE 1
 SHEET 1 OF 2**

DESIGN UNIT / CONTRACT NO.	A-130
SCALE	1" = 200'
DATE	
REV DATE	REV NO



NOTE:
EXISTING ALIGNMENT
SHOWN IN DOTTED LINES.

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT METRO RAIL PROJECT		RTD	A-130 ALIGNMENT MODIFICATION	
DMJM / PBQD / KE / HWA A Joint Venture			DESIGN UNIT / CONTRACT NO. A-130	SCALE 1" = 200'
			DATE	REV NO.
			REV DATE	REV NO.

SHEET 2 OF 2

SECTION 4

COST ANALYSIS

An analysis of the costs associated with the realignment decision indicates that the revised alignment will result in an estimated savings of \$26.6 million in the construction of the facilities impacted by the realignment as shown in Table 1. In addition, the realignment results in a reduction in the \$3.3 million that would have been incurred by the Caltrans Busway Extension Project to accommodate the original Metro Rail alignments, as discussed in Issue No. 3, Section 6.

The bases for the cost analysis are discussed by contract in the following subsections.

4.1 Contract Unit A130 (Yard Leads and Transfer Zone)

As shown in Table 2, \$28,455,000 in cost savings to Contract A130 are estimated to result from adopting the proposed alignment for construction of MOS-1.

The MRTC Alignment Modification Evaluation Report had reported that construction for the original alignment would have a base cost of \$58,838,000 (in 1985 dollars) while the equivalent cost of construction for the modified alignment would be approximately \$40,840,000 (in 1985 dollars). The majority of the difference in cost can be attributed to the elimination of excavation around, and underpinning of, foundations of the Santa Ana Freeway.

Specifically, the original alignment passed beneath an aerial segment of the Santa Ana Freeway. Construction of Metro Rail would have required a complex procedure of excavating around and underpinning the foundations. The new alignment passes

TABLE 1

OVERALL COST IMPACT TO MOS-1 FOR MODIFIED ALIGNMENT

<u>Contract Unit</u>	<u>Cost of Original Alignment</u>	<u>Cost of Revised Alignment</u>	<u>Added Cost/ <Savings></u>
A130	\$ 93,972,000	\$ 65,517,000	\$ <28,455,000> a)
A135	47,519,000	49,052,000	1,533,000 b)
A141	<u>61,471,000</u>	<u>61,815,000</u>	<u>344,000</u> c)
Subtotals	\$202,962,000	\$176,384,000	\$ <26,578,000>
A132	\$ 23,000	\$ -0-	\$ < 23,000>
A134	105,000	105,000	-0-
A136	<u>9,762,000</u>	<u>9,762,000</u>	<u>-0-</u>
Subtotals	\$ 9,890,000	\$ 9,867,000	\$ < 23,000>
TOTALS	\$212,852,000	\$186,251,000	\$ <26,601,000>
Deferred A130 Cost	-0-	13,680,000	<u>13,680,000</u> a)
Estimated Project Savings			\$ <12,921,000>

- a) From Table 2
- b) From Table 3
- c) From Table 4

TABLE 2

COST IMPACT TO CONTRACT A130

	<u>Original Alignment</u>	<u>Proposed Alignment</u>
<u>Construction</u>		
Base Costs (1985 Dollars)	\$ 58,838,700	\$ 40,840,300
Contingency 15%	-0-	6,126,000
Add for Water Treatment	3,204,700	3,204,700
Add Comm. Room	59,000	59,000
Change Requests 6-016 & 5-088	76,000	76,000
Add for Aux. Power	55,000	55,000
Add for Contaminated Waste Disposal	15,000,000	-0-
Underpin Busway Bent 4	N/A	1,000,000
Subtotal	\$ 77,233,400	51,361,000
Escalate to Contract Midpoint	9,113,000	7,036,000
Subtotal Construction	\$ 86,346,400	\$ 58,397,000
Cost Due to Delay for Contaminated Soil Removal	4,506,000	-0-
	\$ 90,852,000	\$ 58,397,000
<u>Expenditures to Date</u>		
Design	\$ 2,920,000	\$ 2,920,000
R.O.W. Acquisition (Legal Fees)	200,000	200,000
Subtotal Expenditures to Date	\$ 3,120,000	\$ 3,120,000
<u>Additional Costs</u>		
Additional Design	\$ -0-	\$ 2,400,000
Additional R.O.W.	N/A	1,600,000
Subtotal		\$ 4,000,000
TOTAL	\$ 93,972,000	\$ 65,517,000
Al30 Cost Reduction		\$ <28,455,000>
Deferral of Vent Structure (Escalated)		\$ 13,680,000
GRAND TOTALS	\$ 93,972,000	\$ 79,197,000
Adjusted Al30 Savings		\$ <14,775,000>

beneath a portion of the Santa Ana Freeway which is built on an embankment. Therefore, the costs to work around the pier foundations which were included in the construction estimate for the original alignment, are not incurred in the modified alignment.

Other line items in Table 2 which require explanation are discussed below:

Contingency - When a contract unit reaches the 100% design stage, it is SCRTD procedure to remove the contingency budgeted during the design phase for a contract and have the contract covered by the Project Contingency. The original total A130 Contract had reached the 100% design stage, and therefore carried no design contingency. The ongoing design of revised Contract Unit A130 warrants a design contingency.

Revision to Base Cost - Amendments to the base cost of Contract A130 include:

1. Add for Water Treatment - the treatment portion of the "dewatering" process, prior to discharging into the Los Angeles Storm Drain System or directly into the Los Angeles River;
2. Add Comm. Room - added a room for communications equipment;
3. Change Request 6-016 - miscellaneous structural modifications;
4. Change Request 5-088 - ventilation modifications;
5. Add for Aux. Power - the addition of a standby generator for dewatering pumps.

Contaminated Soil - Prior to releasing its January 1987 Draft Remedial Action Plan, TETC estimated it would cost \$15.0 million for contaminated soil removal. In the Draft Remedial Action Plan, dated January 31, this estimate was refined and reduced to \$11.2 million. Due to the uncertainties associated with the contaminated soil removal and disposal, SCRTD elected to retain the original \$15.0 million estimate. The estimate represents the projected total cost for excavation and removal of the contaminated soil from the site, transportation to a Class I landfill, and all other treatment and precautions required for the handling of toxic waste materials.

Busway Underpinning - This original alignment passed directly beneath bents 9, 10 and 11 of the El Monte Busway extension. These bents were redesigned and were to be constructed to accommodate Metro Rail alignment requirements. The new alignment passes beneath bent 4 of the Busway extension. Underpinning of Busway bent 4 will be necessary for construction of Contract A130 and the amount shown provides for the underpinning. This matter is described further in Issues No. 2 and No. 9 in Section 6.

Escalation to Contract Midpoint - All elements of the construction estimate have been adjusted from Base December 1985 dollars to the mid-point of construction at a rate of 4% per year. Escalation for the construction of A130 with the original alignment is over a period of 34 months. The escalation period of the modified alignment is 39 months.

Cost Due to Delay for Contaminated Soil Removal

This cost represents estimated additional escalation for

all impacted contracts, including systems contracts. The amount shown was based upon a one year delay to ROD.

Deferred Cost of Vent Structure - The construction cost estimate for Contract A130 under the original alignment included \$12 million (in 1985 dollars) for a vent structure under a portion of the planned busway extension. The vent structure was to be constructed as part of the A130 Contract because it was designed as an integral part of the box structure. In order to provide a common basis for comparison, the vent structure cost, escalated to the midpoint of construction, has been added to the estimated total cost of the modified alignment.

4.2 Contract Unit A135 (Union Station, Stage I)

The additional cost to Contract A135 caused by the realignment is estimated at \$1,533,000, escalated to midpoint of construction, as presented in Table 3. The realigned structure for A135 is virtually identical to the original structure and thus the cost of construction is assumed to be the same. The one exception concerns the Union Station (LAUPT) Passenger Tunnel (from waiting room to platforms) which is intersected by the revised alignment and requires traffic contingencies and reconstruction. An additional design cost is also incurred to modify the A135 contract documents to reflect the revised alignment.

4.3 Contract Unit 141 (Line-Union Station to 5th and Hill Station, including Civic Center Station - Stage I)

The additional cost to Contract A141 is estimated to be \$344,000, consisting of \$268,000 in additional construction cost and \$76,000 in additional design cost. There are no additional real estate acquisition costs. The additional construction cost presented in Table 4, results primarily

TABLE 3
 COST IMPACT TO CONTRACT A135
 (Dollars in Thousands)

	<u>Original Alignment</u>	<u>Revision Alignment</u>
<u>Construction</u>		
Base Construction Cost (1985 Dollars)	\$ 42,239	\$ 42,239
Adjustment for Additional LAUPT Passenger Tunnel Work	-0-	1,000
Escalation to Contract Midpoint	<u>5,280</u>	<u>5,405</u>
Total Construction	\$ 47,519	\$ 48,644
<u>Other Costs and Adjustments</u>		
Additional Design Cost	<u>-0-</u>	<u>408</u>
TOTAL	\$ 47,519	\$ 49,052

Added Cost/<Savings> of Modified Alignment \$ 1,533

Note: No change in real estate requirement.

TABLE 4
 COST IMPACT TO CONTRACT A141
 (Dollars in Thousands)

	<u>Original Alignment</u>	<u>Revised Alignment</u>
<u>Construction</u>		
Base Construction Cost (Award Value)	\$ 61,471	\$ 61,471
Adjustment for Reduced Tunneling Rate	<u>-0-</u>	<u>268</u>
Total Construction	\$ 61,471	\$ 61,739
<u>Other Costs and Adjustments</u>		
Additional Design Cost	<u>-0-</u>	<u>76</u>
TOTAL	\$ 61,471	\$ 61,815
Added Cost/<Savings> of Modified Alignment		\$ 344

Note: No change in real estate requirements.

from the increased length of the curved tunnel segment in which the tunneling rate is assumed to be less than for a tangent tunnel segment.

4.4 Contract Units A132, A134 and A136

Contract Unit A132 includes the demolition of a building located at 530 Ramirez Street (Denny's Restaurant). The demolition of this structure is not necessary as a result of the realignment. Deletion of this contract is estimated to save \$22,000 in 1985 dollars.

Contract Unit 134 includes the demolition of a building located at 719 Vignes Street. The demolition of this structure is necessary regardless of whether the original or new alignment is constructed. Accordingly, no cost impact has been identified.

Contract Unit A136 includes the Stage II construction of Union Station. Although the location of the contract has changed slightly, the scope is virtually unchanged and accordingly no cost impact has been identified.

SECTION 5

SCHEDULE IMPACT ANALYSIS

If the original alignment were retained, it is estimated that the ROD would be adversely impacted by approximately one year. This delay is attributable primarily to two activities with Contract A130. Approximately eight months are due to the special handling required during excavation of contaminated material, and approximately four months are due to the delay of the construction of the El Monte Busway Extension which in turn delays access for Metro Rail construction. The analysis of the realignment schedule indicates that the delay to Contract A130 can be mitigated.

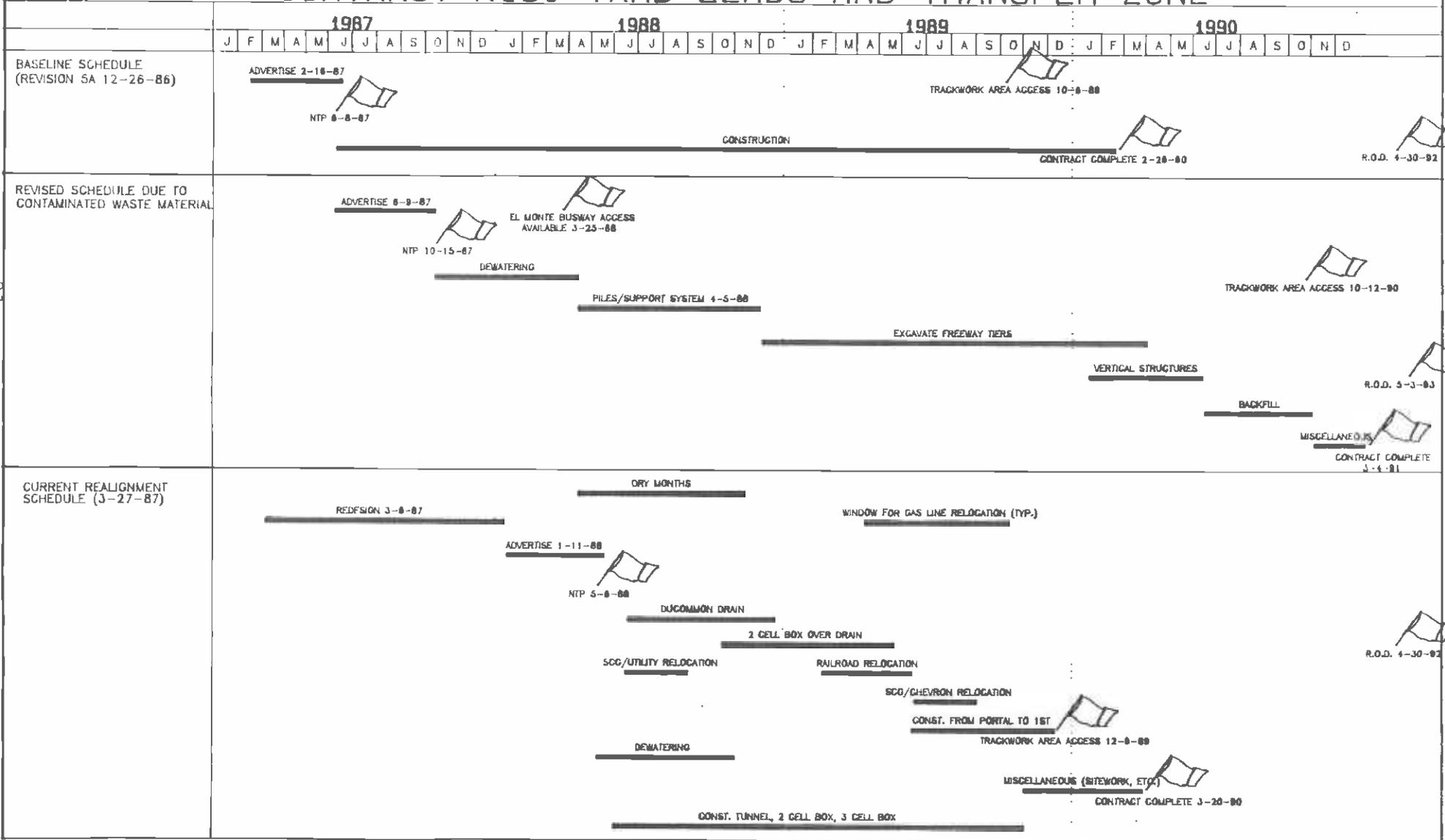
Preliminary SCRTD analysis indicated that delays could be expected in Contracts A135 and A141 if the new alignment were to be implemented. These delays reflected the rescheduled Contract A135 NTP, and the increased duration of the Contract A141 tunneling effort. However, means have been identified to mitigate the delays in Contracts A135, and A141. Consequently, no impact to ROD is anticipated due to the construction of these two contracts.

Schedule impacts are discussed by contract in the following subsections. Bar chart schedules are provided for Contracts A130, A135 and A141 in Figures 3, 4 and 5, respectively.

5.1 Contract A130 Yard Leads and Transfer Zone

The presence of contaminated material within the original A130 Contract alignment would have severely impacted the duration required for excavation activities. The added precautions necessary during excavation of the contaminated soil would have resulted in doubling the excavation period from 8 months to 16 months. Because this activity was on

CONTRACT A130 YARD LEADS AND TRANSFER ZONE

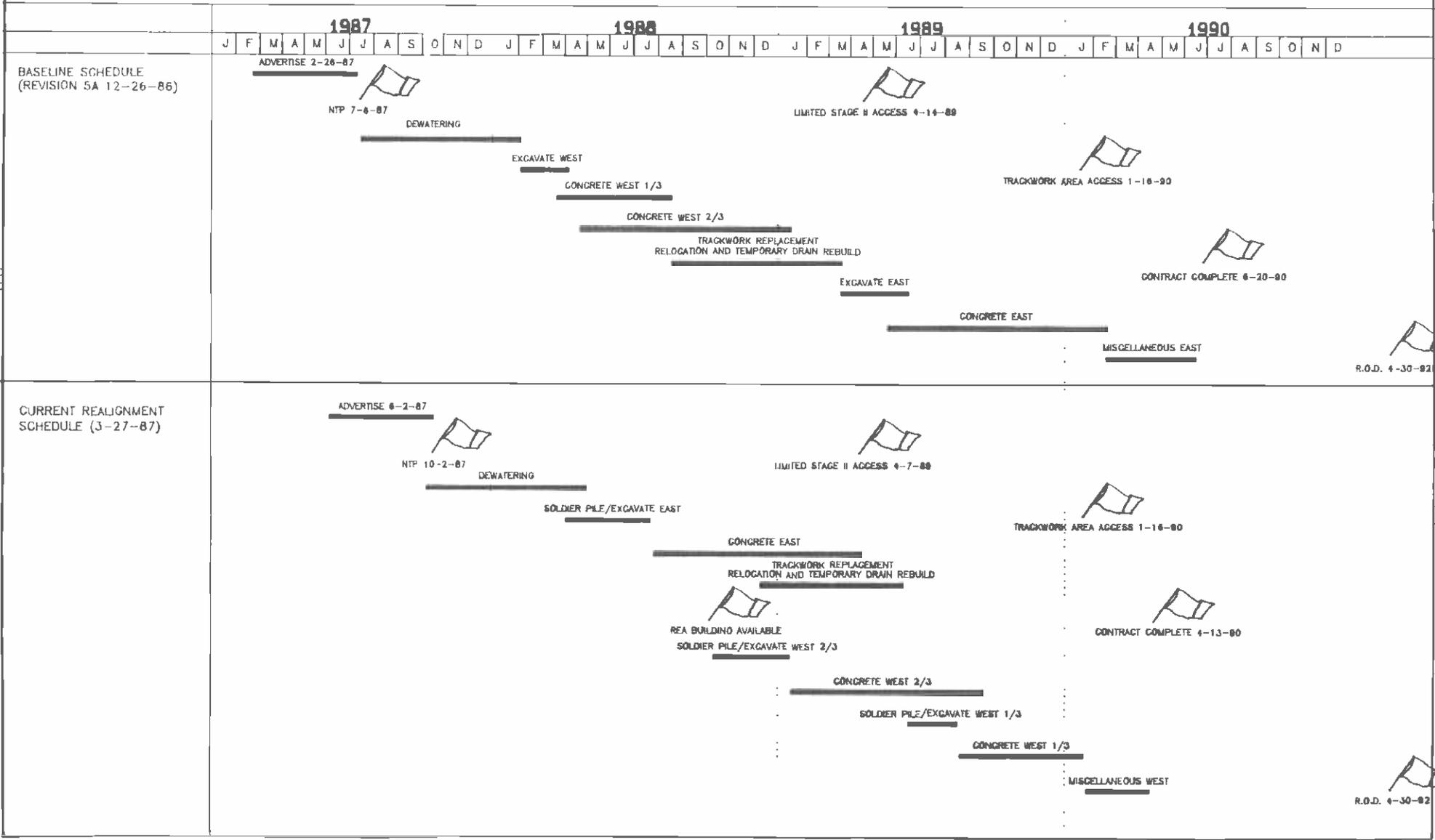


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FIGURE 3

CONTRACT A135 UNION STATION, STAGE I

22



R.O.D. 4-30-82

R.O.D. 4-30-82

FIGURE 4

CONTRACT A141 LINE SECT. UNION STATION--5TH/HILL, CIVIC CENTER STATION STAGE I

23

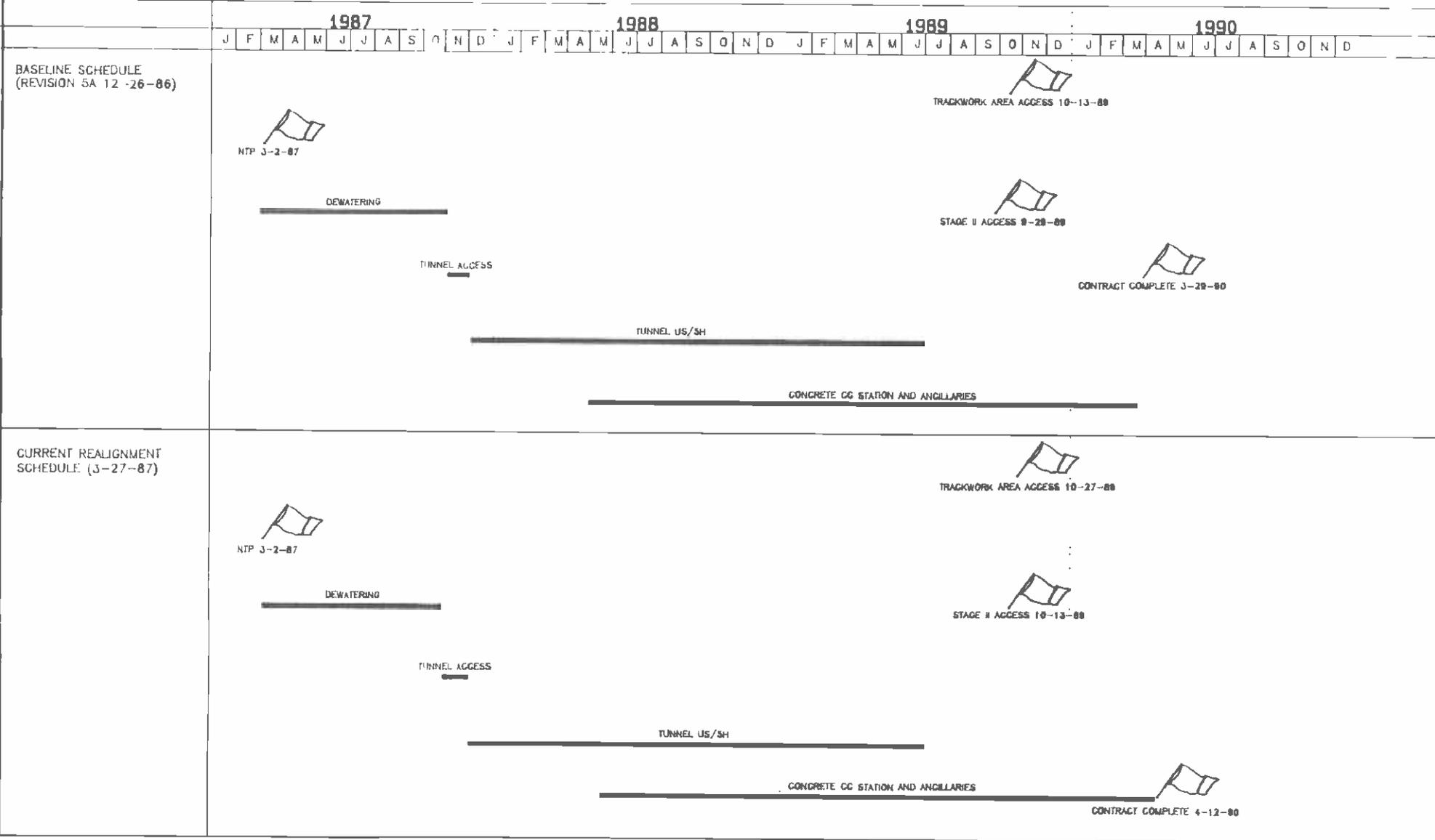


FIGURE 5

the A130 Contract critical path, and the A130 Contract was on the Metro Rail Project critical path, the increased activity duration would have caused a corresponding delay to the ROD, as shown in Figure 3.

An additional unknown impact to starting excavation in the contaminated area for construction along the original alignment was the on-going delay in the completion of the El Monte Busway Extension. In the absence of a Caltrans schedule it was assumed that Metro Rail construction access would most likely be delayed until March 1988, four months after the originally planned start date. The combination of the increased duration for excavation and the delayed access along the El Monte Busway was expected to result in a delay to ROD of one year.

By realigning Contract A130, the schedule impact due to contaminated material excavation and delayed Busway construction is mitigated. In addition, the complicated underpinning required for the Santa Ana Freeway is avoided. Contract duration is decreased by 10 months, from 32.5 months to 22.5 months. The impact on the critical path milestone of trackwork access is two months, primarily caused by extended facilities design work. By resequencing the activities of the trackwork contract, the impact to ROD is eliminated. The critical path remains through trackwork access and track installation.

5.2 Contract A135, Union Station, Stage I

The MRTC Alignment Modification Evaluation Report had indicated that there would be a two and a half month slip in the A135 contract completion date with the revised alignment. The slippage was due to the redesign required by the A130 realignment.

Subsequent to the issuance of the MRTC Report, it was determined that the A135 contract duration could be substantially shortened. The contract duration has been decreased by 5 months from 35.5 months to 30.5 months, as shown in Figure 4.

This decrease in duration was achieved by the following changes:

- o The duration for activities such as trackwork relocation and temporary storm drain installation were shortened by requiring the contractor to work multiple work shifts.
- o The construction sequence was revised to have construction start in the East portion of the station box instead of the West. This allowed construction activities in the West portion of the station box, to begin as soon as the Baggage Building is available for demolition (October 1988).

The combination of revising construction activity durations and the construction sequence resulted in mitigating the realignment impact on A135.

5.3 Contract A141, Line Section Union Station to 5th and Hill, Civic Center Station, Stage I

The change in the A130 alignment is estimated to result in a two week increase in the construction duration of the A141 Contract, as shown in Figure 5. The increase in duration is primarily due to the increase in the length of the curved portion of the A141 twin bore tunnels west of Union Station. The increased curve length increases the tunneling duration due to the reduced tunneling rate along the curve section.

5.4 Contracts A132, A134 and A136

Contract A132 includes the demolition of a building located at 530 Ramirez Street (Denny's Restaurant). Since the parcel of land under this structure is no longer required as a result of the realignment, the contract has been deleted and will have no impact on the Project schedule.

Contract A134 includes the demolition of a building located at 719 Vignes Street. This contract has been awarded and no adverse schedule impacts are anticipated.

Contract A136 includes the Stage II construction of Union Station. No schedule impacts are expected.

SECTION 6

RESOLUTION OF ISSUES

In response to SCRTD's solicitation, LACTC, Caltrans and UMTA have commented on the TETC Draft Remedial Action Plan and the MRTC Draft Alignment Modification Evaluation Report. Additionally, Hill International, UMTA's Project Management Oversight Consultant for the Metro Rail Project, has provided comments. This section addresses these comments:

Issue No. 1: Requirement for new Caltrans encroachment permit.

Source: Caltrans letter of 2/24/87 from D. A. Dove to J. E. Crawley (SCRTD).

Discussion: The new alignment would involve a different portion of the State (Freeway) right-of-way than that required by the original alignment. Caltrans has indicated that for this reason a new encroachment permit will be required.

Resolution: SCRTD has concluded that two encroachment permits will be required for the construction of the realignment route. (One of these would be for tunneling under the freeway; the other would be for a temporary easement at the Vignes Street on-ramp.) These permit applications are scheduled to be filed during September 1987. SCRTD acknowledged the need to file for these permits in its response to Caltrans (SCRTD letter of March 6, 1987, from J. E. Crawley to D. A. Dove). In this letter SCRTD also makes a commitment to "develop design plans in close coordination with the

Caltrans staff and...[to] finalize the design to minimize conflicts between the Busway Project and the Metro Rail Project."

Action: SCRTD will maintain necessary communication with Caltrans to ensure timely requests for and issuance of permits and to coordinate construction activities with the Busway Project.

Impact: No cost or schedule impact to MOS-1.

Issue No. 2: Requirement for underpinning protection to Busway bents 4 and 5.

Source: Caltrans letter of 2/24/87 from D. A. Dove to J. E. Crawley (SCRTD).

Discussion: The new alignment will pass beneath two of the bents supporting the new Busway. Specifically, the new yard lead alignment will pass beneath bent 4 and the tunnel boring for the Westbound track of the planned eastward extension would pass beneath bent 5. Both bents 4 and 5 are essentially complete. Caltrans has required that "underpinning protection...be provided for bents 4 and 5 of the Busway Project to the satisfaction of the State and at SCRTD's expense."

Resolution: SCRTD will underpin bent 4 as stated in the SCRTD letter of March 6, 1987, from J. E. Crawley to D. A. Dove. It contains a commitment to provide "underpinning protection, to the satisfaction of the State,...for bents 4 and 5 of the Busway..." SCRTD plans no work under bent 5 until such time as it is required by the construction of the eastward extension.

Action: SCRTD will maintain communication with Caltrans to ensure sufficient time is allowed for design review and approval of bent 4 underpinning provisions. Refer also to Issue No. 9.

Impact: No schedule impact to MOS-1. Cost impact discussed in Section 4.

Issue No. 3: Redesign of Busway Bents 9, 10 and 11.

Source: Caltrans letter of February 24, 1987, from D. A. Dove to J. E. Crawley (SCRTD).

Discussion: To accommodate the original alignment, SCRTD Work Authorization No. 100 AD 056 PZZ 5850, dated July 26, 1984, authorized Caltrans to expend funds to redesign bents 8, 9, 10 and 11 of the El Monte Busway Extension to accommodate Metro Rail. LACTC agreed to pay the additional design and construction costs of the revised bents. This resulted in bents 9, 10 and 11 being designed as Class 500 CIDH piles, as opposed to driven steel piles, that Caltrans had originally planned. (Note that subsequent to the work authorization, bent 8 was found not to require redesign and was, in fact, constructed according to the original driven steel pile design.) The realignment eliminates the need for the bents to be built as redesigned and Mr. Dove indicated that if Caltrans were formally notified by April 1 that SCRTD had adopted the revised alignment, that it would be possible to redesign the bents and realize some construction cost savings.

Resolution: The SCRTD letter of March 6, 1987 from J. E. Crawley to D. A. Dove indicated that on February 26, 1987, the SCRTD Board of Directors adopted the alignment change and that this would allow Busway bents 9, 10 and 11 to be built according to their original design.

Caltrans was requested by SCRTD to submit actual design and construction costs to date as well as forecast costs, so that the total extra cost of modification work can be established.

Action: Upon receipt of the requested information from Caltrans, SCRTD will notify LACTC of the resultant cost.

Impact: No cost or schedule impact to MOS-1.

Issue No. 4: Request for additional cost and schedule impact information.

Source: UMTA letter of March 3, 1987 from Brigid Hynes-Cherin to J. A. Dyer (SCRTD).

Discussion: UMTA has requested a "detailed comparison of the schedule and cost impacts of the proposed change, including expenditures already made for design, real estate acquisition and modifications to Caltrans' freeway and busway facilities..."

Additionally, UMTA has suggested that such an analysis should include "an assessment of the

feasibility, schedule and cost impacts on any potential Metro Rail extension toward Norwalk."

Resolution: Sections 4 and 5 of this report contain the requested information on cost and schedule impacts. The potential impact on the eastward extension is discussed in Issue No. 13.

Action: See Issue No. 13.

Impact: No cost or schedule impact to MOS-1.

Issue No. 5: Absence from TETC Draft Remedial Action Plan of a recommendation of a preferred alternative for handling the contaminated soil issue.

Source: LACTC letter of March 17, 1987, from Paul Taylor to Mr. R. J. Murray (SCRTD).

Discussion: The Draft Remedial Action Plan identified three feasible remedial actions. They are: on-site incineration; off-site land disposal; and realignment. However, the plan did not recommend any one of these alternatives.

Resolution: Estimates of the cost and schedule impacts of alternatives to the realignment were provided in the Draft Remedial Action Plan. Based upon the information contained in the TETC documents, MRTC prepared the Alignment Modification Evaluation Report dated February 19, 1987. SCRTD staff analyzed the MRTC Report and concluded that the realignment was the most cost effective option.

Action: None required.

Impact: Schedule and cost impacts are discussed in detail in this report.

Issue No. 6: Apparent lack of soils data on borings taken for the proposed realignment.

Source: LACTC letter of March 17, 1987, from Paul Taylor to Mr. R. J. Murray (SCRTD).

Discussion: LACTC has indicated that "there is no soils report on borings taken from the proposed alignment." This concern stems from the fact that LACTC had access only to the Draft Remedial Action Plan at the time the concern was identified.

Resolution: TETC has provided three report volumes in addition to the Draft Remedial Action Plan. One of these, The Phase IV Subsurface Investigation...dated February 12, 1987, specifically addressed the new alignment. Furthermore, the Draft Remedial Action Plan discussed the results of bore hole soil analysis without specifically stating that a number of the bore hole locations were, in fact, along the revised alignment. Figure 6 in this report identifies all bore hole locations identified in the TETC reports, and illustrates the ones that were within the new alignment.

Action: No further action required.

Impact: No cost or schedule impact to MOS-1.

Issue No. 7: Overly optimistic estimated delays associated with implementing any of the feasible remedial alternatives identified by TETC.

Source: LACTC letter of March 17, 1987 from Paul Taylor to Mr. R. J. Murray (SCRTD).

Discussion: LACTC has indicated that the schedules for implementing any of the feasible remedial alternatives identified by TETC do not provide sufficient time to obtain necessary permits and clearances.

Resolution: SCRTD reviewed the estimated schedules provided by TETC for feasible remedial alternatives other than the realignment. These alternatives consisted of on-site incineration, or the removal of contaminated material to either an existing Class I landfill or a new, dedicated landfill. The time required to implement these alternatives was estimated to range from 10 to 30 months. Preliminary analysis of the realignment alternative indicated that it would result in a delay of only 2 months and would cost less than the other alternatives. Accordingly, because of the many imponderables involved, SCRTD did not attempt to further refine the TETC estimates of the time required to implement any of the soil treatment and/or removal alternatives.

Action: No further action required.

Impact: No cost or schedule impact to MOS-1.

Issue No. 8: Absence of cost trade-offs from both the TETC Draft Remedial Action Plan or the MRTC A130 Alignment Modification Evaluation Report.

Source: LACTC letter of March 17, 1987 from Paul Taylor to Mr. R. J. Murray (SCRTD).

Discussion: LACTC has indicated that cost trade-offs for each of the feasible remedial alternatives were absent from the TETC Draft Remedial Action Plan and the MRTC Alignment Modification Evaluation Report, and that they should be identified.

Resolution: SCRTD reviewed the estimated costs provided by TETC for feasible remedial alternatives other than realignment. These alternatives consisted of on-site incineration, and removal to either an existing Class I landfill or a new, dedicated landfill. The costs associated with these alternatives ranged from \$6.3 to \$11.2 million. Preliminary analysis of the realignment alternative indicated that it would result in a lower overall cost than the other alternatives and would result in only 2 months delay, or less. Accordingly, SCRTD has not attempted to further refine the TETC estimates of cost to implement any of the soil treatment and/or removal alternatives because of the many imponderables involved.

Action: No further action required.

Impact: No cost or schedule impact to MOS-1.

Issue No. 9: No mention in the MRTC Alignment Modification Evaluation Report of "the amount of additional

underpinning that may be required for piers of the El Monte Busway Extension."

Source: LACTC letter of March 17, 1987 from Paul Taylor to Mr. R. J. Murray (SCRTD).

Discussion: As illustrated in Figure 2, the new alignment will pass under Busway bents 4 and 5. Specifically, the yard lead will pass beneath bent 4 and the tunnel bore for the westbound track of the eastward extension will pass beneath bent 5. Underpinning will be required under bent 4 for MOS-1 operations. Underpinning of bent 5 will be done when the eastward extension is constructed.

Resolution: The underpinning of bent 4 is an element of the cost analysis provided in Section 4 of this report. Refer also to Issue No. 2.

Action: No further action required.

Impact: No schedule impact to MOS-1. Cost impact discussed in Section 4.

Issue No. 10: Need to renegotiate the Memorandum of Understanding (MOU) regarding Los Angeles Union Passenger Terminal (LAUPT).

Source: Hill International February 1987 Monthly Report to UMTA on the Metro Rail Project.

Discussion: Hill suggests that renegotiating the MOU "may be overly time consuming" and cites the fact that several agencies are parties to the MOU.

Resolution: SCRTD has contacted all of the parties to the MOU (SCRTD refers to it as a Memorandum of Agreement or MOA) by letter to inform them of the realignment decision and to request review of the potential impacts on Union Station, particularly to the Baggage Building, which has been partially demolished to facilitate construction of the El Monte Busway extension. The letter also states that "as soon as the specific [re-design] information is developed a draft amendment to the MOA will be submitted for review." UMTA was advised of these actions in J. A. Dyer's letter of April 3, 1987 to B. Hynes-Cherin.

Action: Prepare draft amendment and expedite negotiation of the required amendment to the LAUPT MOA.

Impact: No schedule or cost impact to MOS-1.

Issue No. 11: Potentially greater environmental impact on Union Station than that identified in the MRTC Alignment Modification Evaluation Report.

Source: Hill International February 1987 Report.

Discussion: Hill suggests that "the impact on Union Station, a historic property listed on the Federal Register, is significant." The MRTC report is cited as stating that a "negative declaration of no-significant-impact" will be issued for the required environmental clearance, and Hill suggests that "it is not clear if this is acceptable to all parties of interest."

Resolution: SCRTD has begun to prepare a Joint State/Federal Initial Study/Environmental Assessment (IS/EA) in accordance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). SCRTD has provided a work plan and schedule for the preparation of the IS/EA, which was submitted to UMTA with J. A. Dyer's letter of April 3, 1987 to B. Hynes-Cherin. UMTA approved the work plan on April 17, 1987.

Action: Complete and submit Initial Study/Environmental Assessment in accordance with approved schedule.

Impact: No schedule or cost impact to MOS-1.

Issue No. 12: Potential Metro Rail Operational Impacts

Source: Hill International February 1987 Report

Discussion: Hill indicated that the reduction in radius and lengthening of the curve at the west end of Union Station is a cause of concern due to the possible need to reduce operating speed, thereby increasing run time. Further, the reconfiguration of the yard throat imposed by the realignment may result in restriction on movements between lead tracks, reduced access to various parts of the yard, limitations on movements between yard areas via the throat end of the yard, complications in yard/mainline transfer and other possible impacts.

Resolution: The reduction in radius will not affect civil speed, in accordance with System Design Criteria and Standards. Thus, there will be no increase in operating run time.

Regarding the operational impacts which result from the reconfiguration of the yard throat, SCRTD has prepared acceptable operating criteria to serve as the basis for the redesign of the yard transfer zone.

Action: Confirm that redesign is in compliance with identified requirements.

Impact: No schedule or cost impact to MOS-1.

Issue No. 13: Impacts on Eastward Extension

Source: LACTC memorandum of March 27, 1987 from Paul Taylor to J. E. Crawley (SCRTD).

Discussion: In its determination of future regional rail corridors LACTC has identified the eastward extension of the Metro Rail system from downtown Los Angeles through East Los Angeles and terminating in Norwalk. The March 27 LACTC memorandum has indicated the eastward extension is to proceed along East First Street rather than the Busway. Further, the memorandum requests that SCRTD confirm that the realignment provides for such an extension.

Resolution: The new alignment was configured with provisions for a future eastward extension to follow the same route as that provided by the original alignment. Preliminary assessment by SCRTD indicates that an alignment of the main line towards East First Street would not be precluded by provisions of the new configuration. Further study is required to ensure that the redesign of Contract Al30 will make

provision for an eastward extension that is cost effective in meeting the revised alignment requirements.

Action: Determine how an eastward extension alignment along East First Street can best be accommodated with the new alignment.

Impact: No schedule or cost impact to MOS-1.

Issue No. 14: Provision of a replacement baggage handling facility at LAUPT.

Source: Access Negotiations between SCRTD and LAUPT.

Discussion: Contract A133 provided for the reconstruction of the baggage handling facility at LAUPT. During the course of negotiations between SCRTD and LAUPT, it was agreed that LAUPT would assume responsibility for the construction. Consequently, the A133 Contract was deleted.

As a result of the realignment review by Amtrak and LAUPT the facility design will be modified to meet new site conditions. However, LAUPT will still assume construction responsibility.

Resolution: SCRTD to work with LAUPT/Amtrak to resolve site specific issues.

Action: Complete negotiation in a timely fashion to preclude construction delays.

Impact: No anticipated impact on schedule.