

第4章 プロジェクトの評価

4-1 事業実施のための前提条件

事業実施のための前提条件は以下のとおりである。なお、支障物件の移転や撤去さらに補償及び関係機関からの承認書類は、原則、E/N 後に開始し、施工業者の事前審査公示までに完了する必要がある。

- 本計画によるタザラ交差点の跨道橋改良では、TANROADS による対象道路用地の確保 (ROW として 60m) と ROW 内の支障物移転・撤去への対応が必要になる。ROW 内の支障物件を管理・運営している関係機関は、本報告書「2-4 道路占有面積」に記述されている TANESCO、DAWASA の 2 機関である。
- 道路用地の確保のために、タザラ駅及び TANESCO 事務所の用地取得が約 1,300m² (4.5m×295m) 必要になる。詳細は、本報告書「2-2-3-1-7 環境社会配慮調査結果」に記述されている。
- タザラ駅側の取得対象用地内にはニエレレ道路用との境界沿いに設置されたフェンス (約 200m) や街路灯 (2 本)、数本の樹木が存在し、これらに対して所有者への補償が必要になる。
- タザラ交差点改良事業実施のためには、実施機関の TANROADS による EIA 実施と NEMC からの承認書取得が必要になる。
- キャンプサイト用地・プラント設置用地 (タザラ駅構内の空き地)、土取場用地・砕石場の提供と掘削許可が必要になる。
- 工事期間中の交通安全を確保するために、TANROADS による道路利用者や地域住民への交通安全の啓蒙活動の実施が行うべきである。
- プロジェクト用調達資機材に対する通関手続きへの支援及び協力、そして免税措置の手続きなど、また工事完了後の維持管理の実施等が必要になる。TANROADS が行うべきこれらの内容は、本報告書「3-3 相手国側分担事業の概要、3-4 プロジェクトの運営・維持管理計画」に詳述されている。

TANROADS は、本プロジェクトの実施にあたって、経費を含む跨道橋施設についても適切な使用と維持管理を行うことが可能と考えられる。また、本プロジェクト完成後の運営・維持管理に必要な予算についても、「3-4 プロジェクトの運営・維持管理計画」に記したとおり十分に確保されると考える。

以上より、事業実施の前提条件は確保されているとみなされる。

4-2 プロジェクト全体計画達成のために必要な相手方投入（負担）事項

プロジェクトの効果を発現・持続するために相手方が取り組むべき事項は以下のとおりである。

- 本プロジェクトの遂行を円滑に実施するために、本報告書「3-3 相手国側分担事業の概要」に述べられた「タ」側の予算を事前に確保する。
- タザラ跨道橋の永続的な機能を確保するために、「タ」国は本報告書「3-4 プロジェクトの運営・維持管理計画」に述べられた毎年の予算確保と維持管理内容を本プロジェクト完成後に持続的に行う要員を配置する。
- EIA の手続きから実施、承認のプロセスを確実にを行うために、TANTOADS は環境社会配慮に係るチームを結成する必要がある。
- 本プロジェクトは都市内景観にも配慮した「タ」国で初めての跨道橋建設であり、また交通安全の確保のために跨道橋建設中の交通整理が非常に重要である。このため、TANROADS は、跨道橋建設の技術移転を日本から得るために、さらに技術の向上を図るために、2～3名の橋梁技術者を施工監理に配置させる必要がある。

4-3 外部条件

プロジェクトの効果を発現・持続するための外部条件は以下のとおりである。

- 本プロジェクトの完成後は、現在の交通量からさらに増加するものと予測されている。このため、設計で見込まれている施設の安全性を確保するために日常及び定期的な維持管理を継続する必要がある。
- 本プロジェクトは車両専用の跨道橋として建設する。しかし、現在 BRT 計画の詳細設計が実施されており、もし BRT が新たな施設として 2 連で建設された本プロジェクトの跨道橋の間に跨道化計画をする場合は、管理機関である TANROADS は BRT 計画に対して本プロジェクトの安全性に対する十分な確認・照査をして本プロジェクト施設の永続性を保持する必要がある。
- ダルエスサラーム市内の交通渋滞は増加する一方である。これを解消するためには、路上への違法駐車・停車の禁止の他に、慢性的に渋滞する交差点に新たな跨道橋建設が望まれる。

上記の外部条件を満足させることにより、本プロジェクトの効果発現が明らかになる。

4-4 プロジェクトの評価

4-4-1 妥当性

本プロジェクトは、比較的低所得層が沿線に居住するニエレレ道路と、ダルエスサラーム港と「タ」国内陸部を連絡する物流回廊の一端を形成するネルソンマンデラ道路が交差するタザラ交差点が対象である。タザラ交差点は現状で慢性的な交通渋滞が観測されており、こ

の交差点の改良により、沿道住民の日常交通のアクセス性の向上および円滑な国際貨物輸送への貢献が期待でき、以下の内容により、プロジェクトを実施する妥当性は高いと判断される。

(1) プロジェクトの裨益対象

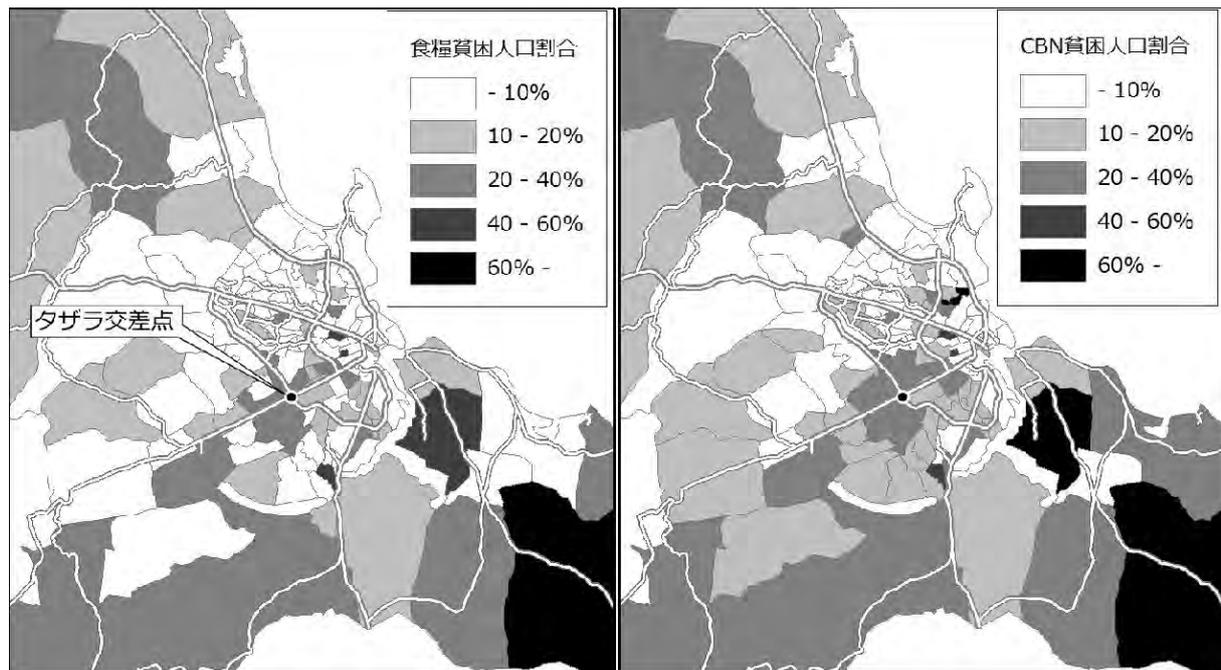
「タンザニア国 ダルエスサラーム総合都市交通体系策定調査 (JICA : 2008,6) (以下、「JICA マスタープラン 2008」と称す。)」で作成された 2007 年のダルエスサラーム市の現況交通データに基づき、ダルエスサラーム全市の一日あたり交通量に対するタザラ交差点通過交通量の割合を推計した。タザラ交差点の改良に伴い、ダルエスサラーム全体のバス利用の約 18%、乗用車交通の 10%、貨物自動車交通の 3~4 割が直接的な裨益を享受できると予測される。

表 4.4.1 タザラ交差点通過交通とダルエス全体の交通に対する割合

	ダルエスサラーム全体の交通量 (2007 推計値)	タザラ交差点通過交通 (2007 推計値)	タザラ交差点通過交通の割合
バスの乗客	1,942,310 人トリップ	348,320 人トリップ	17.9%
自動二輪車	20,349 台トリップ	4,024 台トリップ	19.8%
乗用車	141,766 台トリップ	14,924 台トリップ	10.5%
トラック	31,470 台トリップ	10,143 台トリップ	32.2%
トレーラー	5,626 台トリップ	2,223 台トリップ	39.5%

出典：「タンザニア国 ダルエスサラーム総合都市交通体系策定調査 (JICA : 2008.6)」で作成した需要予測データに基づき調査団が計算

更に、2007 年の家計調査の結果および JICA マスタープラン 2008 の結果を用いて分析した結果、タザラ交差点改良による直接的な裨益を享受できる食糧貧困人口は 5.6 万人 (ダルエスサラーム全体の食料貧困人口の 26.5%)、必要最低限の生活必要消費支出 (以下、「CBN」と称す。) 貧困人口では 7.6 万人 (ダルエスサラーム全体の CBN 貧困人口の 16.1%) と推計される。



出典：2007年家計調査および「タンザニア国 ダルエスサラーム総合都市交通体系策定調査(JICA：2008.6)」で作成したデータに基づき調査団が推計

注：各ゾーンの5歳以上人口に対する食料貧困・CBN貧困ライン以下の所得世帯人口割合

図 4.4.1 2007年における貧困人口分布推計

(2) プロジェクトの緊急性

ダルエスサラーム市の交通渋滞問題とそれによる経済損失は年々深刻化しており、マイクロシミュレーションを用いた将来予測では、タザラ交差点の跨道橋が供用されない場合、2015年で一日あたり46百万タンザニアシリングの経済損失が発生する。このため、「タ」国政府の財政状況を鑑みても早急に本プロジェクトの実施が望まれる。

(3) 「タ」国の中長期計画、上位計画との整合性

「タ」国政府は、国家開発戦略として、1997年に「貧困撲滅戦略(NPES：National Poverty Eradication Strategy)」を策定して貧困削減のための枠組みを提示し、1999年には「タンザニア開発ビジョン2025」を発表して開発の方向性(生活の質の向上、グッド・ガバナンスと法の支配の確保、強く競争力のある経済)を提示した。これらの国家開発戦略を基調に、2000年に貧困削減戦略(PRS：Poverty Reduction Strategy)が策定され2005年7月には第2次PRS「成長と貧困削減のための国家戦略(NSGRP：National Strategy for Growth and Reduction of Poverty)」(通称MKUKUTA)、2010年7月には第3次PRS(MKUKUTA II)が策定された。

第3次PRSは、第2次PRS同様、貧困削減と経済成長を目標に掲げた5年間の包括的な政策枠組みである。国のオーナーシップが重視され、結果志向で分野横断的なアプローチを採用し、成長と貧困削減に貢献する3つの要素として「成長と所得貧困の削減」、「生活の質の改善と社会福祉」、「ガバナンスと説明責任(アカウンタビリティ)」が挙げられている。

また、運輸交通セクターの包括的な戦略書である10カ年の投資計画(10 years Transport Sector Investment Programme 2006:TSIP)が2006年に策定され、道路分野は最大の投資分野

とされている。本プロジェクトの目的は、ダルエスサラーム市内の渋滞ポイントの一つであるタザラ交差点の渋滞緩和であり、この結果として期待される渋滞に伴う経済損失の削減および沿道住民の道路交通サービス向上などは「タ」国の最上位計画の目標と合致する。

(4) 我が国の援助方針・政策との整合性

我が国の対タンザニア国別援助計画（2008年6月）と事業展開計画（2010年8月）ではともにインフラ整備を重点分野としており、「国内輸送網の確立支援プログラム」として政策策定・実施支援、幹線道路整備、維持管理を挙げている。運輸・交通セクターに対する支援は、有償資金協力「アルーシャーナマンガーアティ川間道路改良事業」、「道路セクター支援事業」、無償資金協力「キルワ道路拡幅計画」、技術協力「LBT (Labour Based Technology) 研修能力強化プロジェクト」等を実施している。また、開発調査「ダルエスサラーム総合都市交通体系策定調査」が2007年から2008年にかけて実施され、本計画については、最優先で取り組むべき計画の一つとして提言されている。

TICAD IV横浜行動計画において、「広域運輸インフラ」が重要な課題として挙げられ、「国内及び広域経済回廊の整備・拡充」を支援する旨が明記されている。本計画はダルエスサラーム港と国際幹線道路とのアクセスを改善するものであり、TICAD IV横浜行動計画にも対応するものである。

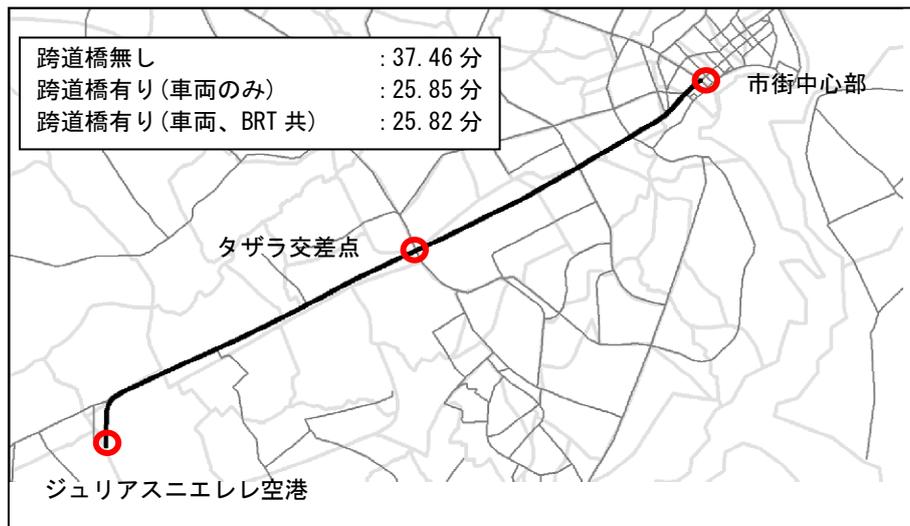
4-4-2 有効性

(1) 定量的効果

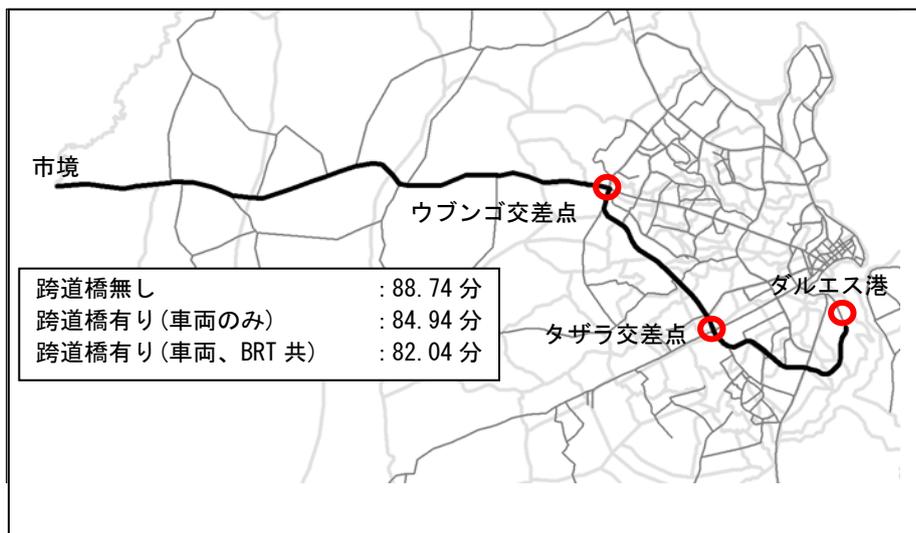
1) 移動時間の短縮

本プロジェクトの実施により、市内移動や広域移動の移動時間が図 4.4.2 に示されるように短縮される。なお、将来の目標値はシミュレーションを用いて計測した結果を用いている。

① 空港からダルエス市内（11km）



② ダルエス港から市境（36km）



出典：JICA 調査団

図 4.4.2 移動時間の短縮

2) 交差点混雑度の緩和

本プロジェクトの実施により、タザラ交差点の混雑度は表 4.4.2 に示されるように緩和される。

表 4.4.2 交差点混雑度

効果指標	跨道橋無し	跨道橋有り (車両、BRT 共)	跨道橋有り (車両のみ)	現況 (2011)
午前ピーク時飽和度	2.35	1.65	1.64	1.040
午後ピーク時飽和度	1.95	1.14	1.12	1.452
平均遅れ時間 (秒/台キロ)	108.8	10.4	29.0	98.0
平均速度 (km/h)	32.6	48.5	44.3	34.2
交差点での平均停止時間 (秒/台キロ)	96.3	6.8	23.4	87.0
平均停止回数 (回/台キロ)	1.7	0.2	0.4	1.3
交差点での平均通過時間 (秒/台キロ)	176.5	76.9	95.4	165.9

出典：調査団による、朝ピーク（7-8時）の観測交通量を用いた1時間シミュレーション結果（BRTを含む全車種平均値）。BRTの運行頻度は5分間隔と想定。

3) 沿道環境効果改善

道路交通の渋滞に伴う大気汚染もダルエスサラーム市の都市交通問題の一つである。本プロジェクトの実施によって走行速度の改善や交差点での待ち時間が短縮され、自動車の排出ガスが削減される。試算では、交差点での信号待ちの間に排出される NOx および CO₂ が本プロジェクトの実施により 2015 年で 12.4 トン/年、1,972 トン/年それぞれ削減されると予測される。

(2) 定性的効果

協力対象事業により期待される定性的な効果を以下に示す。

① 貧困削減効果

比較的低所得世帯が多いタザラ交差点以西のニエレレ道路沿線から、市街地中心部やダルエスサラーム市最大の市場があるカリアコ地区、病院等施設へのアクセス時間の短縮が可能となり、これら低所得層の経済活動の活発化・生活の安定化が見込まれ、結果貧困削減に寄与する。

② 国内・国際物流の円滑化

本プロジェクトの実施によりネルソンマンデラ道路の渋滞が緩和され、ダルエスサラーム港と国内および内陸国への道路貨物輸送の時間短縮が可能となる。結果として、内陸国との物流が活性化される。

③ 交差点内の事故減少

タザラ交差点内、付近で渋滞により発生していた接触事故等が減少し、交通安全の向上が図られる。

④ ダルエスサラーム市企業活動の活性化

本プロジェクトが位置するタザラ交差点は、軽工業を中心とする工業地帯に位置しており、跨道橋が建設されるニエレレ道路沿いには日系企業含む工場や大型の商業施設、公共施設が

存在している。本プロジェクトの実施により、ダルエスサラーム港への材料や製品の輸送コストが減少し、これら沿線企業の商業活動が活性化される。

【資料】

1. 調査団員・氏名	A1-1
2. 調査工程	A2-1
3. 関係者（面会者）リスト	A3-1
4. 討議議事録（M/D）	A4-1
5. 参考資料（「タ」国と交わした Technical Notes）	A5-1
6. その他資料・情報（概略設計図）	A6-1

資料 1. 調査団員・氏名

(1) 現地調査

氏名	担当	所属
芦野 誠	総括	JICA 経済基盤開発部
福沢 大輔	計画管理	JICA 経済基盤開発部 運輸交通・情報通信第二課
今野 啓悟	業務主任／道路計画	(株)オリエンタルコンサルタンツ
小西 知行	橋梁設計 I／上部工	(株)オリエンタルコンサルタンツ
中尾 政徳	橋梁設計 II／下部工	(株)オリエンタルコンサルタンツ
井澤 徹郎	道路設計／盛土工	(株)エイト日本技術開発
宮本 宏一	自然条件調査	(株)エイト日本技術開発
渡辺 幹治	環境社会配慮／社会経済調査	(株)ソーワコンサルタント
澤口 勤	施工・調達計画／積算	(株)オリエンタルコンサルタンツ
有田 禎之	交通流解析（国内解析）	(株)国際開発センター

(2) 中間説明調査

氏名	担当	所属
今野 啓悟	業務主任／道路計画	(株)オリエンタルコンサルタンツ

(3) 準備調査概略説明時

氏名	担当	所属
芦野 誠	総括	JICA 経済基盤開発部
福沢 大輔	計画管理	JICA 経済基盤開発部 運輸交通・情報通信第二課
今野 啓悟	業務主任／道路計画	(株)オリエンタルコンサルタンツ

資料2. 調査行程

(1) 現地調査

日順	日付	総括(JICA)	計画管理(JICA)	業務主任/道路計画	橋梁設計Ⅰ/上部工	橋梁設計Ⅱ/下部工	道路設計/盛土工	自然条件調査	環境社会配慮/社会経済調査	施工・調達計画/積算
		芦野 誠	福沢大輔	今野 啓悟	小西 知行	中尾 政徳	井澤 徹郎	宮本 宏一	渡辺 幹浩	澤口 勲
1	30日 月					成田→ドーハー		成田→ドーバイ		成田→ドーハー
2	31日 火					→ダレスサラム		→ダレスサラム		→ダレスサラム
3	6月 1日 水					9:00~10:00 TANROADS表敬及びIC/R説明、11:00~12:00 建設省表敬及びIC/R説明、14:00~15:00 DART-agency表敬及びIC/R説明				
4	2日 木					サイト調査及び再委託準備				
5	3日 金			ビエンチャン→ハンコク	10:00~11:00 BRT設計コンサルタント会議、再委託契約準備、資料収集	資料収集・整理/技術検討、サイト調査	10:00~11:00 BRT設計コンサルタント会議、再委託契約準備、資料収集	再委託契約準備	10:00~11:00 BRT設計コンサルタント会議、再委託契約準備、資料収集、サイト調査	資料収集・整理/技術検討
6	4日 土			ドーバイ→ダレスサラム						資料整理
7	5日 日		成田							団内会議
8	6日 月	→ダレスサラム、JICA事務所表敬/打合せ	→ダレスサラム、JICA事務所表敬/打合せ	JICA事務所表敬/打合せ	JICA事務所表敬/打合せ		JICA事務所表敬/打合せ	再委託契約		調達・積算基礎資料収集
9	7日 火	10:00~10:40建設省表敬、11:00~12:30TANROADS表敬及び会議、サイト調査					総括と同じ			調達・積算基礎資料収集、サイト調査
10	8日 水	資料整理、14:00~15:00世銀表敬及び会議				資料収集・整理/技術検討、サイト調査	総括と同じ	再委託モニタリング、資料収集・整理/技術検討	資料収集・整理/技術検討、サイト調査	
11	9日 木	9:00~ TANROADSとMD協議及びサイン、14:30~15:30DART表敬及び会議		技術検討、14:30~15:30DART表敬及び会議			業務主任と同じ			調達・積算基礎資料収集、サイト調査
12	10日 金	JICA事務所/大使館表敬・報告、ダレス発		JICA事務所/大使館表敬・報告	資料収集及び技術検討		資料収集及び技術検討			
13	11日 土	→成田		Mkapa橋調査						Mkapa橋調査
14	12日 日									団内会議
15	13日 月									資料収集・整理/技術検討
16	14日 火				技術検討	New Ruvu橋調査、採石場調査	技術検討		New Ruvu橋調査、採石場調査	
17	15日 水				14:00~15:30 ステークホルダー会議	技術検討	14:00~15:30 ステークホルダー会議		資料収集/技術検討	
18	16日 木				資料収集・整理/技術検討、サイト調査		再委託モニタリング	資料収集・整理/技術検討、サイト調査		
19	17日 金				夕国政府関係機関との技術協議/資料収集/技術検討/サイト調査					
20	18日 土									資料整理
21	19日 日									
22	20日 月									
23	21日 火				関係機関との技術協議/資料収集/技術検討/サイト調査	資料収集・整理/技術検討、サイト調査	関係機関との技術協議/資料収集/技術検討/サイト調査	資料収集・整理/技術検討、サイト調査	関係機関との技術協議/資料収集/技術検討/サイト調査	調達・積算基礎資料収集、サイト調査
24	22日 水									
25	23日 木									
26	24日 金									
27	25日 土									
28	26日 日				資料整理		再委託結果整理(交通量)、資料整理		資料整理	
29	27日 月				9:00~ TANROADS及びDARTとの技術会議	9:00~ TANROADS及びDARTとの技術会議、ダレスサラム→	ダレスサラム→	9:00~ TANROADS及びDARTとの技術会議	ダレスサラム→	9:00~ TANROADS及びDARTとの技術会議、ダレスサラム→
30	28日 火				10:00~ テクニカルノート・サイン	ドーハー→成田	ドーハー→成田	10:00~ テクニカルノート・サイン	ドーバイ→成田	ドーバイ→成田
31	29日 水				関係機関との技術協議/資料収集/技術検討			関係機関との技術協議/資料収集/技術検討		
32	30日 木				JICA事務所報告/サイト調査			JICA事務所報告/サイト調査		
33	7月 1日 金				ダレスサラム→			ダレスサラム→		
34	2日 土				ドーバイ→成田			ドーバイ→成田		

(2) 中間説明調査

日程	日付		業務主任/道路計画 今野 啓悟
1	6	日	移動
2	7	月	TANROADS への表敬、概略設計説明
3	8	火	DART への表敬、JICA 訪問
4	9	水	TANTOADS との打合せ
5	10	木	JICA との打合せ、TANROADS との打合せ
6	11	金	関係機関への概略設計説明、移動
7	12	土	移動

(3) 準備調査概略説明時

日程	日付		総括 (JICA) 芦野 誠	計画管理 (JICA) 福沢 大輔	業務主任/道路計画 今野 啓悟	
1	12	10	土			移動
2		11	日	移動	移動	移動
3		12	月	移動、JICA 表敬・説明	移動、JICA 表敬・説明	TANROADS 表敬・説明 JICA 表敬・説明
4		13	火	MOW 表敬・説明 TANROADS 表敬・説明・ミニッツ協議 WB 表敬 DART 表敬・説明	MOW 表敬・説明 TANROADS 表敬・説明・ミニッツ協議 WB 表敬 DART 表敬・説明	MOW 表敬・説明 TANROADS 表敬・説明・ミニッツ協議 WB 表敬 DART 表敬・説明
5		14	水	TANROADS とミニッツ協議 関係機関への概略設計説明	TANROADS とミニッツ協議 関係機関への概略設計説明	TANROADS とミニッツ協議 関係機関への概略設計説明
6		15	木	TANROADS とミニッツ協議、署名 MOW への説明・署名	TANROADS とミニッツ協議、署名 MOW への説明・署名	TANROADS とミニッツ協議、署名 MOW への説明・署名
7		16	金	JICA 事務所への報告 日本大使館への表敬・報告、移動	JICA 事務所への報告 日本大使館への表敬・報告、移動	TANROADS との打合せ 日本大使館への表敬・報告
8		17	土	移動	移動	資料整理
9		18	日			資料整理、移動
10		19	月			移動

資料3. 関係者（面談者）リスト

関係機関名	氏名	役職
建設省（MOW）	Mr. Herbert E. Mrango	Permanent Secretary
	Mr. Alois M. Matei	Assistant Director
	Mr. Fabian Masembo	Principal Engineer
	Ms. Chobya	Senior Engineer
運輸省（MOT）	Mr. D. Kassivele	Principal Officer
タンザニア道路公社 （TANROADS）	Mr. Patrick A.L. Mfugale	Chief Executive
	Mr. Jason Rwiza	Director of Planning
	Mr. Ebenezer R Mollel	Head of Design and Standards
	Mr. Emanuel Msumba	Structural Engineer
	Mr. Kitainda H.	Bridge Engineer
	Mr. Snjo M. Mgeta	Senior Environmentalist
	Mr. Julius K. Luhuro	Environmentalist
ダルエスサラーム市役所(DCC)	Mr. Nyenye S. M.	City Road Engineer
テメケ市役所（Temeke Municipality）	Mr. Ngakuka Uib	Civil Engineer
ダルエスサラーム高速交通公社 （DART）	Mr. Cosmas P.M. Takule	Chief Executive
	Mr. Enoch Kitandu	Director of System & Operations
タザラ鉄道（Tanzania Zambia Railway Authority）	Mr. Richard U. Festa	Regional Civil Engineer
タンザニア鉄道公社（TRL）	Mr. A.H.Hawai	Planning Engineer
タンザニア電気供給会社 （TANESCO）	Mrs.Mercy S.Baregu	Senior Manager Projects
	Mr. A.Zafer Ozgur	Resident Site Engineer
タンザニア上下水道公社（DAWASA）	Mr. G.G.Bhuko	Planner
タンザニア電信電話会社（TTCL）	Ms. Leticia Wamara	Network Engineer
	Mr. Bonaventure Aman	Supervisor Minor Projects
	Mr. Castuly Pulia	Assistant Regional Network manager
世界銀行（WB）	Mr. Yonas Mchomvu	Transport Specialist
	Mr. Negede Lewi	Sr. Highway Engineer
欧州連合（EU）	Mr. B. Kemibaro	Programme Officer
AZAM 食品会社	Mr. Hussein Sufian Ally	Assistant General Manager
BRT Phase II 設計コンサルタント （Kyong Dong Engineering）	Mr. Lee, Seung-won	Deputy General Manager
在タンザニア日本大使館 （Embassy of Japan）	中川 担	特命全権大使
	関 行規	二等書記官
JICA タンザニア事務所 （JICA Tanzania Office）	勝田幸秀	所長
	長谷川 敏久	次長
	丸尾 信	所員
	橋 英輔	所員

MOW: Ministry of Works, MOT: Ministry of Transport, TANROADS: Tanzania National Roads Agency, DCC: Dar es Salaam City Council, DART: Dar es Salaam Rapid Transit, TRL: Tanzania Railway, TANESCO: Tanzania Electric Supply Company Ltd., DAWASA: Dar es Salaam Water & Sewage Company, WB: World Bank, EU: European Union

4. 討議議事録 (M/D)

(1) 現地調査時

**MINUTES OF DISCUSSIONS
ON THE PREPARATORY SURVEY (OUTLINE DESIGN)
ON THE PROJECT FOR IMPROVEMENT OF TAZARA INTERSECTION
IN THE UNITED REPUBLIC OF TANZANIA**

In response to a request from the Government of the United Republic of Tanzania (hereinafter referred to as "Tanzania"), the Government of Japan decided to conduct a Preparatory Survey for Outline Design (hereinafter referred to as "the Survey") on the Project for Improvement of TAZARA Intersection (hereinafter referred to as "the Project"), and entrusted the study to Japan International Cooperation Agency (hereinafter referred to as "JICA").

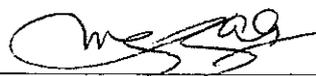
JICA sent the Preparatory Survey Team for Outline Design (hereinafter referred to as "the Team") to Tanzania. The Team is headed by Mr. Makoto ASHINO, Senior Advisor to the Director General, Economic Infrastructure Department, JICA and is scheduled to stay in the country from May 31 to July 1, 2011.

The Team held a series of discussions with the officials of Tanzania and conducted a field survey at the Project area. In the course of the discussions, both sides have confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the Preparatory Survey Report.

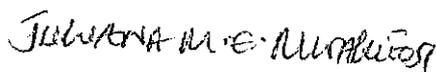
Dar es Salaam, June 9, 2011



Mr. Ashino Makoto
Leader
Preparatory Survey Team
Japan International Cooperation Agency

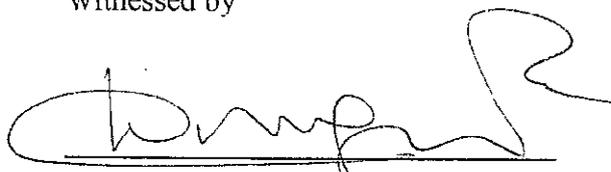


Eng. Patrick A.I., Mfugale
Chief Executive
Tanzania National Roads Agency



Ambassador Herbert E. Mrango
Permanent Secretary
Ministry of Works

Witnessed by



Mr. Ngosha Said Magonya
Commissioner for External Finance
Ministry of Finance

ATTACHMENT

1. Objective of the Project

The objective of the Project is to satisfy the increasing transportation demand and contribute to the reduction of traffic jam, especially in the Central Area of Dar es Salaam City, through the improvement of TAZARA intersection in the Dar es Salaam City in the United Republic of Tanzania.

2. Project Sites

The Project site is located in Dar es Salaam City which is shown in Annex 1.

3. Responsible and Implementing Organizations

The responsible ministry of the Project is the Ministry of Works (hereinafter referred to as "MoW"). The implementing organization of the Project is Tanzania National Roads Agency (hereinafter referred to as "TANROADS"). The organization chart of MoW is under preparation and that of TANROADS is shown in Annex 2.

4. Items requested by the Government of Tanzania

4-1. Components of the Project

The Government of Tanzania requested TAZARA Flyover and the components of the Project are described below.

- Construction of Flyover bridge at the TAZARA intersection along Nyerere Road,
- Construction of approach roads to the Flyover bridge.

4-2. Type of bridge structures

The Tanzanian side expressed that Option 4 would be the best among four options as shown in Annex 3. The Tanzanian side confirmed that any other options would be considered based on the Technical Note in June 2011.

4-3. The Tanzanian side requested that some countermeasures against the traffic jam along Nelson Mandela road near TAZARA Intersection should be taken within the scope of the Project.

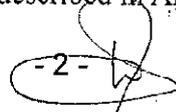
4-4. JICA will assess the appropriateness of the request through the Survey and will report the findings to the Government of Japan. Implementation and components of the Project will be decided by the Government of Japan.

5. Japan's Grant Aid Scheme

5-1. The Tanzanian side has shown a full understanding to the Japan's Grant Aid Scheme explained by the Team, as described in Annex 4 and 5.



- 2 -



5-2. The Tanzanian side will take the necessary measures, as described in Annex 6, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

6. Environmental and Social Considerations

6-1. Both sides confirmed that the Tanzanian side shall conduct the necessary procedure concerning the environmental assessment (including stakeholder meetings, EIA survey etc.) and make EIA report of the Project. The EIA approval shall be received from the responsible authorities and submitted to JICA Tanzania office before March 2012.

6-2. The Tanzanian side agreed to arrange the budget allocation for EIA study, land acquisition, resettlement and compensation for the Project Affected Persons (PAPs) and secure the land before the implementation of the Project.

7. Schedule of the Study

7-1. The Team will proceed with further studies in Tanzania until July 1, 2011.

7-2. JICA will prepare a draft final report in English and dispatch a mission to Tanzania in order to explain its contents around December 2011.

7-3. If the contents of the report is accepted in principle by the Tanzanian side, JICA will complete the final report in English and send it to Tanzania around March 2012.

8. Other Relevant Issues

8-1. The Tanzanian side confirmed that the following undertakings should be taken by the Tanzanian side at the Tanzanian expenses under the Project.

- (1) To provide tax exemption for construction materials and equipment for the Project
- (2) To provide land necessary for the Project including camp yard and temporary construction yard
- (3) To assist on implementation of traffic management plans through law enforcements when required
- (4) To assist on securing sites for borrow pit and disposal area after identification
- (5) To arrange for issuance of license, permission and other necessary procedures from the Project commencement
- (6) To relocate existing utilities within the Project site to designated area or out of the Project site

8-2. The Tanzanian side confirmed that the BRT plan is scheduled to be implemented along Nyerere road.



- 3 - 

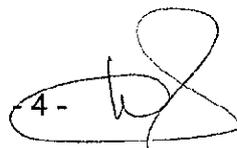
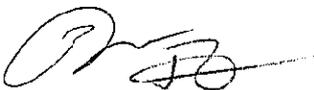


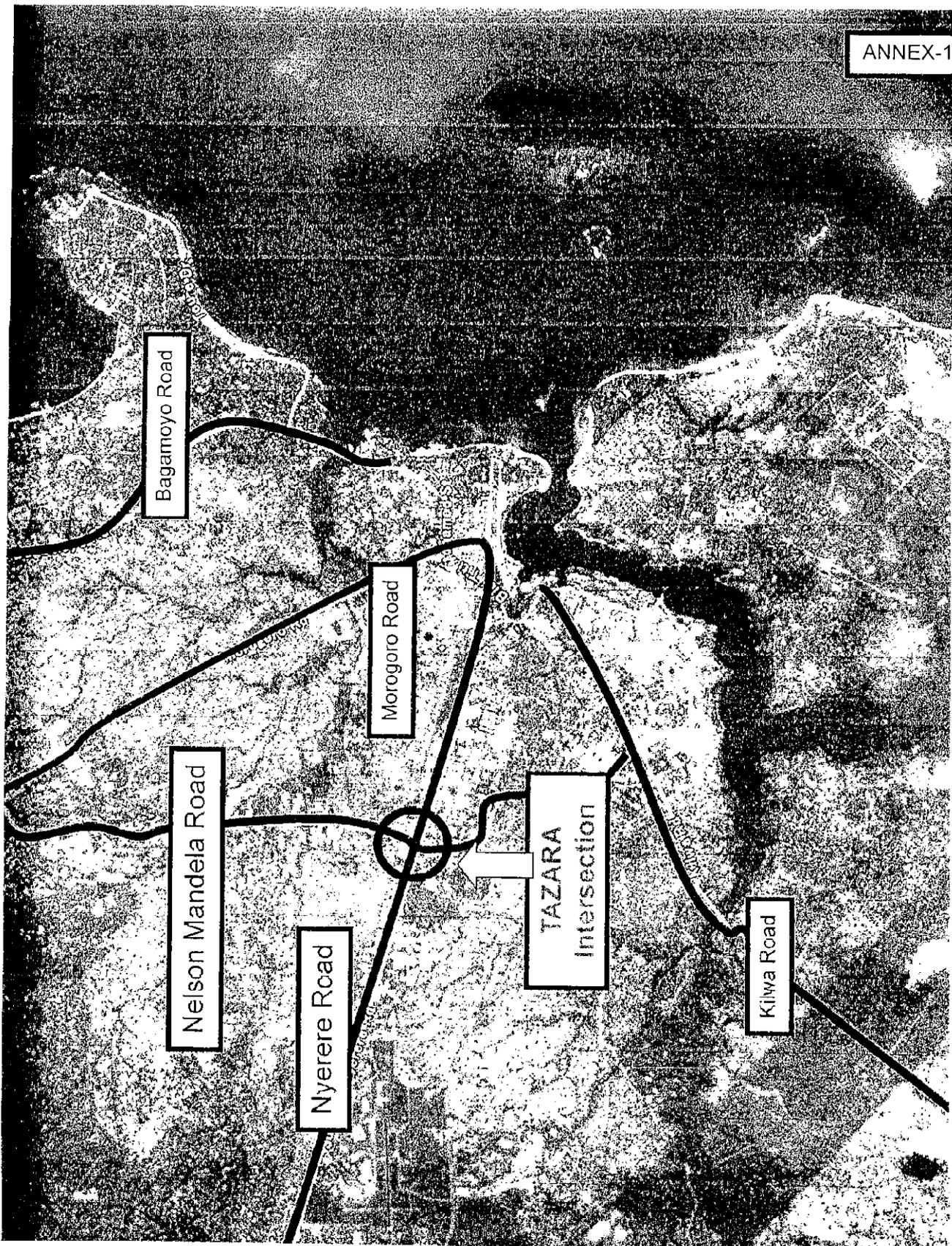
8-3. The Tanzanian side expressed that the BRT truck is expected to be elevated.

8-4. The Tanzanian side expressed their expectation for the early completion of the Project.

8-5. The Tanzanian side shall secure sufficient budget and personnel necessary for the operation and maintenance of the road and bridges constructed by the Project, including the periodical maintenance work after the completion of the Project.

- Annex-1 Project Site
- Annex-2 Organization Chart of TANROADS
- Annex-3 Options for Flyover Bridge type
- Annex-4 Japan's Grant Aid
- Annex-5 Flow Chart of Japan's Grant Aid Procedures
- Annex-6 Major Undertakings to be taken by Each Government



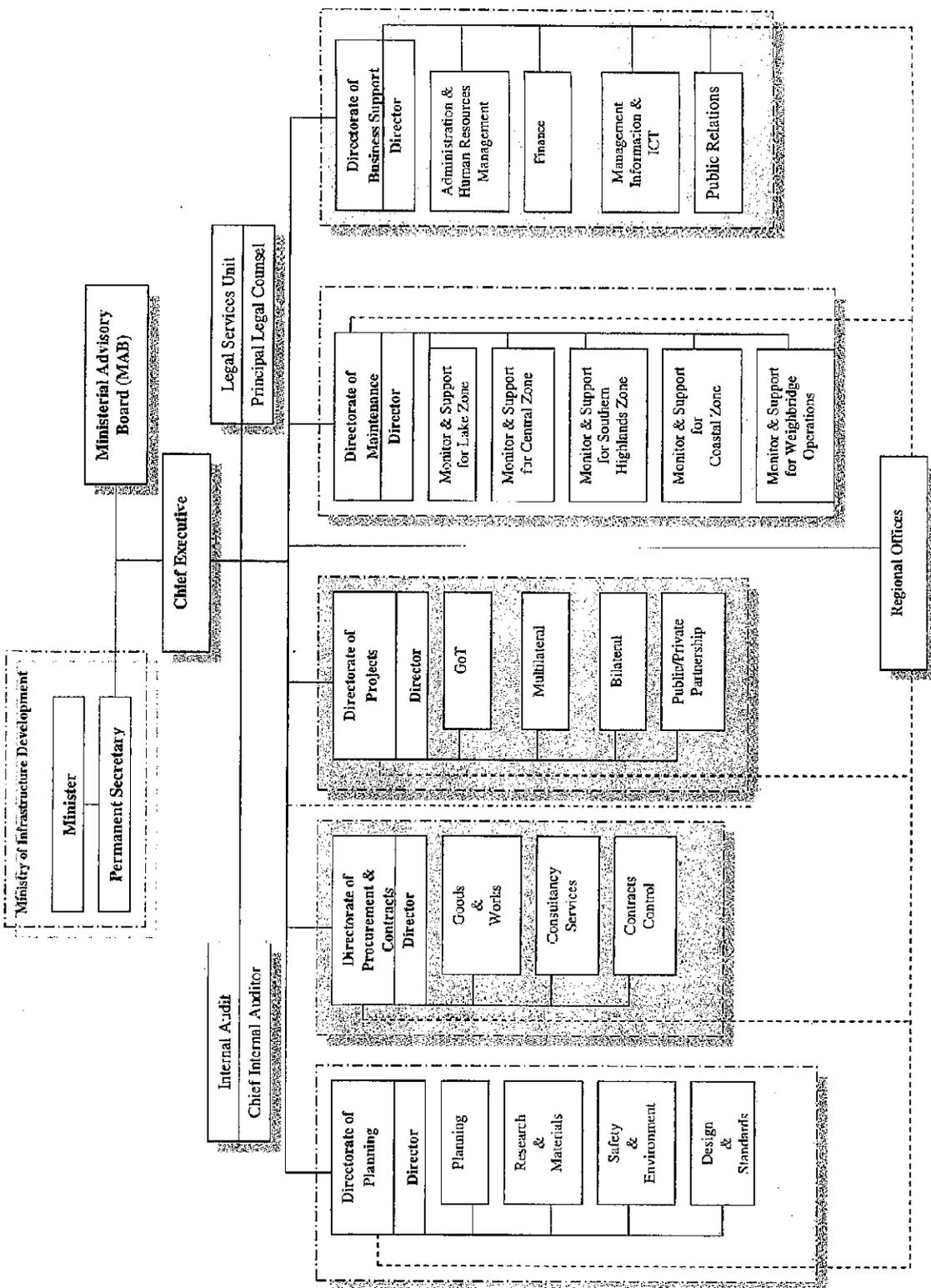


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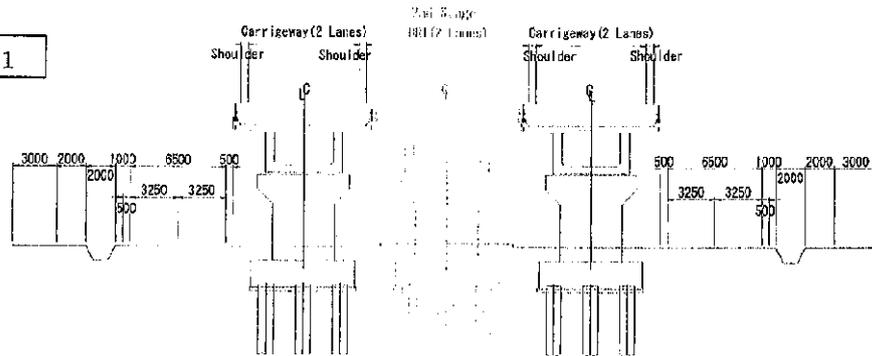
Chart 11

Organization Structure for TANROADS (Headquarters)

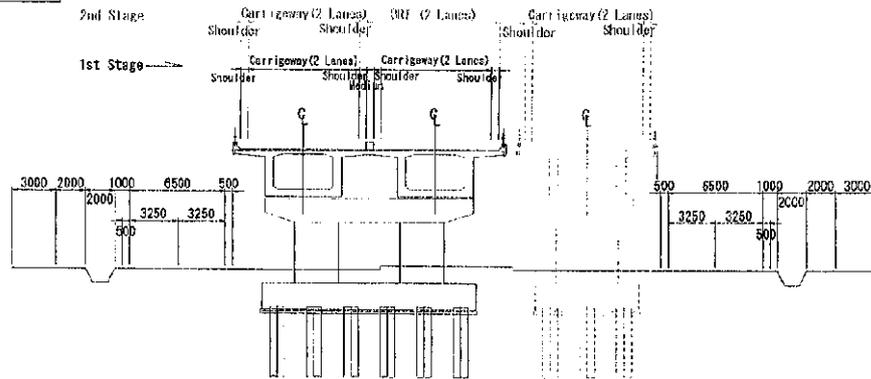


Options for Flyover bridge type

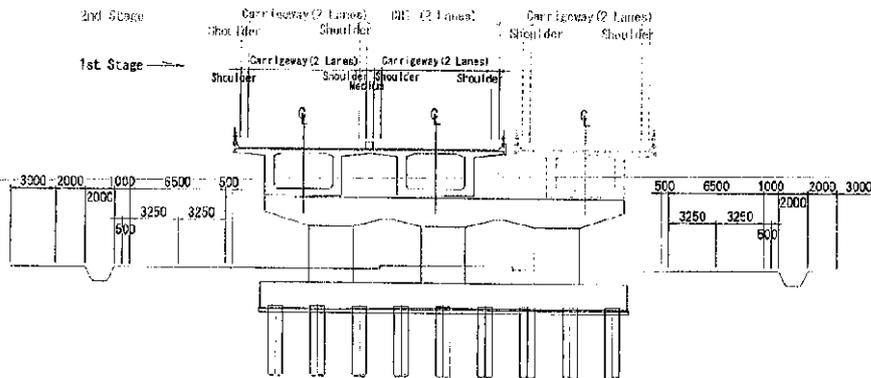
Option 1



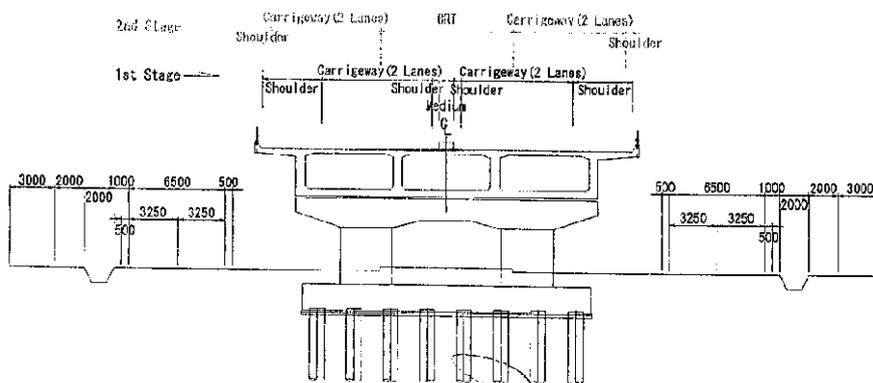
Option 2



Option 3



Option 4



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JAPAN'S GRANT AID

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on this law and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

The Grant Aid is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures :

- Preparatory Survey
 - The Survey conducted by JICA
- Appraisal & Approval
 - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
 - The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
 - Agreement concluded between JICA and a recipient country
- Implementation
 - Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of a outline design of the Project.



- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed based on the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals".



(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

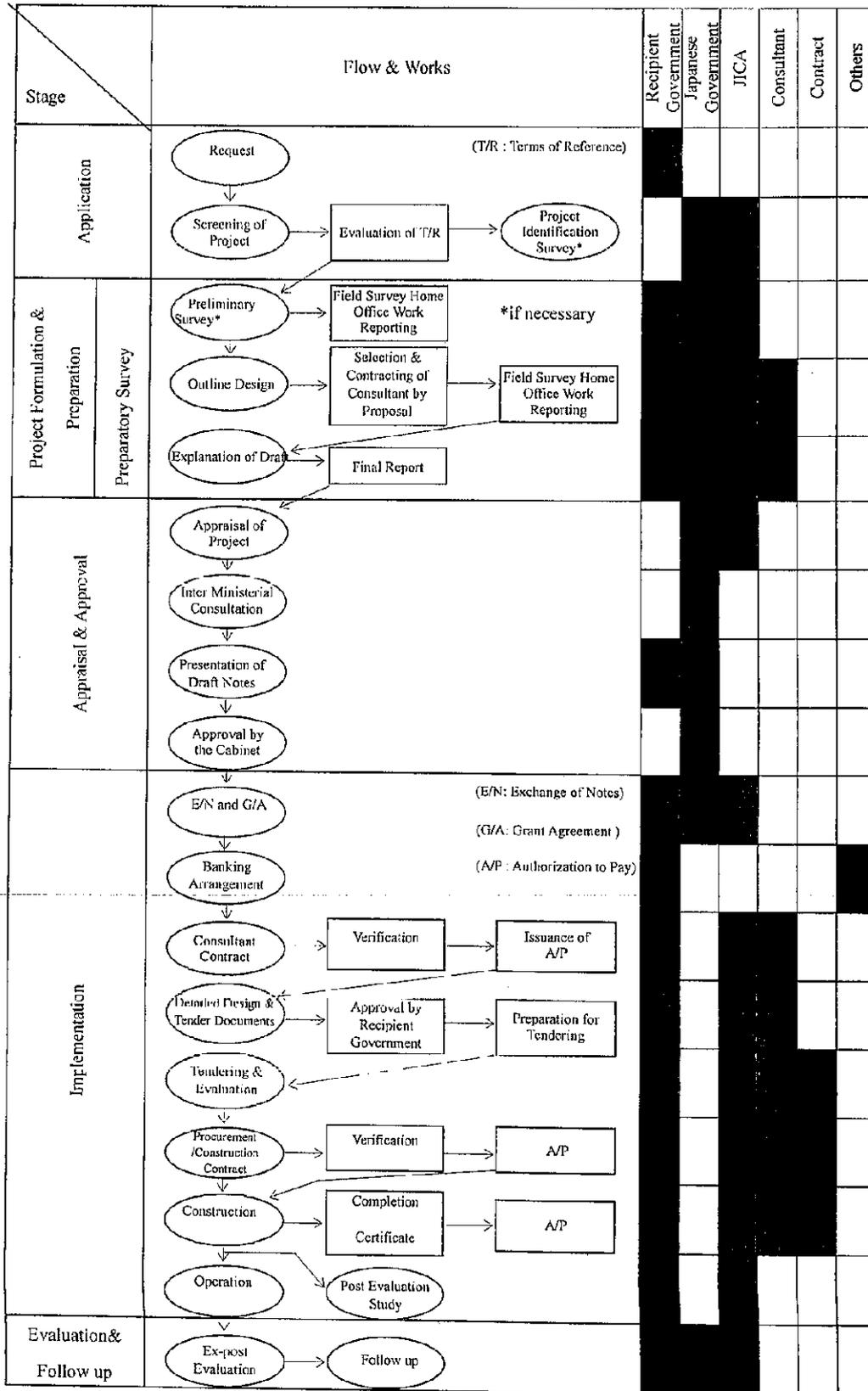
The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

(10) Social and Environmental Considerations

A recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.



FLOW CHART OF JAPAN'S GRANT AID PROCEDURES



Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	to secure land necessary for the implementation of the Project and to clear the site;		●
2	To ensure prompt unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation of the products		
	1) Marine (Air) transportation of the Products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the Products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
3	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services be exempted		●
4	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
5	To ensure that the Facilities are maintained and used properly and effectively for the implementation of the Project		●
6	To bear all the additional expenses, other than those covered by the Grant, necessary for the implementation of the Project		●
7	To bear the following commissions paid to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
8	To give due environmental and social consideration in the implementation of the Project.		●

(B/A : Banking Arrangement, A/P : Authorization to pay)

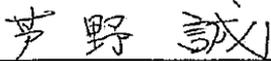
(2) 準備調査概略説明時

**Minutes of Discussions
on the Preparatory Survey
on the Project for Improvement of TAZARA Intersection
in the United Republic of Tanzania**

In June 2011, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team on the Project for Improvement of TAZARA Intersection (hereinafter referred to as "the Project") to the United Republic of Tanzania (hereinafter referred to as "Tanzania"), which through discussions, field surveys and technical examination of the results in Japan, prepared a Draft Final Report of the study.

JICA has therefore sent to Tanzania the Preparatory Survey Team (hereinafter referred to as "the Team") to explain and consult the concerned officials of the Government of Tanzania on the contents of the Draft Final Report. The Team is headed by Mr. Makoto Ashino, Senior Advisor to the Director General, Economic Infrastructure Department, JICA and it has been scheduled that the team will carry out their assignment from 11th to 18th December, 2011. Following the results of the discussions, both sides confirmed the main items described in the attached sheets.

Dar es Salaam, December 15, 2011



Mr. Makoto Ashino
Leader
Preparatory Survey Team
Japan International Cooperation Agency



Eng. Patrick A.L. Mfugale
Chief Executive
Tanzania National Roads Agency



Eng. Dr. John S. Ndunguru
Acting Permanent Secretary
Ministry of Works

Witnessed by



Mr. Ngosha Said Magonya
Commissioner for External Finance
Ministry of Finance



ATTACHMENT

1. Project Component

- 1-1. During the first Preparatory Survey mission in June 2011, the Tanzanian side preferred option four (4) among four options as presented by the Team and therefore requested that six (6) lanes flyover at the TAZARA Intersection should be designed for the following reasons;
- a) There are ongoing preparations for the construction of BRT trunk route along Nyerere road. If the BRT trunk route will be constructed at grade at the TAZARA intersection, then the merits of the flyover will not be realized to the full expectation.
 - b) In case the BRT flyover will be introduced separately at a later stage, there will be delays in the completion of BRT trunk route and the cost of the construction will be higher than if the construction of the same would be done in tandem with current plans of constructing the TAZARA flyover.
 - c) Moreover, separate construction of the BRT flyover will cause inconvenience of traffic disruption and complications for construction activities in the median corridor.
- 1-2. The Team had their opinions that it could be possible to design six (6) lanes flyover, however it is not possible due to the following reasons;
- a) The budget of Japan is constrained due to the force majeure such as the great earthquake in March, 2011.
 - b) At the stage of the Preparatory Survey, the fund for the BRT construction along Nyerere road has not been confirmed and the schedule of BRT implementation plan does not clearly indicate the commencement of the construction activities.
 - c) According to the analysis made by the Team, the separated flyovers will substantially reduce traffic congestion at the TAZARA intersection at the moment.
- 1-3. The Team observed that the optimum component under these circumstances would be two (2) separated flyovers of two (2) lanes each making total of four (4) lanes, which have enough space in between for the future construction of BRT flyover (Option No.1 as specified in the draft final report). In view of the budget constraints for the Government of Japan indicated by the Team, the Tanzanian side has no objection of proceeding with the recommended option by the Team although the Tanzanian side preferred a six (6) lanes flyover. It was agreed that the BRT flyover will be constructed separately upon solicitation of funds by the Government of Tanzania.
- 1-4. After the explanation of the contents of the Draft Final Report by the Team, the Tanzanian side agreed in principle to the project contents.

2. Cost Estimation

Both sides agreed that the Project Cost Estimation as attached in Annex-1 should never be duplicated or disclosed to any third parties before the signing of all the contract(s) with contractor(s) for the Project. The cost to be borne by the Tanzanian side will be updated by the Team upon further review.

3. Japan's Grant Aid Scheme

The Tanzanian side understands the Japan's Grant Aid scheme and the necessary measures to be taken by the recipient country as explained by the Team and described in Annex-4, Annex-5 and Annex-6 of the Minutes of Discussions signed on 9th June 2011. The Tanzanian side also understands that the Preparatory Survey Team is not in the position to guarantee implementation of the Project, this position is the responsibility of the Government of Japan.

4. Schedule of the Study

JICA will complete the final report in accordance with the signed Minutes of Discussions and send it to the Tanzanian side by the middle of April, 2012.

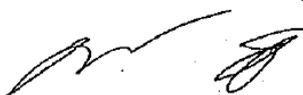
5. Environmental and Social Considerations

- 5-1 The Tanzanian side agreed that they will carryout and complete the EIA (Environmental Impact Assessment) including its certification process.
- 5-2. Both sides agreed to the contents of the Environmental Checklist as shown in Annex-2.
- 5-3. The Tanzanian side agreed that monitoring for Environmental and Social considerations should be conducted by Tanzania National Roads Agency (TANROADS) in accordance with the Monitoring Plan for the Project as described in the Preparatory Survey and EIA reports.
The results of monitoring will be provided to JICA by filling in the Monitoring Form attached as Annex-3, during the pre- construction phase, construction phase, and after completion of the Project.
- 5-4. The Tanzanian side agreed that JICA will disclose monitoring results for Environmental and Social considerations conducted by TANROADS on JICA's website and report them to the Advisory Committee for Environmental and Social Considerations that has been established by JICA.

6. Other Relevant Issues

- 6-1. Both sides confirmed that the following undertakings should be taken by the Tanzanian side at the Tanzanian expenses under the Project.
- (1) To acquire the land for the Project site shown by the Team.
 - (2) Removal/Relocation of existing utilities (power lines and poles/towers, water pipes, telecom lines, etc.) including the underground facilities within the Project site to designated area or out of the Project site.
 - (3) Compensation for the PAPs (Project Affected Persons) which can include landowner of the Project area and long-term street vendors who will be entitled to receive disruption allowance.
 - (4) Securing of the temporary yard for the Project.
 - (5) Securing site for borrowing pit, quarry and disposal area.
 - (6) Necessary assistance on issuance of licenses, permission and other necessary procedures for the commencement of the Project.
 - (7) Necessary assistance for tax exemption and custom clearance for project related equipment, materials and facilities including timely issuance of Government Notice (GN).
- 6-2. The Tanzanian side agreed that the completion of relocation and compensation of all utilities and PAPs is a condition for commencement of the procurement process for the Contractor. The schedule of the commencement of construction and implementation program will be informed by the Government of Japan in case the Project is accepted as a Grant Aid.
- 6-3. The Tanzanian side expressed their expectation for the early commencement and completion of the Project.
- 6-4. The maximum sag level of the expected power line for TANESCO project along Nelson Mandela road which is financed by World Bank should be changed to 15.5m from the ground level instead of 18m as it was indicated in the draft final report.
- 6-5. The costs for utilities to be relocated and project land acquisition from Tazara station and TANESCO areas will be concluded after the necessary consultations with the owners of utilities and land and will be updated in the final report by the Team. In order to update the costs of relocation of utilities and land acquisition, the Team will immediately request such relevant information to the Tanzanian side and the Tanzanian side agreed to provide that information by 15th January 2012.
- 6-6. The Tanzanian side will give additional comments if any about the draft final report to JICA Tanzania office by 15th January 2012. The Team will examine them and may reflect on the final report.

Annex-1 Project Cost Estimation
Annex-2 Environmental Checklist
Annex-3 Monitoring Form



Environmental Checklist: 7. Roads (1)

Annex 2

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) N (b) N (c) N (d) N	(a) The EIA report is preparing and will be submitted to National Environment Management Council (environmental management authority). (b)(c) If the amendment of the EIA report is not required, the report will be approved. (d) The other permissions related to environmental management are not required. Existing borrow pit and quarry site will be used.
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) Y (b) Y	(a) Under the EIA report review, the report will be opened to the public in conformity to the regulation. (b) The interview survey to the local people and stakeholder meeting with the other relevant organizations was conducted at the preparatory study (II) in June 2011. The results were reflected in the design policy and mitigation measures for traffic control, street vendors and so on during
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	(a) Several alternative plans compared direction and structure of flyover bridge have been examined with social and environmental considerations at the preparatory study (I) in July 2010 and the preparatory study (II) in June 2011.
2 Pollution Control	(1) Air Quality	(a) Is there a possibility that air pollutants emitted from the project related sources, such as vehicles traffic will affect ambient air quality? Does ambient air quality comply with the country's air quality standards? Are any mitigating measures taken? (b) Where industrial areas already exist near the route, is there a possibility that the project will make air pollution worse?	(a) - (b) -	(a)(b) Because the project site is located in industrial area, considerable air pollution is feared. However, continuous monitoring of the air quality is not conducted. It is unknown whether the air quality exceeds the environmental standards or not. In the future, total amount of air pollutant caused by vehicle exhaust gas will increase. However, because of improved traffic efficiency, the amount may be reduced compared to without project.
	(2) Water Quality	(a) Is there a possibility that soil runoff from the bare lands resulting from earthmoving activities, such as cutting and filling will cause water quality degradation in downstream water areas? (b) Is there a possibility that surface runoff from roads will contaminate water sources, such as groundwater? (c) Do effluents from various facilities, such as parking areas/service areas comply with the country's effluent standards and ambient water quality standards? Is there a possibility that the effluents will cause areas not to comply with the country's ambient water quality standards?	(a) N (b) N (c) N	(a) Turbid water will generate in the construction works. The turbid water is dispose into existing drainage ditches along the roadside. There are no intake facilities in and down the site. (b) Because drainage facilities have been constructed along the road, impact on water resources of runoff from road surface will not occur. (c) Development of parking or service areas which generate waste water in operation phase are not included in the project.
	(3) Wastes	(a) Are wastes generated from the project facilities, such as parking areas/service areas, properly treated and disposed of in accordance with the country's regulations?	(a) N	(a) Development of parking or service areas are not included in the project.

Environmental Checklist: 7. Roads (2)

Annex 2

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
3 Natural Environment	(4) Noise and Vibration	(a) Do noise and vibrations from the vehicle and train traffic comply with the country's standards?	(a) N	(a) The night noise level on the borderline of the right of way may exceed the environmental standards at present. However, because the project site is located in industrial area, the impact on general population will not be serious. In the future, noise level caused by vehicle driving will increase. However, because F/O bridge will be installed in central part of the right of way, the level on road side may be reduced compared to without project.
	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) There are no protected areas in and around the site.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (d) Are adequate protection measures taken to prevent impacts, such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock? (e) Is there a possibility that installation of roads will cause impacts, such as destruction of forest, poaching, desertification, reduction in wetland areas, and disturbance of ecosystems due to introduction of exotic (non-native invasive) species and pests? Are adequate measures for preventing such impacts considered? (f) In cases the project site is located at undeveloped areas, is there a possibility that the new development will result in extensive loss of natural environments?	(a) N (b) N (c) N (d) N (e) N (f) N	(a) There are no ecological valuable habitats in and around the site. (b) The habitats of endangered species have not been identified in and down the site. (c) Significant ecological impact will not occur. (d) Wild animals migrating through the site have not been identified. (e)(f) The project will not cause destruction of forest and poaching because of bridge construction works along existing road in urban area.
	(3) Hydrology	(a) Is there a possibility that alteration of topographic features and installation of structures, such as tunnels will adversely affect surface water and groundwater flows? (b) Is there any soft ground on the route that may cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides, where needed? (c) Is there a possibility that civil works, such as cutting and filling will cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides? (d) Is there a possibility that soil runoff will result from cut and fill areas, waste soil disposal sites, and borrow sites? Are adequate measures taken to prevent soil runoff?	(a) N (b) N (c) N	(a) Alteration of topographic features and tunnel construction are not included in the project. (a)(b) Small-scale filling works are included in the construction. However, there are no steep slope areas to occur slope failures or landslides in and around the site. (c) Adequate filling works prevent accidental and sufficient soil runoff.
	(4) Topography and Geology			

Environmental Checklist: 7. Roads (3)

Annex2

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(1) Resettlement	<p>(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?</p> <p>(b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement?</p> <p>(c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?</p> <p>(d) Are the compensations going to be paid prior to the resettlement?</p> <p>(e) Are the compensation policies prepared in document?</p> <p>(f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?</p> <p>(g) Are agreements with the affected people obtained prior to resettlement?</p> <p>(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?</p> <p>(i) Are any plans developed to monitor the impacts of resettlement?</p> <p>(j) Is the grievance redress mechanism established?</p>	<p>(a) N</p> <p>(b) N</p> <p>(c) N</p> <p>(d) N</p> <p>(e) N</p> <p>(f) N</p> <p>(g) N</p> <p>(h) N</p> <p>(i) N</p> <p>(j) N</p>	<p>(a)(b)(c)(d)(e)(f)(g)(h)(i)(j) Land acquisition of small area will be required. However, involuntary resettlement will not be caused by the project.</p>
	(2) Living and Livelihood	<p>(a) Where roads are newly installed, is there a possibility that the project will affect the existing means of transportation and the associated workers? Is there a possibility that the project will cause significant impacts, such as extensive alteration of existing land uses, changes in sources of livelihood, or unemployment? Are adequate measures considered for preventing these impacts?</p> <p>(b) Is there any possibility that the project will adversely affect the living conditions of the inhabitants other than the target population? Are adequate measures considered to reduce the impacts, if necessary?</p> <p>(c) Is there any possibility that diseases, including infectious diseases, such as HIV will be brought due to immigration of workers associated with the project? Are adequate considerations given to public health, if necessary?</p> <p>(d) Is there any possibility that the project will adversely affect road traffic in the surrounding areas (e.g., increase of traffic congestion and traffic accidents)?</p> <p>(e) Is there any possibility that roads will impede the movement of inhabitants?</p> <p>(f) Is there any possibility that structures associated with roads (such as bridges) will cause a sun shading and radio interference?</p>	<p>(a) N</p> <p>(b) N</p> <p>(c) N</p> <p>(d) N</p> <p>(e) N</p> <p>(f) N</p>	<p>(a)(b)(c)(d)(e) The project will not cause significant changes and impacts on the livelihood of the local people and road traffic in operation phase because of flyover bridge construction along existing arterial road in urban area. However, traffic congestion and control, and relocation of bus stops will be inevitable. Street vendors around junction will be able to continue their business after completion of flyover bridge.</p> <p>(f) Because the distance between F/O bridge 6 m high and road side is 15 m and there are no residents around the project site, impact on sun shading and radio interference will not occur.</p>

Environmental Checklist: 7. Roads (4)

Annex 2

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) Tazara railway station has historical value. However, impact on the station will not occur.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) There are no valuable landscape sites in and around the project sites.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources to be respected?	(a) N (b) N	(a)(b) The project site is not area where ethnic minorities and indigenous people having unique culture and lifestyle are living.
	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures being taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?	(a) Y (b) Y (c) Y (d) Y	(a) Construction works will comply with the laws and ordinances associated with the working conditions. (b) Because construction works on higher ground are included, tangible safety considerations to prevent labor accidents will be involved in the project. (c)(d) Because the construction works are conducted along existing arterial road in urban area, health program and safety training to construction workers, and considerations to local residents will be included in the environmental management plan.
	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?	(a) Y (b) Y (c) Y	(a) The adequate mitigation measures and monitoring plans to reduce impacts of pollution during the construction will be prepared. (b) The construction activities will not adversely affect the natural environment. (c) Because the construction works are conducted along existing arterial road in urban area, countermeasures against traffic jam will be included in the execution scheme.
5 Others				

Environmental Checklist: 7. Roads (5)

Annex2

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(a) Y (b) Y (c) Y (d) Y	(a) The monitoring plans mentioned in the EIA report will be implemented during the construction and operation phase. (b)(c)(d) Because the EIA report is in progress, the specific monitoring plans have not been prepared yet. JICA study team has submitted the draft monitoring plan to TANROADS.
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation). (b) Where necessary, pertinent items described in the Power Transmission and Distribution Lines checklist should also be checked (e.g., projects including installation of power transmission lines and/or electric distribution facilities).	(a) N (b) N	(a) Deforestation is not included in the project. (b) Relocation of existing power transmission lines will be limited in the right of way and has no serious environmental impacts.
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed, if necessary (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a) N	(a) Impacts to transboundary or global environmental issues will not occur.

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.

in cases where local environmental regulations are required to be made.

2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which it is located.

MONITORING FORM (Draft)

Environmental Item	Responsible Person and Organization	Item	Location	Method	Frequency	Monitoring Results
Construction phase						
Air quality	- Supervision consultant - Construction contractor	Dust	Around construction site	Visual observation and interview to pedestrians	Visual observation : Daily Interview: Monthly or as needed	
Noise and vibration	- Supervision consultant - Construction contractor	Noise and vibration caused by construction works	Around construction site, especially Dar Group Hospital	Interview to persons concerned hospital and pedestrians	Weekly or as needed	
Ground water quality and quantity	- Supervision consultant - Construction contractor	Oil, quantity etc.	Wells in Azam factory	Interview to persons concerned factory	Weekly or as needed	
Waste	- Supervision consultant - Construction contractor	Disposal methods of construction waste	Construction site and disposal site	Visual observation and meeting with contractor	Visual observation : Daily Meeting: Monthly or as needed	
Road side tree felling	- Supervision consultant - Construction contractor	Status of needless tree felling	Construction site	Visual observation and meeting with contractor	Visual observation : Daily Meeting: Monthly or as needed	
Accident	- Supervision consultant - Construction contractor	Effect of accident prevention measures	Construction site	Visual observation, and interview to pedestrians and construction workers	Visual observation : Daily Interview: Monthly or as needed	
Commercial activity near junction	- Supervision consultant - Construction contractor - Ward office - TANROADS	Status of street vendors	Construction site	Visual observation and interview to street vendors	Visual observation : Daily Interview: Monthly or as needed	
Operation phase						
Noise and vibration	- TANROADS	Noise and vibration caused by vehicular traffic	Dar Group Hospital	Measurement by noise level meter and interview to persons concerned hospital	Yearly	
Traffic management	- TANROADS	Status of vehicular traffic	Around Tazara junction	Interview to road users and record of traffic accident	2~6 times during the first year after completion	
Commercial activity near junction	- Ward office - TANROADS	Status of street vendors	Around Tazara junction	Interview to street vendors	2~6 times during the first year after completion	

TECHNICAL NOTES

JICA Survey Team for the Preparatory Survey for TAZARA Intersection Improvement Project (the Survey Team) and the representative of the TANZANIA NATIONAL ROADS AGENCY (TANROADS) which is the responsible and implementing organization for aforesaid project have agreed upon the items described in the attached Technical Notes. Based on these Technical Notes, the Survey Team will carry out the outline design for the Project including the project cost estimate through analysis of the field survey findings and discussions with concerned authorities in Japan.

The results of the analysis and the outline design will be presented and explained in December, 2011.

June 28, 2011

Dar es Salaam



Eng. Patrick A.L. Mfugale

Chief Executive,
Tanzania National Roads Agency
(TANROADS)



Mr. Keigo KONNO

Chief Consultant,
JICA Survey Team

1. Flyover Direction

Tanzania and Japan sides confirm and agree that a flyover shall be planned and designed along the Nyerere Road at TAZARA intersection.

2. Application of Design Guideline

Reference shall be made to following manuals and specification for the outline design requirements of bridge and road:

2.1 Bridge Design

- Draft Code of Practice for the Design of Road Bridges and Culverts Reprinted July 2001, SATCC
- Specifications for Highway Bridges (Part I – V), Japan Road Association

2.2 Highway Design

(1) Geometrical Design

- Draft Road Manual 1989 Edition with its Revisions, Ministry of Communications and Works, the United Republic of Tanzania
- Draft Code of Practice for the Geometric Design of Trunk Road, Reprinted July 2001, SATCC
- A Policy on Geometric Design of Highway and Streets 2001, AASHTO
- Road Structure Ordinance, Japan Road Association

(2) Pavement Design

- Pavement and Material Design Manual 1999, Ministry of Works, the United Republic of Tanzania
- Draft Code of Practice for Design of Road Pavements, Reprinted July 2001, SATCC
- AASHTO Guide for Design Pavement Structures 1993

(3) Intersection Design

- At Grade Intersection Plan and Design Manual, Japan Society Traffic Engineers

(4) Traffic Safety

- A Guide to Traffic Signing 2009, Ministry of Infrastructure Development, the United Republic of Tanzania

2.3 Construction Method/Material Specification

- Standard Specification for Road Works 2000, Ministry of Works, the United Republic of Tanzania

3. Improvement Options

Four (4) improvement options are proposed by the Survey Team and these options are evaluated from engineering view points by the team as well. The result of the evaluations is shown in the Annex-1.

Tanzania side strongly recommends the Option 4 while the Survey Team recommends the Option 1 as optimum.



4. Bridge Structure Material

Followed to analysis in JICA's Master Plan and a consideration of easy maintenance, Tanzania side prefers concrete as the bridge material.

5. Pavement Design Life

Pavement design life shall be recommended as 20 years.

6. Design Parameters

The design parameters to be applied are shown in Table 1.

Table 1 Design Parameters

Parameters	Unit	Design	Remarks
1. Bridge Design			
Live Load		NA and NB (45 units)	STACC
Horizontal Seismic Coefficient		0.05	LOADS FOR STRUCTURAL DESIGN, Building Research Unit (BRU)
Vertical Clearance under F/O	M	5.5	New Draft Road Manual
Temporary Vertical Clearance during Erection	M	5.0	New Draft Road Manual
Maximum Grade	%	4.0	
Min. Reserve for BRT	M	7.0	
Width of Median (Min.)	M	2.0	
Width of Shoulder (Min.)	M	0.5	
Additional Lane Width	M	Not Applied*1	Draft Road Manual
Public Utility Duct		Four(4) ducts to be considered	Add on the Bridge
2. Road Design			
Design Speed	km/hr	60	Draft Road Manual
Design Vehicle		Semi Trailer combination large W=2.6, L=16.7 H=4.1	
Lane Width	M	3.25	Draft Road Manual
Shoulder Width	M	1.5	Draft Road Manual
Reserve for BRT	M	9.0-12.0	
Min. Stopping Sight Distance	M	75	Draft Road Manual
Min. Horizontal Curve Radius	M	135	Draft Road Manual
Min. R of Curve omitting Transition	M	500	Draft Road Manual
Max. Gradient (Fat)	%	5	Draft Road Manual
Max. Super-elevation	%	8	Draft Road Manual
Crest Vertical Curve Stopping	Kmin	16	Draft Road Manual
Sag Vertical Curve Stopping	Kmin	16	Draft Road Manual
Normal Cross-fall	%	2.5	Draft Road Manual
Shoulder Cross-fall	%	2.5	Draft Road Manual
Walkway Width	M	2.0	For Pedestrian
Service Road Width	M	3.0	Followed to the Mandela Rd. Case

*1 Draft Design Manual suggested that 1.0m additional width for 6.5m (Normal Truck Road Lane Width) shall be provided. However, this provision results in creation of bottle neck at its approach. It is, thus, not recommended for the bridges which aim to bring smooth traffic flow.

7. Accessories

7.1 Signal

New Signal system at TAZARA intersection shall be introduced and installed under the Japan's Grant Aid and synchronization with signal at Buguruni Intersection shall also be considered in the outline design.

7.2 Street Light

Tanzanian side strongly requests the provisions of street lights on Flyover Bridge as well as its approach section under the Japan's Grant Aid since there are existing street lights along the Nyerere Road.

8. Environmental Considerations

8.1 EIA Study Schedule

The Tanzania side confirms the EIA Study Schedule as follows,

Table 2 Tentative Schedule of EIA

Year	2011								2012				
	Month	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
JICA Preparatory Survey		■		▲ Selecti on of F/O Options				▲ Draft Final Report		▲ Final Report			
EIA Procedure													
Preparation & submission of project brief, Selection of EIA consultant and Screening				■	■	■							
Preparation & submission of scoping and TOR, and Approval by NEMC						■	■						
EIA study and Holding of public meetings							■	▲					
Submission to NEMC & review of EIS							▲ Submission		■	■	■		
Issue of environmental certificate											▲		

8.2 Policy Framework for Property Affected People (PAP) and Entitlements

Table 3 Table of Entitlements per Category of PAP

PAP Category	Entitlements through Valuers	Entitlements through Complementary Compensation
Authorized non-transient street vendors	Disturbance allowance	Relocation assistance Moving assistance
Other street vendors (daily transient vendors)	-	Relocation assistance

Relocation assistance for informal users of the right of way

There are several types of informal users of the right of way. This includes taxi spots, daladala parking areas, construction truck waiting areas, as well as non-transient street vendors. Relocation assistance will be provided for PAP that are not eligible for disturbance allowance. All these types of PAPs will be assisted through indication of alternative locations where they can continue to develop their current activity, as well as with necessary permitting in order to ensure that activities at new locations are conducted in a legally regular manner.

Basic Source: "CONSULTANCY SERVICES FOR THE CONCEPTUAL DESIGN OF A LONG TERM INTEGRATED DAR ES SALAAM BRT SYSTEM AND DETAILED DESIGN FOR THE INITIAL CORRIDOR, RESETTLEMENT POLICY FRAMEWORK"

9. Traffic Survey Results and Analysis

9.1 TAZARA Intersection

As the results of traffic count survey at TAZARA intersection,

- Inflow traffic volume in morning peak has decreased from the last survey by JICA in 2010.
- The share of motorcycle or Bhajaj has increased. On the other hand, buses including Dala dala have decreased.
- Saturation degree (an index of traffic congestion) at TAZARA intersection has improved in a.m. peak because of decrease of inflow traffic volume during survey period, however, more congested in p.m. peak because of increase of right turn heavy traffic namely, daladala and trucks from north of Nelson Mandela road to airport.

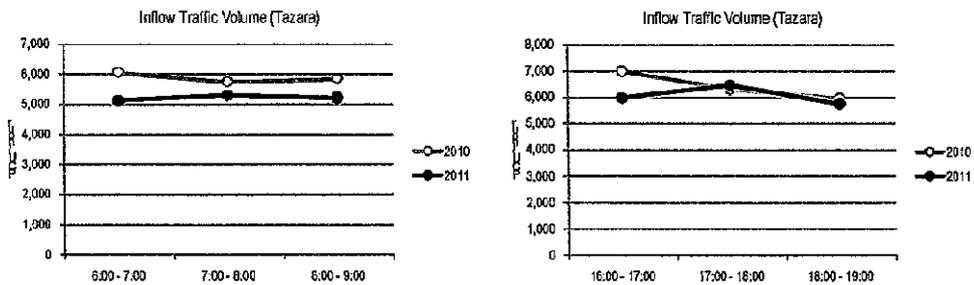


Figure 1 Inflow Traffic Volume at TAZARA Intersection

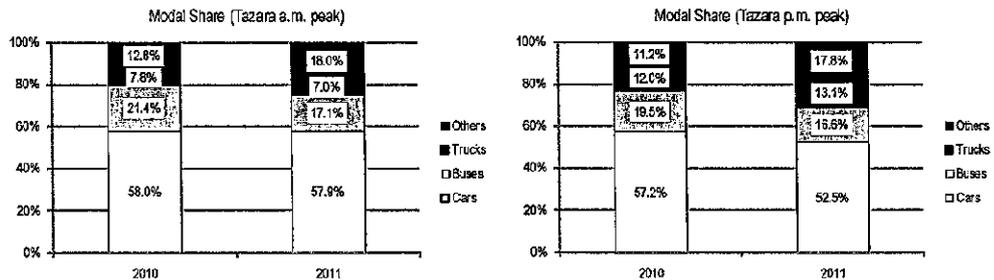


Figure 2 Modal Share of Inflow Traffic Volume at TAZARA Intersection

TECHNICAL NOTES FOR TAZARA INTERSECTION IMPROVEMENT PROJECT, JICA

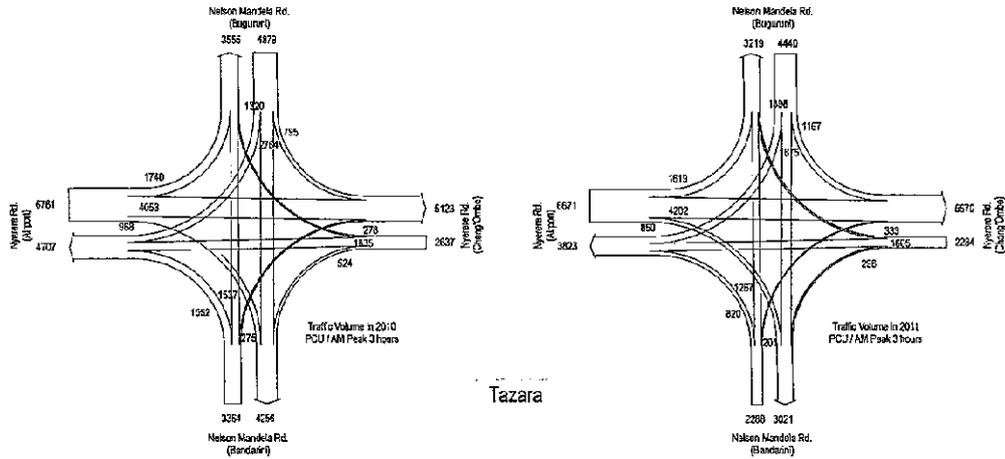


Figure 3 Traffic Volume by Turn Movement at TAZARA intersection (a.m. peak 3 hours)

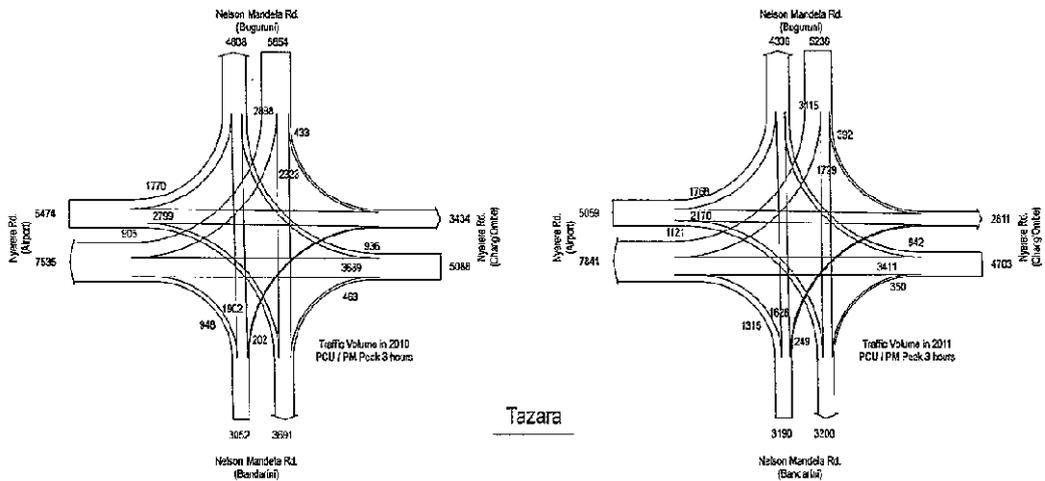


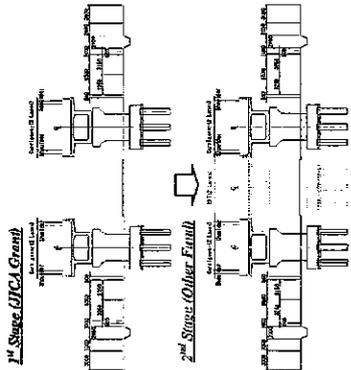
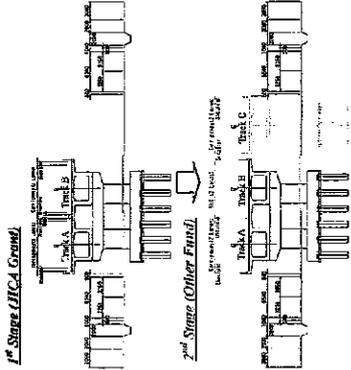
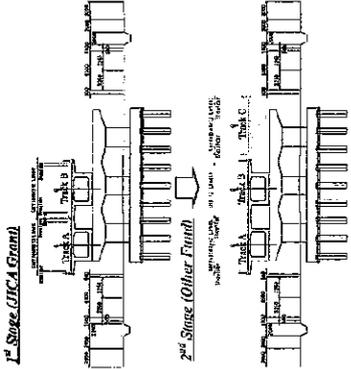
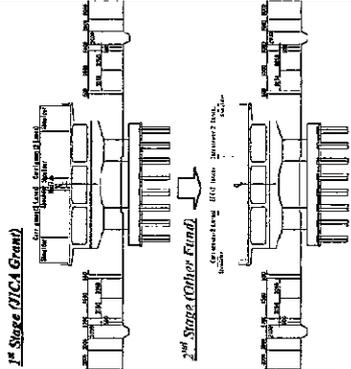
Figure 4 Traffic Volume by Turn Movement at TAZARA intersection (p.m. peak 3 hours)

Table 4 Saturation Degree at TAZARA intersection

		2010	2011
AM Peak	6:00 - 7:00	1.101	0.996
	7:00 - 8:00	1.028	1.040
	8:00 - 9:00	1.066	0.988
PM Peak	16:00 - 17:00	1.749	1.066
	17:00 - 18:00	1.165	1.452
	18:00 - 19:00	1.220	1.414

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B Bridge Type	Option 1	Option 2	Option 3	Option 4
Description of Alternatives	<p>1st Stage: Separated Two (2) bridges (total 4 lanes) shall be constructed for normal through traffic by Japan's Grant Aid.</p> <p>2nd Stage: A bridge is expected to be constructed for BRT (2 lanes) by other donor or Tanzania.</p>	<p>1st Stage: 4 lanes bridge shall be constructed by Japan's Grant Aid and the bridge will be opened for normal through traffic until BRT starts to operate.</p> <p>2nd Stage: A bridge (Track C) is expected to be constructed by other donor or Tanzania, and Track B on the 1st bridge will be converted as BRT track and Track C will be used for normal through traffic after 2nd Bridge opened.</p>	<p>1st Stage: 4 lanes bridge and whole substructure shall be constructed by Japan's Grant Aid and the bridge will be opened for normal through traffic until BRT starts to operate.</p> <p>2nd Stage: Only superstructure (Track C) is expected to be constructed by other donor or Tanzania, and Track B will be converted as BRT track and Track C will be used for normal through traffic after completion of whole bridge.</p>	<p>1st Stage: Whole bridge with enough width shall be constructed by Japan's Grant Aid. It covers normal through traffic and future BRT.</p> <p>2nd Stage: Providing centre 2 lanes for BRT.</p>
Cross Section				
1 Construction Cost Ratio	<p>1st Stage: 1.00</p> <p>2nd Stage: 0.50*</p>	<p>0.95</p> <p>0.55*</p>	<p>1.10</p> <p>0.35</p>	<p>1.25</p> <p>0.00</p>
2 Flexibility to BRT Plan	<p>There is the flexibility to BRT plan (elevated or at grade).</p>	<p>Although BRT can be constructed at grade, BRT and normal traffic will be interaced.</p>	<p>BRT tracks must be elevated (not at grade) since there are piers in centre medium.</p> <p>There is no flexibility to BRT Plan.</p>	<p>BRT tracks must be elevated (not at grade) since there are piers in centre medium.</p> <p>There is no flexibility to BRT Plan.</p>
3 Constructability	<p>For 1st Stage: There is enough space and no difficulty for bridge construction since diversions of current traffic will be provided at outer-sides before bridge construction.</p> <p>For 2nd Stage: It will be possible to construct BRT bridge (9m width) with no difficulty since the distance between separated bridges on 1st stage was kept 12m width.</p>	<p>For 1st Stage: Same as Option 1.</p> <p>For 2nd Stage: There is no difficulty for construction.</p>	<p>For 1st Stage: Same as Option 1.</p> <p>For 2nd Stage: Difficult arrangement will be required at the time of superstructure erection.</p>	<p>For 1st Stage: Same as Option 1.</p> <p>For 2nd Stage: No construction work without lane conversion.</p>
4 Road Alignment	<p>A straight alignment can be designed for entire section.</p>	<p>S (two) curves need to be inserted in approach section for a direction during tentative open to traffic (before BRT comes).</p>	<p>S (two) curves need to be inserted in approach section for a direction during tentative open to traffic (before BRT comes).</p>	<p>A straight alignment can be designed for entire section.</p>
5 Traffic Management	<p>No difficulty for traffic management.</p>	<p>No difficulty for traffic management.</p>	<p>Diversion of existing traffic will be required to keep temporary construction road.</p>	<p>Diversion of existing traffic will be required to keep temporary construction road.</p>
6 Environmental Aspect	<p>Land acquisition in TAZARA station side may be required.</p>	<p>Same as Option 1.</p>	<p>Same as Option 1.</p>	<p>Land acquisition will not be required.</p>
Evaluation	<p>Any BRT design can be accommodated with this alternative.</p> <p>Recommendable</p>	<p>Although any BRT design can be accommodated with this alternative, Road alignment is inferior to Option 1.</p> <p>Not recommendable</p>	<p>There is no flexibility for future BRT Construction. Some items are inferior to other alternatives.</p> <p>Not recommendable</p>	<p>Although there is no flexibility for future BRT Construction, the cost of 2nd stage will be very small.</p> <p>Recommendable</p>

*: When BRT is constructed at grade, this ratio will be 0.00.



6. その他資料・情報（概略設計図）



MINISTRY OF WORKS
TANZANIA NATIONAL ROADS AGENCY (TANROADS)

**THE PREPARATORY SURVEY ON
THE PROJECT FOR IMPROVEMENT OF TAZARA INTERSECTION
IN THE UNITED REPUBLIC OF TANZANIA**

DRAWINGS

DECEMBER 2011



JAPAN INTERNATIONAL COOPERATION AGENCY



ORIENTAL CONSULTANTS CO.,LTD.



EIGHT-JAPAN ENGINEERING CONSULTANTS INC.

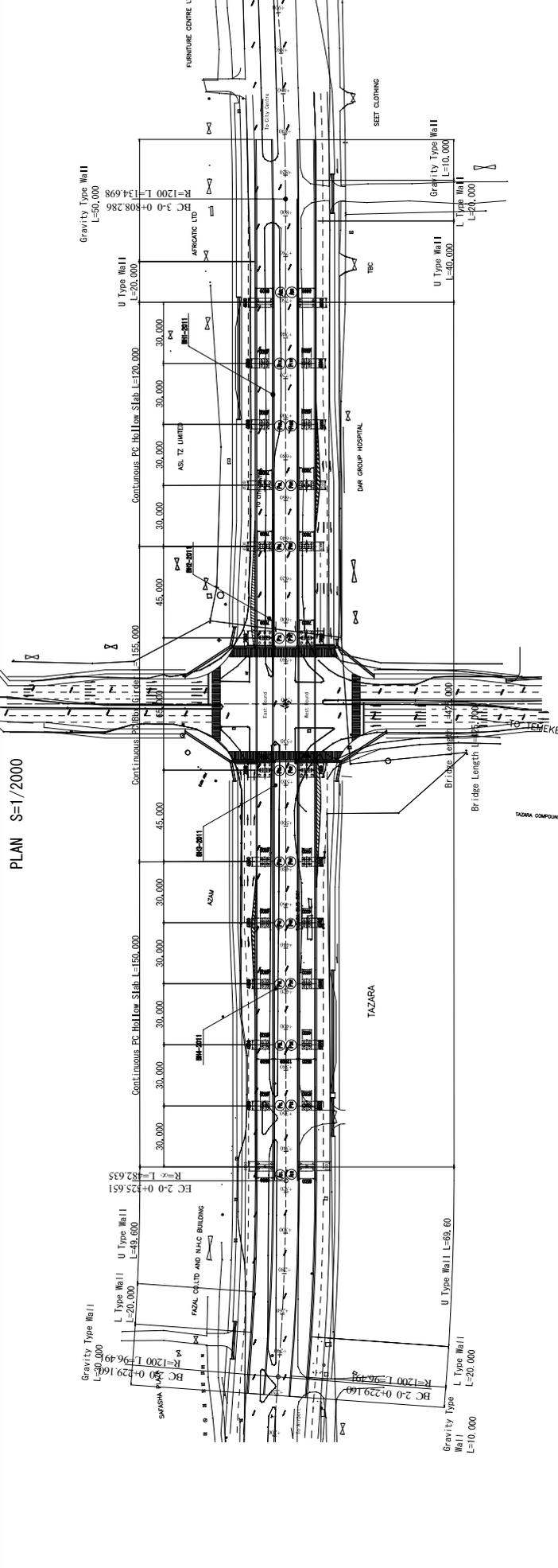
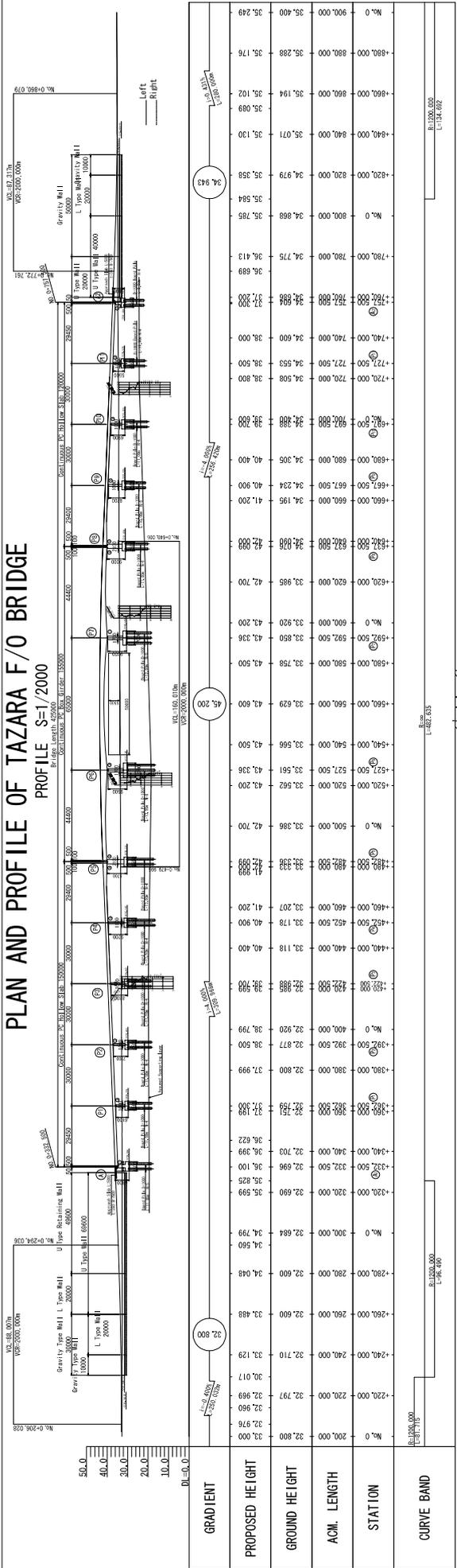


INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.



PLAN AND PROFILE OF TAZARA F/O BRIDGE

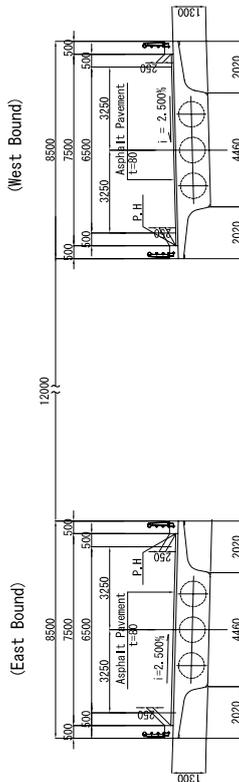
PROFILE S=1/2000



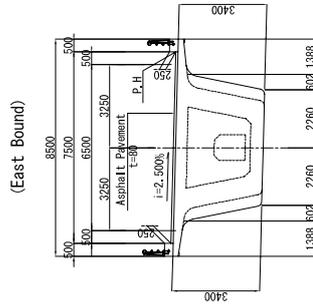
APPROVED:	PROJECT ENGINEER	DESIGNED	DATE	REVISIONS	PROJECT
		Designed		DESCRIPTION	Preparatory Survey on the Project for Improvement of TAZARA Intersection
		Drawn			
		Checked			
		Ref: SMRD			
TANROADS TANZANIA NATIONAL ROADS AGENCY P.O. Box 11364 DAR ES SALAAM		JAPAN INTERNATIONAL COOPERATION AGENCY CONSULTANT Oriental Consultants CO., LTD. Eight-Japan Engineering Consultants Inc., International Development Center of Japan Inc.		DWG TITLE PLAN AND PROFILE OF TAZARA F/O BRIDGE	SCALE As shown
				DATE:	Dwg. No. 1/14
				Rev	Rev

CROSS-SECTION OF TAZARA F/O BRIDGE

SECTION S=1/200
(PC HOLLOW SLAB BRIDGE)



SECTION S=1/200
(PC BOX GIRDER BRIDGE)



DESIGN CRITERIA

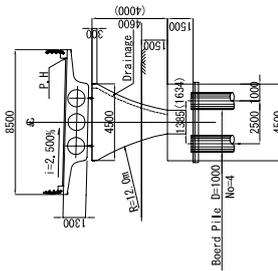
CATEGORY	PRESTRESSED CONCRETE ROAD BRIDGE
TYPE	5 SPAN PC HOLLOW SLAB BRIDGE 3 SPAN PC BOX GIRDER BRIDGE 4 SPAN PC HOLLOW SLAB BRIDGE
TOTAL BRIDGE LENGTH	L=425,000m
BRIDGE LENGTH	5 SPAN PC HOLLOW SLAB: L=150, 0m(630, 0) 3 SPAN PC BOX GIRDER: L=155, 0m(45, 0)+65, 0m(45, 0) 4 SPAN PC HOLLOW SLAB: L=120, 0m(480, 0)
WIDTH	TOTAL: 6,300m (0, 500+0, 500+6, 500+0, 500+0, 500)
LIVE-LOAD	HA and HB(45 UNITS)
SEISM. COEFFICIENT	K=0, 05
ANGLE OF SKEW	90° 00' 00"
RADIUS OF CURVATURE	R=∞
SECTION SLOPE	↑=2, 500%
LONGITUDINAL SLOPE	↑=4, 000%

MATERIALS

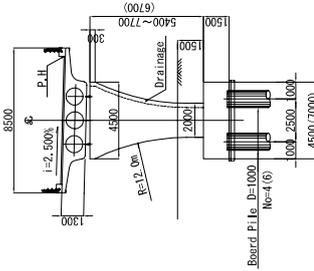
CONCRETE	PC HOLLOW SLAB	σ _{ck} =36, 0N/mm ²
	PC BOX GIRDER	σ _{ck} =36, 0N/mm ²
	SUBSTRUCTURE	σ _{ck} =24N/mm ² - σ _{ck} =30N/mm ²
PC STEEL	PC HOLLOW SLAB	S235, 2 (SMR7BL)
	PC BOX GIRDER	S235, 2 (SMR7BL) S355, 2 (SMR9BL)
DEFORMED BAR	SUPERSTRUCTURE	S4345
	SUBSTRUCTURE	S4345

CROSS SECTION S=1/300

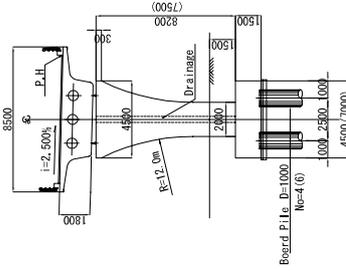
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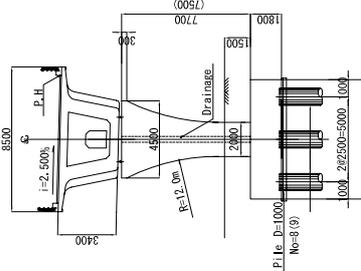
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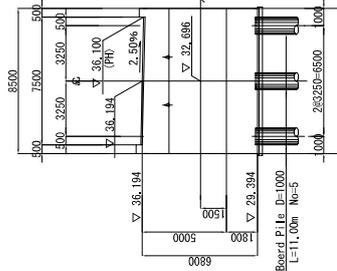
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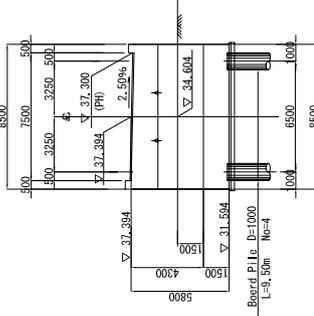
(F9) (F7)



(A1)



(A2)



TANROADS
TANZANIA NATIONAL ROADS AGENCY
P. O. Box 11364
DAR ES SALAM

APPROVED:
PROJECT ENGINEER
CHIEF EXECUTIVE

JAPAN INTERNATIONAL COOPERATION AGENCY
CONSULTANT
Oriental Consultants CO., LTD.
Eight-Japan Engineering Consultants Inc.,
International Development Center of Japan Inc.

Designed
Drawn
Checked
Ref.:SMRD

DATE

REVISIONS
DESCRIPTION

PROJECT
Preparatory Survey on the Project for Improvement of TAZARA Intersection
DWG TITLE
CROSS-SECTION OF TAZARA F/O BRIDGE
SCALE
As shown
DATE:
Dwg. No. 2/14
Rev

